



**NATIONAL HEALTH
LABORATORY SERVICE**



**PROFICIENCY TESTING SCHEMES
PARTICIPANT INSTRUCTIONS**

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A. GENERAL INFORMATION

1. Introduction

Thank you for participating in the National Health Laboratory Service (NHLS) Proficiency Testing Schemes (PTS). We hope that your participation will be beneficial to your laboratory, as well as enjoyable. We would like to welcome any new participants to the Programme. (National Health Laboratory Service Proficiency Testing Schemes)

2. What is a Proficiency Testing Scheme?

A Proficiency Testing Scheme (PTS) is the practice of testing samples of unknown values sent from an external PT scheme. These samples are shipped to a laboratory at various times throughout the year. The samples are analysed within a specified time frame by testing personnel who must treat them like a patient sample. Once the samples have been tested, results are sent to the PTS for evaluation. The evaluated results are sent back to the laboratory in a report that compares the results obtained with the actual results and compares your laboratory to other laboratories using identical or similar methodology. Participation in PTS allows a laboratory to identify procedural problems and take corrective action before patient results are affected. Successful completion of proficiency testing can serve as a benchmark for quality.

(<http://www.cms.gov/CLIA/>), (<http://wwwn.cdc.gov/dls/waivedtests/>)

3. Aim

The NHLS PTS aims to determine the laboratory policy on handling specimens including complete testing and results interpretation. Participants are encouraged to perform testing on all samples. An approach to fulfilling this requirement is to utilise the products and services offered by the NHLS PTS provider.

4. Provider

The NHLS is the sole provider for the proficiency testing schemes. Practice number: 5200296

5. Scope

The NHLS PTS endeavours to assess all aspects of specimen-management, such as turn-around time, accuracy of reports, specimen handling, etc. Rapid turn-around time is an essential element of specimen-management.

B. GENERAL ENROLMENT REQUIREMENTS

Laboratories must enrol on an annual basis. It is mandatory for the NHLS laboratories to enrol on the relevant PTS.

Please take note of below requirements for enrolling for PT Schemes:

Follow the link <https://webpts.nhls.ac.za/login> to enrol.

1. First time enrolment with NHLS PT schemes.

- The Signed Credit Agreement
- Valid Company Registration Document

For the Credit Agreement the following documents **must** be submitted:

- Bank letter not older than 3 months when applying
- Valid Company Registration Document
- Company Letterhead
- Valid Tax Clearance Certificate – South African applicants only.

2. Applicants previously registered on NHLS PT schemes.

The following documentation **must** be submitted:

- Valid Tax Clearance Certificate – South African applicants only
- Bank Letter not older than 3 months – all applicants

3. Payment

The NHLS Finance department will issue a tax invoice; it will be available on the enrolment system to make payment.

4. Enrolment Certificates

The NHLS processes each participant's enrolment and generates an invoice that is sent to participants. For private participants once the invoice is paid in full the enrolment certificate will be available on the system. For non-private participant's certificates are available after enrolments. Table 1 below shows the description of private and non - private laboratories

Table1: Laboratory Categories

| CATEGORY | DESCRIPTION |
|-------------|---|
| Private | Non NHLS laboratories |
| Non Private | NHLS laboratories and Funded facilities |

5. Cancellations/Refunds

Cancellations, refunds and/or adjustments after enrolments and orders been processed will be handled on a case by case basis. All requests must be submitted in writing to ptsadmin@nhls.ac.za.

6. Changes to existing PT scheme enrolments

All correspondence relating to changes regarding participation to PTS must be forwarded to, ptsadmin@nhls.ac.za, at the NHLS Quality Assurance Department no later than four weeks prior to the scheduled sample shipping date.

7. Confidentiality

To protect the confidentiality of each participant on enrolment, a unique participant number is assigned to each laboratory and/or primary health care facility. The laboratory and/or primary health care facility's name will also be used as an identifier for the internal control of the individual laboratory and/or primary health care facility unless the laboratory and/or primary health care facility does not require this. This unique number identifies each laboratory that participates across all surveys. This number remains associated with that participant indefinitely.

Note: Participants can elect to waive confidentiality within the proficiency testing scheme for the purpose of discussion and mutual assistance, e.g. to improve performance. Confidentiality can also be waived by the participant for regulatory or recognition purposes. In exceptional circumstances, when a regulatory authority requires proficiency testing results to be directly provided to the authority by the testing provider, the affected participants shall be notified of this action in writing.

8. Participation

Participation of the NHLS Proficiency Testing Schemes is open to all NHLS laboratories. Private laboratories, both local and international may participate. This includes primary health care facilities.

C. SHIPMENTS AND RECEIPT OF SAMPLES

NHLS PT schemes outsource the shipping of samples to courier companies that comply with the IATA regulations. The courier brokerage is charged separately from the cost of the PT samples, and it is not included in the cost of the PT samples. Samples that fall under the UN3373 Category B Hazardous samples are shipped with a special courier that complies with IATA regulations

1. Packaging

Specimens are transported in IATA 650 compliant packaging and ADR road packaging. All packaging complies with the IATA Dangerous Goods Regulations.

Your subscription package should include the following items:

- Unique participant code
- Please find master copies of results sheets on the following link:

<http://ptschemes.nhls.ac.za>

1.1 Sample transportation and storage

Proficiency testing scheme material is transported at ambient (18°C-25°C) temperature and on arrival in your laboratory the following; Malaria RDT, Bacteriology, Serology, Haematology, Flow Cytometry, Chemical Pathology, EID, Viral Load and SARS- COV 2 scheme samples must be stored at 2°C-8°C until analysed except all slides, CrAg, Mycology, LPA and Mycobacteriology Culture. Qualitative BhCG samples are shipped in the month that it is due

1.2 General sample storage and shipping conditions

Refer to the relevant PTS instructions for proper storage requirements e.g. either between 2 – 8 °C or room temperature before examination.

Identify a separate storage space for already analysed PT samples to decrease the possibility of a mix-up with current PT samples. Samples are shipped at **ambient temperatures**. Customers must make arrangements to accept delivery and have package routed immediately to the appropriate location for proper handling and storage as indicated for different schemes. Should you not receive your shipment within 5 days post the scheduled shipment date or the condition of the samples is unsuitable, please contact the scheme manager/coordinator.

2. Annual shipping dates for the cycle

Shipment dates and due dates for submission of results for all schemes have been published on the intranet/internet and PTS handbook.

3. Receipt of samples

Inspect contents of package immediately on arrival in the laboratory.

Inspect for any breakages, possible deterioration during transportation.

Store the samples as per storage instructions until the samples are tested.

Verify that all samples are present (no duplicate or missing samples).

Inspect for sample integrity (adequate volume, cracked or leaking, haemolysis, etc.).

Verify package received corresponds with your enrolment and shipping schedule.

Contact Scheme Manager/Coordinator **within 5 working days** after receipt of samples if samples have not been received. If there are any issues after inspecting package contents replacement samples are available only as long as quantities are available and sample integrity is maintained.

Failure to request for replacement samples is not considered a valid excuse for non-submission of results.

4. Actions to be taken if sample was not received

Should you not receive your PT samples contact the Scheme

Manager/Coordinator **within 5 working days** post the shipment date. A

“tracking of parcel” will then be instituted with the courier company and the participant will be duly informed of the findings.

5. Sample handling precautions

Because no test method can offer complete assurance that HIV, HCV, Hepatitis B Virus (HBV), or other infectious agents are absent it is thus required that all PT samples be treated as potentially infectious and thereby universal safety precautions must be followed as Proficiency testing (PT) samples may be prepared from blood or other human or animal source material. For Quantitative tests each donor unit used in the preparation of material is tested by an approved method for the presence of the antibodies to Human Immunodeficiency Virus (HIV-1, HIV-2) and Hepatitis C Virus (HCV) as well as the Hepatitis B surface antigen (HBsAg) and found to be negative (were not repeatedly reactive). The laboratories should use good laboratory practice when handling PT samples.

a) Instructions on returning of proficiency test items.

Not applicable for all NHLS Proficiency Testing Schemes unless discussed with the PT Scheme Manager.

D. PROFICIENCY TESTING SAMPLES

1. Selection of sample

Samples included in the NHLS PTS are characterized on a selection of methods to ensure that a correct interpretation of final result is attained. However, since PT samples may not always behave exactly like patient samples due to the matrix used, the NHLS PTS provider cannot guaranty compatibility with every test system available on the market.

Prior to distribution samples are subjected to one or more of the following processes to ensure suitability:

- Quality control
- Characterization
- Verification processes

All laboratories shall receive a selection of identical samples. The composition of the test samples may vary with each survey.

Please note: The numbering of the PT samples on the online system, may differ from the labelling on the sample vials. This is due to coding.

2. Homogeneity and stability

All testing materials are tested and guaranteed for homogeneity and stability in the initial stage as part of the PTS Internal Quality Control (IQC) process.

Chemical Pathology PTS - All testing material are tested and guaranteed for homogeneity and stability by the manufacturers of the material.

3. Treatment and analysis

Please note that for schemes that are live on the web based system, the clinical details will be on the system.

For schemes that are not yet live clinical details will be sent with samples or they can be found on the NHLS internet. Follow the specific sample handling instructions that accompany your shipment. Do not assume that all samples within a shipment are handled in the same manner.

Samples shall be analysed using your own standard operating procedures.

Samples should be treated in the same manner as routine samples.

The specimens should be tested with the laboratory's regular patient workload by staff that routinely performs the testing in the laboratory.

Do not send PT samples to another laboratory for testing.

4. Factors that could influence the testing of samples

Refer to the relevant PT scheme section for further clarity.

Factors could include the following:

Haemolysis

Contamination

Conditions of storage

Samples not brought to ambient temperature before testing

Whole blood samples not mixed adequately before testing

Morphology peripheral blood smears not stored at ambient temperature.

Reticulocyte smears not stored at ambient temperature.

Plasma/serum not stored at -20°C for long term storage.

E. REPORTING PROFICIENCY TESTING SCHEME RESULTS

Please note that for schemes that are live on the web based system, participants are required to enter results on the web based system.

Please use the link below for entry of results:

<http://ptschemes.nhls.ac.za>

For schemes that are not yet live the results form is available electronically and can be found on the NHLS internet and intranet for NHLS participants.

To access the instructions, response forms, specific scheme information including clinical scenarios/information, code booklets, Chemical pathology method questionnaires, receipt checklists and appeal forms on the internet, follow the steps below:

- Go to the web site (Chrome browser preferably)
<https://www.nhls.ac.za>
- Click on **Our Services**
- Go to **Quality Assurance**
- Select **Proficiency Testing**
- Scroll down to find the specific documents

To access the instructions, response forms, specific scheme information including clinical scenarios/information, code booklets, Chemical pathology method questionnaires, receipt checklists and appeal forms on the intranet, follow the steps below:

- Go to the NHLS intranet
<https://intranet.nhls.ac.za>
- Click on **Corporate Departments**
- Go to **Academic Affairs Research and Quality Assurance**
- Select **Proficiency Testing**
- Scroll down to find the specific documents

1. Review analyte/parameter and instrument information

Review/update your analytes/parameters and instrument/method/reagent prior to submitting results. If all information is correct, no changes are required.

If instrument, method, or reagent is incorrect contact scheme manager/coordinator to request an update.

If you need to remove or add an analyte/parameter contact scheme manager/coordinator.

If you are unable to report an analyte/parameter or sample result, you will need to provide reason.

Analyte/parameter and instrumentation/method/reagent changes requested after the due date will not be accepted for the current survey but will be changed for subsequent surveys.

Participants may register more than one instrument. Where samples cannot be shared where laboratories have more than one instrument for the same scheme, the Proficiency Testing Scheme Manager must be informed how many instruments the laboratory needs samples for.

If a participating laboratory has more than one instrument, the results must be submitted on separate result sheets (which your laboratory has made copies from the master result sheet).

Please note: The above is not applicable if the scheme is live on the web based system

Instructions for web based process will be provided for individual schemes.

2. Report in requested units

Report results in the units as provided in the results submission form.

3. Report in requested decimal places

Do not exceed the number of decimal places indicated. Follow your laboratory SOP if rounding or truncating is necessary.

4. Out of range results (Quantitative Schemes)

Results above reportable range: If proficiency testing results exceed the highest reportable range of your instrument upon initial testing, treat them as you do your patient samples.

If you dilute patient samples, then dilute PT samples

If you do not dilute patient samples, record the highest numeric limit of the instrument as your result including the “greater than” (>) sign.

Results below reportable range: If proficiency testing results exceed the lowest reportable range of your instrument upon initial testing, record the lowest numeric limit of the instrument as your result including the “less than” (<) sign.

5. Miscalculations, transpositions and other gross errors

Test results that are found to be inappropriate for evaluation due to miscalculations, transpositions or other gross errors will not be included in the evaluation. Incorrect results will be evaluated as such.

F. MANUAL SUBMISSION OF PTS RESULTS

Please note! Manual submission will only be accepted for schemes that are not yet live on the web based system unless indicated otherwise by the PT Scheme Manager.

Return the survey result form to the PTS provider via post/email or fax. Result forms must be completed in full, Laboratory Code must be stated. Please do not use other email addresses for results submission other than those provided and **DO NOT** redesign the form. All test results, requests for exempted status (temporary suspension of testing), and/or discontinued analyte/parameter testing notification must be submitted until midnight of the due date. Results submitted after the due date will not be evaluated.

Amended results are accepted until midnight of the due date.

Submission address details will be found in the specific PT scheme response form.

G. EVALUATION PROCESS

1. Parametric/ Quantitative data

i. Consensus mean with standard exclusion criteria

After input data, is managed programmatically in a standard manner. The software is programmed to calculate a mean using all raw data. Once this mean has been calculated, each result is measured against the mean. Results that exceed a pre-set limit such as (4s, 3s or 2s- PT Scheme dependent) are flagged and excluded from the data. The mean is then recalculated and each laboratories' z- score is calculated. This data together with the total sample size and overall coefficient of variation is stored for printing on the report. Any result which exceeds the allowable limits of error for the particular assay is flagged. Where it is known that there are consistent differences in methodology which have a significant influence on the results, results are partitioned accordingly. Separate means are then calculated for each group and the participant is measured against their group mean. A minimum number of samples for this calculation is set at 10.

ii. Consensus mean with exclusion criteria based on Chauvenet's criterion

Data is handled in the same way as above. However, the statistical outliers in each group are identified using Chauvenet's criterion instead of using multiples of s as the cut off. This means that with small sample sizes such as individual method groups, outliers are identified more effectively. A minimum number of samples for consensus mean with this type of exclusion is 5.

iii. Defined target value

In some instances, it is necessary to use material which has been analysed and assigned a target value. In this case a direct comparison is made between the result submitted and the target value. Any results outside predetermined limits are flagged. The difference between the target value and the laboratories' result is expressed as a percentage bias. No rejection criteria are required as

the mean is calculated simply as a method of determining the overall range of results.

iv. Robust analysis compliant with ISO: 13528 Algorithm A

Robust statistics are based on the assumption that the data are a sample from an essentially normal distribution contaminated with heavy tails and a small proportion of outliers. Insensitive to the presence of outliers and heavy tails to avoid undue influence from poor results, and this is why the median or a robust mean is valuable. The median, however, is more robust when the frequency distribution is strongly skewed.

There are two choices:

- Remove statistical outliers
- Use statistical techniques that are robust to these values

Robust techniques are preferred.

NHLS as a PT provider needs to mitigate the effect of extreme results, because not all participants are competent, and extreme results are always possible.

These results have a strong effect on consensus statistics. We have two choices; remove statistical outliers or use statistical techniques that are robust to these values. Robust techniques are preferred. International PT Schemes use this method. With the new web NHLS will be using robust techniques; Robust analysis compliant with ISO: 13528 Algorithm A.

2. Peer group

Peer group consists of specific test systems (same instrument/kit, same reagent, same measurement principle).

3. All methods group

All methods group consists of all methods of all participants. All methods may not be an option in situations where there is excessive result variation among peer groups for a particular analyte/parameter or procedure.

4. z-score

The assessment of individual performance for proficiency testing schemes using parametric (numeric) data is most commonly estimated by using the z score. This is a simple calculation that enables an accurate measure of the degree of bias (error) encountered when carrying out a specific test measurement. The

comparative or target value is usually a consensus mean (average) that is calculated from all the participant's results after trimming out all outliers.

5. Bias

Bias is expressed as a percentage. It indicates your result in relation to the target result express as a percentage.

6. Evaluation for qualitative schemes

Evaluations for Qualitative schemes are described in relevant scheme sections.

H. REPORTS

1. Postal service

Due to the ongoing problems and delays with the postal service deliveries in both South Africa and Africa, all reports will be couriered together with the next survey samples. Refer to the shipping dates for the schemes and shipping dates for results. If you require your results before receiving the next surveys samples, contact the scheme manager/coordinator with your request. Important, your **participant code number** must be included with all correspondence. Reports are available approximately 3 weeks after the closing date for schemes that are not on the web based system.

2. Amended report

Amended reports will be issued on investigation of a written dispute or appeal. The amended reports will not be issued if the source of the transcription error was from the participant.

3. Re-issue of Report

The NHLS PTS does not accept responsibility for reports lost or misplaced by the participant. Reports will only be re-printed if a request is done in writing prior to the next survey shipment.

NHLS participants' performances may be disclosed to a restricted list of individuals, their Regional QA managers and QA Coordinators as per NHLS Policy.

I. CPD POINTS

Not Applicable

J. CORRECTIVE ACTION

The onus is on the laboratories concerned to review evaluation reports, identify corrective actions, and to implement corrective and preventative measures, where applicable. If any assistance is required from the NHLS PTS Department, please contact the PTS Managers.

K. PROCEDURE FOR RESOLVING DISCREPANCIES, DISPUTES, APPEALS, COMPLAINTS

Within 5 working days of receiving any proficiency evaluation reports, the participant may dispute the decision to the relevant Proficiency Testing Scheme Manager and shall be limited to investigating whether or not the PTS providers' procedures were followed. All disputes and appeals shall be in writing, clearly stating in detail the nature of the dispute/appeal, and shall provide adequate information as supporting evidence. Participants may submit an appeal for transcription errors only when the NHLS PTS provider is the source of the transcription errors in their preparation of the report. The NHLS PTS provider does not accept responsibility for results faxed/emailed to the wrong fax numbers or email address.

The form to lodge a dispute, appeal and/or complaint is available on the internet/intranet and must be filled in and submitted by the participant to the relevant PT Scheme mailbox.

1. Definitions

- i.** Appeal –the process in which results are reviewed, where participants request a formal change to an official decision.
- ii.** Anomalies - deviations from what is standard, normal or expected.
- iii.** Complaint - a statement expressing dissatisfaction with a particular situation
- iv.** Deviations - activities not conforming to procedures and processes. These are actions departing from an established cause or accepted standard.
- v.** Feedback - information or criticism about prior action or behaviour from an individual, communicated to another individual (or group) that can be used to adjust and improve current and future actions or behaviour. It is used as a basis for improvement

- vi. Incidents - events or occurrences that are not part of normal operations that disrupts operational processes.
- vii. Observation - a statement based on something one has seen, heard, or noticed
- viii. Query - a question, especially one expressing doubt or requesting information.
- ix. Technical error - an error occurring in the technique of a method. It is a deviation from accuracy or correctness.

L. COMMUNICATION PROCEDURES

1. **Return of results** (relevant to PT Schemes where results have to be submitted manually). Results are to be submitted to the relevant PT email addresses. Refer to **Table 13** for contact details of individual PT Schemes.

Note well: results sent to any other email address will not be accepted and a non-return issued

Table 13: Correspondence for individual PT Schemes

| Category | Proficiency Testing Scheme | PT Scheme Manager | Email | Telephone |
|-------------------|--------------------------------------|-------------------|--|---------------------|
| Chemistry | Blood Gases | Bongiwe Mofokeng | chempath@nhls.ac.za | +27 (0)11 386 6148 |
| | Cardiac Markers | Zazi Molebatsi | chempath@nhls.ac.za | +27 (0)11 885 5353 |
| | CRP | Mandisa Zikhali | chempath@nhls.ac.za | +27 (0)11 386-6143 |
| | Endocrinology | Bongiwe Mofokeng | chempath@nhls.ac.za | +27 (0)11 386 6148 |
| | General Chemistry | Bongiwe Mofokeng | chempath@nhls.ac.za | +27 (0)11 386-6143 |
| | TDM | Mandisa Zikhali | chempath@nhls.ac.za | +27 (0) 11 386 6143 |
| | Qualitative BhCG | Bongiwe Mofokeng | chempath@nhls.ac.za | +27 (0)11 386-6148 |
| Haematology | Automated Differential counts | Thokozile Zulu | cd4pts@nhls.ac.za | +27 (0)11 555-0582 |
| | Coagulation: D-Dimer | Zazi Molebatsi | haempts@nhls.ac.za | +27 (0)11 885 5353 |
| | Coagulation: INR and APTT | Mandisa Zikhali | haempts@nhls.ac.za | +27 (0)11 386 6143 |
| | Erythrocyte Sedimentation Rate (ESR) | Bongiwe Mofokeng | haempts@nhls.ac.za | +27 (0)11 386-6148 |
| | Full Blood Count | Mandisa Zikhali | haempts@nhls.ac.za | +27 (0)11 386 6143 |
| | Manual Reticulocyte counts | Bongiwe Mofokeng | haempts@nhls.ac.za | +27 (0)11 555-0413 |
| | Morphology-Peripheral blood slides | Mandisa Zikhali | haempts@nhls.ac.za | +27 (0)11 386 6143 |
| | Automated reticulocytes | Bongiwe Mofokeng | haempts@nhls.ac.za | +27 (0)11 386 6148 |
| Immune Monitoring | CD4 | Mahlatse Maleka | cd4pts@nhls.ac.za | +27 (0) 11 386 6159 |
| | CD4 POCT | Mahlatse Maleka | cd4pts@nhls.ac.za | +27 (0) 11 386 6159 |
| Microbiology | Bacteriology | Zazi Molebatsi | bactpts@nhls.ac.za | +27 (0)11 885 5353 |
| | CrAg LFA | Thokozile Zulu | mycopts@nhls.ac.za | +27 (0) 11 555 0582 |
| | Malaria RDT | Zazi Molebatsi | parapts@nhls.ac.za | +27 (0)11 885 5353 |
| | Mycobacteriology Culture | Esther Tsheola | tbpts@nhls.ac.za | +27 (0)11 555 0563 |
| | Mycobacteriology Microscopy | Esther Tsheola | tbpts@nhls.ac.za | +27 (0)11 555 0563 |
| | Mycology Mould | Thokozile Zulu | mycopts@nhls.ac.za | +27 (0) 11 555 0582 |
| | Mycology Yeast Basic | Esther Tsheola | mycopts@nhls.ac.za | +27 (0)11 555 0563 |
| | Mycology Yeast Advanced | Esther Tsheola | mycopts@nhls.ac.za | +27 (0)11 555 0563 |
| | Non Treponemal Serology | Thokozile Zulu | seroppts@nhls.ac.za | +27 (0) 11 555 0582 |
| | Parasitology Blood | Thokozile Zulu | parapts@nhls.ac.za | +27 (0)11 885 5353 |
| | Parasitology Stool | Zazi Molebatsi | parapts@nhls.ac.za | +27 (0) 11 555 0582 |
| | Specific Treponemal Serology | Zazi Molebatsi | bactpts@nhls.ac.za | +27 (0)11 885 5353 |
| Molecular Biology | SARS – CoV – 2 Molecular PCR | Mahlatse Maleka | molecular.pts@nhls.ac.za | +27 (0) 11 386 6159 |
| | Early Infant Diagnosis (EID) of HIV | Mahlatse Maleka | molecular.pts@nhls.ac.za | +27 (0) 11 386 6159 |
| | Mycobacteriology Line Probe Assay | Esther Tsheola | tbpts@nhls.ac.za | +27 (0)11 555 0563 |
| | Viral Load (HIV) | Mahlatse Maleka | molecular.pts@nhls.ac.za | +27 (0) 11 386 6159 |
| Virology | HBsAg Serology | Thokozile Zulu | seroppts@nhls.ac.za | +27 (0) 11 386 6159 |
| | HIV POCT | Mahlatse Maleka | hiv.poctpts@nhls.ac.za | +27 (0) 11 386 6159 |
| | HIV Serology | Esther Tsheola | seroppts@nhls.ac.za | +27 (0)11 555 0563 |
| | SARS-CoV-2 Antigen Serology | Esther Tsheola | seroppts@nhls.ac.za | +27 (0)11 555 0563 |
| | Hepatitis A IgM Serology | Mahlatse Maleka | seroppts@nhls.ac.za | +27 (0) 11 386 6159 |

When submitting results via email, participants are to indicate the laboratory code, scheme and survey no. on the title of email.

e.g. 000 Mycobacteriology Culture Results 0121

2. General PTS Administration

For correspondence with NHLS PT Schemes regarding general queries, comments, suggestions, compliments, enrolments, please send email to ptsadmin@nhls.ac.za

3. Correspondence

Participants are able to contact the PTS manager to discuss any issues related to the scheme.

Physical address:

1 Modderfontein Road
Sandringham
NHLS
2192

Postal address:

Private Bag X8
Sandringham
NHLS
2131

M. PROFICIENCY TESTING SCHEMES INSTRUCTIONS

NHLS Immune monitoring CD4 Proficiency Testing Scheme

This is a detailed documented participant instruction for NHLS Immune Monitoring CD4 Proficiency Testing Scheme participants. All relevant information regarding this proficiency testing scheme is contained in this document which must be read prior to processing the proficiency testing scheme samples.

Please read the information provided. Important dates for dispatch and return of results are indicated.

Your subscription package should include the following items:

- Unique participant code number
- Two proficiency testing samples. (This material is transported at ambient (18°C-25°C) temperature and on arrival in your laboratory or primary health care facility the material must be stored at 2°C-8°C until analysed. The whole blood material is ready for use once brought to ambient temperature).

The Immune Monitoring scheme issues stabilised whole blood in which participants are required to determine the lymphocyte subsets within the preparation. Participants are required to return absolute counts and/or percentage values depending on which the participant is registered for:

- CD4+ (CD3+CD4+) Absolute count
- CD3+CD8+ Absolute count
- CD3+ Absolute count
- CD4+ (CD3+CD4+) Lymphocyte percentage
- CD3+CD8+ Lymphocyte percentage
- CD3+ Lymphocyte percentage
- CD19⁺ B cells Absolute count
- CD3⁺/CD16⁺/CD56⁺ Natural killer cells Absolute count
- CD19⁺ B cells Lymphocyte percentage
- CD3⁺/CD16⁺/CD56⁺ Natural killer cells Lymphocyte percentage

1. Participation

Participation is open to all laboratories and primary health care facilities who offer Immune Monitoring by flow cytometry and CD4 point of care testing.

2. Important registration for more than one flow cytometer/methodology

- Participants may register more than one flow cytometer.
- If your laboratory has more than one flow cytometer and/or different methodologies, submit results on separate result sheets.
- Use the allocated participant number for each result by requesting the Immune monitoring CD4 PTS manager to allocate a sub number/letter for each new flow cytometer/methodology.
- These sub numbers/letters will then be sent to the participant to be used for all further trials.
- Please confirm that you submit results for each flow cytometer serial number before submitting online.

3. Methodology

The NHLS CD4 laboratories use the Single Platform Panleucogated CD4 method. All other participants use their method of choice.

CD3, CD4, CD8, CD19⁺ and CD3⁺/CD16⁺/CD56⁺ samples

- Two samples are sent out per trial.
- These samples are stabilised material with an expiry date.
 - This material is transported at ambient temperature and on arrival in your laboratory the
 - material must be stored at 2°C-8°C until analysed.
 - All samples should be allowed to attain ambient temperature before testing.
 - All samples should be thoroughly mixed before use.
 - Process the stabilised human blood product as if you were handling routine blood samples (observing associated safety precautions).
 - It is recognised that some minor adjustment of forward and side scatter gains may be required on some flow cytometers as an inevitable consequence of any stabilisation process.

4. Result submission

- Results are submitted online through the website <http://ptschemes.nhls.ac.za/> and can be submitted by nominated individuals referred to as participant or controller.
- The participant's laboratory and/or primary health care facility's name and unique participant code number (and sub code number/letter if registered more than one instrument) must be confirmed by the laboratory prior to submission.
- Please note: If the above is not complied with, no results will be generated and a non-return result will be generated instead.
- Select the correct survey number when submitting results.
- The date received and the date of analysis should be captured.
- The flow cytometer (instrument) serial number must be verified by the participant.
- Use the blocks provided to enter your results.
- If you cannot submit results for any reasons, select the appropriate reason on **"Reason for no submission"**
- After entering your results, you can save and check for errors (as per your manual results entry protocol) and submit results by pressing submit button.
- **If results are only saved and not submitted, no return will be issued.**
- **Also note that once results are submitted changes cannot be made.**
- Information required from participants for instrument registration includes:
 - Monoclonal antibody panel used
 - Flow cytometer used
 - Basic methodology single platform dual platform
 - Bead product
 - Red cell lysing method
 - Results absolute counts and/or lymphocyte percentages

5. Interpretation of cumulative SDI/z score graph results

- Individual cumulative SDI/z-score graph on report:
- On the report form, a participants' standard deviation index (SDI)/z-score result is graphically represented.
- On the y-axis, the SDI/z-score is reported.
- On the x-axis, the survey and trial is reported.

6. Laboratory performance showing the Standard Deviation Index (z-score)

- Acceptable performance is ± 2 SDI (z-score):
- A Standard Deviation Index (SDI) (z-score) of less than 0.5 denotes excellent performance
- A SDI (z-score) between 0.5 and 1.0 is satisfactory
- A SDI (z-score) between 1.0 and 1.5 is acceptable
- A SDI (z-score) between 1.5 and 2.0 is border-line
- A SDI (z-score) of greater than 2.0 requires immediate attention

7. Point of care testing (POCT)

- Application of proficiency testing blood via glass capillary instructions:
- Bring proficiency testing sample tubes to room temperature.
- GENTLY mix sample tube.
- Do not shake or vortex to avoid generating air bubbles.
- Once well mixed, proceed with your POCT method.
- Run both tubes labelled "Sample A" and "Sample B".
- Enter CD4 results on the web-based system.

8. Important registration for more than one flow cytometer/methodology

- Participants may register more than one flow cytometer.
- If your laboratory has more than one flow cytometer and/or different methodologies, inform the PT Scheme Manager to create a profile for each instrument so results can be entered on it. PTS manager will allocate a sub number/letter for each new flow cytometer/methodology.

NHLS D-Dimer Proficiency Testing Scheme

This detailed document contains participant instructions for the National Health Laboratory Service (NHLS) D-Dimer Proficiency Testing Scheme (PTS). All relevant information regarding this proficiency testing scheme is contained in this document which must be read prior to processing the proficiency testing scheme samples.

Please read through the information provided. Important dates for dispatch and return of results are indicated.

Your subscription package should include the following items:

- Unique participant code number.
- Two proficiency testing samples. (This material is transported at ambient (18°C-25°C) temperature and on arrival in your laboratory the material must be stored at 2°C-8°C until analysed).
- The scheme issues lyophilised plasma which participants are required to determine the D-Dimer levels.

1. Participation

Participation is open to all laboratories and primary health care facilities who offer D-Dimer testing.

2. Methodology

All participants use their method of choice.

a) Reconstitution

1. For proper reconstitution the vial must reach room temperature before adding the water.
2. Dissolve the contents of each sample with exactly 1ml distilled water.
3. Leave the sample for 5 minutes then swirl the sample gently to mix and leave for a further 25 minutes for complete reconstitution.
4. Before use mix the sample again gently.

b) Storage of reagents and controls

1. Un-reconstituted lyophilized plasma should be stored at 2-8°C.
2. Reconstituted plasma should preferably be used within 8 hours after reconstitution.
3. Plasma should be kept at room temperature after reconstitution.

c) Reporting unit of the D-Dimer assay

1. The NHLS D-Dimer PTS pilot study was referenced to D-Dimer unit milligrams per litre (DDU mg/mL).
2. All laboratories used the normal reference of 0.00 – ≤0.25mg/L.

d) Criteria of acceptance

1. Acceptable limits of error
 - a) The Negative (normal) range should be 0.00 – ≤0.25mg/L with the interpretation indicating below cut off.
 - b) The Positive (high) range should be >0.25 – 0.50mg/L with the interpretation indicating above cut off.
2. The standard deviation index (SDI)/z-score
For proficiency testing results the acceptable SDI/z-score performance is ±2SD.

e) Online submission of results

After analysing your samples go to the link <http://ptschemes.nhls.ac.za/> and enter your results as in the table below using login credentials provided by the PT provider. The sample number you are entering will be highlighted in green. To move to the next click on the grey bar to highlight new sample.

| Parameters | Units | Result | Interpretation | Non-Submission Reason |
|------------|--------------|--------|----------------|-----------------------|
| D-Dimer | D-Dimer mg/L | 0.39 | Above cut off | Result submitted |

Instrument: CA 600 Serial Number: 25940

Sample: 1 | Sample: 2

Comments (1,000 characters)

f) The report includes the following:

1. Results of survey number, sample 1 and sample 2.
2. A summary table of statistics that includes: reported value (laboratory submitted result), aggregate group mean value (method mean), residual, SD, %CV and SDI (z-score).
3. Interpretation of results which include “above cut-off” or “below cut-off”
4. Individual cumulative z-score graph
5. A table of “Summary methods”
6. Graphical representation of “Above cut off” and “Below cut off”

g) Interpretation of PTS test results

1. Each laboratory performance report includes the performance of all laboratories (all methods).
2. Results are reported in D-Dimer mg/L units.
3. All participants are required to **submit 4 results per cycle:**
 - the numerical value for sample 1 and sample 2
 - the interpretation of “above cut-off” or “below cut-off” for sample 1 and sample 2.
4. The report includes the following:
 - Results of survey number, sample 1 and sample 2.
 - A summary table of statistics that includes: reported value (laboratory submitted result), aggregate group mean value (method mean), residual, SD, %CV and SDI (z-score).
 - Interpretation of results which include “above cut-off” or “below cut-off”
 - Individual cumulative z-score graph
 - A table of “Summary methods”
 - Graphical representation of “Above cut off” and “Below cut off”

h) Evaluation of D-Dimer results

NHLS D-Dimer Proficiency Testing Scheme use the consensus mean and SD calculations along with Chauvenet’s criterion to exclude outliers.

Laboratory performance showing the Standard Deviation Index (z-score)

Acceptable performance is $\pm 2SDI$ (z-score):

A Standard Deviation Index (SDI) (z-score) of less than 0.5 denotes excellent performance

- A SDI (z-score) between 0.5 and 1.0 is satisfactory
- A SDI (z-score) between 1.0 and 1.5 is acceptable
- A SDI (z-score) between 1.5 and 2.0 is border-line
- A SDI (z-score) of greater than 2.0 requires immediate attention

Cut off points

Reference ranges for proficiency testing material and patient's samples in D-Dimer units:

- Negative (normal) range: 0.00 – ≤0.25mg/L
- Interpretation: Below cut off
- Positive (high) range: >0.25 – 0.50mg/L
- Interpretation: Above cut off

Until further notice from the D-Dimer PTS advisory panel the following scoring system will be used

Scoring system:

Sample 1 (if low negative):

- Acceptable performance is ± 2 SDI /z-score
- Score 50%

Cut off points

Negative (normal) range: 0.00 – ≤0.25mg/L

- Interpretation: Below cut off
- No score will be allocated if the interpretation is given

Sample 2 (if high positive):

- Acceptable performance is ± 2 SDI /z-score
- Score 50%

Cut off points

Positive (high) range: >0.25 – 0.50mg/L

- Interpretation: Above cut off
- No score will be allocated if the interpretation is given

Total score 100%

Please note that samples 1 and 2 will be mixed around, that is, sample 1 may be a negative low or a positive high and vice versa.

Only the ± 2 SDI /z-score will apply for % compliance of 80%, flagging and non-conformances for NHLS coagulation laboratories.

NHLS Morphology and Manual Reticulocyte Count Proficiency Testing Scheme

This is a detailed documented participant instruction for NHLS Morphology and Manual Reticulocyte Count Proficiency Testing Scheme participants. All relevant information regarding this proficiency testing scheme is contained in this document which must be read prior to processing the proficiency testing scheme sample

1. Morphology

Ten surveys per cycle are sent out.

One stained blood film for differential cell counts, morphology and interpretative comments. Please do not refrigerate morphology slide on arrival in the lab.

1.1 Manual differential count

- Participants are encouraged to report their differential according to their laboratory protocols however, the following must be noted when entering results.
- Perform the differential at 40x or 50x objective. Identify and count all the different types of white blood cells.
- Differential count reported on results sheet should make total of 100%
- The counted Nucleated red cells/100 WBC, this count should not form part of above 100% differential count.

- The differential must be reported in whole numbers only.

- A numerical value must be entered in all cell lines. i.e. if no basophils, myelocytes etc. are counted on the film, "0" must be entered into the entry field. If a field is left blank, it will appear as "no results were returned".
- Any cells that are not part of the defined categories on the results sheet, provided in the survey (e.g. abnormal promyelocytes, lymphoma cells) should be quantitated in the "Other" category, record what cells are those.

This is necessary for assessment purposes.

Online portal results entry

NATIONAL HEALTH LABORATORY SERVICE | **NHLS PROFICIENCY TESTING SCHEMES** | **YOUR RESULTS**

Identification Code: [] Scheme: **Morphology - Peripheral Blood Smears** Survey Number: **05-23** Issue Date: **07 September 2023** Closing Date: **22 September 2023**

Date Received: **08/06/2023** Date Assayed: **21/09/2023**

Buttons: Instructions, Report, Print, Survey Closed

Required: Full Blood Count interpretation, Differential count, Differential interpretation, morphology interpretation, differential diagnosis and favoured diagnosis. Please note that once completed select save followed by submit. If you do not select submit the system will generate a NO RETURN.

Reported by: Pathologist Scientist/medical technologist

Clinical Information: A 25-year-old male patient who is known to the Haematology clinic, presents with abdominal pain.

Sections: Patient Details, FBC Interpretation, Differential Count

- A. date received
- B. Date assayed
- C. Instructions or any uploaded document e.g. codes or Commentary report
- D. Reports
- E. Required and notes
- F. Reported by –select pathologist or scientist/Technologist
- G. Clinical Information-Patient history
- H. FBC interpretation- FBC patient results

Number of submissions allowed per each description and special instructions

- A. FBC Interpretation – Interpret FBC results
 - FBC interpretation has 8 permissions, score =8
 - Select ≤ 8 options/descriptive terms
- B. Differential count and interpretation
 - Diff interpretation has 8 permissions
 - Absolute counts will need to be calculated
 - Band neutrophils are counted as neutrophils
 - A numerical value must be entered in all cell lines. i.e. if no basophils “0” must be entered if not entered the system will recognise this as a NO RETURN and marks will be subtracted.
- C. Red cells description
 - Total of 5 permissions
 - Select ≤ 5 options/descriptive terms
- D. White cells description

- Total of 5 permissions
 - Select ≤ 5 options/descriptive terms
- E. Platelets description
- Total of 5 permissions
 - Select ≤ 5 options/descriptive terms
- F. Miscellaneous description
- Will be added under platelets
- G. Differential diagnosis
- A total of 4 permissions allowed.
- H. Favoured Diagnosis
- Only 1 permissions allowed
- I. Comment field
- Online portal system does not mark any results entered on the comment field

NB Do not leave blank space i.e. if the cell line description or interpretation is normal always selects no significant morphology abnormality code if this is not selected and participants leave blank space the marks will be=0.

If a participant, select abnormality on description/interpretation and there is no abnormality the lab will obtain =0

2. Reticulocyte Count

Four surveys per cycle are sent out.

One stained blood film is provided for the determination of reticulocyte counts.

3. Peripheral blood slide assessment

3.1 Clinical information

- a) Clinical information with a relevant full blood count and platelets will be given with each slide to be assessed.
- b) This information helps to get an idea of the pathology even before looking at the peripheral blood slide.

3.2 Performance score

- a) All slides will be given a marked score out of 10 for manual assessment and 48 for online portal, which will be deemed either acceptable or not acceptable.

- b) All laboratories will need to obtain a score of 80% or above to be regarded as acceptable. Any score below 80% will be regarded as not acceptable.
- c) The following are required for scoring purposes:
 - a. Differential white cell count, white cell morphology, red cell morphology, platelet morphology, interpretative comment, diagnosis/differential diagnosis and suggest further investigations, for inline portal further investigation is not included.
- d) Please note: Normal and abnormal slides will be scored according to the following criteria:

3.3 Interpretation

This is to explain the meaning of the morphological findings of the patient.

The comments stated on RBC, WCC, platelets morphology that lead to attempted or differential diagnosis. For example, the presence of toxic granulation, neutrophilia and thrombocytosis are in keeping with an infective process.

3.4 Diagnosis or differential diagnosis

This is to identify the disorder or disease causing the morphological findings and clinical presentation. Where a number of diseases or disorders can be the cause of the morphological and clinical findings, this list should be given. This is called the differential diagnosis.

4. Manual Reticulocyte Count

On the clinical information sheet a full blood count result will be given together with information required from participants.

4.1 Required:

- a) Uncorrected reticulocyte count percentage.
- b) Corrected reticulocyte count percentage (the 0.45 figure is taken as a normal haematocrit).
- c) Reticulocyte production index.
- d) The formula, the calculation and the result must be shown
- e) The reticulocyte count result sheet must be used

For the purposes of the Manual Reticulocyte Proficiency Testing Scheme the following maturation time (index) shall be used:

The maturation time (Index) of the reticulocyte is taken as:

- 1 day at a haematocrit of 0.45
- 1.5 days at a haematocrit of 0.35
- 2 days at a haematocrit of 0.25
- 3 days at a haematocrit of 0.15

4.2 Scored results

All laboratories will need to obtain a mark of 80% or above to be regarded as acceptable. Any mark below 80% will be regarded as not acceptable.

Manual marking

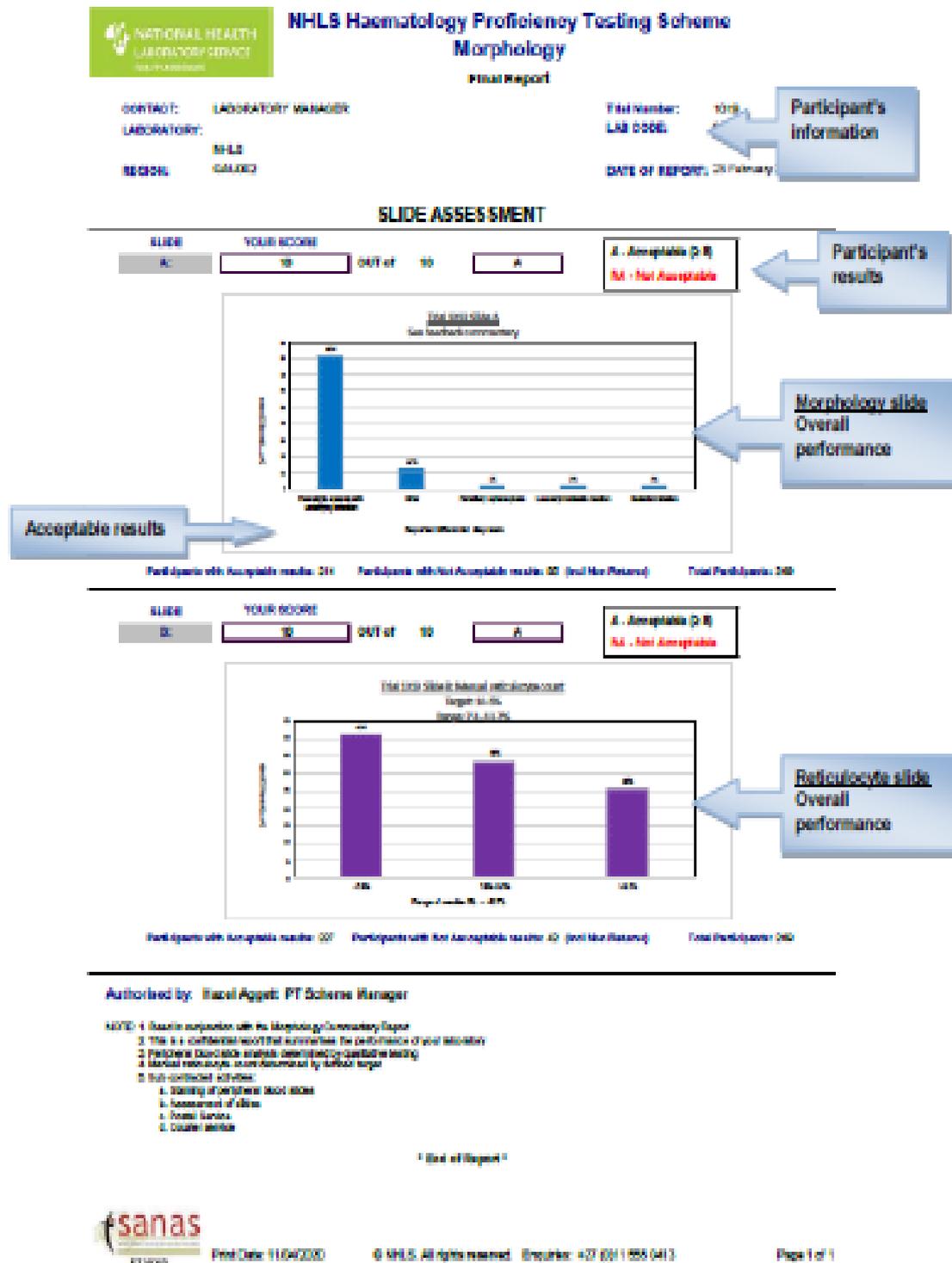
| | |
|---|---|
| Uncorrected reticulocyte count percentage (4) | 2 marks for reticulocytes count % 1 mark for the formula. 1 mark for calculation |
| Corrected reticulocyte count percentage(3) | 1 mark for the formula 1 mark for the calculation 1 mark for haematocrit |
| Reticulocyte production index (3) | 1 mark for the formula 1 mark for the calculation 1 mark for the correct maturation index |
| Total marks | 10 |

| | Score |
|-----------------------------------|--------------|
| Differential white cell count | 1 |
| White cell morphology | 1 |
| Red cell morphology | 1 |
| Platelet morphology | 1 |
| Interpretative comment | 4 |
| Diagnosis/ differential diagnosis | 1 |
| Suggested further investigations | 1 |
| Total | 10 |

| Online web marking | |
|--|--------------|
| Section | Score |
| Full Blood Count Interpretation | 8 |
| Differential Count Interpretation | 8 |
| Morphology Interpretation - Red Cells | 5 |
| Morphology Interpretation - White Cells | 5 |
| Morphology Interpretation - Platelets | 5 |
| Differential Diagnosis | 4 |
| Favoured Diagnosis | 1 |
| Morphology Peripheral blood performance Total Possible Score: 36 Your Total Score: The average % calculation done by system as per weighing scale Performance Percentage Compliance: % | |

Figure 3: Morphology and Manual Reticulocyte Count report

Appendix 1: Graphical interpretation of NHLS Morphology and Manual Reticulocyte Count proficiency testing scheme report. A cumulative z-score graphical representation of performance, which illustrates the laboratory's z-score value, within the group distribution.



Online portal Results example

Survey Management Status: 07 July 2020
Survey Closing Date: 08 July 2020
Report Status: Available

Skelton Pathogen: Seroprevalence Pathology
Email: pathology@skelton.ac.uk

The Subject analysis complies with ISO 15189:2013 Algorithm A.

Distribution of All Results

| Section | Results | Number |
|---|---|---|
| Full Blood Count Interpretation | <ul style="list-style-type: none"> 001 Anaemia 002 Thrombocytopenia 003 Microcytic 004 Normochromic 005 Microcytic 006 Normochromic 007 Normochromic 008 Normochromic 009 Normochromic 010 Normochromic 011 Normochromic 012 Normochromic 013 Normochromic 014 Normochromic 015 Normochromic 016 Normochromic 017 Normochromic 018 Normochromic 019 Normochromic 020 Normochromic 021 Normochromic 022 Normochromic 023 Normochromic 024 Normochromic 025 Normochromic 026 Normochromic 027 Normochromic 028 Normochromic 029 Normochromic 030 Normochromic 031 Normochromic 032 Normochromic 033 Normochromic 034 Normochromic 035 Normochromic 036 Normochromic 037 Normochromic 038 Normochromic 039 Normochromic 040 Normochromic 041 Normochromic 042 Normochromic 043 Normochromic 044 Normochromic 045 Normochromic 046 Normochromic 047 Normochromic 048 Normochromic 049 Normochromic 050 Normochromic 051 Normochromic 052 Normochromic 053 Normochromic 054 Normochromic 055 Normochromic 056 Normochromic 057 Normochromic 058 Normochromic 059 Normochromic 060 Normochromic 061 Normochromic 062 Normochromic 063 Normochromic 064 Normochromic 065 Normochromic 066 Normochromic 067 Normochromic 068 Normochromic 069 Normochromic 070 Normochromic 071 Normochromic 072 Normochromic 073 Normochromic 074 Normochromic 075 Normochromic 076 Normochromic 077 Normochromic 078 Normochromic 079 Normochromic 080 Normochromic 081 Normochromic 082 Normochromic 083 Normochromic 084 Normochromic 085 Normochromic 086 Normochromic 087 Normochromic 088 Normochromic 089 Normochromic 090 Normochromic 091 Normochromic 092 Normochromic 093 Normochromic 094 Normochromic 095 Normochromic 096 Normochromic 097 Normochromic 098 Normochromic 099 Normochromic 100 Normochromic | 104 105 108 113 124 208 301 327 334 340 345 404 414 827 827 |
| Differential Count Interpretation | | |
| Morphology Interpretation - Red Cells | | |
| Morphology Interpretation - White Cells | | |
| Morphology Interpretation - Platelets | | |
| Morphology Interpretation - Parasites | | |
| Differential Diagnosis | | |
| Favoured Diagnosis | | |

No differential count

All the different results received from all participants. Description and code.

You will notice that there are more results than the permissions allowed. Only 5 permissions can be selected by each participant for red cells.

This is the number of participants who selected the various descriptions.

Section A: Morphology Peripheral Blood

| Section | PARTICIPANT RESULTS (Pathologist Level) | |
|---|--|--|
| | Your Result | Expected Result |
| Full Blood Count Interpretation | Anaemia (104) Thrombocytopenia (105) Microcytic (108) Normochromic (113) | Anaemia (104) Thrombocytopenia (105) Microcytic (108) Normochromic (113) |
| Differential Count Interpretation | | Left shift (124) |
| Morphology Interpretation - Red Cells | Creation / echinocytes (208) | Creation / echinocytes (208) |
| Morphology Interpretation - White Cells | Haemophagocytosis (301) Neutrophils - hyposegmentation (327) Blasts (334) Apoptotic cells (340) Lymphocytes - reactive (345) | Haemophagocytosis (301) Neutrophils - hyposegmentation (327) Blasts (334) Apoptotic cells (340) Lymphocytes - reactive (345) |
| Morphology Interpretation - Platelets | Inaccurate platelet count (404) Parasites - other (414) | No significant morphological abnormality (400) Inaccurate platelet count (404) Parasites - other (414) |
| Differential Diagnosis | Trypanosomiasis (827) | Trypanosomiasis (827) |
| Favoured Diagnosis | Trypanosomiasis (827) | Trypanosomiasis (827) |
| Morphology Peripheral blood performance Total Possible Score: 36 Your Total Score: 26.3 Performance Percentage Compliance: 73 % | | |

Section B: Manual Differential Count

Comparative Statistics



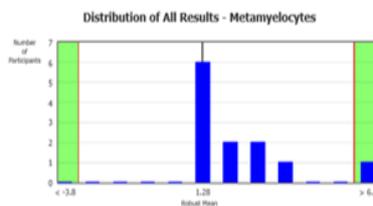
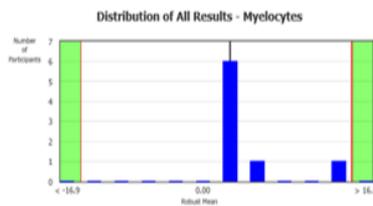
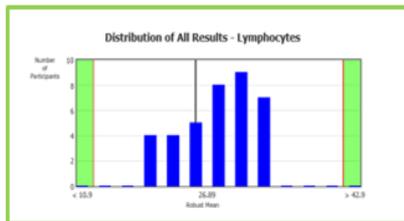
| Cell Line | Your Result | Z-Score | N | Robust Mean | SD | CV |
|----------------------|----------------|----------------|----|-------------|-------|--------|
| Neutrophils | Not answered ❌ | Not calculated | 0 | | | |
| Lymphocytes | 25 | -0.35 | 37 | 26.89 | 5.34 | 19.85 |
| Monocytes | 5 | -0.57 | 36 | 6.88 | 3.33 | 48.32 |
| Eosinophils | 1 | -1.46 | 37 | 4.91 | 2.68 | 54.65 |
| Basophils | 1 | 0.41 | 19 | 0.67 | 0.81 | 121.88 |
| Abnormal Lymphocytes | 0 | 0.00 | 7 | 0.00 | 0.00 | 0 |
| Promyelocytes | 0 | 0.00 | 8 | 0.00 | 0.52 | 0 |
| Myelocytes | 0 | 0.00 | 8 | 0.00 | 5.65 | 0 |
| Metamyelocytes | 0 | -0.75 | 13 | 1.28 | 1.70 | 132.76 |
| Blasts | Not answered ❌ | Not calculated | 0 | | | |
| Other Cells | 0 | 0.00 | 11 | 0.00 | 13.18 | 0 |
| NRBC/100wbc | 0 | 0.00 | 7 | 0.00 | 0.56 | 0 |

Performance Percentage Compliance 83 %

correct

Z Score: measures how many standard deviations your result is above or below the mean.

Results – Bar graphs



For each cell type counted in the differential the results will also be illustrated in a bar graph. The number of participants on the Y axis and the mean on the X axis.

| Overall Performance Percentage Compliance | |
|---|------|
| Section A: Morphology Peripheral blood | 73 % |
| Section B: Manual Differential count | 83 % |
| Average Performance Percentage Compliance | 78 % |

Summary of average performance

| SUMMARY STATISTICS FOR THIS SURVEY | | | | |
|------------------------------------|----------------|----------------|----------------|---------------------------|
| Number of labs that responded | Labs with 100% | Labs with ≥80% | Labs with <80% | Labs that did not respond |
| 39 | 0 | 0 | 39 | 186 |

NHLS Automated Differential Count Proficiency Testing Scheme

This is a detailed documented participant instruction for NHLS Automated Differential Count (5-part differential) Proficiency Testing Scheme participants. All relevant information regarding this proficiency testing scheme is contained in this document which must be read prior to processing the proficiency testing scheme samples.

Please read the information provided. Important dates for dispatch and return of results are indicated.

Your subscription package should include the following items:

- Unique participant code number
- One proficiency testing sample. (This material is transported at ambient (18°C-25°C) temperature and on arrival in your laboratory the material must be stored at 2°C-8°C until analysed. The whole blood material is ready for use once brought to ambient temperature).
- Process the stabilised human blood product as if you were handling routine blood samples (observing associated safety precautions).

IMPORTANT

Make sure you have the correct sample for the type of haematology analyser used in your laboratory.

The NHLS Automated Differential Count (5-part differential) scheme issues stabilised whole blood in which participants are required to determine the 5-part differential count within the preparation. Participants are required to return absolute counts and percentage values.

| Parameter | Percentage (%) | Absolute (10⁹/L) |
|--|-----------------------|------------------------------------|
| White cell count (Only absolute result required) | | |
| Neutrophils | | |
| Lymphocytes | | |
| Monocytes | | |
| Eosinophils | | |
| Basophils | | |

1. Participation

Participation is open to all laboratories who offer Haematology full blood counts and differential counts.

2. Methodology

The laboratories are to use the haematology analyser method for their laboratory. Methodology for the following user groups:

- Coulter Act 5Diff series
- Coulter LH and DxH series
- Advia series
- Sysmex series
- Mindray series

3. Homogeneity and stability

The samples have been tested and found to be homogeneous and stable for this scheme.

4. Stability and storage

Store the tubes vertically in their original package at 2 to 8°C when not in use. DO NOT FREEZE.

All PT material to be discarded as per the waste management standard operation procedure

5. Reconstitution

No reconstitution required, the sample is stabilised whole blood.

- Remove the tube of blood from the refrigerator and allow to warm at room temperature (18 to 25°C) for 15 minutes before mixing.
- To mix, hold a tube horizontally between the palms of the hands. Do not pre-mix on a mechanical mixer.
- Roll the tube back and forth for 20 - 30 seconds; occasionally invert the tube. Mix vigorously, but do not shake.
- Continue to mix in this manner until the red cells are completely suspended. Tubes stored for a long time may require extra mixing,
- Gently invert the tube 8 - 10 times immediately before sampling.
- Return tube to the refrigerator within 30 minutes of use.

6. Instructions to participants for the following user groups

a. Coulter Act 5 diff

- Whole blood material compatible with Act 5diff OV, Act 5diff CP and AcT 5diff AL instruments.
- Analyse the sample as instructed in the Quality Control section of the Operator's Manual for your instrument.
- This product should be sampled as QC material.
- Please report UNCORRECTED WBC.

b. Coulter LH Series and DxH instruments

- Whole blood material compatible with Coulter LH series, DxH 600, 800, 900 instruments.
- Analyse the sample as instructed in the Quality Control section of the Operator's Manual for your instrument.
- Please report UNCORRECTED WBC.

c. Advia 2120i

- Whole blood material compatible with Advia instruments.
- Analyse the sample as instructed in the Quality Control section of the Operator's Manual for your instrument.
- Please report UNCORRECTED WBC.

d. Sysmex

- Whole blood material compatible with Sysmex instruments.
- Analyse the sample as instructed in the Quality Control section of the Operator's Manual for your instrument.
- This product should be sampled as QC material.
- Sysmex XN: Please ensure TNC-N (Total Nuclear Cell Count (WBC#+NRBC)) value is reported.
- Sysmex XE/XT: Please report your impedance count for all parameters.

e. Mindray

- Whole blood material compatible with Advia instruments.
- Analyse the sample as instructed in the Quality Control section of the Operator's Manual for your instrument.

- Please report UNCORRECTED WBC.

7. Result sheet

- Copies are to be made from the master result sheet.
- The participant's laboratory name and unique participant code number (and sub code number/letter if registered more than one instrument) must be written in.
- Please note: If the above is not complied with, no results will be generated and a non-return result will be sent to the participant.
- The survey number must be written in.
- The instrument name and serial number must be written in.
- Information required from participants includes:
 - Results absolute counts and/or lymphocyte percentages
 - Name, signature, telephone number and email address

8. Laboratory performance report

- The results which have been sent by the participating laboratories are analysed and documented in a report.
- Each laboratory performance report includes the performance of technology group.
- The report includes the following:
 - Results of survey number and date of report
 - A automated differential count report sheet that summarises the information submitted by the participant and identifies the institution, laboratory participant number, haematology analyse with serial number.
 - A summary table of statistics that includes reported value (laboratory submitted result), aggregate group mean value (method mean), residual, SD, %CV and z-score.
- Results include:
 - a) White cell count (Only absolute result required)
 - b) Percentage (%)
 - Neutrophils
 - Lymphocytes
 - Monocytes
 - Eosinophils
 - Basophils
 - c) Absolute counts ($10^9/L$)
 - Neutrophils

- Lymphocytes
- Monocytes
- Eosinophils
- Basophils

9. Evaluation of Automated Differential Count results

NHLS Automated Differential Counts Proficiency Testing Scheme use the consensus mean and SD calculations along with Chauvenet's criterion to exclude outliers.

A cumulative z-score graphical representation of performance, which illustrates the laboratory's z-score value, within the group distribution.

10. Interpretation of cumulative SDI/z score graph results

Individual cumulative SDI/z-score graph on report:

- On the report form, a participants' standard deviation index (SDI)/z-score result is graphically represented.
- On the y-axis, the z-score is reported.
- On the x-axis, the survey and trial/survey is reported.

11. Criteria of acceptance with the z-score

Acceptable performance is ± 2 z-score:

- A z-score of less than 0.5 denotes excellent performance
- A z-score between 0.5 and 1.0 is satisfactory
- A z-score between 1.0 and 1.5 is acceptable
- A z-score between 1.5 and 2.0 is border-line
- A z-score of greater than 2.0 requires immediate attention

Note

Sample sizes less than 10 may result in the distortion of the mean and as a consequence must be taken with reserve.

Appendix 1: Graphical interpretation of NHLS Automated Differential Count (5-part differential) proficiency testing scheme report. A cumulative z-score graphical representation of performance, which illustrates the laboratory's z-score value, within the group distribution.

NATIONAL HEALTH LABORATORY SERVICE
QUALITY ASSURANCE

NHLS PROFICIENCY TESTING PROGRAMME
Automated Differential Count (5-part differential)
Individual Report by Technology

Results of Survey Number 2020-01

Date of Report: 13-Nov-20

Laboratory name: LABORATORY: Serial No: (0)

Serial number: Serial No: (0)

REGION: ETC002

Instrument: INSTRUMENT: SYSMEX XS 1000i

Survey number: Survey number

Technology Group: SYSMEX XN/XS Series

| TEST | RESULTS | RESIDUAL | z-score | >+/- 2,0 | METHOD | No. | MEAN | SD |
|---|---------|----------|---------|----------------|---------|-----|--------|-------|
| WBC (10 ⁹ /L) | 19.91 | 0.18 | 0.27 | | OVERALL | 85 | 19.728 | 0.683 |
| Neutrophils % | 71.70 | 2.99 | 0.46 | | OVERALL | 89 | 68.713 | 6.502 |
| Lymphocytes % | 13.90 | -0.19 | -0.07 | | OVERALL | 87 | 14.17 | 18.79 |
| Monocytes % | 3.76 | 0.94 | 0.68 | | OVERALL | 88 | 3.78 | 48.92 |
| Eosinophils % | 10.60 | -0.85 | -0.27 | | OVERALL | 90 | 10.60 | 27.86 |
| Basophils % | 0.10 | -2.43 | -0.67 | | OVERALL | 86 | 0.10 | 0.66 |
| Large granular lymphocytes % | | | | Not Applicable | OVERALL | | | |
| Immature lymphocytes % | | | | Not Applicable | OVERALL | | | |
| Large unstained cells % | | | | Not Applicable | OVERALL | | | |
| Neutrophils Abs count (10 ⁹ /L) | 14.28 | 0.72 | 0.46 | | OVERALL | 88 | 13.559 | 1.568 |
| Lymphocytes Abs count (10 ⁹ /L) | 2.77 | 0.00 | -0.01 | | OVERALL | 89 | 2.774 | 0.495 |
| Monocytes Abs count (10 ⁹ /L) | 0.74 | 0.18 | 0.65 | | OVERALL | 89 | 0.558 | 0.280 |
| Eosinophils Abs count (10 ⁹ /L) | 2.11 | -0.14 | -0.24 | | OVERALL | 89 | 2.251 | 0.601 |
| Basophils Abs count (10 ⁹ /L) | 0.02 | -0.47 | -0.69 | | OVERALL | 89 | 0.493 | 0.687 |
| Large granular lymphocytes (10 ⁹ /L) | | | | Not Applicable | OVERALL | | | |
| Immature granulocytes (10 ⁹ /L) | | | | Not Applicable | OVERALL | | | |
| Large unstained cells (10 ⁹ /L) | | | | Not Applicable | OVERALL | | | |
| NRBC /100WBC | | | | Not Applicable | OVERALL | 41 | 0.339 | 0.648 |

Note: Statistics calculated from consistent results. CV's ≥50 are not reported

Cumulative z-score

Your results

Cumulative graph

+/- 2SD

Overall statistics

Subcontracted Activities : Postal Services
Courier Services

Authorised by: Hazel Aggett - PT Scheme Manager

PTS Manager

Important notice

* End Of Report *

Please Note: Sample sizes less than 5 may result in distortion of the mean and as a consequence must be taken with reserve. This is a confidential report that summarises the performance of your laboratory.

Print Date: 13/11/2020

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Page 1 of 1

Figure: NHLS Automated Differential Count (5-part differential) report

NHLS Bacteriology Proficiency Testing Scheme Instructions

a) Scope

The NHLS PTS for Bacteriology aims to determine the laboratory policy on handling specimens including complete identification, antimicrobial susceptibility testing and recommendations to clinicians. Participants are encouraged to perform all of the survey challenges.

b) Selection of sample

Isolates that are included in the NHLS PTS for bacteriology are carefully characterised to ensure that typical features are present to facilitate identification. Prior to distribution, phenotypic methods are used to test the isolates. The design of the NHLS PTS for bacteriology is reviewed annually at the advisory committee meetings.

c) Homogeneity and stability

All testing materials are tested and guaranteed for homogeneity and stability in the initial stage as part of the NHLS PTS internal quality control process.

d) Sample reception

Each survey consists of four samples; **Sample A, Sample B, Sample C and Sample D**, unless otherwise stated. Please open package and inspect for any breakages, possible deterioration during transportation or missing samples. Please keep all samples **refrigerated** until time of testing.

e) Reconstitution and inoculation of lyophilized culture

Aseptically rehydrate the freeze-dried material by adding 1ml of a suitable broth e.g. nutrient broth or BHI broth, to the vial using a sterile syringe. Gently swirl the vial to dissolve the material. Allow to stand for 10-15 minutes before sub-culturing the material. Inoculate the suspension onto media appropriate for the type of sample supplied. Keep the reconstituted vial at room temperature until you have identified the organisms fully.

f) Proficiency test item –treatment and analysis

Read the clinical details and processing instructions for each sample. Samples shall be analysed using your own standard operating procedures. All participants are required to use the test method of their choice.

g) Factors that could influence the testing i.e. Nature of the PT items, conditions of storage, whether the PTS is limited to selected methods and timing of the PT Item

Temperature: Samples are shipped at ambient conditions. Please ensure that samples are refrigerated on receipt. When ready to start processing bring samples to room temperature and keep them at room temperature at all times until final identification.

Stability: Some of the simulated specimens have a limited viability; therefore, your laboratory should process the samples as soon as they are received in the laboratory.

h) Special handling instructions and safety requirements

If the package contains broken samples, sterilize (autoclave) the container and contents immediately. Dispose broken samples as per safety protocols used in your laboratory. Guard against the production of aerosols. Please follow universal safety precautions at all times.

i) Specific environmental conditions that the tests must be performed

Please keep all processed samples at room temperature until you have final identification of the organism/s.

j) Recording and submission of PTS results

Print a response form, clinical scenarios and code booklet from www.nhls.ac.za. If an answer code is not provided in the table, please write out the answer in the comment space. If any other format is used to, report results other than that requested by NHLS PTS provider, then the result will not be evaluated. Please adhere to the format in which we request antimicrobial susceptibility results to be reported. Return the completed survey response form by the survey deadline via email to bactpts@nhls.ac.za or fax to 086 225 2460. Responses will not be evaluated if instructions are not followed.

NHLS MYCOBACTERIOLOGY CULTURE

a) Scope

The NHLS PTS for Mycobacteriology Culture aims to determine the laboratory policy on handling specimens and to obtain an objective measure of the diagnostic ability of participating laboratories and build capacity in the field of human diagnostic tuberculosis in Africa. Participants are encouraged to perform all of the survey challenges.

b) Proficiency Test Item –Treatment and analysis

Read the clinical details and processing instructions per sample. Instructions and response forms are available on the NHLS internet www.nhls.ac.za. Instructions on how to access the information was sent with first survey samples. Samples shall be analysed using your own standard operating procedures. All participants are required to use the test method of their choice unless otherwise stated for culture.

c) Survey Requirements;

The NHLS PTS for Mycobacteriology Culture endeavours to assess all aspects of specimen-management, such as turn-around time, accuracy of reports, clinical relevance of results, specimen handling, *etc.* Rapid turn-around time is an essential element of specimen-management.

If a laboratory code is not completed on the survey questionnaire or results are received after 24h00 on the closing date then these results will not be assessed, this is equivalent to omitting a patient's name on a report.

Please contact NHLS PT if you are unsure of your LABORATORY CODE

e) Factors that could influence the testing e.g. Nature of the PT items, conditions of storage, whether the PTS is limited to selected methods and timing of the PT Item.

Temperature: Cultures are shipped at ambient conditions. On receipt in the laboratory, please ensure that cultures are stored and processed at room temperature at all times unless instructions are supplied to the contrary

Stability: Process the samples as soon as they are received in the laboratory.

f) Selection of samples:

All laboratories receive identical test panels. The test panel includes 4 samples whose composition of the test panels may vary with each survey.

g) Homogeneity and stability:

All testing materials are tested and guaranteed for homogeneity and stability in the initial stage as part of the NHLS PTS internal quality control process.

h) Mycobacteriology survey contents

The survey consists of 4 samples, 4 Lowenstein Jensen (LJ) samples or a combination of LJ slopes and lyophilized samples.

The composition of the test panels may vary with each survey.

i) Special handling:

If the package contains broken PTS samples, sterilise (autoclave) the container and contents immediately. Dispose of according to normal procedures in your laboratory. Guard against the production of aerosols. Please follow universal safety precautions at all times.

j) Specific environmental conditions that the tests must be performed at.

All PTS samples should be stored at room temperature and are stable for the period of the programme.

k) Instructions on returning of proficiency test items.

Not applicable for this PTS.

l) Sample reception

Please open package and inspect for any breakages, possible deterioration during transportation or missing samples, inform PTS Co-ordinators in writing if samples were unsuitable and should you require a replacement sample.

m) Reconstitution of samples

Indicated on the response form if needed.

n) Recording and submission of PTS Results.

All responses may be submitted via fax +27 (0) 86 225 2458 , email tbpts@nhls.ac.za and on the online portal: <http://ptschemes.nhls.ac.za/>

May you please indicate the laboratory code, scheme and survey no. on the title of email when emailing results.

e.g. 000 Mycobacteriology Culture Results 0123

PLEASE DO NOT USE OTHER EMAIL ADDRESSES FOR SUBMISSION OF RESULTS, DO NOT REDESIGN THE RESPONSE FORM.

STATE YOUR LABORATORY CODE ON THE RESPONSE FORM.

RESPONSE FORMS MUST BE COMPLETED IN FULL.

Please note your results will not be evaluated if the above instructions are not adhered to

o) Closing date for submission of results and consequence of late submission or no returns.

Closing dates are indicated under **shipments and receipt of samples** in general information section of the document

Non-returns will be issued for all late submissions.

If the response form is incomplete or results are received after 24h00 of the closing date, then these results will not be evaluated.

p) Evaluation of responses:

The scheme uses either acceptable or unacceptable based on the qualitative results submitted by the participants. All acceptable (correct) results are thus given a score of 6, 8 or 10 depending on test required and all unacceptable (incorrect) results are given a score of 0.

r) Reporting

Final report:

The performance of NHLS participant may be disclosed to a restricted list of individuals; viz: regional QA Managers and QA Co-ordinators as per NHLS Policy. When external parties require the PTS report, a written request shall be submitted to the scheme managers by the participant.

Re-issue of reports:

The PT providers do not accept responsibility for reports lost or misplaced by the participant. Reports will be reprinted if a request is made in writing prior to the shipment of the next survey.

NHLS Genotype Line Probe Assay (LPA) of Mycobacterium Strain

Note: There has been changes from the previous 2022/23 cycle. The MTBDRplus has been discontinued due the change in procedures implemented by the laboratories. Only CM is performed on three isolates.

a) Scope

The NHLS PTS for LPA aims to determine the laboratory policy on handling specimens including complete testing and final results interpretation. Participants are encouraged to perform testing on all samples.

b) Survey Requirements

The NHLS PTS for LPA endeavors to assess all aspects of specimen-management, such as turn-around time, accuracy of reports, specimen handling, etc.

Rapid turn-around time is an essential element of specimen-management.

Incomplete laboratory codes on response forms will result in non-assessment.

Response forms received after 12:00 midnight on the closing date will also result in non-assessment. This is equivalent to omitting patient details on a report and not meeting turn-around times (TAT).

c) Factors that could influence the testing i.e. Nature of the PT items, conditions of storage

Temperature: Samples are shipped at ambient conditions. Please ensure that samples are stored and processed at room temperature at all times unless instructions are supplied to the contrary.

d) Sample reception

Please open package and inspect for any breakages, possible deterioration during transportation or missing samples. Inform PTS Manager/s in writing if samples are unsuitable and whether you require a replacement sample.

e) Special Handling instructions and safety requirements.

Dispose of broken samples as per safety protocols used in your laboratory. Guard against the production of aerosols. Please follow universal safety precautions at all times.

f) Specific environmental conditions that the tests must be performed at.

Samples should be stored at ambient conditions before processing, and must be examined by routine methods.

g) Instructions for Analysis of Proficiency Test Item

1. Samples shall be analyzed using your own standard operating procedures.
2. **Include controls**, record results and **attach PCR** strips on the Genotype Common Mycobacteria (CM) response sheet.
3. **Sample Details**: The package contains three Heat Inactivated MGIT Culture samples (**LPA 01 -03**) with +-2.5ml of culture

h) Instructions on returning of proficiency test results.

Instructions and response forms are available on the NHLS internet

www.nhls.ac.za.

Please send the original PCR strips for evaluation – [HAIN Genoscan results, if available, are also acceptable]

Record all sample numbers on the response form for the CM

i) Recording of results

Please record results as in the example below:

CM

| SAMPLE NO. 1 | CONTROLS | BANDS | INTERPRETATION |
|-----------------|--|--------|-------------------------------|
| RESULTS | CC, UC, GC - present | 4 | <i>Mycobacterium avium</i> |
| ATTACH CM STRIP |  | | |
| | CONTROLS | BANDS | INTERPRETATION |
| RESULTS | CC, UC, GC - present | 10, 12 | <i>Mycobacterium kansasii</i> |
| ATTACH CM STRIP |  | | |

Result forms must be completed in full, Laboratory Code must be stated.

j) Submission of PTS Results.

Please indicate the laboratory code, scheme and survey no. on the title of the email when submitting results.

e.g. 000 LPA results 0123

k) Closing date for submission of results and consequence of late submission or no returns.

Closing dates are indicated under **shipments and receipt of samples** in general information section of the document. Non-returns will be issued for all late submissions.

If the response form is incomplete or results are received after 24h00 of the closing date, then these results will not be evaluated.

l) Reporting

Final Report: Hard copies are sent via post prior to the shipment of the next survey.

All performance data is treated as confidential. NHLS participants' performances may be disclosed to a restricted list of individuals, their regional QA managers and QA Coordinators as per NHLS Policy.

When sponsors require the PTS report a written request must be submitted to the PTS Manager.

Should a regulatory authority or any other 3rd party require participants PTS results, and then the affected participant shall be required to submit written consent to the PTS Manager.

Amended Report: Amended reports will be issued on investigation of a written dispute or appeal. Amended reports will not be issued if the source of the transcription error was the participant.

NHLS MYCOBACTERIOLOGY MICROSCOPY

- a) The NHLS PTS for Mycobacteriology Microscopy endeavors
- b) to assess all aspects of specimen-management, such as turn-around time, accuracy of reports, clinical relevance of results, specimen handling, *etc.*
- c) Rapid turn-around time is an essential element of specimen-management.
- d) A laboratory must be registered with the NHLS Quality Assurance Department and be in possession of a laboratory code.
- e)
- f) If a laboratory code is not completed on the survey questionnaire or results are received after 12am on the closing date then these results will not be assessed, this is equivalent to omitting a patient's name on a report.
- g) Please contact NHLS PTS provider (PTSP) if you are unsure of your LABORATORY CODE

h) Scope

The NHLS PTS for TB Microscopy aims to determine the laboratory policy on handling specimens including microscopy and quantitation of the acid fast bacilli present in the smears and to obtain an objective measure of the diagnostic ability of participating laboratories and build capacity in the field of human diagnostic tuberculosis in Africa. Participants are encouraged to perform all of the survey challenges.

i) Proficiency Test Item –Treatment and analysis

Samples shall be analyzed using your own standard operating procedures. All participants are required to use the test method of their choice.

j) Survey Requirements

k) Factors that could influence the testing for examples: nature of the PT items, conditions of storage, whether the PTS is limited to selected methods and timing of the PT Item.

Temperature: Samples are shipped at ambient conditions. Please ensure that samples are stored and processed at room temperature at all times unless instructions are supplied to the contrary.

l) Selection of samples:

All laboratories receive identical test panels. The test panel includes slides with different grades of positivity in order to evaluate the ability of the technicians to properly grade positive slides. The composition of the test panels may vary with each survey. Prior to distribution, the smears are quality controlled by using standard staining and microscopy methods.

The design of the NHLS PTS for Mycobacteriology/(TB) Microscopy is reviewed annually at the advisory committee meetings.

m) Homogeneity and stability:

All testing materials are tested and guaranteed for homogeneity and stability in the initial stage as part of the NHLS PTS internal quality control process.

n) Clinical Details and Sample preparation

The package contains 2 slide mailers labeled TB slides unstained. Each test panel includes ten slides which have been heat fixed. **All the slides are unstained**

o) Special Handling instructions and safety requirements.

If the package contains any broken slides or unsuitable slides, please dispose of them according to normal procedures in your laboratory and if available participants can request repeat slides. Please follow universal safety precautions at all times.

p) Specific environmental conditions that the tests must be performed at.

Please keep all processed smears at room temperature until you have received either the final evaluation of the survey

q) Instructions on returning of proficiency test items.

Laboratory results forms and smears (if necessary) are returned for evaluation to the Academic Affairs Research and Quality Assurance (AARQA) at the NHLS. It is to be noted that the returning of slides is not mandatory for the laboratories.

Returned slides are reviewed only should there be a major error (High False negative/ High False positive) on evaluation.

r) Sample reception

Please open package and inspect for any breakages, possible deterioration during transportation or missing samples, inform PTS Managers in writing if samples were unsuitable and should you require a replacement sample.

Please keep all processed smears at room temperature until you have received either the interim results or final evaluation of the survey.

s) Instructions for completing the survey

Slides A-J:

Slides A-J have been made using concentrated sputum and fixed. Stain the slides using your laboratories routine procedure. Record the staining procedure used. Report on the presence of acid-fast bacilli and if present, supply a quantitative result

Reporting of results:

Use the slide quantification scheme recommended by the International Union against Tuberculosis and Lung Disease (Refer to table 1)

Table 1: IUALTD grading system for TB microscopy slides

| Carbol-fuchsin stain under oil | Report |
|---------------------------------------|---|
| - No AFB - | No acid-fast bacilli observed/ negative |
| 1 to 9 AFB/100 fields | record exact number (scanty) |
| 10 to 99 AFB/100 fields | 1+ |
| 1 to 10 AFB/field | 2+ |
| >10 AFB/field | 3+ |

Note: Laboratories using Auramine O are requested to use an appropriate new reporting format table 2 below.

Table 2: IUALTD New Auramine O new reporting format

| What you see (200x) | What you see (400x) | What to report |
|----------------------------|----------------------------|------------------------|
| No AFB in one length | No AFB in one length | No AFB observed |
| 1-4 AFB in one length | 1-2 AFB in one length | Confirmation required* |
| 5-49 AFB in one length | 3-24 AFB in one length | Scanty |
| 3-24 AFB in one field | 1-6 AFB in one field | 1+ |
| 25-250 AFB in one field | 7-60 AFB in one field | 2+ |
| >250 AFB in one field | >60 AFB in one field | 3+ |

** Confirmation required by another technician or prepare another smear, stain and read*

t) Recording and submission of PTS Results.

Instructions are available on the NHLS internet www.nhls.ac.za. Instructions on how to access the information was sent.

All responses to be submitted on the online portal system only.

u) Closing date for submission of results and consequence of late submission or no returns.

Closing dates are indicated under **shipments and receipt of samples** in general information section of the document. Non-returns will be issued for all late submissions.

If the results are received after 24h00 of the closing date, then these results will not be evaluated.

v) Evaluation of submitted results

Participants are allowed to stain the slides with a method of choice (ZN or Auramine O).

The scheme uses the International Union Against TB and Lung Disease IUATLD grading system for grading slides as in Table 1 below. A target value is assigned for all smears.

In the event of a lack of referee laboratory and participant consensus for a challenge, the sample will not be assessed.

Errors are classified using Table 3. Major discrepant results returned from the participating laboratory to the PT providers are confirmed by the PTS staff. Each result is allocated a score using Table 3. The scores are totalled.

A total score of 80% or more is deemed to be an acceptable performance.

Table 3: Classification of errors

| Result of participating laboratory | Result as deemed by QA | | | | |
|------------------------------------|------------------------|---------------|---------|---------|---------|
| | Negative | Exact /Scanty | 1+ | 2+ | 3+ |
| Negative | Correct | LFN | HFN | HFN | HFN |
| Exact no/Scanty | LFP | Correct | Correct | QE | QE |
| 1+ | HFP | Correct | Correct | Correct | QE |
| 2+ | HFP | QE | Correct | Correct | Correct |
| 3+ | HFP | QE | QE | Correct | Correct |

Interpretation

| | |
|---------------------------|-------------|
| QE = Quantification Error | Minor error |
| LFN = Low False Negative | Minor error |
| LFP = Low False Positive | Minor error |
| HFN = High False Negative | Major error |
| HFP = High False Positive | Major error |

Table 4: Scoring system

| Classification | Interpretation | Score |
|------------------|----------------|-----------|
| Correct response | No error | 10 points |
| QE | Minor error | 5 points |
| LFN, LFP | Minor error | 5 points |
| HFN, HFP | Major error | 0 points |

NHLS MYCOLOGY YEAST

a. Introduction

This PT Scheme is coordinated by the Microbiology PT Scheme Managers at NHLS Academic Affairs, Research and Quality Assurance (AARQA). Samples for the scheme are prepared with assistance from National Institute for Communicable Diseases, a Division of the National Health Laboratory Service. Please refer to the most recent correspondence from the Microbiology PT Scheme Managers for their contact details.

b. Scope

The NHLS PTS for Mycology (Yeasts) aims to teach participants to identify pathogenic yeasts. Participants are encouraged to perform all of the survey challenges, even if their laboratories do not usually perform them routinely.

c. Selection of samples

Isolates which are included in the NHLS PTS for Mycology (Yeasts) are carefully characterized to ensure that typical features are present to facilitate identification. Prior to distribution, the organisms are tested using standard phenotypic methods and a part of the fungal genome is sequenced to confirm the final identity.

d. Proficiency Test Item –Treatment and analysis

The package contains sample **E** (slide) and **F** (culture suspended in water). Laboratories that perform antifungal susceptibility testing receive sample **H** (culture suspended in water). If the package contains broken samples, sterilize (autoclave) the container immediately. Dispose of according to normal procedures. Guard against the production of aerosols.

Inoculation of culture suspended in sterile water

After gently swirling, inoculate approximately half of the suspension directly onto media appropriate for the type of sample supplied. Keep the vial at room temperature until you have identified the isolate completely.

Instructions for samples

Read the clinical scenarios provided with each survey samples. Examine the provided slide/ simulated specimen (sample **E**) for evidence of yeasts. Identify the culture suspended in water (sample **F**) using standard operating procedures. *If your laboratory routinely performs antifungal susceptibility testing*, identify the culture suspended in water (**sample H**) and perform testing for the listed antifungal agents using standard operating procedures.

Please complete the survey questionnaire using the provided answer codes or by marking the appropriate tick box. If an answer code is not provided in the table, please write the full answer in the questionnaire. Return the survey questionnaire **for Mycology yeast advanced** before the return deadline: email mycopts@nhls.ac.za, fax +27 (0) 86 225 2458 and on the online portal <http://ptschemes.nhls.ac.za/>

e. Survey Requirements;

The NHLS PTS for Mycology (Yeasts) endeavors to assess aspects of specimen management, such as turn-around time, accuracy of reports, clinical relevance of results, specimen handling, *etc.* Rapid turn-around time is an essential element of specimen management, so any survey questionnaires which are received after the return deadline will be penalized and those received after the preliminary survey answers are distributed will not be assessed. If a laboratory name and number is not completed on the survey questionnaire, it is considered equivalent to leaving a patient's name off a laboratory report. These results will not be assessed, even if a covering fax sheet is sent with them.

Please contact NHLS PT if you are unsure of your LABORATORY CODE

- f. Factors that could influence the testing e.g. Nature of the PT items, conditions of storage, whether the PTS is limited to selected methods and timing of the PT Item.**

Temperature: Samples are shipped at ambient conditions. On receipt in the laboratory, please ensure that samples are stored and processed at room temperature at all times unless instructions are supplied to the contrary

g. Homogeneity and stability:

All testing materials are tested and guaranteed for homogeneity and stability in the initial stage as part of the NHLS PTS internal quality control process.

h. Sample Dispatch and actions to be taken if sample was not received.

Should you not receive your shipment or the condition of the shipment is unsuitable, please contact the scheme coordinators within **5 working days** of receipt.

i. Specific environmental conditions that the tests must be performed at.

All PTS samples should be stored at room temperature and are stable for the period of the programme.

j. Instructions on returning of proficiency test items.

Not applicable for this PTS

k. Sample reception

Please open package and inspect for any breakages, possible deterioration during transportation or missing samples, inform PTS Co-ordinators in writing if samples were unsuitable and should you require a replacement sample

l. Recording and submission of PTS Results.

All responses for the **Mycology Yeast Advanced** may be submitted via fax +27 (0) 86 225 2458, email mycopts@nhls.ac.za and on the online portal

<http://ptschemes.nhls.ac.za/>

May you indicate the laboratory code, scheme and survey no. on the title of email when emailing results.

e.g. 000 Mycology yeast advanced 0123 results.

Note! Mycology Yeast Basic results to be submitted **online only**.

PLEASE DO NOT USE OTHER EMAIL ADDRESSES FOR SUBMISSION OF RESULTS,

DO NOT REDESIGN THE RESPONSE FORM.

STATE YOUR LABORATORY CODE ON THE RESPONSE FORM.

RESPONSE FORMS MUST BE COMPLETED IN FULL.

Please note your results will not be evaluated if the above instructions are not adhered to.

m. Corrective Action (CA)

The onus is on the participant to review evaluation reports, identify corrective actions, and to implement corrective and preventative measures, where applicable. If any assistance is required from the PT providers, the regional manager may contact the PTS Manager.

n. Response forms

Read the clinical details and processing instructions per sample. Instructions and response forms are available on the NHLS internet www.nhls.ac.za. Instructions on how to access the information was sent with first survey samples.

o. Survey Grading

The survey questionnaires are graded by one person using a model answer framework and moderated by a second person. The model answer framework is reviewed by the NHLS PTS Microbiology Advisory Committee.

NHLS Parasitology Blood Proficiency Testing Scheme Instructions

1.Scope

One of the main objectives of the Blood Parasites PT Scheme is to teach and participants are encouraged to perform all of the survey challenges, even if their laboratories do not perform them routinely. Participants are encouraged to keep survey specimens. Survey specimens can be used in the future as teaching aids, used as reference material or as controls for tests by participants.

The NHLS PTS for Parasitology Blood aims to assess other aspects, such as turn-around time, accurate result reports, clinical relevance of results, specimen handling etc. Rapid turn-around time is an essential element of PTS. PTS survey samples should be treated in the same way as routine patient specimens.

The NHLS PT Scheme procedure is that all late returns, received after the result deadline, or those submitted with incorrect/incomplete laboratory details on the PTS response form will not be assessed, even if a covering fax sheet is sent with it.

2.Survey requirements

a) Selection of sample

This survey contains 5 challenges. Identify any parasite(s) present, even if not pathogenic and write the answer codes. Only the answer codes will be assessed, not parasite names (except for code 33). More than one answer code can be reported for mixed infections. Do not report artefacts. The response form below will be sent with each shipment of samples with the clinical scenarios relevant to that survey.

b) Homogeneity and stability

All testing materials are tested and guaranteed for homogeneity and stability in the initial stage as part of the Parasitology Blood Internal Quality Control Process.

c) Actions to be taken if sample was not received

Should you not receive your shipment or the condition of the shipment is unsuitable, please contact the scheme Managers within the scheduled shipment week. Return of PTS items to the PT provider is not applicable for this PT scheme.

!!!Important!!!

PTS sample donation

We are always in need of blood parasite-positive specimens to use in this PT scheme. Ideally fresh EDTA blood (<8 hours old) is needed for preparation of good quality blood films; it is important for laboratories close to NHLS Sandringham to contact us, by telephone, immediately when they get a positive specimen so that we can arrange for collection.

d) Proficiency test item –treatment and analysis

Read the clinical details and processing instructions for each sample. Samples shall be analyzed using your own standard operating procedures. All participants are required to use the test method of their choice.

e) Factors that could influence the testing i.e. Nature of the PT items, conditions of storage, whether the PTS is limited to selected methods and timing of the PT Item

Temperature: Samples are shipped at ambient conditions. Please ensure that samples are stored and processed at room temperature at all times.

f) Special handling instructions and safety requirements

If the package contains broken samples, sterilize (autoclave) the container and contents immediately. Dispose broken samples as per safety protocols used in your laboratory.

g) Specific environmental conditions that the tests must be performed

N/A

h) Recording and submission of PTS results

Print a response form, clinical scenarios and code booklet from www.nhls.ac.za. All responses may be submitted via fax 086 225 2460 or email parapts@nhls.ac.za. Complete the response form using the appropriate answer codes provided.

NHLS Haematology Full Blood Count Proficiency Testing Scheme

1. Scope

The FBC is a group of tests that evaluate the cells that are circulate in blood including red blood cells, white cells and platelets. The FBC can evaluate the overall health and detect variety of diseases and conditions, such as infections, anaemia and leukemia. Blood cells are produced in the bone marrow, and are released into the bloodstream as needed.

The samples are shipped twelve times a year.

2. Sample matrix

- The scheme ships two stabilized whole blood samples every second month, in which participants are expected to process the sample, and report FBC parameters: (WCC, RBC, Hb, Hct, MCV, MCH, MCHC, RDW, PLT and MPV)

3. Participation

Participation is open to all Hematology laboratories who offer the tests covered by the NHLS PTS.

For all correspondence the unique identifier must all always be used.

4. Important information.

- If your laboratory has more than one backup instrument, the sample is sufficient to process through up to 3 instruments.
- Use the laboratory QA number for each result sheet submitted.

5. Sample preparation

Samples are sent to participants according to the survey schedule. The samples have been tested by an FDA approved method for the presence of HIV antigen, hepatitis B surface antigen as well as for hepatitis C antigen and have been found to be negative. As with all preparations of human origin, suitable precautions should be taken in the handling and disposal. After receipt of the samples should be stored at 2-8 °C until analysis.

6. Factors that can influence testing.

- Inadequate mixing of the PT sample.
- Technical errors associated with the assay.
- Improper storage.
- Not allowing the samples to reach the room temperature equilibrium.

7. Homogeneity and stability

All testing material have been tested and found to be homogeneous and stable. For the material that is procured the manufacturer issues the certificate of analysis for each survey.

8. Handling instructions and safety requirements.

- Upon receipt please refrigerate samples at (2-8 °C).
- To ensure consistent and reproducible results, the control material must be thoroughly mixed and handled in the same manner as patient sample.

9. Instruction for use.

- No reconstitution required – the samples contain 2.ml of stabilised whole blood.
- Allow to stand at RT for 15 minutes before testing.
- Mix well before processing.
- To mix, hold vial horizontally between palms of the hands. Do not pre-mix on a mechanical mixer.
- Roll the vial back and forth for 20-30 seconds; occasionally invert the vial, do not shake.
- Continue to mix in this manner until the red cells are completely suspended. Vials stored for a long time may need extra mixing.
- Gently invert the vial 8-10 times immediately before running each sample.
- Return vials to refrigerator within 30 minutes of use.

Beckman coulter users.

Please report the uncorrected WCC.

Siemens users.

Please report the uncorrected WCC.

Sysmex users

Sysmex XN: Please ensure TNC-N (Total Nuclear Cell Count (WBC#+NRBC) value is reported.

Mindray users

Analyze the QA material in the QC mode of the instrument in the same manner as you run daily QC, or as instructed in the Quality Control section of the Operator's Manual for your instrument.

10. Completing the result sheet or entering results on the online web portal

- After analysing the samples complete a result sheet by filling in the Laboratory name, QA lab number, date, instrument used and the name of the person who did the assays as well as the results you obtained. Use the blocks provided for the results.

- Incomplete result sheets will result in a corrective action/no return.
- **Please do not enter two numbers in a block.**
- Please report results in the SI units on the result form or online portal, if different units are used please use the conversion factors, **do not edit or change SI units on the results sheet.**

11. Stability and storage.

Opened tubes/vial are stable for 7 days stored at 2-8°C.

12. Indication of deterioration.

After mixing product should be similar in appearance to fresh whole blood. In unmixed tubes the supernatant may appear cloudy and reddish, this is normal and does not indicate deterioration. Other discolouration, very dark supernatant or haemolysis. Do not use the product if deterioration is suspected.

NHLS Manual Erythrocyte Sedimentation Rate (ESR) Proficiency Testing Scheme

1. Scope

Erythrocyte sedimentation rate is a test that indirectly measures the degree of inflammation present in the body. The red cells settle at a faster rate in the presence of an increased level of protein.

ESR PT material is an assayed level control for evaluating the accuracy and precision of manual Erythrocyte Sedimentation Rate (ESR) methods.

This ESR PT material is intended for use as supplied. Adulteration by dilution or addition of any material to the ESR PT material vial invalidates any diagnostic use of the ESR PT material.

The samples are shipped four times a year.

2. Sample matrix

- The scheme ships one stabilized whole blood sample, in which participants are expected to process the sample, and report the ESR in mm/hr.

3. Participation

Participation is open to all Haematology laboratories who offer the tests covered by the NHLS PTS.

For all correspondence the unique identifier must all always be used.

4. Important information.

- Use the laboratory QA number for each result sheet submitted.
- Please submit a completed result sheet with instrument serial number and model of the instrument indicated.

5. Sample preparation

Samples are sent to participants according to the survey schedule. The samples have been tested by an FDA approved method for the presence of HIV antigen, hepatitis B surface antigen as well as for hepatitis C antigen and have been found to be negative. As with all preparations of human origin, suitable precautions should be taken in the handling and disposal. After receipt of the samples should be stored at 2-8 °C until analysis.

6. Factors that can influence testing.

- Inadequate mixing of the PT sample.
- Technical errors associated with the assay.
- Improper storage.
- Not allowing the samples to reach the room temperature equilibrium.
- Dilution of PT material.

7. Homogeneity and stability

All testing material have been tested and found to be homogeneous and stable as part of the internal quality control processes.

8. Handling instructions and safety requirements.

- Upon receipt please refrigerate samples at (2-8 °C).
- To ensure consistent and reproducible results, the control material must be thoroughly mixed and handled in the same manner as patient sample.

9. Instruction for use.

Manual procedure:

- **Do not dilute ESR PT material-use directly from the vial.**
- **If you have to transfer the sample to another tube, please use a dry tube-no anticoagulant!**
- Remove vial from refrigerator and allow it to equilibrate to room temperature (18-30 degrees) for 20-30 minutes.
- Mix vial through inversion and by gently rolling upright between palms until red cells are completely suspended. Continue to mix for 90 seconds. The samples may also be rotated on a rotator prior to use.
- Follow your laboratory standard operating procedure for processing the manual ESR.

10. Stability and storage.

ESR sample (open vial) is stable for 95 days when stored at 2-30°C.

11. Indication of deterioration.

After mixing product should be similar in appearance to fresh whole blood. In unmixed tubes the supernatant may appear cloudy and reddish, this is normal and does not indicate deterioration. Other discolouration, very dark supernatant or haemolysis. Do not use the product if deterioration is suspected.

NHLS Automated Coagulation (PT/INR and APTT) Proficiency Testing Scheme

1. Scope

1.1 PT and APTT

The central event in the coagulation pathway is the production of the thrombin, which acts upon the fibrinogen to produce fibrin and therefore fibrin clots. This clot is further strengthened by crosslinking action of factor XIII, which itself is activated by thrombin. The two commonly used coagulation tests, activated partial thromboplastin time (APTT) which measures the integrity of the intrinsic system and the common components. The Prothrombin time (PT) along with its derived measure international normalized ratio (INR) are assays collectively evaluate the extrinsic and common pathway of coagulation. The INR is a calculation based results of a PT and is utilised to monitor individuals being treated with blood thinning medication warfarin. The PT and INR are used to monitor the effectiveness of the anticoagulant warfarin.

2. Sample matrix

- The scheme ships two lyophilized material, in which participants are expected to process the sample and report PT in seconds, INR, APTT in seconds and interpretation.

3. Participation

Participation is open to all Haematology laboratories who offer the tests covered by the NHLS PTS.

For all correspondence the unique identifier must all always be used.

4. Important information.

- The clinical information will be included on the insert issued with each survey.
- If your laboratory has more than one backup instrument, the samples are sufficient to process through up to 3 instruments.
- All samples are lyophilized plasma and require reconstitution.
- Use the laboratory QA number for each result sheet submitted.
- Please submit a completed result sheet with instrument serial number and model of the instrument indicated.

5. Sample preparation

Samples are sent to participants according to the survey schedule. The samples have been tested by an FDA approved method for the presence of HIV antigen, hepatitis B surface antigen as well as for hepatitis C antigen and have been found to be negative. As with all preparations of human origin, suitable precautions should be taken in the handling and disposal. After receipt of the samples should be stored at 2-8 °C until analysis.

6. Factors that can influence testing.

- Inadequate mixing of the PT sample.
- Technical errors associated with the assay.
- Improper storage.
- Not allowing the samples to reach the room temperature equilibrium.
- Wrong diluent.
- Incorrect volume.

7. Homogeneity and stability

All testing material have been tested and found to be homogeneous and stable. For the material that is procured the manufacturer issues the certificate of analysis for each survey.

8. Handling instructions and safety requirements.

- Upon receipt please refrigerate samples at (2-8 °C).
- To ensure consistent and reproducible results, the control material must be thoroughly mixed and handled in the same manner as patient sample.

9. Instruction for use.

- Carefully open the vial of material.
- Add 1 ml of redistilled/purified water into each vial,
- Allow to stand for 10 minutes.
- Gently swirl the vials.
- Allow to stand again for 15 minutes.
- The samples are ready to be processed.
- Use the material within 8 hours of reconstitution.

10. Stability and storage.

- Reconstituted and stored at 2-8°C stable for 8 hours.
- Reconstituted and frozen at -20°C stable for 48 hours.
- Opened vial stored at 2-8°C stable for 7 days.
- Opened vial stored at -20°C stable for 28 days.
- Unopened vial stored at 2-8°C stable until expiry date.

All PT material to be discarded as per the waste management standard operation procedure.

Appendix A: Example Coagulation (PT and PTT) report online

6/13/23, 3:19 PM

NHLS PT/INR & APTT - Survey 0122 Report

Haematology Proficiency Testing Scheme
Academic Affairs Research and Quality Assurance Department
1 Modderfontein Road
Sandringham 2131
South Africa
Telephone : 0113866148

Survey number

PT/INR & APTT Survey: 0122

Your lab code

Lab results compared with Peer results

Overall results

Participant Report : Provisional
Identification Code:
Region:
Survey Start Date: 21 April 2022
Survey End Date: 29 April 2022

Date Received: 13 Apr 2022
Date Assayed: 20 Apr 2022
Scheme Manager: Zazi Molebatsi
Email: haempts@nhls.ac.za

QUANTITATIVE RESULTS

Peer Group Comparison Results

Overall Comparison of Results

Your Instrument information & sample number

Peer Group Summary: Siemens BPTII
Serial Number: D2738742

| Parameter Method | Unit | Your Result | Your z-score | N | Robust Mean | SD | CV% |
|---|--------|-------------|--------------|----|-------------|-------|------|
| Prothrombin time (PT) - Optomechanical | Second | 13.9 | 0.74 | 16 | 12.99 | 1.221 | 9.39 |
| International normalised ratio (INR) - Optomechanical | Ratio | 1.13 | -0.06 | 18 | 1.13 | 0.076 | 6.67 |
| Activated partial thromboplastin time (APTT) - Optomechanical | Second | 26.8 | -0.98 | 12 | 29.32 | 2.579 | 8.80 |

Peer Group Summary: Siemens BPTII
Serial Number: D2738742

SAMPLE: A02

| Parameter Method | Unit | Your Result | Z-Score | N | Robust Mean | SD | CV% |
|---|--------|-------------|---------|----|-------------|-------|-------|
| Prothrombin time (PT) - Optomechanical | Second | 18.0 | 0.35 | 17 | 17.35 | 1.848 | 10.65 |
| International normalised ratio (INR) - Optomechanical | Ratio | 1.48 | -0.20 | 19 | 1.52 | 0.195 | 12.81 |
| Activated partial thromboplastin time (APTT) - Optomechanical | Second | 49.1 | -1.11 | 11 | 50.80 | 7.210 | 14.19 |

Your results

All Results

SAMPLE: A01

| Parameter | Your Result | Z-Score | N | Robust Mean | SD | CV% |
|---|-------------|---------|----|-------------|-------|-------|
| Prothrombin time (PT) (Second) | 13.9 | 1.49 | 72 | 12.74 | 0.779 | 6.11 |
| International normalised ratio (INR) (Ratio) | 1.13 | 0.50 | 74 | 1.09 | 0.073 | 6.65 |
| Activated partial thromboplastin time (APTT) (Second) | 26.8 | -1.11 | 55 | 31.03 | 3.801 | 12.25 |

All R results

SAMP: E: A02

| Parameter | Your Result | Z-Score | N | Robust Mean | SD | CV% |
|---|-------------|---------|----|-------------|-------|-------|
| Prothrombin time (PT) (Second) | 18.0 | 1.50 | 64 | 16.48 | 1.014 | 6.15 |
| International normalised ratio (INR) (Ratio) | 1.48 | 0.51 | 66 | 1.42 | 0.118 | 8.31 |
| Activated partial thromboplastin time (APTT) (Second) | 49.1 | -0.24 | 55 | 50.80 | 7.210 | 14.19 |

Acceptable z-score key note

Key:
Non-acceptable response (z-score $\geq \pm 2$)

Results Interpretation

PARTICIPANT RESULT

This section is NOT ASSESSED and is strictly for information purposes only

Instrument Group / Method: Opto-mechanical Serial Number: D2738742

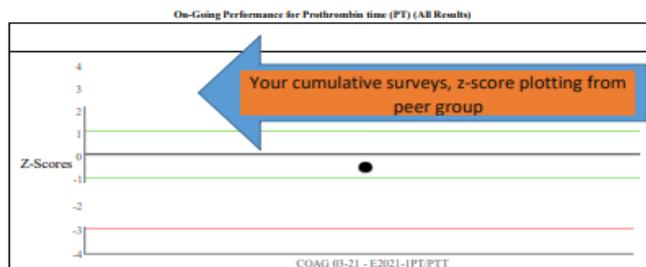
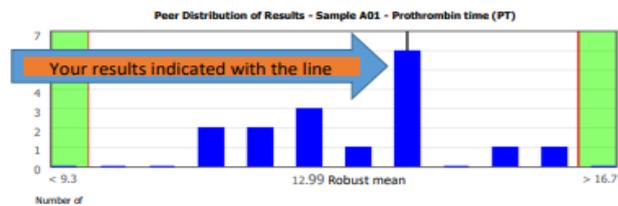
| Sample | Your Result | Expected Result |
|---|-------------|-----------------|
| A01 - Prothrombin time (PT) (Second) | Normal | Normal |
| A01 - International normalised ratio (INR) (Ratio) | Below | Below |
| A01 - Activated partial thromboplastin time (APTT) (Second) | Normal | Normal |
| A02 - Prothrombin time (PT) (Second) | Extended | Normal |
| A02 - International normalised ratio (INR) (Ratio) | Below | Below |
| A02 - Activated partial thromboplastin time (APTT) (Second) | Extended | Normal |

| Peer-Group Summary - Sample A01 - Prothrombin time (PT) | | | | |
|---|----|-------------|--------------------|------|
| Instrument Group / Method | N | Robust Mean | Standard Deviation | CV% |
| Prothrombin time (PT) (Second) | 72 | 12.74 | 0.779 | 6.11 |

| | | | | |
|---|----|-------|------|-------|
| Siemens BFTII / Opto-mechanical | 16 | 12.99 | 1.22 | 9.39 |
| Siemens BFTII / Photo-optical detection | 12 | 13.21 | 1.50 | 11.38 |
| ACL LITE / Coagulometric | 8 | 12.38 | 0.38 | 3.05 |
| Siemens BFTII / Mechanical clot detection | 8 | 13.93 | 2.97 | 21.32 |
| Other / Photo-optical detection | 5 | 12.24 | 0.63 | 5.19 |
| Other / Coagulometric | 4 | 12.83 | 0.46 | 3.57 |
| Other / Mechanical clot detection | 4 | 13.20 | 1.04 | 7.90 |
| ACL LITE / Nephelometry | 3 | 12.67 | 0.58 | 4.56 |
| Siemens BFTII / Coagulometric | 3 | 12.83 | 0.25 | 1.96 |
| Other / Opto-mechanical | 1 | 12.70 | 0.00 | |
| ACL LITE / Mechanical clot detection | 1 | 12.40 | 0.00 | |
| ACL LITE / Photo-optical detection | 1 | 12.60 | 0.00 | |

| SAMPLE A01 - Prothrombin time (PT) | | | | | |
|------------------------------------|-----------------------------------|-------------|------|------|---------|
| BFTII - Opto-mechanical | Comparative Statistics Peer Group | | | | Z-Score |
| | N | Robust Mean | SD | CV% | |
| Your Result 13.9 | 16 | 12.99 | 1.22 | 9.39 | 0.74 |

Lab Z-score from peer group



| Peer-Group Summary - Sample A01 - International normalised ratio (INR) | | | | |
|--|---|--|--------------------|-----|
| Instrument Group / Method | N | Peer data per instrument methods and group | | |
| | | Mean | Standard Deviation | CV% |
| | | | | |

GENERAL NOTES. (FBC , Auto differential Count, ESR and PT/APTT)

a) Completion of result sheet

- The survey number be written on the form.
- The QA number.
- Instrument name and serial number.
- Results obtained **please do not submit the instrument raw data.**
- Name of personnel who processed the PT samples.
- Only the current financial year 20XX/20XX result sheets will be acceptable.
- When entering results on the web based online system save your results, check for errors (as per your manual results entry lab protocol) and submit results by pressing submit button.

If results are saved and not submitted, no return will be issued.

Also note that once results are submitted changes cannot be made.

Beckman coulter users.

Please report the uncorrected WCC.

Siemens users.

Please report the uncorrected WCC.

Sysmex users

Sysmex XN: Please ensure TNC-N (Total Nuclear Cell Count (WBC#+NRBC) value is reported.

Mindray users

Analyze the QA material in the QC mode of the instrument in the same manner as you run daily QC, or as instructed in the Quality Control section of the Operator's Manual for your instrument.

b) Laboratory performance report.

A confidential performance report is issued on monthly basis to participating laboratories.

The information provided is as follows.

The overall mean, standard deviation (SD) and coefficient of variation (CV) for each test parameter for all method.

The results outside the 2SDI (z-score) are flagged.

c)Performance evaluation

1. Consensus of the mean (Chauvenet's Criterion)

Participant results are compared to consensus mean that uses Chauvenet's Criterion.

As an individual performance indicator the Z-score is used. The Z-score indicates the distance between the participants' result and the consensus value expressed as a ratio of the standard deviation.

The Z-score can be either positive or negative depending whether the participants' results is higher or lower than the consensus value.

The z-score is calculated as follows: [(laboratory result) - (mean result of all laboratories)] / (standard deviation of all results)

d)Acceptance criteria

Each participant should carefully evaluate the Z-scores given in the report. In accordance with ISO guideline 17043 and ISO guideline 13528 the following acceptance criteria are used:

- Z score ≤ 2 the results are acceptable.
- Z score > 2 the results are unacceptable (action signal).
- A single action signal or two warning signals in consecutive surveys shall be taken as evidence that an anomaly has occurred that requires investigation by the laboratory.

The formula is as follows:

$$z = \frac{t - \bar{x}}{SD}$$

Where $t = \text{lab result}$

$\bar{x} = \text{overall mean}$

$SD = \text{standard deviation}$

In other words:

$$z \text{ score} = \frac{\text{your result} - \text{method mean}}{\text{standard deviation}}$$

For example:

Your result = 125

Method mean = 130

SD = 5

Z score = -1

Note:

Sample sizes less than 10 may result in the distortion of the mean and as a result must be treated with reserve.

Appendix: B Example of FBC report.



**National Health Laboratory Services
Proficiency Testing Program**

Proficiency Testing Schemes
Academic Affairs Research and
Quality Assurance Department
01 Modderfontein Road
Sandringham, South Africa
2131

**HAEMATOLOGY (FBC)
Preliminary Report**

Tel : +27 (0)11 386 6148

386 6296

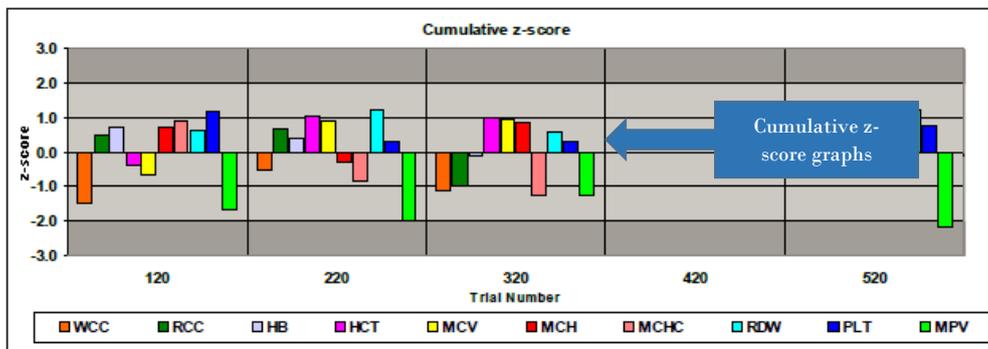
Survey
number

| CONTACT: | LABORATORY: | TESTED PARAMETER | RESULTS | OUT OF LIMITS | z-score | MEAN | SD | CV (%) |
|----------|--------------------|---------------------------|---------|---------------|---------|------|-------|--------|
| | Laboratory results | WCC (10 ⁹ /L) | 2.40 | | 0.00 | 275 | 2.40 | 6.3 |
| | | RCC (10 ¹² /L) | 2.09 | | 0.72 | 272 | 2.06 | 2.2 |
| | | Hb (g/dL) | 6.4 | | 0.39 | 273 | 6.4 | 4.2 |
| | | HCT (L/L) | 0.193 | | 0.29 | 273 | 0.191 | 2.0 |
| | | MCV (fL) | 92.1 | | -0.10 | 279 | 92.6 | 5.3 |
| | | MCH* (pg) | 30.6 | | -0.45 | 273 | 30.9 | 2.0 |
| | | MCHC* (g/dL) | 33.3 | | -0.06 | 276 | 33 | 4.1 |
| | | RDW* (%) | 14.0 | | 1.24 | 268 | 12.9 | 6.7 |
| | | PLT (10 ⁹ /L) | 145 | | 0.77 | 271 | 138 | 6.6 |
| | | MPV | 8.6 | * | -2.15 | 271 | 0.51 | 5.2 |

Flagged results

Statistics above calculated from consensus of the mean
(*) - Not SANAS accredited

Overall mean



Authorised by: Bongwiwe Mofokeng - PT Scheme Manager

* End Of Report *



Please Note: This is a confidential report that summarises the performance of your laboratory.

PT S0006

Print Date: 20/09/2020

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Page 1 of 1

Appendix C: Example FBC report online



**NATIONAL HEALTH
LABORATORY SERVICE**
HEALTHY. INSPIRED.

**Full Blood Count
Survey: FBC-0922**

Haematology Proficiency Testing Scheme
Academic Affairs Research and Quality Assurance Department

1 Modderfontein Road
Sandringham 2131
South
Africa Telephone :
0113866148

Participant Report : Provisional

Identification Code:
Region:

Date Received: 09 Dec 2022
Date Assayed: 12 Dec 2022

Survey Shipment Date: 08 December 2022
Survey Closing Date: 16 December 2023
Report Date: undated

Overall results

Scheme Manager: Bongwiwe Mofokeng
Email: haempts@nhls.ac.za

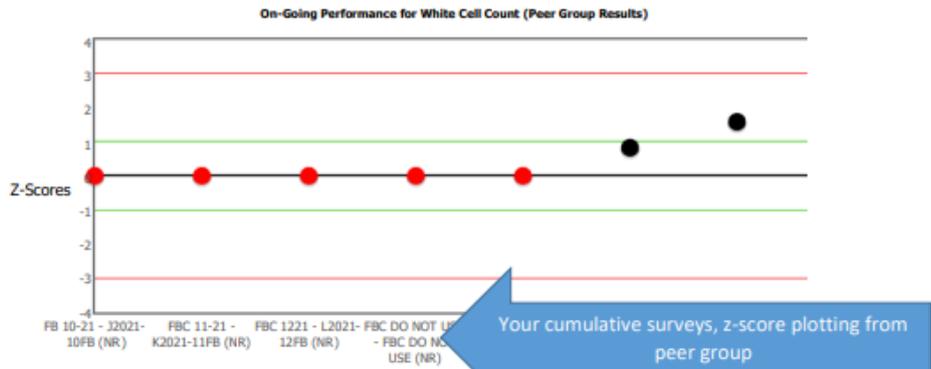
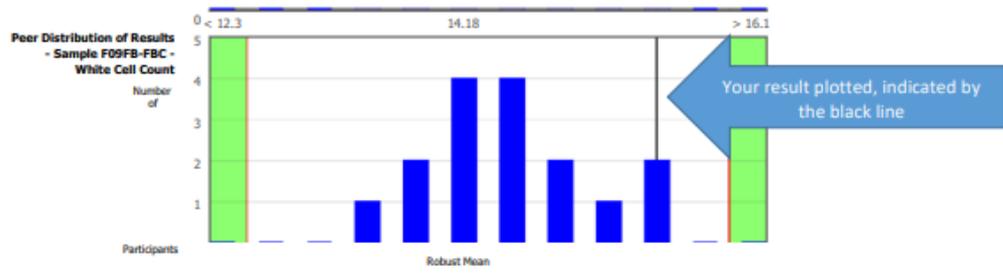
Overall Comparison of Results

| All Results | | | | | | |
|---|-------------|-------------|------------|--------------|--------------|-------------|
| SAMPLE: F09FB-FBC | | | | | | |
| Parameter | Your Result | Z-Score | N | Robust Mean | SD | CV% |
| White Cell Count (10 ⁹ /L) | 15.17 | 0.03 | 250 | | | |
| Red Cell Count (10 ¹² /L) | 3.51 | 0.39 | 250 | 3.49 | 0.057 | 1.64 |
| Haemoglobin (g/dL) | 10.7 | 3.93 | 250 | 10.14 | 0.143 | 1.41 |
| Haematocrit (L/L) | 0.272 | -1.54 | 250 | 0.29 | 0.009 | 3.22 |
| Mean Cell Volume (f/L) | 55 | 3.55 | 250 | 82.13 | 1.853 | 2.26 |
| Mean Cell Haemoglobin (pg) | 30.5 | 2.79 | 250 | 29.08 | 0.511 | 1.76 |
| Mean Cell Haemoglobin Concentration (g/dL) | 39.5 | 3.75 | 250 | 35.38 | 1.097 | 3.10 |
| Platelet Count (10 ⁹ /L) | 361 | 0.32 | 250 | 354.04 | 21.680 | 6.12 |
| Red Cell Distribution Width (%) | 15.2 | 1.04 | 250 | 14.61 | 0.570 | 3.90 |
| Mean Platelet Volume (f/L) | 10.6 | 2.40 | 246 | 9.58 | 0.424 | 4.42 |

Key:
Non-acceptable response (z-score $\geq \pm 2$)

Peer results

| SAMPLE F09FB-FBC - White Cell Count | | | | | |
|---|--------------------------------------|-------------|------|------|----------------|
| INSTRUMENT: ADVIA 2120i (FBC) SERIAL No. IR10441921 METHOD: 2 dimensional laser light scatter | Comparative Statistics Peer Group | | | | Your Deviation |
| | N | Robust Mean | SD | CV% | Z-Score |
| Your Result 15.17 <small>10⁹/L</small> | 16 | 14.18 | 0.62 | 4.40 | 1.58 |



Peer-Group Summary - Sample F09FB-FBC - White Cell Count

Peer data per instrument methods and group

| Instrument Group | N | Robust Mean | Standard Deviation | CV% |
|------------------------------|-----|-------------|--------------------|------|
| Sysmex XT and XS (FBC Group) | 132 | 15.33 | 0.42 | 2.73 |
| Sysmex XN (FBC Group) | 37 | 14.96 | 0.51 | 3.42 |
| Other | 23 | 15.05 | 0.44 | 2.90 |
| Advia2120i (FBC Group) | 16 | 14.18 | 0.62 | 4.40 |
| Beckman coulter (FBC Group) | 15 | 15.18 | 0.74 | 4.87 |
| Sysmex XP and KX (FBC Group) | 12 | 14.65 | 0.42 | 2.87 |
| CBC-X: XN/XS (ADC Group) | 6 | 15.24 | 0.27 | 1.74 |
| Mindray (FBC Group) | 4 | 15.15 | 0.99 | 6.51 |
| CBC-X: XT/XE (ADC Group) | 3 | 15.06 | 0.46 | 3.05 |
| CBC-SD (ADC Group) | 1 | 15.95 | | |

Appendix D: Example ESR report access database



NATIONAL HEALTH LABORATORY SERVICES
HEALTH SERVICES

Proficiency Testing Scheme
Academic Affairs Research and Quality Assurance Department
01 Middelfontein Road
Sandringham, South Africa
2131

National Health Laboratory Services Proficiency Testing Program

HAEMATOLOGY (ESR)

Final Report

Tel: +27 (0)11 396 6148
Fax: +27 (0)11 396 6208

CONTACT: LABORATORY MANAGER

LABORATORY: NHLS

REGION: GAU003

Trial Number: 420

Sample: ES 04-20

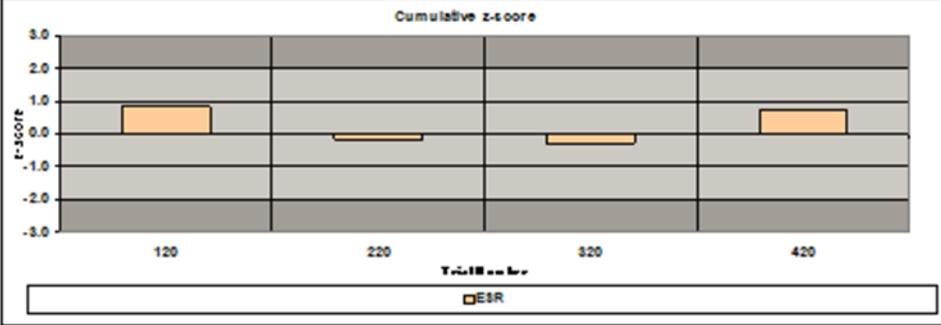
ESR METHOD: Manual

LAB CODE: 007

DATE OF REPORT: 22 February 2021

| SAMPLE: ES 04-20 | RESULTS | OUT OF LIMITS | z-score | No | MEAN | SD | CV (%) |
|------------------|---------|---------------|---------|-----|------|-------|--------|
| ESR (mm/h) | 62 | | 0.78 | 206 | 38 | 17.71 | 48.3 |

Statistics above calculated from consensus of the mean.



Cumulative z-score

Authorised by: Bonglwe Mofokeng - PT Scheme Manager

* End Of Report *



PT50005

Please Note: This is a confidential report that summarises the performance of your laboratory.

Print Date: 25/03/2021 © NHLS. All rights reserved. Enquiries: +27 (0)11 396 6148

Page 1 of 1

Appendix E: Example ESR report online

6/12/23, 2:39 PM

NHLS Erythrocyte Sedimentation Rate - Survey ESR 01-23 Report

Lab number

Participant Report : Final R

Identification Code:

Region: GAU003

Survey Shipment Date: 14 April 2023
Survey Closing Date: 28 April 2023
Report Date: 05 June 2023

Survey number

Erythrocyte Sedimentation Rate
Survey: ESR 01-23

Haematology Proficiency Testing Scheme
Academic Affairs Research and Quality Assurance Department
1 Modderfontein Road
Sandringham 2131
South Africa
Telephone : 0113866148

Date Received: 13 Apr 2023
Date Assayed: 28 Apr 2023

Scheme Manager: Bongjwe Mofokeng
Email: haempts@nhls.ac.za
Report Authorised By: Bongjwe Mofokeng

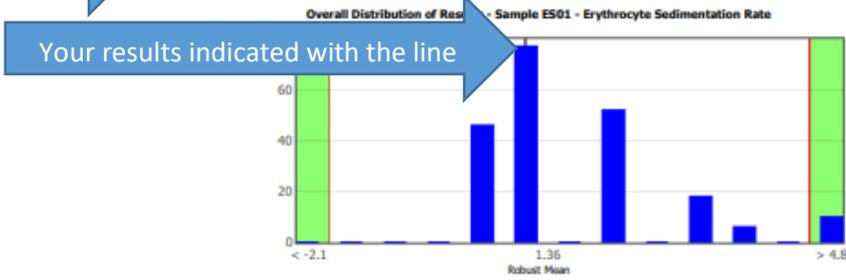
Overall Comparison of Results

| All Results SAMPLE: E501 | | | | | | |
|---------------------------------------|-------------|---------|-----|-------------|-------|-------|
| Analyte | Your Result | Z-Score | N | Robust Mean | SD | CV% |
| Erythrocyte Sedimentation Rate (mm/h) | 1 | -0.31 | 209 | 1.36 | 1.145 | 84.17 |

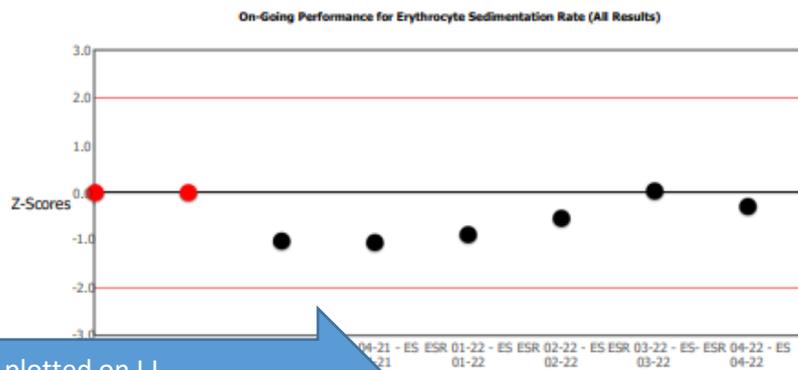
Acceptable z-score key note

Your results

Statistical data



Your results indicated with the line



Cumulative surveys, z-score plotted on LJ

Peer-Group Summary - Sample E501 - Erythrocyte Sedimentation Rate

| Method | N | Robust Mean | Standard Deviation | CV% |
|----------|-----|-------------|--------------------|--------|
| Webbigen | 209 | 1.29 | 1.59 | 124.59 |

Your methods

ptschemes.nhls.ac.za/scripts/TrialReport_Quantitative.asp

1/2

GENERAL INFORMATION FOR CHEMICAL PATHOLOGY SCHEMES

Introduction

Welcome to the new financial year NHLS Chemical Pathology Proficiency Testing Schemes. We hope that your participation will be beneficial to your laboratory. Please read the information provided.

Instructions for recording and reporting of results

Please enter the results online.

The results must be entered in the result column, and for any non-submission the laboratory should select the reasons on the drop down menu.

| Determinations | Units | Result | Non-Submission Reason |
|----------------|--------|----------------------|-----------------------|
| Sodium | mmol/L | <input type="text"/> | Result submitted |
| Potassium | mmol/L | <input type="text"/> | Result submitted |
| Chloride | mmol/L | <input type="text"/> | Result submitted |
| Magnesium | mmol/L | <input type="text"/> | Result submitted |

Results to be reported in the units on the form, if a participating laboratory use different units please convert and report in the units on the system.

General Chemistry - Web entry

Web address: <http://ptschemes.nhls.ac.za>

Method of evaluation

The Chemical Pathology PTS has two methods of evaluation.

1. Consensus of the mean (Chauvenet's Criterion)

Participant results are compared to consensus mean that uses Chauvenet's Criterion to eliminate outliers. The following schemes are evaluated according to this method

- Chemistry
- CRP

2. Defined target

The defined target schemes use traceable reference material and the allowable limits are calculated using Rhodes acceptable limits, RCPA and or Westgard acceptable limit criteria). The following PT schemes are evaluated according to this method.

- Therapeutic Drugs
- Endocrinology
- Blood gas
- Cardiac

3. Direct Qualitative analysis

The Qualitative BhCG results are compared to the expected results and reported as Acceptable or Not-acceptable.

| PARTICIPANT RESULTS | | | |
|------------------------------------|-------------|-----------------|------------|
| Method: Chromatest (LINEAR B-hCG) | | | |
| Sample | Your Result | Expected Result | Evaluation |
| A1 | Positive | Positive | Acceptable |
| B1 | Positive | Positive | Acceptable |

Laboratory performance report Chemical Pathology

The results which have been sent by the participating laboratories are analysed and documented in a report.

The report includes the following:

- Results of survey number, trial number and sample number.
- A summary table of statistics that includes: reported value (laboratory submitted result), consensus mean value (method mean), SD, %CV and z-score (SDI).
- A red colour on the analyte indicates a result more than 3SD (z-score)

| | | | | | | | |
|---------------------------------|-----|------|------|----|-------|-------|-------|
| Aspartate Transaminase, AST 37° | U/I | 48.2 | 4.68 | 30 | 28.34 | 4.245 | 14.98 |
|---------------------------------|-----|------|------|----|-------|-------|-------|

- An orange colour indicates a result of more than 2SD (z score)/results outside of the acceptable limit.

| | | | | | | | |
|---------------------|--------|------|-------|----|------|-------|------|
| Phosphate Inorganic | mmol/L | 1.29 | -2.01 | 62 | 1.37 | 0.039 | 2.82 |
|---------------------|--------|------|-------|----|------|-------|------|

Reports are send out before the next survey is due (+- 4 weeks post submission)

Acceptable criteria for Chemical Pathology

Each participant should carefully evaluate the Z-scores given in the report. In accordance with the laboratory standard operating procedures.

- $-2 \leq Z\text{-score} \leq 2$: The result is acceptable
- $-3 < Z\text{-score} < -2$ or $2 < Z\text{-score} < 3$: The results are questionable (warning signal)
- $Z\text{-score} \leq -3$ or $Z\text{-score} \geq 3$: The result is unacceptable (action signal)

A single action signal or two warning signals in consecutive surveys shall be taken as evidence that an anomaly has occurred that requires investigation by the laboratory

Key:

Borderline acceptable response (>2 z-score < 3)

Non-acceptable response (z-score > 3)

Defined target interpretation- the result must be within the acceptable limits defined on the report.

Calculations used for Chemical Pathology Schemes

Z-score

The z-score shows how well your result compares with the peer group mean. It is expressed in units as a ratio of the difference between your lab mean and the pool mean to the standard deviation of the pool mean.

$$\text{Z-score} = \frac{\text{Your Lab Result} - \text{Group Mean}}{\text{SD of Group Mean}}$$

Percentage Bias

The percentage Bias indicates your result in relation to the target result express as a percentage.

$$\% \text{bias} = (\text{X} - \text{target value}) / \text{Target value} * 100$$

NHLS Qualitative BhCG Proficiency Testing Scheme

1.Scope

A human chorionic gonadotropin (hCG) urine test is a pregnancy test. A pregnant woman's placenta produces hCG, also called the pregnancy hormone.

2. Material supplied.

The scheme ships two vials of liquid urine, in which participants are expected to process the sample and report the BhCG results.

3. Analysis

The control is to be used in accordance with the directions accompanying the assay procedure being used. Samples to be treated in the same manner as patient specimen.

For in vitro diagnostic use only

CAUTION: Human source material, from which this product has been derived, has been tested at donor level for Human Immunodeficiency Virus (HIV1, HIV 2) antibody, Hepatitis B Surface Antigen (HbsAg), and Hepatitis C Virus (HCV) antibody and found to be non-reactive. FDA approved methods have been used to conduct these tests. However, since no method can offer complete assurance as to the absence of infectious agents, this material and all patient samples should be handled as though capable of transmitting infectious diseases. Dispose of any discarded material in accordance with your laboratory waste regulations.

Samples are ready for use; no reconstitution is required.

4. Limitations of procedure.

- Inadequate mixing of the PT sample.
- Technical errors associated with the assay.
- Improper storage and handling.
- Not allowing the samples to reach the room temperature equilibrium.

For more information, refer to the "Limitations of Procedure" section of the direction insert of the assay procedure being used. If there is visible evidence of microbial growth in a vial do not use that vial and request another vial from the QA Department.

5. Homogeneity and stability

All testing material have been tested and found to be homogeneous and stable as part of the internal quality control processes.

6. Storage conditions.

The samples are transported at ambient temperature. Once received store at 2-8°C.

7. Completing the results online as per below screenshot.

The screenshot shows a web interface for entering results. At the top, there is a 'Sample ID selection bar' with two tabs: 'Sample: A2' (highlighted in green) and 'Sample: B2'. Below this bar, a red text note reads: 'Please note that the samples on the system are labelled differently, due to coding. Sample 2a on the system A2 and sample 2b on the B2 Save and click SUBMIT'. The main interface is a table with three columns: 'Parameters', 'Method', and 'Non-Submission Reason'. The 'Parameters' column contains 'BhCG'. The 'Method' column has a dropdown menu showing 'Chromatest (LINEAR B-hCG)'. The 'Non-Submission Reason' column has a dropdown menu showing 'Result submitted'. A blue box labeled 'Results entry' points to the 'Method' dropdown. Another blue box labeled 'Select test kit on dropdown menu.' points to the 'Chromatest (LINEAR B-hCG)' option.

| Parameters | Method | Non-Submission Reason |
|------------|---------------------------|-----------------------|
| BhCG | Chromatest (LINEAR B-hCG) | Result submitted |

- After analysing the samples, enter results on the online web.
- Ensure the following lab information is correct
- Fill the date of sample receipt and date of analysis
- Use the blocks provided to enter your results.
- If you cannot submit results for any reasons, select the appropriate reason on “**Reason for no submission**”
- After entering your results, you can save and check for errors (as per your manual results entry protocol) and submit results by pressing submit button.
 - **If results are only saved and not submitted, no return will be issued.**
 - **Also note that once results are submitted changes cannot be made.**

8. Reports

Participants reports are made available online after evaluation.

NHLS Blood Gas Proficiency Testing Scheme

MATERIALS SUPPLIED

Ten ampoules of aqueous control material labelled 1A- 5B. (Store at 2 - 25°C)

ANALYSIS

Two ampoules are analysed for each cycle e.g. 1A and 1B.

N.B. Allow a minimum of four hours for the sample to reach room temperature before analysing.

Before sampling, hold the ampoule between the thumb and forefinger and shake for 10 seconds to completely mix the contents, and then gently tap so that any fluid trapped in the top of the ampoule is forced down.

To open, place the ampoule in a piece of paper towel between thumb and forefinger to prevent injury from broken glass, snap open and immediately introduce into the instrument.

The material must be analysed in the same way as patient samples and run in accordance with protocol for the instrument in use.

1. Direct aspiration: Aspirate the contents directly from the opened ampoule as per instrument protocol.
2. Syringe transfer:
 - a) To prime the syringe fill with a small volume (0.2 –0.3ml) of control.
 - b) Remove the syringe from the ampoule, carefully debubble and discard most of the solution leaving the syringe “dead space” filled with control. Do not return any discarded material to the ampoule.
 - c) Aspirate the desired volume with the syringe.
 - d) Expel one or two drops through the needle.
 - e) Remove the needle and immediately inject the sample into the instrument.

STORAGE CONDITIONS

Material - The controls should be stored between 2 to 25°C and are stable for the period of the survey.

The samples are shipped under ambient conditions.

PROCEDURE

The control is to be used in accordance with the directions accompanying the assay procedure being used. While following these directions, the control is to be treated in the same manner as a patient specimen.

LIMITATIONS OF PROCEDURES

The results obtained using the control is dependent upon several factors. Erroneous results can occur from improper storage, reconstitution inaccuracies, inadequate mixing, and technical errors associated with the assay procedure. For more information, refer to the "Limitations of Procedure" section of the direction insert of the assay procedure being used. If there is visible evidence of microbial growth in a vial do not use that vial and request another vial from the QA Department.

DISPOSAL

Dispose of used vials in a glass disposal container in accordance with your laboratory waste regulations.

COMPLETING THE RESULT SHEET

- After analysing the samples complete a result sheet by filling in the Laboratory name, QA lab number, date, instrument used and the name of the person who did the assays as well as the results you obtained. Use the blocks provided for the results.
- Incomplete result sheets will result in a corrective action/no return.
- Please do not enter two numbers in a block. Ascertain that your laboratory is reporting the results in the units required.

NHLS Cardiac Markers Proficiency Testing Scheme

MATERIALS SUPPLIED

A vial per survey of appropriately labelled lyophilised serum (Store at 2-8°C)

ANALYSIS

1. The control is to be used in accordance with the directions accompanying the assay procedure being used.

For in vitro diagnostic use only

CAUTION: Human source material from which this product has been derived has been tested at donor level for HIV-1, HIV-2, HBsAg and HCV antibodies and found to be NON REACTIVE. However, it is recommended that this product be handled with the same precautions used for patient specimens. Dispose of any discarded material in accordance with your laboratory waste regulations.

RECONSTITUTION

Carefully reconstitute each vial of lyophilised serum with exactly 1ml of redistilled water at 15 to 25°C. Close bottle and allow to stand for 30 minutes before use. Ensure contents are completely dissolved by swirling gently. Avoid formation of foam. Do not shake.

STORAGE CONDITIONS

Unreconstituted material - the samples should be stored between 2 - 8°C. Protect from light.

Reconstituted material – the samples are stable for 5 days at 2 - 8°C and 4 weeks at -20°C if kept capped in original container and free from contamination.

Troponin I is stable for 2 weeks at -20°C if kept capped in original container and free from contamination.

LIMITATIONS OF PROCEDURES

The results obtained are dependent upon several factors. Erroneous results can occur from improper storage, reconstitution inaccuracies, inadequate mixing, and technical errors associated with the assay procedure. For more information, refer to the "Limitations of Procedure" section of the direction insert of the assay procedure being used. If there is visible evidence of microbial growth in a vial do not use that vial and request another vial from the QA Department. Testing has been conducted to assure that this product is sufficiently homogeneous. This program does not assess CK MB Activity

Completing the result sheet

- After analysing the samples complete a result sheet each month by filling in the Laboratory name, QA lab number, date, instrument used and the name of the person who did the assays as well as the results you obtained. Use the blocks provided for the results.
- Incomplete result sheets will result in a corrective action/no return.
- **Please do not enter two numbers in a block, the correct number of blocks and decimal places are provided for each assay's result.**
- **Participants are also encouraged to enter results online as well, even though reports will not currently be issued online**

NHLS General Chemistry Proficiency Testing Scheme

MATERIALS SUPPLIED

Ten vials of lyophilised serum labelled 1-10 (Store at 2-8°C)

ANALYSIS

1. The control is to be used in accordance with the directions accompanying the assay procedure being used.

2. Each sample must be analysed at the appropriate time, preferably some time before the final date for receipt of results. **It serves no useful purpose to analyse all ten samples simultaneously or to perform multiple analyses of each parameter to derive a mean result. Results will only be analysed in the month that it is due, no results will be kept by QA when send in the incorrect month.**

3. **Please ascertain that your laboratory is classified under the correct method for enzyme assays. If any methods change during the year indicate the changes in the spaces provided on the result sheet.**

For in vitro diagnostic use only

CAUTION: Human source material was used in the manufacture of this product. Each donor unit used was tested for and found to be non-reactive for HBsAg, HIV-1, HIV-2 and HCV. Because no test method can offer complete assurance that products derived from human blood will not transmit infectious agents, it is recommended that this product be handled with the same precautions used for patient specimens. Dispose of any discarded material in accordance with your laboratory waste regulations.

RECONSTITUTION

1. Add exactly 5ml of distilled water at 15 - 25°C to the vial.
2. Replace the stopper in the vial and allow standing for 30 minutes out of direct sunlight.
3. Swirl the contents until homogeneous, then remove sample for testing. Avoid formation of foam. Do not shake.
4. Keep material in the refrigerator up to the time of analysis. Prior to reuse, mix sample thoroughly.

STORAGE CONDITIONS

The samples are transported at ambient temperature.

Unopened material - The samples should be stored between 2 - 8°C and are stable for the period of the programme.

Reconstituted material – The samples are stable for 8 hours at 15 - 25°C or 7 days at 2 - 8°C and 28 days when frozen once at -20°C. Do not return any residual product to the original vial.

It is recommended that for Alk Phos the reconstituted serum is allowed to stand for 1 hour at 15 - 25°C before measurement. Total and Direct Bilirubin is stable for 4 days at 2 - 8°C when stored in the dark. Do not store at 15 - 25°C. Do not freeze; analysis should be done on the day of reconstitution.

LIMITATIONS OF PROCEDURES

Glucose, bilirubin and alkaline phosphatase should be analysed on the day of reconstitution.

The results obtained are dependent upon several factors. Erroneous results can occur from improper storage, reconstitution inaccuracies, inadequate mixing, and technical errors associated with the assay procedure. For more information, refer to the "Limitations of Procedure" section of the direction insert of the assay procedure being used. If there is visible evidence of microbial growth in a vial do not use that vial and request another vial from the QA Department.

Testing has been conducted to assure that this product is sufficiently homogeneous.

COMPLETING THE RESULT SHEET

After analysing the General Chemistry samples, enter the results as per below table.

Sample: A-02

Instrument: BECKMAN DXI 600/800 Serial Number: 3476

Please save and click on submit button. Please note that samples are named differently due to coding. Sample2 on the system is labelled as A-02

| Determinations | Units | Result | Non-Submission Reason |
|---------------------|--------|--------|-----------------------|
| Sodium | mmol/L | 154 | Result submitted |
| Potassium | mmol/L | 6.1 | Result submitted |
| Magnesium | mmol/L | 1.67 | Result submitted |
| Urea | mmol/L | 18.4 | Result submitted |
| Creatinine | µmol/l | 382 | Result submitted |
| Calcium | mmol/L | 2.97 | Result submitted |
| Phosphate Inorganic | mmol/L | 2.26 | Result submitted |
| Cholesterol | mmol/L | 8.00 | Result submitted |
| Glucose | mmol/L | 15.8 | Result submitted |
| Uric Acid | mmol/L | 0.53 | Result submitted |

RESULT SUBMISSION

- After analysing the samples, enter the results on the online web system.
- Ensure the following lab information is correct: Instrument name, instrument serial, QA lab code and correct SI units.
- Fill the date of sample receipt and date of analysis
- Use the blocks provided to enter your results.
- If you cannot submit results for any reasons, select the appropriate reason on **"Reason for no submission"**
- After entering your results, you can save and check for errors (as per your manual results entry protocol) and submit results by pressing submit button.
 - **If results are only saved and not submitted, no return will be issued.**
 - **Also note that once results are submitted changes cannot be made.**

REPLACEMENT SAMPLES

Please complete the appropriate form when requesting a replacement sample

NHLS C-Reactive Protein Proficiency Testing Scheme

1. Scope

C-reactive protein (CRP) is a blood test marker for inflammation in the body. It is produced in the liver and its level is measured by testing the blood. CRP is classified as an acute phase reactant, which means that its levels will rise in response to inflammation.

3. Material supplied

The scheme ships four vials of liquid serum labelled survey 1 to survey 4 ready for analysis, in which participants are expected to process the sample and report the CRP results.

4. Analysis

The control is to be used in accordance with the directions accompanying the assay procedure being used. While following these directions, the sample is to be treated in the same manner as a patient specimen.

For in vitro diagnostic use only

CAUTION: Human serum was used in the manufacture of this product. Each donor unit used was tested with licensed reagents and found to be non-reactive for HbsAg, HIV1/2 Antibody and HCV Antibody.

Because no test method can offer complete assurance that products derived from human blood will not transmit infectious agents, it is recommended that this product be handled with the same precautions used for patient specimens. Dispose of any discarded material in accordance with your laboratory waste regulations.

Samples are ready for use; no reconstitution is required.

4. Limitations of procedure.

- The results obtained are dependent upon several factors.
- Erroneous results can occur from improper storage.
- Inadequate mixing,
- Technical errors associated with the assay procedure.

For more information, refer to the "Limitations of Procedure" section of the direction insert of the assay procedure being used. If there is visible evidence of microbial growth in a vial do not use that vial and request another vial from the QA Department.

5. Homogeneity and stability.

All testing material have been tested and found to be homogeneous and stable. For the material that is procured the manufacturer issues the certificate of analysis for each survey.

6. Storage and conditions.

The samples are transported at ambient temperature.

The samples should be stored between 2 - 8°C and. Protect from light and heat.

7. Results submission

CRP is submitted on the web based online system

- After analysing the samples, enter results on the online web.
- Ensure the following lab information is correct: Instrument name, instrument serial, QA lab code and correct SI units.
- Fill the date of sample receipt and date of analysis
- Use the blocks provided to enter your results.
- If you cannot submit results for any reasons, select the appropriate reason on “**Reason for no submission**”
- After entering your results, you can save and check for errors (as per your manual results entry protocol) and submit results by pressing submit button.
 - **If results are only saved and not submitted, no return will be issued.**
 - **Also note that once results are submitted changes cannot be made.**

Example CRP report online

6/14/23, 11:13 AM

NHLS C-Reactive Protein - Survey CRP 04-22 Report

Survey number

Participant number

Chemistry Proficiency Testing Scheme
Academic Affairs Research and Quality Assurance
Department

C-Reactive Protein
Survey: CRP 04-22

1 Modderfontein Road
Sandringham 2131
South Africa
Telephone : 011
386 6148

Overall results

Date Received: 13 Apr 2022
Date Assayed: 30 Mar 2023

Scheme Manager: Bongive Mofokeng
Email: chempath@nhls.ac.za

Report Authorised By: Bongive Mofokeng

Overall Comparison of Results

| All Results | | | | | | |
|---------------------------|-------------|---------|-----|-------------|-------|------|
| SAMPLE: D-04 | | | | | | |
| Analyte | Your Result | Z-Score | N | Robust Mean | SD | CV% |
| C-Reactive Protein (mg/l) | 100 | 0.49 | 203 | 96.85 | 6.411 | 6.62 |

Key:
Borderline acceptable response ($3 \geq z\text{-score} > 2$)
Non-acceptable response ($z\text{-score} > 3$)

SAMPLE D-04 - C-Reactive Protein

| Your Result | Comparative Statistics Peer Group | | | | | |
|-------------|-----------------------------------|-------------|----------------------------|------|------|---------|
| | N | Robust Mean | Acceptable Performance (%) | SD | CV% | Z-Score |
| 100 mg/l | 9 | 97.11 | 12 | 5.69 | 5.86 | 0.51 |

Overall Distribution of Results - Sample D-04 - C-Reactive Protein

On-Going Performance for C-Reactive Protein (All Results)

Peer-Group Summary - Sample D-04 - C-Reactive Protein

Instrument information

Acceptable z-score key note

Mean, SD, CV and z-score of the analyte

Your result plotted, indicated by the black line

Cumulative surveys, z-score plotting

NHLS Therapeutic Drug Proficiency Testing Scheme

MATERIALS SUPPLIED

Five vials of lyophilized serum labelled 1-5. (Store at 2 - 8 °C)

ANALYSIS

1. All constituents should be analysed on the day of reconstitution.
2. Each sample must be analysed at the appropriate time. It serves no useful purpose to analyse all five materials simultaneously or to perform multiple analyses of each parameter to derive a mean result. **Results will only be analysed in the month that it is due, no results will be kept by QA when send in the incorrect month.**

For in vitro diagnostic use

PRECAUTIONS

This serum is human based and has been tested for the presence of HIV-1/HIV-2 antibody, HBsAg, and HCV and was found to be non-reactive. This product may also contain other human source materials for which there are no approved tests. In accordance with good laboratory practice, all human source material should be considered potentially infectious and handled in the same manner as patient samples. Dispose of any discarded material in accordance with your laboratory waste regulations.

STORAGE CONDITIONS

The samples should be stored between 2 to 8°C and are stable for the period of the program.

The samples are shipped under ambient conditions.

RECONSTITUTION

1. Open the vial carefully, avoiding any loss of material.
2. Reconstitute with exactly 5 ml distilled or deionised water.
3. Replace the rubber stopper and allow to stand for 15 minutes.
4. Gently swirl gently contents to ensure that the contents are completely dissolved.
5. Prior to use, mix the contents by inverting the vial, avoiding the formation of foam.
Ensure that no lyophilized material remains unreconstituted.
6. Allow the sample to reach room temperature before use (18 - 25°C). Replace the stopper promptly.

Reconstituted vials are stable for 7 days when stored tightly capped at 2 to 8°C and 4 weeks frozen at -20°C

Do not return residual product to the original vial to avoid contamination.

PROCEDURE

The sample is to be used in accordance with the directions accompanying the assay procedure being used.

LIMITATIONS OF PROCEDURES

The results obtained using the sample is dependent upon several factors. Erroneous results can occur from improper storage, reconstitution inaccuracies, inadequate mixing, and technical errors associated with the assay procedure. If there is visible evidence of microbial growth in a vial do not use that vial and request another vial from the QA Department.

Testing has been conducted to assure that this product is sufficiently homogeneous.

Results submission

TDM is submitted on the web based online system

- After analysing the samples enter results on the online web ensure the following lab information is correct: Instrument name, instrument serial, QA lab code, and correct SI units.
- Fill the date of sample receipt and date of analysis
- Use the blocks provided to enter your results.
- If you cannot submit results for any reasons, select the appropriate reason on **“Reason for no submission”**
- After entering your results, you can save and check for errors (as per your manual results entry protocol) and submit results by pressing submit button.
- If results are only saved and not submitted, no return will be issued.
- Also note that once results are submitted changes cannot be made.

Example TDM report online

1/14/23, 12:27 PM NHLS Therapeutic Drug Monitoring - Survey 2022-06 Report



Therapeutic Drug Monitoring Survey: 2022-06

Participant Report : Final Report
 Identification Code: [Redacted]
 Region: [Redacted]
 Survey Shipment Date: 02 March 2023
 Survey Closing Date: 31 March 2023
 Report Date: 23 April 2023

Chemistry Proficiency Testing Scheme
 Academic Affairs Research and Quality Assurance
 Department
 1 Modderfontein Road
 Sandringham 2131
 South Africa
 Telephone : 011 386 4143

Date Received: 13 Apr 2023
 Date Assayed: 28 Mar 2023
 Scheme Manager: Hlatshwayi Mokoena
 Email: hlatsh@nhls.ac.za
 Not Authorized By: [Redacted]

Peer Group Comparison of Results - Algorithm A

Peer Group Summary: DIMENSION
 Serial Number: 12252970
 SAMPLE: TDM Sample 6

| Analyte | Unit | Your Result | Z-Score | N | Mean | SD | CV% |
|---------------|--------|-------------|---------|---|--------|--------|------|
| Valproic Acid | µmol/L | 653 | -0.56 | 4 | 668.75 | 14.054 | 2.10 |

Key:
 Borderline acceptable response (3 ≥ z-score > 2)
 Non-acceptable response (z-score > 3)

Peer Group Comparison of Results - Defined Targets

Peer Group Summary: DIMENSION
 Serial Number: 12252970
 SAMPLE: TDM Sample 6

| Analyte | Unit | Your Result | N | Target | Acceptable Low | Acceptable High | Bias % |
|---------------|--------|-------------|---|--------|----------------|-----------------|--------|
| Valproic Acid | µmol/L | 653 | 4 | 755.00 | 566.25 | 943.75 | -0.86 |

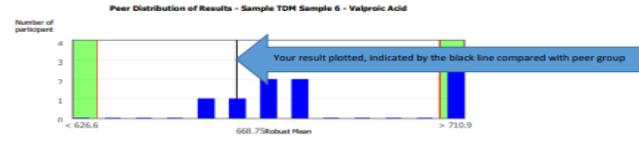
Key:
 Outside acceptable limits - highlighted

SAMPLE TDM Sample 6 - Valproic Acid (Algo A)

| INSTRUMENT: DIMENSION SERIAL No. 12252970 METHOD: Turbidimetric | Comparative Statistics Peer Group | | | | Your Deviation | |
|---|-----------------------------------|-------------|----------------------------|-------|----------------|---------|
| | N | Robust Mean | Acceptable Performance (%) | SD | CV% | Z-Score |
| Your Result 653 µmol/L | 4 | 668.75 | 25 | 14.05 | 2.10 | -0.56 |

6/14/23, 12:27 PM NHLS Therapeutic Drug Monitoring - Survey 2022-06 Report

Peer Distribution of Results - Sample TDM Sample 6 - Valproic Acid



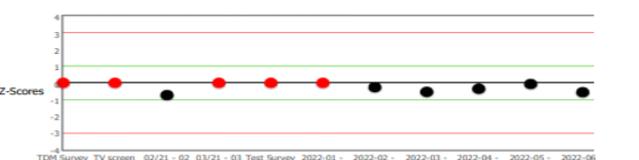
SAMPLE TDM Sample 6 - Valproic Acid (Defined targets)

| INSTRUMENT: DIMENSION SERIAL No. 12252970 METHOD: Turbidimetric | Comparative Statistics Peer Group | | | | | |
|---|-----------------------------------|--------|----------------------------|----------------|-----------------|--------|
| | N | Target | Acceptable Performance (%) | Acceptable Low | Acceptable High | Bias % |
| Your Result 653 µmol/L | 4 | 755.00 | 25 | 566.25 | 943.75 | -0.86 |

Peer Distribution of Results (Defined Targets) - Sample TDM Sample 6 - Valproic Acid



On-Going Performance for Valproic Acid (Peer Group Results)



TDM Survey TV screen 02/21 - 02 03/21 - 03 Test Survey 2022-01 - 2022-02 - 2022-03 - 2022-04 - 2022-05 - 2022-06
 6 of test - TV (NR) TDM - TDM TDM Sample TDM Sample TDM Sample TDM Sample TDM Sample
 2019/20 - screen test TDM sample (NR) Sample 1 (NR) 2 3 4 5 6

itschemes.nhls.ac.za/scripts/TrialReport_Quantitative_TAE.asp

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NHLS Endocrinology Proficiency Testing Scheme

MATERIALS SUPPLIED

Five vials of lyophilized serum labelled 1-5. (Store at 2 - 8 °C)

ANALYSIS

- All constituents should be analysed on the day of reconstitution.
- Each sample must be analysed at the appropriate time. It serves no useful purpose to analyze all five materials simultaneously or to perform multiple analyses of each parameter to derive a mean result.
- The sample, tightly capped will be stable for 20 days if frozen once and stored at -10 to -20°C.

For in vitro diagnostic use

PRECAUTIONS

This serum is human based and has been tested for the presence of HIV-1/HIV-2 antibody, HBsAg, and HCV and was found to be non-reactive. This product may also contain other human source materials for which there are no approved tests. In accordance with good laboratory practice, all human source material should be considered potentially infectious and handled in the same manner as patient samples. Dispose of any discarded material in accordance with your laboratory waste regulations.

STORAGE CONDITIONS

The samples should be stored between 2 to 8°C and are stable for the period of the program.

The samples are shipped under ambient conditions.

RECONSTITUTION

- Open the vial carefully, avoiding any loss of material.
- Reconstitute with exactly 5 ml distilled water at +15°C to 25°C.
- Replace the rubber stopper and allow standing for 30 minutes.
- Gently swirl gently contents to ensure that the contents are completely dissolved.
- Prior to use, mix the contents by inverting the vial, avoiding the formation of foam
- **. Ensure that no lyophilised material remains unreconstituted.**

Reconstituted vials are stable for 7 days when stored tightly capped at 2 to 8°C and 4 weeks at -20°C.

Do not return residual product to the original vial to avoid contamination.

PROCEDURE

The sample is to be used in accordance with the directions accompanying the assay procedure being used.

LIMITATIONS OF PROCEDURES

The results obtained using the samples are dependent upon several factors. Erroneous results can occur from improper storage, reconstitution inaccuracies, inadequate mixing, and technical errors associated with the assay procedure. If there is visible evidence of microbial growth in a vial do not use that vial and request another vial from the QA Department.

Testing has been conducted to assure that this product is sufficiently homogeneous

COMPLETING THE RESULT SHEET

- After analysing the samples complete a result sheet by filling in the Laboratory name, QA lab number, date, instrument used and the name of the person who did the assays as well as the results you obtained. Use the blocks provided for the results.
- Incomplete result sheets will result in a corrective action/no return.
- **Please do not enter two numbers in a block. Please report results in the units on the result form, if different units are used please use the conversion factors.**
- Please complete the form attached to indicate the tests your laboratory would be participating in
- Mark any method changes in the space provided

Consensus Mean Report Interpretation Access data report



**NHLS PROFICIENCY TESTING
(CHEMICAL PATHOLOGY)**

Mean of results in method group



Results of Survey number 1 for 2011/12

Daouvenet's Criteria

Your instrument

Date of Report: 17 May 2011

LABORATORY:

Final Report

REGION:

INSTRUMENT:

ROCHE MODULAR

| TEST | RESULTS | z-score | >+/- 2,0 | NATIONAL | | | | |
|-------------------------|---------|---------|---------------|----------------------|-----|---------|--------|-------|
| | | | | METHOD | No. | MEAN | SD | CV |
| SODIUM mmol/L | 121 | 1.37 | | OVERALL | 246 | 116.695 | 3.136 | 2.69 |
| POTASSIUM mmol/L | 2.8 | 1.02 | | OVERALL | 248 | 2.675 | 0.122 | 4.56 |
| CHLORIDE mmol/L | 79 | -0.61 | | OVERALL | 238 | 83.071 | 6.702 | 8.07 |
| MAGNESIUM mmol/L | | | No Result | OVERALL | 145 | 0.793 | 0.061 | 7.65 |
| UREA mmol/L | 5.50 | -0.14 | | OVERALL | 262 | 5.556 | 0.414 | 7.45 |
| CREATININE µmol/l | 131 | 1.16 | | OVERALL | 285 | 116.737 | 12.300 | 10.54 |
| CALCIUM mmol/L | 2.13 | 0.76 | | OVERALL | 162 | 2.054 | 0.100 | 4.87 |
| INORGANIC PHOS mmol/L | 1.23 | | | OVERALL | 109 | 1.255 | 0.086 | 6.85 |
| | | | | DIMENSION | 17 | 0.651 | 0.112 | 17.27 |
| | | | | SYNCHRON CARTRIDGE | 19 | 0.936 | 0.069 | 7.41 |
| CHOLESTEROL mmol/L | | | Not Performed | OVERALL | 185 | 3.889 | 0.212 | 5.45 |
| GLUCOSE mmol/L | 6.1 | -0.23 | | OVERALL | 281 | 6.175 | 0.329 | 5.33 |
| URATE mmol/L | 0.25 | 0.09 | | OVERALL | 211 | 0.249 | 0.014 | 5.70 |
| TOTAL BILIRUBIN µmol/L | 30 | -0.35 | | OVERALL | 238 | 32.311 | 6.683 | 20.68 |
| DIRECT BILIRUBIN µmol/L | 24 | 1.01 | | OVERALL | 236 | 19.233 | 4.698 | 24.43 |
| TRIGLYCERIDES mmol/L | 1.83 | 5.45 | W | OVERALL | 154 | 1.298 | 0.098 | 7.52 |
| TOTAL PROTEIN g/L | 49 | 0.21 | | OVERALL | 208 | 48.188 | 3.832 | 7.95 |
| | | | | SYNCHRON CARTRIDGE | 38 | 59.921 | 1.880 | 3.14 |
| ALBUMIN g/L | 33 | 0.81 | | BCG | 168 | 31.548 | 1.794 | 5.69 |
| | | | | BCP | 87 | 29.230 | 1.020 | 3.49 |
| ALP U/L | 135 | -0.67 | | PNP(AMP BUFFER) 37°C | 237 | 148.882 | 20.634 | 13.86 |
| | | | | PNP(DEA BUFFER) 37°C | 8 | 394.750 | 49.161 | 12.45 |
| | | | | IFCC 37°C (-P5P) | 217 | 60.968 | 3.575 | 5.86 |
| AST U/L | 56 | -1.39 | | | 28 | 60.714 | 3.789 | 6.24 |
| | | | | IFCC 37°C (-P5P) | 217 | 60.968 | 3.575 | 5.86 |
| ALT U/L | 49 | -2.41 | | | 253 | 60.585 | 4.801 | 7.92 |
| | | | | IFCC 37°C (-P5P) | 31 | 58.968 | 7.387 | 12.53 |
| LDH U/L | 591 | 0.45 | | DGKC (P-L) 37°C | 56 | 576.036 | 33.213 | 5.77 |
| | | | | (LACT.- PYRUV.)37°C | 33 | 243.121 | 27.684 | 11.39 |
| | | | | SFBC (P-L) 37°C | 38 | 705.026 | 28.516 | 4.04 |
| | | | | IFCC 37°C | 20 | 288.250 | 12.916 | 4.48 |
| | | | | SZASZ 37°C | 247 | 32.255 | 3.322 | 10.30 |
| GGT U/L | 33 | 0.22 | | | 121 | 116.174 | 8.242 | 7.09 |
| | | | | PNP-G7 (IFCC) 37°C | 40 | 123.925 | 26.216 | 21.16 |
| | | | | PNP-G3 (37°C) | 12 | 74.250 | 4.288 | 5.77 |
| AMYLASE U/L | 101 | -1.84 | | MALTOTETRAOSE 37°C | 138 | 158.181 | 8.564 | 5.41 |
| | | | | NAC act. (IFCC) 37°C | 23 | 89.130 | 9.655 | 10.83 |
| LIPASE U/L | 77 | -1.26 | | OVERALL | 91 | 1.520 | 0.143 | 9.42 |
| | | | | POC | 25 | 2.016 | 0.440 | 21.84 |
| LACTATE mmol/L | 1.5 | -0.14 | | OVERALL | 91 | 1.520 | 0.143 | 9.42 |
| IRON µmol/l | 15.2 | 0.15 | | | 25 | 2.016 | 0.440 | 21.84 |
| | | | | OVERALL | 38 | 15.037 | 1.094 | 7.27 |

Method used

Your result

Your Performance Score



Please Note: Sample sizes less than 5 may result in distortion of the mean and as a consequence must be taken with reserve. This is a confidential report that summarises the performance of your laboratory.

PT S0005

Print Date: 18/07/2011

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Consensus Mean report Online report

Survey number

Chemistry Proficiency Testing Scheme
Academic Affairs Research and Quality Assurance Department
1 Modderfontein Road
Sandringham 2131
South Africa
Telephone : 011 386 6143

Participant number

General Chemistry Survey: Chem 12-22

Participant Report: **16Y2-04**

Identification Code: **605**

Region: **GAU001**

Date Received: **13 Apr 2022**

Date Assayed: **30 Mar 2023**

Survey Shipment Date: **07 March 2023**

Survey Closing Date: **31 March 2023**

Report Date: **17 April 2023**

Scheme Manager: **Bongiwe Mofokeng**

Email: **chempath@nhls.ac.za**

Peer Group Comparison Results

Peer Group Summary: Roche Cobas c systems
Serial Number: 16Y2-04
SAMPLE: K-12

| Analyte | Unit | Your Result | Z-Score | N | Mean | SD | CV% |
|-------------------------------------|--------|-------------|---------|-----|--------|--------|-------|
| Sodium | mmol/L | 149 | 2.38 | 105 | 141.92 | 2.970 | 2.09 |
| Potassium | mmol/L | 4.1 | 0.80 | 105 | 4.00 | 0.120 | 2.99 |
| Chloride | mmol/L | 95 | -0.15 | 104 | 95.37 | 2.462 | 2.58 |
| Magnesium | mmol/L | 0.92 | -0.42 | 51 | 0.93 | 0.022 | 2.36 |
| Urea | mmol/L | 7.6 | 1.01 | 57 | 7.27 | 0.326 | 4.48 |
| Creatinine | µmol/l | 140 | 0.46 | 6 | 136.50 | 7.596 | 5.54 |
| Calcium | mmol/L | 2.18 | -0.13 | 67 | 2.19 | 0.053 | 2.42 |
| Phosphate Inorganic | mmol/L | 1.33 | -1.44 | 12 | 1.38 | 0.038 | 2.71 |
| Bilirubin, Total | µmol/l | 25 | -1.09 | 23 | 26.09 | 0.996 | 3.82 |
| Bilirubin, Direct | µmol/l | 19 | -0.24 | 73 | 19.27 | 1.121 | 5.82 |
| Protein, Total | g/L | 57 | 0.81 | 35 | 55.63 | 1.699 | 3.05 |
| Albumin | g/L | 43 | 0.14 | 114 | 42.78 | 1.515 | 3.54 |
| Alkaline Phosphatase, ALP 37° | U/l | 190 | -0.01 | 108 | 190.17 | 17.293 | 9.09 |
| Aspartate Transaminase, AST 37° | U/l | 31 | 1.87 | 75 | 27.75 | 1.736 | 6.25 |
| Alanine Transaminase, ALT 37° | U/l | 37 | 1.06 | 64 | 34.89 | 1.985 | 5.69 |
| Gamma Glutamyl Transferase, GGT 37° | U/l | 52 | -0.10 | 83 | 52.18 | 1.740 | 3.33 |
| Amylase 37° | U/l | 87 | 0.16 | 13 | 86.23 | 4.935 | 5.72 |
| Creatine Kinase - Total 37° | U/l | 195 | -0.80 | 139 | 205.63 | 13.344 | 6.49 |
| Bicarbonate (CO2) | mmol/L | 12 | -0.44 | 156 | 12.56 | 1.281 | 10.20 |

Key:
Borderline acceptable response (>2 z-score < 3)
Non-acceptable response (z-score > 3)

Overall Comparison of Results

All Results
SAMPLE: K-12

| Your Result | Z-Score | N | Robust Mean | SD | CV% |
|-------------|---------|-----|-------------|--------|-------|
| 149 | 2.29 | 265 | 142.12 | 3.006 | 2.11 |
| 4.1 | 1.38 | 265 | 4.00 | 0.120 | 2.99 |
| 95 | -0.28 | 249 | 95.59 | 2.083 | 2.18 |
| 0.92 | -0.10 | 185 | 0.92 | 0.033 | 3.59 |
| 7.6 | 0.34 | 280 | 7.44 | 0.458 | 6.15 |
| 140 | 0.42 | 282 | 136.63 | 7.957 | 5.82 |
| 2.18 | -0.02 | 190 | 2.18 | 0.075 | 3.42 |
| 1.33 | -1.00 | 183 | 1.38 | 0.050 | 3.63 |
| 25 | -1.17 | 275 | 27.88 | 2.456 | 8.81 |
| 19 | 0.30 | 270 | 18.38 | 2.073 | 11.28 |
| 57 | 0.20 | 268 | 56.53 | 2.324 | 4.11 |
| 43 | 0.55 | 271 | 41.83 | 2.143 | 5.12 |
| 190 | -0.67 | 263 | 203.01 | 19.551 | 9.63 |
| 31 | 0.42 | 248 | 29.60 | 3.361 | 11.35 |
| 37 | 0.04 | 280 | 36.87 | 3.392 | 9.20 |
| 52 | 0.04 | 267 | 51.86 | 3.499 | 6.75 |
| 87 | -0.72 | 126 | 90.11 | 4.316 | 4.79 |
| 195 | -0.80 | 139 | 205.63 | 13.344 | 6.49 |
| 12 | -0.44 | 156 | 12.56 | 1.281 | 10.20 |

Flagged results

Number of participants

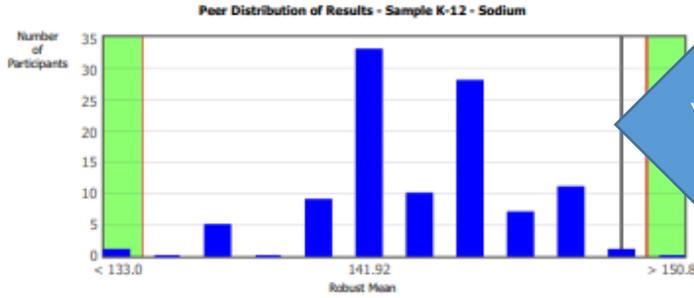
Acceptable z-score key note

Analyte

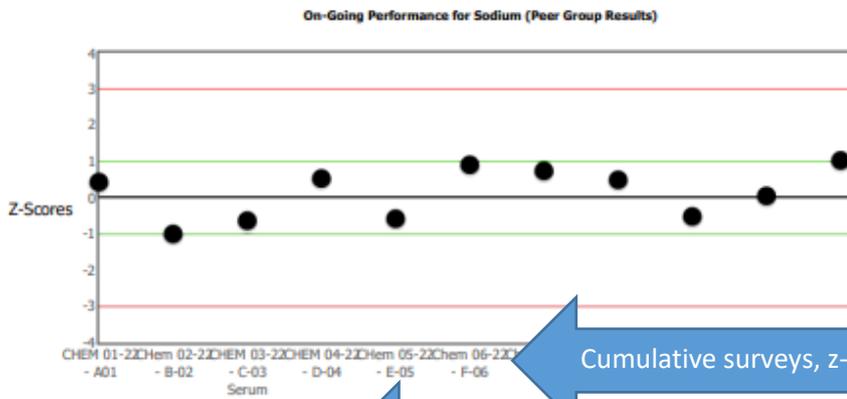
Name of instrument

| SAMPLE K-12 - Sodium | | | | | |
|---|--------------------------------------|-------------|------|------|----------------|
| INSTRUMENT: Roche Cobas c systems SERIAL No. 1672-04 METHOD: Ion Selective electrode - indirect | Comparative Statistics Peer Group | | | | Your Deviation |
| | N | Robust Mean | SD | CV% | Z-Score |
| Your Result 149 mmol/L Acceptable Performance (3.6 %) | 105 | 141.92 | 2.97 | 2.09 | 2.38 |

Mean, SD, CV and z-score of the analyte



Your result plotted, indicated by the black line



Cumulative surveys, z-score plotting

Peer data per instrument methods and group

| Instrument Group / Method | N | Robust Mean | Standard Deviation | CV% |
|--|-----|-------------|--------------------|------|
| Roche Cobas c systems / Ion Selective electrode - indirect | 105 | 141.92 | 2.97 | 2.09 |
| Beckman AU / Ion Selective electrode - indirect | 52 | 144.06 | 3.57 | 2.48 |
| Beckman DxC / Ion Selective electrode - indirect | 23 | 139.65 | 3.52 | 2.52 |
| Roche Cobas c systems / Ion Selective electrode - direct | 16 | 141.81 | 2.69 | 1.90 |
| Dimension / Ion Selective electrode - indirect | 14 | 142.64 | 1.91 | 1.34 |
| Siemens Chemistry Analysers / Ion Selective electrode - indirect | 8 | 143.75 | 2.31 | 1.61 |
| Other / Ion Selective electrode - direct | 7 | 134.14 | 10.29 | 7.67 |
| Beckman AU / Ion Selective electrode - direct | 7 | 144.86 | 2.97 | 2.05 |
| Beckman DxC / Ion Selective electrode - indirect | 7 | 140.43 | 2.15 | 1.53 |

Defined Target Result Interpretation



NHLS PROFICIENCY TESTING PROGRAM (ENDOCRINE)



Results of Survey number 1 for 2011/12

Date of Report: 08 June 2011

LABORATORY:

REGION:

INSTRUMENT:

BECKMAN DXI

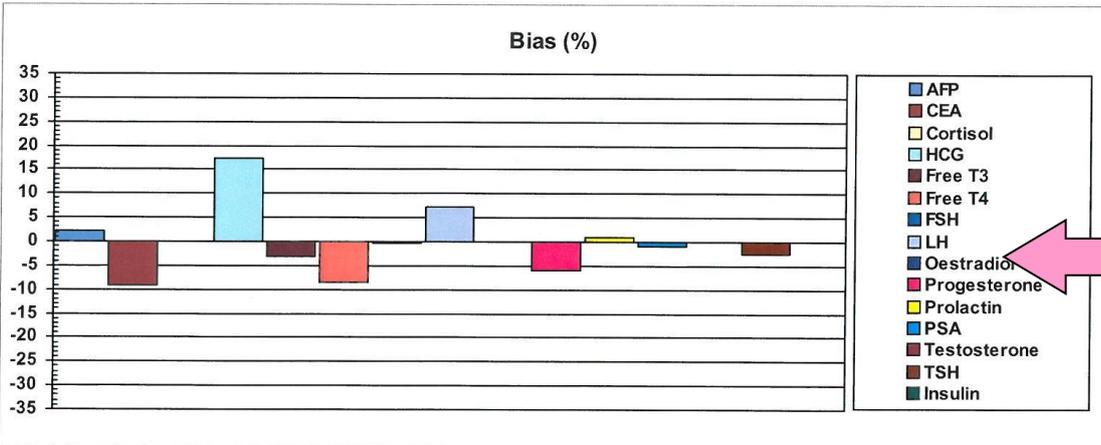
Lower and upper limits of your method group

Mean of results in method group

Your instrument

| TEST | RE | BIA % | ACCEPTANCE LIMITS | | | INSTRUMENT MEAN | No. |
|-----------------------|-------------------|-------|-------------------|---------|---------|-----------------|-----|
| | | | LOW | HIGH | TARGET | | |
| a-Foetoprotein kU/L | | 2.22 | 151.00 | 208.00 | 180.00 | 195.57 | 7 |
| CEA µg/L | 39.30 Beckman DXI | -9.03 | 36.30 | 50.10 | 43.20 | 41.45 | 8 |
| Cortisol nmol/L | | NR | 641.00 | 961.00 | 801.00 | 770.9 | 7 |
| HCG U/L | | 17.48 | 119.00 | 167.00 | 143.00 | | 7 |
| Free T3 pmol/L | | -3.15 | 10.20 | 15.20 | 12.70 | 12.2 | 7 |
| Free T4 pmol/L | 49.50 Beckman DXI | -8.67 | 45.40 | 63.00 | 54.20 | 48.03 | 9 |
| FSH IU/L | Beckman DXI | -0.46 | 36.00 | 50.60 | 43.30 | 43.17 | 7 |
| LH U/L | 61.60 Beckman DXI | 7.13 | 48.30 | 66.70 | 57.50 | 61.00 | 7 |
| Oestradiol pmol/L | Beckman DXI | NR | 2036.00 | 2811.00 | 2424.00 | 2542.50 | 6 |
| Progesterone | 96.80 Beckman DXI | -6.02 | 84.80 | 121.00 | 103.00 | 94.93 | 7 |
| Prolactin µg/L | 32.60 Beckman DXI | 0.93 | 27.10 | 37.50 | 32.30 | 32.94 | 7 |
| PSA µg/L | 21.20 Beckman DXI | -0.93 | 18.00 | 24.80 | 21.40 | 20.725 | 8 |
| Testosterone nmol/L * | Beckman DXI | NR | 21.70 | 30.00 | 25.90 | 26.23 | 4 |
| TSH mIU/L | 33.10 Beckman DXI | -2.65 | 28.60 | 39.50 | 34.00 | 32.800 | 9 |
| Insulin mIU/L * | Beckman DXI | NR | 107.00 | 147.00 | 127.00 | 131.00 | 2 |

* - Not accredited by SANAS



* End Of Report *

Authorised by: Ann Higgs - PT Scheme Manager



Please Note: Sample sizes less than 5 may result in distortion of the mean and as a consequence must be taken with reserve. This is a confidential report that summarises the performance of your laboratory.

PTS0005

Print Date: 20/07/2011

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NHLS Cryptococcal antigen lateral flow assay Proficiency Testing Scheme

Introduction

Cryptococcal meningitis (CM) is a leading cause of death among individuals with HIV/AIDS. Despite increased availability of ART and appropriate therapy, CM continues to be associated with high mortality rates (20%-70%). Early targeted screening and treatment is a more cost-effective and successful means of reducing CM-related mortality. CrAg is detectable in blood prior to development of meningitis. Prevalence of antigenaemia in HIV-infected populations varies between 6%-20%. Studies suggest that patients with CD4+ T-lymphocyte counts <100 cells/ μ L are at highest risk for developing antigenaemia and cryptococcal disease. Identifying patients with CrAg through screening provides a unique opportunity to treat patients who are at risk for developing CM, and to identify patients with early or unrecognised cryptococcal disease who are at risk for immune reconstitution inflammatory syndrome (IRIS).

Proficiency Test Item-Treatment and analysis

1. This material is transported at ambient temperature and on arrival in your laboratory the simulated samples must be stored at 2°C-8°C until analysed.
2. The simulated samples should be well mixed before analysis.
3. Participants must **not** test the three simulated samples in the same manner as patients' specimens.
4. Participants should test the three simulated samples the same number of times that it routinely tests patients' samples.
5. The three simulated samples should be tested with the regular patient workload by staff members who routinely perform the testing in the laboratory, using the routine methods.

Survey Requirements

1. The NHLS CrAg LFA PTS endeavours to assess all aspects of specimen-management, such as turn-around time, accuracy of reports, specimen handling, etc.
2. Rapid turn-around time is an essential element of specimen-management.
3. **Incomplete participant codes on result sheets will result in non-assessment.**
4. **Result sheets received after 12:00 midnight on the closing date will also result in non-assessment. This is equivalent to omitting patient details on a report and not meeting turn-around times (TAT).**

L. Factors that could influence the testing of samples

1. Although rare, extremely high concentrations (>0.140mg/mL) of CrAg can result in weak test lines or false negatives (due to high-dose hook effect or prozone phenomenon).
2. Drops of diluent adhering to the side of the microcentrifuge tube before the addition of sample.
3. Bubbles in the diluent or prepared test: **do not** shake the tube to mix sample with diluent.
4. Inadequate mixing of sample into diluent by pipette tip.
5. Inadvertently bending the strip when inserting so that damage occurs to the strip wick or membrane or both.

M. Homogeneity and stability

1. All simulated samples are tested and guaranteed for homogeneity and stability as part of the NHLS PTS internal quality control process.

N. Sample reception

1. Open package and inspect for any breakages, leaks, missing samples and possible deterioration during transportation.
2. Inform the PTS manager in writing if samples were unsuitable and should require a replacement sample

S. Methodology

- The NHLS CD4 laboratories currently use the IMMY CrAg Lateral Flow Assay kit.
- The kit lot number and expiry date must be written on the result sheet.
- If your laboratory is using any other CrAg kit, please indicate which one.

i. Cryptococcal antigen screening

- Early detection and pre-emptive treatment of CM saves lives.
- Asymptomatic cryptococcal antigenaemia precedes the onset of CM by a median of 3 weeks; this provides a window of opportunity for screening.
- Patients with antigenaemia can be identified by reflexively screening blood specimens using a CrAg detection test.
- Newly-diagnosed CrAg+ patients should be urgently followed up and started on antifungal treatment followed by antiretroviral treatment (ART).

ii. The CrAg test

CrAg can be detected by several test formats:

- Latex agglutination (LA),
- Enzyme immunoassay (EIA)
- Lateral flow assay (LFA).

However, only the LFA format is used in the NHLS CD4 laboratories to reduce specimen preparation time. This is the only method acceptable for the CrAg PTS.

The CrAg PTS uses the LFA method:

- The CrAg LFA is a dipstick sandwich immunochromatographic assay (Immuno-Mycologics, Inc., Norman, OK). The test uses specimen wicking to capture gold-conjugated, anti-CrAg monoclonal antibodies and gold-conjugated control antibodies deposited on the test membrane.
- If CrAg is present in the specimen, it binds to the gold-conjugated, anti-CrAg antibodies.
- The gold-labelled antibody-antigen complex forms a sandwich with capture antibodies at the test line resulting in a visible test line.

iii. Equipment and Materials

- IMMY CrAg Lateral Flow Assay kit, 50 strips
- 1.5 ml disposable micro centrifuge tubes
- 40µl pipette (50 or 100µl pipette to dispense 40µl) and pipette tips
- Timer capable of accurately measuring 10 minutes
- A rack suitable for the micro centrifuge tubes
- Class II biohazard cabinet (if available)
- Centrifuge with 5 ml adaptors

iv. Preparation and Storage of reagents and controls

The kit comprises:

- 50 test strips
- 1 bottle of positive control
- 1 dropper bottle of specimen diluent

No preparation is necessary and the kit is stored at room temperature (22°C - 25°C)

v. Procedure

CrAg PTS tests should be performed on CrAg PTS simulated samples C, D and E.

- Label one micro centrifuge tube for the positive control and one for the negative control.
- Add 1 drop of specimen diluent using the dropper bottle to each PTS sample's micro centrifuge tube (Samples C, D and E) and to the positive control tube.
- Ensure that the drop is centrally placed in the tube.
- Add 2 drops of specimen diluent using the dropper bottle to the negative control tube.
- Add 40µl of the CrAg PTS simulated sample using a pipette to the corresponding labelled micro centrifuge tube and mix the diluent and CrAg PTS simulated sample with the same pipette and tip by aspirating and dispensing the total volume at least twice.
- Add 1 drop of the positive control to the corresponding labelled micro centrifuge tube and mix using a pipette as above.
- Submerge the white end of a CrAg LFA strip into each micro-centrifuge tube
- Set the timer for 10 minutes
- Read the reaction immediately after 10 minutes has elapsed and record the results on the CrAg PTS result sheet.

vi. Interpretation of PTS test results

- The presence of two lines (test and control) regardless of the intensity of the lines (bright or faint), indicates a positive result.
- A single control line only indicates a negative result.
- Ensure that the positive control has two lines and the negative control has one line.
- If the control line does not appear on either a control or patient test sample, the results are invalid and the test must be repeated.

T. Potential biohazardous material

Laboratories should use good laboratory practice when handling this reagent.

U. Laboratory safety

- Use universal precautions with all specimens.
- Follow standard laboratory safety operating procedures.
- Wear a laboratory coat, gloves, and safety glasses when handling simulated whole blood samples.
- Decontaminate all working surface with 70% alcohol and wipe spills with sodium hypochlorite.
- Document and report any laboratory accidents immediately.

V. Result sheet

All CrAg (LFA) results to be captured online.

- If results are only saved and not submitted, no return will be issued.
- Also note that once results are submitted changes cannot be made.
- Three results are required to be entered, Sample C, Sample D and Sample E.
- The LFA method is semi-quantitative but only qualitative results should be reported: negative, positive or indeterminate. **CrAg titres need not be checked and reported for positive CrAg results.**
- **If you record an indeterminate result you must give an explanation. If no explanation is given, the result will be flagged.**

W. Laboratory performance report

Test results that are found to be inappropriate for statistical evaluation due to miscalculations, transpositions or other gross errors will not be included in the evaluation. They will be marked as not evaluated and unacceptable. If the test is not done or a no response they will be marked as not evaluated and unacceptable.

PT items that were distributed but were found to be unsuitable for performance evaluation due to non-homogeneity, instability, damage or contamination are cancelled for evaluation. Such PT items are exempted from evaluation and full scores are assigned. Basic statistics are used for this scheme. Method of data evaluation is no-parametric (qualitative, positive/negative). A cumulative graph is generated for each trial with the number of responses. Statistics include:

- Number of laboratories participating
- Laboratories with acceptable responses
- Laboratories with not acceptable responses.
- Laboratories that did not respond at all.

X. Evaluation of performance

The laboratories are currently using the IMMY CrAg Lateral Flow Assay kit. Three proficiency testing samples, Sample C, Sample D and Sample E are sent to the participants. The participants are graded qualitatively for this scheme (non-parametric), that is negative and positive. In order for performance to be deemed acceptable the participant has to get all three results correct. All surveys and statistic results are automatically generated by the Access data base. Methods of evaluating PTS performance is described in tables 1 and 2.

Table 1: CMPT grading system for scoring participants acceptable results

| Sample | Qualitative evaluation | Score | Percentage | Evaluation |
|--------|------------------------|-------|------------|------------|
| C | Correct response | 4 | 33.33 | Acceptable |
| D | Correct response | 4 | 33.33 | Acceptable |
| E | Correct response | 4 | 33.33 | Acceptable |

Table 2: CMPT grading system for scoring participants unacceptable results

| Sample | Qualitative evaluation | Score | Percentage | Evaluation |
|--------|------------------------|-------|------------|----------------|
| C | Incorrect response | 0 | 0 | Not acceptable |
| D | Incorrect response | 0 | 0 | Not acceptable |
| E | Incorrect response | 0 | 0 | Not acceptable |

Acceptable: Report is technically correct and clinically appropriate.

Unacceptable: Report contains errors that could result in incorrect interpretation and actions.

The method of evaluation is referenced to:

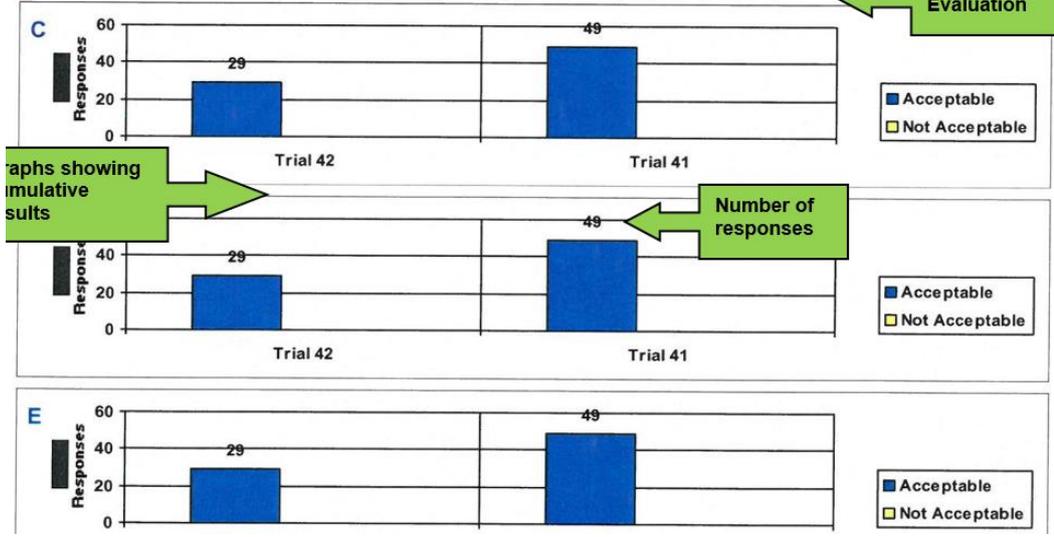
- Clinical Bacteriology numeric grading system guidelines CMPT grading system ([http://cmpt.ca/eqa-programs/mycology/External Quality Assessment for Mycology Laboratories](http://cmpt.ca/eqa-programs/mycology/External%20Quality%20Assessment%20for%20Mycology%20Laboratories)).
- Management of the NHLS Proficiency Testing Scheme for Mycology QASY0009.

Participants are issued with a report detailing their performance compared with that the expected result. A cumulative graph represents the number of responses that are acceptable and not acceptable. A table of statistics is given per survey.

Laboratory performance report

Qualitative evaluation: (Positive/Negative)

Number of acceptable and non acceptable responses.



National Health Laboratory Services

Proficiency Testing Scheme

CrAg LATERAL FLOW ASSAY

Survey : Trial 42

PTS name and Trial number

Individual report: Final Report

Test kit

Survey Print Date: 27 Feb 2017

LABORATORY: **Immu-Mycologics (IMMY)**

METHOD: **Immu-Mycologics (IMMY)** Number: L100273 Kit expiry date: 2019/01/13

Unique code number

Your results

Acceptable

| SAMPLE | Your Result | Expected Result | Evaluation |
|--|-------------|-----------------|------------|
| C Weak Positive (10 µl CrAg) | Positive | Positive | Acceptable |
| D Negative (0 µl CrAg) | Negative | Negative | Acceptable |
| E Strong Positive (30 µl CrAg) | Positive | Positive | Acceptable |

Expected results

Your result

Evaluation results for 3 samples

COMMENT:

NHLS MYCOLOGY MOULDS

Selection of samples: Isolates which are included in the NHLS PTS for Mycology (Moulds) are characterised to ensure that typical features are present to facilitate identification. Prior to distribution, the organisms are identified using standard phenotypic methods and a part of the fungal genome is sequenced to confirm the final identity.

Survey Requirements: The NHLS PTS for Mycology (Moulds) endeavours to assess aspects of specimen-management, such as turn-around time, accuracy of reports, clinical relevance of results, specimen handling, *etc.* Rapid turn-around time is an essential element of specimen-management, so any survey questionnaires which are received after the return deadline will be penalised and those received after the preliminary survey answers are distributed will not be assessed. If a laboratory name and number is not completed on the survey questionnaire, it is considered equivalent to leaving a patient's name off a laboratory report. These results will not be assessed, even if a covering fax sheet is sent.

Preliminary Survey Answers: The identity of the samples distributed through the NHLS PTS for Mycology (Moulds) will be emailed to NHLS quality Assurance (QA) Managers and non-NHLS laboratories a week after the deadline for return of the survey questionnaire. Therefore, survey questionnaires which are received late cannot be assessed. Please email the above address to be added to the distribution list.

Survey Grading: The survey questionnaires are graded by one person using a model answer framework and moderated by a second person. The model answer framework is reviewed by the NHLS PTS Microbiology Advisory Committee.

INSTRUCTIONS FOR SURVEY

The package contains samples **A, B, C** and **D** (cultures suspended in sterile water). If the package contains broken samples, sterilize (autoclave) the container immediately. Dispose of according to normal procedures. Guard against the production of aerosols.

Inoculation of culture suspended in sterile water

After gently swirling, inoculate approximately half of the suspension directly onto media appropriate for the type of sample supplied. Keep the vial at room temperature until you have identified the isolate completely.

Instructions for completing the survey questionnaire

Read the clinical scenarios provided with each survey samples. Identify the provided samples (**A to D**), using standard operating procedures. Note – sample **D** is provided as a “difficult identification challenge” and will not be graded.

Please complete the survey questionnaire using the provided answer codes. If an answer code is not provided in the table, please write the full answer in the questionnaire.

Grading system for NHLS PTS for Mycology (Moulds)

| Score | Result | Definition | Performance assessment |
|-------|----------------------------------|---|------------------------|
| 4 | Completely correct result | A result which is accepted as the most correct and clinically relevant result. | Acceptable |
| 3 | Almost completely correct result | A result which is not technically correct, but the error or omission has little or no clinical impact; a deviation from what is considered the most clinically relevant result. | Acceptable |
| | <i>Separator</i> | <i>To divide acceptable from unacceptable responses.</i> | N/A |
| 1 | A significantly incorrect result | A clinically relevant result which could lead to a minor diagnostic or treatment error. | Unacceptable |
| 0 | Completely incorrect result | A clinically relevant result which could lead to a major diagnostic or treatment error. | Unacceptable |
| 0 | No result | No result submitted by participant. | Unacceptable |

NHLS Parasitology Stool Proficiency Testing Scheme Instructions

Scope

One of the **main objectives** of the Stool Parasites PT Scheme is to **teach** and participants are encouraged to perform **all** of the survey challenges, even if their laboratories do not perform them routinely. Participants are encouraged to keep survey specimens. Survey specimens can be used in the future as teaching aids, used as reference material or as controls for tests by participants.

Selection of sample

a) Proficiency Testing Schemes involve more than a positive or negative answer to a survey sample and this PT Scheme aims to assess other aspects, such as turn-around time, accurate result reports, clinical relevance of results, specimen handling, etc. Rapid turn-around time is an essential element of PTS. PTS survey samples should be treated in the same way as routine patient specimens. This survey contains 5 challenges. Identify any parasite(s) present, even if not pathogenic and write the answer codes. Only the answer codes will be assessed, not parasite names (except for code 33). More than one answer code can be reported for mixed infections. Do not report artefacts.

b) Homogeneity and stability

All testing materials are tested and guaranteed for homogeneity and stability in the initial stage as part of the Parasitology Stool Internal Quality Control Process.

PTS sample donation:

We are always in need of 3+ parasite positive specimens to use in this PT scheme and all contributions are welcome. Please ensure that stool specimens are sent in 10% formalin. You can contact us at the numbers above for any further instructions.

a) Proficiency test item –treatment and analysis

Read the clinical details and processing instructions for each sample. Samples shall be analyzed using your own standard operating procedures. All participants are required to use the test method of their choice.

b) Factors that could influence the testing i.e. Nature of the PT items, conditions of storage, whether the PTS is limited to selected methods and timing of the PT Item

Temperature: Samples are shipped at ambient conditions. Please ensure that samples are stored and processed at room temperature at all times.

c) Special handling instructions and safety requirements

If the package contains broken samples, sterilize (autoclave) the container and contents immediately. Dispose broken samples as per safety protocols used in your laboratory.

d) Specific environmental conditions that the tests must be performed

N/A

e) Provisional results

Provisional results are e-mailed to regional managers and participants who request them, one week after the result deadline. Please e-mail us at the above e-mail address to be added to the mailing list.

NHLS Malaria RDT Proficiency Testing Scheme

a) Scope

The NHLS PTS for Malaria RDT aims to assess the correct interpretation of the various Malaria RDT kits that participants are using.

b) Selection of sample

This survey contains three challenges. Participants are required to test for the presence or absence of malaria antigens from the samples given.

c) Proficiency test item –treatment and analysis

Samples shall be analysed using your own standard operating procedures. All participants are required to use the test method of their choice.

d) Factors that could influence the testing i.e. Nature of the PT items, conditions of storage,

whether the PTS is limited to selected methods and timing of the PT Item

Temperature: Shipment of samples is at ambient conditions. Please ensure that samples are kept **frozen** on receipt, thaw and bring to room temperature before testing.

e) Special handling instructions and safety requirements

If the package contains broken samples, sterilize (autoclave) the container and contents immediately.

Dispose broken samples as per safety protocols used in your laboratory.

f) Specific environmental conditions that the tests must be performed

N/A

g) Online submission of PTS results

After analysing your samples go to the link <http://ptschemes.nhls.ac.za/> and enter your results as in the table below using login credentials provided by the PT provider.

| Challenge | Answer | Kit Used |
|-----------|--------------------------------------|-----------------------------------|
| MR01/23 | P. falciparum antigen test: negative | ICT Malaria Plasmodium falciparum |
| MR02/23 | P. falciparum antigen test: positive | ICT Malaria Plasmodium falciparum |
| MR03/23 | P. falciparum antigen test: negative | ICT Malaria Plasmodium falciparum |

NHLS Specific Treponemal Serology Instructions

a) Scope

The NHLS PTS for Specific Treponemal Syphilis Serology aims to determine the laboratory policy on handling specimens including complete testing and results interpretation. Participants are encouraged to perform testing on all samples.

b) Selection of sample

All laboratories receive identical test panels. The test panel includes both positive and negative samples. The composition of the test panels may vary with each survey. Prior to distribution, the samples are quality controlled by external referee laboratories using standardized methods.

c) Proficiency Test Item –Treatment and analysis

Samples shall be analysed using your own standard operating procedures. All participants are required to use the test method of their choice.

d) Homogeneity and stability:

All testing materials are tested and guaranteed for homogeneity and stability in the initial stage as part of the Specific Treponemal Syphilis Serology Internal Quality Control Process.

e) Sample reception

The package contains three serum samples (**ST01, ST02, and ST03**) - the samples are derived from human plasma converted into serum by a process of recalcification. Please open package and inspect for any breakages, possible deterioration during transportation or missing samples.

f) Factors that could influence the testing i.e. nature of the PT items, conditions of storage

Temperature: Samples are shipped at ambient conditions. Please ensure that samples are stored at 2-8°C upon receipt and at -20°C for long-term storage.

g) Special Handling instructions and safety requirements.

If the package contains broken samples, sterilize (autoclave) the container and contents immediately. Dispose of broken samples as per safety protocols used in your laboratory. Guard against the production of aerosols. Please follow universal safety precautions at all times.

Reference: Q-Pulse5/docs/active/QASF0012/ QASF0008 /QASH0019/
QASC0008/QASM0048/QASP0019/QASS0003/QASS0016/QASQM0007/

h) Specific environmental conditions that the tests must be performed.

Samples should be stored between 2 – 8 °C before examination. Bring samples to room temperature and test using routine methods.

i) Online submission of PTS Results.

After analysing your samples go to the link <http://ptschemes.nhls.ac.za/> and enter your results as in the table below using login credentials provided by the PT provider. The sample number you are entering will be highlighted in green. To move to the next click on the grey bar to highlight new sample.

| | | | |
|---------------------------------------|----------------------|--------------|-----------------------|
| Sample: ST01 | Sample: ST02 | Sample: ST03 | |
| Parameters | Method | Result | Non-Submission Reason |
| Specific Treponemal Syphilis Serology | Other | Reactive | Result submitted |
| Comments (1,000 characters) | <input type="text"/> | | |

j) Evaluation of submitted results

The results are graded as in Table 1 below

Table 1 Evaluation of Specific Treponemal Serology PTS

| Sample | Qualitative Evaluation | SCORE |
|--------|------------------------|-------|
| ST01 | Correct Response | 4 |
| ST02 | Correct Response | 4 |
| ST03 | Correct Response | 4 |

A total score of 12 is possible, all incorrect responses will receive zero.

NHLS NON SPECIFIC TREPONEMAL SEROLOGY

a) Factors that could influence the testing ie. Nature of the PT items, conditions of storage

Temperature: Samples are shipped at ambient conditions. Please ensure that samples are stored at 2-8°C upon receipt and at -20°C for long term storage.

b) Selection of sample

All laboratories receive identical test panels. The composition of the test panels may vary with each survey. Prior to distribution, the samples are quality controlled by external referee laboratories using standard methods.

c) Homogeneity and stability:

All testing materials are tested and guaranteed for homogeneity and stability in the initial stage as part of the Non-Specific Serology Internal Quality Control Process.

d) Sample Details

The package contains 3 sera samples (**S01, S02, and S03,**) - the samples are derived from human plasma converted into serum by a process of recalcification.

e) Special Handling instructions and safety requirements.

If the package contains broken samples, sterilise (autoclave) the container and contents immediately. Dispose of broken samples as per safety protocols used in your laboratory. Guard against the production of aerosols. Please follow universal safety precautions at all times.

f) Specific environmental conditions that the tests must be performed.

Samples should be stored between 2 – 8 °C before examination, and must be examined by routine methods.

g) Sample reception

This package contains 3 sera samples labeled with sample number, department name and year of survey.

Please open package and inspect for any breakages, possible deterioration during transportation or missing samples. Inform PTS Coordinators in writing if samples are unsuitable and whether you require a replacement sample.

h) Recording and submission of PTS Results.

Print a response form from www.nhls.ac.za. Submissions can be made via fax 086 225 2460 or email seropts@nhls.ac.za. Please complete the survey result form by recording results either as reactive or non-reactive.

i) **Evaluation of submitted results**

The scheme uses a grading method for the allocation of a score for each of the 3 samples, as in Table 1 below.

Table 1

| Sample | Qualitative Evaluation | Score | Quantitative Evaluation/Titre | Score |
|---------------|-------------------------------|--------------|--------------------------------------|--------------|
| S01 | Correct Response | 4 | Correct Response | 1 |
| S02 | Correct Response | 4 | Correct Response | 1 |
| S03 | Correct Response | 4 | Correct Response | 1 |

A total score of 15 is possible, all incorrect responses will receive zero.

NHLS HIV EARLY INFANT DIAGNOSIS

a) Selection of sample

Prior to distribution, the samples are examined by external referee laboratories using standard methods and then further subjected to pre-distribution testing by the provider. All laboratories shall receive identical panels consisting of a selection of negative and/or positive samples. The composition of the test panels may vary with each survey.

b) Sample reception

Sample contents detailed in the instructions and process checklist.

Please open package and inspect for any possible deterioration during transportation or missing samples. Inform the PTS Provider in writing if samples are unsuitable and whether you require a replacement sample.

c) Evaluation of submitted results

The scheme uses a grading method for the allocation of a score for each of the 5 Dried Blood Spots, as in Table 1 below.

Table 1

| SPECIMEN CATEGORY | PARTICIPANTS' RESPONSE | SCORE |
|--------------------|------------------------|-------|
| HIV-1 Detected | HIV-1 Detected | 1 |
| | HIV-1 Not Detected | 0 |
| HIV-1 Not Detected | HIV-1 Not Detected | 1 |
| | HIV-1 Detected | 0 |

d) Recording and submission of PTS Results.

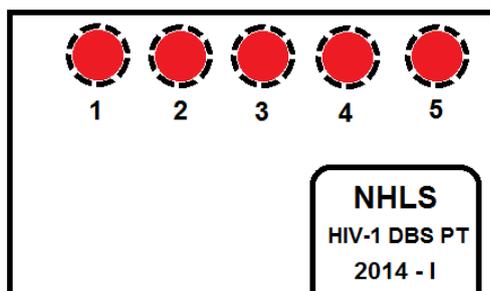
- Results are submitted online through the website <http://ptschemes.nhls.ac.za/> and can be submitted by nominated individuals referred to as participant or controller.
- The participant's laboratory and/or primary health care facility's name and unique participant code number (and sub code number/letter if registered more than one instrument) must be confirmed by the laboratory prior to submission.
- Please note: If the above is not complied with, no results will be generated and a non-return result will be generated instead.
- Select the correct survey number when submitting results.
- The date received and the date of analysis should be captured.
- Use the blocks provided to enter your results.
- If you cannot submit results for any reasons, select the appropriate reason on "**Reason for no submission**"
- After entering your results, you can save and check for errors (as per your manual results entry protocol) and submit results by pressing submit button.
 - If results are only saved and not submitted, no return will be issued.
 - Also note that once results are submitted changes cannot be made.

HIV-1 Proficiency Testing Program for Early Infant Diagnosis

| |
|------------------------------------|
| Instructions and Process Checklist |
|------------------------------------|

In this PT testing event, a DBS PT Panel for each Survey is included. Please process 5 samples. With the card oriented upright, please process the DBS from the left to the right as numbered in the diagram below. Report the sample IDs as follows: 20XX-1, 20XX-2, 20XX-3, 20XX-4, and 20XX-5.

DBS PT Panel



Checklist

Please indicate with the date and your initials when Proficiency Testing materials were received. Your test kit should include:

| Initial | Date | Item |
|---------|------|--|
| | | 2 NHLS DBS PT Panel card (5 Spots on card) – 2 sets (Survey 1 and 2) |
| | | 1 NHLS Positive Quality Control Card (10 DBS) |
| | | 1 NHLS Negative Quality Control Card (10 DBS) |

Testing Instructions

| Initials | Date | Action |
|----------|------|--|
| | | Perform PT testing according to your laboratory's Standard Operating Procedure |

Result Submission online

| Initials | Date | Action |
|----------|------|--|
| | | Complete blank fields on the top portion of the form. |
| | | Provide your laboratory's final interpretation for each specimen in the table. (HIV-1 Detected, HIV-1 Not-detected, Equivocal, or Invalid) |
| | | Provide CT values for all specimens including Kit and NHLS controls. |
| | | Review Results and check for transcription errors. Verify that all result fields are complete. |
| | | Submit results electronically by due date online as per login details submitted at http://ptschemes.nhls.ac.za/ . |
| | | A copy of results submitted may be printed from the online system for record keeping. |

NHLS HIV SEROLOGY

a) Selection of sample

Samples included in the NHLS PTS for HIV Serology are characterized on a selection of both HIV ELISA and Rapid test methods to ensure that a correct interpretation of final result is attained. Prior to distribution, the samples are examined by external referee laboratories using standard methods and then further subjected to pre-distribution testing by the provider. All laboratories shall receive identical panels consisting of a selection of negative and/or positive samples. The composition of the test panels may vary with each survey.

b) Sample reception

The package contains 6 sera samples (**H01, H02, H03, H04, H05 and H06**) - the samples are derived from human plasma converted into serum by a process of recalcification. The samples are labeled with sample number, department name and year of survey.

Please open package and inspect for any breakages, possible deterioration during transportation or missing samples. Inform PTS Coordinators in writing if samples are unsuitable and whether you require a replacement sample.

c) Evaluation of submitted results

The scheme uses a grading method for the allocation of a score for each of the 6 samples, as in Table 1 below.

Table 1

| SPECIMEN CATEGORY | PARTICIPANTS' RESPONSE | SCORE |
|-------------------|------------------------|-------|
| Anti-HIV positive | Positive | 2 |
| | Negative | 0 |
| Anti-HIV negative | Positive | 0 |
| | Negative | 2 |

d) Submission of PTS Results.

- Results are submitted online through the website <http://ptschemes.nhls.ac.za/> and can be submitted by nominated individuals referred to as participant or controller.
- The participant's laboratory and/or primary health care facility's name and unique participant code number (and sub code number/letter if registered more than one instrument) must be confirmed by the laboratory prior to submission.
- Please note: If the above is not complied with, no results will be generated and a non-return result will be generated instead.
- Select the correct survey number when submitting results.
- The date received and the date of analysis should be captured.
- Use the blocks provided to enter your results.
- If you cannot submit results for any reasons, select the appropriate reason on "**Reason for no submission**"
 - After entering your results, you can save and check for errors (as per your manual results entry protocol) and submit results by pressing submit button.
 - **If results are only saved and not submitted, no return will be issued.**
 - **Also note that once results are submitted changes cannot be made.**

NHLS HBsAg SEROLOGY

a) Selection of sample

Samples included in the NHLS PTS for HBsAg Serology are characterized on a selection of both HBsAg ELISA and Rapid test methods to ensure that a correct interpretation of final result is attained. Prior to distribution, the samples are examined by external referee laboratories using standard methods and then further subjected to pre-distribution testing by the provider. All laboratories shall receive identical panels consisting of a selection of negative and/or positive samples. The composition of the test panels may vary with each survey.

b) Sample reception

The package contains 6 sera samples (**HB01, HB02, HB03, HB04, HB05 and HB06**) - the samples are derived from human plasma converted into serum by a process of recalcification. The samples are labeled with sample number, department name and year of survey.

Please open package and inspect for any breakages, possible deterioration during transportation or missing samples. Inform PTS Coordinators in writing if samples are unsuitable and whether you require a replacement sample.

c) Proficiency Test Item –Treatment and analysis

Samples positive for HBsAg have been heat inactivated at 56°C for 60 minutes.

d) Special Handling instructions and safety requirements.

If the package contains broken samples, sterilise (autoclave) the container and contents immediately. Dispose of broken samples as per safety protocols used in your laboratory. Guard against the production of aerosols. Please follow universal safety precautions at all times.

e) Evaluation of submitted results

The scheme uses a grading method for the allocation of a score for each of the 6 samples, as in Table 1 below.

Table 1

| SPECIMEN CATEGORY | PARTICIPANTS' RESPONSE | SCORE |
|--------------------------|-------------------------------|--------------|
| HBsAg Positive | Positive | 2 |
| | Negative | 0 |
| HBsAg Negative | Positive | 0 |
| | Negative | 2 |

f) Submission of PTS Results.

- Results are submitted online through the website <http://ptschemes.nhls.ac.za/> and can be submitted by nominated individuals referred to as participant or controller.

- The participant's laboratory and/or primary health care facility's name and unique participant code number (and sub code number/letter if registered more than one instrument) must be confirmed by the laboratory prior to submission.
- Please note: If the above is not complied with, no results will be generated and a non-return result will be generated instead.
- Select the correct survey number when submitting results.
- The date received and the date of analysis should be captured.
- Use the blocks provided to enter your results.
- If you cannot submit results for any reasons, select the appropriate reason on "**Reason for no submission**"
- After entering your results, you can save and check for errors (as per your manual results entry protocol) and submit results by pressing submit button.
- If results are only saved and not submitted, no return will be issued.
- Also note that once results are submitted changes cannot be made.

NHLS HIV-1 VIRAL LOAD

a) Factors that could influence the testing i.e. Nature of the PT items, conditions of storage

Temperature: Samples are shipped at ambient conditions. Store specimens at 2-30°C until day of testing. Do not use past expiration date on vial. Specimens must be at room temperature before opening vials. Each vial should be tested once and then discarded.

b) Sample Details

- 10 single use vials [two identical sets of 5 Dried Tube Specimens (DTS)]
- One tube (13 ml) reconstitution buffer.

c) Sample preparation and testing

- Add 1.1 ml reconstitution buffer to each DTS specimen and vortex for 10 seconds.
- Reconstituted specimens should be red in color, free of particulate matter and used immediately. If needed, the rehydrated specimens of DTS can be stored at 4°C for 24 hours or -20 °C or colder for up to one week, with no more than one freeze-thaw.
- Perform testing according to your laboratory's Standard Operating Procedure along with your patients' specimen into your daily workflow, so test results are truly indicative of your lab's daily performance.

d) Submission of PTS Results.

- Please note that Results must be reported in log 10 copies/ml
- Results must be submitted online to the PTS Provider before the return deadline. Login details have been emailed to individual laboratories but the PT Coordinators can be contacted for more information.
- Results are submitted online through the website <http://ptschemes.nhls.ac.za/> and can be submitted by nominated individuals referred to as participant or controller.
- The participant's laboratory and/or primary health care facility's name and unique participant code number (and sub code number/letter if registered more than one instrument) must be confirmed by the laboratory prior to submission.
- Please note: If the above is not complied with, no results will be generated and a non-return result will be generated instead.
- Select the correct survey number when submitting results.
- The date received and the date of analysis should be captured.
- Use the blocks provided to enter your results.
- If you cannot submit results for any reasons, select the appropriate reason on "**Reason for no submission**"
- After entering your results, you can save and check for errors (as per your manual results entry protocol) and submit results by pressing submit button.
- **If results are only saved and not submitted, no return will be issued.**
- **Also note that once results are submitted changes cannot be made.**

NHLS SARS-COV-2 MOLECULAR PCR AND RAPID ANTIGEN TEST

a) Scope

The PTS for SARS-COV-2 aims to determine the facility's policy on handling specimens including complete testing and final results interpretation. Participants are encouraged to perform testing as directed.

b) Sample Details

- Each pellet/swab contains human respiratory epithelial cells.

c) Sample preparation and testing

Pellet

- a. Rehydrate the lyophilized pellet by adding it to a tube or vial containing an appropriate buffer, transport media, or nuclease-free water.
- b. Vortex the rehydrated pellet for 10 seconds or until pellet is dissolved.
- c. Use the appropriate volume of the rehydrated pellet for the assay being performed and follow laboratory protocols or manufacturer instructions for processing the sample.

Note: Each pellet is intended as a single use test. Dilutions may be performed and used immediately. Storage of the rehydrated or diluted material for future use is not recommended.

Swab

- d. Tear open the foil pouch containing the quality control swab at the notch.
- e. Remove the swab from the pouch.
- f. Rehydrate the swab in a method appropriate to the assay and follow laboratory protocols or manufacturer's instructions for processing the sample.

Note: Each swab is intended as a single use test. Dilutions may be performed and used immediately. Storage of the rehydrated or diluted material for future use is not recommended.

d) Recording and submission of PTS Results.

- An electronic copy will be made available if required.

e) Recording and submission of PTS Results.

- Print a response form from www.nhls.ac.za.

NHLS SARS-COV-2 MOLECULAR PCR RESULTS

- Results for SARS-CoV-2 Molecular PCR must be submitted to molecular.pts@nhls.ac.za

NHLS SARS-COV-2 ANTIGEN RESULTS

- Results for SARS-CoV-2 Antigen Serology must be submitted to seropts@nhls.ac.za

NHLS Hepatitis A IgM SEROLOGY

e) Selection of sample

NHLS PTS for Hep A IgM Serology aims to determine the laboratory policy on handling specimens including complete testing and final results interpretation. All laboratories shall receive identical panels consisting of a selection of negative and/or positive samples. The composition of the test panels may vary with each survey.

f) Sample reception

The package contains 3 sera samples ([HA01](#), [HA02](#) and [HA03](#))
Please open package and inspect for any breakages, possible deterioration during transportation or missing samples. Inform PTS Coordinators in writing if samples are unsuitable and whether you require a replacement sample.

g) Proficiency Test Item –Treatment and analysis

Samples shall be analysed using your own standard operating procedures. Samples should be treated in the same way as routine patient specimens.

h) Special Handling instructions and safety requirements.

If the package contains broken samples, sterilise (autoclave) the container and contents immediately. Dispose of broken samples as per safety protocols used in your laboratory. Guard against the production of aerosols. Please follow universal safety precautions at all times.

f) Evaluation of submitted results

The scheme uses a grading method for the allocation of a score for each of the 3 samples, as in Table 1 below.

Table 1

| SPECIMEN CATEGORY | PARTICIPANTS' RESPONSE | SCORE |
|--------------------------|-------------------------------|--------------|
| Hepatitis A IgM Positive | Positive | 4 |
| | Negative | 0 |
| Hepatitis A IgM Negative | Positive | 0 |
| | Negative | 4 |

g) Submission of PTS Results.

- Print a response form from www.nhls.ac.za.
- Results for SARS-CoV-2 Antigen Serology must be submitted to seropts@nhls.ac.za

NHLS Automated Reticulocyte Count Proficiency Testing Scheme

This is a detailed documented participant instruction for NHLS Automated Reticulocyte Count Proficiency Testing Scheme participants. All relevant information regarding this proficiency testing scheme is contained in this document which must be read prior to processing the proficiency testing scheme samples.

Please read the information provided. Important dates for dispatch and return of results are indicated.

Your subscription package should include the following items:

- Unique participant code number
- One proficiency testing sample. (This material is transported at ambient (18°C-25°C) temperature and on arrival in your laboratory the material must be stored at 2°C-8°C until analysed. The whole blood material is ready for use once brought to ambient temperature).
- Process the stabilised human blood product as if you were handling routine blood samples (observing associated safety precautions).

IMPORTANT

Make sure you have the correct sample for the type of haematology analyser used in your laboratory.

The NHLS Automated Reticulocyte Count scheme issues stabilised whole blood in which participants are required to determine the reticulocyte count within the preparation. Participants are required to return absolute counts and percentage values.

12. Participation

Participation is open to all laboratories that process the automated reticulocytes.

13. Methodology

The laboratories are to use the haematology analysers for processing reticulocytes.

- Coulter series
- Advia series
- Sysmex series

14. Homogeneity and stability

The samples have been tested and found to be homogeneous and stable for this scheme.

15. Stability and storage

Store the tubes vertically in their original package at 2 to 8°C when not in use. DO NOT FREEZE.

All PT material to be discarded as per the waste management standard operation procedure

16. Reconstitution

No reconstitution required, the sample is stabilised whole blood.

- Remove the tube of blood from the refrigerator and allow to warm at room temperature (18 to 25°C) for 15 minutes before mixing.
- To mix, hold a tube horizontally between the palms of the hands. Do not pre-mix on a mechanical mixer.
- Roll the tube back and forth for 20 - 30 seconds; occasionally invert the tube. Mix vigorously, but do not shake.
- Continue to mix in this manner until the red cells are completely suspended. Tubes stored for a long time may require extra mixing,
- Gently invert the tube 8 - 10 times immediately before sampling.
- Return tube to the refrigerator within 30 minutes of use.

17. Result sheet

- Copies are to be made from the master result sheet.
- The participant's laboratory name and unique participant code number (and sub code number/letter if registered more than one instrument) must be written in.
- Please note: If the above is not complied with, no results will be generated, and a non-return result will be sent to the participant.
- The survey number must be written in.
- The instrument name and serial number must be written in.
- Information required from participants includes:
 - Results absolute counts and % value.
 - Name, signature, telephone number and email address

18. Laboratory performance report

- The results which have been sent by the participating laboratories are analysed and documented in a report.
- Each laboratory performance report includes the peer data.
- The report includes the following:
 - Results of survey number and date of report

- An automated reticulocyte count report sheet that summarises the information submitted by the participant and identifies the institution, laboratory participant number, haematology analyse with serial number.
- A summary table of statistics that includes reported value (laboratory submitted result), peer mean value (method mean), residual, SD and z-score.
- Results include:
 1. Percentage (%)
 2. Absolute counts ($10^9/L$)

19. Evaluation of Automated reticulocytes Count results

NHLS Automated Reticulocyte Counts Proficiency Testing Scheme use the peer mean and SD calculations along with robust statistics to exclude outliers.

20. Interpretation of cumulative SDI/z score graph results

Individual cumulative SDI/z-score on report:

- On the report form, a participants' standard deviation index (SDI)/z-score result.

21. Criteria of acceptance with the z-score

Each participant should carefully evaluate the Z-scores given in the report. In accordance with the laboratory standard operating procedures.

- $-2 \leq Z\text{-score} \leq 2$: The result is acceptable
- $-3 < Z\text{-score} < -2$ or $2 < Z\text{-score} < 3$: The results are questionable (warning signal)
- $Z\text{-score} \leq -3$ or $Z\text{-score} \geq 3$: The result is unacceptable (action signal)

Note

Sample sizes less than 10 may result in the distortion of the mean and as a consequence must be taken with reserve.

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**National Health Laboratory Services
Proficiency Testing Scheme**

Automated Reticulocyte count

Survey: 01-23

Survey number

Final report

Instrument name: Advia 2120i (IR10371820)

Instrument name

Lab QA number:

Number of all participants: 49

Number of Advia participants: 10

Date of report: 19 June 2023

| Sample 1 | | | | | | |
|------------------------------|--------------|-------------|------|---------|----------------|---------------------|
| Parameter | Your results | Robust mean | SD | z-score | Interpretation | Your interpretation |
| RBC | 3,68 | 3,655 | 0,07 | 0,34 | Raised | Normal |
| Reticulocytes Count % | 9,38 | 6,05 | 1,99 | 1,67 | Raised | Normal |
| Reticulocytes Count absolute | 0,345 | 0,2 | 0,07 | 1,65 | Raised | Normal |

Results analysis table

Non acceptable response (z-score $\geq \pm 2$)

Acceptable criteria

Method of evaluation: Robust mean

Method of analysis

Comparative stats: Peer data

Report authorised by: PT Scheme Manager

Bongiwe Mofokeng