

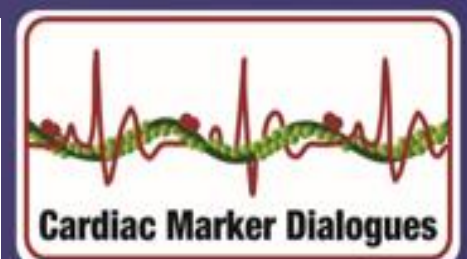
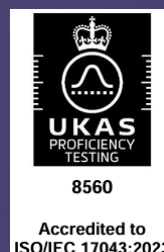


UK NEQAS
Cardiac Markers

**UK National External Quality
Assessment Service
Cardiac Markers**



**Participants'
Manual**



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1. General Information

1.1 Background

UK NEQAS Cardiac Markers is a non-profit centre working within NHS Greater Glasgow and Clyde to improve cardiac biomarker investigations in the clinical laboratory sector for the benefit of patients. Greater Glasgow and Clyde established under the National Health Service (Scotland) Act 1978, known as NHS Greater Glasgow & Clyde (Legal Entity), operating UK NEQAS Cardiac Markers is an ISO/IEC 17043:2023 accredited proficiency testing provider, accredited by UKAS (No: 8560).

UK NEQAS Cardiac Markers External Quality Assessment (EQA) Scheme comes under the organisational framework of UK NEQAS and follows the UK NEQAS code of practice for member schemes, but is financially and organisationally distinct. UK NEQAS Cardiac Markers is supported financially by fees paid by participants. This allows the scheme to run independently.

1.2 Scheme Management

The schemes for cardiac markers are run from the Laboratory Medicine & Facilities Management Building, Queen Elizabeth University Hospital, situated within the Biochemistry Department. It is managed by Naomi Elkin (Scheme Organiser), who will be pleased to provide advice or assistance on any aspect of the scheme.

1.3. Contact Details

Address: UK NEQAS Cardiac Markers
Level 1 (Room B/046)
Laboratory Medicine & FM Building
Queen Elizabeth University Hospital
1345 Govan Road, Glasgow G51 4TF Scotland UK

Phone: +44(0)141 440 2888

General email: info@ukneqas-cm.org.uk

Website: www.ukneqas-cm.org.uk

Scheme Organiser email: naomi.elkin@nhs.scot



1.4 Scheme Objectives

UK NEQAS Cardiac Markers aims to:

- Provide an accurate, fair, efficient, cost effective, UKAS accredited external quality assessment programme to all participants of the scheme within the resources available, therefore assuring a high-quality diagnostic service to the participants' patients.
- Provide professionally-led and scientifically based EQA scheme with a primarily educational objective.
- Provide a regular, reliable distribution of appropriate specimens.
- Provide rapid feedback of individual participant performance in reports that are comprehensive and readily understood.
- Provide data on method related performance.
- Facilitate laboratories of participating members to fulfil current ISO 15189 requirements regarding participation in inter-laboratory comparison programmes
- Maintain and improve performance of diagnostic testing at a high level of proficiency, wherever testing is performed.
- Provide an opportunity to participate in EQA as an established part of Quality Assurance, actively encouraged by professional bodies.

1.5. Design overview

UK NEQAS Cardiac Markers is organised to provide an External Quality Assessment (EQA) Scheme for the assay of serum cardiac Troponin I and Troponin T, Creatine Kinase-MB (CKMB), Myoglobin, B-type Natriuretic Peptide (BNP) and N Terminal -proB-type Natriuretic Peptide (NT-proBNP) and will develop appropriate EQA schemes for new cardiac biomarkers.

The fundamental design of the scheme began in 1997 there the requirement for a UK wide EQA scheme for the new cardiac markers Troponin I (cTnI) and Troponin T (cTnT) was recognised and a scheme for these two analytes was proposed. This received recognition and funding as a pilot scheme from Clinical Pathology Accreditation (UK) Ltd (CPA) in February 1998.

The cardiac Troponin EQA schemes received CPA accreditation in December 1999. In June 2002 Myoglobin and CKMB Point of Care Schemes also received CPA accreditation. These developments were supported from participant fees. We have developed an EQA material suitable for N terminal Pro-B type Natriuretic Peptide (NT-ProBNP) and B-Type Natriuretic Peptide (BNP) on both laboratory-based systems and point of care systems. On the 23rd March 2016 the scheme became United Kingdom Accreditation Service (UKAS) accredited to ISO/IEC 17043 General Requirements for Proficiency Testing.

All of these schemes are now established in the UK and our priority is to continually maintain their quality and where appropriate develop EQA schemes for new cardiac biomarkers. Maintaining accreditation to ISO/IEC 17043 is seen as an essential step in meeting these aims.

UK NEQAS Cardiac Markers is a simultaneous participation proficiency testing scheme, distributing to participants for concurrent testing. Within UK NEQAS Cardiac Markers the frequency of distribution is 11 per year as documented in the Distribution Schedule. A 'distribution' basis may be two or three specimens dependent on the specific Scheme. After completion of the testing, the results are returned to UK NEQAS Cardiac Markers and compared to give an indication of the performance of the individual participants with the group as a whole.



A Position Paper is available discussing the rationale for Scheme Design within the UK NEQAS Chemistry Division.

Various aspects of the EQA Programme can from time to time be subcontracted. UK NEQAS Cardiac Markers does not subcontract the planning of the EQA Programme, the evaluation of performance or the authorisation of the final report. If any subcontracting is necessary, UK NEQAS Cardiac Markers will be responsible for ensuring the quality of this work. Additionally, UK NEQAS Cardiac Markers uses products and services provided by external service providers, for example procurement of serum. UK NEQAS Cardiac Markers will inform participants, in advance and in writing, of products and services that are provided externally, when they affect the validity of our activities. UK NEQAS Cardiac Markers is responsible for any externally provided products and services.

1.6. Schemes

The Schemes provided by UK NEQAS Cardiac Markers work within the framework of ISO/IEC 17043, but some Schemes and/or analytes might be in a pilot phase or may not be accredited where participant numbers are low; this is clearly stated on the website and reports. Up to date information on accredited services is also available on the [UKAS website](#).

Details of available schemes are shown on the next four pages.



Cardiac Marker Schemes (Laboratory Based Scheme)																													
Objective of Scheme:	Provides EQA for laboratory based cardiac marker assays. Combined samples are issued for troponin, CKMB, myoglobin and NT-proBNP. An additional sample for troponin analysis only is issued for high sensitivity methods to cover very low clinically important levels around the assay detection limit.																												
Number of samples:	Three lyophilised samples per distribution																												
Frequency of distribution:	Eleven per year																												
Range of tests:	Cardiac Troponin I, Cardiac Troponin T, CKMB, Myoglobin, and NT-pro B-type Natriuretic Peptide (NT-proBNP)																												
Concentration ranges:	Varied by analyte additions																												
Troponin I and T additions are in the form of a complex. This complex is released in to the bloodstream of patients with myocardial muscle cell injury and have the required source specificity. CKMB and Myoglobin also have required source specificity. NT-proBNP is a recombinant peptide which has the required source specificity.																													
Concentration ranges employed in this EQA Scheme (cTnI, cTnT, CKMB and Myoglobin):																													
These cover the clinically encountered range from less than the assay detection limit, levels around the diagnostic decision limits and levels found in the 24 hours following a myocardial infarction or after thrombolysis wash out. The numerical value depends on the assay method.																													
Concentration employed in this EQA (NT-proBNP):																													
These cover the clinically encountered ranges from less than the assay detection limit, levels around the diagnostic decision limits and levels found in patients with heart failure For NT-proBNP the numerical value depends on the assay method.																													
Base Matrix:	Pooled human serum																												
Target Value:	Method Laboratory Trimmed Mean (MLTM) for Troponin I; All Laboratory Trimmed Mean (ALTM) for Cardiac Troponin T, CKMB, Myoglobin; Group Laboratory Trimmed Mean (GLTM) for NT-proBNP																												
Performance Evaluation:	ABC Scoring system																												
Target Values and Performance Limits:																													
	<table border="1"> <thead> <tr> <th>ANALYTE</th> <th>Target Value</th> <th>B Score</th> <th>C Score</th> </tr> </thead> <tbody> <tr> <td>Cardiac Troponin I</td> <td>MLTM</td> <td>±15%</td> <td><15%</td> </tr> <tr> <td>Cardiac Troponin T</td> <td>ALTM</td> <td>±15%</td> <td><15%</td> </tr> <tr> <td>CKMB (Mass)</td> <td>ALTM</td> <td>±20%</td> <td><25%</td> </tr> <tr> <td>CKMB (Activity)</td> <td>ALTM</td> <td>±25%</td> <td><35%</td> </tr> <tr> <td>Myoglobin</td> <td>ALTM</td> <td>±20%</td> <td><25%</td> </tr> <tr> <td>NT-proBNP</td> <td>GLTM</td> <td>±15%</td> <td><20%</td> </tr> </tbody> </table>	ANALYTE	Target Value	B Score	C Score	Cardiac Troponin I	MLTM	±15%	<15%	Cardiac Troponin T	ALTM	±15%	<15%	CKMB (Mass)	ALTM	±20%	<25%	CKMB (Activity)	ALTM	±25%	<35%	Myoglobin	ALTM	±20%	<25%	NT-proBNP	GLTM	±15%	<20%
ANALYTE	Target Value	B Score	C Score																										
Cardiac Troponin I	MLTM	±15%	<15%																										
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CKMB (Activity)	ALTM	±25%	<35%																										
Myoglobin	ALTM	±20%	<25%																										
NT-proBNP	GLTM	±15%	<20%																										



B-Type Natriuretic Peptide (BNP) Scheme (Laboratory Based Scheme)		
Objective of Scheme:	Provides EQA for laboratory-based BNP assays to cover clinically important ranges.	
Number of samples:	Three Lyophilised samples per distribution.	
Frequency of distribution:	Eleven per year	
Range of tests:	B-type Natriuretic Peptide (BNP)	
Concentration ranges:	Varied by analyte additions	
BNP additions are in the form of a synthetic peptide which has the required source specificity.		
Concentration employed in this EQA (BNP):		
These cover the clinically encountered ranges from less than the assay detection limit, levels around the diagnostic decision limits and levels found in patients with heart failure. For BNP the numerical value depends on the assay method.		
Base Matrix:	Pooled human EDTA plasma (female only)	
Diluent:	One vial containing 2 mL diluent supplied with each distribution	
Target Value:	Method Laboratory Trimmed Mean	
Performance Evaluation:	ABC Scoring system	
Performance Limits:	B score: $\pm 15\%$	C score: $< 20\%$



Point of Care Scheme (Serum)	
Objective of Scheme:	Provides EQA for point of care methods for cardiac troponin I, cardiac troponin T, CKMB, myoglobin and NT-proBNP. Combined samples are issued for troponin, CKMB and myoglobin to enable assessment of multi-analyte panels. Separate samples are issued for NT-proBNP to enable coverage of the analytical range. This Scheme does not cover very low levels of troponin, detectable by high sensitivity assays; a separate scheme is available for these methods.
Number of samples:	Two lyophilised samples per distribution + 500 µL of diluent supplied in plastic vials for each sample
Frequency of distribution:	Eleven per year
Range of tests:	Cardiac Troponin I, Cardiac Troponin T*, CKMB*, Myoglobin* and NT-pro <i>B-type natriuretic peptide</i> (NT-proBNP)*
Concentration ranges:	Varied by analyte additions
Troponin I and T additions are in the form of a complex. This complex is released in to the bloodstream of patients with myocardial muscle cell injury and has the required source specificity. CKMB and Myoglobin also have required source specificity. NT-ProBNP is a recombinant peptide which has the required source specificity.	
Concentration ranges employed in this EQA Scheme (cTnI, cTnT, CKMB and Myoglobin):	
These cover the clinically encountered range from less than the assay detection limit, levels around the diagnostic decision limits and levels found in the 24 hours following myocardial infarction or after thrombolysis wash out. The numerical values depend on the assay method.	
Concentration employed in this EQA (NT-proBNP):	
These cover the clinically encountered ranges from less than the assay detection limit, levels around the diagnostic cut-off and levels found in patients with heart failure. For NT-proBNP the numerical value depends on the assay method.	
Base Matrix:	Pooled human serum
Target Value:	All Laboratory Trimmed Mean
Performance Evaluation:	ABC Scoring system
Performance Limits (all analytes):	B score: $\pm 20\%$ C score: $< 25\%$

* Analytes not currently accredited to ISO/IEC 17043:2023



High Sensitivity Troponin Point of Care Scheme	
Objective of Scheme:	Provides EQA for point of care high sensitivity cardiac troponin I methods. The Scheme covers the analytical range including clinically important levels around the assay detection limit.
Number of samples:	Two lyophilised samples per distribution + 500 µL of diluent supplied in plastic vials for each sample
Frequency of distribution:	Eleven per year
Range of tests:	Cardiac Troponin I
Concentration ranges:	Varied by analyte additions
Troponin I additions are in the form of a complex. This complex is released in to the bloodstream of patients with myocardial muscle cell injury and have the required source specificity.	
Concentration ranges employed in this EQA Scheme (cTnI):	
These cover the clinically encountered range from levels around the assay detection limit, the diagnostic decision limits, and levels found in the 24 hours following a myocardial infarction or after thrombolysis wash out. Troponin I levels will be in the range of 2 – 3000 ng/L. The numerical values depend on the assay method.	
Base Matrix:	Pooled human serum
Target Value:	Method Laboratory Trimmed Mean
Performance Evaluation:	ABC Scoring system
Performance Limits:	B score: $\pm 15\%$ C score: $< 25\%$



1.7. The number and type of expected participants

Laboratory Based Schemes (March 2025)

Analyte	Number of Participants
Cardiac Troponin I (including hs cTnI)	297
Cardiac Troponin T (including hs cTnT)	290
CKMB (mass)	28
CKMB (activity)	3
Myoglobin	28
BNP	24
NT-proBNP	302

Point of Care Based Schemes (March 2025)

Analyte	Number of Participants
Cardiac Troponin I	21
Cardiac Troponin T (Roche Systems)	3
CKMB	9
Myoglobin	9
NT-proBNP	10
High sensitivity cardiac Troponin I methods	46

1.8. Changes to Schemes

UK NEQAS Cardiac Markers shall promptly advise participants of any changes to EQA Scheme design or operation.

1.9. Participant Appraisal of the Service

The scheme welcomes participant feedback in forms of suggestions, compliments, or complaints. Participants can contact the scheme by telephone, email or post on the contact details provided in section 1.3. The scheme organises educational and participant meetings as well as user questionnaires to allow participant appraisal of the service. This aids to inform decision making and to set quality objectives to improve the scheme.



1.10. External Regulation of Our Services

Accreditation

UK NEQAS Cardiac Markers is accredited by UKAS against the requirements of ISO/IEC 17043 – Conformity Assessment – General requirements for proficiency testing. The scope of accreditation can be viewed on the UKAS website.

UK NEQAS Consortium

UK NEQAS Cardiac Markers services comply with the UK NEQAS Code of Practice.

Steering Committees & Specialist Advisory Groups

All EQA providers are required to seek advice from and report to Steering Committees and/or Specialist Advisory Groups. For Terms of Reference see Appendix 1. The Clinical Chemistry division of UK NEQAS is presently served by several Specialist Advisory Groups (SAGs) providing external scientific advice.

Steering Committees and Specialist Advisory Groups do not consider the performance of individual participating laboratories, except in advising on performance criteria or where this may indicate a failure in the operation of the Scheme (and even in such cases the laboratories will not be identifiable).

The Immunoassay Specialist Advisory Group (iSAG) meets three times a year.

An additional Specialist Advisory Sub-group (cSAG) has been established to discuss analytical and clinical state of the art in the area of cardiac biomarkers. The cSAG is comprised of a small group of experts in this area who will discuss current clinical use, algorithms in use and possible future biomarkers and how these will impact on our service provision. The cSAG meets at least once per year.

National Quality Assurance Advisory Panel & Quality Assurance Pathology Committee

The Quality Assurance Pathology Committee (QAPC) and National Quality Assurance Advisory Panel (NQAAP) have been 'paused' with effect from 1st January 2026. UK NEQAS Cardiac Markers will continue performance surveillance and will work with any successor of this process. Further information is available in appendix 2.



2. Terms and Conditions of Participation

2.1. Eligibility

UK NEQAS Cardiac Markers provides services to all clinical and research laboratories and point of care providers in the UK and abroad. Manufacturers may participate 'anonymously', whilst a product is not yet available on the market, or on an 'information only' basis, i.e. without receiving samples and returning results.

Intending participants can access registration information on the UK NEQAS Cardiac Markers website or can contact the Scheme to request information.

2.2. Terms and Conditions

By signing up to participate in the service you are deemed to agree with these terms and conditions of participation and this constitutes a contract between your legal entity and Greater Glasgow Health Board.

These terms and conditions of participation are governed and construed in accordance with Scots Law. Where the participant:

1. is not a body referred to in Section 17A of the National Health Service (Scotland) Act 1978, any disputes regarding these terms and conditions of participation shall be subject to the exclusive jurisdiction of the Scottish courts; and
2. is a body referred to in Section 17A of the National Health Service (Scotland) Act 1978, any disputes regarding these terms and conditions of participation shall be resolved in accordance with the said Section 17A.

All participants offering a direct or indirect clinical service in the UK have previously been subject to the Quality Assurance Pathology Committee (QAPC), and its Conditions of EQA Scheme Participation. The QAPC and relevant committees have been 'paused' with effect from 1st January 2026. UK NEQAS Cardiac Markers will continue performance surveillance and will work with any successor of this process.

The primary and only authoritative source for all EQA Scheme related information is by each Centre within the UK NEQAS Clinical Chemistry Division on either the Results & Reports portal or individual websites. This includes specimen dispatch dates, specimen information, EQA reports, communication etc.

2.3. Period

Participation in all UK NEQAS Cardiac Markers Schemes is deemed to be continuous with automatic annual renewal and invoicing for subscription fees for each NHS financial year (1st April to 31st March). Participation may begin at any time during the year; part-year participation charges may be higher than pro-rata, to cover additional administration.

2.4. Participation fee

We recognise the financial constraints being imposed upon many laboratories and therefore we keep our participation fees as low as possible.

The participation fee for the Laboratory Based Schemes and Point of Care Schemes are available on request. This fee covers all sample distributions and associated reports for a 12-month period, starting on 1st April. All Royal Mail postage costs are included within the subscription fee. Overseas participant



fees only cover airmail postage and additional charges may be required for courier delivery. VAT charges will be made appropriately as required by HM Revenue and Customs.

Once a purchase order has been received an invoice will be issued by our host organisation and legal entity, NHS Greater Glasgow & Clyde.

In the event of a participant failing to submit a purchase order or to pay the participation fee in a timely manner, the Scheme Organiser reserves the right to terminate, without notice, the membership of that participant without prejudice to any claim for payment for services already provided.

A participant may withdraw from the Scheme at any time, but no refund will be given of fees paid.

2.5. Confidentiality

Information provided by participants is treated as strictly confidential as outlined by UK NEQAS Cardiac Markers Privacy Policy. Each laboratory will be registered under a unique code number, which is common across UK NEQAS Centres, to ensure confidentiality and impartiality. Participant identification will be known only to persons involved in the operation of the Scheme. Where information about a participant is received from a source other than the participant, the information will be kept confidential. The identity of the source will also be kept confidential, unless agreed by the source.

The only circumstances under which participation and/or performance records in the scheme might be divulged are where a participant shows consistently poor performance or when requested by any other regulatory authority. Participants will be informed of any referral and the content of such referral if and when required.

UK NEQAS Cardiac Markers reports are copyright and may not be copied, distributed, published or used for publicity and promotion in any form without the written consent of the Scheme Organiser on each and every occasion, though performance data may be shared with individual clients (e.g. GPs, clinicians, pharmaceutical companies) without consultation. The Scheme may use anonymised specimen and rolling time-window data to produce summary or method-specific or state-of-the-art data in commentaries, webinars and publications etc.

2.6. Impartiality

UK NEQAS Cardiac Markers is committed to impartiality in all EQA activities undertaken by UK NEQAS Cardiac Markers personnel. Impartiality is risk assessed and monitored regularly.

2.7. Use of Material

The materials distributed are provided as specimens for the sole purpose of enabling external quality assessment at the recipient's laboratory during the current distribution. No claim is made that specimens may be suitable for any other purpose or at any other point in time.

UK NEQAS Cardiac Markers specimens do not meet the definition of a reference material and do not intend to be reference material.

There is no intrinsic value to the specimens but they are an essential component to the service that is provided by UK NEQAS Cardiac Markers. They do not constitute in vitro medical diagnostic devices (IVDs) and EQA specimens are explicitly excluded from the scope of the IVD Directive and its successor Regulation.



Resale or distribution of specimens to third parties is strictly prohibited. It is accepted, however, that residual material may be retained by the participant and used as part of method evaluation.

If materials are to be used in research which is expected to be published, or if participation forms part of contractual agreements with third parties, written consent must be obtained from the Scheme Organiser on each and every occasion.

Samples distributed as part of the Schemes should be treated, handled, and disposed of as if they were routine clinical specimens. Participants must ensure that their laboratory facilities and expertise are adequate to ensure the safe handling of these specimens during their participation in the Schemes.

2.8. Repeat Samples

Limited numbers of single samples or sets from a particular distribution are usually available to full participants who may wish to check aberrant results from previous distributions or require fresh samples from current distribution due to sampling errors. UK NEQAS Cardiac Markers reserves the right to ask why repeat samples are needed and limit their supply if this would compromise the service to other participants.

2.9. Reporting of Results

All full participants are expected to return results promptly within the specified reporting period. Participants are expected to return 100% of results within the relevant cumulative performance scoring period. Where a laboratory is unable to return a set of results, the XPL code should be entered and an explanation must be provided using the comments box on the online result entry page.

Participants are expected to participate in all elements of each Scheme, whether these are pre-examination, post-examination, interpretations, questions and answers, or provision of calibrator and reagent lot number information.

Collusion between participants and falsification of results is not permitted.

2.10. Demographic information

Participants are responsible for ensuring that the contact (including invoicing contacts and Head of Department details), method and reporting unit information held by UK NEQAS Cardiac Markers is current and up-to-date. Participants must inform UK NEQAS Cardiac Markers of any method changes. Having the correct contact details is vital so that we can contact you, you know you are receiving the correct information and we will not be inadvertently breaching confidentiality by contacting someone who may have left your organisation.

2.11. Access to Reports

Whilst registered on the scheme, reports will be available on the 'Results and Reports' website for a minimum of 5 years (usually longer). Once a participant leaves the scheme, full access will remain for 3 months. After 3 months EQA reports will still be accessible but the laboratory will not be able to access any other information on the site. After 12 months the participant will not be able to review reports and access is removed. It is recommended that these reports are downloaded within 12 months of leaving the scheme to keep them available.



3. Materials

UK NEQAS Cardiac Markers use lyophilised samples which are prepared in house. All samples should be treated as if they were patient samples. All preparation is carried out to ISO/IEC 17043 specifications that ensure uniformity and condition of samples. EQA samples should be regarded as possibly infectious material and handled according to local procedures. All suppliers are evaluated for their competency to provide products and services.

3.1. Pool Manufacture

Pools are prepared using a pooled human plasma or serum base matrix. Analyte levels are varied by addition of troponin complex, cTnI, cTnT, CKMB, Myoglobin, NT-pro-BNP and BNP to the base matrix. All materials have been screened for infective agents. Samples, included within a distribution, are lyophilised and have a reconstituted volume of 500 μ L.

3.2. Participant Handling and Storage of EQA Materials

Lyophilised samples should be reconstituted by addition 500 μ L of distilled or deionised water using a pipette with a tolerance of ± 8 μ L. Additional plastic vials with pre-measured diluent are supplied with the BNP scheme. Vials should be allowed to stand for 15 minutes with occasional mixing and then stored at 4°C.

The EQA material should be assayed after reconstitution as follows:

- cTnI, cTnT, CKMB, Myoglobin and NT-proBNP between 1 and 3 hours.
- BNP between 40- and 90-minutes post reconstitution.

For the Point of Care based schemes, two plastic vials containing appropriate volumes of diluent are provided for reconstitution in locations out with the laboratory. Instructions on reconstitution of the materials are given on the report form enclosed with the distribution.

Samples are transported to participants at ambient temperature. If participants are unable to analyse material immediately on receipt, it is recommended to store lyophilised samples in the fridge (approximately 4°C). Following analysis, reconstituted samples should be frozen immediately, and stored (approximately -20°C) should repeat analysis for troubleshooting be required.

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

3.3. Stability

It has been established that at 4°C, troponin (I and T) loss is <2% over 3 hours. CKMB, Myoglobin and NT proBNP are also stable for this period of time. However, BNP is a labile peptide and should be assayed between 40 –90 minutes post reconstitution.



4. Operations

4.1. Distribution Cycle

All schemes operate according to a regular cycle of activity with 11 distributions per year. A distribution has a unique identifier (usually numeric) with fixed sample dispatch and results return dates.

The distribution schedule is available on the UK NEQAS Cardiac Markers website (and at participants' request) from the beginning of each registration year. This schedule indicates the date that samples are issued, the closing date for return of results and the date that reports are issued to give sufficient notice of Scheme activities. Dates may be subject to minor changes dependent upon operational circumstances.

Participants should contact the Scheme if they have not received their monthly distribution (all or part), or their samples have been damaged in transit. UK NEQAS Cardiac Markers will replace the non-received EQA material(s) and initiate an investigation of the non-conformance to avoid repeat occurrence.

4.2. Method Classification

A crucial element of participation for all schemes is the correct assignment of method codes, since performance scoring may be method-based, and the provision of accurate method-related information is an important element of the service. Methods are given unique codes in the computer system. Considerable effort has to be expended by UK NEQAS Cardiac Markers staff to ensure the accuracy of method coding and updating records when these changes. Participants are required to cooperate with this process by informing us of errors, omissions or changes at the earliest opportunity.

4.3. Packaging & Mailing

Samples for each distribution are mailed to the registered scheme contact(s) using the most appropriate route possible. Second class mail is used for the UK, and tracked airmail (with express surcharge where necessary) is used for non-UK participants. The packages are clearly marked 'EQA Samples URGENT'. Packaging complies with current UK legislation for the mailing of our EQA material.

All tubes are labelled with the scheme, distribution identifier and sample number. The naming convention for the latter comprises a sequential numeric distribution identifier plus a letter where there are multiple specimens in a distribution (e.g. 256A, 256B, 256C). Once the specimens have been dispatched, the registered scheme contacts are sent an email notification of sample dispatch.

If for any reason specimens are not received, not received when expected, or are damaged upon receipt, participants should notify UK NEQAS Cardiac Markers via one of the methods listed under 1.3 Contact Details.

4.4. Results Documents

All schemes have distribution-specific Report Forms which are individual to each participant. These carry the laboratory code, a full list of the analytes available in the scheme, as well as details about sample handling and return of results. In some cases, method confirmation is also included. They are under constant review to make them easy to understand and use, and may change from time to time



to reflect improvements. The functionality of the Report Form mirrors the Results return section of the online service.

4.5. Results Reporting Procedure

Result entry, via the 'Results and Reports' website, opens on the distribution date and the result sheet distributed with samples details this. Participants are notified by email when the distribution opens. Each UK NEQAS number is assigned a unique password to access the 'Results and Reports' system, which is provided upon commencement of participation.

Unless specified otherwise, all results must be returned using our online service. This provides the most rapid means of reporting results, with real-time validation against plausibility limits and confirmation of submission.

In the unlikely event that the online results entry system is not available, results transcribed onto the original Report Form document may be sent as an email attachment, by prior arrangement with UK NEQAS Cardiac Markers. Participants should give date of receipt of samples on submission of results.

Results should be entered in the units shown on the online service form, taking care to match sample numbers and avoid transcription or transposition errors. If the units displayed on your results document are different to your usual reporting units, please notify us.

Laboratories should report EQA results to the same number of decimal places as they would report results for clinical specimens.

- **Late results/returns** are defined as results received after the distribution has closed, but before the report is published. Participants should return late results along with an explanation of why results were returned late. Late returns are monitored by UK NEQAS Cardiac Markers.
- **Null returns** where there are no results available e.g. if the assay is out of service, or if one or more results from a panel of analytes is missing, then enter XPL into the results entry boxes for the affected analytes/specimens and provide a brief explanation in the comments box at the bottom of the results entry screen.
- **Failure to return results.**
When a participant fails to return results for 3 distributions within the 12-month scoring window they may be contacted by the Scheme Organiser as a Persistent Poor Performer.

4.6. Amendments Prior to Data Processing

Participants who discover an error in their reported results before the reporting deadline can amend their results via the online service at any time whilst the distribution is open.

4.7. Amendments After Data Processing

If errors are identified after the return-by date, requests to amend non-analytical errors should be made by contacting the Scheme in writing. Requests for amendments can only be made for the distribution prior to the one currently open. The requestor should include their name and a valid reason.



- **Late Return**

Late results/returns are defined as results received after the distribution has closed, but before the report is published. Participants should return late results along with an explanation of why results were returned late.

- **Very Late Return**

Very Late Returns are defined as results received after the distribution has closed, and after the report is published. Very Late Returns will only be accepted if:

- they are accompanied by evidence of results (e.g. a lab worksheet or computer printout) and an explanation of why results were returned very late
- Results returned are for the current distribution with a published report

The Scheme cannot process results and provide an amended report if there is no evidence or the results are for a historical distribution.

- **Denied Late Return**

If participants request to return results late or very late without evidence, the Scheme will not process an amended report. If a very late return is requested by a participant which is for a distribution older than the current report published the Scheme cannot process them.

- **Blunders**

Participants who have submitted an incorrect result due to a non-analytical error (e.g. a transcription error when entering results online, or a unitage error) may contact UK NEQAS Cardiac Markers to have their results and report amended. They must state the Scheme, Distribution number and reason(s) for the error, and copies of results obtained (lab worksheet or computer printout) must be appended.

Participants will be investigated:

- if they submit “very late” results
- if the action for a blunder is a request to amend results/reports without appropriate evidence supplied
- on the basis of reliable reports of suspected collusion/falsification of results.

If the suspicion of collusion/falsification of results is supported by strong evidence, the participant will be suspended and all reports will be halted until further notice. If collusion is proven, the relevant competent authority will be notified.

Amending results is at the discretion of the Scheme Organiser and is not an automatic entitlement. The Scheme Organiser reserves the right to request additional evidence in the form of the original output from the analyser. All amended results are flagged as such in our database and monitored.



5. Data Processing

5.1. Data Handling

All Scheme data are held on secure network servers which are backed up daily. Data processing is performed using bespoke EQA software modules which have been developed in association with the Wolfson Computer Laboratory.

5.2. Calculation of Target Values

As there is no accuracy base, and no internationally recognised reference preparations currently exist for the analytes in this scheme, consensus values are used. Validity of these consensus means will be assessed by reissue of pools over different time periods.

To eliminate the distorting effect of grossly atypical results, outliers are trimmed from both tails of the ranked data set, with a corrected estimate of dispersion (SD or CV) by the method of Healy (1979) to allow for the removal of extreme values which are not 'true' outliers. The data processing for individual schemes is conducted using individually configured modules within the computer system.

For all our Schemes we have a minimum data set size that we use to calculate a target value. We are aware that for analytes that have a low number of users, those participants do want to see some level of assessment even though both they and UK NEQAS Cardiac Markers are well aware of the limitations of this approach. Statistically speaking, this carries a huge uncertainty overhead but the alternative is not to provide Laboratories with any indication of their performance.

For those analytes with a target that regularly comprises fewer than 5 results, the standard deviation and coefficient of variation are not calculated and there is often no formal performance assessment.

In cases where the target value is the MLTM and the number of users for a particular method is less than five, where possible, we will allocate a method grouping or comparison against another suitable target, like the ALTM. The source of the target value to which a participant is compared is shown on the report under target value to the right of the histogram. This approach provides a target value and generation of rolling time window statistics, allowing participants to risk assess their performance. Participants may also look at comparing themselves against the most populous method or the method closest to theirs in terms of method principle, assay architecture or calibration.

Where an analyte has a total of less than five registered users, participants are required to undertake their own risk assessment as to the best way to gain information on their performance in the scheme. This may include consideration of inter-related concentrations or stability over time for repeated distributions of the same specimen pool. In such a case, until the number of participants in the scheme increases, the analyte should be considered as out-with scope of our current ISO/IEC 17043 accreditation.

5.3. Calculation of Performance Scores

As well as providing data on closeness to the target value in a given distribution, schemes employ scoring systems which yield a performance score averaged over a number of distributions and individual samples within a rolling time window to give a robust estimate of overall bias and its variability.



The scoring method used for all UK NEQAS Cardiac Markers schemes is the 'ABC of EQA' system. Unlike many other schemes which conduct a series of discrete cycles after which an 'end-of-cycle report is prepared, UK NEQAS operate on the basis of continuous analysis for a rolling time window.

5.4. Acceptable Performance Criteria

Limits for acceptable performance scores are recommended by the Scheme Organiser and endorsed by the SAG(s) after due deliberation and consultation with Organiser, to reflect the state of the art of analysis and encourage improvement. Procedures are used to identify those laboratories which have breached these limits on a set number of occasions within the cumulative reporting period.

5.5. Processing Surveillance

As each distribution is processed, the Scheme Organiser carefully checks the resulting data for integrity and consistency of results, and any unexpected shifts in method-related values which might signal a clinically-important shift in diagnostic products. If any are identified, where possible, the manufacturer will be contacted to discuss the findings.



6. Reports and Report Interpretation

6.1. Target Turn-Around Times for Reporting

Reports are issued to participants in accordance with the Distribution Schedule (available on the UK NEQAS Cardiac Markers website). UK NEQAS Cardiac Markers target for report issue is within two weeks following distribution closure. The exact date is recorded and is regularly audited.

6.2. Report Versions

The current definitive report is that on the secure Results and Reports website. When reports for a scheme distribution are published the name and date of authorisation are stated, and the time and date of publication are printed on each page. Unless specified in the report (e.g. an initial report awaiting republishing with a commentary) this may be considered as a 'final' report.

Revised reports including a participant's late or amended results are identified by the words "LATE RESULTS" or "AMENDED" below the laboratory code at the top right of the report. Changes in target values resulting from inclusion of late or amended results are normally trivial (and will always improve target validity), and will be reflected in reports for subsequent distributions. On the rare occasions when revised reports are published for a distribution, the revised report is clearly identified as such, with reference to the date when the report which is replaced was published.

If additional data is received and flagged as a late return:

- If the method group has less than 10 participants an amended report will be issued to all participants using this method with a comment as to why they have received this report and indicating that this supersedes the previous report. Date of previous report will be given.
- If the method group has greater than 10 participants the Scheme Organiser or deputy will assess whether there has been a significant change in method target which will affect resultant statistics. If so, then amended reports will be issued, as described above, to all participants using the affected method. If not, an amended report will be issued to the late returning laboratory.

6.3. Distribution of Reports

Reports can be accessed by participants by logging in to the 'Results and Reports' website. Participants will be notified by email when reports are available. Each UK NEQAS number is assigned a unique password to access the online system, which is provided upon commencement of participation. In the unlikely event that reports are not issued in accordance with the Distribution Schedule, participants will be notified.

Whilst registered on the scheme, reports will be available on the website for a minimum of 5 years (usually longer). Once a participant leaves the scheme, full access will remain for 3 months. After 3 months EQA reports will still be accessible but the laboratory will not be able to access any other information on the site. After 12 months the participant will not be able to review reports and access is removed. It is recommended that these reports are downloaded within 12 months of leaving the scheme to keep them available.



6.4. Report Formats

Scheme reports are the main interface with participants, and a great deal of effort has gone into making these informative and easy to interpret. All scheme reports are generated as A4 format PDF files, which display the data in a number of discrete tabular and graphic formats shared across related schemes.

Scheme reports now have 'traffic light' colour coding, where symbols and their colour (green, yellow or red) indicate how close individual percentage biases are to the target value, and whether performance scores lie within or outside acceptable limits. Reports consist of the following: feedback page, performance summary page, participation summary page, distribution summary page, method summary page, cumulative summary page and method pages that are associated with analytes participants are registered for on the scheme.

Examples are available on request and an hs Troponin T example is given in appendix 3.

Network reports, containing a summary of B and C score data from a number of individual participant codes are available for each scheme. A separate network login and password is provided to participants. Network reports can be set up on request, once we have confirmed the right to access data for all requested participant codes.

Dashboards are available for individual participant codes, or networks. The dashboard is a front interface that links to the 'Results & Reports' website so that you can see from a high-level overview how a single laboratory code or single network is performing down to individual analyte level at a single distribution. The dashboard allows results reporting as well as viewing reports. The dashboard is password controlled, on the Participants 'Results & Reports' webpage. The dashboard is pan-Chemistry and covers all ABC style schemes from Birmingham Quality, Glasgow, and Guildford.

6.5. Result Validation

UK NEQAS Cardiac Markers will send an email notification to the registered scheme contacts when pdf reports for a scheme have been published to the website. Each report is specific for the laboratory identifier and password entered.

The results for that distribution should be checked by participants to ensure that they are the ones returned by your laboratory.

Mistakes can occur. Requests to amend non-analytical errors should be made directly by contacting UK NEQAS Cardiac Markers. Amending results is at the discretion of the Scheme Organiser and is not an automatic entitlement. The Organiser reserves the right to request additional evidence in the form of the original output from the analyser. All amended results are flagged as such in our database and monitored.

Also, it is crucially important that participants' methods (and sub-methods, instruments, reagents, calibrants and reporting units where appropriate) are accurately identified, especially where performance is assessed against the method mean. Any apparent discrepancies should be corrected by contacting UK NEQAS Cardiac Markers directly.



6.6. Definitions

The various indices used in the scoring system may be defined as:

All Laboratory Trimmed Mean (ALTM)

The recalculated mean value after exclusion of all results outside 2 (or 3) SD from the All Laboratory Mean.

- Troponin T
- Myoglobin
- CKMB

Method Laboratory Trimmed Mean (MLTM)

The recalculated mean value of results returned by all laboratories using the same method. Widely discrepant results are trimmed as for the ALTM.

- Troponin I
- BNP

These methods have a lack of agreed standardisation which increases method to method variability beyond that usually encountered in established immunoassay i.e. that arising from variations in antibody - epitope responses. The calculation of an all method trimmed mean (ALTM) is calculated for information but participants are scored against their MLTM.

Group Laboratory Trimmed Mean (GLTM)

As for MLTM but using all results from laboratories with related methods which have been predefined into a method group. Data will not be trimmed if <20 data points.

- NT-proBNP

6.7. ABC of EQA Scoring

'ABC of EQA' is an ISO Guide 17043 compliant framework which meets and surpasses the utility of existing systems. The main benefit for participant laboratories, EQA Organisers, Steering Committees, and Specialist Advisory Groups alike, is that it is a single system, which not only works across analytes, schemes and disciplines, but can allow meaningful comparisons to be made between analytes, schemes and disciplines.

External quality assessment (EQA) is intended to give you an independent and objective assessment of your performance. This requires effective scheme design, including

- a reliable basis for assessment, with reliable specimens and valid target values
- sufficient recent data, achieved by frequent distributions and rapid turnaround of reports
- effective communication through informative, intelligible reports and a running scoring system.

UK NEQAS reports are structured so as to complement and best utilise the 'ABC of EQA' scoring system, and reports in the UK NEQAS 'house style' allow you to see at a glance if you are performing well. If you are performing well; no further action is required. If you are not performing well then you can probe further into the data presented. Similarly, you can see if you are performing in keeping with other users of your method and whether the method itself is performing well.



There are three scores A, B and C:

A is for Accuracy (total error)

B is for Bias

C is for Consistency of bias

which are conveniently referred to as the 'A score', 'B score' and 'C score', or simply A, B and C.

- Every laboratory will have an A, B and C score for each analyte they measure.
- All 3 scores should be used when assessing performance.
- The B and C scores (which have not been transformed) are best looked at together and provide analytical data on average bias and its consistency (pattern).
- The A score is weighted as part of a transformation process to take into account factors such as 'degree of difficulty' and normalised (median set at 100).
- The A score is primarily used as a quick 'comparator' or 'screening tool' for performance across all analytes. An A score of '100 is 'average', but this may of course be 'better' or 'worse' than what is required clinically, depending on the analyte.

6.7.1. A, B and C scores in detail

Each of the 3 scores is calculated over a rolling time-window and thus comprises data (results) from many specimens. They are always being updated with fresh current data, while older data drops out of the 'time-window'. The time-window has been set at 6 distributions (equivalent to 6 months) for 'standard' schemes.

For all UK NEQAS Cardiac Marker Schemes and in line with other UK NEQAS Centres, all scores are set so that a low score is 'good', a high score is 'bad'.

- The Accuracy A score tells you, on average, how good your overall performance is. This takes into account such factors as bias, consistency of bias, degree of difficulty etc. It has been transformed to ensure that A scores are broadly equivalent across analytes. For example, if you have an A score of 85 for Troponin I and you also have an A score of 85 for BNP, this would indicate that you are performing both, on average, equally well.
-
- The Bias B score tells you how far away from the 'target', on average, you are. It has not been transformed.
- The Consistency of bias C score tells you, on average, if you usually have the same bias pattern. It is also not transformed and can assist in answering the following questions. 'Do you have different bias depending on the concentration of analyte in the sample?' 'Does your bias vary depending on the specimen matrix?' 'Has your bias changed during the time window?' 'Are you imprecise?' A high (poor) C score does not necessarily mean that you are imprecise, though if you are imprecise, it is impossible for you to have a very good (low) C score. Poor consistency of bias is not the same as imprecision.



6.7.2. A, B and C score calculation

B Score Calculation

The specimen-level % bias calculation (specimen %bias) is at the heart of all calculations:

$$\text{Specimen \% bias} = \frac{(\text{result} - \text{target})}{\text{target}} \times 100$$

If the target is 10 and you get a result of 11, then your bias is +10%; if the target is 10 and you get a result of 8, then your bias is -20%; if the target is 10 and you get a result of 10, then your bias is 0%, and so on. We then calculate your 'B score', (i.e. your average bias), as the trimmed mean of all individual 'specimen %biases' (including the sign) in the rolling time window.

C Score Calculation

The 'C score' is simply the standard deviation (adjusted to take into account the degree of trimming) of the data which make up the B score.

A Score Calculation

The A score is an estimate of accuracy [total error] in UK NEQAS and is derived as follows:

- we take your Specimen % bias and transform it by a 'degree of difficulty' factor (see below) to get your Specimen transformed bias [this can be positive or negative].
- we then take the modulus of this Specimen transformed bias to give the Specimen Accuracy Index [as it is a modulus it has no sign].
- finally, we calculate your 'A score' as the trimmed mean of all of your Specimen Accuracy Indices in the rolling time-window.

6.7.3. How did we choose the 'degree of difficulty factor'?

The transformation itself has been empirically derived separately for each analyte and is based on modelling of data dependent on the concentration (target value) for the individual specimen. We did this by:

- examination of the relationship between CV and target value for the analyte, based on 2008-2009 data.
- derivation of an equation for this relationship, to yield concentration-dependent factors.
- normalisation of the factors to yield a median A score of 100 at January 2010.

6.8. Minimum Participant Numbers

See section 5.2 Calculation of Target Values.

The minimum number of participants required to produce meaningful statistics is ≥ 5 for all analytes. Reports will reflect this by including this statement:

“The scoring of a method or a group of methods with < 5 participants should be considered as out-of-scope of our current accreditation.” Also reference that a participant should refer to the participant manual.



This statement will appear on the following pages of the report:

- Distribution Summary Page
- Each analyte page which show histograms (first page of the analyte report).

6.9. Standard Uncertainty

The Standard Uncertainty (SU; 'u') statistic has now been added into our reports. The inclusion of this statistic is a requirement for UKAS ISO 17043 Accreditation. The SU can be found to the right of the histograms.

The SU is calculated as $1.25 * [SD / \sqrt{n}]$. The target is considered valid if 'u' is less than $0.3 * SD$.

The UK NEQAS Cardiac Markers Scheme Organiser is in agreement with the following statement from Finlay MacKenzie (Birmingham Quality):

“Simplistically, the ‘uncertainty’ of a target value increases as the number of points used to calculate it decreases. Similarly, the ‘uncertainty’ increases as the SD widens. One would logically have more ‘confidence’ in a target that was calculated from 100 results with an SD of 2 rather than in a target calculated from only 20 results which had an SD of 10. The SU just puts a number to this commonsense notion and so attempts to quantify it in some way. It is reported in the same unit as the mean and SD. It is our reading of the algebra that, when you re-arrange the equations, if $n < 18$ it is impossible to pass.”

Reports will reflect this by including this statement:

“Please note that the Standard Uncertainty is not negligible when calculated with < 18 data points.” Also reference that a participant should refer to the participant manual.

This statement will appear on the following pages of the report:

- Distribution Summary Page
- Each analyte page which show histograms (first page of the analyte report).

6.10. Performance interpretation on reports (Traffic lights and arrow indicators)

There are only three places where the report uses colour coding, namely:

- performance summary icons page
- coloured circle ‘traffic lights’ associated with the A, B and C scores
- coloured symbols associated with the Specimen % bias

In addition, with the traffic light circles there is also a range of “Am I getting better?” trend arrow. The colours have been mapped to the blue shadings used on graphs. So, Green equates to the ‘white shading’, Yellow to the ‘light blue shading’ and Red equates to the ‘dark blue shading’.

Colour coding uses the universal Green is ‘Good’, Red is ‘Bad’ traffic light approach. Yellow is the ‘Warning’ zone, so though not as ‘Good’ as it could be, is not yet in the ‘Bad’ category.



- **Coloured circle ‘traffic lights’ associated with the A, B and C scores**

Because the A score is an across-analyte comparator, the limits used for the A score are common across all analytes, namely: up to and including 100 is white/green from 101 up to and including 200 is light blue/yellow and greater than 200 is dark blue/red.

For the B and C scores there are analyte specific settings.

- **Coloured symbols associated with the Specimen % bias**

At the specimen level, we have used a combination approach of colour and symbol together to produce a self-evident representation. We have red double triangles, yellow single triangles (both of which can point up to represent a positive bias or can point downwards to represent a negative bias) and a green diamond. The green diamond indicates the bias of a result which is within desirable limits.

In the following example you can see that the results on Specimen 211A were as follows: very low for Troponin I and BNP was close to the target.

Results for specimen 211B were as follows: a bit low for Troponin I and BNP was close to the target.

Results for specimen 211C were as follows: a very low for Troponin I and BNP was close to the target.

	Specimen	Pool	Result	Target	Specimen %bias	A score	B score	C score	A	B	C
Cardiac Troponin I (ng/L [pg/mL])	211A	CMS58	138.8	170.41	-18.6 ▾	76	-1.1	10.5	🟢 ▾	🟢 ↗	🟡 ▾
	211B	CMS55	154.9	176.04	-12.0 ▾				🟢 ↗	🟢 ↗	🟡 ▾
	211C	CMS57	70.8	91.76	-22.8 ▾				🟢 ↗	🟢 ↗	🟡 ▾
B Type Natriuretic Peptide (ng/L [pg/mL])	211A	BPS23	229.4	247.3	-7.2 ◆	110	-5.5	13.0	🟡 ↔	🟢 ↔	🟢 ↔
	211B	BPS22	20.1	17.90	+12.3 ◆				🟡 ↔	🟢 ↔	🟢 ↔
	211C	BPS17	3428.4	3789	-9.5 ◆				🟡 ↔	🟢 ↔	🟢 ↔

- **The “Am I getting better?” trend arrows associated with the A, B and C traffic lights**

Are a broad-brush indicator of whether things are improving (trend arrow up), things are staying the same (trend arrow flat) or things are getting worse (trend arrow down).

There are two things to note. Firstly, we have used the convention ‘Trend arrow up’ to indicate improvement. So, if your B score changes from being +50% to +25% you are improving so the trend arrow is up, even although the B score itself has a lower numerical value.

Secondly, we have used a broad-brush approach not an absolute cut-off for our trend arrows. So, if your A score has worsened from 125 to 126, we nevertheless categorise this as a ‘trend arrow flat’ as we do not consider this to be a significant change. If the change does exceed our limits, for example an A score changing from 125 to 145, then this will signify that things are genuinely changing for the worse and a ‘trend arrow down’ is appropriate.



7. Performance Criteria - Limits of Acceptable Performance and Performance Problems

7.1. Performance Criteria

Performance criteria have been agreed with the Specialist Advisory Groups. They have been implemented by the Scheme Organiser. The following performance limits are reviewed annually.

Limits of Acceptable Performance (Laboratory Based Schemes)

ANALYTE	B Score	C Score
Cardiac Troponin I	±15%	<15%
Cardiac Troponin T	±15%	<15%
CKMB (Mass)	±20%	<25%
CKMB (Activity)	±25%	<35%
Myoglobin	±20%	<25%
BNP	±15%	<20%
NT-proBNP	±15%	<20%

Limits of Acceptable Performance (POC Based Schemes)

ANALYTE	B Score	C Score
Cardiac Troponin I	±20%	<25%
Cardiac Troponin T	±20%	<25%
CKMB (Mass)	±20%	<25%
Myoglobin	±20%	<25%
NT-proBNP	±20%	<25%
High sensitivity cTnl	±15%	<25%

The current limit of acceptable performance for each scheme and analyte may be found at the top righthand area of the 'Histogram' page of the scheme report.

7.2. Definitions of Unacceptable Performance

The definitions of "poor performer" and "persistent poor performer" and procedures when unacceptable performance has been detected have been approved by the NQAPP and Specialist Advisory Group and will be reviewed annually.

Participants will be defined as poor performers under the following circumstances:

- Failure to return for one distribution unless valid reason for non-return has been communicated to the Scheme Organiser
- Having an average B Score out- with the stated limits
- Having an average C Score out-with the stated limits



Participants will be defined as persistent poor performers under either of the following circumstances:

- A poor performer as defined above, compounds the errors by failing to make more returns or continues with a B Score out-with the limits.
- C Score remains out-with the limits over further distributions.

7.3. Participation and Return Rate

Participants are expected to return 100% of results within the relevant cumulative performance scoring period. Where a laboratory is unable to return a set of results, an explanation must be provided.

UK NEQAS Cardiac Markers will assess a laboratory's performance as satisfactory if they have in total up to 2 late and/or amended distributions from the last 12.

7.4. Performance Surveillance and Advisory Panel Liaison

The Scheme Organiser highlights out-of-consensus performance in the routine report by the use of scores, symbols, graphs, banners and 'traffic lights'. The fact of UK NEQAS Cardiac Markers providing participants with a red banner or red traffic light constitutes a formal communication of out of consensus performance, and separate communication about this performance problem may not be issued. Participants are encouraged to review their performance report promptly and the scores or commentary it contains.

It is the responsibility of the Participant to act on, investigate and resolve all out-of-consensus performance. It should be logged in their Quality Management System. For any red B or C score traffic light, participants are expected to both acknowledge and fix the problems as part of their routine Quality Management System. UK NEQAS Cardiac Markers is here to help. If participants are unsure as to why they have out-of-consensus problems or if they are having difficulties with their Root Cause Analysis, then they should contact us.

The Quality Assurance Pathology Committee (QAPC) and National Quality Assurance Advisory Panel (NQAAP) have been 'paused' with effect from 1st January 2026. UK NEQAS Cardiac Markers will continue performance surveillance, including contacting persistent poor performers, and will work with any successor of this process.



8. Complaints and Appeals Procedure

UK NEQAS Cardiac Markers welcome the opportunity to discuss any problem or query concerning our services. UK NEQAS Cardiac Markers has a Complaints and Appeals policy which details how Complaints and Appeals are managed. This is available upon request. Formal complaints and other communications which point out deficiencies, difficulties or problems are recorded together with any response or action taken by us. These are audited by the Scheme.

8.1. Complaints Procedure

Should a participant have a complaint regarding any aspect of the scheme, they should notify the Scheme (info@ukneqas-cm.org.uk) or Scheme Organiser directly (naomi.elkin@nhs.scot). All complaints will be handled in accordance with the UK NEQAS Cardiac Markers Complaints and Appeals Policy, and formally acknowledged within 14 days. Complaints are logged in accordance with the UK NEQAS Cardiac Markers Communication Process.

If the matter cannot be resolved at Scheme level, the participant will be advised to refer the complaint to the Chair of the Immunoassay Specialist Advisory Group (iSAG). All complaints will be monitored and reviewed by the Immunoassay Specialist Advisory Group (iSAG). At all times during the complaint procedure, participant confidentiality will be maintained. Participants are requested to assist in this respect.

8.2. Appeals Procedure

An appeal may be raised if participants are unhappy with their performance. Participants can appeal by contacting the Scheme Organiser. Appeals concerning statistically derived performance evaluations will be addressed as complaints. It is hoped that resolution will occur at this stage however, if participants wish to escalate the appeal, they are referred to the Chairperson of the Immunoassay Specialist Advisory Group (iSAG) of UK NEQAS. Appeals are handled in the same manner and timescales as complaints (see above).



Appendix 1

Steering Committee/Specialist Advisory Group – Terms of Reference

To advise the Scheme Organiser on the overall design and operation of the Scheme(s), including aspects such as:

- analytes to be included in EQA Schemes
- frequency of distribution of materials
- types of materials to be distributed
- safety of materials
- methods of data analysis
- presentation of results
- research and development for the Scheme(s)
- promotion of educational aspects of Quality Assessment
- regulatory body requirements.



Appendix 2

Quality Assurance in Pathology Committee

The Quality Assurance Pathology Committee (QAPC) and National Quality Assurance Advisory Panel (NQAAP) have been 'paused' with effect from 1st January 2026. UK NEQAS Cardiac Markers will continue performance surveillance and will work with any successor of this process. Participants and manufacturers should not experience any change to the service offered by UK NEQAS Cardiac Markers.

There is link to the notification from the RCPATH, IBMS and LabMed [here](#).

There is a reply on behalf of the whole UK NEQAS consortium from the President of the UK NEQAS charity published [here](#).



Appendix 3

hs Troponin T example report

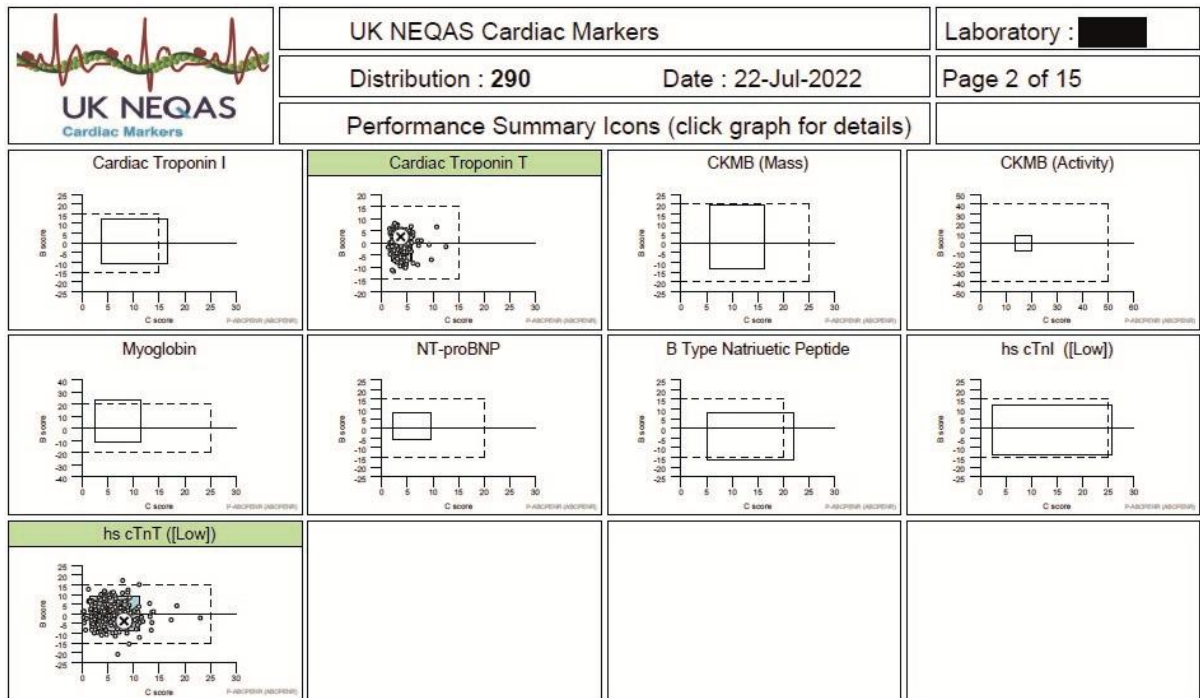
Reports for hs Troponin T consist of the following pages:

Feedback
Performance Summary Icons
Participation summary
Distribution Summary
Method Summary
Cumulative Summary
Cardiac Troponin T
hsTroponin T(4th sample)
Commentary


In this example there are reports for Cardiac Troponin T and hs Troponin T (4th Sample).

- Feedback Page
 - Address and Comments.
 - Any comments you made to us are shown on this page and have been acted upon where necessary
 - Any specific comments applicable only to laboratory XXXXX are shown on this page
 - Any general comments applicable to all laboratories are shown on this page
 - General comment: Report authorised by Naomi Elkin (Scheme Organiser)

- Performance Summary Icons Page



- Participation Summary Page

		UK NEQAS Cardiac Markers		Laboratory : XXXXXXXXXX
		Distribution : 290	Date : 22-Jul-2022	Page 3 of 15
		Participation summary		
Analytical Performance over the last 6 months (rolling time window of 6 distributions)				
You have out of consensus performance for:	None			
You have in consensus performance for:	Cardiac Troponin T	hs cTnT ([Low])		
You have no performance data for:	None			
Participation and Return Rates				
	Distributions	Rating	Affected Distributions	
Participation	12 distributions out of a possible 12	Satisfactory		
Late Returns	0 distributions from the last 12	Satisfactory		
Amendments	0 distributions accepted from the last 12	Satisfactory		
Analytical Performance for specimens from distribution 290 only				
Out of consensus for at least one specimen for:	None			
In consensus for all specimens for:	Cardiac Troponin T	hs cTnT ([Low])		
You have no specimen %bias etc. for:	None			
You are not registered for:	Cardiac Troponin I CKMB (Mass) CKMB (Activity)	Myoglobin NT-proBNP B Type Natriuretic Peptide	hs cTnI ([Low])	

• Distribution Summary Page

UK NEQAS Cardiac Markers		Laboratory: [REDACTED]	
Distribution : 290		Date : 22-Jul-2022	
Distribution Summary		Page 4 of 15	

This distribution contained 3 serum based pools (A,B and C) for analysis of cTnI (all methods) and cTnT (all methods), CKMB, Myoglobin and NT-proBNP. An additional (Low) serum based pool (D) is distributed to participants using high sensitivity Troponin methods. This sample should only be used for troponin analysis. An additional 3 EDTA plasma based pools (A,B,C) were also issued to relevant participants for BNP analysis only.

Specimen	Pool	Result	Target	Specimen %bias	A score	B score	C score	A	B	C	
Cardiac Troponin T (ng/L [pg/mL])	290A	CS137	22	23.19	-5.1	34	+2.5	3.7	↔	↔	↔
	290B	CS136	62	64.25	-3.5						
	290C	CS134A	117	116.3	+0.6						
hs cTnT (Low) (ng/L [pg/mL])	290D	HS39	16	16.75	-4.5	43	-3.7	8.1	↔	↔	↔

The scoring of a method or a group of methods with <12 participants should be considered as out-of-scope of our current accreditation. Please note that the Standard Uncertainty is not negligible when calculated with <18 data points. For both comments please refer to the participants manual.

For Serum based pools: Samples 290A and 290B are for the first time. Sample 290C was previously issued as part of distribution 289 (June 2022). Sample 290D (hs cTnT (Low) sample) was previously issued as part of distribution 289 (June 2022).

For EDTA plasma based pools: Samples 290A, 290B and 290C are issued for the first time.

If we have entered your results as "OMI" this is because the numerical value we obtained from you was implausible for this analyte.
 If we have entered your result as "XPL" this is because you did not report a numerical value for this analyte, but you did provide an explanation as to why your result was not reported.
 If no result (Blank) has been entered or we entered your result as "NR" this is because no result was received by the scheme.

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• Method Summary Page

UK NEQAS Cardiac Markers		Laboratory: [REDACTED]	
Distribution : 290		Date : 22-Jul-2022	
Method Summary		Page 5 of 15	

	Your Method	Your Submethod	Units	A score with trend arrow	Method median A score	All lab median A score
Cardiac Troponin T	Roche Cobas Systems	e801 Module (5)	ng/L [pg/mL]	34 ↔	38	38
hs cTnT (Low)	All Roche Systems(hs)	e801 Module (5)	ng/L [pg/mL]	43 ↔	52	52

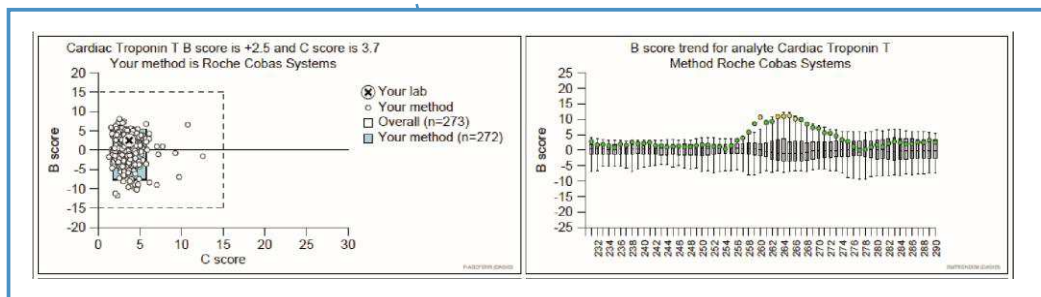
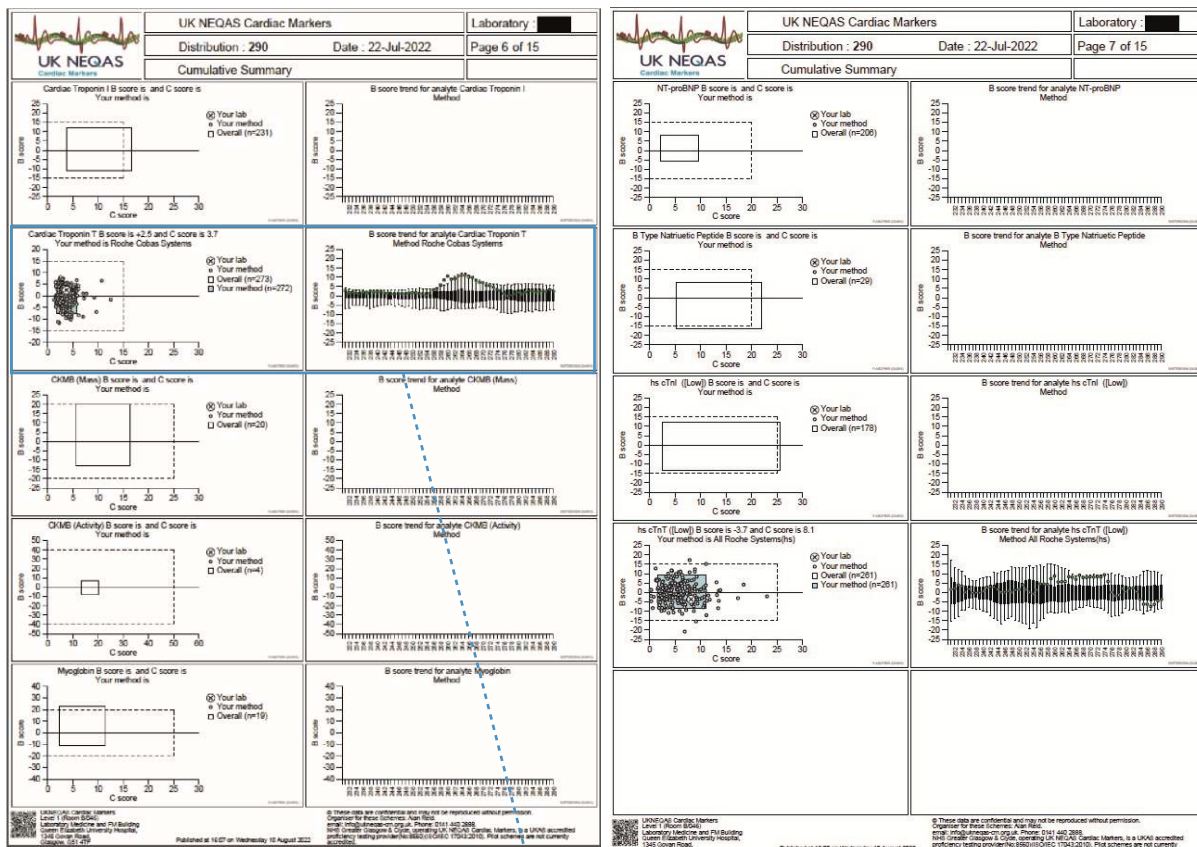
Graphic Equalizer Plot of A scores All laboratories

Method Graphic Equalizer Plot of A scores for your methods

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Specimen	Pool	Result	Target	Specimen %bias	A score	B score	C score	A	B	C	
Cardiac Troponin T (ng/L [pg/mL])	290A	CS137	22	23.19	-5.1	34	+2.5	3.7	↔	↔	↔
	290B	CS136	62	64.25	-3.5						
	290C	CS134A	117	116.3	+0.6						
hs cTnT (Low) (ng/L [pg/mL])	290D	HS39	16	16.75	-4.5	43	-3.7	8.1	↔	↔	↔

- Cumulative Summary Pages



This summary report shows your performance and the B score trends for both your laboratory (colour coded points) and your method.

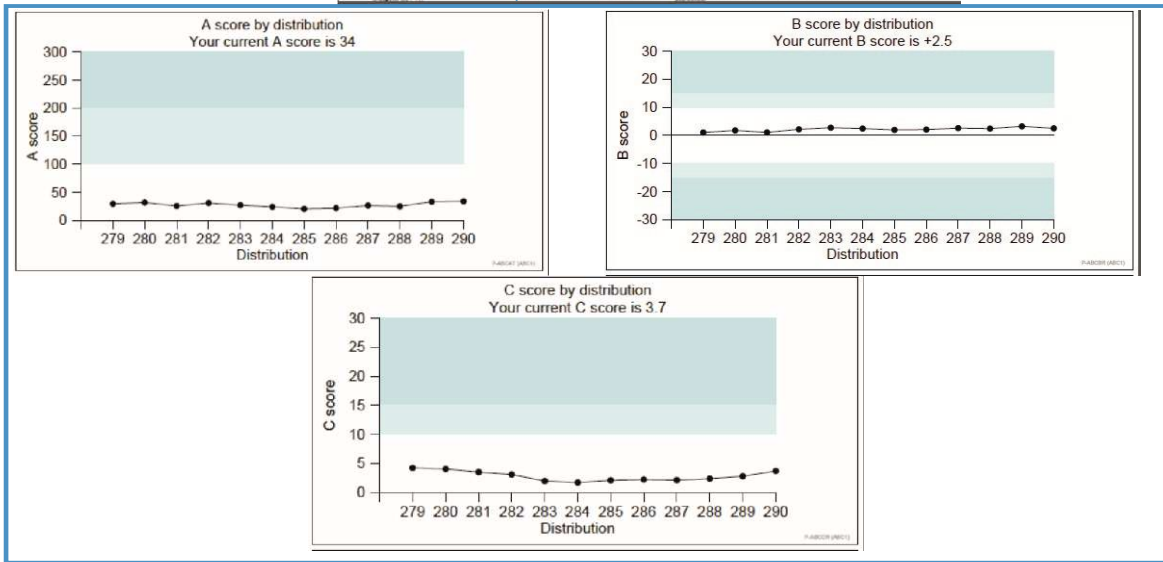
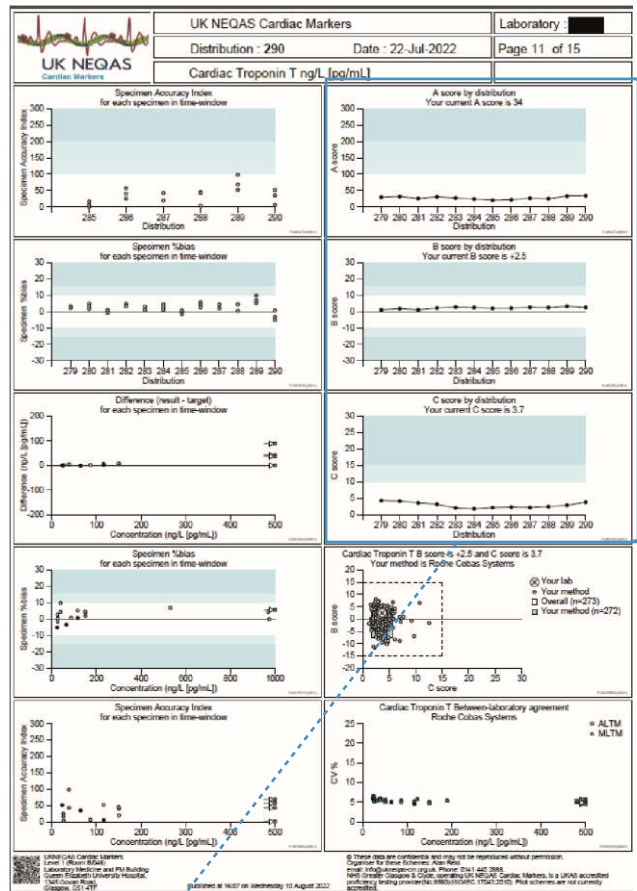
• Cardiac Troponin T

UK NEQAS Cardiac Markers		Laboratory: [REDACTED]	
Distribution : 290		Date : 22-Jul-2022	
Analyte : Cardiac Troponin T (ng/L [pg/mL])		Page 8 of 15	
Spec. Pool	Pool description / Treatments / Additions	<input type="checkbox"/> All methods <input type="checkbox"/> Roche Cobas Systems <input checked="" type="checkbox"/> e801 Module (5)	Your A score is 34 Your B score is +2.5 Your C score is 3.7 The A limit is 200 The B limit is +/- 15.0 The C limit is 15.0
290A	CS137 Female serum spiked with cTn complex,CKMB,Myog,NTproBNP.		
290B	CS136 Female serum spiked with cTn complex,CKMB,Myog,NTproBNP.		
290C	CS134A Female serum spiked with cTn complex,CKMB,Myog,NTproBNP.		
Specimen : 290A		Your result 22	
All methods [ALTM]	n Mean SD CV(%)	Target value (ALTM) 23.19	
Roche Cobas Systems	269 23.19 1.39 6.0	Standard Uncertainty 0.11	
e402 Module (6)	2 23.10	Your specimen %bias -5.1	
e411 Module (2)	21 22.23 2.46 11.1	transformed bias -51	
e601 Module (3)	60 22.65 1.12 5.0	Accuracy Index 51	
e602 Module (4)	61 22.47 1.01 4.5	Method mean [MLTM] 23.19	
e801 Module (5)	125 23.92 1.13 4.7		
Specimen : 290B		Your result 62	
All methods [ALTM]	n Mean SD CV(%)	Target value (ALTM) 64.25	
Radiometer AQT90	1 29.00	Standard Uncertainty 0.26	
Roche Cobas Systems	268 64.27 3.25 5.1	Your specimen %bias -5.6	
e402 Module (6)	2 66.40	transformed bias -35	
e411 Module (2)	20 60.88 3.94 6.3	Accuracy Index 35	
e601 Module (3)	60 62.63 2.55 4.1	Method mean [MLTM] 64.27	
e602 Module (4)	61 62.90 2.91 3.2		
e801 Module (5)	125 66.34 2.35 3.5		
Specimen : 290C		Your result 117	
All methods [ALTM]	n Mean SD CV(%)	Target value (ALTM) 116.3	
Radiometer AQT90	1 61.00	Standard Uncertainty 0.44	
Roche Cobas Systems	269 116.4 5.4 4.7	Your specimen %bias +0.6	
e402 Module (6)	2 121.0	transformed bias +6	
e411 Module (2)	21 109.8 6.1 5.5	Accuracy Index 6	
e601 Module (3)	60 114.0 4.4 3.8	Method mean [MLTM] 116.4	
e602 Module (4)	61 113.9 3.8 3.3		
e801 Module (5)	125 119.8 4.1 3.4		
<p>The scoring of a method or a group of methods with <12 participants should be considered as out-with scope of our current accreditation. Please note that the Standard Uncertainty is not negligible when calculated with <10 data points. For both comments please refer to the participants manual.</p> <p>Your Reagent Lot Number: Your Calibrant Lot Number:</p> <p>UK NEQAS Cardiac Markers Level 1 PCR Building Laboratory Medicine and Pathology Queen's University Belfast Belfast, BT9 6BX (UK) +44 (0) 28 262 2222 Published at 16:07 on Wednesday 10 August 2022</p>			

UK NEQAS Cardiac Markers		Laboratory: [REDACTED]	
Distribution : 290		Date : 22-Jul-2022	
Analyte : Cardiac Troponin T (ng/L [pg/mL])		Page 9 of 15	
Pool (resolution)	Distribution 290 25-Feb-2022	Distribution 296 25-Mar-2022	Distribution 297 23-Apr-2022
[Type]	result target %bias	result target %bias	result target %bias
CS137	25 25.42 -1.0	26 25.36 +2.5	
CS130			26 25.90 +1.4
CS133			40 28.24 +1.3
CS128		XPL 51.61	42 38.25 +0.8
CS106			62 64.25 -3.5
CS129	87 86.43 +0.7	156 150.0 +4.0	153 150.1 +2.0
CS134A			156 149.2 +4.5
CS132			122 115.9 +5.2
CS135			117 116.3 +0.8
CS121	974 974.7 -0.1	1664 1555 +5.7	1011 983.3 +4.3
CS126			
Method mean	B05 0.3	B06 +4.1	B06 +3.1
A score	21	22	26
B score	+1.0	+2.1	+2.6
C score	2.1	2.2	2.1
<p>Cardiac Troponin T B score is +2.6 and C score is 3.7 Your method is Roche Cobas Systems</p> <p>Legend: ● Your lab (n=27) □ Overall (n=273) ■ Your method (n=272)</p>			
<p>The scoring of a method or a group of methods with <12 participants should be considered as out-with scope of our current accreditation. Please note that the Standard Uncertainty is not negligible when calculated with <10 data points. For both comments please refer to the participants manual.</p> <p>Your Reagent Lot Number: Your Calibrant Lot Number:</p> <p>UK NEQAS Cardiac Markers Level 1 PCR Building Laboratory Medicine and Pathology Queen's University Belfast Belfast, BT9 6BX (UK) +44 (0) 28 262 2222 Published at 16:07 on Wednesday 10 August 2022</p>			

Spec. Pool	Pool description / Treatments / Additions	<input type="checkbox"/> All methods <input type="checkbox"/> Roche Cobas Systems <input checked="" type="checkbox"/> e801 Module (5)	Your A score is 34 Your B score is +2.5 Your C score is 3.7 The A limit is 200 The B limit is +/- 15.0 The C limit is 15.0
290A	CS137 Female serum spiked with cTn complex,CKMB,Myog,NTproBNP.		
290B	CS136 Female serum spiked with cTn complex,CKMB,Myog,NTproBNP.		
290C	CS134A Female serum spiked with cTn complex,CKMB,Myog,NTproBNP.		
Specimen : 290A		Your result 22	
All methods [ALTM]	n Mean SD CV(%)	Target value (ALTM) 23.19	
Roche Cobas Systems	269 23.19 1.39 6.0	Standard Uncertainty 0.11	
e402 Module (6)	2 23.10	Your specimen %bias -5.1	
e411 Module (2)	21 22.23 2.46 11.1	transformed bias -51	
e601 Module (3)	60 22.65 1.12 5.0	Accuracy Index 51	
e602 Module (4)	61 22.47 1.01 4.5	Method mean [MLTM] 23.19	
e801 Module (5)	125 23.92 1.13 4.7		

- Cumulative Summary Pages



• hs Troponin T ([Low])

UK NEQAS Cardiac Markers		Laboratory: [REDACTED]	
Distribution : 290		Date : 22-Jul-2022	
Analyte : hs cTnT ([Low]) (ng/L [pg/mL])		Page 14 of 15	
2900			
All methods (ALTM)	n	Mean	SD CV(%)
All Roche Systems (hs)	269	16.75	1.23 7.3
e402 Module (5)	2	15.95	
e411 Module (2)	21	18.31	2.98 12.7
e401 Module (3)	63	16.27	0.99 5.1
e402 Module (4)	61	16.03	0.82 5.1
e401 Module (5)	124	17.42	0.96 5.5
A score			
All methods	n	Median	Interquartile range
All Roche Systems (hs)	269	52	36 72
e402 Module (5)	2	52	36 72
e411 Module (2)	21	52	36 72
e401 Module (3)	63	52	36 72
e402 Module (4)	61	52	36 72
e401 Module (5)	124	52	36 72
B score			
All methods	n	Median	Interquartile range
All Roche Systems (hs)	269	-0.3	-3.6 +3.8
e402 Module (5)	2	-0.3	-3.6 +3.8
e411 Module (2)	21	-0.3	-3.6 +3.8
e401 Module (3)	63	-0.3	-3.6 +3.8
e402 Module (4)	61	-0.3	-3.6 +3.8
e401 Module (5)	124	-0.3	-3.6 +3.8
C score			
All methods	n	Median	Interquartile range
All Roche Systems (hs)	269	5.2	3.3 7.7
e402 Module (5)	2	5.2	3.3 7.7
e411 Module (2)	21	5.2	3.3 7.7
e401 Module (3)	63	5.2	3.3 7.7
e402 Module (4)	61	5.2	3.3 7.7
e401 Module (5)	124	5.2	3.3 7.7

