

*The digital landscape in laboratory medicine:
Current systems, future possibilities*

Strategies to implement minimum retest intervals in laboratory medicine

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30th April 2026

Background

- North Midlands & Cheshire Pathology Service (NMCPS)
 - Three NHS Trusts
 - Four hospital laboratories
 - Population approx. 1.5 million
 - Approx. 20 million biochemistry tests per year
- Implemented WinPath Enterprise (WPE) for all four sites in March 2024
- ICE and Careflow order-comms



Overview

- Background and rationale
- Introduction to MRIs
- General approaches
- MRI rules in LIMS
- Further considerations & common pitfalls

Laboratory workload

- High workloads, and increasing (~5-10% year-on-year)
- Growing repertoire and increasing complexity
- Not matched with increasing resource and budgets
- A proportion of laboratory testing will add little or no clinical value
 - Inappropriate test selection
 - Too frequent testing
- Reasons
 - New/updated evidence and guidelines (new tests/expansion of current tests)
 - Aging population
 - Higher standards/expectations, new treatments
 - Increased patient education/awareness
 - Less resource/more demand in other departments, e.g. hospital flow, referral avoidance
 - Financial incentives (e.g. QOF)

Demand optimisation

- Clinical user education
- Patient education
- Benchmarking, peer-comparison reports
- Repertoire review
- Test profile content review
- Order-comms layout, rules and decision support
- Care sets
- Minimum retest intervals (MRIs)

Minimum retest intervals

- RCPATH guidance – Version 2 published March 2021 – due for review from March 2026

“Minimal retesting intervals (MRI) are defined as the minimum time before a test should be repeated, based on the properties of the test and the clinical situation in which it is used”



National minimum retesting intervals in pathology

March 2021

Authors: Dr Tim Lang, County Durham and Darlington NHS Foundation Trust
Dr Bernie Croal, Aberdeen Royal Infirmary, NHS Grampian

Unique document number	G147
Document name	National minimum retesting intervals in pathology
Version number	2
Produced by	Dr Tim Lang is the main project lead and author of the previous minimum retesting intervals for clinical biochemistry. Dr Bernie Croal is the demand optimisation lead and coordinator of this wider pathology version.
Date active	March 2021
Date for full review	March 2026



MRIs in guidance

The Royal College of Pathologists
Pathology: the science behind the cure

The Association for
Clinical Biochemistry &
Laboratory Medicine
Better Science, Better Testing, Better Care

IBMS Institute of
Biomedical Science

Nat

Authors:

Unique document number	
Document name	
Version number	
Produced by	
Date active	
Date for full review	

Pathology

GIRFT Programme National Specialty Report

by **Dr Tom Lewis** MA, PhD, MBChB, FRCPath
and **Dr Marion Wood** MBBS, FRCP, FRCPath
GIRFT Joint Clinical Leads for Pathology

Dr Martin Myers MBE, PhD, FRCPath
GIRFT Senior Clinical Advisor for Pathology

September 2021

GIRFT recommendation 6c

c PNs to:

- check all minimum retest intervals are aligned to RCPATH guidance;
- build intervals into decision support and electronic requesting; where this is not possible, impose lab limits;
- educate requestors on the proper use of minimum retest intervals.

Avoiding unnecessary repeat tests: minimum retest intervals

Some test results are unlikely to change over short to medium timescales, and so retests within those timescales are unnecessary. We found variation in the use of minimum retest intervals, and recommend networks implement consistent intervals as part of network standards.

The best joined-up care for *all*



MRIs in the literature

Fryer AA, Smellie WS. Managing demand for laboratory tests: a laboratory toolkit. *J Clin Pathol.* 2013;66(1):62-72. doi:10.1136/jclinpath-2011-200524

Waldron JL, et al. An automated minimum retest interval rejection rule reduces repeat CRP workload and expenditure, and influences clinician-requesting behaviour. *J Clin Pathol.* 2014;67(8):731-733. doi:10.1136/jclinpath-2014-202256

Lang T. Minimum retesting intervals in practice: 10 years experience. *Clin Chem Lab Med.* 2020;59(1):39-50. Published 2020 Sep 7. doi:10.1515/cclm-2020-0660

Panteghini M, et al. Pursuing appropriateness of laboratory tests: a 15-year experience in an academic medical institution. *Clin Chem Lab Med.* 2022;60(11):1706-1718. Published 2022 Aug 23. doi:10.1515/cclm-2022-0683

Boerman AW, et al. The usefulness of implementing minimum retest intervals in reducing inappropriate laboratory test requests in a Dutch hospital. *Clin Chem Lab Med.* 2022;61(3):412-418. Published 2022 Dec 19. doi:10.1515/cclm-2022-0946

Hersi I, Griffiths RL, Gama R, Kalaria T. Efficacy and implications of minimum retesting intervals for HbA1c. *Ann Clin Biochem.* 2026;63(2):182-184. doi:10.1177/00045632251367278

MRIs: Impact on tests performed

Number of tests rejected by LIMS MRI rule

- NMCPS snapshot data: January – March 2026

	HbA1c <i>(MRI: 2 months)</i>	NT-proBNP <i>(MRI: 6 months)</i>	Vitamin D <i>(MRI: 6 months)</i>	B12 <i>(MRI: 3 months)</i>	Folate <i>(MRI: 3 months)</i>	ELF <i>(MRI: 3 years)</i>
Number rejected due to MRI	4581	999	2453	2499	2529	167
% total requests	3.1%	8.6%	8.4%	6.6%	7.3%	9.5%

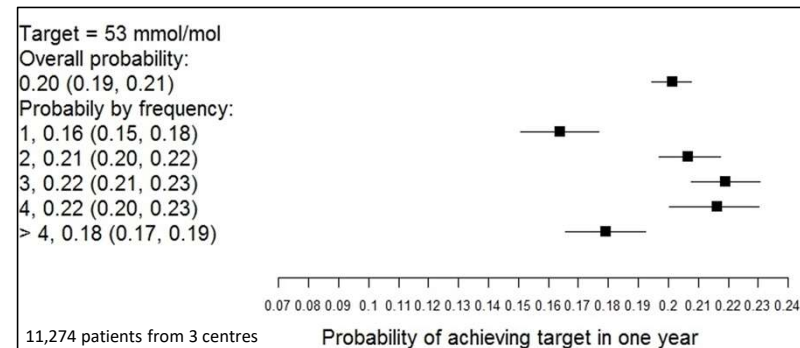
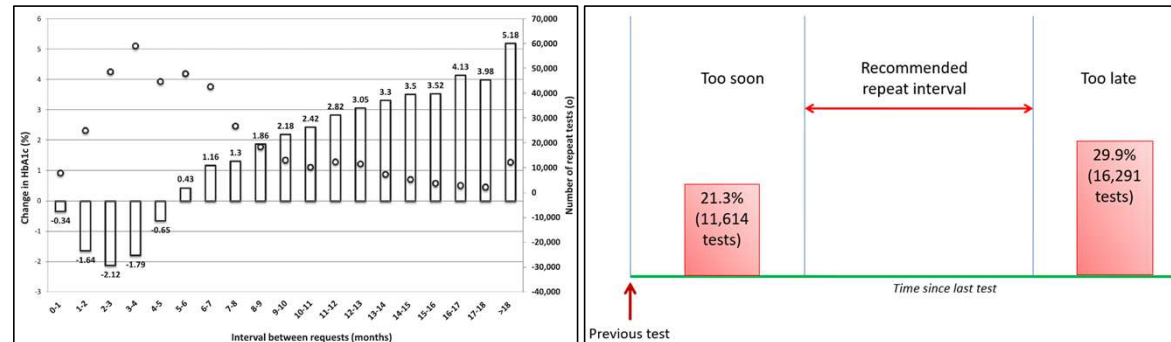
Testing interval: wider aspects

INTERCEPT study

*IN*vestigation of *ThE* Root Causes of Excessive replicate Pathology Testing

Tony Fryer & Owen Driskell

- HbA1c requests from Jan 2001- Mar 2011
 - 519,664 requests, 3 UK centres
- Large variation across requesting locations
- Overtesting and undertesting
- Testing interval associated with outcome



Pros and Cons

Benefits	Risks and issues
<p>Cost savings</p> <ul style="list-style-type: none"> • Reagents • Laboratory consumables • Phlebotomy consumables • Staff time <p>Reduced patient inconvenience</p> <p>Improved clinical outcomes</p> <p>Wider societal and economic benefits</p> <p>In line with guidance (GIRFT, RCPATH)</p> <p>Improved sustainability</p> <ul style="list-style-type: none"> • Reduced biomedical waste • Reduced single use plastics • Manufacturing/logistics impact 	<p>Missed/delayed diagnosis</p> <p>Missed/delayed treatment adjustment</p> <p>Missed technical/clerical errors</p> <p>Clinical user dissatisfaction</p> <p>Patient dissatisfaction</p> <p>Complaints and incidents</p> <p>Inefficiency in other parts of system</p>

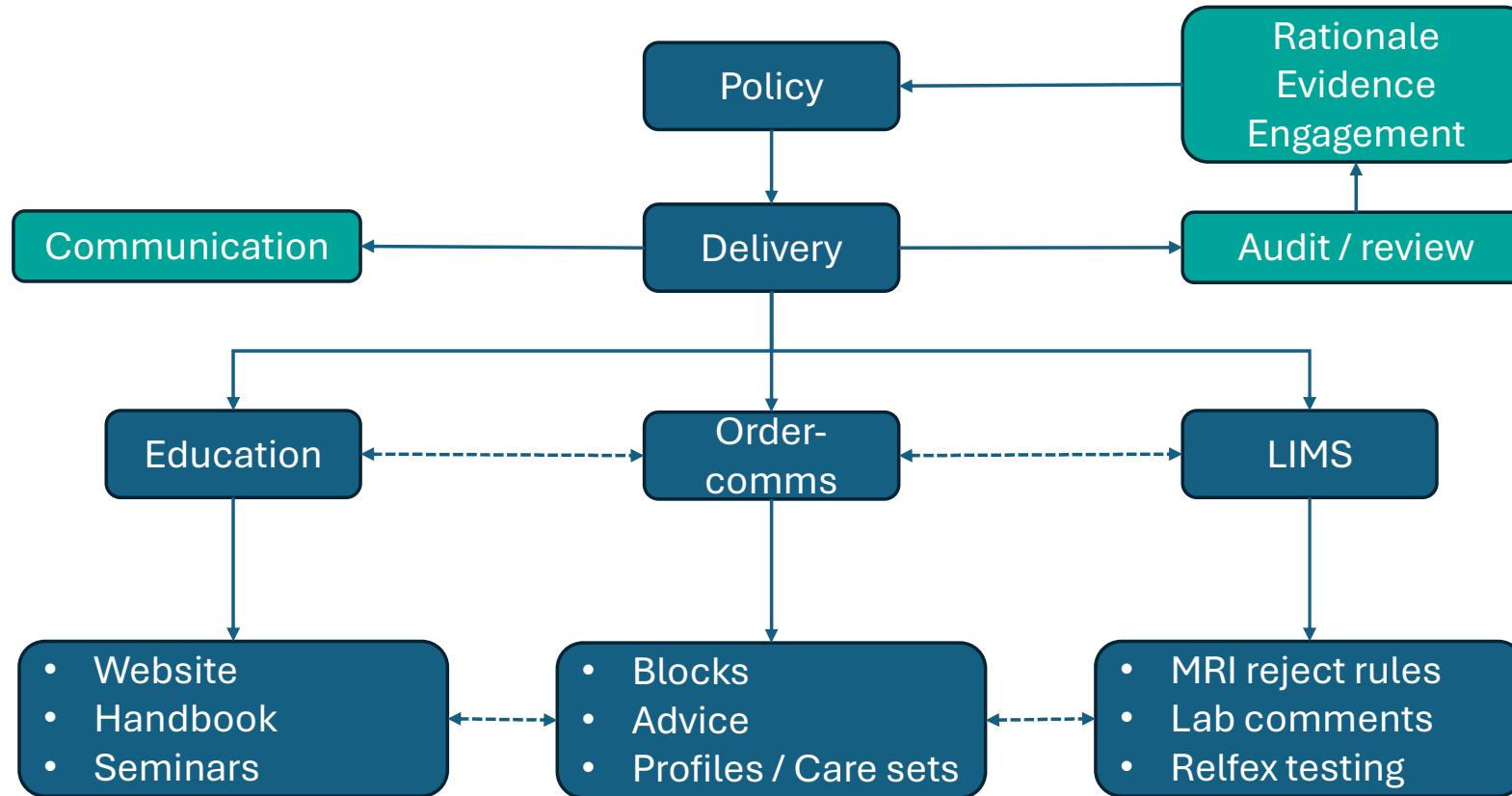
**Actual vs.
perceived??**

Overall goal:

Limit inappropriate testing whilst not causing clinical harm, and without introducing undue operation inefficiency



General approaches to MRIs



General approaches: LIMS

LIMS MRI reject rule

Overall goal:

*Limit inappropriate testing
whilst not causing clinical
harm, and without
introducing undue operation
inefficiency*

General approaches: LIMS

LIMS MRI reject rule

Test selection & interval setting

Evidence-base / guidance
Governance and documentation
User engagement / consultation

Idealism vs. pragmatism

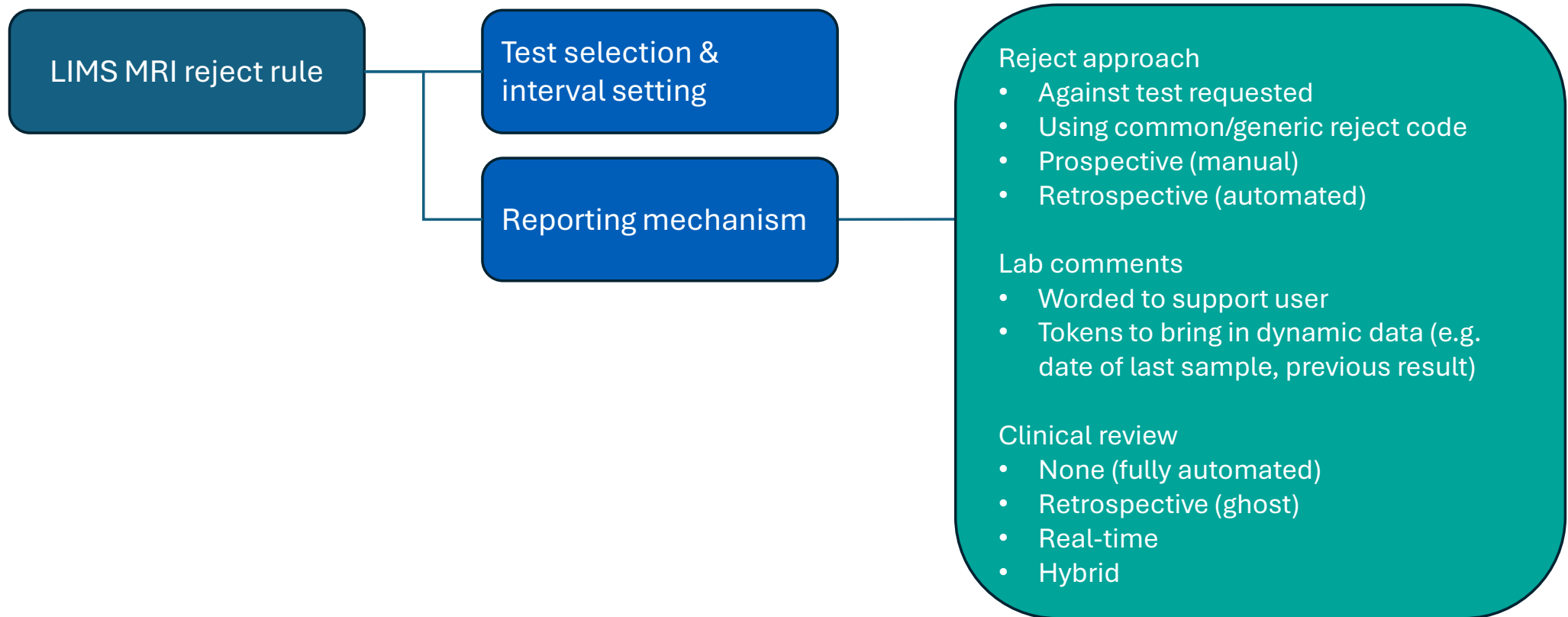
- Grace/buffer periods
- Consider user perspective
- Type of test (clinical utility)
- Sample type (ease of repeat, timing in relation to clinical event/intervention)
- Caution re. DFTs, fluids, paediatrics
- If in doubt, be conservative (?)

Consider differential MRIs tailored to situation (may require multiples rules per test)

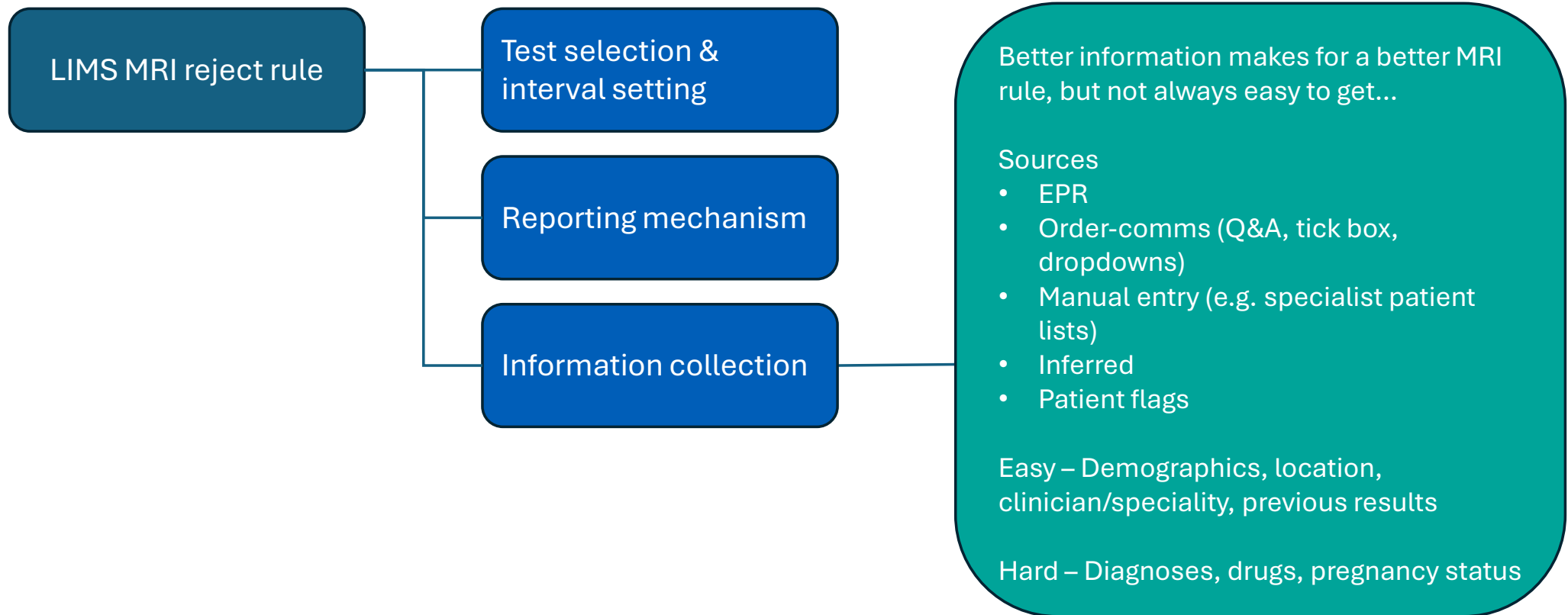
Overall goal:

Limit inappropriate testing whilst not causing clinical harm, and without introducing undue operation inefficiency

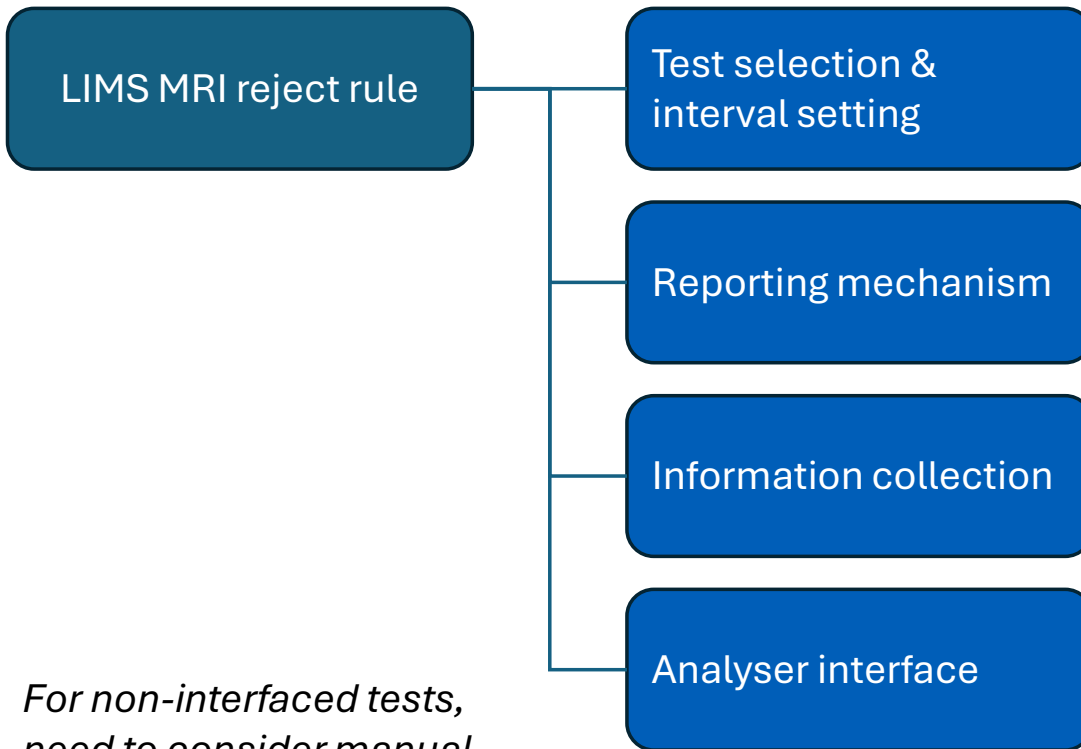
General approaches: LIMS



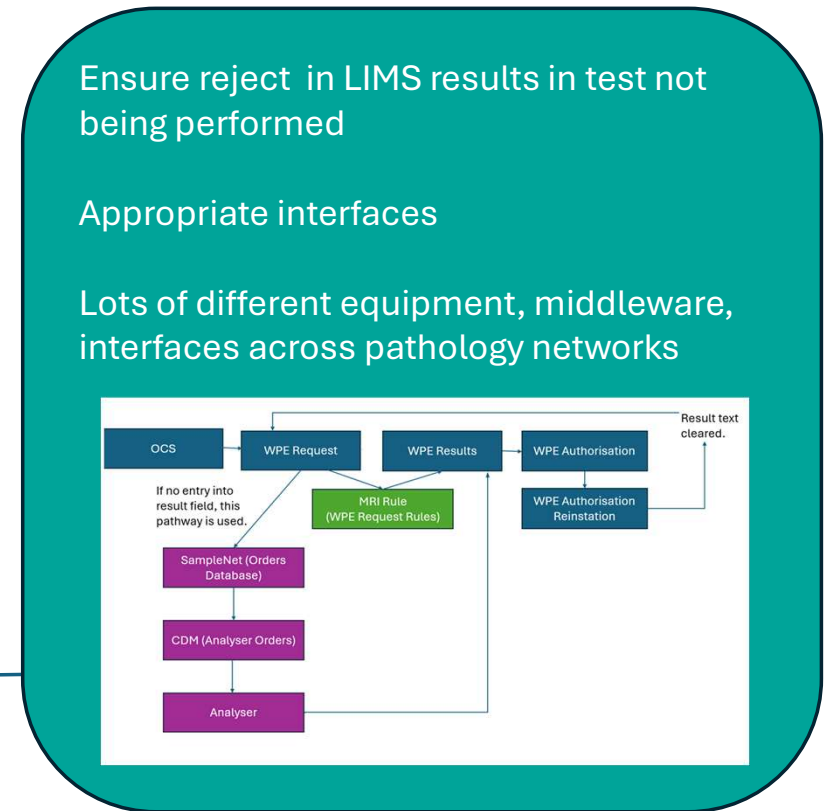
General approaches: LIMS



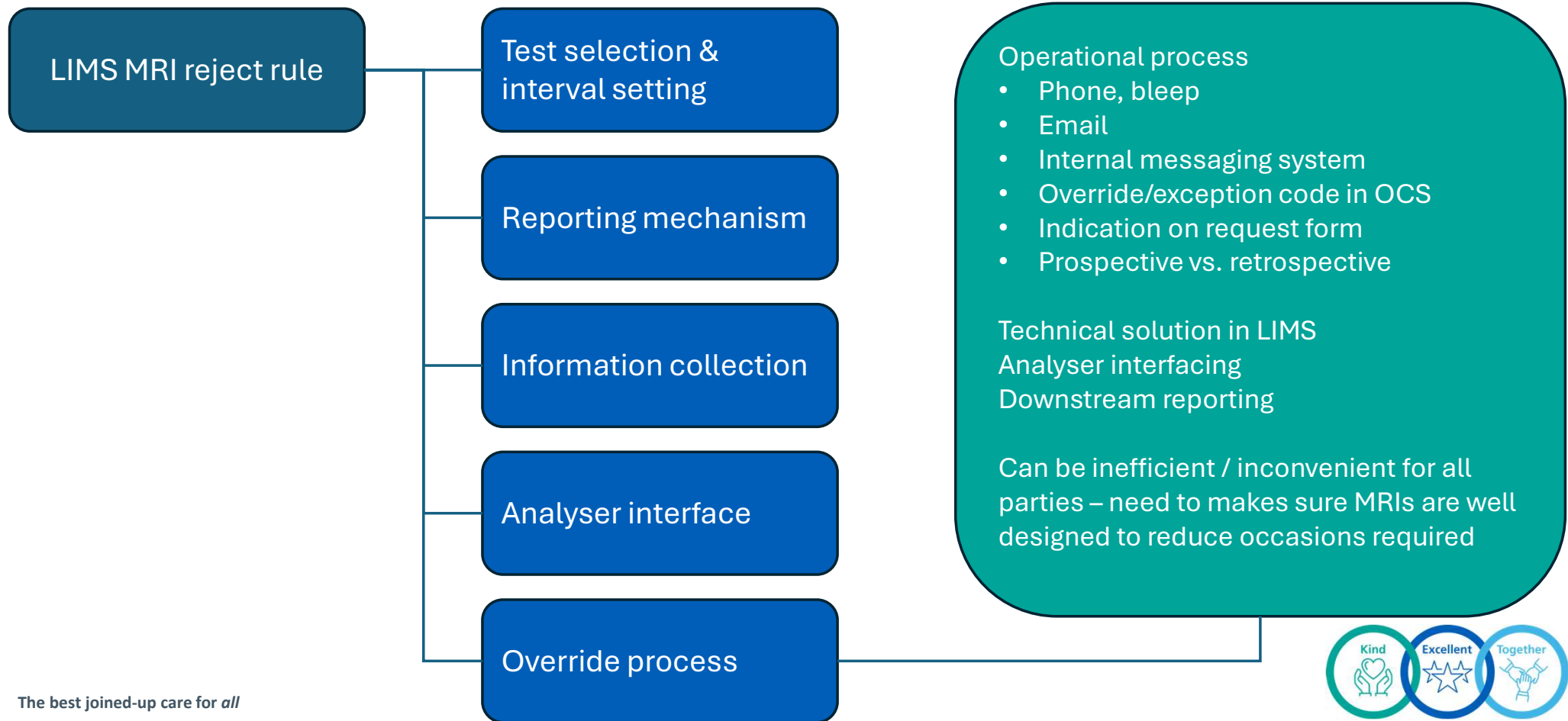
General approaches: LIMS



*For non-interfaced tests,
need to consider manual
workflow*



General approaches: LIMS



MRI rules in LIMS

High-level approach at NMCPS

- Autorejection used
 - +/- retrospective clinical review, depending on situation
- Rejection comment reported against the specific test requested
- Comment incorporates date of previous test and result, where possible (i.e. for numeric results)
- If test reinstated, amended report is issued

Core MRI rule in LIMS

(test code) ?

[IF RECENT] *(test code)* *(interval)*

Specifies the MRI period (usually in days)

Previous request and/or previous result

Can stipulate previous result numeric

Core MRI rule in LIMS

(test code) ?

[IF RECENT] *(test code) (interval)*

[IF NOT CLINDET] *(override code)*

MRI rule not applied if code present

Can target various fields in LIMS

Entered manually, by rule, or from OCS

Core MRI rule in LIMS

(test code) ?

[IF RECENT] *(test code) (interval)*

[IF NOT CLINDET] *(override code)*

(test code) <\$> (comment code)

Anti-loop

Prevents rejection comment being applied repeatedly

Core MRI rule in LIMS

(test code) ?

[IF RECENT] *(test code)* *(interval)*

[IF NOT CLINDET] *(override code)*

(test code) <\$> *(comment code)*

[THEN] REPLACEALL *(test code)* WITH *(comment code)*

Adds pre-determined rejection comment

Can incorporate dynamic data

Updates status to “complete” in LIMS

Core MRI rule in LIMS

(test code) ?

[IF RECENT] *(test code)* *(interval)*

[IF NOT CLINDET] *(override code)*

(test code) <\$> *(comment code)*

[THEN] REPLACEALL *(test code)* WITH *(comment code)*

[THEN] ADD TLC *(pseudo test code)*

Reflexed pseudo test

Allows ghost queue-like functionality

Optional element

Core MRI rule in LIMS

(test code) ?

[IF RECENT] *(test code)* *(interval)*

[IF NOT CLINDET] *(override code)*

(test code) <\$> *(comment code)*

[THEN] REPLACEALL *(test code)* WITH *(comment code)*

[THEN] ADD TLC *(pseudo test code)*

Core MRI rule in LIMS (example)

HFE ?

[IF RECENT] HFE (9999)

[IF NOT CLINDET] MRI

HFE <\$> @HFE1

[THEN] REPLACEALL HFE WITH @HFE1

[THEN] ADD TLC CREJ

```
pV Biochemistry Test Rejected
pF Haemochromatosis genotype
pF
pF
```

```
Test rejected, see comment
This test has already been performed recently.
Test result is from Lab number 26B00101388 on
14/01/2026
```

Additional elements: Demographic conditions

(test code) ?

[IF RECENT] *(test code)* *(interval)*

[IF NOT CLINDET] *(override code)*

[IF AGE] > 16

(test code) <\$> *(comment code)*

[THEN] REPLACEALL *(test code)* WITH *(comment code)*

[THEN] ADD TLC *(pseudo test code)*

Additional elements: Previous numeric result

(test code) ?

[IF RECENT] *(test code)* *(interval)* PREV.ONLY NUM.ONLY

[IF NOT CLINDET] *(override code)*

[IF AGE] > 16

(test code) <\$> *(comment code)*

[THEN] REPLACEALL *(test code)* WITH *(comment code)*

[THEN] ADD TLC *(pseudo test code)*

Additional elements: Previous numeric result

IGF1 ?

[IF RECENT] IGF1 (90) PREV.ONLY NUM.ONLY

[IF NOT CLINDET] MRI

[IF AGE] > 16

IGF1 <\$> @IGFX

[THEN] REPLACEALL IGF1 WITH @IGFX

[THEN] ADD TLC CREJ

Standard MRI for numeric results

Eliminates risk of incorrectly rejecting repeat test if previous result not reported

Other elements can be added in to make more sophisticated

```
pV      Biochemistry Test Rejected
pB      IGF-1
pB
pB
pB
```

```
Test rejected, see comment
This test has been rejected because the minimum
request interval has not been exceeded. The
previous result requested on 23/01/2026 was
28 nmol/L
```

Additional elements: Previous numeric result

IGF1 ?

[IF RECENT] IGF1 (90) PREV.ONLY NUM.ONLY

[IF NOT CLINDET] MRI

[IF AGE] > 16

IGF1 <\$> @IGFX

[THEN] REPLACEALL IGF1 WITH @IGFX

~~[THEN] ADD TLC CREJ~~

Without clinical review

```
pB      IGF-1
pB
pB
pB
```

```
This test has been rejected because the minimum
request interval has not been exceeded. The
previous result requested on 23/01/2026 was
28 nmol/L
```

Additional elements: Previous request

(test code) ?

[IF RECENT] *(test code)* *(interval)* REQUESTED PREV.ONLY

[IF NOT CLINDET] *(override code)*

(test code) <\$> *(comment code)*

[THEN] REPLACEALL *(test code)* WITH *(comment code)*

[THEN] ADD TLC *(pseudo test code)*

Additional elements: Previous request

PE ?

[IF RECENT] PE (90) REQUESTED PREV.ONLY

[IF NOT CLINDET] MRI

PE <\$> @PEX

[THEN] REPLACEALL PE WITH @PEX

[THEN] ADD TLC CREJ

MRI based on previous request being present, not necessarily previous result

Good for tests with longer TATs, e.g. electrophoresis, genetics, referred work

Not as well suited to full auto-rejection strategies

```
pC Serum protein electrophoresis
pC
pC
```

```
This test has already been performed recently.
Test result is from Lab number 26B00878083 on
14/04/2026
```

Additional elements: Clinical speciality

PE ?

[IF RECENT] PE (90) REQUESTED PREV.ONLY

[IF NOT CLINSPEC] 303

[IF NOT CLINSPEC] 823

[IF NOT CLINDET] MRI

PE <\$> @PEX

[THEN] REPLACEALL PE WITH @PEX

[THEN] ADD TLC CREJ

Clinician code groupings

Used frequently for tests linked to certain specialities, e.g.

- Electrophoresis for Haematology
- TSH for Oncology, Endocrinology
- Calprotectin for Gastroenterology
- PTH for ENT
- Vitamin D for Rheumatology

May totally exclude, or can have separate MRI rule with different criteria for a particular specialty (i.e. [IF CLINSPEC ###])

Additional elements: Source/location code

Specific location excluded:

[111010] # (location code)

e.g. [111010] # RSW105

Specific location included (required):

[111010] = (location code)

e.g. [111010] = RSW124

Source classification (e.g. all outpatients):

[IF NOT CLASS] (source classification code(s))

e.g. [IF NOT CLASS] RSO|LHO|MHO|CHO

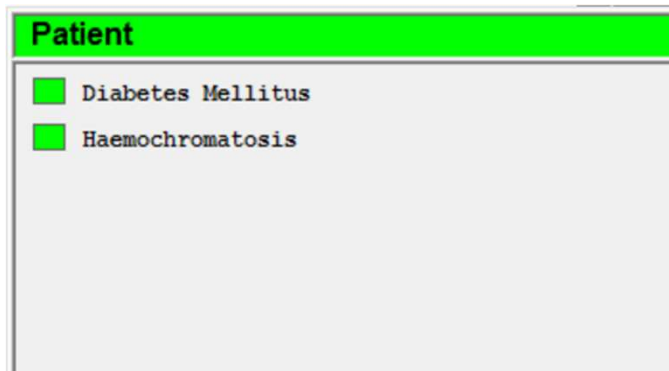
Similar to Clinical Speciality codes

Used frequently for tests linked to certain specialities, e.g.

- PTH for ENT wards
- Lipids for Critical Care
- HbA1c for Antenatal locations
- Separate ferritin rule for Renal

Works less well for samples booked under generic/broad location codes (e.g. outpatients)

Additional elements: Patient Flag



[IF PATIENT FLAG] (patient flag)

e.g. [IF PATIENT FLAG] DM

[IF NOT PATIENT FLAG] (patient flag)

e.g. [IF NOT PATIENT FLAG] HC

To include/exclude certain patients from MRI rules

Examples:

- Known vs. not known diabetes mellitus for HbA1c rules
- Known haemochromatosis for ferritin rules

Entered manually, by rule, or from OCS

Care needed when assigning and using Patient Flags

Additional elements: Previous result

Previous result above/below/within reference range:

???P^(test code) >= %REFRANGE (test code,L)

???P^(test code) <= %REFRANGE (test code,L)

???P^(test code) >= %REFRANGE (test code,U)

???P^(test code) <= %REFRANGE (test code,U)

Previous result above/below/within specific values:

???P^(test code) (previous result limit)

e.g. ???P^CALP <100

???P^CALP >250

Useful in cases where decision to repeat sooner influenced by previous results (e.g. low or high)

- Block MRI being applied
- Apply different MRI rule

Can also drive differential MRI behaviours, e.g. only autoreject if previous result normal

Examples:

Ferritin, testosterone, B12, ACE, calprotectin, HbA1c

```
A1C ?  
[IF AGE] >18  
[IF PATIENT FLAG] DM  
[IF RECENT] A1C (55) NUM.ONLY PREV.ONLY  
[111010] # LHANC  
[IF NOT CLINDET] MRI  
A1C <$> @A1CC  
[THEN] REPLACEALL A1C WITH @A1CC  
[ELSE]  
A1C ?  
[IF AGE] >18  
[IF RECENT] A1C (55) NUM.ONLY PREV.ONLY  
???P^A1C <= 47  
[111010] # LHANC  
[IF NOT CLINDET] MRI  
A1C <$> @A1CC  
[THEN] REPLACEALL A1C WITH @A1CC
```

Part 1

Rejects HbA1c if:

- Adult
- Know diabetes mellitus
- Valid result within 55 days
- Not from antenatal location

A1C ?

[IF AGE] >18

Excludes paediatric patients

[IF PATIENT FLAG] DM

Includes diabetes patients

[IF RECENT] A1C (55) NUM.ONLY PREV.ONLY

Previous numeric result in last 55 days

[111010] # LHANC

Excludes antenatal locations

[IF NOT CLINDET] MRI

A1C <\$> @A1CC

[THEN] REPLACEALL A1C WITH @A1CC

[ELSE]

A1C ?

[IF AGE] >18

[IF RECENT] A1C (55) NUM.ONLY PREV.ONLY

??P^A1C <= 47

[111010] # LHANC

[IF NOT CLINDET] MRI

A1C <\$> @A1CC

[THEN] REPLACEALL A1C WITH @A1CC



Part 1

Rejects HbA1c if:

- Adult
- Know diabetes mellitus
- Valid result within 55 days
- Not from antenatal location

A1C ?

[IF AGE] >18

Excludes paediatric patients

[IF PATIENT FLAG] DM

Includes diabetes patients

[IF RECENT] A1C (55) NUM.ONLY PREV.ONLY

Previous numeric result in last 55 days

[111010] # LHANC

Excludes antenatal locations

[IF NOT CLINDET] MRI

A1C <\$> @A1CC

[THEN] REPLACEALL A1C WITH @A1CC

[ELSE]

Part 2

If criteria not met in Part 1, rejects HbA1c if:

- Adult
- No known DM
- Previous result <48 mmol/mol

A1C ?

[IF AGE] >18

[IF RECENT] A1C (55) NUM.ONLY PREV.ONLY

??P^A1C <= 47

Excludes if previous result >47 mmol/mol

[111010] # LHANC

[IF NOT CLINDET] MRI

A1C <\$> @A1CC

[THEN] REPLACEALL A1C WITH @A1CC



Other approaches to MRIs

- LIMS MRI reject rules
 - Clinical details as a condition (coded and free-text)
 - Test profile as a condition
- Reflex rules that consider MRI (e.g. γ GT and TSH)
- Order-comms rules

CliniSys ICE - Work - Microsoft Edge
 https://ice/icedesktop/dotnet/icedesktop/usertoolbar.aspx?ID=92A49EA7A67D44C7AF73A878538308D6

ICE
 Patient Name: **Master John-J Test-Testing** Hospital Number: **E111** Sex: **Female**
 Date of Birth: **06 March 1979** NHS Number: **333 333 3333**
 Address: **Royal Stoke University Hospital, Newcastle Road, Stoke-on-Trent, ...** Telephone No: **01782123123** User: **madden91**

GP Request | Imaging Requests | Reflexed Tests | GUM & CASH Requests

Routine Bloods | Biochemistry | Haematology | Immunology | Virology | Micro/Cell Path | Drug/Hor/Tumor | Urine Chemistry | Screening | Order Sets | Special Haem 2 | Special Chemok | Routine BI Old | Special Chem 2 | Conditions and Diseases | Search

Liver Function
 Liver (ALT, T Bil, Alb, ALP)
 Total Bilirubin
 Conjugated Bilirubin
 Aspartate Transaminase
 Gamma Glutamyl Transferase
 Bile Salts

Protein Assays
 Serum Electrophoresis
 Immunoglobulins (IgG, IgA, IgM)
 Total Protein
 Alpha-1 Antitrypsin
 Caeruloplasmin

Urate (Uric Acid)
 Angiotensin Converting Enzyme
 Creatine Kinase (CK)
 LDH
 Vitamin D
 Cobalt
 Chromium
 Glucose Tolerance Test
 Faecal Elastase
 Faecal Calprotectin
 Fructosamine
 Cyclosporin
 Tacrolimus

Genetic Testing
 Haemochromatosis
 HLA B27
 Hereditary Thrombophilia

Haematological Indices
 Ferritin
 Iron Deficiency Screen
 Vitamin B12 and Folate
 Vitamin B12
 Iron Studies
 Haptoglobin

Myeloma Screen2

Enhanced Liver Fibrosis (ELF) Score

Test previously requested-- Web page Dialogue

Enhanced Liver Fibrosis (ELF) Score
 previously requested at 23/04/2026 13:18.
 Do you want to continue?
 Yes View Previous Results No

Most recent requests made for this patient:

Requested	Investigations
23 Apr 2026 13:34:09	Bone (Ca, Cc, AB, Phos, ALP)
23 Apr 2026 13:25:28	Serum UOE (Na, K, Urea, Creatinine)
23 Apr 2026 13:20:53	Vitamin B12
23 Apr 2026 13:18:02	Enhanced Liver Fibrosis (ELF) Score
18 Mar 2026 15:27:08	Liver (ALT, T Bil, Alb, ALP)

CliniSys ICE - Work - Microsoft Edge
 https://ice/icedesktop/dotnet/icedesktop/usertoolbar.aspx?ID=92A49EA7A67D44C7AF73A878538308D6

ICE
 Patient Name: **Master John-J Test-Testing** Hospital Number: **E111**
 NHS Number: **333 333 3333**
 Address: **Royal Stoke University Hospital, Newcastle Road, Stoke-on-Trent, ...** Reflexed Tests

Results associated with 'Enhanced Liver Fibrosis (ELF) Score' investig...

Test	Results	Unit	Range	Date
ELF Score	7.00		0.00 - 10.50	23/04/2026 13:37:00
ELF Score	Insufficient sample			16/03/2024 12:42:00
ELF Score	Insufficient sample			16/03/2024 12:42:00

Test previously requested-- Web page Dialogue

Enhanced Liver Fibrosis (ELF) Score
 previously requested at 23/04/2026 13:18.
 Do you want to continue?
 Yes View Previous Results No

The best joined-up care for all



Education & decision support

- Meetings, seminars
- Formal communications, newsletters
- Order-comms
- Website
- Need to consider clinicians and patients

Clinical Team & Advisory Service

The clinical biochemistry team work with all areas of healthcare to ensure the delivery and a safe and effective biochemistry service. Our main role involves participation in the duty biochemist rota, where we provide clinical interpretation of results and act as a point of contact for the laboratory. Further responsibilities include supporting quality assurance, service development and teaching & training at both a local and national level.

The clinical team regularly revise and update critical telephone limits, add on request intervals and minimum request intervals. To obtain the most up-to-date information, please follow the links below.

[Critical Telephone Limits](#)

[Minimum Request Intervals:](#)

Add-On Request Intervals: Please refer to specific test page.

North Midlands and Cheshire Pathology Service

Biochemistry minimum retest intervals

Minimum retest intervals (MRIs) based on guidance from the Royal College of Pathologists.

Repeat requests received in the laboratory within the stated timelines in the below table will be rejected (exemptions apply).

If a repeat test is required within the stated MRI, this should be discussed with the Duty Biochemist.

Test / Profile	MRI (days)	Conditions / additional information
Alpha-1-antitrypsin (AAT)	365	Not applied if age <18 years
Angiotensin converting enzyme (ACE)	27	
AFP	7	
Beta-2 microglobulin	27	
CA125	7	
CA153	7	
CA199	7	
Caeruloplasmin	365	Not applied if age <18 years
Calprotectin (faecal)	180	Not applied if: <ul style="list-style-type: none"> • Age <18 years • Gastroenterology speciality clinician/location • Outpatient location • If previous result in the equivocal range (100-250 µg/g)
CEA (serum)	7	
Cholesterol	27	See Lipid profile
Cholesterol:HDL-C ratio	27	See Lipid profile
Copper	13	
Creatinine clearance	7	
DHEAS	27	
Elastase (faecal)	90	
ELF	1095	



Further considerations & Common pitfalls

- Multi-site issues (from user perspective) – i.e. previous request from different site, and therefore user does not have visibility of previous results
- Repeats required due to ? technical errors
- Incorrect date specimen collected (manual entry vs. order-comms)
- Days vs. weeks vs. months – how this feels to users (e.g. February short month)
- OOHs override process (esp. bank holiday weekends)
- Rules overwriting – understanding how rules are triggered
- MRIs for high volume “routine/acute” chemistry tests, e.g. CRP, LFT
- Consistency across interdependent tests (e.g. TSAT – iron + transferrin)
- Out of sync “profiles” e.g. TSH + fT4 and Igs + electrophoresis

Top tips

- ✓ Engage users
- ✓ Don't be too idealistic
- ✓ Design approach for the specific test/situation
- ✓ Communicate effectively
- ✓ Seek specialist expertise
- ✓ Properly assess risk-benefit
- ✓ Test solution thoroughly before implementation
- ✓ Review processes periodically

Thank you for listening!

chris.duff@uhnms.nhs.uk