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Optimising blood testing in primary care

16 September 2021

1. Introduction

1.1 This document signposts best practice guidance and practical advice for optimising use of blood testing while maintaining clinical standards. It represents the prevailing best practice that should be followed in day-to-day practice.

1.2 Primary care clinicians have wide-ranging expertise in the clinical risk assessment and appropriate investigation and management of the huge range of clinical presentations they encounter. This document does not supplant clinical judgement: it is intended to highlight best practice recommendations, including some that relate to very specific situations, that may inform and support practice.

1.3 Requesting blood tests is a clinical responsibility and sits with the assessing clinician. This can be anyone in the primary, community or acute trust clinical team including nurses, allied health professionals (AHPs) and doctors.

1.4 As with any guidance, this collation of best practice guidance should be considered and adapted as appropriate to the specific situation and the specific needs of the patient (taking into account any particular preferences, needs or characteristics they may have or any risks that may apply).

1.5 The GMC provides guidance for doctors on planning, using and managing resources. Similar considerations apply to all healthcare professionals working in the NHS:

- Whatever your role or level in your organisation, whether you are a junior, non-training grade or other doctor, you should be willing to demonstrate leadership in managing and using resources effectively. This means that you should be prepared to contribute to discussions and decisions about:

  - allocating resources and setting priorities in any organisation in which you work
  - commissioning services for the wider population of patients.
- To minimise waste, improve services and promote the effective use of resources, you should take financial responsibility for delivering your service at a level appropriate to your role. You should understand the roles and policies of local and, where relevant, regional and national agencies involved in healthcare if they affect your role as a doctor.

1.6 Requesting blood tests appropriately has benefits for patients, the health system and the environment:

- There is significant unwarranted variation in blood test requesting across primary care. Rationalising blood taking improves patient experience (fewer venepuncture events, less time/travel for outpatient blood taking); reduces the risk of anaemia associated with repeated blood taking; and reduces the harms associated with investigation of incidental findings.
- Appropriate blood test planning and requesting reduces demands on phlebotomy and laboratory resources and reduces avoidable costs (for example, of unnecessary retesting) to the NHS.
- The carbon footprint of common blood tests is mostly attributable (>50% and, depending on the test, as much as 90%) to the sample collection process: blood tubes, blood collection system components, gloves, gowns, sample bags, etc are required. Therefore, rationalising the requesting of tests (and, where appropriate, combining multiple tests or adding on tests to a single sample) has environmental benefits. While the carbon footprint of each individual test is small, this adds up over the millions of tests requested each year.[1]

1.7 Given the current acute shortage of blood tubes, this document also suggests some strategic (CCG/practice level) actions as well as practical advice to assist primary care clinicians in safely delivering guidance on reducing blood testing while the acute shortage lasts.

1.8 In recovering from the acute shortage, the best practice guidance included here is intended to support return to best (rather than existing) practice. We therefore ask integrated care systems (ICSs)/CCGs and practices to consider implementing this advice for longer-term change.

[1] McAlister S et al. The carbon footprint of pathology testing. Med J Aust 2020; 212(8): 377-82. doi: 10.5694/mja2.50583

1.9 This document is divided into several sections – and separates general best practice and advice specific to the acute shortage:

- Section 2 gives practical best practice advice for primary care clinicians – this is general best practice guidance (applicable in normal day-to-day practice) and is not specific to the period of acute shortage.
- Sections 3 gives guidance aimed at ICSs/CCGs and Section 4 at individual clinicians (Section 4) which relates specifically to the period of acute shortage – this will be updated as appropriate in response to the evolving situation.
- Appendix 2 summarises general best practice advice (applicable in normal day-to-day practice) on frequency of testing (minimum retesting intervals) and is not specific to the period of acute shortage.

2. Practical best practice advice for primary care clinicians

2.1 Optimising resource use (Think twice, Check twice, Order once)

Think twice

2.1.1

- Most laboratory parameters do not change rapidly – be familiar with the national guidance on minimum retesting intervals. This is a comprehensive reference document. For easy reference, some key examples relevant to primary care are included in Appendix 2.
- Note that in the context of the acute shortage of blood tubes, NHS England and NHS Improvement have provided additional guidance on reducing or deferring non-urgent blood tests.
- Other bodies have also issued relevant guidance (eg the National Blood Transfusion Committee).
- Further guidance to support blood tube conservation specifically during the current acute shortage is given in Sections 3 and 4.

2.1.2 Before requesting blood tests, consider if the test is essential for management and adheres to clinical guidance:

- **Long-term condition/chronic disease monitoring and reviews** – see Appendix 2:
  - note that FBC, LFTs and TFTs are rarely required for most routine reviews.

- **Coagulation** – rarely required as a routine test in primary care:
  - INR – point of care testing (POCT) should be used for INR monitoring if available (and lab confirmation of POCT results is not required unless equipment malfunction is suspected). POCT testing should follow the MHRA guidance on training quality and maintenance.
- **D-dimer:**
  - D-dimer testing for venous thromboembolism (VTE) should be done in accordance with NICE guidance (NG158), taking into account the clinical likelihood of VTE and the availability and timing of testing
  - for people in whom DVT is likely (Wells score ≥2), a D-dimer test should be done if an initial ultrasound scan is negative or cannot be obtained within 4 hours and further NICE guidance followed (NICE NG158 1.1.3–1.1.7)
  - for people in whom DVT is unlikely (Wells score ≤1), a D-dimer test should be done and further NICE guidance followed (NICE NG158 1.1.8–1.1.11)
  - for people in whom pulmonary embolism is unlikely (Wells score ≤4), a D-dimer test should be done and further NICE guidance followed (NICE NG158 1.1.21)
  - D-dimer testing should not be done in patients in whom pulmonary embolism is likely (Wells score >4):
    - D-dimer testing should only be done in patients in whom DVT is likely (Wells score ≥2) in accordance with the NICE guidance (NG158)
    - D-Dimer POCT should be considered where laboratory testing is not immediately available (eg in the primary care/community setting if not referring to same day emergency care or the emergency department) and does not need to be confirmed by lab sample testing.
- **Inflammatory markers:**
  - inflammatory markers (eg CRP and ESR) should only be requested if there is a clinical indication and the result will change management
  - outside of specific rheumatological indications (eg temporal arteritis/polymyalgia rheumatica), ESR adds no new information over CRP and there is therefore no need to request both tests
  - suggested that, in the absence of rheumatology advice or a specific clinical indication, CRP alone is preferable
  - also note that in most cases ESR can be tested on the same EDTA sample as FBC (and so an additional sample tube is not required).

- Consider using POCT for glucose, INR and haemoglobin where available and appropriately quality assured.

Check twice

2.1.3 Double check if the test was recently done in secondary care – does it need to be repeated?

- To support this, ICSs/CCGs are asked to ensure that clinicians in both primary and secondary care have access to the results of tests conducted for their patients in all care settings.

Order once

2.1.4 Before requesting blood tests check if the patient is due another test and whether the tests can be combined:

- For example, if a patient is due a CKD review and there is concern about LFTs, ensure both tests are done together, using a single blood tube for all the biochemistry tests.

2.1.5 Add on tests – check if the test can be added on to a recent (past days to week) sample – do not rebleed your patient without first checking:

- Your local lab service should have a contact number for add on tests – please ensure all clinical staff are aware of this.
- ICSs/CCGs are asked to promote awareness of the potential to add on blood tests within primary and community care, including by providing the direct dial number to contact the relevant lab and, where possible, indicative timescales/sample ages within which add-on tests are possible.

2.2 Clinical information resources

2.2.1 How often should blood tests be repeated?

- Most blood tests do not need to be frequently repeated in primary (or acute) care. National guidance on minimum retesting intervals, 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, is available. This is a comprehensive reference document. For easy reference, some key examples relevant to primary care are included in Appendix 2.

- Note that in the context of the acute shortage of blood tubes, NHS England and NHS Improvement have provided additional guidance on reducing or deferring non-urgent blood tests.

2.2.2 Which samples should be sent in which blood tubes? And which samples can be combined in one tube?

- Refer to your local blood tube guide and look out for new information on tube substitutions and suggestions for combining multiple tests in a single tube – only substitute or combine samples as advised by your local laboratory.
- We suggest that ICSs/CCGs work with their local labs to develop an easy reference, up-to-date table that: reflects local lab policies; shows blood tube types in use and which samples can be sent in which tubes; gives clear advice on tube substitutions, samples that can be combined and any specific instructions. This should be distributed to all relevant clinical areas.

2.3 Blood sample collection and dispatch

2.3.1 When taking specimens please only collect the number of tubes stated by order comms or on the request form (do not send an extra tube just in case):

- Where samples can be combined, please only send a single tube:
  - this may be the case, for example, for: HbA1c and FBC (a single EDTA tube), biochemistry and immunology or virology samples (a single serum tube)
  - local lab practices vary, however, so it is important to follow relevant local guidance
  - such combinations should be advised by your lab and disseminated by ICSs/CCGs to ensure all relevant clinicians are aware.

2.3.2 Ensure that good phlebotomy technique is used:

- Good preparation, trained phlebotomists, order of draw, adequate filling of blood tubes – this will help avoid haemolysis or inadvertent sample activation.

2.3.3 Ensure correct labelling (particularly when hand-writing labels, such as for transfusion samples – please refer to local laboratory requirements for transfusion sample labelling).

2.3.4 Ensure all tubes and request forms are double checked for errors before they are dispatched to the laboratory to avoid wasting tubes on rejected samples.

3. ICS/CCG-level response to the acute shortage

3.1 Referral pathways and protocols

3.1.1 We recommended that ICSs/CCGs review referral pathways and work with local referral services to rationalise local pre-referral work-up requirements:

- We suggest that ICSs/CCGs review clinical referral pathways requiring blood tests to agree with the referral services which test requirements can be safely omitted or deferred at the point of referral.
- This might include, for example: 2WW, memory clinic, haematology referrals, recurrent miscarriage clinics.
- For preoperative testing, please follow NICE guidance (NG45) and note that preoperative HbA1c testing and identification of anaemia are particularly important as they may change management.

3.1.2 Work with acute trusts to ensure that requests for follow-up blood testing in primary care are rationalised:

- We suggest that ICSs/CCGs review with acute trusts requests for follow-up blood testing after discharge to the community with a view to rationalising these in line with national minimum retesting intervals guidance.
- This might include, for example: requests and indications for monitoring of renal function; monitoring of therapeutic drug level and associated complications (including psychiatric drugs); routine postop follow-up blood tests (such as post-bariatric surgery routine follow-up bloods including for micronutrients such as selenium, copper or zinc).

3.2 Stock optimisation

3.2.1 Review all the recommendations provided and aim to reduce your use of blood tubes where appropriate.

3.2.2 Stock rotate your tubes to avoid tubes being wasted by going out of date.

3.2.3 Do not stockpile – continue your normal ordering, little and often to avoid any disruption to overall supplies.

3.2.4 If running short on stock, contact your CCG, laboratory or usual supplier – usually that is Primary Care Support England (PCSE). If the situation is not resolved by contacting the supplier, then local mutual aid should be explored via your CCG.

3.2.5 Engage fully in providing stocktake data when this is requested; the number of tubes held centrally and at individual GP practice or other sites. This will help ensure that everyone has adequate supply for urgent care.

3.2.6 Be prepared for calls to substitute specific tube orders for alternatives and requests to remove from use tubes which are in short supply, to enable fair distribution to other sites.

4. Guidance on blood test requesting during the current acute shortage

4.1 Patient communication and shared decision-making

4.1.1 Changes to patient testing should be made in consultation with individual patients. Make it clear that deferred tests will be carried out in the future where appropriate.

4.1.2 As part of conversations with patients make it clear that routine tests will be deferred only where it is clinically safe to do so.

4.1.3 Be open and honest with patients about the supply issue. Deferral of testing is not the practice's fault.

4.2 Indications for blood testing during the period of acute shortage

4.2.1 In the context of the acute shortage of blood tubes, there NHS England and NHS Improvement have provided additional guidance on reducing or deferring non-urgent blood tests.

4.2.2 This guidance also sets out important indications for requesting blood tests.

4.2.3 **Tests that are urgent and clinically indicated should not be delayed.**

4.2.4 In conjunction with the NHS England and NHS Improvement guidance, the following may be considered important indications for not deferring testing during the shortage period:

- a concern for cancer and making a 2-week wait referral
- acute disease where the lack of primary care confirmation would mean that the only other route is to attend ED/admit

- monitoring of DMARDs and lithium
- U&E in advance of planned **contrast** CT if not tested in the previous 3 months
- bloods that are extremely overdue and/or essential for safe prescribing of medication
- bloods that are essential for monitoring a new or existing condition
- vulnerable patients (with severe mental illness, a learning difficulty or dementia) if this will change management or where there is a risk that the patient will not attend again
- antenatal serology/fetal anomaly blood tests.

4.3 Guidance relating to specific tests during the blood tube shortage

4.3.1 Advice on QOF blood tests:

- NHS England and NHS Improvement have provided additional guidance specifically relating to testing during the period of acute shortage.
- Some QOF indicators relate to testing (see Appendix 1).
- Full guidance on QOF indicators is available here.

4.3.2 Vitamin D testing:

- Too much vitamin D testing is carried out routinely. We recommend that it is stopped except in the very exceptional circumstances set out in NICE CKS guidance..
- Examples of people who do not need routine testing for vitamin D:
  - asymptomatic people at higher risk of vitamin D deficiency, but they should be advised on the need for maintenance dose vitamin D supplementation
  - people with osteoporosis and fragility fracture who are treated with vitamin D supplements and an oral antiresorptive agent.
- Complex nutritional patients, such as those on home parenteral feeding, should have their annual vitamin D checks delayed unless clinically urgent and/or directed by the secondary care team.

4.3.3 Routine wellness screening:

- Routine wellness screening (eg for pre-diabetes or dyslipidaemia) is not a priority and especially if patients are in the acute phase of any illness.
- However, certain acute tests should be assessed as appropriate, and all acute patients assessed appropriately when recovered.Alternative evidence-based

interventions to promote wellness include Making Every Contact Count, nutrition, exercise and Moving Medicine.

4.3.4 Allergy testing:

- Allergy testing is not a priority at this time unless there are overriding clinical indications.

4.3.5 Routine infertility testing:

- Routine infertility testing should generally be deferred until the supply disruption has been resolved, with the exception of patients over 35 years of age in consultation with the individual patient.
- Where the patient is under 35 and there is a known cause of infertility, consider whether infertility testing can be delayed or not.
- If a patient of any age is undertaking fertility treatment and requires monitoring of bloods, tests should not be delayed.

4.3.6 Thyroid tests:

- Annual monitoring for thyroid replacement therapy can be deferred for an additional 3 months if stable. If dose has changed, then wait 2 months before repeating.
- Routine screening in asymptomatic patients should only be repeated after 3 years.

4.3.7 Lipid tests:

- Lipid levels for patients on statins for primary prevention do not require monitoring (except to confirm initial compliance/effect, eg after 3 months).
- In high-risk patients/those on a statin for secondary prevention, annual testing is advised (as detailed in the national minimum retesting intervals guidance and the summary table in Appendix 2).

4.3.8 Monitoring of DMARDs in rheumatology patients:

- The following provides a **suggested** approach to modifying DMARD monitoring protocols in the context of the acute shortage of blood tubes/testing capacity. **Local policies should be followed in discussion with appropriate rheumatology colleagues.**
- Patients who have been on treatment for <12 months and/or on their current dose for <6 weeks should continue to be monitored as per the standard shared care agreement schedule.

- For patients under shared care who have been on treatment for >12 months **and** where their last **two** blood monitoring tests have been normal **and** current dose has been stable for **3 months**:

Medication	Current monitoring schedule	Suggested modified schedule during shortage
Methotrexate (MTX)	3 monthly	**6 monthly**
Azathioprine	3 monthly	**6 monthly**
Mercaptopurine	3 monthly	**6 monthly**
Penicillamine	3 monthly	**6 monthly**
Leflunamide	3 monthly	**6 monthly**
Hydroxychloroquine	Nil	Nil

- No monitoring is required for patients on sulfasalazine after 1 year, based on current shared care schedule. For patients on treatment for <1 year, 3-monthly monitoring should continue.

4.3.9 Blood transfusion samples (group and screen):

- The National Blood Transfusion Committee (NBTC) has produced guidance relevant to transfusion-related testing and laboratory practices during the period of acute shortage.
- Clinical and laboratory transfusion staff should follow local policies, and laboratories and haematology departments are encouraged to review the NBTC guidance.
- Laboratories are encouraged to liaise with ICSs/CCGs to ensure that local practices and clinicians are aware of updated policies.

4.3.10 Genomics testing:

- Genomic testing remains a high priority, including for all referrals classified as urgent, genomic testing within the neonatal setting, prenatal screening and for cancer diagnosis. NHS England and NHS Improvement will issue this guidance to all genomics laboratory hubs.

4.3.11 Antenatal testing:

- Antenatal serology and fetal anomaly blood tests are time-sensitive and should not be delayed.

4.3.12 Blood-borne virus screening in high-risk populations:

- Screening for HIV and hepatitis B and C in high-risk groups should be done in accordance with BHIVA and NICE guidance, respectively. These are treatable conditions and delayed diagnosis contributes to poor outcomes and health inequalities.
- Care should be taken to minimise unnecessary repeat testing, however, especially if a previous positive result has been obtained (eg HIV or hepatitis).

4.3.13 Other tests:

- Blood tests may be deferred in the case of fatigue, post DEXA osteoporosis blood tests, amiodarone monitoring (if assessed in the previous 12 months).
- Nutritional and trace elements – check with laboratory before taking samples to ensure the correct tubes are used.

4.3.14 Blood tests as part of clinical research:

- Blood tests in the context of ongoing clinical research studies should not be disrupted where doing so would lead to deviation from the study protocol or risk invalidating the research. Where tests can safely be modified or omitted, this should be done in consultation with the appropriate research governance bodies.
- Please continue to follow the study protocol (without modifications or deviations) except where changes have been agreed in advance with the chief investigator.
- Where appropriate, we suggest that research groups advise primary care providers on the necessity of research blood tests and work with primary care to ensure adequate provision of blood tubes for research testing.

Appendix 1: QOF indicators related to testing

- **DM020:** The percentage of patients with diabetes, on the registers, without moderate or severe frailty in whom the last IFCC-HbA1c is 58 mmol/mol or less in the preceding 12 months (NICE 2018 menu ID: NM157).
- **DM021:** The percentage of patients with diabetes, on the register, with moderate or severe frailty in whom the last IFCC-HbA1c is 75 mmol/mol or less in the preceding 12 months (NICE 2018 menu ID: NM158).
- **DM022:** The percentage of patients with diabetes aged 40 years and over, with no history of cardiovascular disease and without moderate or severe frailty, who are currently treated with a statin (excluding patients with type 2 diabetes and a CVD risk score of less than 10% recorded in the preceding 3 years.
- **H011:** The percentage of patients with schizophrenia, bipolar affective disorder and other psychoses who have a record of a lipid profile in the preceding 12 months (in those patients currently prescribed antipsychotics, and/or who have pre-existing cardiovascular conditions, and/or smoke, and/or are overweight [BMI of ≥23 kg/m^2 or ≥25 kg/m^2 if ethnicity is recorded as White]) or preceding 24 months for all other patients (based on NM129).
- **MH012:** The percentage of patients with schizophrenia, bipolar affective disorder and other psychoses who have a record of blood glucose or HbA1c in the preceding 12 months (NICE 2015 menu ID: NM130).
- **NDH001:** The percentage of patients with non-diabetic hyperglycaemia who have had an HbA1c or fasting blood glucose performed in the preceding 12 months (NICE 2017 menu ID: NM150).

Appendix 2: Key primary care minimum retesting intervals guidance

The table below summarises key guidance for primary, community and outpatient secondary care and is adapted from National minimal retesting intervals in pathology (March 2021). This represents general best practice advice and is **not** specific to the exceptional period of acute supply shortage. Please refer to the full guidance for further detail.

The guidance below does not supplant clinical judgement: it is intended to highlight best practice recommendations, including some that relate to very specific situations, that may inform and support practice. It must be adapted as appropriate to the specific situation and the specific needs of the patient (taking into account any particular preferences, needs or characteristics they may have or any risks that may apply).

Renal		
Monitoring of ACE inhibitors or ARB therapy	Within 1 week of starting and 1 week after each dose titration, then annually (unless required more frequently because of impaired renal function)	NICE Clinical Knowledge Summary, 2019 *[Level of evidence – D]*
Diuretic therapy	Before the initiation of therapy and after 4 weeks, and then 6 monthly/yearly or more frequently in the elderly or in patients with renal disease, disorders affecting electrolyte status or patients taking other drugs (eg corticosteroids, digoxin)	NICE Clinical Knowledge Summary, 2019 *[Level of evidence – D]*
eGFR-EPI: CKD	Repeat in 14 days if new finding of reduced GFR and/or confirmation of eGFR* <60 mL/min/1.73 m^2 *eGFR by MDRD not valid in AKI	NICE CG182, 2014 *[Level of evidence – D]*
Bone and vitamin D		
Vitamin D request: no clinical signs and symptoms	Do not retest (except in very exceptional circumstances set out in NICE CKS guidance	Consensus opinion of the relevant expert working group *[Level of evidence – GPP]*
Biochemical testing in CKD-MBD: CKD stages 3–5	For stage 3b progressive, test bone profile every 6 months, PTH at baseline and 25OHVitD at baseline	The Renal Association, 2015[2]

[2] The Renal Association. *CKD-Mineral and Bone Disorders (CKD-MBD).* Bristol, UK: The Renal Association, 2015.

	For stage 4, test bone profile every 3 months, PTH every 6 months and 25OHVitD at baseline For stage 5, test bone profile every month, PTH every 3 months and 25OHVitD at baseline For stage 5D, test bone profile every month, PTH every 3 months and 25OHVitD at baseline	*[Level of evidence – GPP]*
Liver		
Non-acute setting	Testing at 1 to 3-month intervals	Smellie S et al ACB Venture Publications, 2011[3] *[Level of evidence – D]*
Initiating or changing therapies for primary or secondary cardiovascular disease prevention (LFTs)	3 months	NICE Clinical Knowledge Summary, 2019 *[Level of evidence – C.]*
Diabetes		
HbA1c screening for diabetes in asymptomatic patients	Adults <45 years old with normal weight and no risk factor: screening not recommended Adults >45 years old with normal weight (BMI <25 kg/m^2) and no risk factor*: 3 years Adults >18 years old with BMI ≥25 kg/m^2 and one risk factor*: 3 years, if result is normal *Risk(s) factors listed in Table 4 of *Diabetes Care* 2012; 35(S1): S11–S63	Position statement *Diabetes Care* 2012; 35(S1): S11–S63 *[Level of evidence – B]* *[Level of evidence – GPP]* *[Level of evidence – B.]*
Diagnosing diabetes using HbA1c in an asymptomatic patient (not to be used in children or young adults)	Diagnosis should not be made on the basis of a single abnormal plasma glucose or HbA1c value. At least one additional HbA1c or plasma glucose test result with a value in the diabetic range is required within 2 weeks of the initial measurement, either fasting, from a random (casual) sample or from the OGTT	WHO, 2011 *[Level of evidence – B]*
HbA1c monitoring of patients with type 2 diabetes mellitus (T2DM)	2 to 6-monthly intervals (tailored to individual needs) until the blood glucose concentration is stable on unchanging therapy; use a measurement made at an interval of <3 months as an indicator of direction of change, rather than as a new steady state 6-monthly intervals once the blood glucose concentration and blood glucose lowering therapy are stable	NICE NG28, 2015 *[Level of evidence – B]*
Lipids		

[3] Smellie S, Galloway M, McNulty S. *Primary Care and Laboratory Medicine, Frequently Asked Questions.* London, UK: ACB Venture Publications, 2011.

Low-risk cases for IHD assessment (primary prevention)	Lipids levels for patients on statins for primary prevention do not require monitoring (except to confirm initial compliance/effect)	Smellie WS *et al J Clin Pathol* 2005; 58: 1016–24 *[Level of evidence – D.]*
Higher risk cases for IHD assessment and those on stable treatment (secondary prevention)	1 year	Consensus opinion of the relevant expert working group *[Level of evidence – GPP]*
Initiating or changing therapies for primary or secondary prevention (include non-HDL cholesterol)	3 months	NICE Clinical Knowledge Summary, 2019 *[Level of evidence – B]*
Thyroid		
Thyroid function testing in a healthy person in the absence of any clinical symptoms	3 years	Consensus opinion of the relevant expert working group *[Level of evidence – GPP]*
Hypothyroidism: monitoring change in treatment	2 months (The minimum period to achieve stable concentrations after a change of dose of thyroxine is 2 months and TFTs should not normally be assessed before this period has elapsed)	Association for Clinical Biochemistry, British Thyroid Association and British Thyroid Foundation, 2006 *[Level of evidence – B]*
Hypothyroidism: stable long-term treatment	Annual (Patients stabilised on long-term thyroxine therapy should have serum TSH checked annually An annual fT4 should be performed in all patients with secondary hypothyroidism stabilised on thyroxine therapy)	Association for Clinical Biochemistry, British Thyroid Association and British Thyroid Foundation, 2006 *[Level of evidence – B]*
Monitoring adult subclinical hypothyroidism	Patients with subclinical hypothyroidism should have the pattern confirmed within 3–6 months to exclude transient causes of elevated TSH Patients with subclinical hypothyroidism who are ATPOAb positive should have TSH and fT4 checked annually Patients with subclinical hypothyroidism who are ATPOAb negative should have TSH and fT4 checked every 3 years	Association for Clinical Biochemistry, British Thyroid Association and British Thyroid Foundation, 2006 *[Level of evidence – B]*
Thyroid peroxidase antibody (ATPOAb)	Not routinely required	*[Level of evidence – GPP]*

	There is limited value in repeating ATPOAb testing following an initial positive result	
Patients on amiodarone	Should have thyroid function tested before starting treatment and then routinely monitored every 6 months thereafter while on treatment and up to 12 months after cessation of therapy	Association for Clinical Biochemistry, British Thyroid Association and British Thyroid Foundation, 2006 *[Level of evidence – B.]*
Patients on lithium	Thyroid function tested before starting treatment and then should be routinely monitored every 6–12 months while on treatment	Association for Clinical Biochemistry, British Thyroid Association and British Thyroid Foundation, 2006 *[Level of evidence – B.]*
Cardiac		
Using BNP (NT-ProBNP): primary care (heart failure triage)	Should only be measured once unless there is a repeat episode of suspected heart failure with a change in clinical presentation and the diagnosis of heart failure has previously been excluded. Single time point use adequate for NICE guidance purposes	NICE CG108, 2010 *[Level of evidence – A.]*
Iron deficiency and haematinics		
Iron deficiency diagnosis	Repeat iron measurement not required unless doubt regarding diagnosis	Goddard AF et al *Gut* 2011; 60: 1309–16 *[Level of evidence – D]*
Iron deficiency treatment	Check FBC 2 weeks post-iron therapy Once Hb normalised check FBC after 2 months	GAIN, 2015 *[Level of evidence – D]*
Iron profile/ferritin in a normal patient	1 year	NICE CG32, 2006 *[Level of evidence – A]* Smellie WS et al *J Clin Pathol* 2006; 59: 781–9 *[Level of evidence – D]*
Monitoring vitamin B12 and folate deficiency	Repeat measurement of vitamin B12 and folate is unnecessary in patients with vitamin B12 and folate deficiency However, vitamin B12 can be measured 1–2 months after starting treatment if there is no response Check FBC and reticulocyte count 10 days post-treatment for response. Once Hb is normalised, the minimum retesting interval is 8 weeks	NICE Clinical Knowledge Summary, 2019 GAIN, 2015 *[Level of evidence – D]*

Immunology, rheumatology and proteins		
ESR in temporal arteritis/polymyalgia rheumatica	Every 3 months following first month of treatment	Dasgupta B *et al* *Rheumatology* 2010; 49: 186–90 *[Level of evidence – B]*
Monoclonal gammopathy of undetermined significance	Test at 3 to 4-monthly intervals within the first year of identification. Then 6 to 12 monthly as long as no symptoms of progression	Bird J et al *Br J Haematol* 2009: 147; 22–42 *[Level of evidence – D]*
PSA screening	When first result is raised, repeat once in the following 6 weeks to assess the trend	Public Health England, 2019 *[Level of evidence – D]*
Monitoring disease with PSA	Every 3 months for first 1–2 years Every 6 months for 2 years Annually thereafter	Smellie WS *et al. J Clin Pathol* 2006; 59: 1116[4] *[Level of evidence – D]*
CRP	May be most informative, in the acute setting, at an interval of 48–72 hours Should not be retested within a 24-hour period following an initial request, with the exception of paediatric requests	Hutton HD et al *Ann Clin Biochem* 2009;46:155–8 *[Level of evidence – D]*
Supplemental advice		
INR	Use point of care testing (POCT) unless following local protocol for POCT malfunction	
D-dimer	D-dimer testing for VTE should be done in accordance with NICE guidance NG158, taking into account the clinical likelihood of VTE and the availability and timing of testing For people in whom DVT is likely (Wells score ≥2), D-dimer testing should be done if an initial ultrasound scan is negative or if an ultrasound scan cannot be obtained within 4 hours and further NICE guidance followed (NICE NG158 1.1.3–1.1.7) For people in whom DVT is likely (Wells score ≤1), a D-dimer test should be done and further NICE guidance followed (NICE NG158 1.1.8–1.1.11) For people in whom pulmonary embolism is unlikely (Wells score ≤4), a D-dimer test should be done and further NICE guidance followed (NICE NG158 1.1.21)	

[4] Smellie WS, Forth J, Sundar S, Kalu E, McNulty CA, Sherriff E et al. Best practice in primary care pathology: review 4. *J Clin Pathol* 2006; 59: 1116.

	D-dimer testing should not be done in patients in whom pulmonary embolism is likely (Wells score >4) D-dimer testing should only be done in patients in whom DVT is likely (Wells score ≥2) in accordance with the NICE guidance above D-dimer POCT should be considered where laboratory testing is not immediately available (eg in the primary care/community setting if not referring to same day emergency care or the emergency department) and does not need to be confirmed by lab sample testing, and should be used first line where available	
APPTr and other coagulation indices	Should be considered rarely as part of investigation for clotting disorders Seek haematology specialist advice in first instance, eg by advice and guidance or other local scheme	
Shared care drugs (eg methotrexate and ciclosporin)	Refer to local shared care guidelines	
Preoperative blood tests	Follow local and national protocols and NICE guidance NG180 In particular, preoperative HbA1c testing and identification of anaemia are important as they may change management	
Antinuclear antibodies (ANA) and other rheumatological autoimmune serologies	In many cases there is limited value in repeating these tests Rheumatology discussion/advice is advised	
COVID-19 serology		
COVID-19 anti-Spike (anti-S) serology	Criteria for access to neutralising monoclonal antibody therapies for prophylaxis or treatment of COVID-19 may include establishing COVID-19 seronegativity In this case, testing for anti-Spike (anti-S) IgM and IgG is indicated. If positive, this test should not be repeated except in exceptional circumstances	
COVID-19 anti-nucleocapsid (anti-N) serology	COVID-19 anti-nucleocapsid (anti-N) serology is a test specifically for immunity acquired from previous natural infection with COVID-19 (as opposed to immunity acquired by vaccination). This test is not indicated in the work-up for monoclonal antibody therapy	

See Appendix A of National minimal retesting intervals in pathology guidance for explanation of evidence levels.