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THE ROLE OF CRP POCT IN THE PRIMARY CARE SETTING

Advisory Board Summary Report

On the 19th of July 2023, eight clinicians came together for an advisory board to discuss C-reactive protein (CRP) as a point of care test (POCT) and the benefits it may provide in primary care clinical practice.

In the advisory board, we aimed to build a business case for CRP – identifying the benefits and mitigating the concerns – understand how to communicate the business case to the appropriate bodies and, finally, how to translate this into implementation.

DELEGATES



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EXECUTIVE SUMMARY

The World Health Organization (WHO) considers antimicrobial resistance (AMR) to be a significant threat to global public health which must be addressed by governments worldwide.¹ The UK government's current national action plan, "Confronting antimicrobial resistance 2024 to 2029", is part of a 20-year strategy for the containment, control and mitigation of AMR.² One of the key strategic outcomes of the plan is to improve diagnostics and treatment to reduce the need for and exposure to antimicrobials.² Clinically appropriate prescribing of antibiotic medications (Ab) is a key benefit of CRP POCT in contributing to the prevention of AMR. However, long-term benefits are often not prioritised by commissioning bodies, with short-term cost savings being the more influential factor.

The National Institute for Health and Care Excellence (NICE) has noted that C-reactive protein (CRP) point-of-care testing (POCT) can potentially be used as a cost-effective diagnostic intervention with regard to reduced antibiotic prescription but highlights that data on longer term impacts, including on AMR, are lacking, particularly as there is no agreed means of assessing impact.³ The findings of NICE agree with a recent systematic review of 12 unblinded trials with low or unclear risk of bias, which reported that use of CRP POCT likely reduced antibiotic prescription, with the evidence rated as moderate to high-certainty using the GRADE criteria.⁴ NICE highlight more accurate pathogen identification as a research goal that would result in better antimicrobial prescription practices and improved antimicrobial stewardship;⁵ while both such benefits should also lead to fewer inappropriate secondary care referrals, both NICE and the authors of the review agree that data on impact of CRP POCT on hospital admissions and mortality were insufficient to draw conclusions.^{3,4}

Highlighting of the potential benefits of CRP POCT adoption to integrated care boards (ICBs) could improve likelihood of uptake. However, studies of longer term benefits to the goal of antimicrobial stewardship and reduced Ab prescriptions are needed to validate such goals.

Despite cost being a prominent barrier to adoption, the faculty also highlighted concerns around perceived time required to run the test, availability of funding for devices, and education, as well as a lack of sufficiently strong guidance and a lack of reimbursed targets for Ab prescribing in primary care.

To overcome the concerns presented, the faculty suggested building a business case template for clinicians to communicate the cost of Ab prescribing for their region to their Area Prescribing Committee, to couple this with the clear improvements that can come from CRP POCT. The faculty felt that contacting patient charities for advocacy could contribute to building a strong local case. The faculty noted that stronger recommendations from NICE on the use of CRP POCT would be beneficial; however, the most recent NICE guidance suggests that CRP POCT should be considered only when it is unclear if antibiotic prescription is required.⁶

Regarding implementation, faculty discussed adoption in community pharmacy and acute respiratory infection (ARI) hubs as options to relieve GPs of the winter pressures; particularly as instating ARI hubs comes with ring-fenced funds that could extend to POCT machines. It was clear that guidance and standard operating procedures (SOPs) are needed to ensure testing accuracy and that clinicians can see the benefits of this new technology.



1. WHO. Antimicrobial resistance. 2023. Available online: <https://bit.ly/4fGWMwt> (accessed Aug 2024).

2. UK government. Confronting antimicrobial resistance 2024 to 2029. 2024. Available online: <https://bit.ly/46NpF66> (accessed Aug 2024).

3. NICE. [B] Evidence review for rapid tests to inform triage and antibiotic prescribing decisions. NG237. NICE, 2023

4. Smedemark et al. Cochrane Database Syst Rev. 2022;10:CD010130.

5. NICE. [D] Evidence summary for acute respiratory infection. NG237. NICE, 2023.

6. NICE. Suspected acute respiratory infection in over 16s: assessment at first presentation and initial management (NG237). National Institute of Health and Care Excellence. 2023.

BUILDING THE BUSINESS CASE FOR CRP POCT

THE IMPACT OF CRP POCT IN PRIMARY CARE ON AMR IS CLEAR, BUT COMMUNICATING THE SHORT-TERM BENEFITS IS CRUCIAL TO IMPLEMENTATION

AMR is associated with global mortality rates that are greater on average per year than that of the COVID-19 pandemic peak. The use of CRP POCT as a decision tool can reduce Ab prescribing and tackle this growing issue. The problem, however, lies with the perceived lack of immediacy of the impact of AMR, and thus it is not a priority within the NHS. To achieve implementation of CRP POCT in the primary care setting, communication of its short-term benefits is crucial so that commissioners recognise its advantages for the coming winter.

The main benefit of having CRP POCT is clinically appropriate prescribing of Abs. Despite this contributing to the AMR agenda, this can also change patients' behaviour towards their need for antibiotics. The faculty reported that having a numerical value of inflammation can remove diagnostic uncertainty for the clinician, while providing reassurance to the patient that they do not need an antibiotic. This improves the quality of care being given and the patient experience.

Moreover, in the opinion of the advisors, this patient reassurance could potentially reduce the number of appointments in two ways: (1) immediate reductions in the numbers of patients seeking second opinions or seeking Abs from other GP practices or urgent care centres, and (2) reduction in patients booking appointments for minor illnesses as they know that, from previous appointments with CRP POCTs, they will not be given Abs. For the latter point, this POCT is used as an educational tool to show patients when their illness is self-limiting and drive the behavioural change that will reshape the patient's expectation for an Ab prescription. The result is a win-win, as the patient is being educated then and there, and there will be more available appointments for unwell patients as we move into the colder months.

The advisors felt that the reassurance to both the clinician and patient can improve the flow and quality of care on a local level and across the whole system; firstly, with potentially fewer admissions into secondary care, but also through a reduction in harm to patients. Achieving diagnostic certainty with just a small additional step means that an accurate decision can be made at the time of consultation and patients are appropriately admitted to hospital, thus reducing pressures in the overall system. Furthermore, one faculty member highlighted that lower Ab prescribing can reduce harm to patients; for patients with allergies, the alternative

macrolides and fluoroquinolones antibiotics have considerable side effects, including cardiac death. Therefore, CRP POCT can potentially contribute to reduced appointments and admissions, as well as general improvements in work flow and quality of patient care.

THE CRP POCT BUSINESS CASE WILL RELY ON MITIGATION OF CONCERNS

The faculty reported little concern around the accuracy of CRP POCT; research conducted in the Netherlands shows very accurate results even when tests for inflammation status don't necessarily require high sensitivity. The top three barriers reported were time needed to run tests, funding for devices, and education.

THE FACULTY FELT PERCEIVED TIME WOULD BE A BARRIER TO CRP POCT IMPLEMENTATION

Due to the restriction of a ten-minute appointment in primary care, a lack of time is often used to challenge the implementation of new technologies. However, the faculty emphasised that this was an issue of perceived time; in fact, Advanced Nurse Practitioners (ANP) or members of admin teams can be trained to perform the POCT. When uncertainty arises, the GP can send a patient for their CRP POCT with an ANP, and patients can be sent directly home if their CRP is in the normal range. Guidance on how this fits into the work flow would be required to utilise GP time most effectively.

Dr Rogier Hopstaken explained that, in the Netherlands, they use, on average, three to five tests per week. Therefore, this slight increase in consultation time will not amount to much overall and there is little fear of overusing the device.

CONFIDENCE IN INTERPRETING RESULTS WILL IMPACT THE USEFULNESS OF CRP POCT

Due to staff shortages across the NHS, there are more primary care clinicians with less experience and less confidence. It was stated that, for respiratory conditions, a 1% decrease in GP confidence can double to triple the number of hospital admissions; therefore, it is imperative that sufficient education and training is given to avoid this.

There is a large grey area on a CRP result between 20 and 100 where this lack of confidence can take the greatest effect. Clinicians should be advised to use the result to add to their clinical notes and build their diagnosis; it should add to their confidence, not reduce it. There is a need for guidance that conveys CRP results are not a

prognostic tool alone, but instead must be considered along with patient history and presentation. Education and training on the meaning of CRP results for differing patients, such as age or level of frailty, is key to ensuring safe decision-making.

To ensure that CRP is not used definitively, many of the faculty mentioned the use of safety net procedures. Where Abs are not prescribed, advice is given to patients on symptoms for which they should return. This means that Ab prescriptions are delayed in order to see if the patient will improve on their own but, if they worsen, clear advice is given to return to the GP or seek emergency care. This should be included in guidance set out for CRP POCT to assure quality of care.

GUIDANCE FROM NICE IS INSUFFICIENT TO ENSURE UPTAKE

Currently, the National Institute of Health and Care Excellence (NICE) states that CRP POCT should be considered for patients with symptoms of lower respiratory tract infection if a diagnosis is not clear after clinical assessment. However, the faculty stated that this recommendation is insufficient to drive change, and the ‘should consider’ must become ‘should use’ for commissioners to take action.

One issue to be addressed within the system is that, if CRP POCT is to be mandated by NICE, then access to the devices across the country is imperative. In this case, it is most likely that CRP POCT will be used in ARI hubs, as there will be funding set aside for this change in structure.

A LACK OF TARGETS ON AB PRESCRIBING MEANS THAT COMMISSIONERS DO NOT PRIORITISE THIS

The development of targets relating to AMR and Ab prescribing can incentivise clinicians and ensure monitoring from NHS England (NHSE). An example of this were the targets associated with Methicillin-resistant *Staphylococcus aureus* (MRSA) and *Clostridium difficile*; when these were put in place for commissioners, Ab prescribing dropped as this was monitored from above.

The Quality and Outcomes Framework (QOF) is one of the most important frameworks for primary care, and so would be highly influential if it added a target for Ab prescribing. With evidence that CRP POCT reduced Ab prescribing, this incentive could fuel its implementation and its funding. The faculty suggested that if

reductions in Ab prescribing were in the GP contract, then GPs could get reimbursed for their CRP POCT devices and cartridges in this way. Further to QOF, primary care can also be incentivised at a more local level through Local Enhanced Service (LES) or Direct Enhanced Service (DES) contracts.

For targets that can already be leveraged, the NHS Long Term Plan aims to target increased hospital admissions through the winter months. In the colder northern regions of England, this will be a particularly prominent argument as these are also the more deprived areas of England that are missing their national targets. This will link in well with care inequality targets in the NHS to ensure better quality of care through winter in the colder regions.



COMMUNICATING THE BUSINESS CASE TO KEY DECISION-MAKERS

It is clear that the recommendation of CRP POCT in NICE guidelines will impact its use. Nevertheless, without sufficient funding this effort is frivolous. So, who are the key decision-makers for the funding of CRP POCT?

NHSE can provide funding to the ten regions if they are convinced to take action in a particular area. The faculty explained that, in this circumstance, the technology may be funded for up to two years, at which point the funding is withdrawn and the regions' existing resources must take over. However, the existing resource is often insufficient to continue such programmes; the issue with trying to obtain funding for additional technologies is that there is no new money in the system, meaning it must be diverted from one place to another. The faculty concluded that this must be instated at an integrated care board (ICB) level.

Other stakeholders with considerable influence are patient organisations and charities. Bringing in the patient voice with backing from such groups would provide an additional level of persuasion.

FUNDING FOR CRP POCT IS THE BIGGEST BARRIER TO ITS ADOPTION IN PRIMARY CARE

Since the healthcare system works in one-year financial cycles, and therefore recognises financial savings that are achievable now, the cost of AMR will not be sufficient to win this argument alone. Using CRP POCT to change patient behaviour now could reduce presentations in the winter. A potential reduction in hospital admissions could also be an important cost saver but requires a systemwide approach, so that cost savings are recognised across both primary and secondary care.

Potential reductions in mortality rates and resistance rates are also key. The Netherlands has the lowest Ab prescribing rates, which corresponds to the lowest resistance rates for Strep A and pneumonia.

HOW CAN WE COMMUNICATE THE IMPORTANCE OF LONG-TERM AMR COSTS?

With AMR not being considered an immediate priority, communicating the cost argument to commissioners is difficult considering the low-cost price of Abs. However, the faculty reported findings showing accurate predictions that the cost of AMR by 2025 will surpass the costs of the first year of the

COVID-19 pandemic. It is even more concerning that some basic infections currently require secondary care antibiotics to resolve; the development of new antimicrobial treatments to replace those to which resistance has been developed costs approximately \$5bn. The key message mustn't be about developing new Abs, but the better use of existing ones. Therefore, the financial business case for CRP POCT must include the long-term costs of AMR at the forefront.

The long-term cost argument can be communicated to commissioners and NICE through economic modelling. The faculty highlighted three NICE economic outcome evaluations where data are missing: (1) the cost of AMR, (2) the cost of antibiotics avoided in a certain scenario, (3) the cost of every antibiotic prescription to AMR. Since Abs are very low cost due to their generic nature, mounting an economic argument will need to show at which point the cost of Ab prescriptions to AMR surpasses the cost of implementing CRP POCT.

PROVISION OF A BUSINESS CASE TEMPLATE COULD HELP CLINICIANS MAKE THE ARGUMENT TO COMMISSIONERS

The faculty agreed that the development of a template whereby clinicians could model amalgamated costs for their demographic and present this to their Area Prescribing Committee would be very useful. Furthermore, partnering this with a directive that shows the evidence for CRP POCT would equip clinicians with information on both the problem and the solution. This would need to include information on the clinical benefits, as well as statistics to mitigate practical and financial concerns.

Guidance or examples of this can be obtained from the UK Government Treasury, which shows how to build strategic, economic, and financial cases. The faculty noted that, to be most persuasive, a business case should include a case study example showing the problem, the solution, and the financial saving. This can then be backed by the evidence base for CRP POCT.



WHAT COULD IMPLEMENTATION OF CRP POCT LOOK LIKE IN PRIMARY CARE?

The faculty discussed how implementation of CRP POCT might fit into the primary care system, looking at community pharmacies and ARI hubs. ARI hubs would be an excellent way to take the pressure of respiratory infection away from GPs and, in this case, funds would be ring-fenced to support this new service. Community pharmacy is also an option for implementation with guidance for commissioners and community pharmacies on POCT already available from the NHS. Both options would relieve GP pressures and the barrier of perceived time in a ten-minute GP appointment would be negated.

Another suggested approach was how to further utilise the diagnostic capacity of the POCT machines. Due to a shortage of nurses in the NHS, many diabetic patients turn up for their assessment without having their preassessment bloods taken, resulting in a wasted appointment. Combining the use of the POCT machine to include both CRP and HbA1c testing would increase the cost effectiveness. The faculty also suggested that the ability to lease machines is very beneficial, particularly if the cartridges came as a block contract.

SOPS ARE REQUIRED FOR SAFE IMPLEMENTATION OF CRP POCT

For successful implementation, services must understand how to operationalise POCT at a local level and manage the associated risks. Lack of oversight and standardisation of data collection is one of the biggest downfalls in POCT. Despite the high accuracy

of the tests, results from the early value assessment through NICE show POCTs have failed due to clinicians not believing the result or not knowing how to act on the result. It is imperative that clinicians have a positive experience using POCTs in order to increase their confidence in using them, and thereby allowing them to see the benefits. This requires comprehensive clinician training accompanied by thorough SOPs and quality measures.

The Netherlands have provided an example of implementation, providing e-learning materials on scientific evidence of CRP POCT, video clips of how to fit it into the consultation, and conversation guides to help doctors see the benefit of including the test in their assessment.

Following from the ENASPOC conference, Dr Rogier Hopstaken explained that in the Netherlands, the local pathology system is responsible for oversight of the POC service in a 'hub and spoke' model. In this model, expert laboratory staff are responsible for quality assurance of the POCT machines, thereby relieving practice staff of this additional task and utilising expertise within the system. It may be a challenge to motivate pathologists and microbiologists to come out of the laboratories, but they have the skills to add value elsewhere. The faculty concluded that the NHS does not use enough of its experts in diagnostic testing and if we can learn from the Netherlands, then this could smooth the pathway to adoption of CRP POCT.

RECOMMENDATIONS

- 1 It is necessary to economically model the long-term benefits to the AMR agenda to obtain cost data for NICE and commissioners**

Since the NICE recommendation for CRP POCT is only to consider its use, data presenting the long-term cost savings to regulatory bodies must be gathered. This includes data on (1) the cost of AMR, (2) the cost of antibiotics avoided in a certain scenario, (3) the cost of every antibiotic prescription to AMR. Equally, consulting the research recommendations provided by NICE would be beneficial to shaping future studies to adequately fill the research gaps identified.⁵


- 2 Short term benefits of CRP POCT in reducing antibiotic prescription have been acknowledged by NICE; however, robust data on the impact on hospitalisation and mortality are needed**

The most recent guidance by NICE suggests considering the use of CRP POCT but does not make a stronger recommendation owing to a paucity of data on its impact on rates of hospitalisation and mortality. Well designed studies that take into consideration the requirements of the NICE research recommendations, established as a medium national priority, should provide the basis of a stronger recommendation by NICE.


- 3 Implementation will likely be in ARI hubs initially as funding will be allocated here; however, it would also be well placed in community pharmacies to reduce pressures on GPs**

The NHS should consider backing the roll out of ARI hubs and supporting community pharmacies to reduce the ever-growing respiratory pressure on GPs, particularly moving into the winter. Having CRP POCT to support decision-making should be considered at the ICB level to reduce hospital admissions and reduce the impact on AMR through appropriate antibiotic prescribing.


- 4 Implementation will require thorough education and creation of SOPs to maintain clinician confidence**

There is a need to develop clear and thorough guidance in the form of SOPs for clinicians, to ensure accurate and safe use. Proper use of the CRP POCT machines will increase clinician confidence in the new technology and ensure they have a positive experience. In the Netherlands, training was given through e-learning modules, videos on fitting the test into the consultation work flow, conversation guides, and guidance on how the CRP result should shape decision-making.


- 5 There are many CRP POCT advocates within the NHS, creating a clear business case template could help them to present data to commissioners**

With many CRP POCT advocates pushing for its implementation across the NHS, industry should consider providing support through a business case template. This must communicate the immediate benefits of implementation, as well as the significant impact that AMR is predicted to have. With the cost of AMR exceeding that of COVID-19, equipping champions with the tools to keep presenting the case to their ICBs can help to keep commissioners engaged.



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