Healthcare Improvement Scotland

Evaluation of C-reactive protein in primary care settings to support reduction of antibiotic prescribing for self-limiting respiratory infections

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ISSUES WITH MANAGING RESPIRATORY TRACT INFECTIONS IN PRIMARY CARE

- Patient expectations
- Diagnostic uncertainty
- Decision fatigue
- Targets to reduce unnecessary antibiotic use

PNEUMONIA IN ADULTS: DIAGNOSIS AND MANAGEMENT – NICE CG191

For people presenting with symptoms of lower respiratory tract infection in primary care, **consider a point of care C-reactive protein test** if after clinical assessment a diagnosis of pneumonia has not been made and it is not clear whether antibiotics should be prescribed.

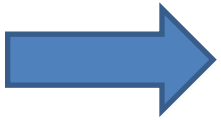
Use the results of the C-reactive protein test to guide antibiotic prescribing in people without a clinical diagnosis of pneumonia as follows:

- Do not routinely offer antibiotic therapy if the C-reactive protein concentration is less than 20 mg/litre.
- Consider a delayed antibiotic prescription (a prescription for use at a later date if symptoms worsen) if the C-reactive protein concentration is between 20 mg/litre and 100 mg/litre.
- Offer antibiotic therapy if the C-reactive protein concentration is greater than 100 mg/litre

https://www.nice.org.uk/guidance/cg191?unlid=38265691201622116555

C-REACTIVE PROTEIN

- Biomarker of infection which is part of the acute phase response to acute tissue injury regardless of the aetiology (infection, trauma and inflammation)



Surrogate marker of infection

- Evidence supports the clinical and cost-effectiveness of CRP testing for management of lower respiratory tract infections in primary care
- CRP is standard of care in some European countries
- CRP testing also recommended in Public Health England (PHE) primary care guidance (May 2016) for acute cough bronchitis
- Test takes 3.5 minutes so can be utilised within GP consultations to inform clinical management

EVIDENCE FOR CRP TESTING

- *Jensen A R et al, Biomarkers as point-of-care tests to guide prescription of antibiotics in patients with acute respiratory infections in primary care (Review) Cochrane Collaboration 2014*
- *Cooke J et al, Narrative review of primary care point-of-care testing (POCT) and antibacterial use in respiratory tract infection (RTI). BMJ Open Resp Res 2015;2:e000086*
- *Cals J W L et al, Point-of-Care C-Reactive Protein Testing and Antibiotic Prescribing for Respiratory Tract Infections: A Randomized Controlled Trial, Ann Fam Med 2010;8:124-133*
- *Oppong R et al. Cost-effectiveness of point-of-care C-reactive protein testing to inform antibiotic prescribing decisions Br J Gen Pract. 2013 Jul; 63(612): e465–e471*
- *Hunter R, Cost-Effectiveness of Point-of-Care C-Reactive Protein Tests for Respiratory Tract Infection in Primary Care in England. Adv Ther (2015) 32:69–85*
- *Andreeva A, Melbye H, Usefulness of C-reactive protein testing in acute cough/respiratory tract infection: an open cluster-randomized clinical trial with C-reactive protein testing in the intervention group, BMC Family Practice 2014, 15:80*
- *Howick J et al, Current and future use of point-of-care tests in primary care: an international survey in Australia, Belgium, The Netherlands, the UK and the USA, BMJ Open 2014;4:e005611*
- *Huddy J R et al, Point-of-care C reactive protein for the diagnosis of lower respiratory tract infection in NHS primary care: a qualitative study of barriers and facilitators to adoption, BMJ Open 2016;6:e00995*

WHEN IS CRP USEFUL?
WHAT ABOUT USING PROCALCITONIN?

- Evidence base supports use in LRTI
- Work underway in children presenting to Out-of-hours settings (mainly with URTI) and in patients with COPD exacerbations (anticipatory care).

- **Procalcitonin** also useful biomarker for infection but evidence only established in hospital practice – mainly in ICU to assess response to treatment and inform when antibiotics can be stopped.
- Early trials in primary care underway.
- Test takes about 20 minutes for a result so logistics of use in primary care would need different model to CRP

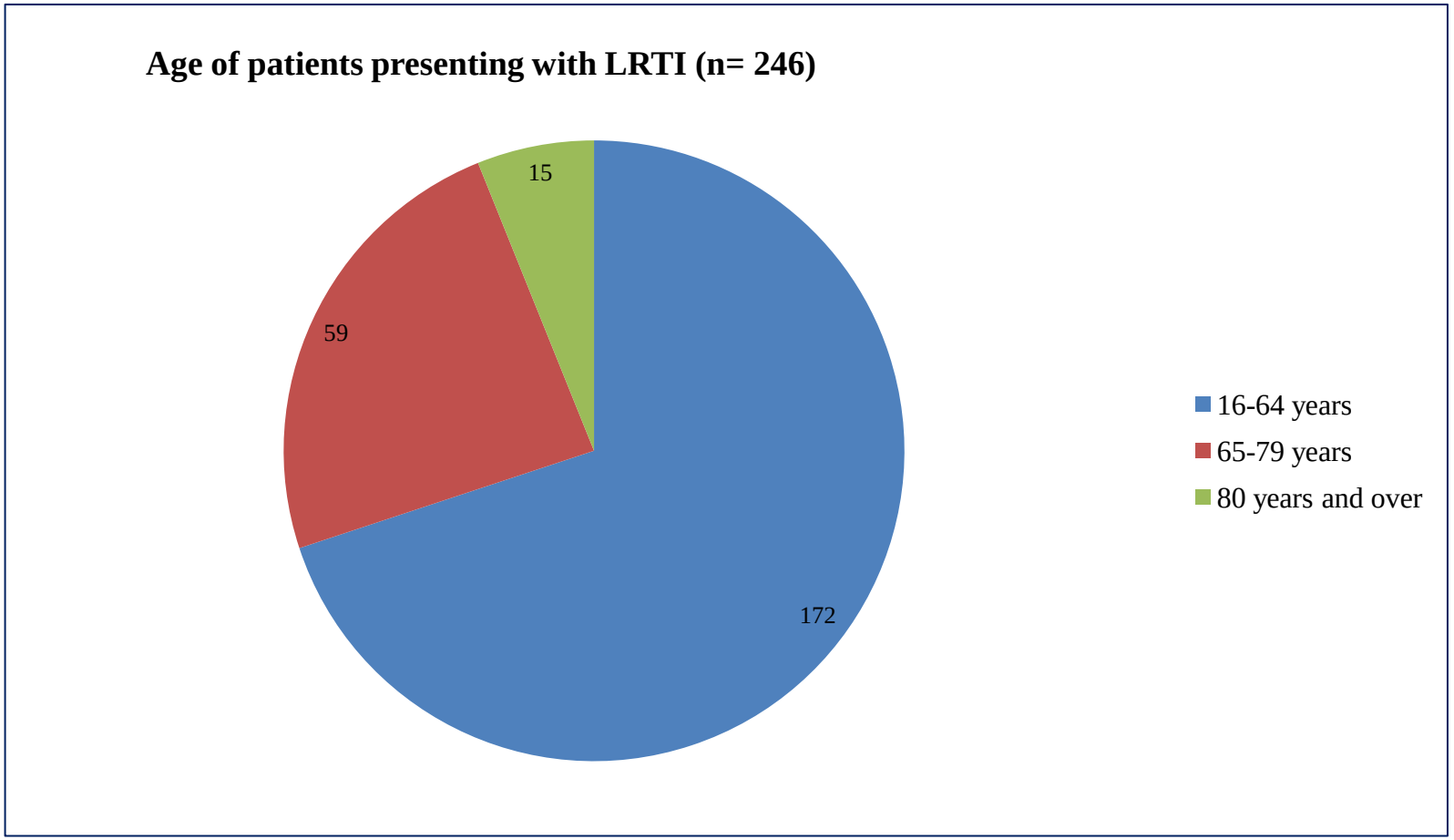
SAPG STUDY

AIM - to evaluate the feasibility of using CRP to support clinical decision-making in lower respiratory tract infections in GP practices in Scotland.

METHOD

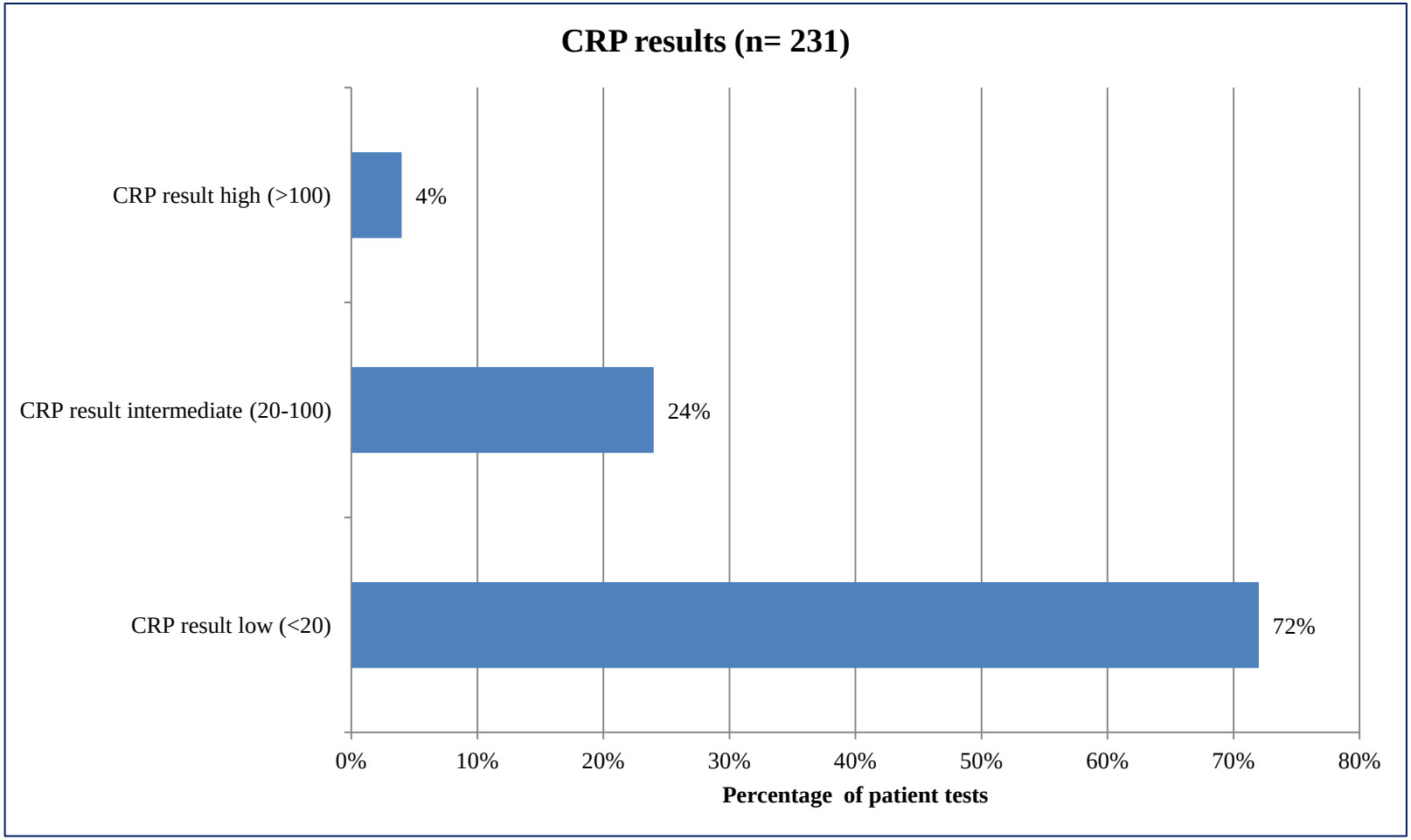
- Study steering group established to advise on methodology and governance issues.
- Ten GP practices recruited across four NHS board areas to take part in study.
- Alere Afinion® instruments provided on loan and training provided within each practice.
- Test strips ordered by practices and funded by SAPG (£3.50 per test).
- CRP testing used with patients presenting with suspected LRTI for at least 4 weeks during the period November 2015–February 2016. NICE CRP thresholds used.
- Data on patient demographics and decision to prescribed or not collected during consultations.
- On-line survey used to gather feedback on practical aspects of how the test was used and its perceived impact on GP decision-making and prescribing of antibiotics.

RESULTS - PATIENTS PRESENTING WITH LRTI



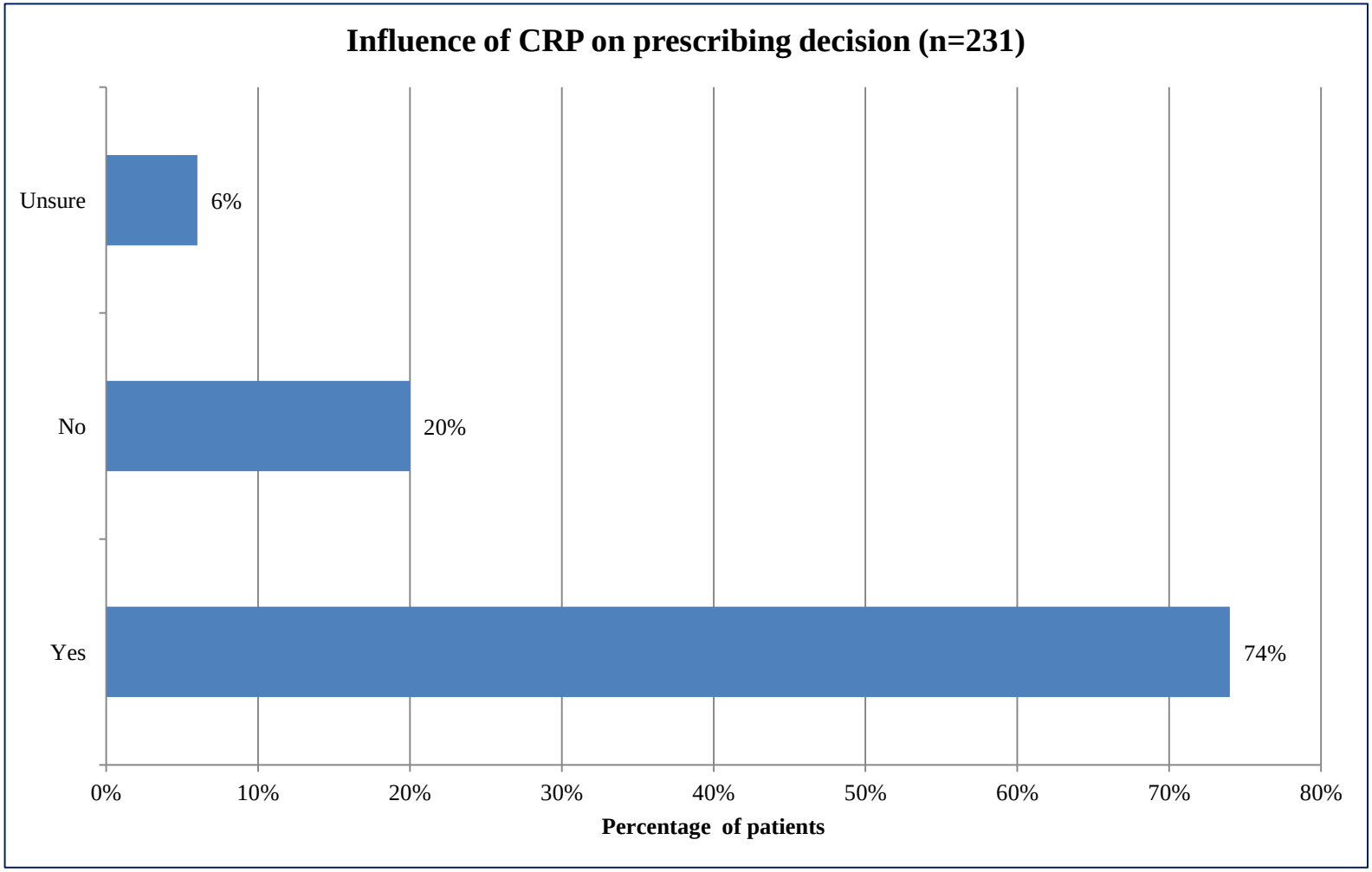
18% of patients had COPD

CRP TEST RESULTS

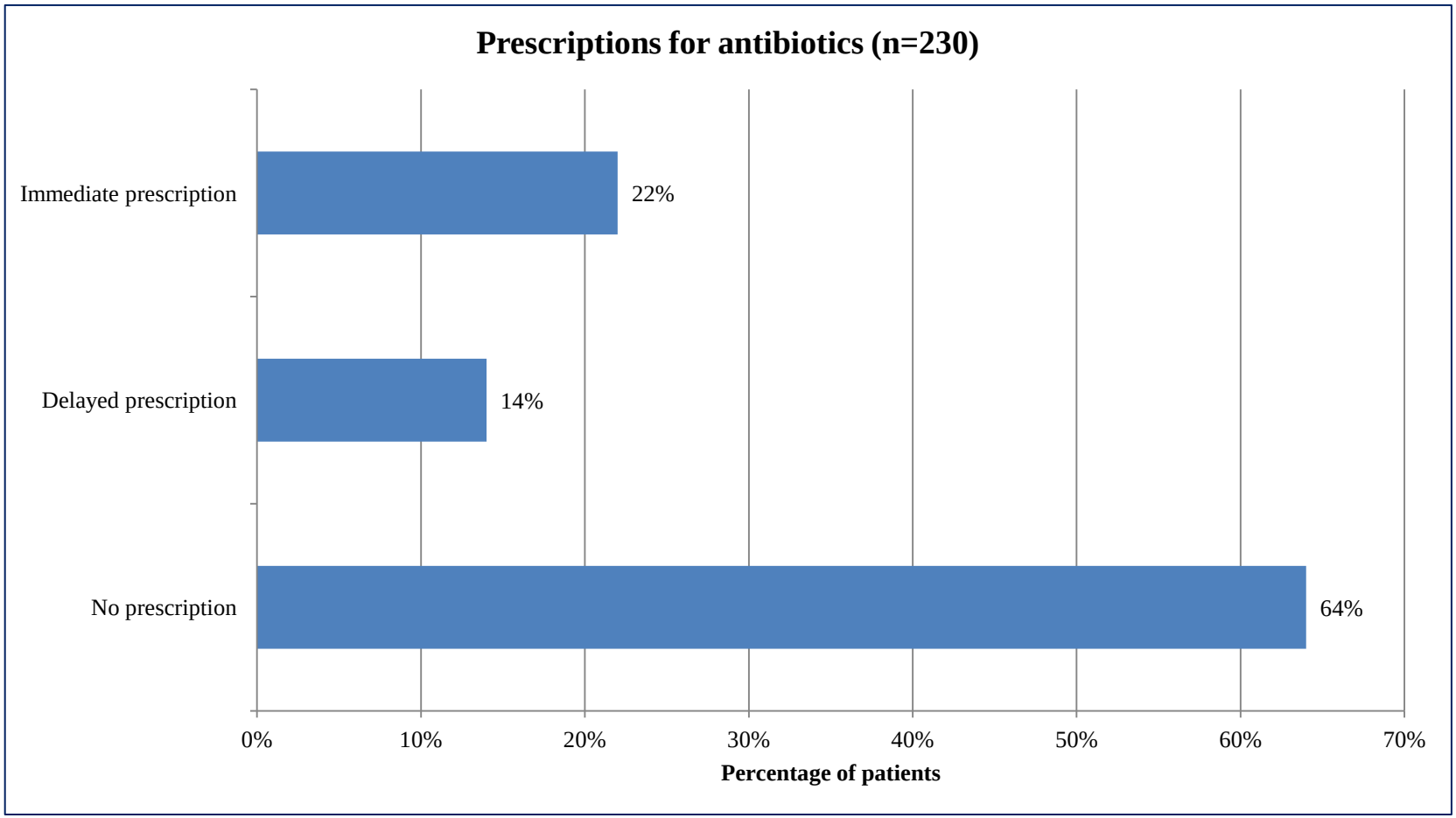


For 15 patients (6%) there were problems with instrument error message so no result recorded

DID CRP TEST RESULT AFFECT DECISION MAKING?



HOW DID CRP INFLUENCE PRESCRIPTIONS?



One patient referred to hospital as high CRP

FEEDBACK SURVEY – USING AFINION INSTRUMENT

- Completed by 15 GPs.
- Training provided was sufficient but suggestion for a training DVD to provide a refresh on details of user technique.
- Most respondents found test easy to use.
- Three respondents reported having problems with user technique e.g. not using adequate blood sample, getting air bubble in cartridge.
- A few respondents suggested the need to switch on to warm up for 15 minutes and 3+ minute wait for result were potential barriers although this became easier with use.
- A variety of models were used; 4 GPs carried out tests themselves, 8 had test carried out by a practice nurse and 3 used a combination of both approaches.

IMPACT ON CLINICAL PRACTICE

- All respondents found it easy to identify patients with LRTI.
- Proportion of consultations where CRP test influenced the decision to not prescribe antibiotics

Proportion of patients	No. GPs (% GPs)
<25%	3 (20.0%)
25-50%	3 (20.0%)
51 – 75%	5 (33.3%)
>75%	4 (26.7%)

- Several respondents commented that using the test improved patient engagement and supported them in not prescribing to back up their assessment of clinical symptoms

PERCEIVED IMPACT ON PATIENTS

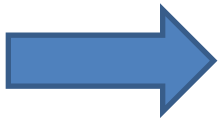
- Most respondents thought their patients found the results of the CRP test an additional reassurance to their clinical diagnosis
- Nine (60%) of respondents found the test helpful in dealing with difficult patients who insisted on an antibiotic
- Other potential benefits identified by some respondents were:
  - increased use of delayed prescriptions for LRTI
  - reduced number of patients seeking a second appointment with the same symptoms

SUMMARY OF EVALUATION

- Overall respondents were positive about the benefits of using CRP testing.
- The main practical concern was the additional time that the test adds to a consultation, 3.5 minutes for the test plus time to explain test to patient is significant within a 10 minute consultation.
- A portable instrument would be of interest for home visits and in care homes, particularly for patients with COPD where exacerbations are often treated with antibiotics despite uncertainty about whether there is an infection.
- Patient experience of the test was positive as it provided reassurance when no antibiotic was required especially for ‘worried well’ patients.
- The majority of respondents would like to see CRP testing used routinely but there were some concerns about cost effectiveness.

WHAT HAPPENS NEXT?

- Study results presented to Controlling Antimicrobial Resistance in Scotland (CARS) group, chaired by CMO



discussions underway within Scottish Government about further testing/roll out.

- Results shared with colleagues in other UK nations trialling or implementing CRP testing.
- Results presented as poster at RCGP and FIS conferences and as presentation at Antibiotic Guardian road show in London.

RECENT STUDIES ON CRP

RCGP conference

- Reduced antibiotic prescribing and unscheduled re-attendance by implementation of CRP point of care testing for acute LRTI in a nurse-led clinic - 67 patients (18-65 years)
- Near-patient CRP testing – a game changer antibiotic prescribing?– 3-month study in primary care using 606 tests resulted in 30% reduction in antibiotic prescriptions

Publications

- Should all acutely ill children in primary care be tested with point-of-care CRP: a cluster randomised trial? Restrict to those with high risk of serious infection. Verbakel et al. BMC Medicine (2016) 14:131
- Point-of-care C-reactive protein testing to reduce inappropriate use of antibiotics for non-severe acute respiratory infections in Vietnamese primary health care: a randomised controlled trial - 1028 children and 1009 adults. Lancet Global Health 2016; 4: e633–41
- Evaluating a point-of-care C-reactive protein test to support antibiotic prescribing decisions in a general practice – 94 patients. Clinical Pharmacist, October 2016, 309-318

DRUG AND THERAPEUTICS BULLETIN OCTOBER 2016

Point-of-care CRP testing in the diagnosis of pneumonia in adults

Conclusion

Lower respiratory tract infections are common, and vary between mild, self-limiting viral conditions to bacterial infections carrying a risk of severe complications. These conditions are hard to discriminate on clinical grounds only, and standard tests such as x-rays or laboratory blood tests require time to complete and to receive results. C-reactive protein (CRP) is a biomarker that is raised in acute tissue injury, and is particularly high during bacterial infection.

The use of CRP testing may reduce unnecessary antibiotic prescribing (which carries a risk of adverse effects and the development of antibiotic resistance), while targeting antibiotic therapy to patients most likely to benefit from it. A CRP test should be considered only when there is doubt about the need for antibiotics after a clinical assessment. The test is not necessary when the patient's condition clearly dictates a course of action, nor is it appropriate to use it when the patient has significant comorbidity.

Point-of-care (POC) CRP tests have been shown to produce results similar to laboratory-based CRP tests when compared under controlled conditions. A POC CRP test may be advantageous when a rapid result is needed to guide treatment choice. Nevertheless, there are likely to be significant issues relating to the adoption of POC CRP testing in primary care, including funding of the testing equipment and consumables, user training and ongoing quality control. Rapid uptake of POC CRP testing in primary care seems unlikely in the absence of a funded implementation programme.

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ACKNOWLEDGEMENTS

- Scottish Government HAI Task Force (now SARHAI Strategy Group) – for funding the study
- Alere Ltd – for supplying Afinion analysers
- Study reference group – for advice on study set up
- SAPG members – for recruiting GP Practices
- GP Practice staff in NHS GGC, Lothian, Tayside and Highland

THANK YOU

http://www.scottishmedicines.org.uk/files/sapg1/Executive_summary_Evaluation_of_CRP_testing_in_primary_care_July_2016.pdf