# How did a Quality Premium financial incentive influence antibiotic prescribing in primary care? Views of Clinical Commissioning Group and general practice professionals

**Running title:** Quality Premium implementation and mechanisms

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## Synopsis

**Background:** The Quality Premium (QP) was introduced for Clinical Commissioning Groups (CCGs) in England to optimise antibiotic prescribing, but it remains unclear how it was implemented.

**Objective:** To understand responses to the QP and how it was perceived to influence antibiotic prescribing.

**Methods:** Semi-structured telephone interviews with 22 CCG and 19 general practice professionals. Interviews were analysed thematically.

**Results:** The findings were organised into four categories. (1) *Communication*: was perceived as unstructured and infrequent and CCG professionals were unsure whether they received QP funding. (2) *Implementation*: was influenced by available local resources and competing priorities, with multi-faceted and tailored strategies seen as most helpful for engaging general practices. Many AMS strategies were implemented independently from the QP, motivated by quality improvement. (3) *Mechanisms*: the QP raised the priority of antimicrobial stewardship (AMS) nationally and locally, and provided prescribing targets to aim for and benchmark against, but money was not seen as reinvested into AMS. (4) *Impact and sustainability*: the QP was perceived as successful but targets were considered challenging for a minority of CCGs and practices due to contextual factors (e.g., deprivation, under-staffing). CCG professionals were concerned with potential discontinuation of the QP and prescribing rates levelling off.

**Conclusions:** CCG and practice professionals expressed positive views of the QP, and associated prescribing targets and feedback. The QP helped influence change mainly by raising the priority of AMS and defining change targets rather than providing additional funding. To maximise impact, behavioural mechanisms of financial incentives should be considered pre-implementation.

## Introduction

Improving the use of antimicrobials is key to delay development of antimicrobial resistance.[1,2] Many antimicrobial stewardship (AMS) interventions aim to optimise use, type, dose and duration of antibiotics.[3,4]

One national intervention to optimise antibiotic prescribing in England is the 'Quality Premium' (QP) scheme for Clinical Commissioning Groups (CCGs) (i.e. organisations responsible for commissioning services in the National Health System (NHS)). The QP incentivises CCGs to improve the quality of primary care services they provide locally, including patient health outcomes, access to services and reducing health inequalities.[5] The Department of Health introduced the QP in 2013 with measures covering national and local priorities (e.g., mental health, cancer diagnosis, patient experience), each with a set of specific targets. Where each target is achieved, the CCG is eligible for the specified percentage of the overall QP payment. However, the QP payment could be reduced or withheld if other quality or financial criteria (e.g., overspent budget, serious quality failure) are not met. As part of the UK Five Year Antimicrobial Resistance (AMR) Strategy,[6] the QP has included measures for improving antibiotic prescribing since 2015, constituting 10-17% of the overall QP payment, with targets to reduce antibiotic prescribing and optimise the choice of antibiotic (Supplementary Document 1).

CCGs could choose to implement any interventions they considered appropriate to meet the QP. In 2014 only 13% of CCGs reported having an AMS action plan.[7] A recent survey on AMS interventions showed that CCGs used a wide range of interventions.[8] Since April 2015, relative to the pre-QP trends, antibiotic prescribing in general practices decreased by 8.2% and prescribing of broad-spectrum antibiotics by 18.9%,[9] and for respiratory tract infections by 3% and 2%, respectively.[10] This suggests a positive impact of the QP. However, it

remains unclear how the QP was implemented by CCGs and how this influenced prescribers' behaviour.

This qualitative study aimed to explore the experiences of professionals from CCGs and general practices in England of implementing the QP and/or associated AMS interventions, and their views on the QP's role in influencing antibiotic prescribing.

## Methods

The study was approved by the University of Oxford Central University Research Ethics Committee (ref. R53960) and the NHS Health Research Authority (ref. 230479). A COREQ reporting checklist is presented in Supplementary Document 2.[11]

### *Participants*

CCG professionals responsible for AMS within CCG Medicines Management/Optimisation teams were identified for 209 CCGs in England (i.e. all CCGs existing at the time of recruitment). Initially we used a purposeful sampling framework to ensure diverse CCG characteristics. However, due to a low response rate, all 145 contacts (some working across multiple CCGs) were invited.

Then, we selected five CCGs with diverse characteristics (antibiotic prescribing, deprivation, location). Practices with the highest and lowest antibiotic prescribing rates (top/bottom 25%) in each CCG were invited. Given a low response rate, additional practices were invited from another seven CCGs from similar areas, resulting in 162 practice invitations.

Study invitations were sent by email (where available) or post, and non-respondents invited by email were followed up approximately two weeks later. Those who expressed interest were emailed a study information leaflet, were given an opportunity to have their questions answered, and were offered a telephone or in-person interview. Participants

provided informed consent in writing or verbally. They were reimbursed £40 shopping vouchers or equivalent payment to their practice.

### *Interviews*

All participants opted for telephone interviews, which were conducted between December 2017 and September 2018 using semi-structured topic guides for CCG and practice professionals (Supplementary Document 3). Questions related to: participant's role, experience of and views on the QP, communication between and within CCGs and practices, AMS interventions, and suggestions for improvements of QP/AMS. Interviews were audio-recorded and transcribed verbatim.

### *Analysis*

Data from CCG and practice professionals were analysed separately, using an inductive thematic approach.[12] Transcripts were coded by AB in NVivo (v.11), and 20 transcripts were double-coded by STC, SA and RA (6-7 transcripts each). Lower-level codes were grouped into higher-level descriptive categories. Themes identified independently by the four researchers were compared and discussed until reaching agreement on the key themes. The codes and categories (used to initially code all interviews) were then revised into an agreed thematic framework. After deriving two separate thematic frameworks for the CCG and practice interviews, the findings of the two sets of interviews were compared and combined into one integrated framework, with attention to similarities and disparities.

## Results

Twenty-two CCG and 19 practice professionals were interviewed (Table 1). CCG professionals worked across 33 CCGs. The CCG and practice interviews lasted 35-65 (mean 52)

and 26-57 (mean 40) minutes, respectively. The findings were organised into four themes. Additional quotes appear in Supplementary Document 4.

### *Communication about the QP/AMS*

CCG professionals were informed of the QP targets by colleagues, email lists, newsletters, and (for some) a specific workshop/webinar. Some reported helpful personal communication with national AMS champions. Nevertheless, many reported limited dissemination of information, guidance on what to do and awareness of what other CCGs were doing as part of the QP.

> *…information comes in a very ad hoc way… Because there's so many different facets of the NHS now, you rely on daily bulletins that are gathered by information teams… I have to say Twitter is a fabulous source of information for bits of information that have been released from the Department of Health which strikes me as being very informal and too much by chance. [CCG-9, leader]*

CCG professionals noted the complexity of quality improvement schemes. They were aware of QP measures unrelated to antibiotics but did not know how well their CCG was meeting them. Most were unsure whether they received the QP payments and did not perceive the QP money as being reinvested directly into AMS work. They suggested that payments for antibiotic-related QP targets should be independent so that money could be used to fund and reward AMS work.

> *Even if we did manage to meet those targets, if the CCG has performed poorly in other areas, then we wouldn't get a financial reward so they're fairly unachievable.*
>
> *[Interviewer:] Do you know how your CCG is doing with those other targets?*
>
> *I don't to be honest. No. I'm working a bit in isolation. [CCG-6, team member]*

CCG professionals reported that it was unclear how the QP targets were set and how they could be achieved. Consequently, they reported some negativity among prescribers.

> *[Prescribers say] 'Why have they chosen 10%? They just plucked these figures out of the air', so it did create some negative feedback. […] it does seem like some [targets] are a bit random. [CCG-6, team member]*

CCG professionals communicated with practices mostly electronically, in locality meetings with practice representatives and annual practice meetings to discuss prescribing feedback and targets. Some CCG professionals visited only high-prescribing practices, and few were regularly based in practices. Practice professionals were unaware of the QP but aware of prescribing targets and reported generally positive views about support from CCGs. All professionals perceived in-person communication most helpful and highlighted the need for repeated messages.

> *The main thing is keeping it in our awareness, which is happening because we're told monthly about our prescribing levels. Having the prescribing advisor catching up with us a bit more often would be helpful, just to keep it fresher. [Practice-3, GP]*

### *Implementation of AMS strategies*

Although CCG professionals were responsible for AMS, it constituted a small part of their roles, which limited how they could support practices. Similarly, in general practices championing AMS was often an informal role. Some CCGs specifically asked practices to nominate AMS champions.

> *[AMS is] probably less than 5% of my time. It's one of those areas where it doesn't really sit within my role. […] I feel that the enthusiasm and time that I put into it is because I think it's an important area… [CCG-3, team member]*

CCGs and practices approached AMS differently. CCG professionals disseminated prescribing targets and feedback in different ways, with few reporting structured approaches, specific AMS strategies and revising these annually.

> *We did it in stages. In 2013 we revised our guidance on broad spectrum. […] We did an audit. […] Then we asked [practices] to do an assessment and assign an Antimicrobial Guardian. […] The outcome was good. The next year we moved one step further. By then RCGP TARGET started having patient information leaflets so we focused on patient education... [CCG-10, team member]*

> *It's not done in a structured way… if I see that somebody has prescribed something that I think was not necessary, then I do challenge them... [Practice-10, GP]*

Use of AMS strategies depended on available resources and how easily they could be implemented (Table 2). For example, more available staff time allowed tailoring and using more intensive strategies, such as, manually auditing individuals' prescribing.

<Table 2 here>

CCG professionals reported that a combination of strategies with consistent messages to keep AMS a top priority was most useful. However, they also reported little feedback from prescribers on how helpful they found strategies. Practice professionals liked reminders, prescribing targets, feedback and comparisons with other practices, and audit and feedback on individual prescribing.

> *It's really a case of the more mud you throw at a wall, the more it's going to stick. So it's us giving them the data... a whole load of resources... There's all that provision of information. There's the ongoing monitoring and peer discussion at the locality meetings and then there's the individual discussion at practice level. [CCG-2, leader]*

### *Perceived mechanisms of financial incentives*

The main benefit of the QP was the perception that it gave AMS greater priority nationally and locally, which appeared to encourage CCG management to direct resources to AMS activities. This was important in the context of competing priorities and limited budgets.

> *Having the Quality Premium has put more of an emphasis on [AMS]… sometimes money makes people think about it more, I got a lot more questions from management when [AMS] went into the Quality Premium. […] It's been really helpful that it's high up on the agenda. Now, there's the money attached, they really see the importance of it. [CCG-1, team member]*

However, most CCG professionals reported also that AMS work had preceded or been implemented independently from the QP, as part of quality improvement.

> *We were working on it long before it was a Quality Premium because it was good care... you're often working on things because they are important. […] I suppose targets focus the mind but… you're always trying to do the best you can for the patients. [CCG-15, team member]*

CCG professionals also perceived the QP to work by providing clear targets. Practices were monitored and benchmarked against targets and provided with feedback.

> *…once you have the data, you have something to act upon… something tangible, you know where you need to target your initiatives. We didn't really do anything specific other than communicate with the prescribers that these are the things that we're going to be measuring… it's like a dashboard which shows red and green whether you're hitting the targets or not. [CCG-4, team member]*

Some CCG professionals reported including QP targets in local financial incentive schemes for practices. However, not knowing whether the CCG would receive the QP money to fund payments made it challenging to implement.

> *Practices will get that payment whether we get the Quality Premium or not… I need to understand whether that's a good use of CCG money to pay practices for something that we're not actually earning money for ourselves because of other indicators. [CCG-2, leader]*

Practice professionals perceived that targets were linked to guidelines, and found it easier to change antibiotic type than reduce prescribing. They reported that being monitored and benchmarked changed antibiotic prescribing because of feeling more accountable and competitive to meet targets and not be an 'outlier' compared with other practices. Where financial incentives were offered, practice professionals perceived them as helpful but insignificant financially.

> *We appreciate the comparative reports. We're ever so slightly competitive. [Practice 18, GP]*

> *[A financial incentive] is not a huge amount of money. In comparison to the overall budget it really is a token but it always helps. [Practice-16, nurse]*

Having different starting points, priorities and characteristics (e.g., patients, deprivation, staff) meant that some CCGs and practices perceived meeting the targets as relatively easy, whereas others reported difficulties. Targets perceived as unachievable or irrelevant were more likely to be disengaged with.

> *It works for your good performers probably, they like staying good. For some outliers it does change behaviour because they don't like sticking out, and for some it doesn't make any difference. [CCG-22, leader]*

*[Targets] have got to be achievable because if they're not achievable, people will just say 'well, that's not achievable so I won't even look at that'. [Practice-6, GP]*

### *Impact and sustainability of the QP/AMS*

CCG professionals perceived the QP as a successful initiative. Most reported that their practices engaged with AMS and were confident to meet the antibiotic-related targets.

*…we've seen this significant drop off across the city that's actually probably been better than the national average and for a city like [name] that's got a lot of deprivation and chronic disease, I think that's a real success story. [CCG-5, leader]*

Nevertheless, all CCG professionals reported considerable variation between practices with few practices remaining high-prescribers or '*pockets of resistance' ('[practices] less inclined to engage*' [CCG-1, team member]). They reported that less engaged practices were likely influenced by higher baseline prescribing (thus perceiving targets as unachievable) and contextual factors, such as deprivation, patient characteristics (e.g., comorbidities) or staffing problems (e.g., high turn-over of locum GPs). Thus, some suggested that to motivate all CCGs and practices to engage with quality improvement, the QP targets should be tailored.

*For us it would be helpful if everybody else would stand still and give us a chance because we are reducing our antibiotics but equally so is everybody else, so whilst we are lower than we were, we are still higher than other areas so I don't think that we can take our eye off the ball… [CCG-2, leader]*

CCG and practice professionals discussed many competing priorities with AMS which acted as barriers to progress. Professionals from higher-prescribing practices reported they could not improve without compromising other priorities, whereas those from lower-prescribing practices reported intending to only take action if prescribing increased.

*We've got a lot of other priorities. We have spent good resource in terms of engaging with the CCG but I don't think we would go any further to be honest because then we will be compromising other things. [Practice-13, practice manager]*

Furthermore, some CCG professionals suggested that recent reductions in antibiotic prescribing would plateau and further reductions might be harmful. Both CCG and practice professionals were concerned with unintended consequences of antibiotic targets, such as increases in hospital admissions, urgent care visits, and higher costs of, or resistance to, new antibiotics.

*What we're seeing now is a levelling off because practices have worked so hard and it's a bit of a low with diminishing returns now. There's only so much reduction you can do, and I think we've probably reached that point, so we just need to keep that reduction in place. [CCG-5, leader]*

*[GP] always feels that we're prescribing for a reason, and that if you were able to compare the data between hospital admissions and prescribing, we would find that our high prescribing actually has a benefit in that we help patients to avoid serious infections. [Practice-4, GP]*

Finally, a few CCG professionals expressed concern that due to the perceived success of the QP, it might not be seen as necessary and be stopped, reversing the recent improvements.

*I can see from a government point of view they might say 'we fixed that, let's not offer [QP] anymore'. But if you then take your eye off the ball and don't incentivise good behaviour, you'll probably find that behaviour lapses. [CCG-8, leader]*

## Discussion

CCG professionals were positive about the impact of the QP on antibiotic prescribing. QP implementation was perceived as challenging because of limited resources and guidance

on how to meet targets, and no perceived link between the QP money, AMS work and prescribers' behaviour. Nevertheless, the QP reinforced CCGs' efforts to promote AMS in general practices by raising the priority of AMS nationally and locally, and by providing clear targets that were used to benchmark performance.

There is a wealth of, but largely inconclusive, evidence on the effectiveness of financial (pay-for-performance) schemes on improving healthcare outcomes.[13-15] Evaluations of the Quality and Outcomes Framework (QOF) in the UK showed initial improvement in incentivised behaviours but, with time, decreasing rates of improvement.[16-18] However, removing indicators from the QOF was associated with immediate reductions in performance on these measures.[19] Similarly, evaluations of the QP showed its positive effect on reducing antibiotic prescribing, with over 85% of CCGs meeting the target for total reduction.[9,10,20,21] This was reflected in our findings, regarding perceived success of the QP and concerns about the QP being stopped. Participants' suggestions to continue the QP, adding new, tailored targets may help maintain engagement with AMS and sustained change. Participants were also concerned about unintended consequences of antibiotic targets; feedback to CCGs/practices on this is important and research is ongoing.[21]

CCGs implemented various AMS interventions, many independently of the QP. This reflects wider promotion of AMS; for example, the UK's AMR strategies (2000, 2013),[6] the TARGET antibiotic toolkit[22,23] and STAR training (2012),[24,25] and surveillance of and access to antimicrobial prescribing data (2014).[20] Therefore, the impact of the QP cannot be considered in isolation from other co-occurring initiatives and, as our participants reported, it may be the combination of these various initiatives that had impact. Moreover, in the absence of implementation guidelines, CCGs took different (more or less structured) approaches to AMS, as shown elsewhere.[8] As initial improvements seemed relatively easy to achieve, a challenge

304 of how to continue these changes remains: how much can we reduce antibiotic use without
305 adverse consequences and how can we facilitate reductions among remaining high-
306 prescribers. Tailored approaches which address context-specific barriers and adapt targets to
307 motivate change are likely needed.

308 We identified possible *mechanisms of impact* of the QP. It helped raise the priority of
309 AMS and justify time and resources, which was seen as crucial in the context of increasing
310 workloads and scarce resources.[26] Promotion of the QP by respected national and local
311 leaders in AMS further facilitated engagement. The QP made the monitoring of prescribing
312 data more salient, and enabled use of targets and feedback. Theories suggest the impact of
313 feedback on behaviour is enhanced by behaviour targets and action plans.[27,28] The QP also
314 provided an opportunity for comparing CCGs' and practices' prescribing rates against each
315 other, thus activating social comparisons and competition,[29,30] and creating social norms of
316 'appropriate' antibiotic prescribing.[31,32] Other studies support feedback and peer comparisons
317 as effective strategies.[33,34]

318 A common concern about financial incentives or rewards is that they may undermine
319 intrinsic motivation.[35] However, this seemed unlikely as professionals did not directly benefit
320 from the QP payments, were often unaware of whether their teams received QP payments
321 and considered the payments relatively insignificant. Indeed, most reported wanting to
322 provide quality care and minimise consequences of AMR, suggesting intrinsic motivation.

323 Finally, interventions can only be effective if they are used. CCG and practice
324 professionals' ability to promote and engage with AMS interventions was constrained by the
325 context of large workloads, staff shortages, lack (or small parts) of roles focused on AMS, and
326 limited sharing of learning. In such contexts, prescribing antibiotics remains a quicker and
327 easier strategy than *not* prescribing or using AMS strategies.[3,36] Further improvement may

benefit from shifting the focus from developing and evaluating new interventions to improving their implementation.[37,38]

### *Limitations*

Despite planning a purposeful sampling strategy, low response rates necessitated convenience sampling. Nevertheless, participants' and organisations' characteristics were relatively diverse. Due to lack of responses we did not know reasons for non-participation (no one dropped out after responding to the invitation). Participants' characteristics, experiences or views may differ compared to non-respondents. Although interviews and analysis were conducted by one researcher, half of the transcripts were independently coded by three researchers and the interpretation discussed in-detail. Our interpretations of the impact and mechanisms of the QP were based on, and provided insight into, participants' perceptions on how the QP/AMS works; other quantitative methodologies are better suited to analyse larger representative samples[8] or explore associations between the QP and changes in antibiotic prescribing.[39,40]

### *Conclusions*

The Quality Premium was perceived as a successful initiative to optimise antibiotic prescribing in general practices in England. Despite being implemented differently in CCGs, due to local contexts and limited guidance, the QP prioritised AMS, provided targets, and enabled benchmarking of CCGs' and practices' antibiotic prescribing. This seemed more important than the financial payments. To maximise impact, intended mechanisms of action and implementation strategies of financial incentives or quality schemes should be articulated more specifically before their introduction.

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## Transparency declarations

CMcN, DL and RA are involved in development and implementation of the TARGET antibiotic resources. Other authors declare that they have no conflict of interest.

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## Tables

### Table 1. Sample characteristics

| | CCG participants (n=22, 33 CCGs) | General practice participants (n=19) |
|---|---|---|
| **Sex** | 17 female, 5 male | 9 female, 10 male |
| **Age (years)** | 35 – 60 (mean 48) | 36 – 68 (mean 49) |
| **Role** | Leadership role: 11<br>Team member/prescribing advisor-type role: 11 | General practitioners: 14<br>Nurse prescribers: 3<br>Practice managers: 2 |
| **Years in current organisation** | 1 – 20 (mean 6) | 1 – 35 (mean 13)<br>General practitioners: 5 – 35,<br>Nurse prescribers: 1 – 5,<br>Practice managers: 7 & 10 |
| **Years in current role / since qualified** | 1 – 19 (mean 4) | 2 – 45 (mean 21)<br>General practitioners: 8 – 45,<br>Nurse prescribers: 2 & 11 |
| **Size of CCG / General practice** | 9 – 97 practices (mean 40)<br>10 CCGs with <25 practices<br>13 CCGs with 25 – 50 practices<br>7 CCGs with 51 – 75 practices<br>3 CCGs with >76 practices | 2 – 24 prescribers (mean 9)<br>7 practices with 2-5 prescribers<br>6 practices with 6-10 prescribers<br>5 practices with 10-15 prescribers<br>1 practice with over 20 prescribers |
| **Deprivation** [a] | High (1-3 decile): 6 CCGs<br>Medium (4-7 decile): 12 CCGs<br>Low (8-10 decile): 15 CCGs | High (1-3 decile): 8 practices<br>Medium (4-7 decile): 7 practices<br>Low (8-10 decile): 4 practices |
| **Antibiotic prescribing rates** [b] (items/STAR-PU) | High (quintiles 4-5): 13 CCGs<br>Medium (quintile 3): 9 CCGs<br>Low (quintiles 1-2): 11 CCGs | High (>0.27): 4 practices<br>Medium (0.25-0.27): 7 practices<br>Low (<0.25): 8 practices |

*Notes:*

*[a] Deprivation was based on the Index of Multiple Deprivation decile in England (2015); 'high' deprivation level was considered for deciles 1-3, 'medium' for deciles 4-7, 'low' for deciles 8-10.*

*[b] For CCGs – based on the PrescQIPP antibiotic prescribing data (items per STAR-PU for year 2017); the CCGs in 1st or 2nd quintile of antibiotic prescribing in England were considered 'low'; CCGs in 3rd quintile were considered 'medium'; CCGs in 4th or 5th quintile were considered 'high'. For general practices – based on Fingertips data (items/ STAR-PU for quarter 4, 2017); general practices with antibiotic prescribing rates under 0.25 were considered 'low', between 0.25 and 0.27 were considered 'medium', and over 0.27 were considered 'high'. STAR-PU (Specific Therapeutic group Age-sex Related Prescribing Unit) is weighting used to take into account variation in the size and nature of the patient population.*

Table 2. AMS strategies used by CCG and practice professionals

| | **AMS strategies reported as widely implemented** (i.e. by all or most CCGs/practices; less time/resource intensive); e.g.: | **AMS strategies reported as less widely implemented** (i.e. by few CCGs/practices or selectively within the CCGs; more time/resource intensive); e.g.: |
|---|---|---|
| **By CCGs** | • Setting prescribing targets & providing feedback (e.g., via reports, dashboards)<br>• Adapting & disseminating prescribing guidelines<br>• Setting up computer/system prompts (e.g., ScriptSwitch)<br>• Promoting other tools/strategies for prescribers (e.g., TARGET toolkit, patient leaflets, clinical scores)<br>• Promoting AMS campaigns (e.g., Antibiotic Awareness Week, Antibiotic Guardian) | • Auditing prescribing in practices (with varied frequency)<br>• Auditing & feedback on individual prescribing (mostly in selected practices only)<br>• Local financial incentive schemes<br>• Providing AMS education/training for prescribers<br>• Providing (funding for) point-of-care CRP testing equipment<br>• Asking practices to nominate AMS Champions |
| **By practices / prescribers** | • Following prescribing guidelines<br>• Reviewing / auditing prescribing (with varied frequency)<br>• Using computer/system prompts<br>• Participating in AMS campaigns (e.g., Antibiotic Awareness Week, Antibiotic Guardian)<br>• Using communication strategies (to explain prescribing decisions, educate patients etc.)<br><br>Used in all practices but with variation between prescribers:<br>• Clinical scores<br>• Patients leaflets<br>• Delayed antibiotic prescriptions | • AMS education/training for prescribers<br>• Using the TARGET toolkit*<br>• Using point-of-care CRP testing<br>• Restricting antibiotic prescribing (e.g., not prescribing over the telephone)<br>• Reviewing long-term, prophylactic antibiotic prescriptions<br>• Using triage, emergency appointments or extended access to allow patients re-consult if needed (rather than prescribing antibiotics 'just in case') |

**Note: While minority of general practice professionals reported being aware of the TARGET toolkit, they often reported being aware of or using some resources that are part of the toolkit (e.g., patient leaflets).*

## Supplementary Data

Supplementary Document 1: Quality Premium antibiotic-related targets

Supplementary Document 2: COREQ checklist

Supplementary Document 3: Interview topic guides

Supplementary Document 4: Additional quotes illustrating the findings