Section A: CPHE to complete	
Name:	Dr Tim Chadborn
Job title:	Behavioural Insights Lead Researcher
Guidance title:	Antimicrobial resistance: changing risk-related behaviours in the general population
Committee:	
Subject of expert testimony:	Public education interventions to reduce pressure on prescribers to prescribe inappropriately [indirectly changing the behaviour of prescribers through changing the behaviour of the public]
Evidence gaps or uncertainties:	[Please list the research questions or evidence uncertainties that the testimony should address]

- Provide further information on the findings of a patient focused intervention in general practice to reduce inappropriate antimicrobial demand
- Preliminary findings of an analysis of the behavioural foundations of patient focused aspects of primary care interventions to reduce inappropriate antimicrobial demand
- Findings of a review of published evidence for public information campaigns to reduce inappropriate antimicrobial demand

Section B: Expert to complete	
Summary testimony:	[Please use the space below to summarise your testimony in 250 – 1000 words – continue over page if necessary]

This guidance is about changing risk-related behaviours but much of the activities in the scope focus on education. In the COM-B framework, referred to in NICE guideline PH49 Behaviour change: individual approaches, it is clear that opportunity and motivation are just as important as knowledge and skills (psychological capability) for enabling behaviour change. The focus on education does seem to reflect a commonly-held fallacy that informing people will result in a change in their behaviour (not acknowledging the large 'intention-action gap').

The two key questions in the scope ask about educational interventions for the public to i) ask for and use antimicrobials appropriately; ii) prevent infection and reduce spread of infection.

My work to date has focused on behaviours related to the use of antibiotics rather than infection, prevention and control (though we are about to start a behavioural analysis in that area). My testimony focuses on

i) a randomised controlled trial of a patient-focused intervention in general practice

ii) [brief note only] some preliminary findings of the patient-focused aspects of a Behaviour Change Wheel classification of national primary care interventions

iii) a brief, non-systematic review of published evidence for public AMR campaigns.

My colleague, Anna Sallis CPsychol, has previously testified about our behavioural analysis of prescribing[1] so I will not repeat that except to highlight that prescribers perceive demand from patients to be much higher than patients report. This is key because it questions how cost-effective it is to change the behaviour of a whole population to reduce demand enough to have the secondary effect on prescriber behaviour of not writing a prescription when it is not appropriate to do so. This highlights the need for application of behavioural science expertise and for clarity of the behaviours that need to be addressed at different levels.

- Randomised controlled trial of a patient-focused intervention in general practice

Lancet. 2016;387:1743-1752

1581 GP practices in the top 20% by prescribing rates were randomised in a 2x2 factorial design (to determine the independent effects of the two intervention) to:

1. Education materials for patients
2. Social norms feedback letter to GPs from the Chief Medical Officer
3. Combination of the two
4. No intervention (control)

The primary outcome was rates of antibiotic prescribing per population.

The educational materials designed by a marketing approach comprised of an A3 poster for the waiting room, copies of a patient leaflet for the waiting room, copies of a modified 'TARGET' patient information leaflet for use in discussion between prescriber and patient, and a briefing letter for GPs and practice managers. The key message was 'If you or your family take them when you don't need them, they're less likely to work when you do. Don't let bacteria build up resistance. Follow your

doctor's advice.' The cost was in the region of £100,000.

There was no reduction in antibiotics dispensed among practices sent patient-focused materials compared to controls.

[Although this testimony focuses on public behaviours, for comparison, the letter to GPs designed by a behavioural science approach, reduced prescribing by 3.3% or 73,406 antibiotic items, cost £4,335, and saved £92,356 in prescription costs alone]

ii) some preliminary findings of the patient-focused aspects of a Behaviour Change Wheel classification of national primary care interventions

We are currently analysing the behavioural foundations of national antibiotic stewardship programmes using scientific frameworks, which involves coding relevant interventions according to their behavioural components. The aim is to identify gaps and improvement opportunities. Among the interventions targeting the public were:

1. Antibiotic Guardian pledge scheme and England-based activities linked to European Antibiotic Awareness Day / World Antibiotic Awareness Week
2. Ask Your Pharmacist campaign
3. Treat Yourself Better with Pharmacist Advice campaign
4. Stay Well This Winter campaign
5. NHS Choices web pages on antibiotics for public education
6. eBug website and learning materials for children and young people
7. TARGET 'Treating Your Infection' patient information leaflet including delayed prescribing

iii) a brief, non-systematic review of <u>published</u> evidence for public AMR campaigns.

Please note: this brief and non-systematic review preluded a systematic review I am involved in that is led by Glasgow Caledonian University.

A key systematic review by Huttner in 2010[2] (but not solely targeting the public) found indicative evidence that:

1. Educational campaigns aiming to change public <u>and physician perceptions</u> and knowledge were associated with a small but sustained decline in antibiotic prescribing.
2. Marketing campaigns included leafletting at primary and secondary care centres, TV and radio advertising, billboards and websites.
3. Evaluation was often "a weak point… partly explained by insufficient funding and difficulty in obtaining data" and therefore, there was limited evidence of effectiveness and cost-effectiveness.

A number of other papers[3-8] (key ones referenced here but many other country-specific ones shown in the presentation) provide evidence that:

1. Repeated, through-the-line, marketing campaigns, such as in France, have shown substantial reductions in antibiotic prescribing
2. But these mass media (incl. TV) and internet campaigns were often delivered alongside locally targeted community-level work (leaflets and posters for prescribing centres) <u>and physician activities</u> (academic detailing, prescribing

feedback, promotion of rapid tests).

3. All programmes reviewed aim to convey that:
    a. AMR is an important concern
    b. Misuse of antibiotics promotes bacterial resistance
4. Positive, negative, risk and gain-framed messages have been used but there is little evidence that these were based on robust behavioural science models or theories.
5. There was no evidence to suggest one type of messaging was most effective, though evaluation methods were weak

My conclusions from the above:

- Currently, little is known about which modes or combinations of modes of delivery, or which components of interventions are most effective in changing the public's behaviours or what effect they have on sub-populations such as older adults or key identities/roles such as 'mothers' or 'carers'
- It is important to separate campaigns from other interventions and multimodal interventions
- Because of the high potential costs of resistance, even expensive AMR campaigns may be cost-effective
- There is likely to be benefit from implementing campaigns with the effect on antibiotic stewardship correlated to investment in the campaign
- Previous effects have been variable, difficult to distinguish from parallel interventions and probably affected by background rates of prescribing
- Robust evaluation of pilots is needed to add to the currently weak cost-effectiveness evidence before longer-term investment is justified
- Behavioural science needs to be used to inform the design of interventions to maximise the likelihood of the desired effect and minimise the risk of unintended consequences.
- Although campaigns may be cost-effective, their comparative cost-effectiveness against other types of interventions should be considered if there are opportunity costs or limitations in funding available for AMR.
- In summary, strategic co-ordination of interventions across topics (prescribing and infection, prevention and control) and at different levels (national, local, organisational, professional, patient, public) is most likely to achieve the goal of improved antibiotic stewardship at minimum cost.

Wider considerations for the committee:

1. How to ensure that increased awareness does not increase demand (potentially via perception of scarcity or boomerang effects?
2. Are these public-facing interventions equally as effective among all sub-populations, the health-literate and less health-literate? Or is there an impact on health inequalities?
3. How do non-AMR campaigns affect AMR risk-related behaviours of the public (for example campaigns creating fear of sepsis and associated child-deaths may encourage early presentation and demand for antibiotic treatment overriding any benefit from AMR messages)?
4. To what extent do the public access to medicines without prescription (for example, from the internet) and is there any evidence of interventions that are

effective in improving the stewardship of these transactions?

5. As this is a review of evidence around behaviour, will behavioural science be used to make the recommendations as clear and actionable as possible for the appropriate implementers to maximise the likelihood of their behaviour change?

References (if applicable):

[1] https://www.nice.org.uk/guidance/GID-PHG89/documents/antimicrobial-resistance-changing-riskrelated-behaviours-in-the-general-population-expert-paper-12

[2] Huttner. Lancet Infectious Diseases. 2010 Jan;10(1):17

[3] Dar. Lancet.387(10015):285

[4] Ashiru-Oredope JAC 2015;70(11):2927

[5] Butler BMJ. 2012;344:8173

[6] Sabuncu PLoS Med. 2009;6(6):e1000084

[7] Wutzke Health Promotion International. 2007;22(1):53

[8] Lambert JAC 2007;59(3):537