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Educating Primary Care Health Professionals for Action on Air Pollution

Insights Report August 2022. A Demonstrator Project with 40 General Practitioners across England Conducted in association with Imperial College, London and UKHACC Funded by DEFRA

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Executive Summary

The Mobilising Primary Care on Air Pollution project successfully demonstrated that GPs are effective emissaries for information on air pollution, both to their colleagues and members of the public, including patient groups vulnerable to the health harms of air pollution. The project, funded by the Department for Environment, Food and Rural Affairs (DEFRA), was a collaboration between Global Action Plan (GAP), Imperial College London's Environmental Research Group, and the UK Health Alliance on Climate Change (UKHACC). It ran from October 2021 to August 2022.

The Mobilising National GPs project provided online teaching on the causes and health impacts of air pollution to 40 general practitioners across England. Co-design workshops with GPs and other health professionals provided insight into the structure, content and design of the teaching sessions and materials for patients. Physical and electronic copies of leaflets and other materials were sent to participants, and these are freely available for download on the GAP website at www.actionforcleanair.org.uk.

The participants shared the teaching and materials with their colleagues and patients during a 4-month trial period. Surveys were conducted immediately before and after teaching and then again at the end of the trial period. Closing surveys and qualitative interviews were also conducted at the end of the trial.

Key achievements:

- **Trained 40 GPs and 3 allied health professionals** from across England as 'Clean Air Champions' boosting their ability and confidence to advise patients on air pollution issues.
 - 100% of participants reported that the training had been useful in preparing them to talk to patients about air pollution.
 - 88% reported that the training had helped them to talk to patients about outdoor air pollution with more confidence while 84% reported greater confidence talking to patients about indoor air pollution.
- **GPs cascaded learning at their home practice:**
 - Within their practice meetings or education sessions.
 - Teaching specific staff groups such as GP registrars or nursing colleagues.
 - Sharing resources through healthcare WhatsApp groups and Clinicians messaging groups.
- **Disseminated clean air messages** beyond home practices, including:
 - At a variety of education sessions, both local and regional events.
 - **Writing an article for the British Geriatric Society** website and national newsletter.
 - **Sharing clean air messaging with colleagues across Primary Care Networks.**
 - **At local and regional NHS groups**, and the regional **Royal College of General Practice Forum** and clinical pharmacist groups.
 - Local community events, communications with schools.
- Several focused Clean Air Day events at practices.
- Developed an **air pollution protocol for GPs.**

"I was surprised actually as to how receptive people were about it to hear about [air pollution], and I think they found it helpful knowing what they could do to reduce their exposure"

Recommendations:

Given the successful delivery of this pilot programme, we believe that the model should now be scaled up and tested with a wider group of GPs, perhaps with all staff in a primary care network (PCN), or across an entire integrated care systems (ICS) region. This could also include other staffing groups, particularly nurses, as it was often commented that nurses can have more time in their appointments to give health advice and often run relevant specialist clinics, for example for asthma.

Further work could involve mapping and influencing the healthcare education sector to make air pollution an embedded part of the curriculum, both in undergraduate and postgraduate training.

An enduring, well-funded public health campaign would increase the population's understanding of air pollution and support healthcare professionals in giving their advice to patients.

Recommendations for future work:

- Repeat a similar study on a larger scale, automatically including every GP across a PCN or an ICS region.
- Perform a similar project with other staffing groups.
- Test independent use of the newly developed air pollution protocol.
- Explore whether GP engagement leads to long-term patient behaviour change.
- Map and influence the healthcare education sector.

Introduction

Air pollution is acknowledged by the UK Government as the largest environmental health risk to the UK public, long-term exposure to which can cause chronic health conditions and reduce life expectancy.¹ Air pollution negatively impacts every organ of the body, can inflame the lining of the lungs, enter the bloodstream passing to the heart and brain, cause lung disease, heart disease, dementia, strokes, and cancer.²

The associated health problems of air pollution have an economic cost too, with ill-health and premature death costing UK business and the health system £20 billion every year.³ On high pollution days there are more hospital admissions for heart and lung diseases and an increased risk of asthma attacks.^{4,5} In December 2020, air pollution was included as a contributing cause of death in the heart-breaking case of nine-year old Ella Kissi-Debrah whose hospital admittance and asthmas attacks aligned with spikes in air pollution. The 'Prevention of Future Deaths' report that followed the inquest into Ella's death called for more information about air pollution and its impact to be made available to the public and found 'the adverse effects of air pollution on health are not being sufficiently communicated to patients and their carers by medical and nursing professionals'.⁶

As part of their response to the Prevention of Future Death's report, the Department for Environment, Food and Rural Affairs (DEFRA) funded Global Action Plan (GAP) to address the coroner's call for healthcare professionals to be educated on the impacts of air pollution. This pilot builds on the previous DEFRA-funded project, mobilising health professions on air pollution.

General Practitioners (GPs) are some of the most trusted health messengers in society and play a crucial role in protecting people's health and improving their quality of life. GPs regularly provide advice on lifestyle choices (smoking, exercise, and diet) but not, as far as we are aware, air pollution avoidance. There is little evidence that the health impacts of air pollution feature as part of standard medical training at undergraduate or postgraduate levels.

Previous pilots run by GAP have tested how adult respiratory and paediatric health professionals can provide health advice about air pollution to patients.

This pilot tests a 'Champions model', training GPs to deliver advice to patients and share their learning with colleagues.

¹ <https://www.gov.uk/government/publications/health-matters-air-pollution/health-matters-air-pollution>

² <https://www.globalactionplan.org.uk/news/clean-air-day-2022air-pollution-impacts-every-organ-in-the-body>

³ <https://www.rcplondon.ac.uk/projects/outputs/every-breath-we-take-lifelong-impact-air-pollution>

⁴ <https://www.bmj.com/content/378/bmj.o1664>

⁵ [Air pollution is a public health emergency | The BMJ](https://www.bmj.com/content/378/bmj.o1664)

⁶ <https://www.judiciary.uk/publications/ella-kissi-debrah/>

Project Aims and Objectives

The overarching aim of the project was to increase awareness of air pollution health harms among healthcare practitioners, leading to vulnerable patients receiving reliable and accurate information on air pollution. Testing the use of GPs as air pollution ‘Champions’ was key.

The defined project outcomes:

1. 40 GPs nationally to be trained as Champions to advise patients on air pollution avoidance measures.
2. Trained GPs deliver air pollution reduction and avoidance advice to patients and colleagues, including their home surgeries.
3. A protocol and information materials that could be distributed to practitioners across the UK are co-designed and tested through the pilot.
4. Indoor air quality messages which could be used by any communicator to best inform the public about risks and actions relating to indoor air quality are identified.
5. Insights into how best to enable primary care practitioners nationwide to dispense such advice are collated.

The Champion Approach

Engaging GPs

GPs from across England (representative of varied income and deprivation levels) were recruited to take part in the pilotⁱ. Organisations including the Royal College of General Practitioners (RCGP), Primary Care Respiratory Society, British Medical Association and UKHSA supported recruitment efforts. The opportunity was also advertised through networks including 'Greener Practice' and 'Deep End'. Significant interest in the pilot ensured that GPs were recruited from a wide range of locations across England.

It was noted early on through stakeholders that other healthcare professionals including nurses are often best suited to deliver air pollution messages to patients. This was considered in the design of teaching and communication materials. The recruitment process was focused on GPs initially with enthusiastic uptake, meaning that there was little room for additional staffing groups to be included. However, several allied health professionals were welcomed to the project and taught as Champions.

“Quite difficult to engage patients with time restrictions etc on this in acute setting. But sharing with the nurses, who are doing year end care reviews with patients, have more time to discuss trigger for their conditions including pollution. So good to get them involved as more time in these reviews”

Co-design

Early practitioner recruits joined GAP staff for two co-design sessions in order to generate appropriate teaching materials and prioritise patient groups who would most benefit from receiving information on air pollutionⁱⁱ.

Training

Teaching materials and training contentⁱⁱⁱ were created and shared with GPs through a one-hour online training session delivered by GAP staff, including Dr. Malcolm White (MBChB). As part of this training, GPs were encouraged to 'champion' clean air and disseminate learning within and beyond their practice.

Training was completed by a total of 43 healthcare practitioners (40 GPs, one advanced nurse practitioner, a pharmacist and a practice manager, henceforth referred to as 'Champions').

Champions Delivering Air Pollution Information

Following the training, Champions were sent printed and electronic communication materials including leaflets, training slides, a teaching video, and suggested text for messaging and social media to support them in sharing their learning with colleagues and patients.

Practitioners reported positive experiences when initiating conversations on air pollution with their patients.

Information that the patients reportedly found most valuable included information on indoor pollution, the impact on children and actions that they can take to reduce exposure. A few GPs mentioned that parents, particularly of new-born or asthmatic children wanted information on how they could improve air quality at home, while respiratory patients were also reported to have found, typically "indoor advice very helpful".

“I was surprised actually as to how receptive people were about it to hear about it, and I think they found it helpful knowing what they could do to reduce their exposure” GP_9

“You get responses such as oh, I didn't know that or I didn't realize that was a big issue” GP_10

“...it kind of felt like something she could actually do actively that could have a positive impact for her and help her feel better” GP 9

“..they were quite receptive to thinking about how even just things like, you know, trying to walk on different streets at different times and trying to just reduce their direct risk to air pollution. And, you know, they were interested in that” GP 6

Sharing learning at their home practice

Over 75% of Champions reported cascading their learning to at least one colleague. Figure 1 gives a breakdown of the GP colleagues and practice staff who were engaged through the project. Most Champions reported that their colleagues were very receptive to learning about air pollution. Some highlighted that while most health professionals are aware of air pollution per se, there is a lack of knowledge of the extent to which air pollution can harm human health, the different groups of people that can be affected and the extent of the problem at a local level. Only one GP reported that a limited number of colleagues may have doubted the relevance of the air pollution topic with their clinical practice/location.

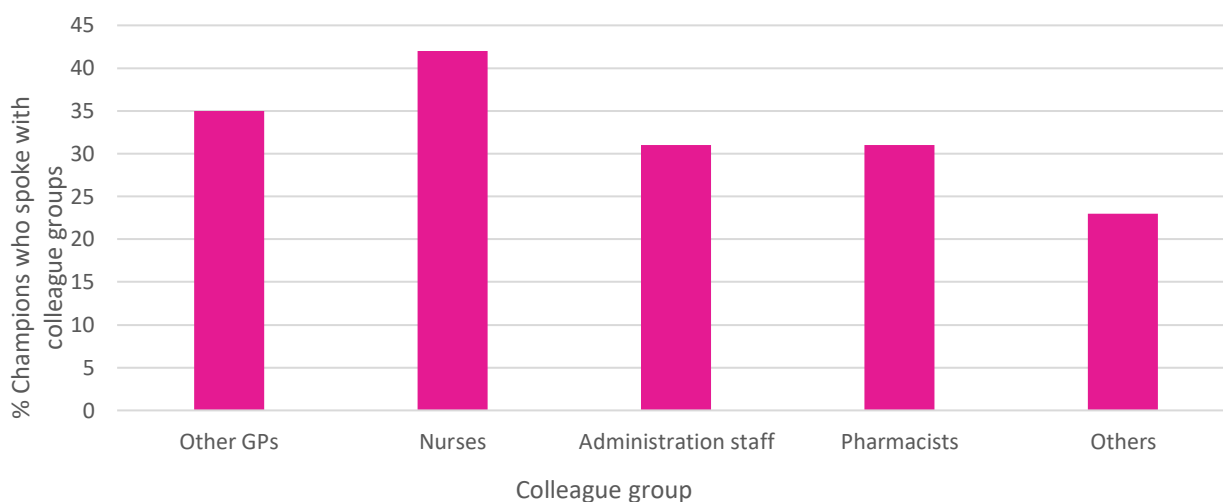


Figure 1 - Learning shared with other colleagues in home practices

“..once people actually see that the facts and figures, people are astonished really that they haven't perhaps learned about it before and agree that it is something that they want to talk to people about” GP_4

Sharing the clean air message beyond home practice

Champions shared clean air messaging beyond their home practice, including Primary Care Networks (PCNs), training with GP registrars, a regional Royal College of General Practice forum and clinical pharmacist groups, as well as local schools and parents^{iv}

GPs reported having informal face to face meetings with colleagues, writing articles in clinical newsletters including the British Geriatric Society and sharing resources through healthcare messaging groups.

Several GPs mentioned the use of text messages and patient communication platforms (e.g., AccuRX) as a quick and easy way to convey information to patients. One GP reported having used a text messaging tool to send a message about air quality to all 23,000 of the practice's patients. They also shared information outside their normal work commitments such as with local societies or climate groups, family and friends.

Clean Air Day 2022

Clean Air Day, the UK's biggest day of the year in the fight against air pollution, was highlighted to Champions as a particularly valuable opportunity to engage their colleagues and patients in discussions about air pollution. Some described Clean Air Day as a useful prompt to giving advice to patients for the first time (June 16 2022).

Many of the Champions reported being very active during Clear Air Day, sharing the clean air message with colleagues and patients through onsite events, newsletters and social networks and holding information stalls, as well as placing leaflets and posters in a prominent position in the practice.

The wider recognition of this national event and the support for associated action from higher levels of the NHS further empowered GPs in their roles as Champions.

“we had an announcement about Clean Air Day from our local CCG (Clinical Commissioning Group) and that was amazing so that really felt like it was I was being backed up”

One GP practice organised a local road closure with stalls and information boards about air pollution. They spoke to members of the public visiting the nearby market and contacted parents of children attending the school opposite, via the school's newsletter, to talk about air pollution.



Figure 2 - Clean air pledges made by the local community



Figure 3 - Healthcare professional preparing her stall on air pollution at a community event

Evaluating project success

Approach

A combination of quantitative and qualitative data was gathered by Global Action Plan and Imperial College London to evaluate progress against project outcomes.

Online surveys before and after training

An online survey was designed by Imperial College London and GAP, then delivered to all the training participants via email. Responses were anonymous. The first survey was completed immediately before the training session and the second immediately after the training session. A third longer survey was distributed to participants at the end of the project (Summer 2022) to explore how the learnings had been put into practise. All surveys are attached as an appendix. Survey findings were analysed by Imperial College London using the Statistical Package for Social Sciences (SPSS).

1:1 Interviews

To complement the quantitative survey findings, 1:1 qualitative interviews were conducted with a sub-set of GPs (n=10) after they had completed the training and put their learnings into practice. Interviews assessed the extent to which the Champions felt that the training sessions and communication materials equipped them with the necessary knowledge and tools to effectively communicate air pollution information and advice to patients and colleagues.

Interviews were designed to explore the following broad questions:

1. What is the value of providing air pollution advice to patients?
2. What information do patients think is most valuable to them? what additional information they would like to have that they were not given?
3. To what extent did practitioners successfully manage to advise patients about air pollution
4. What hindered or facilitated the delivery of information to patients?
5. What impact do practitioners believe the advice is having on their patient's knowledge and behaviours regarding air pollution?

Interviews were carried out by two members of the GAP project team and lasted for about for 30 minutes on average. With informed consent from the participants, all interviews were audio-recorded. Data from audio recordings was transcribed and imported to NVivo (version 12) for thematic analysis (categorising respondents' accounts in ways that can be summarised). All transcripts were read and systematically coded in full. Codes were then organised to construct larger themes.

Evaluation results

All 43 attendees of the first training session completed the ‘pre-training’ baseline survey; 40 participants completed the near-identical post-training survey (90% response rate). Twenty-three participants completed the follow up survey in Summer 2022 after putting their training into practise (response rate 53%).

Overview of results against the project’s Key Performance Indicators

Table 1 - Overview of project outcomes, targets and results.

Target Outcome	Success Indicator	Result
<p>Overall Impact</p> <p>Air quality awareness increases among GPs trained as Champions leading to vulnerable patients receiving improved education on air pollution.</p>	70% of GPs participating in training report that they have successfully built air quality advice into their practice.	Before training: 7% of GPs reported that they spoke to patients about air pollution. After training 75% had spoken to patients about air quality.
<p>Outcome 1</p> <p>40 GPs trained as Champions to advise patients on air pollution avoidance methods</p>	1.1 Number of GPs who complete the training.	Achieved: 40 GPs trained as Champions, a further three allied health professionals also trained.
<p>Outcome 2</p> <p>A subset of GPs across England are trained as air quality Champions able to deliver air pollution avoidance advice to patients and to cascade their learning to their home surgeries</p>	2.1 Percentage of healthcare professionals who feel able and willing to provide air pollution avoidance advice to patients compared to pre-intervention baseline survey.	88% of participants reported talking to patients about air pollution with more confidence after completing the project; 84% felt more confident to talk to patients about indoor air pollution.
	2.2 Percentage of healthcare professionals that have successfully built air quality advice into daily practice compared to pre-intervention baseline.	Before training: 7% of GPs reported that they spoke to patients about air pollution. After training 88% had spoken to patients about air quality.
	2.3 Qualitative insights and case studies captured from GPs detailing the impacts their advice and the materials are having on their patients.	Interviews with 10 GPs completed which explored their experience of talking to their patients and colleagues about air pollution. Champions were questioned about the impact of the intervention on behaviour change in their patients. It was felt that the period of assessment was too short to determine the full impact. Insights have been derived and are presented below.

	2.4 Qualitative insights captured from GPs detailing how they shared their air pollution learning with practice colleagues.	Insights captured in the Insights and Impacts section.
Outcome 3 A protocol and information materials that could be distributed to GPs across the UK is co-designed and tested through the pilot	3.1 Qualitative insights identify the messages that GPs and patients are most receptive to.	Completed
Outcome 4 Identification of indoor air quality messages which could be used by any communicator to best inform the public about risks and actions relating to indoor air quality	4.1 An indoor air quality matrix approved by Defra and PHE.	4.1 An indoor air pollution messaging matrix was reviewed and agreed by experts at PHE and DEFRA to guarantee accurate and reliable messaging. Information about the sources of, and actions to avoid, indoor air pollution was collated and included in the training sessions and patient leaflets.
	4.2 GPs can identify indoor air pollutants, risks to health and practical mitigating actions	4.2 Champions taught about indoor air pollution and signposted to additional resources.
Outcome 5 Insight in to how best to enable GPs nationwide to dispense such advice	5.1 A protocol is developed, tested and refined by the end of the pilot, ready to be shared more widely.	Completed
	5.2 The most appropriate tools, materials and messages to engage GPs with air pollution information are identified.	Feedback collected from Champions was particularly positive for leaflets and teaching slides. It was repeatedly stated that air pollution information should be incorporated into teaching in primary care. Further comments below.

Results: Insights and Impacts

Through the surveys and focus groups, key insights and lessons learned through the pilot programme were collated around five key themes:

1. Impact of the training sessions
2. Enablers for successfully educating patients on air pollution
3. Barriers to successfully educating patients on air pollution
4. Limitations of the pilot study
5. Project Recommendations

Impact of the training sessions

Champions gained confidence to share air pollution information with patients

One of the key outcomes of the pilot project was that GPs would feel confident and able to share air pollution awareness information with patients after receiving training and resources. This goal was successfully met with all survey respondents (100%) reporting that the training was useful in preparing them to speak to their patients about air pollution with 57% reporting it to be either very or extremely useful and 43% considering it slightly or moderately useful.

Although most participants ranked their existing knowledge of air pollution quite highly in the survey before the training session, there was an overall increase in understanding after the session. Most survey participants (88%) stated that the training boosted their confidence levels and that they felt more prepared for initiating air pollution conversations with patients and colleagues. Results from the interviews with GPs support these findings, with GPs reporting to have found the training session very useful. Comments from the interviews include these:

“I feel a bit more confident and knowing what kind of what to say and really not just the patients, but it was mainly initially to other members of staff and to try and get things started in my practice” GP_6

“Overall, I thought the training was excellent and what I could put into practice from the training was really, really, really sensible. It gave me a really good framework for being able to talk to patients about air quality” GP_3

“I think I would have liked to have had the opportunity, perhaps to practice or share ideas for actually how to have conversations with patients. And I think it's just Medicine in general. You can have the knowledge, but that doesn't necessarily mean you've got the skills or the sort of lingo to use when you're actually explaining it. GP_9

Information that the patients reportedly found most valuable included information on indoor pollution, the impact of air pollution on children and actions they can take to reduce exposure. Examples included the following:

“A patient with brittle asthma who, when I talked to her about the effect of air pollution, said that, yes, her consultant had also mentioned this to her. I think the consistency of messaging across health care professionals has a reinforcing impact, greater than a single intervention”

“Yes, pre-diagnosis child with? [possibly] asthma parents wanted information on how they can improve air quality at home”

85% of Champions cascaded lessons learned to colleagues

In addition to educating patients on the health impacts of air pollution, a secondary goal was to empower GPs to cascade their learnings on air pollution to practice colleagues. This proved successful with 85% of respondents reporting that they had shared the ‘clean air learning’ with at least one other member of their team while 31% had spoken to at least a third of their team about it. Survey results suggested that 100% of

participants had found the training useful in preparing them to speak to their colleagues about air pollution with 61% considering it 'very' or 'extremely' useful.

Practice team sizes varied from 16 to 200 team members and 92% of respondents had used or referred to the slides from the training session at least once. In addition, 69% of respondents reported that they had spread the clean air message beyond their home practice. Groups spoken to included local and regional NHS groups, schools and parents, local community meetings and a wide range of healthcare education meetings.

Most participants reported that their colleagues were very receptive to learning about air pollution. Some highlighted that while most health professionals are aware of air pollution per se, there is a lack of knowledge of the extent to which air pollution can harm human health, the different groups of people that can be affected and the extent of the problem at a local level.

"..once people actually see that the facts and figures, people are astonished really that they haven't perhaps learned about it before and agree that it is something that they want to talk to people about" GP_4

Enablers for successfully educating patients on air pollution

Air pollution information was well received by most patients

Most participants reported positive experiences when initiating conversations on air pollution with their patients. Champions highlighted that most patients found the information received both new and useful.

"I was surprised actually as to how receptive people were about it to hear about it, and I think they found it helpful knowing what they could do to reduce their exposure" GP_9

You get responses such as oh, I didn't know that or I didn't realize that was a big issue, so it was really helpful just to have that background knowledge" GP_10

"Some of the conversation was not just about how to avoid air pollution, but how to reduce their contribution to air pollution. Because they didn't want other people, because they didn't want their child to suffer, for them to suffer. They then didn't want to be the one who was contributing to other people suffering as well" GP_3

"Couple of patients who have asthma and had more frequent exacerbations recently and talking to them, and they were quite receptive to thinking about how even just things like, you know, trying to walk on different streets at different times and trying to just reduce their direct risk to air pollution. And you know they were interested in that. Those kind of practical things and understanding a bit more about how they're how they're asthma classifications and air pollution are potentially linked" GP_6

"some people seem very, like, tied to cars and get really defensive if you try and criticize anything to do with cars. So, I found that was also generally a little bit of an issue" GP_7

The interviews asked the GPs for any specific strategies they found useful for engaging different patient groups about air pollution. Their suggestions included:

- **Tailoring the message to the individual** – recognise that patients are individuals and for some patients with chronic conditions, overloading them with yet more behaviour change messaging may be too much. Instead, tailor the way you deliver air pollution information to the individual, for some it will be positive and lighter-touch and for others (e.g. parents below) they will be receptive to more detailed information on changing their behaviour.
- **Targeting parents** - Some GPs found it much easier to initiate conversations on air pollution with parents of young children as they were more receptive to receiving information and advice on how to reduce exposure to harmful pollutants.
- **Going local and personal** – GPs reported that bringing the air pollution issue to a ‘local level’ was a very good way for engaging with patients. Focusing on the situation most relevant to them, be it school commutes, workplace exposure, indoor vs. outdoor air pollution will make the topic more relevant.
- **Framing the message positively** - Some GPs mentioned having adopted a ‘positive message framing approach’ when communicating information about air pollution to their patients, focusing particularly on the things that people could do something about. One GP identified that the complexity of patients’ conditions obliged her to focus on the advantages to the patient of an air pollution message, perhaps tailoring the message to suit the patient’s more immediate needs.
- **Using prompts** - A couple of GPs mentioned that having their own bikes in the consulting room served as a ‘prompt’ for engaging with patients and initiating conversations on active transport, health benefits and air pollution exposure reduction and own contribution.

“I think go as local as possible. Go down to your postcode for your house, your workplace. This is you. This is what you're breathing in and it's not what you're breathing in 2030 or 2050. It's what you're breathing in now, today” GP_3

“I think the patients that we really need to be having conversations with, that, have got lots of chronic conditions... You know they already feel like they're being told to change lots of things... So, I think with them it's much more about trying to be positive and to talk about the benefits and things that they could do, rather than adding it to a list of things that they need to change and making them feel responsible” GP_6

Communications materials helped to reinforce the message to patients

92% of respondents reported that they found the communications materials helpful in sharing information with their team and 96% found them useful for sharing information with their patients. Over half of respondents (52%) reported that they found the information leaflets most useful as an information resource, while around a third (36%) said they found the ‘checklist’ leaflets most useful as they were more ‘patient user friendly’.

Some GPs highlighted that having resources such as those developed by GAP in a ‘ready to use’ form was extremely useful, as it saves time and facilitates the sharing of information with others. GPs also reported that the materials developed were very user friendly and accessible.

“I think it's good that they were all relatively brief. I think sometimes people share information, that's just... and really, long and really technical and people are just never going to read all of it, so I think it's really good that it was really, like, visually appealing. It was to the point you could just glance at it and figure out what it was about” GP_4

A combination of digital and hard-copy materials proved effective. Digital resources were perceived to be less wasteful and were convenient to share with many patients, but paper leaflets were deemed more appropriate for some patient groups e.g. elderly patients.

Barriers to successfully educating patients on air pollution

The largest barrier to practitioners sharing information about air pollution with their patients was time

About one third (36%) of respondents had spoken 'Occasionally' to patients about air pollution in the previous two months while another third (32%) had done so 'Rarely' or 'Very rarely'. One fifth spoke about it 'Frequently' or 'Very frequently' and 12% of respondents reported that they had 'Never' spoken to patients about air pollution in the previous two months. This suggests that healthcare professionals are selective in their choice of patient to speak to about air pollution (perhaps focusing on those groups with the most relevant clinical conditions), or that they often forget, feel uncertain about how to initiate the conversation or want to do so but feel they cannot squeeze the topic into their patients' consultation. Despite this, Champions reported that the vast majority of patients were 'receptive/interested' when it came to learning about air pollution and ways in which they could reduce exposure to harmful pollutants. Only a small number of Champions (12%) reported that patients were not at all receptive or interested in messages about air pollution.

Competing priorities

A GP consultation is typically a semi-structured conversation, with dozens of factors involved. There are many protocols and guidelines to consider on hundreds of subjects. They also need to document their interactions in specific ways to justify proper payment to the GP practice. Patients often have multiple health conditions that need addressing. Each GP will likely see upwards of 20 patients each day and still have to do non-clinical work relating to their personal development and potentially managing the practice. It is understandable in the face of these many requirements that Champions reported difficulty sometimes in remembering to add air pollution information in to the consultation. Furthermore, Champions described feeling time pressured in a 10-minute appointment, finding it difficult to introduce a conversation about air pollution into (what feels like) the last 10 seconds of an appointment.

To overcome the barrier of time, Champions were very selective in the choice of patient they spoke to about air pollution. Many practitioners highlighted that having the printed or online resources handy and ready to use helped them to share the information, even when there was little to no opportunity to mention air pollution during the consultation. One GP mentioned that his efforts to bring air pollution advice and information into the consultation were limited until he had access to the printed form of the leaflets.

"I didn't do anything until I had - or very little - until I had access to the leaflets. So, when I had the leaflets, it was much easier, because then I had something like to share with them, and you use that as a framework, really" GP_4

"having, like, written information and information you can send is really useful, because then you can quickly bring it up and you can say, you know, signpost people to more information" GP_6.

It was easier to initiate conversations with patients most affected by air pollution

Several practitioners highlighted that it was easier to initiate conversations on air pollution with patients who have respiratory conditions such as COPD or asthma, or with parents of young children. They also found that when an illness is not well controlled, or not yet controlled, air pollution may be a contributing factor that the patient has not considered or had explained before. It is also clear that the GPs found it more challenging to initiate a conversation when they could find no direct link between the patient's condition and air pollution:

"...if I was speaking to a patient whose COPD wasn't well controlled, I could talk about air pollution. Similarly with asthma. Or maybe somebody with pregnancy or a baby check, it seemed very relevant to a small baby with developing lungs. But if somebody, I don't know, coming with knee pain or something random, it would be much harder to bring it into the conversation in that setting" GP_9

"...because you don't want to sort of have a consultation on condition X, and then you just go 'I'm going to talk to you about condition B'. They're like, but that's not why I'm here" GP_3.

Limitations of the pilot study

Training time limited due to COVID-19

With primary care running under enormous amounts of pressure during COVID-19, the sessions were limited to one hour, easing the time-burden upon the healthcare professionals. While the delivery team were confident that delivering the full range of topics and content was manageable in the hour, we also knew that absorbing this information and adopting air pollution messages into their practice after the single hour of training was a big ask. It was a difficult balance, but asking the participants attend a single teaching session was deemed the most practical way to successfully induct and train enough practitioners while getting all the information across. The participants were then provided with a plethora of supplementary teaching and project materials, as well as regular and ad-hoc email support.

It was suggested by some Champions that sessions would have benefited from being longer (despite logistical and scheduling difficulties) and including more opportunities to ask questions throughout. It was felt that more time and attention could have been given to how practitioners could advise patients, as well as opportunities to discuss this amongst the other participants and practice together.

The response rate for end of project survey

The end of project survey was sent to all 43 Champions and received a 53% response rate (23 responses). A lower proportion of practitioners completed this survey than the two earlier surveys (100% pre-training and 90% post-training). It may be that the results from the end of project survey reflect the experiences of more enthusiastic participants who were more engaged with delivering the clean air message. Despite efforts to streamline the survey, the busy schedule of healthcare practitioners allows little time for non-essential tasks. In hindsight, the project team could have perhaps placed even greater emphasis on the importance of this final survey in measuring the success of the project. This was balanced against considerations for how often participants were emailed, as the project tried not to add overly to their workload. It became clear at the time of sending the end of project survey that several practitioners were on maternity leave or off work for another reason, and many were taking summer annual leave.

Self-appointed group

Those taking part in this pilot were self-appointing, and therefore likely more environmentally conscious than average. Caution must be exercised in making assumptions about the level of interest from the wider healthcare practitioner population.

Limited period of evaluation

The period of evaluation (from the teaching until end of study period) was approximately 4 months, which was shorter than the original plan of 6 months. COVID-19 and staff turnover accounted for much of the delay. Allowing a partial reduction in the period of study was appreciated to be the best balance between giving the practitioners enough time to gain insights and significant project delays.

It was commented on by the Champions that in order to assess behaviour change in their patients that the evaluation period would have had to have been significantly longer (upwards of 1 year).

Project Recommendations

Given the successful delivery of this pilot programme, we believe that the model should now be scaled up with the wider population of GPs and also with other healthcare professionals, both in primary care and elsewhere. Once healthcare professionals are aware of the significant health impacts of air pollution, they are very keen that air pollution information be made more widely available. This means teaching both the healthcare sector and the wider public at significant scale. The champion model is effective at spreading knowledge between colleagues locally, but this needs to be widely implemented and supported from the top-down in a united manner, with all healthcare institutions recognising the importance of air pollution.

Understanding all the different organisations and institutions involved with educating the healthcare sector would be a significant task. Getting them to coordinate their efforts for teaching relating to air pollution may be even larger, but this would be a powerful step in the fight against air pollution and its harms to human health.

Well-funded, enduring public health campaigns are also required, detailing the causes and dangers of air pollution. This would strongly support the efforts of healthcare professionals and make the population much more primed to hear air pollution health advice.

While there are clearly great benefits in healthcare professionals speaking to their patients about air pollution, our Champions understood that the individual only has so much power to change their local environment and circumstances. Participants would often discuss the need for more ambitious air pollution targets, as well as greater efforts in tackling the root causes at a local, regional and national level. GAP supports these calls for the greatest possible levels of ambition in tackling the health and ecological crisis of air pollution.

Opportunities for future work

Wider scale application of the Champions model

Considering that there have been several pilot studies involving healthcare professionals, increasing the size and ambition of future projects is a logical next step. This work could be applied to a Primary Care Network level (with full onboarding across the area being a requirement of success). or across an Integrated Care System level, with all practitioners across primary care and secondary care being taught to speak to their patients about air pollution.

Work with new staffing groups

There are many more nurses in healthcare than there are doctors, and many more types of staffing within the NHS, rather than just the different types of doctor. These are all excellent candidate groups for interventions that increase knowledge around air pollution and pilot projects would be welcome.

Test independent use of the air pollution protocol

One of the key outcomes of this project was the development of a protocol alongside communication materials that could be distributed to GPs across the UK. During this pilot, the wider communications materials were developed and tested with 43 healthcare practitioners. A three-page protocol has been developed to highlight the health impacts of air pollution and suggest points in the patient pathway to share this information. It also provides example phrases to help practitioners integrate air pollution advice into their practice. Testing whether independent use of this protocol at a wider scale is successful would be a useful area of future work, particularly with practitioners who do not have an existing interest in air pollution.

Explore whether GP engagement leads to long-term patient behaviour change

Due to the scope of this project and its focus on testing the champion model, the surveys and practitioner interviews largely explored practitioners' experiences of sharing air pollution information. We strongly recommend that future pilots more deeply explore the influence that healthcare practitioner interactions have on patients. Does a patient's awareness and understanding of air pollution increase as a result of the interaction? Do they make changes to their behaviour to minimise their exposure or contribution to air pollution as a result? Future pilots should incorporate an evaluation of patient knowledge, attitudes, and behaviour change. A similar project by Global Action Plan, focused on the borough of Islington is currently running and has evaluation of patients' knowledge, attitudes and behaviour around air pollution. The patient surveys are running outside practices where healthcare professionals have been taught to share air pollution information with their patients. A study with focused interviews with patients who were previously given air pollution advice, assessing the impact on their knowledge and behaviours would give further insight.

Mapping the healthcare education sector

Medical education is a widespread and often disconnected series of institutions, from the undergraduate level, through the professional training years and beyond into work as a consultant. Training requirements are lifelong with CPD evidence required to maintain a license to practice. There are a great number of institutions that would require onboarding if even just the medical education sector is to understand and teach air pollution information in keeping with the health crisis it presents. Work to map them, determine their current level of air pollution teaching and then campaign for greater inclusion would put air pollution in the prominent place it deserves in understanding. This of course could be repeated across the range of healthcare professions and their respective education pathways.

The [Chief Medical Officer's 2022](#) report focused on air pollution, and (among other things) called for “the training of healthcare staff on the health effects of air pollution, including communication with patients.” Until widespread training provision is made available, this project demonstrates an appropriate avenue to educating patients about air pollution through health professionals.

Learning points for future work

While the format appears to have been effective in empowering GPs to talk about air pollution with patients and share information with colleagues, several improvements were identified from the survey and project interviews that may help sharing the clean air message with a wider group of patients. Recommendations include:

Offer more advice and practice around initiating a conversation on air pollution

As previously mentioned, training sessions were limited to hour-long online sessions due to COVID-19, with minimal time for questions and answers or group discussion. Practitioners reported that they would have liked the opportunity to watch a mock consultation video, or role-play conversations with patients to help them understand how best to start an air pollution conversation. Introducing the conversation was considered particularly challenging during the time of the COVID-19 pandemic and the cost-of-living crisis. Several attendees highlighted that the session could be more interactive, where they could also learn consultation techniques:

“how to talk about it in a consultation when people are more worried about food on the table or heating their home”

Several attendees suggested providing a sample GP consultation video to demonstrate the dynamics taking place when giving information to patients:

“how it can naturally be brought up in an ordinary appointment”

It became clear that, for the study participants, learning to convey appropriate messaging to patients is a journey rather than an event. GPs need time to try different approaches and practise ways of introducing the message to different groups of patients. Many GPs felt that they were still learning and discovering how best to deliver clean air messaging to patients.

The accessibility of communications materials could be improved in future

Language

It was highlighted that materials should be available in other languages as in some areas a significant percentage of the population do not speak English as their first language. We were able to make available electronic versions of the leaflets in Bengali, Turkish and Somali to several practitioners who requested them, as translations had been created as part of another GAP project engaging primary care.

Digital exclusion

Mixed views were expressed regarding the use of electronic and paper leaflets. Those advocating for electronic resources highlighted that printed resources generate waste and people rarely referred back to

them. Supporters of printed resources expressed the view that some elderly patients and those who don't have access to smart phones or computers benefit from having the resources in a printed form. It was also stated that having printed resources available in waiting rooms could spark patient's interest in the subject and a desire to know more.

"...some people don't have the electronic media, like elderlies and care homes and things, so very limited leaflets supplied to them may be beneficial" GP_8

"I think it's good to have some printed out things as well... And people are just sitting in waiting rooms with nothing to do, and sometimes they just read whatever's there and it can just be useful to have that physical leaflet to be there". GP_7

Provide further information on the role of GPs as advocates for change

Champions mentioned wanting further information about how they might be able to influence wider changes in public behaviour such as e.g. getting people to leave their cars at home to reduce their contribution to air pollution, or calling for councils to make changes that encourage active transport. For example, one GP said they wanted to know:

"what clinicians can do to influence systems and advocate for patients on this as individual action by patients to minimise their exposure to air pollution is not tackling the root cause"

"I think it is really useful for trainees because we're... practicing the way that we consult and building things in and getting a kind of structure. And so I think it's useful to have things like this built in from the beginning and to have an awareness and right from when you start practicing" GP_6

Provide more empirical evidence about air pollution exposure and transport options

Practitioners were keen to have access to the latest figures on the level of air pollution exposure associated with different forms of transport so that they could back up the advice they were giving with evidence. This could be built into future courses.

Identify opportunities to reach patients with air pollution information e.g. Clean Air Day/Flu Jab clinics

During this project, Clean Air Day provided practitioners with a useful opportunity to start up conversations with their patients and colleagues about air pollution. Helping them to identify other relevant 'hooks' such as UN awareness days could help them to initiate conversations about clean air. In addition, identifying opportunities to reach specific vulnerable patient groups (e.g. offering flyers to older patients attending the surgery to receive flu jabs) could help to ensure that a wider patient group is reached with air pollution information, not just those attending specifically GP appointments.

Case Studies and GP Experiences

“So one patient lives on a busy road and didn't know anything about air pollution in terms of impact on health, and so it was a bit of eye opener for her, so it's been really, really sort of positive.”

“I think that the patients just didn't really realise how much air pollution can have an impact on their overall health, and I guess as it's invisible, and if you've lived in London your whole life and you're kind of used to breathing it you might not notice air pollution, so it's it was more making people aware of it and what the impact is on their overall health and different body systems not just on respiratory health.”

“I had a patient with fairly advanced COPD who is really quite breathless and I have been seeing her over several occasions to look at her breaths once again to see whether there's anything else going on. And so I spoke to her about air pollution and so she was really interested but, I think perhaps, [I would] expect somebody like her to be because she's very symptomatic from her breathlessness. It affects her day-to-day, so actually, and I think often she's sort of told, well, you know, this is your condition. This is how it is. You've kind of got to live with it, whereas, I think to her, it kind of felt like something she could actually do actively that could have a positive impact for her and help her feel better.”

“I had a mum with their 8–9-year-old child who came in with difficulty breathing and we were talking about asthma and what could contribute to asthma or what could contribute to respiratory symptoms, with air pollution being one of them.

And so it was just a very natural to bring up air pollution. “Is there anybody who smokes in the house? What's the exposure like to air pollution? We know air pollution can make breathing difficulties like this.” And that's when I used tools like the post code/air pollution search (addresspollution.org). “Did you know that this is the air pollution in our area at the moment?” “Ohh, that's quite bad” she said. I could then start giving sort of practical advice about avoiding air pollution at times of day or on busy routes. I'm optimistic that the patient then went away and did the things to avoid air pollution. I don't know for definite, but they were there because of their child's health, and they were taking interest in it.”

“Having my electric bike in my consulting room creates a lot of opportunities for discussions as well. Simple prompts that get people talking are really useful.”

“Most patients are quite happy to hear messaging, I think. I think it's important to be able to give them practical, realistic advice about how they can reduce their exposure. I suppose where I live and work it's a small town and some people might not perceive air pollution as being that big an issue, which it probably is less of an issue than it is in big city centres, but I'm sure it still has an impact, and certainly on my air quality monitor the nitrogen dioxide levels in my office rise steadily as the day goes on.”

“Post-natal checks are a really good setting because most new parents are really keen to do everything they can to improve the health of their children and the outlook for their children.”

“Patients who have asthma and have had more frequent exacerbations recently - talking to them, they were quite receptive to thinking about how even just things like trying to walk on different streets at different times and trying to just reduce their direct risk from air pollution. And you know they were interested in that. Those kinds of practical things and understanding a bit more about how their asthma diagnosis and air pollution are potentially linked.”

Appendix

Recruitment and geographic distribution of participants

To ensure the GPs that received training were representative of the population, they were recruited from across England. The socioeconomic distribution of patient groups was assessed by entering the postcodes of GP Champion practices into the government's 'English Indices of Deprivation' website. The output showed a full range of scores, from 1 to 10, for both the 'Income Decile' and the 'Multiple Deprivation Decile' indices. Since 2015, GP practices have been able to register new patients who live outside the practice area, however we anticipate that a majority of patients reside within the area of their local GP practice. This being the case, the patient group covered by the study experiences the full range of income and deprivation levels.



Figure 4 - Map showing the location of GPs trained as Clean Air Champions during the pilot

Priority patients identified for air pollution advice by co-design group

The following patient groups were identified as being particularly relevant for receiving air pollution information:

- Asthma – Annual asthma reviews, 48hr post-discharge
- COPD
- Emphysema
- Chronic Bronchitis
- Heart and Circulatory Disease
- Lung Cancer
- Dementia
- Low birth weight
- Type 2 diabetes
- Pregnancy
- Preconception and infertility
- Post-natal
- Mental health – eg anxiety/depression, psychosis
- Learning Disability reviews
- Those invited for a 'flu jab (older and clinically vulnerable population)
- All children

Training content

The training sessions comprised the following sections:

- Introduction and welcome from GAP
- Pre-recorded video welcome from Professor Jonathan Grigg
- Overview and importance of air pollution
- The context in England
- The ways that air pollution impacts human health, including an excerpt from an online talk delivered by Professor Sir Stephen Holgate
- The patient groups most relevant to receive information on air pollution
- Opportunities on the patient pathway for informing patients about air pollution: Before, during and after a GP consultation
- How to become a 'Clean Air Champion' by sharing the training with colleagues
- (Post session) Questions and discussion

GP Clean Air Protocol

See accompanying Protocol PDF document file
