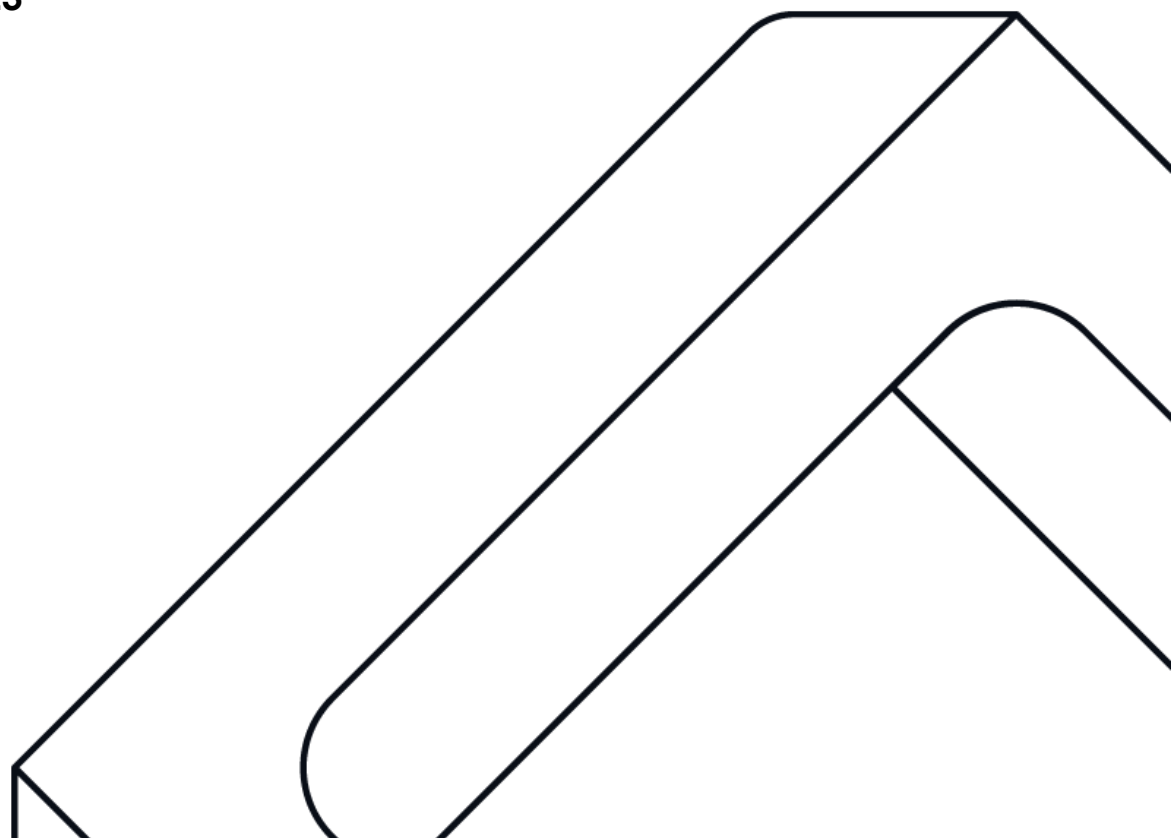
Appendix 3: Air quality qualitative research panel

– Wave 3

December 2023

Version: 1



Contents

1. Topic guide

Qualitative Research Panel for Air Quality Information System Review – Wave 3

Discussion guide

Background

Defra and UKHSA have established the Air Quality Information System (AQIS) review to improve the quality and provision of air quality information to the public. The AQIS review is guided by a multi-disciplinary steering group and is intended to inform the development of communications that will help at-risk groups and the wider population to change their behaviours and reduce their exposure and contribution to air pollution.

The steering group has suggested that communications approaches should be developed in collaboration with members of the public, with insights and materials to test evolving throughout 2023 as the review progresses.

To this end, a qualitative panel has been set up that will take place over three waves of activity in 2023.

The panel is intended to deliver three overarching objectives:

- To gain deeper understanding of the knowledge, attitudes and behaviours of the general population and at-risk groups, with regard to air pollution (avoiding it, and reducing contributions to it)
- To elicit insight into the barriers and facilitators that influence desired behaviours, and other factors relating to communications that seek to change behaviours
- To facilitate co-design communications approaches, taking into account the understanding and insights generated earlier in the project

Wave 3

Wave 3 will be used to explore two main themes:

- Leveraging existing opportunities for information dissemination
- Attitudes to current and new stimulus materials

Based on these themes, six high-level research questions will focus on:

Leveraging existing opportunities:

- What is the role of verbal communication in the dissemination of air quality information and what are the peer-to-peer opportunities afforded by interpersonal relationships?
- To what extent are there 'Moments of Change' in an individual's life course that might provide opportunities to leverage air quality related behaviour changes?
- Which are the most influential factors and key actors when making decisions that have a long-term impact on future polluting behaviours?

Testing new materials:

- How do participants interpret and respond to air quality risk communications where risk is defined based primarily on longer-term pollution levels, rather than short-term health effects?
- Can infographic presentation of data increase understanding and salience of air quality messages?
- What elements of the working and framing of new air quality messaging on air pollution and air pollution health impacts do participants find more/less helpful/engaging?

These questions will be explored across:

- Online group discussions
- An online post-task

This document details the planned approach to the online group discussion for the groups.

Key contacts

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Discussion guide structure (90 minutes total)

Section	Aim	Time
1. Introduction	Remind about research; reassure about confidentiality; set tone of discussion; reconnect with group. **RECORD**	5 mins (5)
2. Warm up	Warm up participants; find out how they have been since Wave 2, whether air quality has been more top of mind	8 mins (13)
3. Social networks and potential of these to influence opinions on air quality	To understand participants' own networks that may influence opinions and decision-making in general and associated with air quality o Personal networks	20 mins (33)

	○ Wider networks ○ Education and pastoral	
4. Lifestage timepoints	Explore impact of timepoints that present opportunities for influencing air quality	10 mins (43)
5. Time in point long-tern decision-making	Explore prescribed list of long-term decisions and understand elements and influences of decision-making process ○ Usefulness of information ○ Decision-making process	15 mins (58)
6. Test infographics	Explore responses to infographics and how these may contribute to understanding of types and impact of pollutants	20 mins (78)
7. Final comments & wrap up	Summary, reminder of next steps and close session	12 mins (90)

Stimulus:

PowerPoint slides showing:

- **Stim 1:** List of longer-term decisions that impact personal polluting levels
- **Stim 2:** Types of pollutants
- **Stim 3:** Pollutants that affect air quality

Please note, this guide is not a script and is intended to be used flexibly, with participant responses guiding the flow of the conversation, topics covered in the order that they naturally arise, and probes used only when needed.

1. Introduction (5 mins)

AIM: Remind about research; reassure about confidentiality; set tone of discussion; reconnect with group

Research introduction

- Remind who you and Kantar (Public Division) are – an independent social research agency
- Kantar is conducting this research on behalf of Defra to help Defra decide how best to inform the public about air quality
- The purpose of the research is to understand more about how air quality messages could be disseminated effectively and to capture their impressions on some air-quality information and communications
- Group length – 90 minutes
- Participation is voluntary and confidential – no quotes or details will be attributed to named individuals or to any business they have worked for
- Kantar's privacy policy can be accessed on the website: https://www.kantar.com/uki/surveys
- Reassurances – there are no right or wrong answers, we are seeking different views and perspectives
- Thank you for continued involved in the project
- Remind that the discussion will be video recorded

House rules

- We ask that they switch their phones off/on silent and do not use them during the session
- We expect to hear from everyone during today's discussion, so please do listen and respond to what others say
- Try to avoid interrupting or speaking over each other to ensure everyone can be heard; please respect people's answers
- We know there is a lot to say on this topic, but we only have a limited amount of time so we may need to move on the conversation to ensure we stay on time and on topic
- What they say today will not be shared with or viewed by anyone outside of the research team at Kantar Public
- This is a safe space – can we please agree amongst ourselves now that everything that is discussed in this room remains confidential and is not shared or discussed outside of this group today
- Remind participation is voluntary and confidential and if there is a question they do not want to answer, for whatever reason, that is OK

- Any questions/concerns

Recording

- Ask participants for permission to record: recording is purely so as not to miss any comments and help with note taking and the recording may be shared with other members of the Kantar Public research team – but will not be shared any further than this
- Start recording and confirm consent on recording

2. Warm up (8 mins)

AIM: Warm up participants; reintroduce themselves, find out how they have been since Wave 2, whether air quality has been more top of mind

Participant introduction

Each participant to re-introduce themselves to the group and remind us:

- Your name, where you live and who you live with
- Whether air quality/pollution has been more top of mind, if so, in what ways

3. Social networks and potential of these to influence opinions on air quality (20 mins)

AIM: To understand participants' own networks that may influence opinions and decision-making in general and associated with air quality

Moderator: Before we talk more specifically about air quality, I want to understand more about their own personal face-to-face networks (so not online) that may influence how, what they think about, and decisions they make in life in general

Personal networks

- Firstly, have you been talking to other people about air quality since we have started the research – if so, who to and what have been the topics of conversation
- What types of people would you say are within your personal networks: people that you interact with on a fairly regular basis, to help build a picture of the key influencers in your life
    - PROBE: think about friends, family, work colleagues, people that share similar hobbies/beliefs to you, people with similar care responsibilities, people in your community
- And what kind of issues, if any, would you talk about or share with these people

- Would you say you tend to discuss issues linked to public health, the environment or civic engagement
- If so, who do you tend to have these types of discussions with predominantly – and where and when
- Can you share any examples of these types of conversations
    - What were they about
    - What triggered them
    - How did the conversation progress
    - Can you remember whether it influenced your opinion or decision-making – or that of the other person/people you were talking to

Moderator: where relevant probe certain members of your groups if you recall them mentioning conversations they may have had with people in their networks and shared with you in previous groups (for example, selecting primary school based on proximity to roads, highlighting dangers of wood burners to a friend with a persistent cough)

Wider networks

- Now, thinking beyond your more immediate personal network, who are the professionals you may go to for advice specifically related to your health, or the health of other people you may care for
    - **Await spontaneous response and then PROBE:** GP, community health practitioners, pharmacists, ante/post-natal practitioners, health visitors, carers, care home or nursing home workers etc
- Do you see these, or other professionals, having a role in sharing information about air quality and potential health impacts; why is that
- Can you identify particular timepoints where healthcare professionals could discuss air quality and potential health impacts

<u>For at risk groups:</u>

Probe if not covered above:

- Which healthcare professionals do you interact with based on your own circumstances (i.e. carers: when pregnant or caring for young children; respiratory conditions/cardiovascular: when managing conditions/symptoms; older adults for aging well)
- When are there opportunities for healthcare professionals to discuss air quality and potential health impacts with you
    - PROBE: Respiratory: asthma diagnosis, annual review, medication request; Cardiovascular consultant appointment; Carers: antenatal check-ups/health visitor checks

All:

- Can you talk me through what this might look like
    - What might healthcare professionals say
    - How might this be raised and discussed
    - What type of information should be provided
    - Are there considerations/sensitivities to bear in mind
- Would you anticipate healthcare professionals being proactive in highlighting air quality as a potential risk factor or do you think they should only respond to patients' particular concerns, or both; why is that
- Have you ever highlighted air quality as a concern to your healthcare provider
- If so, can you talk through any conversations about this
    - How was the conversation initiated
    - What was discussed
    - Were you signposted to any further information resources or given information to take away
    - What was the outcome
    - Reflecting back on the conversation, how do you feel about that now
    - Are there any ways you feel it could have been improved

Education and pastoral

Thinking beyond healthcare professionals:

- What do you feel is the role of nurseries/pre-schools/schools/colleges/universities in raising awareness among/educating parents and carers on the topic of air quality
- What do you feel is the role of these organisations in engaging pupils and students on air quality
- To what extent do you feel this role differs depending on the age of the child – and how would this ideally vary
- Is this important: if so why, why not
- How should this be addressed through education
- Talk through what this should look like
- Is there a role for pupils and students to support in disseminating the messages they learn more widely in society
- Why is this
- How could this role be harnessed to improve wider understanding of the impact of air quality

4. Impact of life stage timepoints (10 mins)

AIM: Explore impact of timepoints that present opportunities for influencing air quality behaviours

Moderator: We know that some of you identified key life decisions such as moving home, having a child, that may influence you to engage more with air quality information

- Can you think of other decisions or times in your life when you think air quality information may be of more interest or be more relevant to you
    - PROBE: previously participants have mentioned: having a child, selecting a school, a health diagnosis
- Can you talk me through any experiences of this
- What was the issue/concern
- Who were the main people you discussed this with
- Where did you go to get information to help inform your decision-making
- What decisions/choices, if any, did you feel you had
- What was the outcome

Moderator: Take an example of a decision raised within the group, and ask participants to consider who they would approach when decision-making around this topic

- Who would be the people you would discuss this with
- What would be the key information you would want to know to help make your decision
- Would they expect to talk through any concerns face-to-face with any individuals, if so why and with whom
- What would be the key sources of information/advice

5. Point-in-time long-term decision making (15 mins)

AIM: To explore prescribed list of long-term decisions and understand elements and influences of decision-making process

Moderator: Share screen and show Stim 1, examples of point in time decisions that have a long-term impact on polluting behaviours

Explain this is a list that Defra has compiled that details the key decisions people make that can have a long-term impact on personal emissions

These are distinct from the shorter-term day-to-day decisions we have discussed previously such as routes to take/avoid and decisions around means of travel

Talk through the list with participants

Usefulness of information

- Looking at this table, what are your first impressions of this list, anything that stands out
- Is there anything missing from the list that you feel should be included
- Would you consider these decisions as having a significant environmental impact
- Why is that
- Which ones stand out as making the most environmental impact
- Why is that
- And which ones, if any, do you associate with having the least impact on the environment
- How do you think awareness of the environmental impact of these decisions could be increased

Decision-making process

Moderator: Taking one or two decisions that have been mentioned in the group

- If you are having to, or have recently made this decision, what kind of things would influence your decision
    - Await spontaneous response and then PROBE: cost/affordability, practicalities, desirability, aesthetics, current trends/influences
- **If not raised spontaneously:** Would there be any environmental considerations; what would they be
- And where do the environmental considerations sit in terms of overall considerations; why is that
- Are there any particular people in your own networks that you would speak to face-to-face to discuss this decision **Moderator: think back to potential earlier responses on networks**
- Who are the people/information sources you would potentially turn to for advice when making this decision; why is that
- Would this be face-to-face, by phone, online, email
- Can you think of any specialists/experts you might engage with to help with decision-making
- Again, what might this look like: face-to-face, online, email, phone
- Are there any other people who might influence thinking about this decision
    - PROBE: Peer influence, marketing, local community initiatives, influencers etc
    - And how might these influencers make the decision more or less appealing

- What other information sources might you turn to for help with decision-making
    - PROBE: online (comparison sites, energy trust, social media)
- Why would you go to these information sources
- How many sources/opinions would you seek before being satisfied that you fell well-informed and would any be more important than others (if so, why)

6. Test infographics (20 mins)

AIM: Explore responses to infographics and how these may contribute to understanding of types and impact of pollutants

Moderator: Share screen and show Stim 2, types of pollutants

Explain this is infographic highlights the different types of pollutants and the major sources of these as well as the impact on people who are at greater risk of being affected. Give participants a few minutes to read through the infographic

- Looking at this infographic, what are your first impressions of it and what do you take from it
- How does it make you feel and why
- What stands out
- What elements do you like/dislike
- Are there any points of confusion or that need additional clarification, are the terms adequately explained; if not, how could they be improved
- Does this infographic improve understanding of the types of air pollutants and reasons
- If it does improve understanding, what specific elements of the infographic contribute to this
- Could anything be changed, i.e. how the information looks or is presented to make it easier to understand
- Do you think there is anything missing that you feel needs to be added or any other information that would be useful to support this: what and reasons
- Where would you expect to find this infographic and who do you think the audience is or should be
    - PROBE: organisations, professionals
- And would you expect anyone to share this with you
    - PROBE: refer to earlier discussion about networks, healthcare professionals, experts
- If you did come across the infographic, to what extent do you think you would take the time to read it, why, and how would that be affected by how you came across it/who shared it

- And would you want to discuss it with anyone in your personal network : if so, who and why

Moderator: Share screen and show Stim 3, pollutants that affect air quality
Explain this second infographic seeks to highlight the sources of pollutants and explain the health impacts the Primary Particulate Matter (PM 2.5) can have
It also highlights which people are more at risk of being affected
Give participants a few minutes to read through the infographic

- Looking at this infographic, what are your first impressions of it and what do you take from it
- How does it make you feel and why
- What stands out
- What elements do you like/dislike
- Why is that
    - PROBE: visual element, colours, icons, information flow
- Are there any points of confusion or that need additional clarification, are the terms adequately explained; if not, how could they be improved
- Does this infographic improve your understanding of types of pollutants and their health impacts; why, why not
- If it does improve understanding, what specific elements of the infographic contribute to this
- Could anything be changed, i.e. how the information looks or is presented to make it easier to understand
- Do you think there is anything missing that needs to be added or any other information that would be useful to support this: what and reasons
- Where would you expect to find this infographic and who do you think the audience is or should be
    - PROBE: organisations, professionals
- And would you expect anyone to share this with you
    - PROBE: refer to earlier discussion about networks, healthcare professionals, experts
- If you did come across the infographic, to what extent do you think you would take the time to read it, why, and how would that be affected by how you came across it/who shared it
- And would you want to discuss it with anyone in your personal network : if so, who and why

7. Wrap up (12 mins)

AIM: Summary, reminder of next steps and close session

Final comments

- Does anyone have anything else they would like to add, which they haven't had the chance to say today

Next steps

- The online task for this wave starts next week (Monday 25 September). This time there will only be one interaction with the Recollective platform, but for a longer period of time (up to 30 mins in total). We will present a visual of a mock website page for feedback and also test out some already published Air Quality information to gather responses. Responses will need to be completed by Friday 29th September
- They will receive an email inviting them to join the platform again on Monday morning
- Any initial thoughts or questions about this?

Payments

- Remind of incentive payments
    - Focus group (£50 – transferred within 10 days)
    - For the Recollective task (£30) – transferred within 10 days of the end of the task
    - For those who have attended all three focus groups and completed all Recollective tasks the bonus incentive (£50) will be paid within 10 days of the end of the task

Final thank you

- Thank participants for their participation and commitment across the past seven months to the project
- Highlight that Defra has been really pleased with the insights and we have received some great feedback from people within Defra and also from other professionals working within the field of air quality
- Explain we hope participants have found the experience interesting, informative and maybe a bit fun!
- Emphasise that the research will be published, alongside other work Defra is collaborating on in relation to air quality and we will leave a link on the online community to show where to look for more information
- If time, ask participants what they have enjoyed or found the most interesting

Close


SYSTEM CERTIFICATION
ISO 14001
SGS
UKAS
MANAGEMENT
SYSTEMS
0005
PRODUCT CERTIFICATION
ISO 20252
SGS
UKAS
PRODUCT
CERTIFICATION
0005
SYSTEM CERTIFICATION
ISO 27001
SGS
UKAS
MANAGEMENT
SYSTEMS
0005

2. Stimulus

KANTAR PUBLIC

Qualitative Research Panel for Air Quality Information System Review

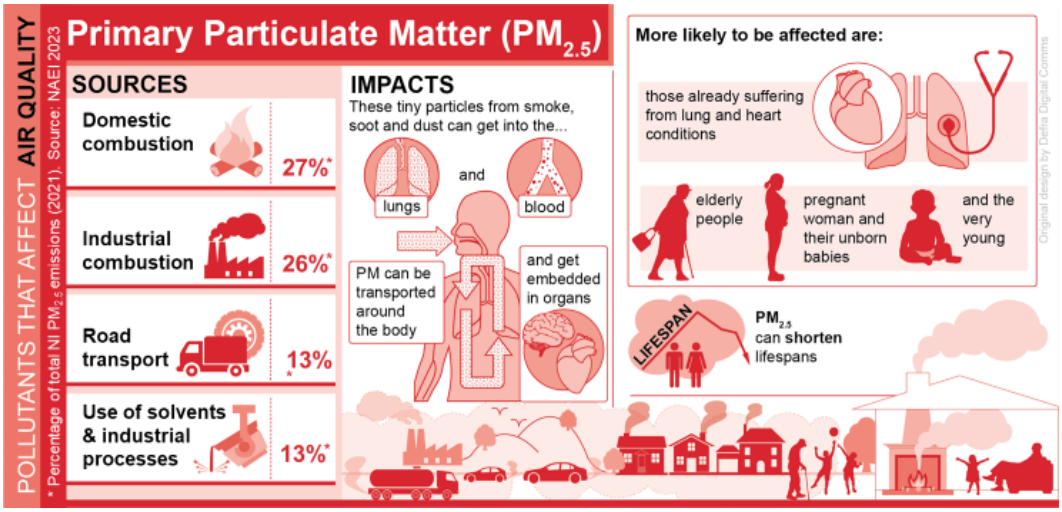
Clean Air & Me
WAVE 3
Online group discussion stimulus

Stim 1: List of longer-term decisions that impact personal polluting levels

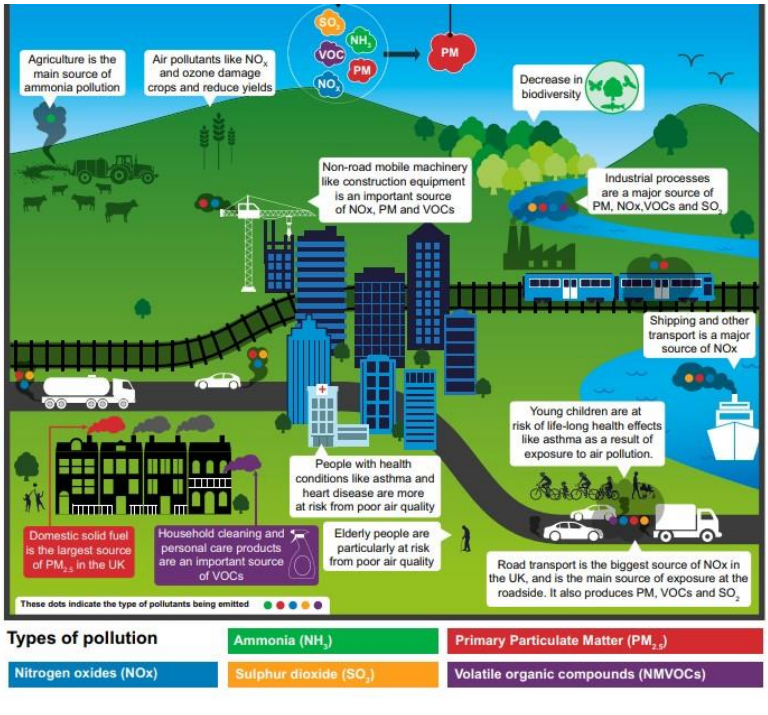
Decisions on:

- **Heating systems in the home,** i.e. replacing or installing a new burning appliance, gas or electric boiler, heat pump
- Installing **home insulation or ventilation**
- Buying a **new vehicle or an annual travel pass** (train/bus)
- Buying a **new cooking appliance**
- **Where to live** i.e. living closer to public services and transport links, work/school to be able to travel in a more sustainable way

Stim 2: Pollutants that affect air quality



Stim 3: Types of pollutants



3. Recollective tasks

KANTAR PUBLIC

Qualitative Research Panel for Air Quality Information System Review

Clean Air & Me
WAVE 3

Online Community
Post focus group task

1. Mock-up 1 - Introduction

Welcome to your first activity!

Please find below a mock -up of a potential .gov.uk website that provides local air quality information.

Imagine you want some information about the air quality where you live. You add a postcode and are presented with these results. (Please note we have added a dummy postcode for the purposes of this activity.)

We are going to ask you to review the website mock-up. Please take your time to read through the information firstly.

When you press "Continue" below, you will move to the task where you will be asked to record your screen and to talk out loud telling us what you think of the mock-up website. You will not be filmed - only your screen, where you move your mouse/keypad and your voice will be recorded!

Please close any unnecessary windows/tabs before proceeding.

To complete this task you must use one of the following browsers:

- Google Chrome
- Mozilla Firefox
- Microsoft Edge

2. Mock-up 1 - Screen Record

Welcome to your first activity!

Please find below a mock -up of a potential .gov.uk website that provides local air quality information.

Before we get started, please read through and then follow the instructions below to set up your screen to record your response to the mock -up website.

1. Firstly, click "Open instructions in a new window to keep them visible" at the bottom of these instructions
2. Then click the green "Share Screen" button below and select 'Entire Screen' from the pop -up window.
3. Click on the "Get Started" button that appears to open the mock -up website and start the recording of your screen.
4. You can now start the activity. REMEMBER TO TALK OUT LOUD.
5. Please try to record your screen for no longer than 2 -3 minute

2. Mock-up 1 - Screen Record

Imagine you want some information about the air quality where you live. You add your postcode and are presented with these results. As this is a mock-up the links are not active and you can't interact with the page.

Please talk out loud and move your cursor around the screen to show us what your talking about, and answer the following:

- What are the first impressions of what you see?
- What do you like/dislike?
- Is there anything that causes confusion?
- Is there anything missing you would like to see here?
- Overall, how does this information make you feel?

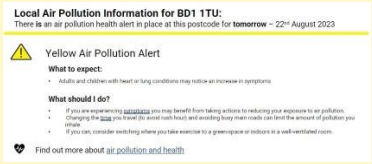
Show us, using your cursor and talk through what you are interested in and why

Once you've answered the above questions, please return to the task and select 'Save Recording'. The system will take some time to compress and upload the video. Once this is done and you're happy with your response, please select 'Done' and proceed to the next task

3. Air pollution alert

Thank you for completing that task.

We are now going to ask some more detailed questions about two specific elements of the mock-up page you just reviewed.



Firstly please look at the local air pollution alert feature.

Please click on the image of the alert below to enlarge it so that you can view it better, and complete the questions underneath.

Please describe briefly what this alert is telling you

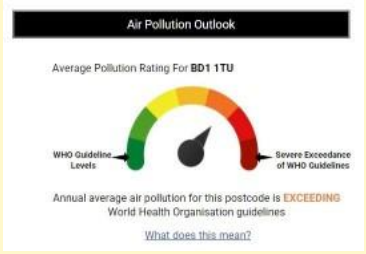
Please let us how useful this is to you (usefulness scale) and why

Scale: 1: Not at all useful, 2: Slightly useful, 3: Somewhat useful, 4: Very useful, 5: Extremely useful

Please complete the following sentence: I think the air pollution health alert is Very clear/Clear/Confusing/Very confusing because

4. Air pollution rating

Now we would like to ask some more detailed questions about another element of the mock-up website page - the Air Pollution Rating.



Please click on the image of the alert below to enlarge it so that you can view it better, and complete the questions underneath.

Please describe briefly what this rating is telling you

Please let us how useful this is to you (usefulness scale) and why

Scale: 1: Not at all useful, 2: Slightly useful, 3: Somewhat useful, 4: Very useful, 5: Extremely useful

Please complete the following sentence: I think the average air pollution rating is Very clear/Clear/Confusing/Very confusing because

5. Air pollution reading

Thank you for completing that task. Now we would like to ask some more detailed questions about some specific elements of the mock-up website page you just reviewed - the air pollution reading and map.

Please click on the image of the air pollution reading below to enlarge it so that you can view it better, and complete the questions underneath.

Please describe briefly what this reading is telling you

Please let us how useful this is to you (usefulness scale) and why

Scale: 1: Not at all useful, 2: Slightly useful, 3: Somewhat useful, 4: Very useful, 5: Extremely useful

Please complete the following sentence: I think the air pollution levels reading for today is Very clear/Clear/Confusing/Very confusing because

6. Air pollution map

Now we would like to ask some more detailed questions about other element of the mock-up website page - the air pollution map.

Please click on the image of the alert below to enlarge it so that you can view it better, and complete the questions underneath.

Please describe briefly what this map is telling you

Please let us how useful this is to you (usefulness scale) and why

Scale: 1: Not at all useful, 2: Slightly useful, 3: Somewhat useful, 4: Very useful, 5: Extremely useful

Please complete the following sentence: I think the map is Very clear/Clear/Confusing/Very confusing because

7. Mock-up 2 - Introduction

Please find below a second mock -up of a potential .gov.uk website that provides an air pollution statement. .

Imagine you now want some more detailed information about air pollution where you live.

You add your postcode and are presented with these results. These results tell you about the annual concentrations of different pollutants so you would only look at this maybe once a year. (Please note, once again, we have added a dummy postcode for the purposes of this activity.)

Like with the first task, we are going to ask you to review this website mock -up.

Please take your time to read through this information.

When you press "Continue" below, you will move to the task where you will be asked to record your screen and to talk out loud telling us what you think of the mock-up website. You will not be filmed - only your screen, where you move your mouse/keypad and your voice will be recorded

Again, please close any unnecessary windows/tabs before proceeding. To complete this task you must use one of the following browsers:

Google Chrome, Mozilla Firefox or Microsoft Edge

8. Mock-up 2 - Screen Record

Before we get started, here are the instructions again of how to record your response. Please read through and then follow the instructions

1. Firstly, click "Open instructions in a new window to keep them visible" from the bottom of these instructions
2. Then click the green "Share Screen" button below and select 'Entire Screen' from the pop -up window.
3. Click on the "Get Started" button that appears to open the mock -up website and start the recording your screen.
4. You can now start the activity. REMEMBER TO TALK OUT LOUD.
5. Please try to record your screen for no longer than 2 -3 minutes.

8. Mock-up 2 - Task

Before we get started, here are the instructions again of how to record your response. Please read through and then follow the instructions

Now imagine you want some more detailed information about air pollution where you live. You add your postcode and are presented with these results. These results tell you about the annual concentrations of different pollutants. Also, by answering a number of additional questions about your home (we have added dummy answers for the purposes of this task), you are presented with colour-coded boxes that represent possible exposure to pollutants inside the home.

As this is a mock-up the links are not active and you can't interact with the page.

Please talk out loud and move your cursor around the screen to show us what you are talking about, and answer the following

- What are the first impressions of what you see?
- What do you like/dislike? Is there anything that you find confusing?
- Is there anything missing that you would like to see here?
- Overall, how does this information make you feel?

Show us, using your cursor and talk through what you are interested in and why.

Once you've answered the above questions, please return to the task and select 'Save Recording'. The system will take some time to compress and upload the video. Once this is done and you're happy with your response, please select 'Done' and proceed to the next task

9. Outdoor air pollution statement - Image review

Thank you for telling us your thoughts. We now want you to answer some more detailed questions about particular aspects of this potential mock-up website

Using the thumbs up/down icons, please highlight elements of the reading that you like/understand or do not like/ understand including what the different pollutants and symbols mean.

1. Please use 👍 the elements you like and 👎 for the elements you dislike by placing the markers directly on the parts of the image that stand out for you.
2. Please explain your reasoning in the comment box. In your response, you may want to consider what you find clear or confusing, or what is easy or difficult to understand .

10. Outdoor air pollution statement

Now we would like to ask some more detailed questions about the top part of the page.

Please click on the image below of the outdoor air pollution statement to enlarge it so that you can view it better, and complete the questions underneath.

Please complete the following sentence:

I think the outdoor air pollution statement is Too detailed/Detailed/Not detailed enough because

How could this statement be improved?

11. Indoor air pollution statement - Image review

We now want you to answer some more detailed questions about some other aspects of this potential mock-up website

Using the thumbs up/down icons, please highlight elements of the reading that you like/understand or do not like/ understand including what the different pollutants and symbols mean.

1. Please use the elements you like and for the elements you dislike by placing the markers directly on the parts of the image that stand out for you.
2. Please explain your reasoning in the comment box. In your response, you may want to consider what you find clear or confusing, or what is easy or difficult to understand.

12. Indoor air pollution

Now we would like to ask some more detailed questions about the bottom part of the page

Please click on the image below of the indoor air pollution statement to enlarge it so that you can view it better, and then complete the questions underneath.

Would you say the statement is Detailed or not detailed enough?

Why?

I would be Happy/Unhappy to provide the requested information about my home because

Please let us how useful this is to you.

Scale: 1: Not at all useful, 2: Slightly useful, 3: Somewhat useful, 4: Very useful, 5: Extremely useful

Why

How could this statement be improved?

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13. Why air pollution is a problem

Thank you for giving your feedback on the mock-up web pages.

Please now find an extract from the .gov.uk website on 'Why air pollution is a problem.'

Please read through the text and answer the questions below.

Please click on the image below to enlarge it so that you can read it better.

Health matters: air pollution - GOV.UK (www.gov.uk)

Air pollution has a significant effect on public health, and poor air quality is the largest environmental risk to public health in the UK. In 2010, the Environment Audit Committee considered that the cost of health impacts of air pollution was likely to exceed estimates of £8 to 20 billion.

Epidemiological studies have shown that long -term exposure to air pollution (over years or lifetimes) reduces life expectancy, mainly due to cardiovascular and respiratory diseases and lung cancer. Short -term exposure (over hours or days) to elevated levels of air pollution can also cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in respiratory and cardiovascular hospital admissions and mortality.

Air pollutants are emitted from a range of both man -made and natural sources. Many everyday activities such as transport, industrial processes, farming, energy generation and domestic heating can have a detrimental effect on air quality.

The UK Health Forum and Imperial College London, in collaboration with and funded by Public Health England (PHE), developed a modelling framework and estimated that a 1 µg/m3 reduction in fine particulate air pollution in England could prevent around 50,900 cases of coronary heart disease, 16,500 strokes, 9,300 cases of asthma and 4,200 lung cancers over an 18 year period.

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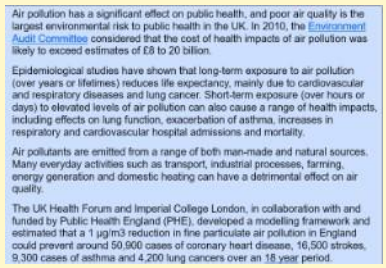
13. Why air pollution is a problem

Please complete the following sentences:



Air pollution has a significant effect on public health, and poor air quality is the largest environmental risk to public health in the UK. In 2010, the Environment Audit Committee considered that the cost of health impacts of air pollution was likely to exceed estimates of £8 to 20 billion.

Epidemiological studies have shown that long-term exposure to air pollution (over years or lifetimes) reduces life expectancy, mainly due to cardiovascular and respiratory diseases and lung cancer. Short-term exposure (over hours or days) to elevated levels of air pollution can also cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in respiratory and cardiovascular hospital admissions and mortality.

Air pollutants are emitted from a range of both man-made and natural sources. Many everyday activities such as transport, industrial processes, farming, energy generation and domestic heating can have a detrimental effect on air quality.

The UK Health Forum and Imperial College London, in collaboration with and funded by Public Health England (PHE), developed a modelling framework and estimated that a 1 µg/m3 reduction in fine particulate air pollution in England could prevent around 50,900 cases of coronary heart disease, 16,500 strokes, 9,300 cases of asthma and 4,200 lung cancers over an 18 year period.

My understanding of why air pollution is a problem Worsened/did not change/ Improved/ Improved a lot/ Improved considerably because

Please let us how easy this was to understand

Scale: 1: Very difficult, 2: Difficult, 3: Neutral, 4: Easy, 5: Very easy

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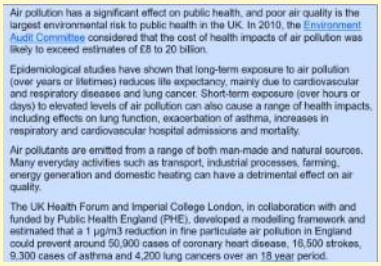
14. Text - Image Review

We now want you to answer some more detailed questions about some other aspects of this potential mock-up website



Air pollution has a significant effect on public health, and poor air quality is the largest environmental risk to public health in the UK. In 2010, the Environment Audit Committee considered that the cost of health impacts of air pollution was likely to exceed estimates of £8 to 20 billion.

Epidemiological studies have shown that long-term exposure to air pollution (over years or lifetimes) reduces life expectancy, mainly due to cardiovascular and respiratory diseases and lung cancer. Short-term exposure (over hours or days) to elevated levels of air pollution can also cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in respiratory and cardiovascular hospital admissions and mortality.

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Now, please highlight elements of the text that you like or dislike.

1. Please use the elements you like and for the elements you dislike by placing the markers directly on the parts of the image that stand out for you.
2. Please explain your reasoning in the comment box. In your response, you may want to consider what you find useful/not useful, engaging/disengaging or if there are any words or sentences that you found difficult to understand.

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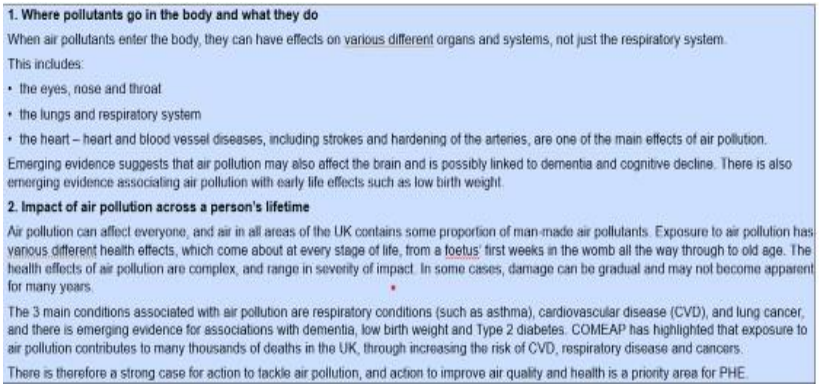
15. Text: How air pollution harms health

hank you for your time so far - you have one last task to complete!

Health matters: air pollution - GOV.UK (www.gov.uk)

Here is a second extract from the same website, this time on 'How air pollution harms health'.

Please read through this text and answer the questions below. Please click on the image below to enlarge it so that you can read it better



1. Where pollutants go in the body and what they do

When air pollutants enter the body, they can have effects on various different organs and systems, not just the respiratory system.

This includes:

- the eyes, nose and throat
- the lungs and respiratory system
- the heart – heart and blood vessel diseases, including strokes and hardening of the arteries, are one of the main effects of air pollution.

Emerging evidence suggests that air pollution may also affect the brain and is possibly linked to dementia and cognitive decline. There is also emerging evidence associating air pollution with early life effects such as low birth weight.

2. Impact of air pollution across a person's lifetime

Air pollution can affect everyone, and air in all areas of the UK contains some proportion of man-made air pollutants. Exposure to air pollution has various different health effects, which come about at every stage of life, from a foetus' first weeks in the womb all the way through to old age. The health effects of air pollution are complex, and range in severity of impact. In some cases, damage can be gradual and may not become apparent for many years.

The 3 main conditions associated with air pollution are respiratory conditions (such as asthma), cardiovascular disease (CVD), and lung cancer, and there is emerging evidence for associations with dementia, low birth weight and Type 2 diabetes. COMEAP has highlighted that exposure to air pollution contributes to many thousands of deaths in the UK, through increasing the risk of CVD, respiratory disease and cancers.

There is therefore a strong case for action to tackle air pollution, and action to improve air quality and health is a priority area for PHE.

15. Text: How air pollution harms health

hank you for your time so far - you have one last task to complete!

Health matters: air pollution - GOV.UK (www.gov.uk)

Please complete the following sentences:

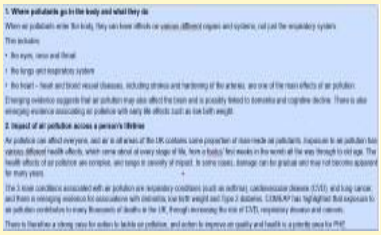
My understanding of why air pollution is a problem Worsened/did not change/ Improved/ Improved a lot/ Improved considerably because

Please let us how easy this was to understand

Scale: 1: Very difficult, 2: Difficult, 3: Neutral, 4: Easy, 5: Very easy

16. Text 2 - Image Review

We now want you to answer some more detailed questions about some other aspects of this potential mock-up website



Once again, we ask that you please highlight elements of the text that you like or dislike.

Please use for the elements you like and for the elements you dislike by placing the markers directly on the parts of the image that stand out for you.

1. Please explain your reasoning in the comment box. In your response, you may want to consider what you find useful/not useful, engaging/disengaging or if there are any words or sentences that you found difficult to understand.

17. Thank you and goodbye!

Thank you for taking the time to complete these activities today. As a thank you for your time your incentive will be paid within 15 days of this task closing For any incentive questions please contact Elle Stephens at elle.stephens@acumenfieldwork.com.

We hope you have enjoyed being part of the Clean Air + Me panel.

Defra and Kantar Public have really appreciated your contribution to the panel and in helping Defra decide how best to inform the public about air quality.

Defra is in the process of updating its information for the public about air quality. It will also be publishing a final report about the work of this panel. This information will be available here later in the year. Please feel free to bookmark this link and revisit it at a later date.

If you have a minute, we would love you to tell us about your experience of being part of the panel. If so, please record and upload your thoughts here. You may like to say what you have enjoyed/or not, anything you may have learnt and whether you have changed any behaviours as a result of being part of the panel or anything else you might want to share with us.

Thank you once again for being part of this panel.

4. Wave 3 Presentation

KANTAR PUBLIC

Qualitative Research Panel for Air Quality Information System Review

Wave 3 presentation

Penny Stothard and Louise Skowron

October 2023

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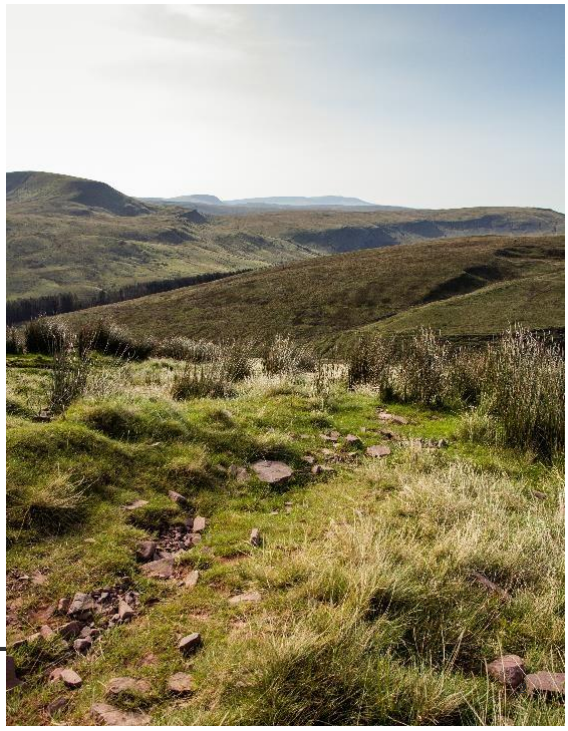

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1 Background and introduction

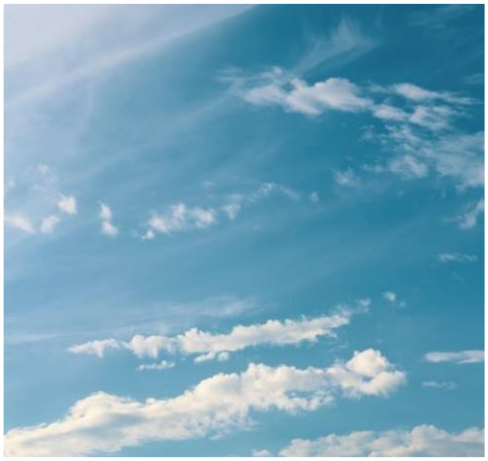
Defra has set up a qualitative panel to inform air quality communication development, focusing on how the public can reduce their exposure and contribution to air pollution

Defra and UKHSA have established the Air Quality Information System (AQIS) review to improve the quality and provision of air quality information to the public, which is guided by a multidisciplinary steering group

The steering group has recommended that communication approaches are developed in collaboration with members of the public

With this in mind, **a qualitative panel was commissioned** that aims to:

- Develop a deeper understanding of the knowledge, attitudes and behaviours of the general population and 'at-risk' groups, with regard to air pollution (avoiding it, and reducing contributions to it)
- Elicit insight into the barriers and facilitators that influence desired behaviours, and other factors relating to communications that seek to change behaviours
- Co-design communication approaches, taking into account the understanding and insights generated earlier in the project



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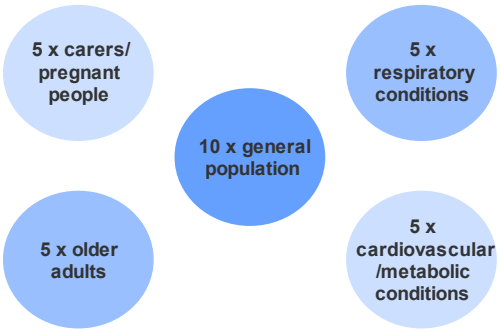
The research has set up a 30-participant panel and three waves of research have taken place

Clean Air + Me panel consists of 30 participants



3 waves of activity – each wave involves:

6 x 90 minute online group discussions
(max 5 participants per group)

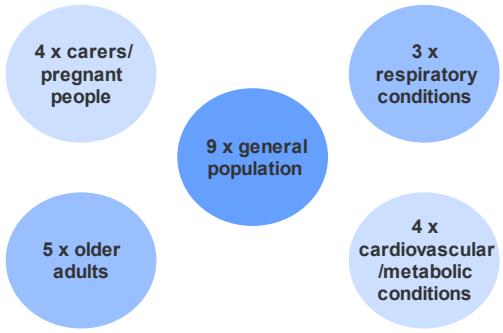
2 x 15 minute (or 1x 30 minute) online task sessions
via the Recollective platform

Recap of headline findings from Wave 2

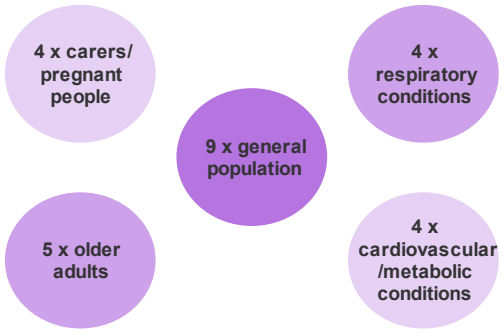
1. **Participants struggled to distinguish air quality from other climate issues**, despite having been sensitised to air quality issues throughout the course of the research
2. **There was relatively low awareness of actions people can take to reduce their contribution to air pollution** while participants were open to changing their behaviour, this is likely to require considerable communication
3. **There was also low awareness of actions people can take to reduce their exposure to air pollution, which was** partly due to a lack of clarity about the impact on health
4. **Participants were generally keen for air quality information to be framed as traffic lights**
5. **Information on actions to take at different levels of air pollution was welcomed** and there was interest among some in sharing top line personal information to enable people to receive air quality information

Wave 3 recalled 25 participants to the discussion groups and 26 participants to the online tasks

Wave 3 online discussion groups (x6) - 25 participants



Wave 3 online interaction– 26 participants



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This report details the findings from Wave 3 of the research (both the group discussions and online tasks), which explored two main themes with three high -level research questions in each

Leveraging existing opportunities for information dissemination

1. What is the role of verbal communication in the dissemination of air quality information and what are peer-to-peer opportunities afforded by interpersonal relationships?
2. To what extent are there 'Moments of Change' in an individual's life course that might provide opportunities to leverage air quality related behaviour changes?
3. Which are the most influential factors and key actors when making decisions that have a long-term impact on future polluting behaviours?

Attitudes to new and existing communication materials

1. Can infographic presentation of data increase understanding and salience of air quality messages?
2. How do participants interpret and respond to air quality risk communications where risk is defined based primarily on longer-term pollution levels, rather than short-term health effects?
3. What elements of the wording and framing of new air quality messaging on air pollution and air pollution health impacts do participants find more/less helpful/ engaging?

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Wave 3 involved participants taking part in an online group discussion and then conducting online activities on the Recollective platform

Online group discussion

Participants discussed

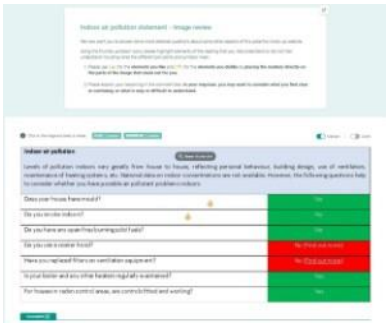
- Their social, health and educational networks that may influence conversations and decision making around environmental issues
- Possible 'Moments of Change' that present opportunities for influencing behaviours around air quality
- Long term decisions that may affect air quality, and what influences these
- Responses to two key infographics, including how these contribute to understanding of the types and impact of pollutants

Online activities

Tasks included

- Responses to a mockup of a possible Gov.uk website (first impressions, as well as more detailed feedback on particular elements)
- Responses to text extracts from existing health information available at Health matters: air pollution - GOV.UK (www.gov.uk)

Here are some screenshots of the activities, which were conducted via an interactive market research platform called Recollective



The platform was available for 24 hours a day for seven days and user support was offered to participants where needed

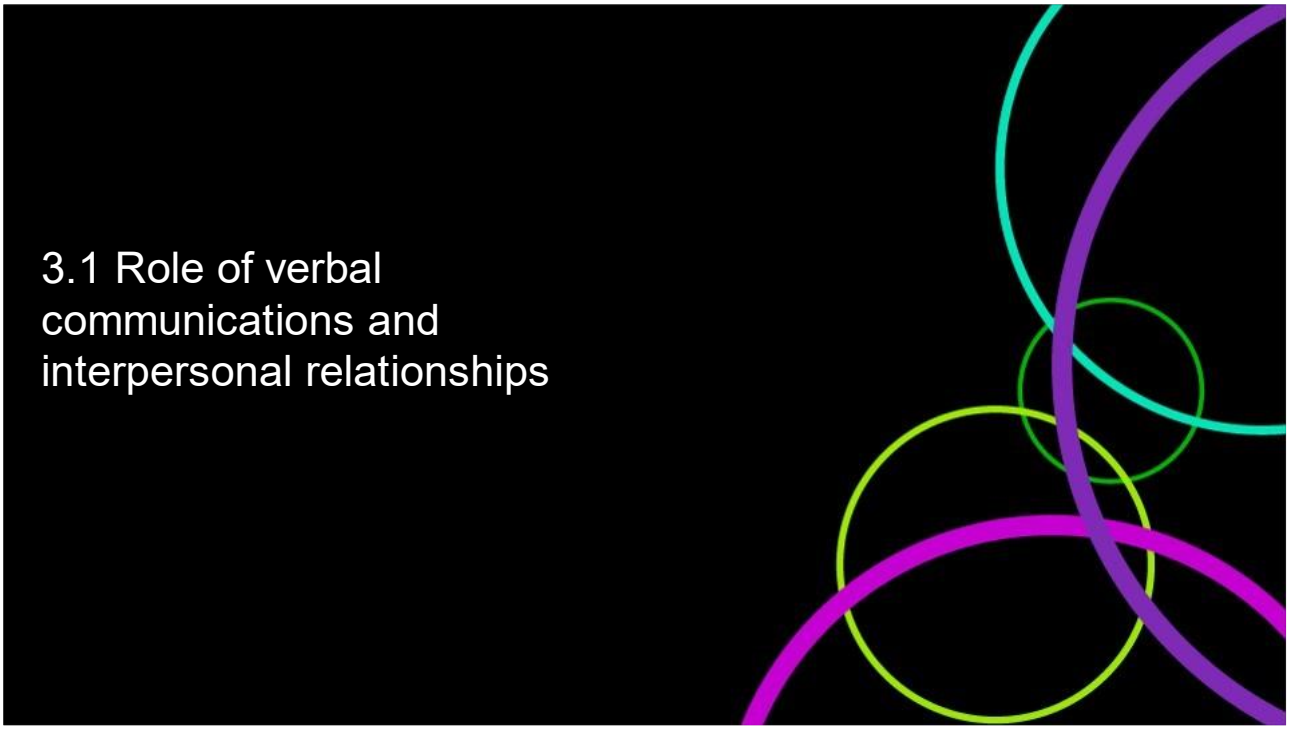
2
Key Wave 3 findings

Summary of key findings

1. **Personal networks** can play a role, to some extent, in disseminating air quality information; healthcare professionals and educators can also help to normalise air quality as a concern and embed it into everyday thinking and action across society
2. '**Moments of Change**,' including pregnancy, a health diagnosis and moving house, offer some opportunities to prompt consideration of air quality as a factor, although these largely relate to actions to limit personal exposure rather than reducing contribution to air pollution
3. **When making longer-term decisions,** people refer to their personal networks and focus on the associated costs: interventions that promote thinking about the impact of these decisions on air quality, like introducing air quality ratings and using reviews, social media and trades people, could help increase consideration of air quality as a factor
4. **Infographics** can help to increase understanding and salience of air quality if they are kept simple, positive, actionable and 'shareable'; if shared in appropriate settings and via social media they have the potential to stimulate both interpersonal and online conversations
5. **Longer-term air quality information,** including information about indoor air quality, can enable people to take air quality into consideration as a factor and plan around it but, to be useful, information needs to communicate risk consistently, in non-technical terms and be presented in a logical way
6. **Information framed around health harms** is a particularly impactful and relevant means of framing air quality messages, especially if the information focuses on the extent and details of the harms; information is most successful where it uses impactful headings, clear broken-down sections, lay terms and links readers onto further information

3
Leveraging existing opportunities for information dissemination

3.1 Role of verbal communications and interpersonal relationships



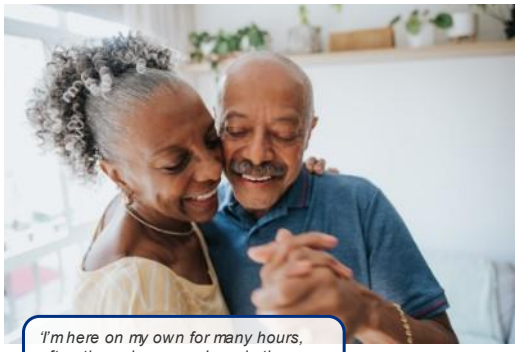
Personal networks varied in size and were primarily influenced by age and physical and economic activity

Personal networks usually included immediate family and close friends, although this varied depending on individual circumstances

- Partners for those who were married or cohabiting
- Parents for younger people or carers with younger children
- Grandparents for people in their 20s
- Grown up children for older groups
- Friends, if younger, of working age or retired but still active

Older people's social networks had become smaller over time

- Partner may have died
- Friends had passed away
- Friends/relatives in care homes/with long term health conditions, such as Alzheimer's disease



'I'm here on my own for many hours, often the only person I see is the postman'
Older adults' group

Beyond family and friends, wider networks included work colleagues and people with shared interests: news stories or public interest topics would be frequently discussed

Wider social networks included

- People with shared hobbies, i.e., walking club, dance club, environmental group
- Work colleagues
- Close neighbours
- Fellow university or college students, including University of the Third Age*
- Local church group, community group

People with these larger networks often talked about issues affecting their community as well as current affairs: conversations predominantly took place in small, informal groups

- Local issues impacting them directly, i.e., ULEZ, local construction, traffic calming
- Current news or issues, i.e., cost of living, state of the NHS, COVID, climate change (extreme weather leading to fires, flooding around the world)

'One of my colleagues is old school, she's knowledgeable… she gives me a lot of guidance A go-to person if I have issues generally'
General population group

'I guess I'm influenced by social media'
Carers' group

*Voluntary, non-profit organisations offering older people low -cost educational opportunities in a pleasant, supportive social setting

Despite this, competing priorities and the perception that air quality lacks relevance, stopped it becoming a topic of conversation for some

People with busy, often hectic lives and are getting on with day-to-day living, i.e., care responsibilities and work life and have limited capacity

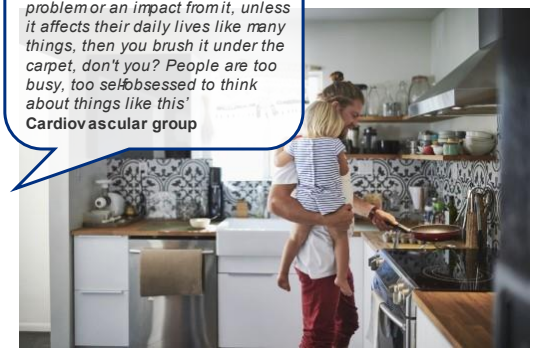
For others, more 'live' issues currently occupy their minds, including

- **Cost of living crisis** with people being acutely affected by this
- Their own **health**, or health of close family/friends

There can also be a difficulty in talking about air quality because it lacks relevance to some people's lives, i.e.

- It is felt as an **intangible issue** – they can't see it, feel it, touch it.
- **There's a lack of understanding of how air quality affects them**
- **A lack of agency** means people don't know how to respond
- Some people, like those living rurally, feel there is **little they can do to change their behaviour**

'I don't think people care too much generally- it's not a factor in their existence, so unless there's a problem or an impact from it, unless it affects their daily lives like many things, then you brush it under the carpet, don't you? People are too busy, too self-obsessed to think about things like this'
Cardiovascular group



Some triggers were identified that would help people to start conversations about air quality within their own networks, echoing findings from Wave 1

Weather report

Integrating daily air quality forecasts with weather reports, similar to pollen readings, in weather apps and online, TV and radio weather reports

- Raises the profile and importance of air quality
- Makes it a current topic
- Triggers people to start thinking and then talking about it
- There appears to be salience via weather apps

News stories

National news stories often triggered conversations and sometimes debates about topics, and to some extent, local stories

- Increases prominence of air quality as a concern
- Highlights what is being done/not done about it

This could be especially the case in local areas

'Share-able' information

Sharing information on social media would trigger face-to-face conversations particularly among 20 30 year olds

- Utilise platforms such as Instagram, Tik Tok and Twitter
- Create 'stories' or 'shorts' for users to share within online networks
- Information would need to be designed to be shared, i.e.
  - Short and 'light touch' i.e. 1 or 2 clear facts
  - With audio explanations
  - Call to action campaign

Healthcare professionals (HCPs) and health settings were largely seen as having an important role in supporting conversations around air quality, possibly from a lifestyle perspective

GP/pharmacist

NHS Health Checks could provide an opportunity for GPs and Pharmacists to raise the profile of air quality as a health concern

- Include air quality questions into these checks alongside other lifestyle questions, i.e., do you have a wood burner, what times/where do you exercise, do you tend to cycle on busy roads
- Highlight risks/steps to avoid exposure which may help to normalise conversations about air quality

However, some recognised that HCPs are time poor and may not have expertise in this topic – only 1 participant (cardiovascular group) had experience of a HCP raising air quality as a concern

Midwife/health visitor

The carers' group felt pregnancy/having a baby is an ideal time to raise the issue of air quality

- Expectants/new parents will do anything to protect their unborn/new baby
- People tend to read information and act upon it at this point in time

Information should highlight the risks of air pollution and give tips on how to avoid exposure

'5 ways to keeps your baby's air quality goed there's a lot of advice maybe missing about how you can keep your newborn's lungs optimal'
Carers' group

Information in health settings

Waiting rooms and areas were recognised as opportune spaces for displaying accessible air quality information

- GP/hospital waiting areas
- Pharmacists

Such information **may prompt patients to proactively raise this** with their HCP and be given/ signposted to more detailed information if wanted

Beyond check-ups, it was felt certain circumstances should prompt HCPs to proactively offer air quality information and advice

Patients with respiratory health conditions, such as asthma or COPD, should know about the effects of poor air quality and why they are at higher risk during

- Asthma reviews
- Consultants' appointments

For patients who display new symptoms such as a persistent cough, HCPs could ask questions about exposure to poor air quality, such as having a wood burner at home or walking/running/cycling along busy roads (similar to questions asked about smoking habits and exposure to second-hand smoke)

During seasonal times, such as periods of high pollen counts, Pharmacists could offer information to people buying antihistamines to highlight the impact of air pollution

When air pollution is high, Pharmacists could display information about how to limit exposure

Only one participant had proactively raised air quality as a concern during an appointment with a lung specialist, with limited response and no signposting

'If I went to the pharmacy and the air quality was bad then I would expect to see a poster up and if I had a cough as well I would expect to receive a leaflet from the Pharmacist'
General population group

Education was felt to be important to raise awareness and help to disseminate messages, to embed air quality into everyday thinking

Pre/primary schools

Teachers are role models for children and can be very influential in setting a good example

Activities must be fun, engaging and visual

- Observing how dirty something gets if placed by the side of a busy road

Integrate it into everyday work – pupils take air reading for the day, similar to how they may write the date and weather down

Integrate it into other school initiatives e.g., highlight effect of active travel to school

However, get the balance right so children do not worry about going outside

'Teachers are such role models for kids and it sets a good example from a young age'
Carers' group

'Young people are talking much more about climate change and air pollution than when I was younger. But they are the voice of the future'
Carers' group

Secondary schools

Integrate into the existing curriculum to inform about different aspects of the topic:

- Science/geography- the science aspect
- Biology – health impact
- PSHE – social responsibility aspect

Find ways to make this an everyday concern

Integrate with social media platforms – one participant mentioned the current trend amongst teenagers to monitor UV levels on Tik Tok

Young people have a large influence on their parents/grandparents and this could be harnessed across communities

Young people encourage parents/grandparents to think differently

- Suggest ideas that parents/grandparents would not have thought of
- Talk through the benefits
- Are not negative – don't find reasons not to do things

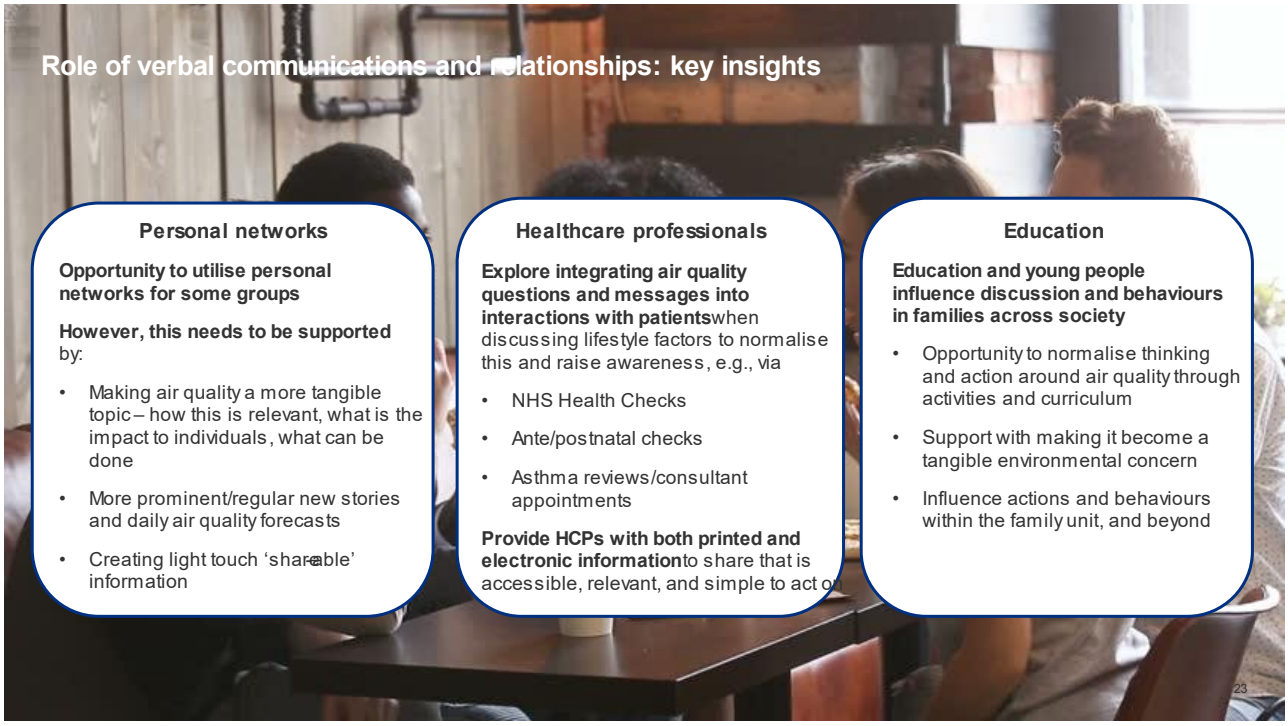
Young people should have greater involvement in decision-making and creating campaigns/information

- They have lots of ideas which should be harnessed across society
- And are passionate about the environment

'Involve pupils, students in decision making. They often have good ideas and are ignored or not listened to and they care very deeply about things often'
General population group

'Children are really switched on about climate change and air quality. They are pushing for climate activism'
Respiratory group

'My grand-daughter is aged 4 and already she is coming home with messages about the car engines running- she is now saying to her granny and I that we should be getting electric cars'
Older adults' group



3.2 Timepoints / opportunities across the life course

Participants found it difficult to identify many ‘Moments of Change’ at which air quality was a relevant factor

The cost of living and a general sense of the limitations many experienced in relation to this topic inhibited discussion to a certain extent

However, some key moments in time emerged during which there is an opportunity to prompt consideration of air quality as a factor:

- Pregnancy
- Moving house
- Extreme weather
- Diagnosis of a health condition
- Choosing a school
- Travel choices

However, it is noticeable that these relate to limiting exposure to air pollution, rather than reducing contribution to air pollution

Possibilities for each ‘Moment of Change’ include

Pregnancy

Discussion of lifestyle and tips to reduce exposure

Provision of information by midwife/health visitor

Diagnosis of a health condition

Identifying whether individuals belong to an ‘at risk’ group at point of diagnosis

Signposting to relevant information sources

Moving house

Providing more information, e.g.,

- A rating about the air quality of a house or area
- Proximity to train station, schools, amenities
- Direct link to air quality information sources
- Via RightMove

Choosing a school

Prompting greater consideration of this as a factor at the time of choosing

Extreme weather

Providing information regarding how to reduce exposure what to do (e.g., when there are long periods of high levels of air pollution)

- Possibly via local news or air quality forecasting information?

Travel choices

Information on air quality ratings for different destinations at certain times of the year

3.3 Influences when making long-term decisions

A list of longer -term decisions that impact personal polluting levels was shared during the discussion groups

Decisions on:

- **Heating systems in the home,** i.e. replacing or installing a new burning appliance, gas or electric boiler, heat pump
- Installing **home insulation or ventilation**
- Buying a **new vehicle or an annual travel pass** (train/bus)
- Buying a **new cooking appliance**
- **Where to live** i.e. living closer to public services and transport links, work/school to be able to travel in a more sustainable way

In general, participants struggled to identify the linkage between these decisions and air quality, with some feeling the decisions were not relevant to them at all

Participants were unclear how the decisions linked directly to air quality, e.g.

- Home insultation – is it about using less energy in the home, or about emitting less gases into the environment?
- Anew cooking appliance – air miles and where the appliance is manufactured?

Some decisions were not perceived as relevant to certain groups, i.e:

- Renters, people who live with their parents, leaseholders (unable to make changes to heating systems/insulation)
- People who do not own a car or drive (buying a vehicle)
- People not living in connected cities (travel pass)
- Lack of charging infrastructure in rural locations (buying an electric vehicle)

Some participants did not necessarily agree with all the decisions and identified further ideas

The affordability and perceived efficiencies were also unclear for some decisions, leading participants to doubt whether these would be worthwhile in the long run, i.e:

- Little evidence about effectiveness of heat pumps
- Energy efficiencies of switching to an alternative fuel or installing insulation

Decisions missing from the list were thought to include:

- Air travel reduction
- Where you work
- Replacing windows (though could fall under insulation)
- Installation of solar panels

Buying a new vehicle was perceived as having the most impact on the environment, although individual efforts were often thought to be easily wiped out by actions of big business

Most impactful

Buying a new vehicle – seen as most relatable in terms of air quality

Where to live – to reduce commuting and use of personal car

Heating systems – clear that much energy is used heating the home

However, the impact of big business/industry is felt by some to undo any impact made at an individual level, reiterating Wave 1 findings

Least impactful

Buying a new cooking appliance – significant uncertainty about the impact on air quality i.e., how does a cooker affect outdoor air quality, low awareness of impact on indoor air quality, and potential benefits of switching

Installing ventilation – lack of clarity as to the benefits this would bring

'Ultimately 100,000 little people could be doing these things, then you get 2 big businesses chucking out pollution and then it negates everything that everyone is trying to do'
General population group

Decisions were mainly influenced by cost and associated practicalities: environmental concerns were not seen as a priority by most

Cost

Budget, cost of purchase and running costs – perception that purchases that are better for the environment cost more

Cost of installation – sometimes perceived as unaffordable and potential risky i.e., limited evidence that prove new technologies are better for the environment and more efficient

Tax implications (road tax)

'A lot of people probably can't afford to prioritise the environment'
General population group

Practicalities

Permissions required for making certain changes to property, i.e., can social renters or leasehold properties be insulated or change fuel?

Availability of experts, i.e., to install

Any logistical limitations, i.e., sufficient space for appliances or installation

Existing infrastructure, i.e., ease of switching from gas to electric, availability and accessibility of electric charging points

Wider considerations

Considerations are wider than air quality and may include:

- Cars – safety ratings, car/boot space
- Cooking appliances- time saving when cooking (air fryer)
- Aesthetics – how things fit with internal décor and other appliances, the look of heat pumps

A range of measures were mentioned to encourage people to prioritise air quality in their decision -making

Increase awareness

Raise awareness of the impact on air quality

- Create an air quality rating similar to existing energy rating stickers
- Comparison websites to include air quality impact
- Impartial information to explain which products are better for air quality and why

'We bought loft insulation recently and it was a learning curve to find out what the thickness of the insulation should be, it was difficult to find out the optimum thickness'
Older adults' group

Clarify costs

Offer support with understanding not just the cost of the product, but the long-term saving

- Online calculators to estimate long-term saving
- Consider grants and tax breaks for 'going green' and make these accessible

'They say you will save all this money on your bills but when you try to work it out and the cost of installing it, you'd have to have it for about 20 years before you'd even make that money back'
General population group

Critical mass

Promote firsthand experience of 'green' decision-making

- Opinion pieces that promote positive experiences
- Utilise experts to promote AQ benefits alongside celebrities/influencers, e.g., Joe Wicks promoting benefits of air fryers

'I'm not convinced about making the switch. It will cost a load of money and I don't know anyone who this [heating systems/insultation]. There's not enough critical mass for me to take action'
Respiratory group

On the whole, participants drew on their own personal networks, online reviews and comparison sites to help with decision -making

Networks frequently included:

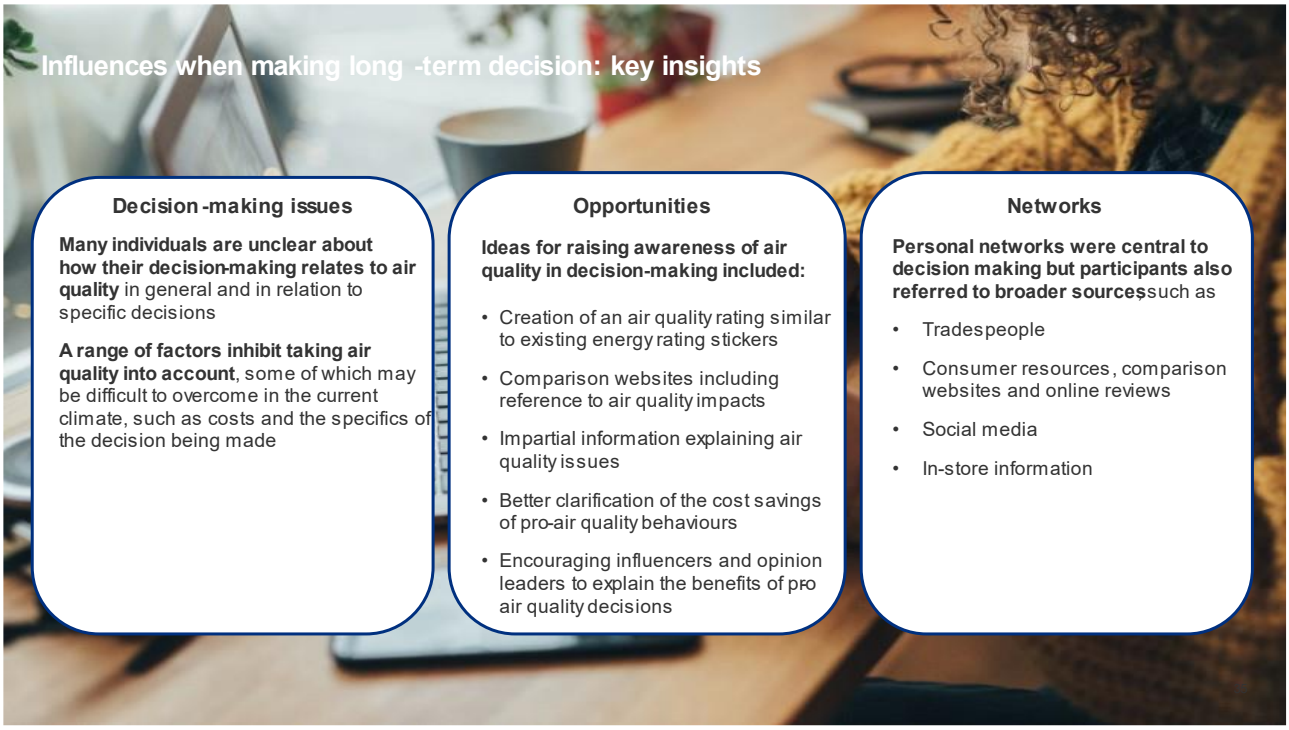
- Wife, husband, partner, people in their network who had made that decision recently or had expertise in the field, e.g., friends, work colleagues, other family members

Wider sources

- Trusted tradespeople (e.g., gas fitter, plumber)
- Consumer resources and comparison websites, e.g. Which?, that allowed for comparison of specific features together with independent reviews/ratings
- User experience reviews (sometimes accessed via Google) though some were aware of paid reviews
- Social media, particularly Tik Tok, was viewed as an influential information source– e.g., the cooking efficiencies and health benefits of cooking with an air fryer (though nothing that highlighted emissions/energy benefits)
- In-store information, i.e., department stores/showrooms/shops

'I trust my brother [a tradesman]. I didn't look for other information because I accepted his assessment that heat pumps aren't relevant for older houses'
Cardiovascular group

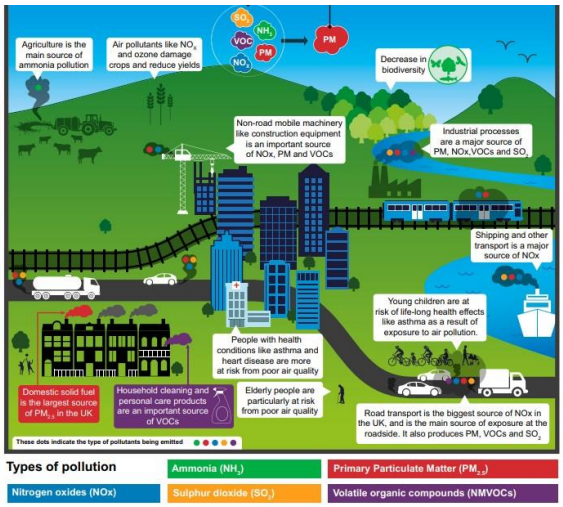
'We're influenced a lot by our peers, even subconsciously'
Carers' group



4
Attitudes to new and existing communication materials

4.1 Role of infographics to increase understanding/salience of messages

We shared an existing infographic about the different type of pollutants during the online groups



Defra, Clean Air Strategy (2019)

Overall participants liked the idea of an infographic, however most felt overwhelmed and confused by the amount of information provided

Format

The infographic format landed well, i.e. can communicate complex information easily

Was perceived as **accessible and friendly**

However, was felt as **trying to cover too many aspects of air quality** and created confusion rather than improved understanding

Content

Abbreviations/acronyms felt to be overly technical

Some confusion over colours/key, i.e.

- Colour-coded dots too subtle
- Were the buildings blue for a reason
- Why are only two text boxes in colour

Style

Colour and imagery was mostly liked with comparisons to children's books and friendly computer games, though a few found this childish

However, some felt there was a mismatch between the style and content, i.e.,

- Style looks happy/jolly but the content is not

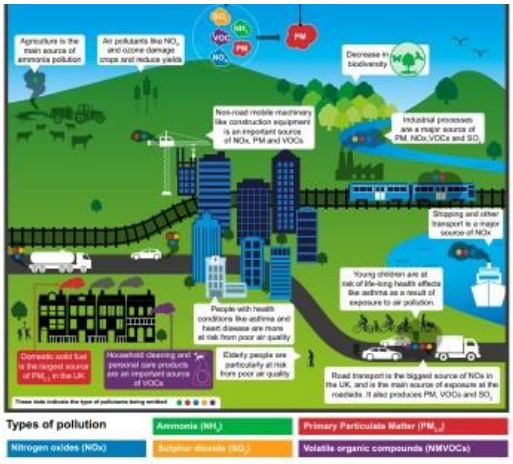
Feelings

Participants felt **depressed and overwhelmed** by the negative content

No clear call to action at an individual level made people feel helpless and become dismissive of their role

'It's just providing a lot of negative information and it's a huge problem what then you're kind of like, OK, so what? What can I do?'
General population group

Participants liked the style and colour however felt a focus on the health impacts and a call to action would be more useful



Positive attributes included

- **Colours and style** – cute and nice to look at
- **Bold and stands out –** draws the reader in
- **Use of icons**
- **Some new content** that prompted thinking about the complexity of the issue i.e. impact of household cleaning products and agriculture

Negative attributes included

- **Information about pollutants/chemicals felt unimportant** – more useful to focus on health impact
- **No clear suggestions/solutions** of what people can do
- **Too much information** – ideally focus on one source of pollutant rather than all of them at once
- **Assumes a level of existing knowledge about chemicals** which can be off putting

There were some positive suggestions for how it could be developed

Information

Better explanation of PM: what they are and how they affect people, possibly how levels of PM2.5 have changed over time

Greater focus on the most important factors/pollutants areand the impact each has on health

Information on what people can do to reduce impact– and what will have most effect

- Simple tips or advice (next to pollutants)
- What people can do
- Impact of taking action

Presentation

Simplification, possibly

- Strip back content to focus on 1 or 2 elements– potentially produce a series of infographics each focusing on one area
- Presenting as an interactive resource so that high level information is provided and participants can click onto different parts to obtain more detail

Move the key closer to the list of chemicals at the top and strengthen the use of colour throughout the infographic, i.e.,

- Follow 'the journey' of each chemical/pollutant clearly throughout the infographic

Communication ideas

Government awareness campaignvia NHS, BBC

Tailoring information by geographical location and putting on posters in local areas

Could lend itself to developing bitesize pieces of information that could be shared via social media

- 'Story' or 'short'
- Push via social media to create a conversation online, to trigger or support face-to-face discussions

Here are some illustrative comments about the infographic

Positive

'I wouldn't have thought that household cleaning products would have as big as an impact as agriculture
General population group

'It's useful to show thatair pollutioncomes in many forms and not just the obvious ones'
Older adults' groups

'It gives you a realisation that you can't just blame industry, they may be the bigger ones but there are so many areas that are giving problems, it's multifaceted'
General population group

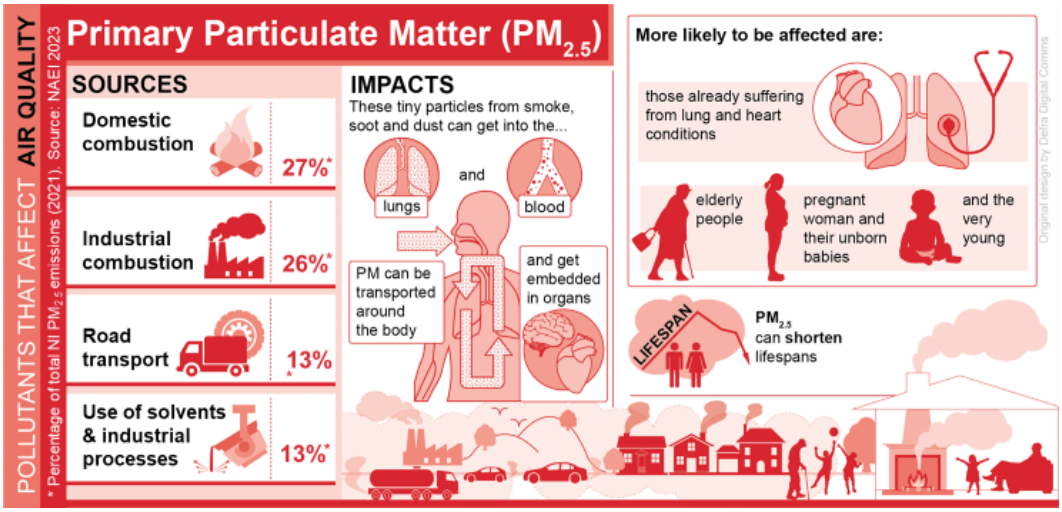
Negative

'There's quite a lot there so it's kind of not really targeted at one specific thing so it's hard to say where you would put it'
General population group

'It feels a little detached…they are just listing all the sources without giving much info'
General population group

'There is a lot there that I have no control over at all'
Respiratory group

We shared a second infographic that discussed PM2.5 and impacts



On the whole participants felt more positive about this infographic and felt it improved their understanding of the health impacts of poor air quality

Format

Felt the infographic format was well executed, i.e., not overly detailed and a good balance of words and images

Content

Contributed to an uplift in understanding about both the sources of pollutants and the health impact

Appropriate level of detail for the general population to be able to understand

Well-pitched and informative, clear, not overly technical

Felt to be a bit more hard-hitting, but not scary

Style

The colour scheme is intense but impactful, i.e., stands out and indicates danger

Good use of images and not too wordy

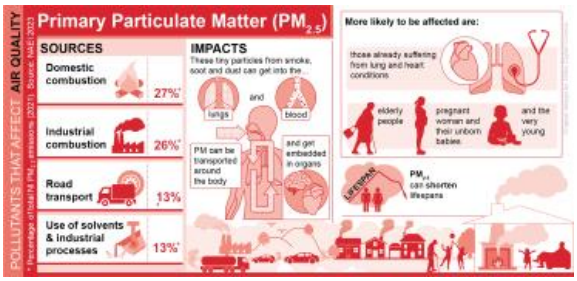
Feelings

Made people think about the health impact

Surprised at the sources of air pollution, i.e., transport is not the biggest emitter

'I was naïve about it, how you breathe in bad air, it's bad in that moment when you breathe it in but you get back into the fresh air and your lungs are clear. I didn't think about it being transported around the blood and being embedded in the organs'
General population group

Participants liked the distinct sections but felt some icons were a distraction and unnecessary



Positive attributes included:

- **Two distant sections on sources and impacts**
- **Good explanation of the impacts on health,**informative, clear
- **Mainly good use of images,**helps with understanding
- **Like the language used,**i.e., 'shortens lifespan', 'embedded in organs'

Negative attributes included:

- **Unclear title** i.e. vertical text at the side is not obvious and is difficult to read
- **Primary Particulate Matter at the top is confusing i.e.** many don't know what this is
- **Too many icons at the bottom** makes it too cluttered
- **Domestic combustion icon is confusing**– replace with an image of a fireplace/wood burner
- **Percentages**don't add up to 100%

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Here are some illustrative comments about this infographic

Positive

'I didn't think about it being transported around the blood and being embedded in the organs'
General population group

It's explaining the impact on the body the organs, blood- now I know what poor air quality is doing'
Carers' group

'This information will help people understand the impacts of different types of pollution'
Older adults' group

Negative

'The domestic combustion icon looks like a scout campfire, not a fire in someone's living room. This should be changed to an image of a fireplace'
General population group

'The message needs to say it affects everyone- maybe also refer to the fact that you may be more likely to develop asthma'
Cardiovascular group

'I want to know more about the impacts, more about what I can do'
Respiratory group

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A number of suggestions were made for improvements

Information

Could be better explanation of the impact, including how individuals might recognise that they have been affected (e.g., change of skin colour, feeling out of breath, persistent cough)

Possibly put greater emphasis on the reduction in lifespan being a key impact of air pollution

Clarify that everyone is affected, not just the groups illustrated

Include call to action, i.e., advice on how to reduce exposure to air pollution

Consider including the other sources so adds up to 100%

Presentation

Simplification

- Create a series of infographics so each is less detailed i.e. less is more
- Remove some of the visuals in the bottom righthand corner
- Replace icon for domestic combustion
- Place vertical title/text at the top and delete Primary Particulate Matter

Present in a more dynamic way where possible, showing pollutants entering your body and what happens to them, e.g., via animation

Communication ideas

Ideas were similar as those generated for the previous visual, i.e.,

- Government awareness campaign
- GPs' surgeries, HCP information
- Local centres, e.g., schools, councils, local news, community centres
- Place-based advertising, e.g., local TV, billboards, bus stops
- Social media– in a shareable video format with a short audio

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Role of infographics to increase understanding and salience: key insights

Format

Infographics can help present complex information, if key principles are followed, i.e.,

- Strip content back or create a series of shorter infographics
- Be positive– not overly negative
- Help the reader to navigate the infographic, i.e., show where to 'start'

And can help to trigger conversations

Action

Highlight how people can respond to information

- What can they do
- Make actions simple and attainable
- Highlight the potential impact of any actions

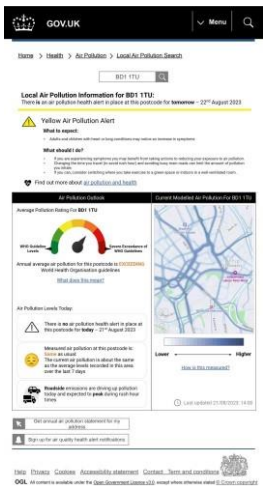
Shareability

Ensure information is 'share-able' on social media so it can become a talking point in personal networks

- Consider developing 'shorts' and 'stories'
- Add audio narrative
- Where possible, develop dynamic/animated features
- Include interactive features

4.2 Responses to longer-term air quality risk information

We presented a mock-up of a potential Gov.uk website page that provided local air quality information using a dummy postcode

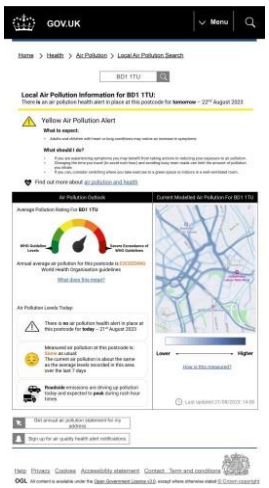


Participants were asked to imagine they had added a postcode to find out about local air quality information where they lived and were presented with this web page, which featured

- Air pollution alert, rating, reading and map

Participants could record their voices and screens as they shared their spontaneous responses to the mock-up web page

The mock-up was mostly felt to be useful, although caused some confusion with no logical flow to the different elements



Likes included:

- **Straightforward** tailored (to individual postcode)
- **User friendly**, easy to navigate, good amount of information links for those who want more info
- **Solutions focused** – offers insight into how to deal with air pollution (e.g., walking on back roads vs main road)

Dislikes included:

- **Lack of clarity** around what colour coding means: how much air pollution etc.
- **Current lack of conceptual consistency**
  - Colour coding inconsistent (use of RAG and blue/grey gradient)
  - Presents information relating to today, tomorrow, last 7 days and year
    - Although if displayed logically this could work, e.g. focus page on today's reading and have tomorrow's further down for logical flow

Recollective tasks focused on individual aspects of the mock-up page

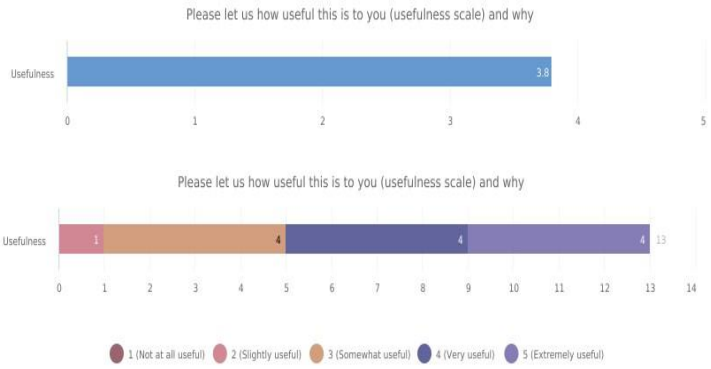
Air pollution alert

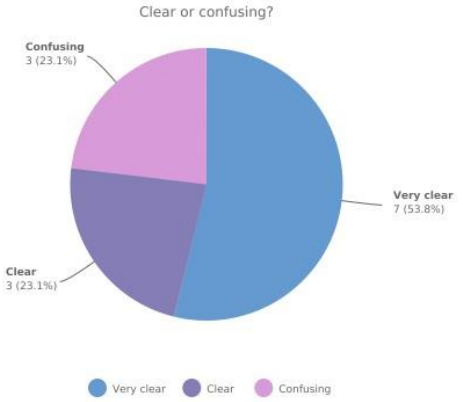
Air pollution rating

Air pollution reading

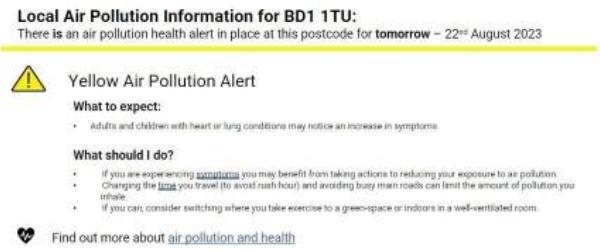
Air pollution map

Participants scored the alert an average of 3.8 out of 5 for usefulness and over half found it very clear





Most liked its simplicity and colour -coding but others found the lack of a key and the hazard symbol confusing



Local Air Pollution Information for BD1 1TU:
There **is** an air pollution health alert in place at this postcode for **tomorrow** – 22nd August 2023

Yellow Air Pollution Alert

What to expect:

- Adults and children with heart or lung conditions may notice an increase in symptoms

What should I do?

- If you are experiencing symptoms you may benefit from taking actions to reducing your exposure to air pollution.
- Changing the time you travel (to avoid rush hour) and avoiding busy main roads can limit the amount of pollution you inhale.
- If you can, consider switching where you take exercise to a green-space or indoors in a well-ventilated room.

Find out more about air pollution and health

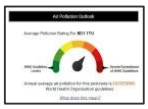
Positive attributes included

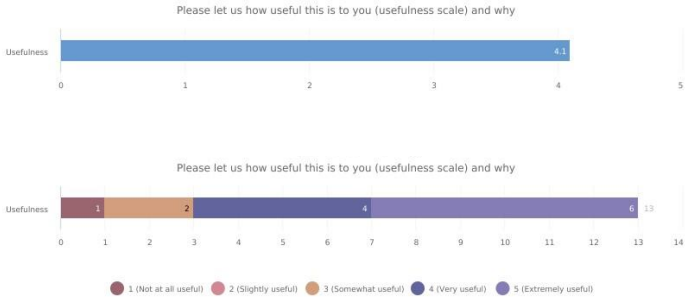
- **Simple and concise**
- **Colour coding clear** to most, though not to all
- **Good level of detail** to meet information needs
- **Hyperlinks** to additional information
- **Enables planning** and making an informed decision
- **Good explanation** of who is affected

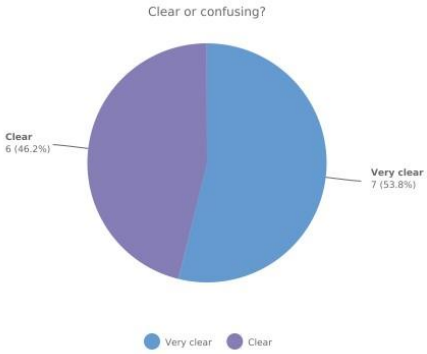
Negative attributes included

- **Unclear** what the hazard symbol signifies- no key to explain the symbols/terms
- **Dislike layout** of writing and font
- **Not enough detail, not enough information on who this** affects and why, i.e., only listsedinformation about people with some conditions

Participants scored the rating an average of 4.1 out of 5 for usefulness and all participants found it clear or very clear







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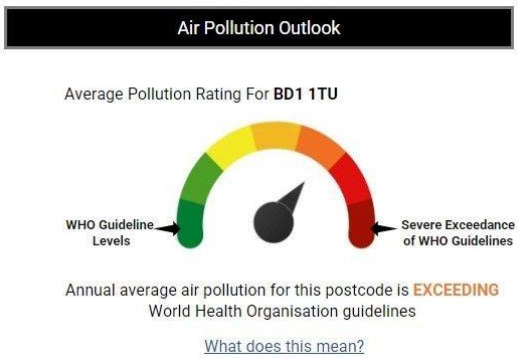
Responses to the rating were largely positive: participants liked the visual element, although some guidance was needed on how to respond



Positive attributes included

- **Easy to understand** at a glance, clear, straightforward
- **Very visual, good use of colour** - universal understanding that green is positive and red is negative
- **Clear scale** based on a strong metric, i.e. WHO guidelines
- **Ability to search** via postcode
- **Hyperlinks** to further information, i.e., WHO guidelines
- **Useful for long-term planning,** i.e., buying a house

Negative attributes included

- **Use of word EXCEEDING** may create anxiety
- **No information on causes** of pollution in the local area
- **No guidance on how to respond** to the alert

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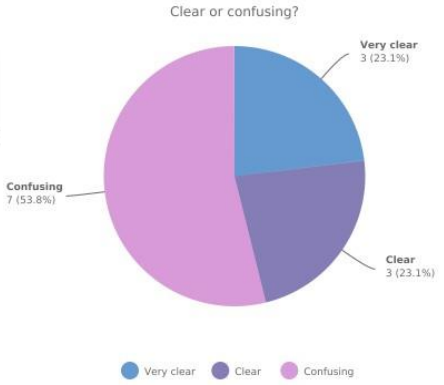
Participants scored the reading an average of 3.4 out of 5 for usefulness and over half of participants found it confusing



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Participants were unclear as to the purpose of the reading and what it was trying to convey

Air Pollution Levels Today:

There is **no** air pollution health alert in place at this postcode for **today** – 21st August 2023

Measured air pollution at this postcode is:
Same as usual:
The current air pollution is about the same as the average levels recorded in this area over the last 7 days

Roadside emissions are driving up pollution today and expected to **peak** during rush hour times

Positive attributes included

- **Offers sufficient information** to plan for the day
- **Puts air quality into context**
- **Provides time-based forecasting** e.g., rush hour

Negative attributes included

- **Unclear about purpose**: what is it saying?
- **Unspecific**, i.e., no air quality level stated– only that there is no alert
- **Wordy**, confusing
- **Absence of colour coding**
- **Emoji is confusing** – it's sad but why, why is it amber
- **Reference to average reading in past week** perceived as unhelpful

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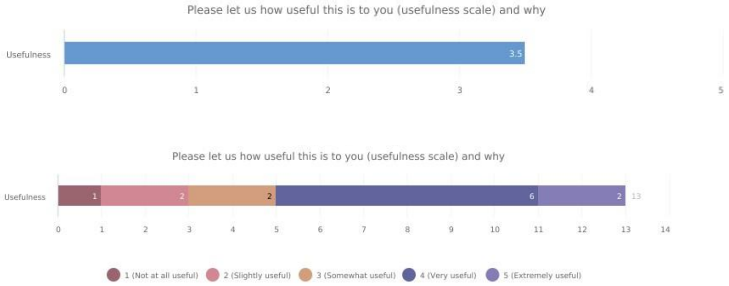
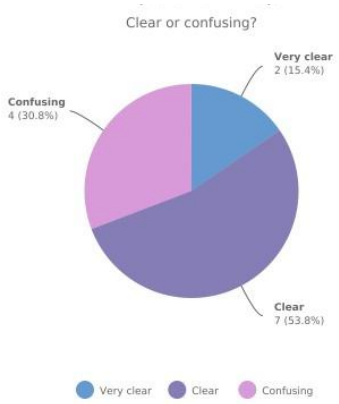
Participants scored the map an average of 3.5 out of 5 for usefulness, with some confusion





Participants liked how the map provided detail on specific areas to avoid, however some struggled to interpret the information quickly

Positive attributes included:

- **Colour coding** with a key was welcomed (although was was not clear to all)
- **Level of detail,** i.e., highlights areas to avoid

Negative attributes included:

- **A lot to interpret** at once: confusing at first sight, i.e., map, faded graphic, small text size, key
- **Single colour gradient** is unclear
- **Use of colour** blue – often associated with clean sky
- **The map itself,** i.e., some struggle to read maps
- **No clear statement to suggest areas to avoid** if possible

Participants felt that there was potential to develop the different elements further

Alert

- Key to explain colour-coding
- Use the same colour-coding throughout
- Consider use of symbols
- Punchier text, not long sentences, greater use of bullets
- Link to advice

Rating

- Consider language used in scale: exceeding feels frightening
- Explanation of what contributes to the rating
- Advice on how individuals can help improve the rating

Reading

- Clarify its purpose, what it is trying to achieve
- Make content useful and relevant
- Punchier text
- Make colour scheme throughout the page consistent
- Consider use of emoji and check whether its colour may create confusion

Map

- Explain key in greater detail
- Emphasise what the map is showing, i.e., darker areas are more polluted and when possible try to avoid
- Use same colour scheme (RAG) as other sections of page rather than a single gradient

Overall, the elements needed to work more cohesively i.e., colour coding, icons, symbols **and for there to be a logical flow of information** from short term to long term risk, i.e., today's reading with the map at the top, tomorrow's alert and then the annual rating

We presented a second mock-up of a potential Gov.uk website page that provided an outdoor and indoor air pollution statement

We asked participants to imagine they wanted some more detailed information about the air pollution where they lived

- Using a dummy postcode, participants were presented with these results that showed the annual concentrations of different pollutants
- We made it clear that participants would only probably want to look at this maybe once a year

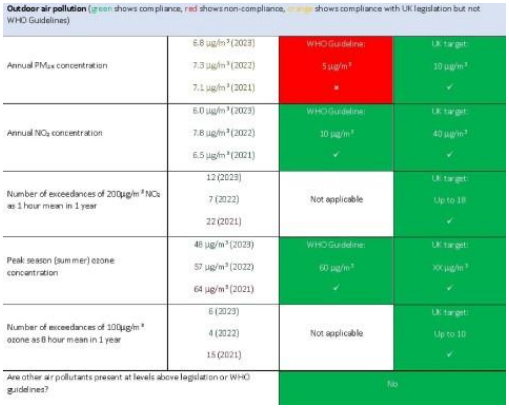
Overall, spontaneous responses to the statement were negative: participants felt the information was too technical and lacked relevance

'This is to be honest far too technical and scientific for me and would just immediately make me want to click off when talking about annual concentrations of different chemicals. I really have no idea what it means'
General population group

'I'm struggling to see the white on red here and the actual information'
General population group

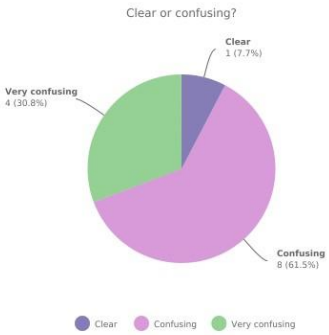
'It's honestly like Greek to me'
Cardiovascular group

We asked more specific questions about the outdoor element of the statement, although nearly all participants found it confusing



Outdoor air pollution (green shows compliance, red shows non-compliance, orange shows compliance with UK legislation but not WHO Guidelines)

Annual $PM_{2.5}$ concentration	6.8 µg/m³ (2023) 7.3 µg/m³ (2022) 7.1 µg/m³ (2021)	WHO Guideline: 5 µg/m³ ✖	UK target: 10 µg/m³ ✓
Annual NO_2 concentration	6.0 µg/m³ (2023) 7.8 µg/m³ (2022) 6.5 µg/m³ (2021)	WHO Guideline: 10 µg/m³ ✓	UK target: 40 µg/m³ ✓
Number of exceedances of 200µg/m³ NO_2 as 1 hour mean in 1 year	12 (2023) 7 (2022) 22 (2021)	Not applicable	UK target: Up to 18 ✓
Peak season (summer) ozone concentration	48 µg/m³ (2023) 57 µg/m³ (2022) 64 µg/m³ (2021)	WHO Guideline: 60 µg/m³ ✓	UK target: XX µg/m³ ✓
Number of exceedances of 100µg/m³ ozone as 8 hour mean in 1 year	6 (2023) 4 (2022) 15 (2021)	Not applicable	UK target: Up to 10 ✓
Are other air pollutants present at levels above legislation or WHO guidelines?		No	

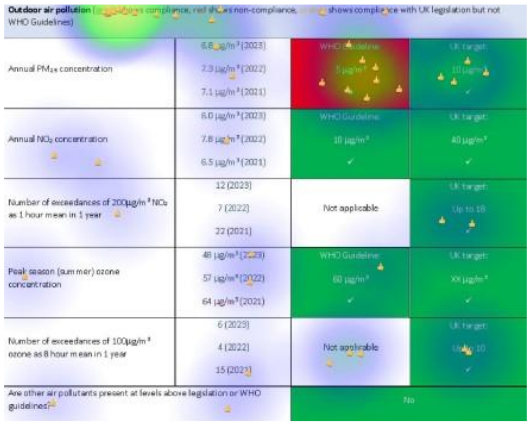


The main factors that contributed to confusion were

- Assumes technical knowledge
- Insufficient explanation of the contexts, metrics or its real world relevance
- Too much information is overwhelming

'The scientific stuff need to be in brackets as a side line. The main information needs to be in simple plain English'
Cardiovascular group

However, participants appreciated the RAG colour scheme for the outdoor pollution statement with its clear key



Positive attributes included:

- **Colour scheme** supports understanding
- **Useful key/description** that explain the colours
- **Red box** stands out as something to pay attention to
- **Changes in years** demonstrates the direction of travel for air quality in the location

'I like the description for what the colours mean. Although this is a bit 'wordy', and could be presented better, i.e., a circle filled with colour, and bullet-point format'
Cardiovascular group

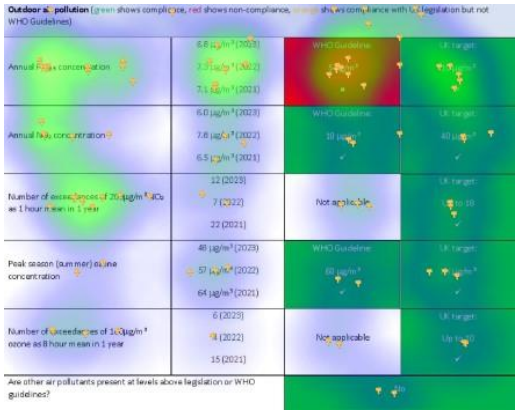
Negative attributes focused on the scientific terms, with some suggestions for improvements

Negative attributes included:

- **Too complex** technical measurements feel detached
- **No explanation of scientific terms** i.e., what they are and do
- **Purpose of the two columns was unclear**

Suggestions for improvements included:

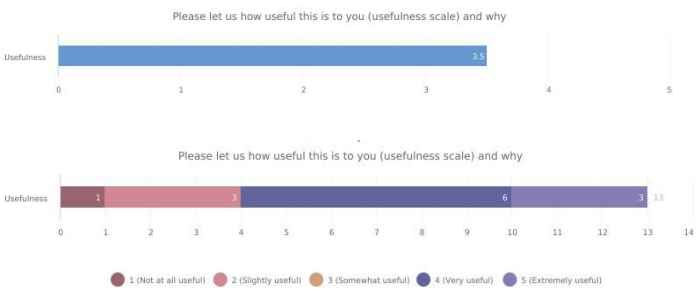
- ℹ **symbol** to click on/hover over for an explanation of the terms
- **Clearer key**
- **Indication of the direction of travel**, i.e., arrow up or down
- **Include column headings**
- **Colour part of the box** so text is against a white background for better accessibility



Participants completed detailed tasks focusing on the indoor air pollution statement

Indoor air pollution Levels of pollution indoors vary greatly from house to house, reflecting personal behaviour, building design, use of ventilation, maintenance of heating systems, etc. National data on indoor concentrations are not available. However, the following questions help to consider whether you have possible air pollutant problems indoors.	
Does your house have mould?	No
Do you smoke indoors?	No
Do you have any open fires burning solid fuels?	No
Do you use a cooker hood?	No (Find out more)
Have you replaced filters on ventilation equipment?	No (Find out more)
Is your boiler and any other heaters regularly maintained?	Yes
For houses in radon control areas, are controls fitted and working?	Yes

Most had not considered indoor air pollution previously and welcomed information: many felt they had greater agency over this



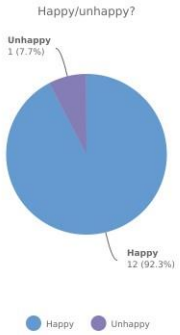
Participants scored the indoor air pollution statement an average of 3.5 out of 5 for usefulness

'Having this information can help me decide on what adjustments I should make in my home'
General population group

Nearly all participants would be happy to share the requested information about their home to generate a more personalised statement

Reasons they gave for sharing information were that this would

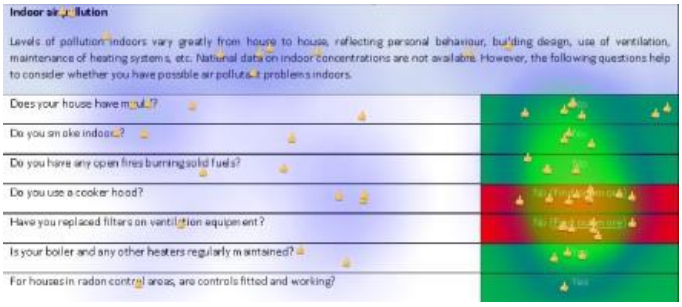
- Provide a more relevant and accurate report
- Create a better understanding of behaviours linked to indoor air quality
- Empower people to consider changes within their home
- Lead to better indoor air quality for the family
- Support with buying/renting a home



'I would be interested to know the results!! Even though I would have to Google some things to put in the correct info'
Respiratory group

'I don't like to feed my data into government systems if avoidable. I'd rather just read an article about the factors to consider'
General population group

Participants welcomed the question format: it was simple and indicated areas in which to make changes



Positive attributes included:

- **A new aspect of air pollution** that many had not considered previously
- **List of questions gives an indication of the factors contributing** to indoor air pollution: felt relevant
- **Simple and quick** to understand
- **Clear areas of how to respond** and make changes
- **Links to more information if desired** so not too much information given upfront

'I like this, the emphasis is on our own behaviour influencing our environment. It makes people take responsibility for their own safety'
Respiratory group

Participants highlighted areas for improvements where there was some confusion

Suggestions to address areas of confusion included:

- **Use of RAG colours** here, i.e., green for your household not having mould but 'No' is written in text
- **Include a link** to a website to check radon control areas: many did not know what a radon was
- **Add a click through/hover over to explain impact** of these factors i.e. impact of smoking indoors, extent to which a cooker hood can make a difference
- **Include an explanation of the term 'solid fuels'**

Responses to longer-term air quality risk information: key insights

Concept

Participants were open to longer-term air quality risk information

- Adds context
- Provides a sense of the direction of travel, i.e., are things getting better or worse
- Enables people to plan ahead and make decisions in the short/medium term (tomorrow) or longer-term (buying a house)

Content

Information must be accessible to engage participants

- Not overly technical or scientific
- Outlining how to respond at the individual level
- Highlighting the direction of travel of a location

Indoor air quality generated interest

- Mostly not considered before
- Participants felt they have greater agency over this as a factor versus outdoor air quality

Consistency and clarity

Communicate risk consistently, i.e., use the same terminology and colour coding of risk levels

Carefully consider the logical flow/ order of information, i.e., start with short, then medium and finish with long term information

Try to avoid information overload, ideally encouraging people to move through different levels/layers of information if they want to

4.3 Impact of wording/framing of messages

Text 1: impact

We showed participants some text communicating about the overall impacts of air pollution

Air pollution has a significant effect on public health, and poor air quality is the largest environmental risk to public hea lth in the UK. In 2010, the Environment Audit Committee considered that the cost of health impacts of air pollution was likely to exceed estimates of £8 to 20 billion.

Epidemiological studies have shown that long -term exposure to air pollution (over years or lifetimes) reduces life expectancy, mainly due to cardiovascular and respiratory diseases and lung cancer. Short -term exposure (over hours or days) to elevated levels of air pollution can also cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in respiratory and cardiovascular hospital admissions and mortality.

Air pollutants are emitted from a range of both man -made and natural sources. Many everyday activities such as transport, industrial processes, farming, energy generation and domestic heating can have a detrimental effect on air quality

The UK Health Forum and Imperial College London, in collaboration with and funded by Public Health England (PHE), developed a modelling framework and estimated that a 1 µg/m3 reduction in fine particulate air pollution in England could prevent around 50,900 cases of coronary heart disease, 16,500 strokes, 9,300 cases of asthma and 4,200 lung cancers over an 18 year period.

Health matters: air pollution - GOV.UK (www.gov.uk)

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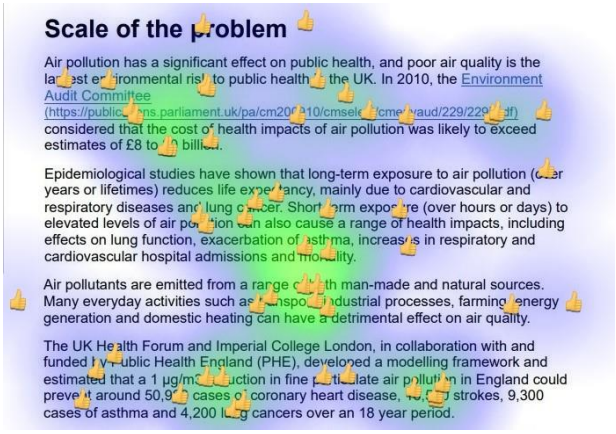
Participants generally felt that the text clearly states the scale of the issue, the health effects involved and the associated costs

Text 1: impact



Positive attributes included

- **Direct, clear, precise** style
- **Costs** help illustrate the scale of the problem
- **Clarity in relation to the health consequences** (both short and long term), which are validated by academic institutions, and relate to everyone
- **Presents links** to other information

'It is clear from this text that it is a massive problem though and that so many health conditions could be prevented by reducing air pollution'
Carers' group

However, participants were sometimes put off by the length and that costs were used as a frame for the information

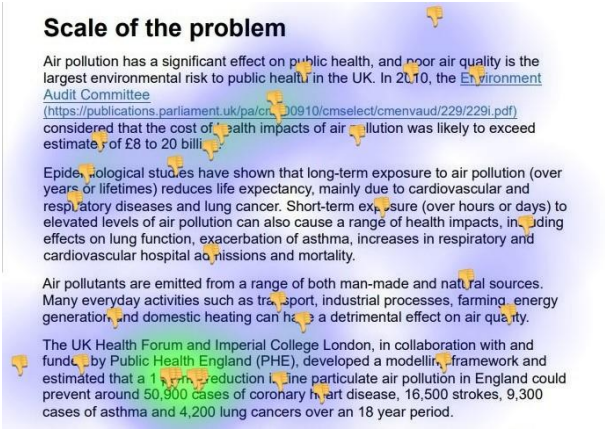
Text 1: impact

Negative attributes included:

- **Long and not broken down** – may be difficult for some to take on board/digest
  - Although some wanted to know more about the modelling framework
- **Some disliked the health issues being put into the context of costs**

Key improvements

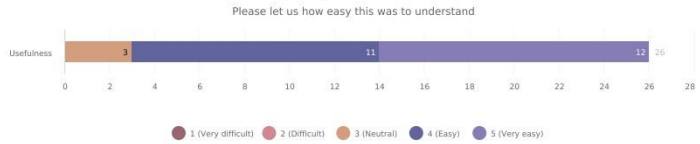
- **Reducing text,** breaking it down using headings
- **Providing more information/links to information regarding contributors** (e.g., domestic heating)
- **Providing more detail on how it can affect individuals**



Text 1: impact

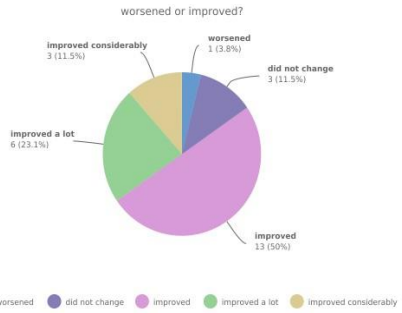
When we asked participants how well they had understood the text, they mostly found it relatively easy to understand and that it had improved their understanding

Most participants (23/26) found the text easy or very easy to understand, and the others were neutral



And the overall 'usefulness' rating was 4.3 out of 5

Most (22/26) felt that the text had improved their understanding to some degree



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Text 1: impact

Here are some comments illustrating perspectives on the text

Improved understanding

'I didn't fully understand how much it could affect people, some more than others. Especially on the health of certain individuals and the impact on the NHS'
Older adults' group

'It is clear and unambiguous in its explanation on the effects of life expectancy but alsœffects on health in the shorter term'
General population group

'I have learnt a bit about the types of pollutants as well as the impact that a reduction could have on our health'
General population group

Did not improve understanding

'It more covers the impact rather than what is causing the most [impact]'
Cardiovascular group

'A lot of the information is already known, however, as previously, the last paragraph got a bit too much scientific, remember everything must be in plain English with the scientific parts in brackets'
Cardiovascular group

'These are common facts that everyone will know'
Older adults' group

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We showed participants some text communicating about the impact of air pollution on the human body, across a lifetime

Text 2: harms

1. Where pollutants go in the body and what they do

When air pollutants enter the body, they can have effects on various different organs and systems, not just the respiratory system.

This includes:

- the eyes, nose and throat
- the lungs and respiratory system
- the heart – heart and blood vessel diseases, including strokes and hardening of the arteries, are one of the main effects of air pollution.

Emerging evidence suggests that air pollution may also affect the brain and is possibly linked to dementia and cognitive decline. There is also emerging evidence associating air pollution with early life effects such as low birth weight.

2. Impact of air pollution across a person's lifetime

Air pollution can affect everyone, and air in all areas of the UK contains some proportion of man-made air pollutants. Exposure to air pollution has various different health effects, which come about at every stage of life, from a foetus' first weeks in the womb all the way through to old age. The health effects of air pollution are complex, and range in severity of impact. In some cases, damage can be gradual and may not become apparent for many years.

The 3 main conditions associated with air pollution are respiratory conditions (such as asthma), cardiovascular disease (CVD), lung cancer, and there is emerging evidence for associations with dementia, low birth weight and Type 2 diabetes. COMEAP has highlighted that exposure to air pollution contributes to many thousands of deaths in the UK, through increasing the risk of CVD, respiratory disease and cancers.

There is therefore a strong case for action to tackle air pollution, and action to improve air quality and health is a priority area for PHE.

Health matters: air pollution - GOV.UK (www.gov.uk)

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This text was felt to be attention-grabbing, clear and informative and there were few issues raised with it

Text 2: harms


How air pollution harms health

1. Where pollutants go in the body and what they do

When air pollutants enter the body, they can have effects on various different organs and systems, not just the respiratory system.

This includes:

- the eyes, nose and throat
- the lungs and respiratory system
- the heart – heart and blood vessel diseases, including strokes and hardening of the arteries, are one of the main effects of air pollution

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There is therefore a strong case for action to tackle air pollution, and action to improve air quality and health is a priority area for PHE.

Positive attributes included:

- **Impactful title**
- **Easy to read**: clearly presented (split into paragraphs with obvious headings, bullet pointed in parts)
- **Information content is new to many** – how air pollution can affect different parts of the body, and not always those that participants expected (e.g., heart health, cognitive decline, dementia, low birth weight)
- **Communicates an urgent message**, which was thought would be likely to prompt action

The few negative attributes mentioned were:

- **Limited focus on the reasons to be worried** about air quality
- **Insufficient detail** (or no signposting to further information) on health impacts

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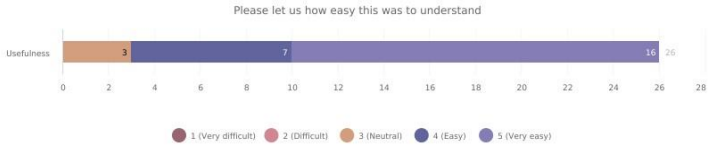
Once again, there was positive feedback on comprehensibility

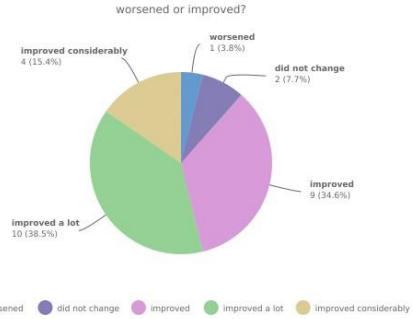
Text 2: harms

Once again, 23/26 participants found the text easy to understand, and the others were neutral



And the overall 'usefulness' rating was 4.5 out of 5

Most (23/26) felt that the text improved their understanding



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Here are some comments illustrating participants' views on the text

Text 2: harms

Improved understanding

'I was not aware of the impact pollution has across a person's lifetime. This was a good way of portraying this information and instils the fact that it is a long term problem'
Cardiovascular group

'I feel it strongly acts as a call to action from an individual through to corporate and governmental level'
General population group

'I have learnt about conditions being linked to air pollution, such as dementia, that I would not have naturally considered as being affected. In addition, information about how it affects people at different life stages is useful'
General population group

Did not improve understanding

'This did explain further on how air pollution affects everyone's health. However, there wasn't enough detail on the list of eyes, nose throat and the other items in the list. For example, you could have a link on eyes, which took you to details of all the problems that air pollution causes eyes. And the same for all the other items on the list'
Cardiovascular group

'Mostly everyday information that most would know'
Older adults' group

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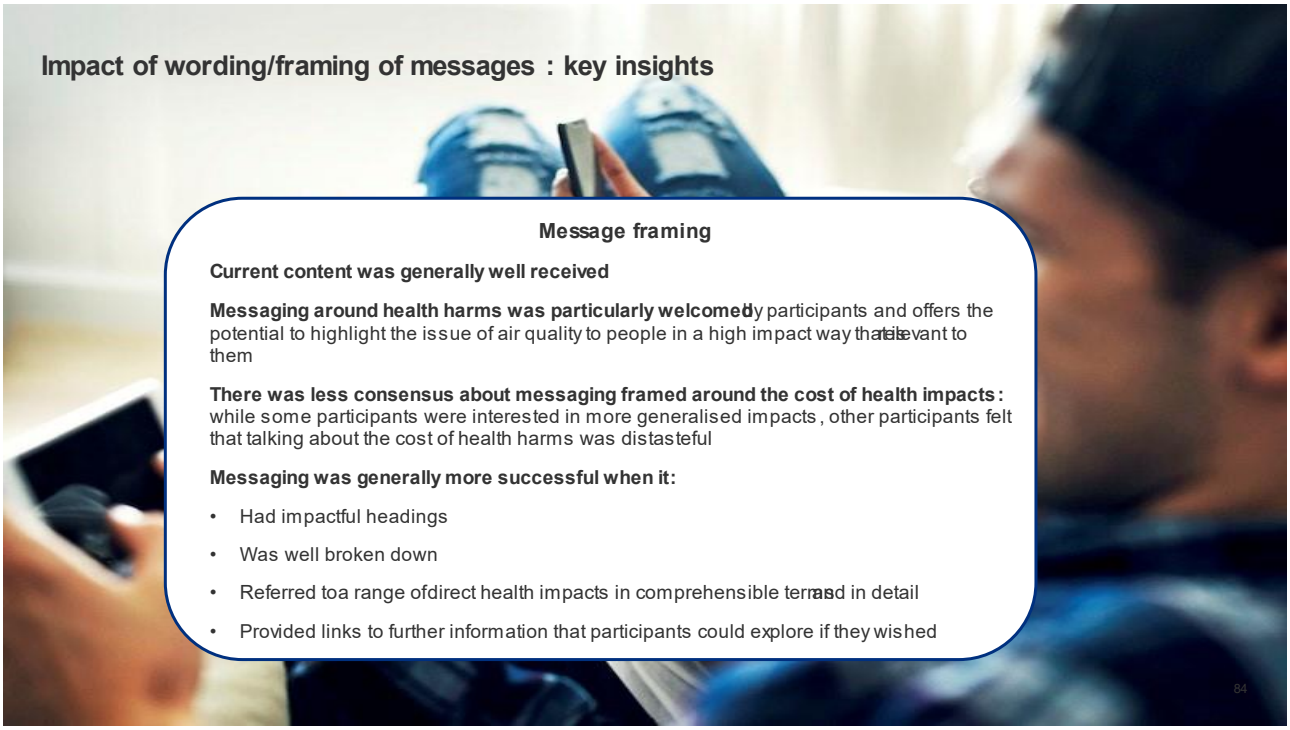

Impact of wording/framing of messages : key insights

Message framing

Current content was generally well received

Messaging around health harms was particularly welcomed by participants and offers the potential to highlight the issue of air quality to people in a high impact way that is relevant to them

There was less consensus about messaging framed around the cost of health impacts: while some participants were interested in more generalised impacts, other participants felt that talking about the cost of health harms was distasteful

Messaging was generally more successful when it:

- Had impactful headings
- Was well broken down
- Referred to a range of direct health impacts in comprehensible terms and in detail
- Provided links to further information that participants could explore if they wished

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Here are a few clips of panellists' experiences of being part of the Clean Air and Me panel

'It's been really useful to speak about air pollution and have it at the forefront of my mind, especially throughout the pregnancy and now having had the baby. I'm so grateful to have had the Forum to do that'
Carers' group

6
Sample

Makeup of the panel in detail

30 participants convening in 6 group discussions(5 participants per group)

Group no	Group type	Further group-based criteria	Other criteria
1	General population	1 person living in an area within decile 1 of the most deprived geographical areas and 1 person within decile 2 (total for both groups) Excluding pregnant people, parents of children under 5, people with respiratory or cardiovascular health vulnerabilities and those over 65	All aged 18-65 (excluding group 6) 14 men, 16 women 8 people from minority ethnic backgrounds 28 from England, 2 from Wales 11 living in urban settings, 12 in suburban, 7 in rural Mix of household incomes, with 13 having incomes of less than £30,000 pa
2	General population		
3	Pregnant people/parent or guardians of children under 5	1 pregnant person, 4 parents/guardians of under 5s 1 person living in an area within decile 1 of the most deprived geographical areas and 1 person within decile 2	
4	People diagnosed with respiratory health vulnerabilities	4 people with diagnosed asthma (2 mild impact, 2 moderate impact), 1 person with COPD 1 person living in an area within decile 1 of the most deprived geographical areas	
5	People diagnosed with cardiovascular health vulnerabilities	3 people with cardiovascular conditions, 2 people with type 2 diabetes 1 person living in an area within decile 1 of the most deprived geographical areas	
6	Older adults	All aged at least 66 years old 1 person living in an area within decile 1 of the most deprived geographical areas	

5. Overview Presentation (waves 1-3)

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Qualitative Research Panel for Air Quality Information System Review

Overview presentation

Penny Stothard and Louise Skowron

December 2023

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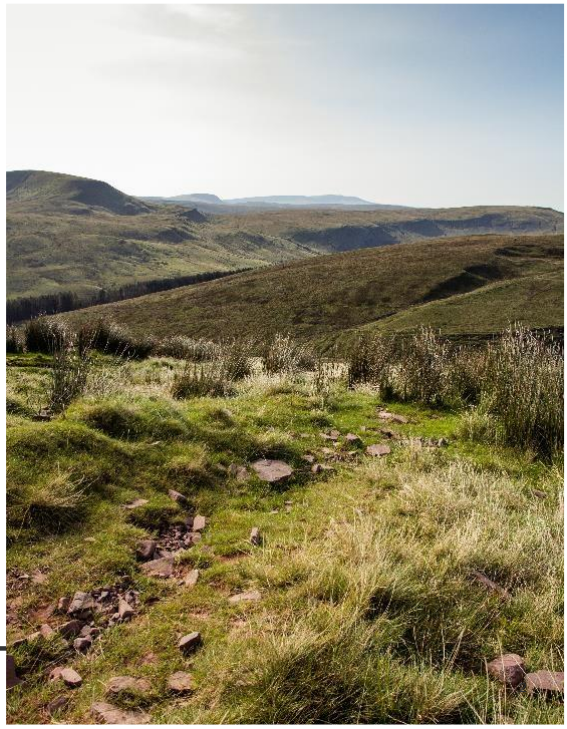

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1 Background and introduction

Defra set up a qualitative panel to inform air quality communication development, focusing on how the public can reduce their exposure and contribution to air pollution

Defra and UKHSA established the Air Quality Information System (AQIS) review to improve the quality and provision of air quality information to the public, which is guided by a multidisciplinary steering group

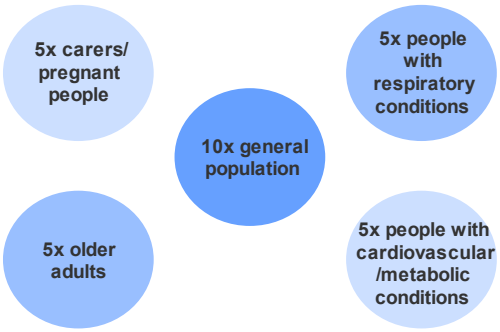
The steering group recommended that communication approaches are developed in collaboration with members of the public

With this in mind, **a qualitative panel was commissioned** that aimed to:

- Develop a deeper understanding of the knowledge, attitudes and behaviours of the general population and 'at-risk' groups, with regard to air pollution (avoiding it, and reducing contributions to it)
- Elicit insight into the barriers and facilitators that influence desired behaviours, and other factors relating to communications that seek to change behaviours
- Explore attitudes to new and existing communication materials and understand opportunities for disseminating them

The research involved a 30-participant panel across three waves of research over 7 months

Clean Air + Me panel consisted of 30 participants



3 waves of activity – each wave involved:

6x 90-minute online group discussions
(max 5 participants per group)

2x 15-minute (or 1x 30-minute) online task sessions
via the Recollective platform

Engagement with the panel dipped slightly after the first wave, predominately due to participant availability, however remained high across the waves (between 25 and 30 participants).

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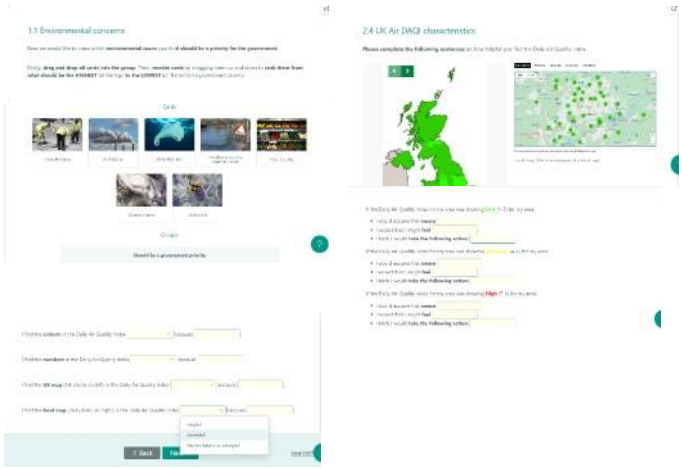
The online tasks were conducted via an interactive market research platform called Recollective

Participants were asked to conduct a range of activities including:

- Sort and rant tasks
- Image reviews of communications materials
- Uploading content to report on behavioural actions

The platform was available for 24 hours a day for seven days in each wave

User support was offered to participants where it was needed, although it is a relatively easy-to-use platform



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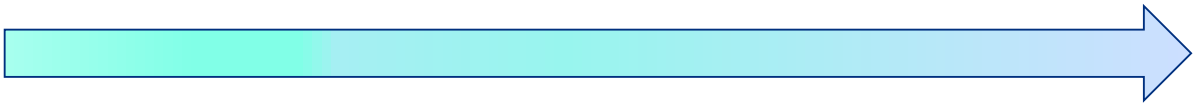
This report details the learnings that have emerged from across the waves, which explored the topics below



WAVE 1	WAVE 2	WAVE 3
Understanding and perceptions of air quality and air pollution	Encouraging behaviour change	Leveraging existing opportunities for information dissemination
Preferred air quality information sources, content and messengers	Communicating risk	Attitudes to new and existing communication materials
Getting to know participants and understand their situations	***Understanding responses to behaviours in 'real life'***	***Exploring 'moments of change' and social networks***
Identifying key sources	***Interrogating risk communications***	***Developing infographics and mocked up webpages***

2
Overarching findings

SUMMARY FINDINGS

Key insight from the research, across all waves

1

Public understanding of air quality seems not to have moved on over the past 10 years

Air quality is a complex topic that needs to be addressed at an individual level, socially and via infrastructure to enable the public to change their behaviour

2

A key focus for communication should be that air quality has the potential to affect everyone's health

There was ignorance of the health impacts of air pollution but interest in knowing that lives may be shortened and the details of the impacts

3

In this research, there were variations in participants' propensity to act

This related to their engagement with the topic and perceived level of agency, although different groups present different opportunities for targeting and behaviour change

4

Information in this context is ideally multi-dimensional: raising awareness and influencing actions

There is a need for higher level information that introduces air quality as a topic, as well as more specific information that highlights what to do and where to find support on decision-making

5

There is a role for information that influences short term action

An accessible daily forecast of information could help to raise the profile of air quality and influence day-to-day behaviour

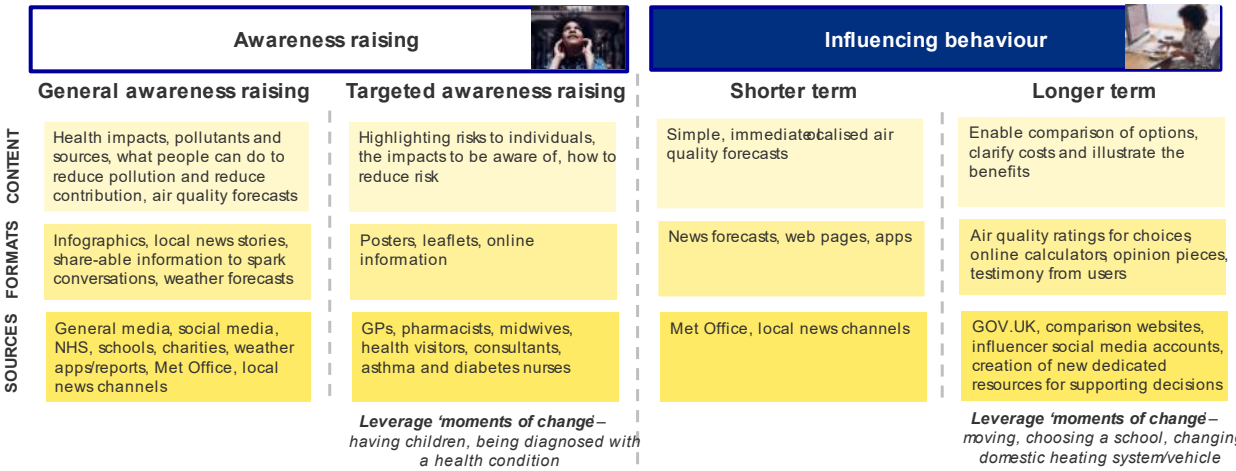
6

There is also a role for information that influences and supports longer-term decision making

In relation to 1) behaviours in the home e.g. heating choices; 2) where people choose to live and work; 3) domestic purchases e.g. buying a gas or electric cooker; and 4) transport choices

INFORMATION ACTIONS

Key information opportunities for shifting behaviour



3. Context

CONTEXT – UNDERSTANDING

Air quality is not a priority and is relatively poorly understood and this does not seem to have shifted over time

The research revealed key knowledge gaps around:

1. **What air quality is** – and how it is distinct from climate change
2. **The impact of poor air quality on health –** and how this varies, and how risk can be reduced
3. **How individuals contribute towards air pollution** and how this can be reduced

Previous research has found similar themes:

- *General public audiences were aware of the concept of air quality at a high level, and commonly talked about it in terms of 'air pollution,' but understanding of the issue was fairly shallow*[1]
- *Participants in this research were also unaware of the connection between climate change and air pollution*[2]

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[1] Defra Air Quality User Needs Report, Kantar, 2021
[2] 'ndividuals' interpretation of air quality information: customer insight and awareness study, University of Brighton, 2011

CONTEXT – UNDERSTANDING

Perceptions of what affects air quality focused on transport, industrial emissions and energy generation

Specific knowledge gaps

Participants were generally **unaware of different air pollutants** (e.g., particulate matter, nitrous oxides) and how different industries/activities contribute to air pollution (e.g., agriculture)

It was a surprise to many that **domestic heating** is such a large contributor versus industry

Indoor air pollution was not normally a focus of attention and understanding of what contributes to it was low

CONTEXT – UNDERSTANDING

Experiences and perception of risk of air pollution also varied by local area and individual

Differences by local area

In urban areas, the negative impact of traffic on air pollution was the most salient concern, e.g.

- Walking/living on/children playing near busy roads/streets

In rural areas, participants tended to assume that there was limited risk or impact on them

- Although in the research one participant lived in a rural location with an industrial plant that caused concern for residents

Differences by individual

More top of mind for some 'at risk' groups

- Older people, people with cardiovascular conditions and people with respiratory conditions tended to be concerned about the immediate and long-term impacts
- Carers were also concerned about the impact on their children

Others assumed they were not at risk and air pollution had limited impact on them

- This included people with health conditions who were only affected mildly by their condition

CONTEXT – AIR QUALITY INFORMATION

The salience of air quality information was low

The majority were unaware of and had not sought air quality information

There were a range of different levels of interest

- **Interested but not aware** – most participants were unaware that information existed at a national or local level
- **Open but unclear what the benefit would be to them** (especially if they did not perceive air quality as having an impact on them or members of their family)
- **Not interested**

However, participants became more aware of air quality information (e.g., via weather apps) over the course of the research once sensitised

A minority had come across air quality information

Participants with respiratory conditions tended to be familiar with information on the pollen count, although did not always recognise this to be air quality information

Some awareness via weather apps

Some participants also recalled air quality information during extreme environmental events, e.g., Saharan sandstorms, as part of weather forecasts and news stories

One person reported receiving an email from Martin Lewis that encouraging readers to look at www.addresspollution.org (to assess air pollution levels and, if high, ask landlord for reduction in rent)

CONTEXT – BEHAVIOUR

The Individual, Social, Material (ISM) behavioural model can help to illustrate the inter - relation of factors and why the issue is so complex to address

Individual

Low awareness of the health impacts – no positive reason to change (for self or others)

Low awareness of how different activities contribute to air pollution – and how individuals can act to change this

Low sense of agency unclear how individuals can make a difference (assume industry is to blame), costs of some actions may be high

Social

Low salience of air quality as an issue (not a national/local/personal topic of conversation)

Lack of 'opinion leaders' or influencers, unclear what the role of institutions is in this context

Low salience of information and/or clarity on what to do with it

Material

Public transport infrastructure perceived as expensive, not joined up and unreliable

Heating infrastructure favours fossil fuels currently

CONTEXT – BEHAVIOUR

While participants were open to acting, this needs to be enabled at different levels

Individual

Giving a reason to act – clarifying the health impacts, encouraging ability to take responsibility for the environment

Showing that there are actions that all people in all situations can put into practice

Showing that the actions are easy, convenient, practical and may improve people's health and wellbeing

Showing the impact of individual actions

Promoting actions that are inclusive and relevant to all, i.e., include those without a car, who are less mobile

Social: local/national

Raising awareness of the issue

- Via opinion leaders/influencers
- Via daily air quality readings

Communicating the actions government/industry are taking

Providing reliable information to help guide day-to-day and longer-term decision-making

Showing the impact of collective actions – how individual actions 'add up' and how others in a community are acting

Material: infrastructure/ policy

Improving reliability and joining up transport infrastructure (public transport and electric vehicle charging points)

Technological nudges: engines automatically switching off, option to combine online deliveries

Financial incentives: around domestic energy sources and transport choices

Demonstrating commitment that we are 'in this together': rules and regulations for industry, enforcement, penalties

CONTEXT – BEHAVIOUR

Participants were open to reducing their contribution to air pollution

Transport

Driving less/at different times was often felt to be relatively difficult to achieve

- Especially those living rurally, workers, families

More achievable actions included:

- **Turning off engines** while stationary
- **Reducing deliveries/collecting from pick up points**
- **Encouraging choice of electric vehicles**
- **Flying less**

Active travel/via a new route tended to lead to feelings of greater wellbeing

Domestic heating/ appliances

Homeowners were more empowered in this context than renters, and would be encouraged by

- Financial incentives
- More information on the choices available
- Confidence infrastructure exists/experts are available to advise/install

Indoor pollution

Indoor pollution was an area over which participants felt they have a large degree of control

- Interest in more information around precisely what to do to improve indoor air quality

CONTEXT – BEHAVIOUR

There was also openness to reducing exposure to air pollution

Changing when/where exercise

Participants were sometimes doing this already (whether due to air pollution reasons or not)

Walking as far from the road as possible created a talking point

However, these actions were irrelevant for those with restricted mobility

'It would be good to understand the science or reasons for this – if you walk X metres away from traffic your air is X% better'
General population group

Other possible actions

Other actions suggested by participants included:

- Avoiding strenuous activity outside
- Closing windows
- Wearing face masks

Without guidance on how to reduce exposure there is a risk of individuals making uninformed decisions

'It's been a bit of a nightmare recently because of the really hot weather, but it's busy on the roads and at peak times I would definitely not open my windows because of the air pollution
Carers group

CONTEXT – INDIVIDUAL VARIATIONS

Participants' responses varied considerably, depending on their confidence in their health…

Perceived confidence in health

Low confidence

People with respiratory conditions and/or cardiovascular conditions

People caring for children or others with respiratory and/or cardiovascular conditions

Pregnant people

Aware of the impact of air pollution on themselves and others

(Urban dwellers and/or those living near to industrial plants)

High confidence

General population

Less aware of/concerned by the negative impact of air pollution

Or, if aware of the negative impact, confidence in health is perceived as something that may decline in the future (i.e. not immediate/ currently salient)

(Rural dwellers)

CONTEXT – INDIVIDUAL VARIATIONS

…and sense of agency

Perceived agency

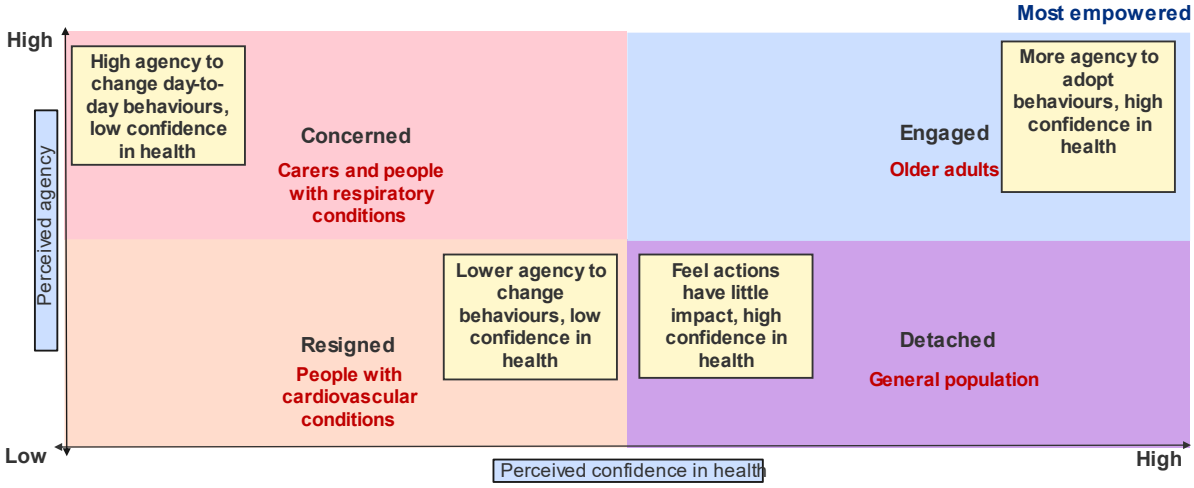
High
Feel they have choices
Feel they have resources (time/money)

Low
Feel they lack choices
Feel they lack resources (time/money)

KANTAR PUBLIC

CONTEXT – INDIVIDUAL VARIATIONS

Participants fell across these two dimensions in the research



KANTAR PUBLIC

CONTEXT – INDIVIDUAL VARIATIONS

Concerned

Hannah (pseudonym) is married and mum to 2 year old son, Bertie. They live in a fairly large house but to be able to afford it compromised on the location – a busy main road. Sometimes she feels guilty because she worries about how the exhaust fumes might affect Bertie. She would like to move house but they are on a fixed -term mortgage so it is not possible at the moment.

Feelings	Personal situation	Key barriers	Key opportunities
Anxious, worried, guilty **Concerned about the impact** on their family **Uncertain** about what to do **Set against worries about other environmental issues** and the cost of living	**Relatively large social network** (family, friends, colleagues, children's friends) **May be interested in environmental issues**	**Others depend on them**, which may limit behavioural flexibility (e.g., need to drive children) **Concerns about safety** (e.g., walking in dark, safety of appliances)	**Motivated to limit impact of air pollution on children** Open to information **during pregnancy, when choosing/ moving house, choosing a school** **Education** via healthcare practitioners and children

CONTEXT – INDIVIDUAL VARIATIONS

Engaged

Andy is retired and lives in a trendy area of Manchester. He has become more aware of air pollution recently and its effects on individuals and nature. With no long -term health conditions himself he does not feel directly affected by poor air quality, although he is concerned about the wider effects locally, nationally and globally. Now he is not working he has more time to read about air quality in the paper and has raised his concerns with his MP.

Feelings	Personal situation	Key barriers	Key opportunities
Passionate about concern that poor air quality is negatively impacting humans and the environment **Frustrated that governments and business are not moving faster** to make change happen	**Social networks vary** according to age and mobility **Tend to have flexibility about behaviour,** as they are often retired **Believe government needs to be more open** about air pollution	**May not perceive themselves as 'at risk'/have high confidence in their own health** so may not try to protect themselves from air pollution **Lack of mobility** may mean that their ability to change behaviour is restricted (e.g. walking limited distances, caring for partner with health needs)	**Healthcare practitioners signposting** to information as appropriate **Educating via grandchildren and community networks** (e.g. hobbies, clubs, churches, day centres) **Clear guidance** about adapting behaviour (e.g., travel choices)

CONTEXT – INDIVIDUAL VARIATIONS

Detached

David is in his mid 20s with no long -term health conditions or care responsibilities. He does not feel he is directly affected by the quality of the air day -to-day and thinks this is more of a concern for people with asthma, lung conditions and young children. He believes everyone can do their bit but it doesn't have much impact unless government and big business are on board.

Feelings	Personal situation	Key barriers	Key opportunities
Indifferent and unconcerned **Although could change in the future** if circumstances change (e.g., have children, parents develop health conditions) **Feel their actions have little impact**	**Variable social networks** but normally including friends, family and work colleagues **Not particularly engaged** with environmental issues- tend to be busy and preoccupied with other issues	**Lack of a reason to engage** **Lack of awareness** of the impact of air pollution on everyone's health **Cynicism** about government and industry	**Educating and raising awareness** via social media, influencers **Information and clear guidance** about the impact of air pollution on everyone, how they can adapt their behaviour (contribution to pollution) and the impact of this

CONTEXT – INDIVIDUAL VARIATIONS

Resigned

Teri has a cardiovascular condition and lives in a polluted area. She can see polluted air when she goes out and can feel it on her chest. She worries that this will worsen as she ages. Her cardiologist has told her to move to somewhere less polluted but she doesn't think she'd be able to get a job easily in an unpolluted area.

Feelings	Personal situation	Key barriers	Key opportunities
Emotional, worried, distressed **Concerned that poor air quality is negatively impacting** on their health and that this is worsening over time	**Variable social networks** depending on age, mobility and economic activity **Highly attuned to health topics** **May have already taken drastic action** to change their situation (e.g., moving house)	**Perceive they have few choices** (they may have already taken as much action as they can) **Cynicism around government and industry acting** – feel this needs to be done to support them changing their behaviour and showing collective action	**Healthcare practitioners signposting** them to more information at point of diagnosis **More information on choices** they have for managing their condition at times of high air pollution

4. Role of information

INFORMATION – OVERALL ROLE

In this context, there are roles for different types of information

Awareness raising

General awareness raising

Information detailing

- The issue itself and how it impacts on health
- The main sources of air pollution
- Key air pollutants and what generates them
- How different people's actions contribute
- What can be done to reduce contribution (and what is being done)

Targeted awareness raising

Simple, immediate information to influence day-to-day behaviour

- Highlighting the issue to 'at risk' groups
- What impacts they should be aware of in their own body
- How they can reduce their exposure to, and therefore the impact of air pollution

Influencing behaviour

Shorter term

Simple, immediate localised forecasts

- This week, by hour/time of day
- At street level, colour coded
- Advice on what to do (e.g. keep windows shut, don't put out washing, stay indoors)
- Focus on the positive for good air quality (e.g. go outdoors, exercise)
- Option (if desired) to access more detailed information about air quality such as scales (e.g. PM2.5)

Longer term

Historic air quality information to influence choices, e.g.,

- House, school
- Travel destination
- Choice of heating technology

Further information to support decision-making

- Providing information on costs, comparisons and other people's experiences

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INFORMATION – SOURCES/MESSENGERS

Participants suggested using a range of different sources and messengers

Friends/family/ social network

Awareness raising

Discussion of local/national topics

'Word of mouth' recommendations (e.g., for new technologies)

Social groups can set new norms

Events at local centres/school can help to start conversations

Healthcare

Awareness raising

Via NHS website

Influencing behaviour

Signposting to relevant information on health impacts and how to reduce risk via healthcare practitioners

However, needs to be easy to deliver (participants were concerned about burden)

Education

Awareness raising

Included in the curriculum and embedded in everyday life at school

Part of school-based community activities

Media

Awareness raising

Met Office, BBC and local news channels trusted for information

Social media providing 'conversation starters'

Influencing behaviour

Assumption that local air quality forecasts would be part of local news

Other

Awareness raising

Government less generally trusted overall, although GOV.UK may be a good source of 'neutral' information

- Especially if information is clearly based on scientific research conducted by well-respected institutions

Charities can provide a trusted, reliable alternative perspective (e.g., Asthma UK)

INFORMATION – VARIATIONS

Different groups present different key information opportunities

Concerned

Via midwives and health visitors

Via schools

How to reduce impact of air pollution on children

Engaged

Via GP practices/health centres

Via schools (grandchildren)

How they can reduce the impact of air pollution on their health

Detached

Via news and forecasts

Via social media

Impact of air pollution on everyone

Resigned

Via specialists

Via news, forecasts and social media

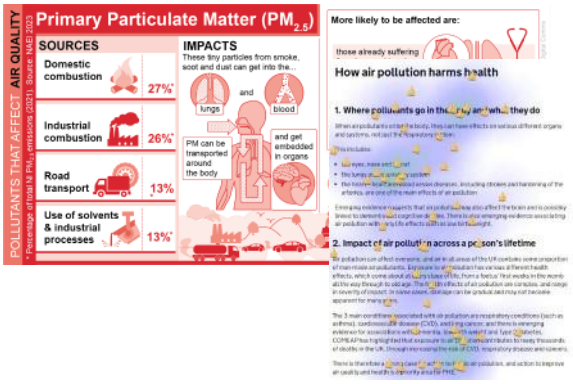
How to reduce impact of air pollution on their health

Messages around how individuals can reduce their contribution are relevant across the board

5. Awareness raising

AWARENESS RAISING – MESSAGING

Participants overwhelmingly focused on health impact as the most motivating reason to care



Key content

The specific impact of air pollution, e.g.,

- Which organs it affects and how
- How individuals might recognise that they have been affected (e.g., change of skin colour, feeling out of breath, persistent cough, sore throat/eyes)

The reduction in lifespan as the key impact of air pollution

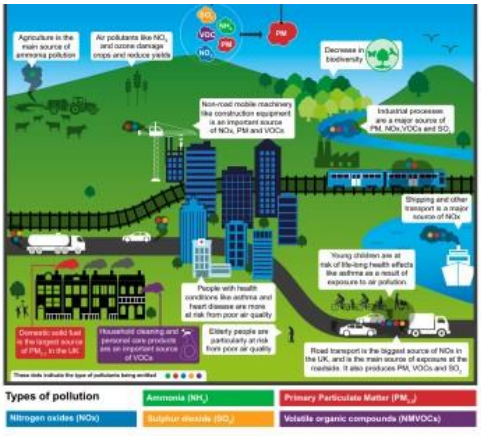
Emphasis on how everyone is affected, not just the groups illustrated

- Refer to indoor and outdoor pollution
- Provide call to action, i.e., advice on how to reduce exposure to air pollution

Preference for information to be framed around health impact on individuals versus more general focus on the costs for the country

AWARENESS RAISING – MESSAGING

Background information is interesting to some but needs to be 'entry level'



Key content

Better explanation of different pollutants

- What they are and how they affect people
- Which are the most important and why
- What are the sources
- How levels have changed over time

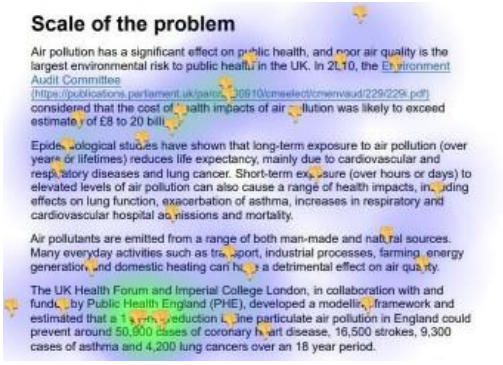
Information on what people can do to reduce impact – and what will have most effect

Emphasise a positive message, if there is one, e.g..

- If people change behaviour, levels can reduce and/or they have reduced over time

AWARENESS RAISING – PRESENTATION

Some guidelines around presenting this information emerged



Scale of the problem

Air pollution has a significant effect on public health, and poor air quality is the largest environmental risk to public health in the UK. In 2010, the Environment Audit Committee (https://publications.parliament.uk/pa/cm200910/cmselect/cmenvaud/229/229i.pdf) considered that the cost of health impacts of air pollution was likely to exceed estimates of £8 to 20 billion.

Epidemiological studies have shown that long-term exposure to air pollution (over years or lifetimes) reduces life expectancy, mainly due to cardiovascular and respiratory diseases and lung cancer. Short-term exposure (over hours or days) to elevated levels of air pollution can also cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in respiratory and cardiovascular hospital admissions and mortality.

Air pollutants are emitted from a range of both man-made and natural sources. Many everyday activities such as transport, industrial processes, farming, energy generation and domestic heating can have a detrimental effect on air quality.

The UK Health Forum and Imperial College London, in collaboration with and funded by Public Health England (PHE), developed a modelling framework and estimated that a 1 µg/m³ reduction in fine particulate air pollution in England could prevent around 50,000 cases of coronary heart disease, 16,500 strokes, 9,300 cases of asthma and 4,200 lung cancers over an 18 year period.

Key guidelines

Break up text and simplify wherever possible

Use non-technical language, assume no pre-existing knowledge

Infographics can help illustrate an issue but readers may need help knowing how to 'read' them

- Where to start, how to interpret etc

Where possible, layer information

- Provide top level content, allowing reader to reveal more detail (if they wish)

Consider how information could be adapted/shared for social media

- Create 'stories' or 'shorts' with audio content
- Push via social media to create a conversation online, to trigger or support face-to-face discussions

AWARENESS RAISING – HEALTHCARE PRACTITIONERS

These professionals were often seen as playing an important role in raising awareness around air pollution

GP/pharmacist

Via NHS Health Checks

- Include air quality questions, e.g., do you have a wood burner, what times/where do you exercise, do you tend to cycle on busy roads?
- Highlight risks/steps to avoid exposure, which may help to normalise conversations about air quality

However, not expected to be experts on air quality – role should be in raising issue and signposting to more information

Midwife/health visitor

Pregnancy/having a baby is an ideal time to raise the issue of air quality

- Expectants/new parents will do anything to protect their unborn/new baby- they tend to read information and act upon it

Opportunity to place information about air quality within information given to new and expectant parents

Information in health settings

Waiting rooms and areas were recognised as opportune spaces for displaying accessible air quality information

- GP/hospital waiting areas
- Pharmacists

This **may prompt patients to proactively raise the issue** with their practitioner and be given/signposted to more detailed information if wanted

AWARENESS RAISING – HEALTHCARE PRACTITIONERS

Beyond check-ups, it was felt that in certain circumstances, practitioners should proactively offer air quality information and advice

Opportunities

Patients with respiratory and cardiovascular conditions should know about the effects of poor air quality and why they are at higher risk during

- Asthma reviews
- Consultants' appointments

For patients who display new symptoms such as a persistent cough, healthcare practitioners could ask questions about exposure to air pollution, such as having a wood burner at home or walking/running/cycling along busy roads (similar to questions asked about smoking habits and exposure to second-hand smoke)

During seasonal times of high air pollution, pharmacists could offer information to people buying antihistamines and/or display information about how to limit exposure

'If I went to the pharmacy and the air quality was bad then I would expect to see a poster up and, if I had a cough as well, I would expect to receive a leaflet from the pharmacist'
General population group

AWARENESS RAISING – DISSEMINATION

There were some ideas for how to disseminate this type of information

Key channels

Government awareness campaign (using normal channels)

Local centres, e.g., schools, councils, local news, community centres

Place-based advertising e.g., local TV, billboards, bus stops

Local council websites

GPs' surgeries, healthcare practitioner information

Social media – in a shareable video format with a short audio

Considerations for social media

Ensure information is 'shareable' on social media so it can become a talking point in personal networks

- Consider developing 'shorts' and 'stories'
- Add audio narrative
- Where possible, develop dynamic/animated/interactive features

6. Influencing action

INFLUENCING ACTION – SHORT TERM

An accessible daily forecast of information could help to raise the profile of air quality and influence day-to-day behaviour

Opportunities

The availability of localised and timely information has the potential to influence

- When people exercise and where (e.g. particular routes, where children play)
- When people use their cars (e.g., avoid peak polluting times)
- When to open windows/hang out washing
- Whether people with asthma take their inhaler when leaving the house
- How much medication people with relevant conditions take

INFLUENCING ACTION – SHORT TERM

Participants identified key features of localised information

Key information features

Easily accessible

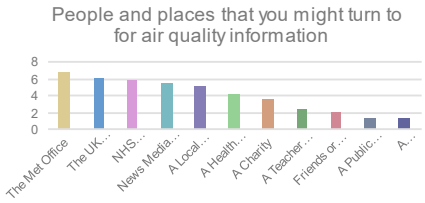
Provided at town/area or ideally at street level

Easy to understand (top level information, using established information norms e.g. RAG rating, that can clearly help to guide behaviour)

Indicating the time of the day when pollution levels are to be highest and lowest

Providing simple advice on how to respond to air quality information, including ideas for when air quality is good

Option to quickly access more detail e.g., descriptions of air quality levels to help with understanding



The Met Office was the overall favoured source of air quality information, although others were also suggested

INFLUENCING ACTION – SHORT TERM

‘At risk’ groups particularly felt that an air quality forecast could help them

Respiratory and heart conditions

Prompts better understanding of **how air quality can impact condition**

Gives advice on how to mitigate symptoms and manage condition, e.g.,

- What to avoid and when
- When reliance on inhaler may increase

Enables tracking of symptoms (e.g., on a calendar) next to air quality reading

Could support discussion with healthcare practitioners

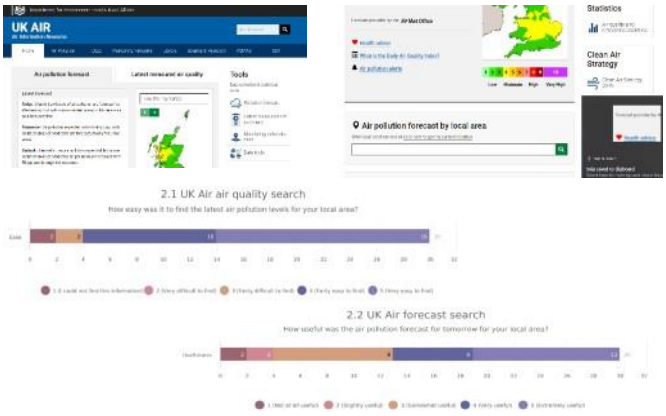
Carers/pregnant people

Prompts focus on **how air quality can impact a developing foetus, and the health of a pregnant person and babies/children**

Helps take action to mitigate the effects on children in general, as well as those with asthma/other respiratory conditions

INFLUENCING ACTION – SHORT TERM

Participants often found it difficult to use and interpret the current Daily Air Quality Index provided on UK Air



Key developments

Greater clarity about the scale used

- Some confusion about whether the scale refers to ‘air quality’ or ‘air pollution’, which meant misinterpretation of the rating was possible

Greater clarity about how to use the webpage

- Not all realised the map is interactive or that they needed to scroll to the bottom

More detail about what is being measured

- Ideally providing the ability to find out more detail on this

More direction regarding how to respond to the reading

INFLUENCING ACTION – SHORT TERM

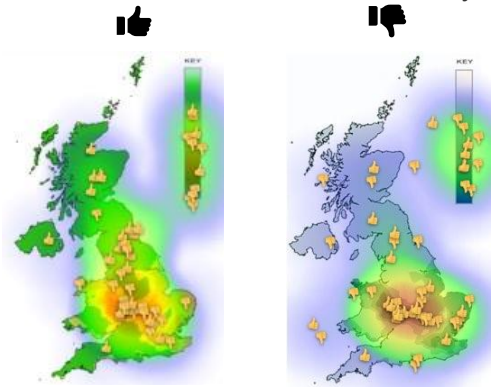
There was consensus that a 'red amber green' system used to communicate risk is easy to understand

Key preferences

Participants overwhelmingly preferred RAG approach for denoting risk

- Most correctly interpreted this as a colour scheme, assuming 'green means safer, no threat, all is well', easy to differentiate between different 'bands' of pollution
- Whereas use of a single colour with gradients caused much more confusion

'Clearer difference in colours and more visually striking. Also uses colours commonly associated with 'bad' and 'good'



However, our inference is that there is a need to make clear that the lack of a short-term risk is not misinterpreted as no risk at all.

INFLUENCING ACTION – SHORT TERM

There were also some preferences revealed regarding the wording of risk communication

Framing of scales

Framing with health (US) provoked concern and anxiety

Framing with pollution (China) induced more anger (as well as anxiety)

Approach A (US):
- Good
- Moderate
- Unhealthy for sensitive groups
- Unhealthy
- Very unhealthy

Approach B (China):
- Good
- Lightly polluted
- Moderately polluted
- Heavily polluted
- Severely polluted

Framing of 'at risk' categories

Participants felt that **referring to people who are 'at risk'** versus the 'general population' implies that the latter group is 'safe'

In the context of them understanding more about the health impacts of air pollution, participants felt it would be more relevant to **indicate a spectrum**

'At greater/higher risk'; 'at lower risk'

INFLUENCING ACTION – INFORMATION SHARING

Some participants were interested in sharing information to receive air pollution alerts and suggested a range of possible models

Opt-out system from local council

- Based on postcode area
- Information could be tailored by individual according to preference

Facility to opt-in via NHS app

- Many already using this anyway
- Assumed this holds current health information on conditions and could be further tailored, depending on need

Development of a new healthy living app

- Sign up to set targets for outdoor exercise etc
- Air pollution information

Key requests

Alert messaging (via app notifications or texts)

The facility to **choose message frequency** and level at which alert is sent (e.g., every day, when air quality is 4+)

The facility to **access different layers of information** top level, able to click through to more detailed information

Information on reasons for air pollution (e.g., traffic on the M25)

Ability to link to background information on air pollution (causes/impacts), including symptoms to look out for

Information provided shows choices and not is presented too negatively to scare people

INFLUENCING ACTION – LONGER TERM

Participants were positive about the availability of a means of understanding air pollution in a location in the longer term to support their decision -making

Key requests

Elements work together cohesively at a visual level, i.e., colour coding (ideally RAG), icons, symbols, and are explained via a key

Logical flow of information from short term to long term risk, i.e., today's reading at the top, tomorrow's alert and then the annual rating

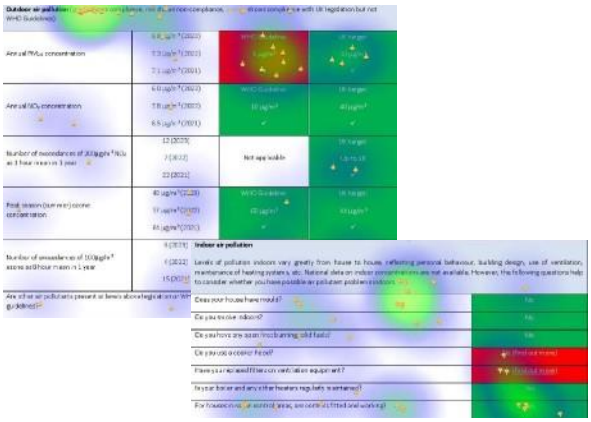
Concise text, short sentences, use of bullets

Further information available if wanted, e.g.,

- How the rating has been collated/what contributes to it/what it is based on
- Advice on how individuals can help improve the rating (if relevant)
- Link to further advice where relevant (e.g., if pollution is high)

INFLUENCING ACTION – LONGER TERM

Participants were interested in sharing household details to obtain a pollution statement but these need to be set out in non -technical ways to ensure they are comprehensible



Key components

Introduction to the information, giving background on the context, the pollutants and what the information shows

Explanation of specific terms (e.g., click on/hover over for detail, link to further sources for greater information) on

- Different pollutants
- What constitutes 'solid fuel'

Colour coding of level for relevant period (RAG)

Visual representation of direction of travel (e.g., upwards/ downwards arrow)

Give details of how to improve indoor air pollution

INFORMATION – RESPIRATORY CONDITIONS

Participants were keen for asthma advice to be created collaboratively and provided consistently

Key requests

Created in collaboration with an expert group (e.g., Asthma UK)

Clearly set out, concise, visually striking

Show realistic actions that are easy to understand and follow

Give 'new' information

Low	Moderate	High	Very High
Enjoy your usual outdoor activities.	People with asthma, **who experience symptoms**, should **consider reducing** outdoor moderate to vigorous physical activity^.	People with asthma, **who experience symptoms**, should **reduce** outdoor moderate to vigorous physical activity^.	People with asthma should undertake moderate to vigorous physical activity^ **indoors, rather than outdoors**.
Where possible, consider changing your: • Travel route (e.g., take quieter back streets or routes through green spaces such as parks) • Exercise location (e.g., in green spaces such as parks or indoors in a well-ventilated room or gym) and/or • Time of travel or exercise (e.g., avoid 'rush hour')			
		Preventative inhalers can reduce the adverse effects of air pollution. Take your preventative inhaler even if your asthma is OK. Reliever inhalers can be used when symptoms occur. If symptoms persist, or you want more advice, talk to your healthcare professional. Currently, there is little evidence to recommend the use of facemasks.	

INFORMATION – SUPPORTING DECISION-MAKING

Participants suggested ways of supporting their longer -term decision -making such as buying white goods, a car or upgrading heating systems

Enable comparison

Create air quality rating similar to existing energy rating stickers

Ask **comparison websites** to include air quality impact

Impartial information to explain which products are better for air quality and why

'We bought loft insulation recently and it was a learning curve to find out what the thickness of the insulation should be, it was difficult to find out the optimum thickness'
Older adults' group

Clarify costs

Online calculators to estimate long-term savings

Information on grants, eligibility criteria and how to access them

'They say you will save all this money on your bills but when you try to work it out and the cost of installing it, you'd have to have it for about 20 years before you'd even make that money back'
General population group

Illustrate the benefits

Opinion pieces that promote positive experiences

Experts/celebrities/influencers promoting the benefits of specific decisions

'I'm not convinced about making the switch. It will cost a load of money and I don't know anyone who this [heating systems/insultation]. There's not enough critical mass for me to take action'
Respiratory group

7. Sample

Makeup of the panel in detail

30 participants convening in 6 group discussions(5 participants per group)

Group no	Group type	Further group-based criteria	Other criteria
1	General population	1 person living in an area within decile 1 of the most deprived geographical areas and 1 person within decile 2 (total for both groups) Excluding pregnant people, parents of children under 5, people with respiratory or cardiovascular health vulnerabilities and those over 65	All aged 18-65 (excluding group 6) 14 men, 16 women 8 people from minority ethnic backgrounds 28 from England, 2 from Wales 11 living in urban settings, 12 in suburban, 7 in rural Mix of household incomes, with 13 having incomes of less than £30,000 pa
2	General population		
3	Pregnant people/parent or guardians of children under 5	1 pregnant person, 4 parents/guardians of under 5s 1 person living in an area within decile 1 of the most deprived geographical areas and 1 person within decile 2	
4	People diagnosed with respiratory health vulnerabilities	4 people with diagnosed asthma (2 mild impact, 2 moderate impact), 1 person with COPD 1 person living in an area within decile 1 of the most deprived geographical areas	
5	People diagnosed with cardiovascular health vulnerabilities	3 people with cardiovascular conditions, 2 people with type 2 diabetes 1 person living in an area within decile 1 of the most deprived geographical areas	
6	Older adults	All aged at least 66 years old 1 person living in an area within decile 1 of the most deprived geographical areas	