**ME-NET stakeholder innovative labs - qualitative data compiled for Wellcome Trust interim report**

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*This interim report (28th February, 2025) presents a synthesis of qualitative analysis conducted focusing on the first and second rounds of stakeholder Innovation Labs involved in the co-design of the ME-NET application for smart-phone and website.*

**Research question:** What user functions would improve the visibility of climate change impacts, and how deliverable are these, given data availability and quality in regions? The ongoing data collection and analysis will help to address this question when all the stakeholder innovative labs and data analysis are completed.

**METHODS**

*Design*

An iterative co-creative co-design approach was adopted, including three rounds of virtual Innovation Labs with multi-institutional and interdisciplinary stakeholders from the UK (Lincolnshire County, North/North East Lincolnshire) and Ghana (Accra and Sekondi-Takoradi), to inform the development of the Methane Early Warning Network Application (ME-NET). The ME-NET project began in July, 2024, with the first and second rounds of stakeholder Innovation Labs in August and November. This interim report addresses qualitative data compiled from these initial Innovation Labs. The final round of meetings will take place in March, 2025.

*Stakeholders*

Ethics approval was granted by the ethics committee of the University of Lincoln.

A purposive sampling method was used to recruit stakeholders from the chosen regions taking into consideration their interest and current professional or occupational affiliation. Individual stakeholders were contacted by email with a study information and consent form for the purpose of obtaining written informed consent. Participation was voluntary and with a £25 voucher as a token for their time. Table 1 presents details of stakeholders below.

**Table 1 Details of stakeholders attending the 1st and 2nd round of Innovation Labs**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1st round of Innovation Labs: NEL (19/08/2024 & 27/08/2024), Lincolnshire (20/08/2024), Ghana (02/09/2024)** | | | | **2nd round of Innovation Labs: Lincolnshire (04/11/2024), NEL (06/11/2024), Sekondi-Takoradi (07/11/2024), Accra (19/11/2024).** | | | **3rd round of meetings:** | | |
| **ID** | **Region** | **Professional role** |  | **ID** | **Region** | **Professional role** | **ID** | **Region** | **Professional role/background** |
| 1 | North East Lincolnshire (group1) | Public health programme manager |  | 1 | Lincolnshire | Assistant director for prevention and early intervention in public health, Lincolnshire County Council |  |  |  |
| 2 | North East Lincolnshire (group1) | Social prescribing in a Charity |  | 2 | Lincolnshire | Everyone charity |  |  |  |
| 3 | North East Lincolnshire (group2) | Sustainability officer at Lincolnshire County Council |  | 3 | Lincolnshire | Children and young people, programme manager for Lincolnshire integrated care board |  |  |  |
| 4 | North East Lincolnshire (group2) | Clinical Psychologist, University of Lincoln |  | 4 | Lincolnshire | Assistant psychologist in the community mental health team from LPFT |  |  |  |
| 1 | Lincolnshire | Manager Met office |  | 5 | Lincolnshire | children's respiratory nurse |  |  |  |
| 2 | Lincolnshire | Partner of the Wellness Network |  | 6 | Lincolnshire | Professor of respiratory medicine at the University of Exeter |  |  |  |
| 3 | Lincolnshire | Assistant director at Lincolnshire County Council |  | 7 | Lincolnshire | Chief intelligence and analytics Officer for the Lincolnshire health and care system working for the ICB |  |  |  |
| 4 | Lincolnshire | Health research scientist at the Met office |  | 8 | Lincolnshire | Senior lecturer in epidemiology at the Hull and York Medical school |  |  |  |
| 5 | Lincolnshire | Children young people programme lead at the NHSICB |  | 9 | Lincolnshire | Senior health research scientist at the Met Office |  |  |  |
| 6 | Lincolnshire | Assistant psychologist at CMHT |  | 10 | Lincolnshire | County Council, also lead the Coastal Communities Alliance |  |  |  |
| 7 | Lincolnshire | GP and ICB medical director |  | 11 | Lincolnshire | Clinical psychologist, co leading psychological health and well-being research group, University of Lincoln |  |  |  |
| 8 | Lincolnshire | Partner of the Wellness Network |  | 12 | Lincolnshire | Associate professor at the university of Lincoln in the School of Creative Arts. |  |  |  |
| 9 | Lincolnshire | Covers deprivation and issues around coastal communities and national lead for Coastal Communities Alliance |  | 13 | Lincolnshire | A resident in the area. |  |  |  |
| 10 | Lincolnshire | Community conversations and facilitating those within co-production |  | 14 | Lincolnshire | A resident in the area. |  |  |  |
| 11 | Lincolnshire | Research and evaluation manager at East Midlands ambulance service |  | **15** | Lincolnshire | Public contributor affiliated to the University of Lincoln |  |  |  |
| 12 | Lincolnshire | Chief Intelligence Analytics Officer for the ICB |  | 16 | Lincolnshire | Research and evaluation manager at East Midlands ambulance service NHS Trust |  |  |  |
| 13 | Lincolnshire |  |  | 17 | Lincolnshire | Sustainability team at Lincolnshire County Council |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| 1 | Ghana | S/L department of physics, University of Ghana, work s in Air Quality |  | **1** | North East Lincolnshire | Engagements and Projects manager for Health and Care Partnership |  |  |  |
| 2 | Ghana | Climate change and mental health, University of Ghana |  | **2** | North East Lincolnshire | Centre4, head of health, well-being and community |  |  |  |
| 3 | Ghana | S/L, department of geography and resource development, University of Ghana |  | **3** | North East Lincolnshire | Operations manager at Centre4 in the health and well-being team |  |  |  |
| 4 | Ghana | Ghana Meteorological Agency |  | 4 | North East Lincolnshire | Deputy Director of Public Health in NE Lincolnshire council |  |  |  |
| 5 | Ghana | Weather Position Office |  | 5 | North East Lincolnshire | Public Health Specialty Registrar, North Lincolnshire |  |  |  |
| 6 | Ghana | Ghana meteorological society |  | 6 | North East Lincolnshire | Head of clinical networks - ICB predominantly cardiac, stroke, diabetes and respiratory |  |  |  |
| 7 | Ghana | Institute for oil and gas studies at the University of Cape Coast - climate and energy system modelling |  |  |  |  |  |  |  |
| 8 | Ghana | Principal meteorologist and external relation officer, Ghana Meteorological Agency |  | 1 | Sekondi-Takoradi, Ghana | Civil engineer and urban environment and climate change specialist, Secondi |  |  |  |
| 9 | Ghana | Paediatric Pulmonologist, Korle-Bu Teaching Hospital |  | 2 | Sekondi-Takoradi, Ghana | Mechanical engineer and technology planner, doing environmental impact assessment & management for the past 30 years |  |  |  |
| 10 | Ghana | General Paediatrician, Princess Marie Louis Children's Hospital |  | 3 | Sekondi-Takoradi, Ghana | Takoradi Metropolitan Assembly, the metropolitan officer |  |  |  |
|  |  |  |  | 4 | Sekondi-Takoradi, Ghana | Metropolitan environmental head officer for Sekondi-Takoradi |  |  |  |
|  |  |  |  | 5 | Sekondi-Takoradi, Ghana | Environmental health analyst with Sekondi-Takoradi Metro Assembly |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | 1 | Ghana | Ghana Meteorological Agency, as a researcher and climate scientist and also into air quality |  |  |  |
|  |  |  |  | **2** | Ghana | General paediatrician, Princess Marie Louis Children's Hospital in Accra |  |  |  |
|  |  |  |  | **3** | Ghana | Paediatric pulmonologist. I work at Korle-Bu Teaching Hospital which is the largest hospital in Ghana |  |  |  |
|  |  |  |  | **4** | Ghana | Ghana Meteorological Agency |  |  |  |
|  |  |  |  | **5** | Ghana | Waste management and Landfill site manager |  |  |  |
|  |  |  |  | **6** | Ghana | Assistant professor in the university of Ghana, department of mental health |  |  |  |
|  |  |  |  | **7** | Ghana | Civil engineer, environment and climate change specialist |  |  |  |
|  |  |  |  | **8** | Ghana | Numerical weather prediction unit |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

*Data Collection*

The Innovation Labs, lasing two hours with breaks, were held online via Microsoft Teams. Sessions were recorded and later transcribed verbatim. The first round of Innovation Labs were held online with stakeholders from the following regions and corresponding dates: North East Lincolnshire, UK (19/08/2024 and 27/08/2024), Lincolnshire, UK (20/08/2024), and Accra, Ghana (02/09/2024). The second round of Innovation Labs were also held online: Lincolnshire, UK (04/11/2024), North East Lincolnshire, UK (06/11/2024), Sekondi-Takoradi, Ghana (07/11/2024), and Accra, Ghana (19/11/2024).

The first round of Innovation Labs consisted of the ME-NET project lead (HM) presenting prototype material co-developed with Common Knowledge, including an ozone ‘early warning’ system, respiratory and mental health self-reporting to establish links between ozone, methane, and health outcomes, educational ‘module’ about the impact of methane and ozone on health outcomes, an interactive map displaying environmental and health data, profile characteristics, and proposed design and functionality features of the ME-NET application for smart-phone and website. After protype presentation, stakeholders were invited to discuss suitability, accessibility, and feasibility of design features, including using real-time surveys to anonymously capture concerns (e.g., about ozone alerts creating panic). After the initial round of Innovation Labs, participants were encouraged to complete a follow-up survey consisting of quantitative and qualitative questions to capture stakeholder perspectives and views.

The second round of Innovation Labs involved the presentation of additional ME-NET features, including detailed characteristics of the environment and health app co-designed by Common Knowledge, and proposed features for enabling health self-reporting.

*Data Analysis*

Qualitative data analysis was conducted for Innovation Lab transcripts, as well as data collated using social surveys during and after virtual sessions.

The audio recorded meetings were transcribed verbatim, and transcripts were analysed following the procedure of Braun and Clarke (2006) which included five steps. Step 1 involved familiarization with the data by repeatedly reading the transcripts. In step 2, one researcher performed the initial coding in NVivo. A second researcher then checked the initial codes and validated them against the transcripts. In step 3, codes were grouped into common themes based on coherent patterns. In step 4, the themes were reviewed through several discussions between the researchers. In step 5, the themes were defined by eliminating redundant themes. In the results section that follows below, quotes from stakeholders are used to support the contextualisation of the themes.

**RESULTS**

**First round of Innovation Labs**

Analysis of qualitative data from the first set of stakeholder Innovation Labs across the selected regions resulted in the themes and quotes stated below for this interim report. These will be developed further for the final report, when analysis of data is completed for all innovative labs.

**1.What do you think of when you think of methane?**

**Perceptions/concerns about methane**

Cows/cattle**:**

*I think of cows! And cow flatulence! I'm sure you've probably heard of that before*: 1ST meeting, Stakeholder 1- North East Lincolnshire (NEL).

*What comes to mind when I think of methane, is mostly cows, I think*: 1st meeting Stakeholder 4-NEL

*When I think of anything, it is very similar to what others have said, the first thing that came to my mind was cows*: 1st meeting, Stakeholder 12-Lincolnshire

*The first thing that I think is cows when we talk about methane*: 1st meeting, Stakeholder 5-Lincolnshire

Gas/Unpleasant gas:

*I think of the gas given off by rotten material*: 1st meeting, Stakeholder 2-NEL

*As far as methane is concerned, I guess the only thing that springs to mind is gas*: 1st meeting, Stakeholder 3-NEL

*An unpleasant substance. There is the connotation of it not being very nice:*1st meeting, Stakeholder 7-Lincolnshire

A greenhouse gas, global warming and Climate change:

*When I think of methane, I think of global warming potential, cattle grazing and deforestation, and it takes me back to my science and climate change background:* 1st meeting, Stakeholder 3-NEL

*When I think of methane, I think of greenhouse gases and climate change*: 1st meeting, Stakeholder 6-Lincolnshire

*I think methane is one of those greenhouse gases that contributes a lot to what we call climate change:* 1st meeting,Stakeholder 1-Ghana

*Methane is one of the greenhouse gases leading to global warming:* 1st meeting,Stakeholder 8-Ghana

*The tendency for people to restrict discussions about climate change to methane. To address this, it should be mentioned from the onset that methane is one of the several climate change issues..*: 1st meeting, Anonymous – Ghana

Cooking:

*The first thing that comes to my mind when I think about methane is my gas cooker, it being powered by natural gas which is mostly methane*: 1st meeting, Stakeholder 1-Lincolnshire

*Sources of methane Lots of household activities contribute to Methane*: 1st meeting, Anonymous – Ghana

Compost:

*For methane, he is I have been trying to make my own compost for my organic farm. So that's how I got to know about this meeting:*1st meeting,Stakeholder 9-Ghana

Waste:

*I'm not so good at getting my cooking waste and peelings down to my allotment, so I put it in black bags, and every time I open those black bags, an absolute stink, which I think is methane*: 1st meeting, Stakeholder 11-Lincolnshire

Not feeling very well**:** Has impact on health**,** e.g effects on respiratory health., dangerous to our health …

*When I think of methane, I think of not feeling very well! Just a bit woozy and dizzy and not good*: 1st meeting, Stakeholder 2-Lincolnshire

Pollutants:

*I believe it's one of the pollutants causing a lot of respiratory risk and other related health issues:* 1st meeting, Stakeholder 3-Ghana

*For methane, I have been trying to make my own compost for my organic farm…, apart from learning about the effects on respiratory health and having three papers on it so I can pass my exam:* 1st meeting,Stakeholder 9 -Ghana

*I don't know much about methane; I just know that it's dangerous to our health:* 1st meeting,Stakeholder 10-Ghana

**2. ‘Red flags’ and unintended consequences related to the ozone educational module content and the App**

**Unintended consequences - physical and mental health impact/concerns**

Anxiety/ fear and panic**:** Could scare people, Over analysed, uneducated conclusion, fear and panic…

*It could just scare the life out of you:* 1st meeting, Stakeholder 2-NEL

*The more knowledge that they've got, the more scared they can get, and come up with theories about ice and industry and all the other stuff:* 1st meeting, Stakeholder 2-NEL

*People may unintentionally stay indoors more than previously impacting on physical and mental well-being’:* 1st meeting, Stakeholder 1-NEL

*I think there is a lack of robust evidence, which would make me nervous:* 1st meeting, Stakeholder 13-Lincolnshire

*It's difficult because there are some really scary statistics that you have on there, and there's a fine line between absolutely terrifying people that they won't go out and leave their front door again, to making them stop and think:* 1st meeting, Stakeholder 8-Lincolnshire

*That's certainly one thing that I wrote that it could scare people, and I think in a sense that's necessary as well because it's scary stuff: Stakeholder 11-Lincolnshire*

*You will be locking the doors and not coming out again!:* 1st meeting, Stakeholder 8-Lincolnshire

*I think it is a very valid concern. A lot of people who are prone to reacting to these environmental changes, people with chronic illnesses, and they're already overburdened. So I can really understand this adding to their anxiety. So, I can really understand this adding to their anxiety:* 1st meeting,Stakeholder 9 – Ghana

*If I know the concentration of methane in the environment, and my app is telling me that it's pretty high, what do I do next? And to me, that is the most important thing. If people don't know what to do with the information that they're processing, then we are going to increase their anxiety and make them more devastated with the information that they're consuming then before:* 1st meeting,Stakeholder 2 – Ghana

*Anything that has an adverse effect on your health is going to affect your mental health:* 1st meeting, Stakeholder 2-NEL

*If something is affecting someone’s respiratory, then there's going to be a chance that it impacts on mental health as well*: 1st meeting, Stakeholder 2-NEL

*It's tricky isn't it to say that the ozone might have a direct impact on mental health*: 1st meeting, Stakeholder 2-NEL

*Majority of people are going to be more interested in things that affect them directly then the overall picture*: 1st meeting, Stakeholder 14-Lincolnshire

*Anxiety and misinformation among residents*: 1st meeting, Anonymous - Ghana

*Being too scared to leave the house if the data shows particular levels of ozone*: 1st meeting, Anonymous - Lincolnshire

*Could cause panic if levels are high and the support mechanisms aren't in place for the patients etc*: 1st meeting, Anonymous - Lincolnshire

*Could create a panic with parents of children with asthma*: 1st meeting, Anonymous - Lincolnshire

*Creating fear or concern about something new to many people*: 1st meeting, Anonymous - Lincolnshire

*Feed into extant anxieties (such as health anxiety)*: 1st meeting, Anonymous – NEL2

*Impact on physical and mental wellbeing*: 1st meeting, Anonymous - NEL

*May panic some of our older residents*: 1st meeting, Anonymous – NEL2

*Over analysing, uneducated conclusion*: 1st meeting, Anonymous - NEL

*Over-protection-preventing activities when levels are above user-defined thresholds*: 1st meeting, Anonymous - Lincolnshire

*People may unintentionally stay indoors more than previously, impacting on physical and mental wellbeing*: 1st meeting, Anonymous - NEL

*Potential to become oversensitive to the alerts, ie could create a panic with parents of children with asthma and this can be picked up by the children thereby it's the anxiety being rejected not the ozone affect*: 1st meeting, Anonymous - Lincolnshire

*That it scares people. Which is necessary. But, I wonder whether people would rather put their head in the sand and not know about such things*: 1st meeting, Anonymous - Lincolnshire

*Potential to exacerbate if, for example, physical activity is a mediator of negative effects of pollution in health - people may avoid/do less when alerts are up, and thereby amplify negative impact*: 1st meeting, Anonymous – NEL

Feeling of helplessness**:**

*With that fear, the fear and worry that comes with that is one thing. But I think the feeling of helplessness is problematic, and I wonder whether or not there is something that can be done with this:* 1st meeting,Stakeholder 11-Lincolnshire

Potential for disempowering: Unattractive without empowerment …

*This kind of epidemiological evidence on that slide is a bit too much, and kind of disables people. It is disempowering:* 1st meeting, Stakeholder 4-Lincolnshire

*It's not enough for residents to know that methane is emitted through the sun and blah, blah, blah. It's also about - What can we do as communities. What is the urgency to act:* 1st meeting,Stakeholder 11-Ghana

*So if you just create the urgency and the fear and the importance of methane and gas and blah, blah, blah, and you don't really empower people to change what you are asking about, then it becomes a bit unattractive:* 1st meeting,Stakeholder 11-Ghana

Overburdening communities:

*We need to be a bit measured in how we integrate some of these interventions on the ground, so that it doesn't become too heavy for communities to digest and use*: 1st meeting,Stakeholder 11-Ghana

*Currently in some of the areas that I work in, we're beginning to have a lot of education and capacities and campaigns and pictures around air pollution. Now we include methane and then it becomes very complex for community people to appreciate:* 1st meeting,Stakeholder 11-Ghana

**Unintended consequences - functionality concerns**

Chemical symbols or technical terms can confuse people:

*I've just wondered if it's conceivable that you could call it B-Zone, something else completely just for this purpose, so that people don't get confused:* 1st meeting, *Stakeholder 1-NEL.*

Complexity/ too technical: … Difficult for somebody to understand, Not everyone will be good with maps etc

*I do think it's quite complex. I do rate myself as fairly clever, and I don't fully understand it*: 1st meeting, Stakeholder 2-NEL

*Do we need all the scientific names. It is very difficult for somebody to understand; especially if you haven't studied science for last 40 years - what does this terminology mean and how is it impacting on my life*: 1st meeting, Stakeholder 3-NEL

*The map thing was really good, but for me I didn't know where anything was*: 1st meeting, Stakeholder 1-NEL

*No, because it is quite complex*: 1st meeting, Anonymous – NEL

*I think some terms are perhaps too complex*: meteorological: 1st meeting, Anonymous – NEL2

*Too technical It is too technical for children & young people*: 1st meeting, Anonymous - Lincolnshire

*It is too technical for the general public*:1st meeting, Anonymous - Lincolnshire

*It’s good for this forum but too technical for the majority of the public*: 1st meeting, Anonymous - Lincolnshire

*It's written in a academic way*: 1st meeting, Anonymous – NEL2

*Way too technical. Combustion? Who knows what that is*: 1st meeting, Anonymous – Lincolnshire

Concerns about alerts: ..

*Continuous monitoring and alerts from app could lead to fatigue among users, where they become desensitised and begin to ignore important warnings or updates*: 1st meeting, Anonymous – Ghana

*Over-protection -preventing activities when levels are above user-defined thresholds*: 1st meeting, Anonymous – Lincolnshire

*People may avoid or do less when alerts are up*: 1st meeting, Anonymous – NEL2

*Could dissuade people from seeking professional help because they are relying on app*: 1st meeting, Anonymous – Lincolnshire

*Too many alerts - user stops using ME-NET*: 1st meeting, Anonymous – Lincolnshire

**3. What should go in the App**

**Functions of the APP**

An alert function: … An alert on what to do with ozone level

*I think that's why an explicit kind of simplistic alert kind of thing would help that*: 1st meeting Stakeholder 1-NEL

*If you got an alert saying - Air quality is poor today. That would mean a lot more to him than the ozone is bad*: 1st meeting, Stakeholder 1-NEL

*Have a time of day one, so with ozone, it will increase throughout the course of the day. So you could actually say to go for a walk in the morning, rather than waiting until after you pick the kids up from school*: 1st meeting Stakeholder 3-NEL

*I’m imagining if there was a similar thing for sea water - ie red alert don’t swim here as it’s full of sewage*: 1st meeting, Anonymous – Lincolnshire

Allow competition with other users: …

*That could be a 'game-action' kind of element- the more bits that you read, your avatar changes colour, you get trophies or badges, there might be an element of that kind of internal competition with other users*: 1st meeting, Stakeholder 4-NEL

It could be personalised: ..

*It could be kind of personalised. How it has and hasn't affected them previously*: 1st meeting, Stakeholder 4-NEL

*Maybe if the messaging is a bit more bespoke to each person, is probably going to be more helpful to them to t4ink - Ok, what do I actually do with this information*: 1st meeting, Stakeholder 3-NEL

*Put it positively - Was it's helpful, did you find that a lot useful today, did you respond in a different way because you received that alert*: 1st meeting, Stakeholder 3-NEL

*Some ways the more personalised responses could be from a predetermined selection, but if you're setting up your profile questionnaire there's a bit more detail*: 1st meeting, Stakeholder 3-NEL

Feedback function to reduce overcaution: …

*There could be some kind of feedback of what is your reaction this week, that might highlight that maybe they could have been less cautious*: 1st meeting, Stakeholder 2-NEL

*A traffic light feedback system - How do you feel today, Smiley face - middle face, sad face*: 1st meeting, Stakeholder 1-NEL

*It would have to be way dumbed down for Joe Public*: 1st meeting, Stakeholder 1-NEL

*'Positive feedback loop' can so easily be seen as a good thing*: 1st meeting, Anonymous – NEL2

*The positive feedback loop is an excellent simplified example of how the data could be presented*: 1st meeting, Anonymous - Lincolnshire

A link for further information: … Link to existing advice and guidance web sites …

*A button somewhere, a little thing you can click on, that says if you want to know more about the science*: 1st meeting, Stakeholder 1-NEL

*Can it be seamlessly linked to existing advice and guidance web sites eg connect to support, 111 etc* : 1st meeting, Anonymous – Lincolnshire

Have a preventative section: ..

*Then you could have a preventative section, that says to remember to balance this with the positive impacts for being outdoors and exercising and all those sorts of things:* 1st meeting, Stakeholder 13-Lincolnshire

More pictures and less words: Use of imagery, use of infographics:, more visuals...

*My final point is that I would say that an image tells 1000 words, I would suggest more pictures and less words, that would be my view*: 1st meeting, Stakeholder 1-NEL

*The imagery helps*: 1st meeting, Anonymous – NEL2

*Use of an infographic video that would make it much more accessible*: 1st meeting, Anonymous - Lincolnshire

*I believe having more visuals would be excellent?:*1st meeting, Anonymous - Ghana

Have an open profile where people put their information in:

*I think the best way to do this, I think J is right, just have an open profile where people put their information in, and they can go on whenever they want and report symptoms*: 1st meeting, Stakeholder 1-Lincolnshire

*So I would make it really explicit that this is part of a research trial, get people to include their information in their profile, that means they can answer less questions*: 1st meeting, Stakeholder 1-Lincolnshire

Tell people where and when pollution is high and low:

*The other thing is around providing alerts when pollution is high, it's useful perhaps to tell people where and when it's actually low at the same time, so they can adapt perhaps how do I get to someplace, decide to go somewhere at a different time of the day when the pollutants are less around there*: 1st meeting, Stakeholder 4-Lincolnshire

The predictive value is important: ...

*And also, the predictive value of this, we really struggle with when we expect a peak in demand, whereas this could really help us because this could say that we have now seen a specific change in our pattern, ozone and others*: 1st meeting, Stakeholder 7-Lincolnshire

*We have to be clear about cause and effect*: 1st meeting, Stakeholder 7-Lincolnshire

Embed validated scales: There are lots of validated scales that we could embed if possible: …

*A short one we quite often use for measuring anxiety and depression and mental health symptoms*: 1st meeting, Stakeholder 7-Lincolnshire

We can provide sources of help as well:

*What might you do about those symptoms. If you are in need, call 111. That sort of thing as well*: 1st meeting, Stakeholder 13-Lincolnshire

**Communication function:**

For easy understanding and communication of the content, stakeholders suggested:

keeping it simple: …

*Basically, keep it simple is the thing that I would advocate because it's so easy to put it in our language, academic language, which just turns people off*: 1st meeting, Stakeholder 14-Lincolnshire

*Could be much better communicated in slightly different arrangement of language ...*: 1st meeting, Anonymous - Lincolnshire

*The information could be much better communicated in slightly different arrangement*: 1st meeting, Anonymous - Lincolnshire

**Inclusion of all relevant population groups:**

Hook everybody in: …

*We need to hook everybody in from the beginning, and if people do want more science information, they can further learn, and have different sections on the apps or modules and kind of learn more sections, it makes more sense to do it that way*: 1st meeting, Stakeholder 3-NEL

*Children, youth and adults must be properly represented: Anonymous - Ghana*

*Including sound may be helpful for the visually impaired*: 1st meeting, Anonymous - Ghana

*Look at our target audience and their literacy level*: 1st meeting, Anonymous - Ghana

*Ordinary urban residents seeking livelihoods*: 1st meeting, Anonymous - Ghana

*People in more deprived areas will struggle to understand*: 1st meeting, Anonymous - Lincolnshire

*Someone with a visual disability may struggle*: 1st meeting, Anonymous - Ghana

*There should be a voice over on the app for the visually impaired*: 1st meeting, Anonymous - Ghana

*Young people get very easily confused with terms like emissions, pollution, global warming and use them interchangeably*:1st meeting, Anonymous - NEL

Bring the disabled in/ Improving accessibility for the disabled: Disability friendly …….

*For the disabled, it would be good to bring them also, have an interaction with them. Yes, maybe a group that can be your voice might be better, but maybe from their own experience what could be more comfortable for them to be able to access this information and interpret it better:*1st meeting,Stakeholder 8-Ghana

*Some of the folks here at the university, I think they have developed something like an app for people who as you know, visually disabled:* 1st meeting,Stakeholder 1-Ghana

*Will the APP be disability friendly? Anonymous - Ghana*

*We can add AI to be able to transcribe what is written into sound, so that others who cannot read, would be able to understand this:* 1st meeting,Stakeholder 1-Ghana

Allow choice of gender …

*Gender-it is no longer strictly binary. Hope people can choose whatever gender they want*: 1st meeting, Anonymous - Ghana

Consider native/local language: …..non-English speaker ..

*I wanted to comment on the language, but I think that M has done justice to it. So, we are good to go. French is not predominantly used in Ghana. We can go for the native language:*1st meeting,Stakeholder 6-Ghana

*In terms of the languages, we need to consider a local language maybe taking those areas that we're looking to for consideration. If there is a language that is a common one, then we look at that and see how it can be leveraged for other areas. So that's what I would like to say:*1st meeting,Stakeholder 8-Ghana

*An audio notification in a native language would help*: 1st meeting, Anonymous – Ghana

*These gases do not easily translate into local languages*: 1st meeting, Anonymous - Ghana

*Those who do not read English*: 1st meeting, Anonymous – Ghana

Simple language: …

*The first slide uses language I'm not familiar with so my clients definitely wouldn't and would be turned off straight away. Much simpler language*: 1st meeting, Anonymous - Lincolnshire

*There's nothing wrong with having simpler language and maybe a 'find out more section with the technical terms in there*: 1st meeting, Anonymous – NEL

*No, language is too technical. Permafrost referred to without explanation for example*: 1st meeting, Anonymous - Lincolnshire

*Make the language more plain English*: 1st meeting, Anonymous - NEL

*For patient facing material, this needs to be much simpler in wording and graphics*: 1st meeting, Anonymous - Lincolnshire

*You may consider using simple language and relatable experiences for most people who will use the app*: 1st meeting, Anonymous - Ghana

Consider co-production: ……

*So we need to go co-production, most of us on this course, we need user inclusivity. We want them to use this, for them to share their own experience with us and tell us what they want, and we can combine that with our expert views to develop the project. I think that would be the best way for this discussion, for the best result for us to get:*1st meeting,Stakeholder 8-Ghana

**Accessibility and data security:** …

*Limited access to internet or limited access to information in local languages*: 1st meeting, Anonymous – Ghana

*Data breaches*: 1st meeting, Anonymous –Ghana

*Would the app have multi factor authentication*: 1st meeting, Anonymous – Lincolnshire

*We're going to collect personal data, there would be a need to see what the access is about, this type of app that we're going to use*: 1st meeting, Stakeholder 1-Ghana

**Educational content:**

Simple information:

*I think the general people, almost more simplified, they don't need that much information, they just need*: 1st meeting, Stakeholder 2-NEL

*It can be simplified to the level a ten-year-old child*: Anonymous - Lincolnshire

*It needs to be basic, and people understand how it relates to them*: 1st meeting, Anonymous - Lincolnshire

*Some might understand the content, but others may need a simpler message*: 1st meeting, Anonymous - Lincolnshire

*The app design (screenshots presented earlier) could also use more colour and simplicity*: 1st meeting, Anonymous – Lincolnshire

*The content could be simplified*: 1st meeting, Anonymous - Lincolnshire

Hook in that health element:

*I do think the hook needs to be that health element - Why am I invested in the app*: 1st meeting, Stakeholder 2-NEL

*This extra education that we'd like to fit in there as well*: 1st meeting, Stakeholder 2-NEL

Present it in the right way - If you have it presented in the right way, people take from it…

*For the majority, that first bit of the visual. The first 30 seconds really describes everything else*:1st meeting, Stakeholder 7-Lincolnshire

*I think the majority of what you have presented there would be infographic*: 1st meeting, Stakeholder 13-Lincolnshire

*I'm not concerned about things being technical because I think if you have it presented in the right way, people take from it what they can take from it, and they just ignore the technical words that are on there*: 1st meeting, Stakeholder 13-Lincolnshire

*It's about saying that you heard about ozone, have you heard about this*: 1st meeting, Stakeholder 7-Lincolnshire

*People take the right story, if they have a really low level of understanding or they take on the complex stuff if they have a much higher level of technical understanding*: 1st meeting, Stakeholder 13-Lincolnshire

*There are some really good infographics out there in the acid rain cycle, in the atmosphere and how that links to cause and effect*: 1st meeting, Stakeholder 3-Lincolnshire

It comes back to person education –

*Education is absolutely key but maybe there could be something around that way you could educate people around nutrition, and keeping themselves hydrated*: 1st meeting, Stakeholder 2-Lincolnshire

*For me, it is the educational element built into the process, would be great*: 1st meeting, Stakeholder 7-Lincolnshire

*Is there a link that says - If you report this, click on here and they will tell you what you can do*: 1st meeting, Stakeholder 7-Lincolnshire

*So that health message that is linked to the reported alert, or at least the signpost to where you could do that*: 1st meeting, Stakeholder 7-Lincolnshire

*The more self-help that we can educationally put into the app, the better*: 1st meeting, Stakeholder 7-Lincolnshire

Start with a story - Start the educational presentation with a story that will catch attention ..

*Catch them in the beginning, have a story that's easy to follow, and I think it would make sense. I probably do it with a little cartoon or something*: 1st meeting, Stakeholder 11-Lincolnshire

*I think that the first slide completely turned me off because you're already using language that is not familiar to me*: 1st meeting, Stakeholder 8-Lincolnshire

*I think the situation comes first, I think you would lose people with the descriptions. Methane is this and this… and now this is what happens*: 1st meeting, Stakeholder 11-Lincolnshire

*There's something to do with narrative structure, really thinking about a first slide to really grab their attention, and if you've got it, then you can hold onto it, I think*: 1st meeting, Stakeholder 11-Lincolnshire

A form of educating them; …..

*How would the app help me mitigate and it just to adapt to the impact of maintaining the environment or the zoning environment:*1st meeting,Stakeholder 2-Ghana

*If people understand where these sources are coming from, in their day-to-day activity, they need to take some actions to reduce the production of things that are leading to the increase of this ozone methane in the society or community:*1st meeting,Stakeholder 8-Ghana

A function of your audience: ……

*Context really matters, depending on the audience that we seek to influence, so it's a function of your audience. So once you know your audience and your target, then you are able to pull through the mix; that really has impact:*1st meeting,Stakeholder 11-Ghana

Structure of educational content: ..

*No relevance to a member of the general public*: 1st meeting, Anonymous – NEL

*The descriptions need to come first*: 1st meeting, Anonymous - Lincolnshire

*The structure should be reversed*: 1st meeting, Anonymous – Lincolnshire

**Mitigating anxiety relating to the App**:

A text box for comments: …

*Maybe a text box to comment why. Might be useful in collecting data to add resonance to whether mental health is affected by ozone levels*: 1st meeting, Stakeholder 1-NEL

Be specific: ….

*Then be more specific perhaps with what your advice would be for them*: 1st meeting, Stakeholder 1-NEL

*Be clear this is a research data collection and not NHS or linked to patient records (although you could potentially send data to primary care with consent if it was deemed to be of value)*: 1st meeting, Anonymous – Lincolnshire

*Need to be clear on purpose- this is a research project, and we can then use this to inform future health care*: 1st meeting, Anonymous – Lincolnshire

A smart messaging service : e.g An alert on what to do with ozone level ..

*We have like a smart messaging service. They get these messages. They're asked if they want to see the message. It is prompted*: 1st meeting, Stakeholder 4-NEL

*Have a time of day one, so with ozone, it will increase throughout the course of the day. So you could actually say to go for a walk in the morning, rather than waiting until after you pick the kids up from school*: 1st meeting, Stakeholder 3-NEL

Ask about when they are struggling: ..

*I might ask them to think about when they're struggling for some helpful advice, so they're almost sort of generating their own responses as part of like an initial induction*: 1st meeting, Stakeholder 4-NEL

Emphasis on what people can do: ..

*I guess if you're going to talk about any of this to really put the emphasis on what people can be doing to mitigate, or promote their health, in the context of an environment that they can't change directly*: 1st meeting, Stakeholder 4-NEL

Warming the system up: ..

*A way of warming the system up to you and what you might like, or what you might respond well to so that you maybe mitigate against some of that projected panic or anxiety:* 1st meeting, Stakeholder 3-NEL

*I also wonder whether or not with that fear, the fear and worry that comes with that is one thing. But I think the feeling of helplessness is problematic, and I wonder whether or not there is something that can be done with this*: 1st meeting, Stakeholder 11-Lincolnshire

Addressing anxieties and concerns: …….

*We also need to embed into it the overtime, information will be collected about the levels and analysed and people will be engaged, so that they see that something is being done about it:*1st meeting,Stakeholder 9-Ghana

Link it with the economics of the day: …….

*Given my role of dedication for knowing the health impacts of methane, it's very, very useful, if we are able to link that with the economics of the day, how it affects people's lives now you have to spend money at the hospital and how you the health bill:*1st meeting,Stakeholder 11-Ghana

**4. Other unique comments relating to content of the App**

**Uncertainty in the evidence**

Evidence is key: … Back the information with evidence

*I know there's an evidence base that links SMI’s with COPD, asthma and I think diabetes*: 1st meeting, Stakeholder 2-NEL

*I would be concerned that the mental health aspect is unproven*: Stakeholder 1-NEL

*The evidence base is key, if we're not sure, it's difficult to put it across in that perspective*: 1st meeting, Stakeholder 2-NEL

*Given the uncertainty around, and to health impacts now and whatever kind of mechanisms that might be there, I'm not sure if you should be sharing anything on that*: 1st meeting, Stakeholder 4-NEL

*For me, my experience with anybody that has any kind of physical illness or situation that they're having to deal with, will have poor mental health alongside it*: 1st meeting, Stakeholder 8-Lincolnshire

*I think it's really important to have such a widespread amount of data that you're looking at, because it can almost create its own thing*: 1st meeting, Stakeholder 8-Lincolnshire

*If there is a clinical review of the existing evidence, then the clinical judgement, would be what is most important*: 1st meeting, Stakeholder 13-Lincolnshire

*If this is about information that we share with the public, we need to be clear that it's evidenced and not share things that aren't evidenced*: 1st meeting, Stakeholder 13-Lincolnshire

*Information might need to be checked from a science point of view, so as to not educate people with the wrong facts*: 1st meeting, Stakeholder 4-Lincolnshire

*We don't want to be fearmongering one way or the other, and we should only be sharing stuff that we do have robust evidence for*: 1st meeting, Stakeholder 13-Lincolnshire

*We just need to be really careful about sharing any information with the public that isn't evidenced*: 1st meeting, Stakeholder 13-Lincolnshire

It must be area specific: …

*NE Lincs, and Lincolnshire are very different, and the agencies that you would contact are very different in some circumstance: 1st meeting, Stakeholder 3-NEL*

*Do we have geographic areas where air quality problems will always be present that make the app less valuable to some residents*: 1st meeting, Anonymous – Lincolnshire

**Political impact/implications:**

Blame culture:

*It would maybe concern me that the message could get misconstrued, a kind of a blame culture type of thing*: 1st meeting, Stakeholder 1-NEL

Being true to the purpose:

*If we start politically lobbying, we will go down all sorts of rabbit holes, I think will just detract from the great work*: 1st meeting, Stakeholder 7-Lincolnshire

Influencing government to change regulations:

*If you want to flag it up or something that needs to be addressed, that there's a way that you can do that and get involved to start to put pressure on the government to change their regulations*: 1st meeting, Stakeholder 11-Lincolnshire

*Impact on local industries which may be blamed for methane emissions and associated stigmatization*: 1st meeting, Anonymous - Ghana

*Data used for other purposes- e.g. political lobbying*: 1st meeting, Anonymous - Lincolnshire

It is uncontrollable:

*All of this is going to be in the atmosphere regardless of how much people know about it*: 1st meeting, Stakeholder 2-NEL

*I'm sure you need to have it somewhere, but in terms of the masses, it is uncontrollable - all those different things that people are suffering on a day-to-day basis*:1st meeting, Stakeholder 2-NEL

Being measured in integrating the interventions:

*We need to be a bit measured in how we integrate some of these interventions on the ground, so that it doesn't become too heavy for communities to digest and use:*1st meeting,Stakeholder 11-Ghana

Consider having a perception survey:

*So whilst we do the perception survey, we get to know what they know already about methane, the environment, pollution and all of that. That becomes a very useful starting point for even developing all of these messaging and all the types of intervention we want to do*: 1st meeting,Stakeholder 11-Ghana

How to measure methane:

*How to measure methane - I want to believe that we are discussing using equipment- gadgets, scientific gadgets. Is that the conversation:*1st meeting,Stakeholder 11-Ghana

**Now I know, what do I do next**

How to mitigate

*How would the app help me mitigate and it just to adapt to the impact of maintaining the environment or the zoning environment:* 1st meeting,Stakeholder 2-Ghana

*I guess when I look at it from my population, is that those images are great, the information is great, but - so what*: 1st meeting, Stakeholder 3-NEL

*You've given me this information, but so what. What does it mean. And that's why I put the comments around - What does it mean for somebody with breathing difficulties*: 1st meeting, Stakeholder 3-NEL

Highlight the fact that Lincolnshire is doing things around the Sincil Bank area:

*They're doing a lot of work on that, making it one way, improving the conditions there*: 1st meeting, Stakeholder 14-Lincolnshire

Traffic must come into this somewhere:

*I think that traffic has to come into this somewhere, if mothers are taking their kids for walks, pushing their pushchairs along busy roads but busy times, when traffic is stationary*: 1st meeting, Stakeholder 14-Lincolnshire

**Second round of Innovation Labs**

For this interim report, analysis of qualitative data from the second round of stakeholder Innovation Labs across the selected regions resulted in the themes and quotes stated below. These will be developed further for the final report, when analysis of data is completed for all stakeholder innovative labs.

**1.What comes to mind when you think of methane?**

**Perceptions/concerns about methane**

Impact on climate change/ Greenhouse gases: Contributing to climate change and global warming ..

*I suppose methane for me, and something I've not thought about until you just mentioned it there, it would actually be reflecting back at Immingham. Growing up as a child, my dad worked on the docks, I'm quite a lot of time we would go in the car and pick him up with my mom. The same as you, you would see the flames coming out of the big chimneys, and being on the dockside itself, was incredible, an incredible vision. I suppose for me, it would also be about, and I don't know if this is right or wrong, I would probably in my brain, is telling me, would have an impact on the climate change* – 2nd meeting, North East Lincolnshire (NEL) Stakeholder 2

*Basically, in terms of the anthropogenic methane, which is I guess what we're concerned and focused about, we're not just going to drain the bogs, that's estimated to be more than half of the contribution potentially; much worse than the big ticket greenhouse gases that we all think about, but fortunately much shorter kind of persistence in the atmosphere* – 2nd meeting, NEL Stakeholder 5

*I suppose methane for me, and something I've not thought about until you just mentioned it there, it would actually be reflecting back at Immingham. Growing up as a child, my dad worked on the docks, I'm quite a lot of time we would go in the car and pick him up with my mom. The same as you, you would see the flames coming out of the big chimneys, and being on the dockside itself, was incredible, an incredible vision. I suppose for me, it would also be about, and I don't know if this is right or wrong, I would probably in my brain, is telling me, would have an impact on the climate change* – 2nd meeting, NEL Stakeholder 2

*I know it's a very powerful gas that contributes to climate change and global warming* – 2nd meeting, Ghana stakeholder 4

Greenhouse gas/global warming:

*Methane also comes to mind when you are talking about the greenhouse gas, which contributes to global warming* – 2nd meeting, Sekondi-Takoradi Stakeholder 5

*My idea or a few things that I know about methane gas, is that they are pollutants* – 2nd meeting, Sekondi-Takoradi Stakeholder 2

Burning of fossil fuel:

*I think I must have begun to know that the burning of the fossil fuel and all those things also have methane gases* – 2nd meeting, Sekondi-Takoradi Stakeholder 2

Gas from open dumps and landfill sites:

*Methane is a gas that is coming out from open dumps and landfill sites, maybe wastewater accumulation and other release of emissions of such nature* - Sekondi-Takoradi Stakeholder 4

*When methane comes to mind, what I think of is the landfill because the landfill is a major contributor, but anything, especially open dump, which is more common in Ghana, especially where I am at the landfill site* -2nd meeting, Sekondi-Takoradi Stakeholder 5

Cooking gas:

*Short carbon chain. And isn't it in cooking gas?* – 2nd meeting, NEL Stakeholder 7

Cows:

*Actually, when I think of methane, I think of cows. It kind of comes to mind. And to be fair, I had no idea whatsoever before that methane could come from anything other than cows* – 2nd meeting, NEL Stakeholder 1

*In terms of methane, what do I think of?* - 2nd meeting, Lincolnshire (L) Stakeholder 2

*I think of cow’s bottoms!* – 2nd meeting, L Stakeholder 2

*Methane, it is cows, but I do worry about them, they seem to get the blame* – 2nd meeting, L Stakeholder 18

Fractional distillation:

*Fractional distillation, short carbon chain* – 2nd meeting, NEL Stakeholder 7

Gas from waste disposal sites: A key gas at waste management and landfill site ..

*I think regarding my knowledge of methane, I've done this before, so I've already got an answer which makes it easier for me, but I'll add to that as well. So my daughter was the manager of waste disposal sites, and what they did there, was use the gas that was produced from the rotten waste to supply the village. You know they didn't have British Gas or anything like that coming through their cookers. They had the gas that was produced from this waste disposal site where they were recycling the gas* – 2nd meeting, NEL Stakeholder 3

*Methane is one key gas that emitted at a site. So basically, that is me. Waste management and landfill site* – 2nd meeting, Ghana stakeholder 5

*I'm interested in the methane because it's come up and more research, new research is coming up and STME may have a lot of issues as in myself with the landfill, it's management and emission of methane and the energy aspect of the methane* – 2nd meeting, Ghana stakeholder 7

**Impact of methane:**

Impact of methane on people's lives:

*But in addition to that, recently, I kind of saw something on the news a couple of weeks ago that was a problem that China has tried to deal with at the minute: the role that rice production plays in the production of methane as well. And recently been set huge targets on reducing that, and obviously recognised it in the same way, the impact that it's having on people’s lives* – 2nd meeting, NEL Stakeholder 3

Methane affects human health:

*As we speak, there is data to confirm that yes, methane emissions in STMA has really gone up and that the effect on human health and well-being is underscored in that report* – 2nd meeting, Sekondi-Takoradi Stakeholder 8

*In the case of Sekondi-Takoradi, we have developed what we call sustainable energy assets and climate action plan. And as part of the data, that we've got to form the baseline analysis for this plan, and then the projections into the future, we have found* – 2nd meeting, Sekondi-Takoradi Stakeholder 8

Harmful air pollutants and respiratory conditions: ….e.g Asthma

*In terms of methane, what do I think of? I think of my asthma* – 2ND meeting,, L Stakeholder 2

*It can contribute to the formation of ground level ozone, a very harmful air pollutants that can cause respiratory problems and have a great asthma and affect human health* – 2nd meeting, Ghana stakeholder 4

*Something I can say about methane is that it's one of the key pollutants now that we have regarding air quality and it's contributed to the formation of ground level ozone* – 2nd meeting, Ghana stakeholder 1

Traffic :

*I think of traffic –* 2nd meeting, L Stakeholder 2

**2. Main Features - unintended negative consequences and suggestions (reference to last meeting)**

**Concerns**

Potential to scare people: The more they end up scaring themselves, I think …

*It was fantastic information that was coming through, but thinking about the service users that we have, they probably just want to see what's good for them, and all of the science behind it. I think you probably get some people you do want to go down that mine shaft is the more they find out, the more they end up scaring themselves, I think – 2nd meeting,* NEL Stakeholder 3

Contribution of methane to public health issues not fully understood:

*I don't think we fully understand how much methane is contributing to kind of public issues; particularly in urban areas where there is a lot of carbon related air pollution. So that's where I’m coming from, obviously, given the interest of the programme in north Lincolnshire, and my boss is DL, the Director Public Health in Northern Lincolnshire, so that's an area of interest –* 2nd meeting, NEL Stakeholder 4

Language should not be too scientific:

*Not in massive amounts of detail, but I think the main thing from me thinking about it from a user's perspective, which is kind of what we see day to day, is about the language not becoming too scientific. I think that was the big think that we're feeding back. It was fantastic information that was coming through, but thinking about the service users that we have, they probably just want to see what's good for them, and all of the science behind it* – 2nd meeting, NEL Stakeholder 3

How do we measure methane:

*How would we measure the methane level at any point in time to determine whether if my breathing is affected, that it's coming from the methane, and not from some other gases* – 2nd meeting, Sekondi-Takoradi Stakeholder 3

*I think one of the key issues will be method of measurement, how do we measure methane* – 2nd meeting, Sekondi-Takoradi Stakeholder 3

Concern is about methane levels and health: …

*The concern is rather the correlation with the model which is relating the health of the individual at a point in time with the methane level. That is a more specific issue we're looking at, not if it has an effect on respiration - Sekondi-Takoradi Stakeholder 3*

**Suggestions**

Temperature related prompts:

*Prompts to avoid going out completely is the answer or avoid exercise on those days* – 2nd meeting, L Stakeholder 7

*But it's both, temperature contributes to the catalytic formation of ozone, but also the sunlight is involved in that process, bright sunny days are when your ozone levels of worse anyway, and it interacts. So temperature will interact and cause worse respiratory health in countries, they are multiplicative. It's just making it a little bit more complex, and the educational bit pointing out that just because it looks like a nice bright sunny day, it doesn't mean the air quality is good; which is something that most people I don't think understand –* 2nd meeting, L Stakeholder 7

*Just to comment on the earlier meetings, there's no mention about temperature, one of the paradoxes with ozone is that it is a worse problem when it is nice and sunny and a pleasant day, such as the need to be something in there that ozone is a worse problem when it's sunny and a pleasant day? –* 2nd meeting, L Stakeholder 7

*That may not be true. Ozone levels are generally higher on periods of good sunny weather, so it doesn't matter what time of day it is, when it's nice bright and sunny is when the problem is worse, which is a paradox that most people don't know or understand –* 2nd meeting, L Stakeholder 7

Blend animations with look-up pictures for dump site: …

*So it's about bringing in that dump site and also maybe mixing, having different pictures or characters animations to depict that* – 2nd meeting, Ghana stakeholder 8

*It's clear that in Ghana, one of the major sources of methane is also from the landfills. So if we can, I don't think I saw, do we have that in the animations* – 2nd meeting, Ghana stakeholder 8

Illustrate key sources with practical situations: …

*If we can typify and illustrate some of their key sources with practical situations, if we go to the waste away at the dump site. People go to the farm, they interact with cows* – 2nd meeting, Sekondi-Takoradi Stakeholder 1

Mix the visuals: …

*We can also mix, in terms of the visuals, mix some of the photos showing maybe local communities, women, children, especially when you talk about – How am I exposed* – 2nd meeting, Sekondi-Takoradi Stakeholder 1

Ways of measuring effect of methane: .An application showing methane affects health …

*We need to justify. For example, if there is an application that will show that the methane level is high and therefore it's affecting my health* – 2nd meeting, Sekondi-Takoradi Stakeholder 3

A system for determining degree of exposure of personal data: …

*Exactly, and looking at the bigger picture, we could consider it for a future project, when F was speaking, that's what was running through my mind, this is the beginning of something bigger, we need to plug into different projects, and some conversations* - 2nd meeting, Sekondi-Takoradi Stakeholder 1

*So if somebody is a waste picker or if somebody works with cows, or any of these animals that have a lot of methane emissions, can we also provide a system that the person can determine the degree of exposure or how much at risk they are* – 2nd meeting, Sekondi-Takoradi Stakeholder 1

Establish acceptability and desirability: Need for some level of acceptance and desirability from perspective of all stakeholders …

*Looking at it from the consultant perspective, environmental management from all levels, both from the government side and then the industry side* – 2nd meeting, Sekondi-Takoradi Stakeholder 3

*This whole exercise should have some level of acceptance and desirability, people should desire. If it's accepted by both parties, the operators and then the other affected parties. If accepted by both ends, then we can reach some success* – 2nd meeting, Sekondi-Takoradi Stakeholder 3

**Suggestions on mitigating pollutants:**

There must be a mitigation effect from the polluter: …

*Find out who is the polluter Then we send our grievance to stop him, to make him work, to do something more, that there must be a mitigation effect from that polluter* – 2nd meeting, Sekondi-Takoradi Stakeholder 3

Capture all waste - oil drilling industry, cows:…

*I'm also thinking that we are speaking about, is done in the dump. So the waste because the kind of picture where we have a cow, the oil drilling and then we have the industry, that particular picture, if we're speaking about a whole kind of page on its own for waste pickers, because now we have a lot of waste pickers, especially for Sekondi here, we have more than 200 we speakers in the open dump, that is in the landfill site. And when you go to Accra, you go to the Sawa Adipal landfill, we have a whole lot of people dying to waste picking, and we also go to .., it is an international organisation. They also do more into this waste picking. And they are at first hand in having this methane gas at the site. So if that could be captured amongst the cows, on the industries, I think it will be of help* – 2nd meeting, Sekondi-Takoradi Stakeholder 5

*Similar to what I was suggesting, do you want people to relate to the app, so you need to use everyday things. You know, people wake up, they go to the dump, they go to the farm* – 2nd meeting, Sekondi-Takoradi Stakeholder 1

**Suggestions on links in the APP:**

Have it in the Ghanaian context …

*If we can have it in the Ghanaian context where we can have like open dumps and then women, children and those kind of people* – 2nd meeting, Sekondi-Takoradi Stakeholder 5

A quiz for interaction between the app and the user …

*I'm thinking of if along the way there a kind of a quiz in the form of animation is that will ask app users to like maybe answer a question concerning, let's say, maybe after they are presented with causes, what brings about with ozone, and then those main* – 2nd meeting, Sekondi-Takoradi Stakeholder 5

**Other suggestions**

Use the sustainable energy assets and climate action plan (SEACAP) …

*So this is something we can stand on to move this project forward. We can actually have data to incorporate or feed into the app if we want to use the sustainable energy assets and climate action plan (SEACAP). And so this is what I want to bring on board* – 2nd meeting, Sekondi-Takoradi Stakeholder 8

Government standard has no information on methane: …

*I'm wondering how we could because our regulation has not in any way looked at methane, how we could generate this data, because the government standard has no information on methane* – 2nd meeting, Sekondi-Takoradi Stakeholder 3

Work together rather than duplicating work: ….

*We also need to discuss how he integrates this into that, and then make sure we don't duplicate efforts too much* – 2nd meeting, Sekondi-Takoradi Stakeholder 8

**3. Prompting images preference**

**Comments/concerns**

Combine both images: prefer both images: …

*Similarly, I think there are bits to combine from both of them* – 2nd meeting, NEL Stakeholder 5

Easier to visualise as silhouette than an image:

*Since you mentioned EDI, quite a few of these silhouettes are coded pretty white and pretty male, but at least they’re silhouettes. So there could be more generically coded maybe, I think it might be easier for people to visualise themselves represented in a silhouette than an image* – 2nd meeting, NEL Stakeholder 5

Having links:

*If I was using tools like that, having links at the bottom rather than having to go through them all, and then having to get to the end to get to like a general NHS information thing would probably be how I would want to use it because I'd pick up the sections that were relevant to me* – 2nd meeting, NEL Stakeholder 5

*Like if my windows were already closed, but I was going needing my inhaler, I would want to see the stuff particularly linking to that on the page* - 2nd meeting, NEL Stakeholder 5

Images should relate to both Europe and Ghana:

*I was thinking similar. I was thinking if it's going out to Ghana, would some of the images relate to people. It relates to me, but it might not relate if I was a person living in Ghana. And also, just one thing that I thought of was like your windows well, they look like windows that we have in, I'm not sure the style of houses in Ghana, but would they relate to the kind of imagery and housing makeup and all of that that goes with it. It is very white European culture that comes through on these slides. If you just doing it for European, then yes will stop but if you don't get for Africa, I'm not sure if it will all relate* – 2nd meeting, NEL Stakeholder 1

Prefer first image - man coughing:

*I do like some of the things in the other one, if they could be adapted, but for me I think the first one would definitely be my winner* – 2nd meeting, NEL Stakeholder 2

*There were some things I didn't like about #2 that made me equivocate because it was a forced choice. The chemicals, they shouldn't be there, it's not really doing anything, but it looks intimidating. It looks like you're about to do a science bit, but actually the text is the same* – 2nd meeting, NEL Stakeholder 5

*I think visually in the first slides that you gave us, the picture tells the story, whereas the other one I had to keep reading the writing to see what that's trying to tell me* – 2nd meeting, NEL Stakeholder 2

*So for me, I think this should be that you can actually see the man coughing, whereas the second one by the first glance, you wouldn't actually know that. But you can actually see it in the first one* – 2nd meeting, NEL Stakeholder 2

Prefer second image:

*So what I preferred about the second one, it visualises that the specific connection was the same happening in the atmosphere and in the different industries, instead of just picturing them vaguely, it's showing they are directly connected, it shows it physically* – 2nd meeting, NEL Stakeholder 5

Simpsons type cartoon thing on it - negatives and positives: …

*I think the cartoon route, as C mentioned, does potentially dumb down the message and make it seem less serious and less impactful. Maybe I'm being influenced somewhat by what we were looking at last time, and actually been quite impressed at the extent that it has changed and improved* – 2nd meeting, L Stakeholder 15

*You are trying to reach an audience that doesn't know anything about it. So something like a Simpsons type cartoon thing on it* – 2nd meeting, L Stakeholder 7

The left-hand side - the image of the person coughing: …

*One of the reasons why I chose the left hand rather than the right hand set, like in terms of the local context in Lincolnshire I guess, and in the UK generally, we don't actually have these oil producing rigs, so the imagery for an oil production rig is not something that is recognisable in the UK landscape. I was thinking something more like the oil refineries that you get in Lincolnshire would be more appropriate* – 2nd meeting, L Stakeholder 10

*So I think the one on the left is really good for the simplicity* – 2nd meeting, L Stakeholder 8

*The reason I would have voted for that, the left hand one for the person coughing, it makes it human. I think that's an important aspect of it* – 2nd meeting, L Stakeholder 8

The right-hand side with the infographics: …

*I agree on the infographics, certainly the person on the front as well, and the actual infographics on the second one* – 2nd meeting, L Stakeholder 8

*In the end the infographics won, I didn't have the option to put the two together* – 2nd meeting, L Stakeholder 8

The image on the right has a wider scope in terms of age groups: …

*I get the comments about the human factor with the top image on the left, with the children and young people’s hat on, I'm just wondering where the image on the right has a wider scope in terms of age groups, whereas for younger people, I'm not sure whether the photo image would resonate as well as just the shadow image. For me, for children and young people, I'm not entirely sure this is going to grasp their attention, if you see what I'm getting at?* – 2nd meeting, L Stakeholder 3

*The reason that I voted for the one on the right is because you have been able to provide the additional information in a way that doesn't create noise* – 2nd meeting, L Stakeholder 8

**Suggestions**

Consider data intensity of the images: ..

*The other thing that I was going to add though, I wonder if the data intensity of whatever images you are using is also something to consider. If you're talking about in some rural areas, the signal that people might have, I guess it might get loaded onto some people's phones so that the assets are all stored locally on the device, or if they are downloading things in real time when they have a signal. You might also be thinking about what is more intensive that could be prohibitive I guess if it's photo real images –* 2nd meeting, L Stakeholder 14

Context is important : …

*I think being able to provide that context is really important because, yes, you could say that in certain circumstances people should stay in the house and shouldn't leave the house, what we don't want to do is encourage people to stay in the house and not leave the house who really on balance would get better impact by going out and exercising despite the fact that there is ozone. I just think we need to balance some of those public health messages –* 2nd meeting, L Stakeholder 8

Tailoring to audience:

*I want a second go! S Just reminded me of something that I thought when you were talking earlier about how do you make it sufficiently generic and transferable that it’s right for everybody. I think in some cases, possibly you can't, so it might be useful to consider having versions said people can download or use the version that is most suitable to them. Because you can't necessarily globally transferable, and you can't necessarily get something that is transferable to children in the same way the day is for adults. You probably need to think a little bit about who is the audience for this. The audience is parents and adults, then you would go with one route, if another audience is the children themselves, then it might be that they need a different version. I don't think it would be a huge push to make two or three versions so that people can download the one that is most appropriate to them –* 2nd meeting, L Stakeholder 8

*It's going to be different things to different people. So again, it needs a wider public audience I think. I'm sure you'll get a lot of different sponsors –* 2nd meeting, L Stakeholder 18

*We need to go out to the wider population who would actually use the app If we really want to know what they're going to think –* 2nd meeting, L Stakeholder 18

*So the issue that I wanted to help emphasise, was the context, particularly the fact that you're going to be conducting this study in a number of locations; even if it's within the same country, probably different regions, and it will be good to get a local perspective before you rule out images –* 2nd meeting, L Stakeholder 9

Less complicated context for informed choices: …

*I think without having to make any of those messages too complicated, you can use some of the ability to provide that narrative to give some of the context that people can make informed choices –* 2nd meeting, L Stakeholder 8

Evidence:

*We should have the evidence available that allows us to draw that balance from the right sort of people* – 2nd meeting, L Stakeholder 8

**4. Map data**

**Concerns**

Health profile not clear:

*The health profile, I'm not too sure what that value adds, I don't know if that's a high health profile or a low health profile when it's 0.8* – 2nd meeting, NEL Stakeholder 7

*Yes, I appreciate that. But it's whether if there is a statistic, then it's the right statistic* – 2nd meeting, NEL Stakeholder 7

*Those are quite broad, those will be population profiles which are very different to individual risk* – 2nd meeting, NEL Stakeholder 7

Too complicated: The conversation is ‘sciency’ ….

*I think it's probably too complicated to engage widespread users. I work in the business obviously, and some of that I wouldn't immediately understand* – 2nd meeting, NEL Stakeholder 4/technical

*If it's in this format, I don't think you're going to get the downloads great that you're going to need to support it in the community* – 2nd meeting, NEL Stakeholder 1

*I'm not quite sure how 1311 kg per hour is going to resonate in someone's brain; even that understanding. I think for me it kind of needs to be – It’s high today, take precautions, don't think. And then you can have a little bit about what we're trying to do with the project, that we're working on it* – 2nd meeting, NEL Stakeholder 1

*I'm struggling to know what your target audience is for this app because all that conversation there was well sciency. And I understand that science is important when you're doing these things, because these things are kind of sciency, if your app is for academics, then I guess this is perfect for academics. But if this is to have a person living on the East Marsh or the South Ward, this is going to go over their heads big time* – 2nd meeting, NEL Stakeholder 1

*You have to be very numerate to understand this slide, don't you? A lot of people won't be numerate, perhaps I said that they won't say, I love numbers, but a lot of people don't. And those who don't, will probably not tune into this slide. And/or we have to create two slides, one for those that love numbers and those that don't to think about how we get that message across* – 2nd meeting, NEL Stakeholder 7

Representation and inclusion of content:

*One of the things that we're grappling with at the moment is how to represent matters exactly like this. Its fine representing concentrations but when you start linking it with health, this is where it starts to become a bit tricky, you have to be very car* - 2nd meeting, L Stakeholder 21

*We were talking earlier about if somebody chooses not to go out today, and they stay inside, that might be a very positive response to the environmental conditions but negates the predictive value of the environmental condition because they are not being exposed to it. Without wanting to over complicate that graphic, we were just talking about it, that may be in that graphic that you have two scenarios, if you stay inside today this is your risk, if you go out today then this is your risk, so that could help people make a choice of what they do rather than us either predicting the effects, or being directive about how they should respond* – 2nd meeting, L Stakeholder 7

Lack of clarity: …

*I was wondering what purpose that metric was there for, weather is supposed to be surface ozone, but it's obviously stressing stratospheric ozone from the units* – 2nd meeting, L Stakeholder 10

*Essentially white areas which are not shown in the actual colour scale in the middle of. So I'm not entirely sure what these white areas represent* – 2nd meeting, L Stakeholder 10

*The question that I'd like to ask this group is, with that kind of information, what would the health people do with that information* – 2nd meeting, L Stakeholder 21

**Suggestions for improvement:**

Be sure there is a link with mental health:

*Let me ask a question in a different way, is there a generally accepted link amongst the wider research community that this is an established link amongst the wider research community? What I'm trying to do they say that there might be cases that cite for it, there might be cases that cite against it. Is this a generally accepted principle in the scientific community? What I'm trying to make sure is that you don't focus something here that you immediately are going to trigger a whole kickback from others who don't agree* – 2nd meeting, NEL Stakeholder 7

It needs to engage with people:

*I'm not sure I have any suggestions at the minute, but perhaps engagement directly with those who create these platforms for public consumption would be helpful –* 2nd meeting, NEL Stakeholder 4

*I think for people to engage with this, there needs to be something more for them: it is about me and my condition, and actually there's that guidance. Once you get used to that, like you say that second layer, I might take more of an interest than think, how does this all fit in? How does it all work? It gives you more of an understanding behind if you want to look for it –* 2nd meeting, NEL Stakeholder 2

Prompts and guidance: … Visual guidance on moving to the next screen

*But maybe a little hint to say to maybe take your child out later, again it's that prompt. And actually, they can change maybe some of the plans for the evening* – 2nd meeting, NEL Stakeholder 2

*Potentially, I would want something more from it. Like again we look at the temperature there, so if my child was coughing a lot, it would be handy for me to look on and say that the temperature is this and this is the guidance. Like you say, close windows* – 2nd meeting, NEL Stakeholder 2

*I think we also need to look at that visually. So they want to press that guidance, and they want to go to the next screen instead of actually looking at the first thing and thinking – Oh no, I don't want to go any further. Sorry!* – 2nd meeting, NEL Stakeholder 2

Look at other Apps:

*I think we have a lot of apps for different health conditions that work really well. So for me, it's about actually looking at those apps and seeing what that support looks like to somebody and adapting that into this –* 2nd meeting, NEL Stakeholder 2

Simplified and user-friendly information: ….

*From when we spoke at the first meeting, I very much see it from the point of the user where it's very simplified. Almost my thought process was - How do I feel today? What's going on outside? What should or can I do that changes that? But, having reflected on all those conversations last time and slides such as this, I think there is some incredible information there, so I do think there is a great value in showing people this information, but it's about getting it down to that simplified version where it kind of almost makes you want to read it as opposed to who sometimes you look at it and think – I'll skip that because I want to focus on my breathing today, or working out what numbers are saying* – 2nd meeting, NEL Stakeholder 3

*I think it needs to be far more simplified for their use for them to engage with that* – 2nd meeting, NEL Stakeholder 2

*You do have to make it much more simple to understand to get the kind of engagement I think that you would want for something like this* – 2nd meeting, NEL Stakeholder 4

*I think, you know the information that we want to share with them, I think it could be fantastic. I think it just needs to not look like this. I think it definitely needs to be more user friendly to the person. We talk about language, don't we? And that's what it needs to portray* – 2nd meeting, NEL Stakeholder 4

Things like Addresspollution.org could help:

*I think it looks great, but that probably means that it's not right! I think with that in mind, it makes me think of things like addresspollution.org. I don't know if you've seen that, I'll pop a link in, but it lets you put in your post code and then it shows you very simply. It shows a picture of your house front like Google Maps, like your front door –* 2nd meeting, NEL Stakeholder 4

*And then it shows you kind of colour coded the key air pollution outcomes for like particular address against like the limits and the benchmark for your area against the kind of targets, and I think potentially also other areas. I think it would then let people go to their local representatives and say - Well people from there can mostly breathe, I want to be able to breathe. I'm shouting that it's much worse here. That's me feels like the bitter bit that a person would be able to take it away and say that - It's not getting any better over time, it's not as good as the people over there. That might be a way to simplify it and let's it needed to action. I don't know if it's relevant enough, although it's not your intended purpose, and then it could just be a snapshot of some of the key indicators and like a colour code for the how it relates to other areas –* 2nd meeting, NEL Stakeholder 5

The layering makes a lot of sense*:*

*I think the layering makes a lot of sense. This has the right stuff on it, it's just competing with all the other stuff. There is a visual thing that says high health risk. If some of the other stuff was hidden within that layer, and just high health is going to colour bar was the thing that popped out at you, and what you should do about this at different levels of risk – 2nd meeting, NEL Stakeholder 5*

NHS type research: ..

*I'm not sure if S might know, but there's been lots of NHS type research, easy to read documents, how you reach people with English as a second language, it's something that we're thinking about – 2nd meeting, NEL Stakeholder 1*

Representation of health risk using images: …

*We have 10 little images of people, what we normally do with our infographics is have 10 outlines, and then just shared in across the amount* – 2nd meeting, L Stakeholder 8

*Maybe 50 or something then. I think larger than 10 I would suggest, because it implies that most people are going to be infected* – 2nd meeting, L Stakeholder 7

Help people make a choice of what they do rather than predicting the effects: ..

*If you go out today then this is your risk, so that could help people make a choice of what they do rather than us either predicting the effects, or being directive about how they should respond* – 2nd meeting, L Stakeholder 7

Use different colours for immediate effects and long-term effects: ..

*Have people bright red for immediate, and for people blue for longer term effects or something like that* – 2nd meeting, L Stakeholder 7

An initiative called Forecasting the Nation's Health: ..

*A few years ago, myself and a friend of mine, started what was the forerunner to the COPD service that C and others have been doing so well within the Met Office. We started an initiative called Forecasting the Nation's Health, as we grandly named it* – 2nd meeting, L Stakeholder 21

*If you said that the ultimate aim was to somehow give them personalised feedback, that we found was quite good encouragement for them to actually give us the sort of information that that they wanted* – 2nd meeting, L Stakeholder 21

*You could using GIS techniques etc, have an idea where people of a certain age lived and or the quality of housing, and quite a few other factors, the idea was whether or not we could circumnavigate the need for some of these people are going to go down ...* – 2nd meeting, L Stakeholder 21

Exposure models: ..

*I want to ask a quick question with regard to the health impacts, how one works out say exposure to a particular concentration? The reason why I ask, one of our clean air programme projects has developed an exposure modelling system, and obviously if you're looking at exposure, it's no good looking at what goes on outside a closed environment, so it takes into consideration both indoor and outdoor pollutants to give an all-round exposure, or indication of exposure –* 2nd meeting, L Stakeholder 21

Need for a modelling approach using local data: ..

*I was wondering if your counterpart there may not be able to benefit from the modelling approach using the local data because I know within the UK system data is everywhere: you can literally log into one facility, obtain data and use it for a lot of things – 2nd meeting, L Stakeholder 9*

*In Ghana, data is being collected but in silos, how we decide to conduct a project like this, it is still possible to find a way of maybe accessing specific datasets within certain areas -*2nd meeting, L Stakeholder 9

The Dymex: …

*It's one of these agent based modelling approaches, so they've gone through and worked out by socioeconomic, by age group, by a whole different type of ways of categorising people, the proportion of time that people spend in the house, or other closed environment whether it is schools, of offices or care. –* 2nd meeting, L Stakeholder 21

*Fantastic population level models I think those models are fantastic at a population level for epidemiology and global policy, for an individual patient, what matters to them, I might be out 100% today, I'll be in 100%, I am aged 45. The aggregation is useful to look at population impacts, but not necessarily personal –* 2nd meeting, L Stakeholder 21

Methane is not a visible pollutant: …

*I think emphasising that this is an invisible pollutant as well should be part of the key message and the imagery maybe needs to reflect that* – 2nd meeting, L Stakeholder 7

*The other thing is that when you get a cloud of methane, it is an invisible gas, I wondered if there was something misleading and actually depicting it, people might be expecting to see something that is a hazard for their health, when actually it's not* – 2nd meeting, L Stakeholder 10

Indicate communities close to these landfills on the map: ..

*Those communities that are close to these landfills should also be indicated in their maps so that they can have a very first-hand information because they are more mostly close to the dump and the damage – 2nd meeting, Ghana stakeholder 4*

**5. Visual analogue scales**

**Visual analogue preference:**

Prefer something horizontal: .. Prefer it presented horizontally

*Horizontal, because it's like the sliders you normally do on an app like swiping left and right. That's the movement you tend to do on the phone. And you can do it with one firm* – 2nd meeting, NEL Stakeholder 1

*It just feels more natural to me, it is the way that we read, I wouldn't need to work anything out* – 2nd meeting, L Stakeholder 15

*It's probably a bit of bias, because many of the skills and these kinds of measures come up, and we often read them and present them horizontally* – 2nd meeting, L Stakeholder 9

*It just feels more natural to me, it is the way that we read, I wouldn't need to work anything out. But what also put me off, what I don't like is the actual emojis themselves on the left or right, they seem extremely happy or completely lost their mind! I think just a general smile would work better!* – 2nd meeting, L Stakeholder 9

*The whole left to right sliding scale seem to be more appropriate to the way people think* – 2nd meeting, L Stakeholder 21

Prefer Horizontal one - not happy to extremely happy:

*I will go for the horizontal one. And my justification for using this is, I mean most often on the scales, that's what I've been I've encountered, I haven’t encountered the vertical one* – 2nd meeting, Ghana stakeholder 10

The vertical one suggests you are sadder: ..

*I just think the neutral to sad, the vertical one, it could psychologically suggest that you are probably sadder than you are* – 2nd meeting, L Stakeholder 18

*The vertical one, when you are down you are sad, and when you're happy you are up* – 2nd meeting, L Stakeholder 21

*You wouldn't expect energetic to be at the top So you wouldn't expect energetic to be at the top. That's why I did not go with that one and I went with the bottom one* – 2nd meeting, L Stakeholder 11

The faces are absolutely terrifying: ..

*I know it's a validated thing, but the faces are absolutely terrifying. Can they be modified? Could they look less like they're going to strike some sort of episode comment like that absolutely chilling, I can't look* - 2nd meeting, NEL Stakeholder

**6. Mental widgets**

**Comments /concerns**

Avoid unvalidated widgets:

*I'm less concerned about the smiley faces because they are validated, I just think that there were some things being invented that are unvalidated, like as you say pragmatically, if we can avoid when we do that, then it saves resource and you can go elsewhere. However as long as testers don't hate it, I think for these, I don't hate them. But yes, you could always have them a bit better, but you know we live within a resource constraint system* – 2nd meeting, NEL Stakeholder 5

Some are good and can be used: ..

*There are some good ones there that could be used. The feeling worthless, that shows it when you see that, you know down that whole kind of feeling that there alone. The isolated one is quite a good widget, but I'm not sure about some of the others*. – 2nd meeting, NEL Stakeholder 2

*There is some good ones there that could be used. The feeling worthless, that shows it when you see that, you know down that whole kind of feeling that there alone. The isolated one is quite a good widget, but I'm not sure about some of the others* – 2nd meeting, NEL Stakeholder 2

Could have ethical issues:

*I’m just wondering if there is some unintended consequences which could have ethical issues, even if it’s not an NHS app officially –* 2nd meeting, L Stakeholder 10

People might drop off the radar:

*I'm just wondering if there's a risk of unintended consequences here with the fact that people might just drop off the radar on this app -* 2nd meeting, L Stakeholder 10

Recovery and phobia widgets are not appropriate*: ...*

*I mentioned at first because there are ones that I do have a problem with like when I look at the recovery one, it makes me quite angry really, that for recovery you have a syringe of the line for it on this person that is super happy now that they've give.. –* 2nd meeting, L Stakeholder 15

*Equally, the self-harm one, the phobia seems quite ridiculous, I criticise these in the knowledge that I haven't got the solution for it, and maybe these are really difficult things to be able to capture in a widget in this way –* 2nd meeting, L Stakeholder 15

Estimating a fractional contribution of a specific pollutant: …

*The Global Burden of Disease Team have done some estimations and they have been able to get some fractional contribution of exposure to different pollutants it is not accurate, but the methodology is there, and you can probably look at it to see if you want to adapt part of it* – 2nd meetings, L Stakeholder 9

*People don't have a say in the air they breathe You have these conflicts with people living in one area who don't have a say in the air they breathe, and not really being made aware of the damage that it can cause their health* – 2nd meeting, L Stakeholder 16

People experiencing worsening health, would be put off from engaging with the app:

*Besides issues with the imagery, I was wondering if when people were experiencing worsening health, they would actually be put off from engaging with the app for instance, especially if in cases of paranoia or just distrusting or disorientation, they would just you know not trust the app on a lot of other things in one’s life zone* – 2nd meeting, L Stakeholder 11

The specific impacts drawn up are not all-encompassing: …

*I think we need to categorise them a little bit. Because if someone came onto this and was feeling some of these things - paranoia, distrust, intrusive thoughts, imagination playing tricks; they're all impacts of a similar thing really* – 2nd meeting, L Stakeholder 8

**Suggestions**

GP follow up in addition widgets: …

*Depending on their response or lack of responses, you could have the GP follow up with the individual patients as they had a dashboard of who was responding how. And I was wondering if this could be useful obviously in a different form to these widgets* – 2nd meeting, L Stakeholder 10

Combine narrative and imagery: …

*I believe if you think about adding some narratives to the imagery that will help people connect faster than just having the image alone and expecting that they pick it up* – 2nd meeting, L Stakeholder 9

*I think we've been really good at thinking about how do you get information over to people in the easiest and most transferable way, and imagery is usually really good for that* – 2nd meeting, L Stakeholder 8

Additional function:

*So you know if people make particular selections or they're in a particular trend for that person - do you need support - And that's where the local stuff comes in because you can click on - Do you need support* – 2nd meeting, L Stakeholder 8

Triggering messages will be good: *…*

*I did put into the chat about triggering messages, if somebody is coming on here and saying that they feel mental and they have a negative mental impact, we don't want to show them a picture of self-harm. Things like that can be quite triggering, it can cause impacts –* 2nd meeting, L Stakeholder 8

Use quite standard terms: …

*I think it would also be quite useful to use quite standard terms, because if you do use standard terms and you start to gather really good intelligence out of this, you would be able to then compare that to what's actually happening at a population level – 2nd meeting, L Stakeholder 8*

*Equipment: …Equipment that can capture local data ..*

*I mean bring us equipment that can capture us the local, I mean the ground data to validate this satellite models that we are trying to forecast and meeting to the people – 2nd meeting, Ghana stakeholder 4*

**7. Feedback on mental health widgets**

**Difficult to understand widgets:**

Need text to give clarity:

*I think they (and perhaps all images, given experience of e.g., 'easy read' surveys) need text to give clarity* – 2nd meeting, Stakeholder Engagement Board meeting -Lincolnshire - 11

Discharge plan:

*Difficult ones include discharge plan* – 2nd meeting, Stakeholder Engagement Board meeting -Lincolnshire - 8

Distrusting:

*Distrusting* – 2nd meeting, Stakeholder Engagement Board meeting – Ghana - 13

Intrusive thoughts:

*Intrusive thoughts* – 2nd meeting, Stakeholder Engagement Board meeting – Ghana - 12

Isolated:

*The top ones, isolated etc are stronger* – 2nd meeting, Stakeholder Engagement Board meeting -Lincolnshire - 4

Paranoid:

*The paranoid one is not easily understood* – 2nd meeting, Stakeholder Engagement Board meeting -Lincolnshire - 6

Selective eating:

*Difficult ones include selective eating* – 2nd meeting, Stakeholder Engagement Board meeting -Lincolnshire – 4

*Selective eating* – 2nd meeting, Stakeholder Engagement Board meeting – Ghana - 12

Those without a caption:

*I wouldn’t understand most of them without a caption. Except for phobias and constant washing. I would keep some explainer text in* – 2nd meeting, Stakeholder Engagement Board meeting -Lincolnshire - 5

**Negative unintended consequences of using these widgets in the ME-NET**

Beliefs of symptoms before the problem:

*Could it make people feel they should have the symptoms before they have a problem so don't seek help* – 2nd meeting, Stakeholder Engagement Board meeting -Lincolnshire - 2

Quite triggering:

*Some images may be quite triggering* – 2nd meeting, Stakeholder Engagement Board meeting – Lincolnshire - 3

Vague and wrongly interpreted:

*I would avoid using the self-harm image. Recovery may involve upkeep of medications. Without captions, images may be vague and wrongly interpreted* – 2nd meeting, Stakeholder Engagement Board meeting - Lincolnshire - 5

Misrepresentation of feelings:

*If people try to engage with the widgets while having an episode, they might mis-represent their feelings* – 2nd meeting, Stakeholder Engagement Board meeting- Lincolnshire - 6

Potentially distressing:

*Given that for the general population, the key thing will be picking up on slight changes (and perhaps within a fairly low-level range of 'symptom' intensity), there's potential that it's distressing to put fairly common day-to-day experiences on graphical continua with very severe symptoms* – 2nd meeting, Stakeholder Engagement Board meeting- Lincolnshire - 11

They dumb down profound clinical issues:

*I think some of them are really problematic as they dumb down profound clinical issues. So in a way they need to be more generic. For instance, the constant washing one is great - it's clear and not loaded. But at the other end of the spectrum the one for what seems to be getting over drug addiction is ridiculous* – 2nd meeting, Stakeholder Engagement Board meeting- Lincolnshire - 9

Would put people off from engaging:

*Possibly the images would put people off from engaging which would be a negative consequence* – 2nd meeting, Stakeholder Engagement Board meeting- Lincolnshire – 8

**8. Personal lived experience of mental health and respiratory health – positionality survey**

**Lived experiences with mental health and respiratory health**

Lived experience with the mental health of other people in my life:

*Personal lived experience with the mental health of other people in my life* – Stakeholder 1 – Woman, 45-54yr, White British

*Personal lived experience with the mental health of other people in my life* – Stakeholder 3 – Man, 55-64, White, British, European, with Scottish, Dutch and *German ancestry*

*Personal lived experience with the mental health of other people in my life* – Stakeholder 4 – Woman, 18-24, Indian

*Personal lived experience with the mental health of other people in my life* – Stakeholder 5 – Man, 25-34, Akan

*Personal lived experience with the mental health of other people in my life* - Stakeholder 6 – Man, 65+, Caucasian

*Personal lived experience with the mental health of other people in my life* - Stakeholder 10 – Woman, 25-34, White British

*Personal lived experience with the mental health of other people in my life* – Stakeholder 12- Woman, 35-44, White British

*Personal lived experience with the mental health of other people in my life* – Stakeholder 15- Man, 35-44, Mixed (British-Iranian)

*Personal lived experience with the mental health of other people in my life* -Stakeholder 16 - Man, 45-54, White

*Personal lived experience with the mental health of other people in my life* -Stakeholder 18 – Woman, 35-44t, Mixed Arabic/Irish/Italian

Lived experience with the respiratory health of other people in my life:

*Personal lived experience with the respiratory health of other people in my life* – Stakeholder 1 – Woman, 45-54, White British

*Personal lived experience with the respiratory health of other people in my life* -Stakeholder 2 – Woman, 45-54, White British

*Personal lived experience with the respiratory health of other people in my life* -Stakeholder 4 – Woman, 18-24, Indian

*Personal lived experience with the respiratory health of other people in my life* - Stakeholder 5 – Man, 25-34, Akan

*Personal lived experience with the respiratory health of other people in my life* -Stakeholder 9 – Man, 55-64, African

*Personal lived experience with the respiratory health of other people in my life* - Stakeholder 14- Man, 65+, Black Caribbean

*Personal lived experience with the respiratory health of other people in my life* - Stakeholder 18 – Woman, 35-44, Mixed Arabic/Irish/Italian

*Personal lived experience with the respiratory health of other people in my life* – Stakeholder 20 - Man, 35-44, ASHANTI

Lived experience of own mental health:

*Personal lived experience related to my own mental health*- Stakeholder 4- Woman, 18-24, Indian

*Personal lived experience related to my own mental health* – Stakeholder 5- Man, 25-34. Akan

*Personal lived experience related to my own mental health* – Stakeholder 10 – Woman, 25-34, White British

*Personal lived experience related to my own mental health* – Stakeholder 12 – Woman, 35-44, White British

*Personal lived experience related to my own mental health* – Stakeholder 15- Man, 35-44, Mixed (British-Iranian)

*Personal lived experience related to my own mental health* – Stakeholder 16- Man, 45-54, White

*Personal lived experience related to my own mental health* – Stakeholder 18- Woman, 35-44, Mixed Arabic/Irish/Italian

Lived experience of own respiratory health:

*Personal lived experience related to my own respiratory health* – Stakeholder 3 – Man, 55-64, White, British, European, with Scottish, Dutch and German ancestry

*Personal lived experience related to my own respiratory health* – Stakeholder 9 – Man, 55-64, African

*Personal lived experience related to my own respiratory health* – Stakeholder 14 - Man, 65+, Black Caribbean

*Personal lived experience related to my own respiratory health* – Stakeholder 15 – Man, 35-44, Mixed (British-Iranian)

Professional lived experience with mental health patients:

*Professional lived experience with mental health patients* – Stakeholder 4- Woman, 18-24, Indian

*Professional lived experience with mental health patients* – Stakeholder 10 – Woman, 25-34, White British

*Professional lived experience with mental health patients* – Stakeholder 12- Woman, 35-44, White British

*Professional lived experience with mental health patients* – Stakeholder 15- Man, 35-44, Mixed (British-Iranian)

Professional lived experience with respiratory health patients:

*Professional lived experience with respiratory health patients* – Stakeholder 10- Woman, 25-34, White British

*Professional lived experience with respiratory health patients* – Stakeholder 13 – Man, 25-34, Akan

*Professional lived experience with respiratory health patients* – Stakeholder 15- Man, 35-44, Mixed (British-Iranian)

*Professional lived experience with respiratory health patients* – Stakeholder 17- Woman, 45-54, Black African

*Professional lived experience with respiratory health patients* – Stakeholder 19- Woman, 35-44, Ewe

**Other health related experiences**

Air quality science:

*Air quality science* - Stakeholder 8 – Man, 55-64, White

Bladder cancer:

*Another morning a few years ago I found that I was peeing blood, I reported to the doctors, and I was diagnosed with bladder cancer and had a course of treatment which appear so far to be working* - Stakeholder 7 – Man, 65+, English Anglo-Saxon

Seizures:

*Seizures..... Suddenly without warning one morning about 3 years ago having showered and dressed and walking to get my morning newspaper I returned to my house as I had forgotten something. The next thing I recall getting up from my tiled floor in my house with blood coming from my head. I then recall seeing a friend looking through my glass door with a look of anxiety on his face, he had called an ambulance - the next vague memory that I have, is I was in a hospital bed - this then led to courses of treatments. I still take medication for this* – Stakeholder 7- Man, 65+, English Anglo-Saxon