Int: Thanks so much for joining us today. It feels like a long time since I’ve seen some of you, and quite recently since I’ve seen some of you. But a little update from us. In the time since we've seen you, our colleague E has done some travel. So from the university, E has done some travel for us and made some really excellent contacts in other areas within Ghana. So we are really pleased to see some of our colleagues who we met more recently joining in the session today. So I will just prepare my little presentation for today and preface this one with apologies to some of our more recent colleagues who have already seen some of these slides, but our original Accra team have not. So this is what we'll be going through today with some additions to what we went through in in our group recently. So we might just start off then with our agenda for today, which really begins with some introductions .

<Displays Agenda for Today slide>

<Int:> OK, so our agenda for today, we'll go through some introductions for our new members. I have some updates on progress following the really fantastic input that we got from the last meeting. And I'll just do some little refreshes on where we're up to with the development of this project. And then, and this should be new to everybody, we've got some self-reporting and visual self-assessment tools to introduce. And I'll give a bit more background to that. And then we also have some additional feedback and evaluation activities similar to last time really. And we'll briefly discuss what's happening for future meetings. So I thought I would just get you to introduce yourself, now most people in our group have already done this. I've asked you about what you think of when you think about methane. So I won't ask you to do that again. But what I will ask you to do is introduce yourself, the institutional community that you represent, simply because we do have a few people with us today who potentially might not know each other. So I'll go round and I'll just ask people to introduce themselves. So starting with S?

Res1: Hi everyone, this is not my first time actually, I was with the group with the initial meeting that we had I think a few months back. I'm with the Ghana Meteorological Agency as a researcher and climate scientist and also into air quality. And 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, which worsens air quality and can also lead to anxiety in affected populations due to health risk and increased outdoor activities.

Int: Thank you, M?

Res2: My name is MA and I'm a general paediatrician. I work at the Princess Marie Louis Children's Hospital in Accra, in the business district. So the hospital I work in is situated in a sort of urban slum area and we see children from across the city with all sorts of things.

Int: Thank you. S?

Res3: My name is SM. I am a paediatric pulmonologist. I work at Korle-Bu Teaching Hospital which is the largest hospital in Ghana. So my interest in this project is because of my respiratory background. Since our last meeting, I've had a project in Agbogbloshie where we did lung function testing for children and adults because it's an area that is noted for high rates of pollution, both air and otherwise. So I ran a pulmonology service and that includes asthma, and then I also work as a general paediatrician in the wards.

Int: Great, thank you and good to hear a bit of what you've been up to since we last spoke. E from the Ghana meteorological agency?

Res4: All right, good afternoon once again. I'm E from Ghana Meteorological Agency. I think I joined this meeting last month, yeah, last month. And then briefly I want to explain something about methane. I know it's a very powerful gas that contributes to climate change and global warming. In terms of air quality, 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. So I'm very keen for this project and I'm looking for it for better solutions to help these people affected with this kind of pollutants in the environment.

Int: Thank you so much. J, I think everybody knows you and me. E?

Res5: My name is EA, I work with STMA, I'm the landfill manager and I'm interested in this programme because while I work, you know, we have plant foods, you know, methane is one key gas that emitted at a site. So basically, that is me. Waste management and landfill site.

Int: S?

Res6: Yes, good afternoon everyone. My name is SA, and I am an assistant professor in the university of Ghana, in the department of mental health I'm happy to be on this project to just explore how methane and related politics actually contribute to mental health building across populations.

Int: EA?

Res7: I am an engineer, EA, at STME, a civil engineer, environment and climate change specialist. 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. Also because of this new message, it's an issue of consern and therefore we are much interested to know and also to contribute to the message.

Int: I see that E has just joined us, do you want to tell colleagues a little bit about your recent adventures, and about our newly expanded team?

Res8: Thank you very much. So for today's meeting, we decided to bring in colleagues from Sekondi-Takoradi with the understanding that we can pool and share experience and based on what we've been doing in Accra and what we've also started in Takoradi. In September, I visited Takoradi to try and also touch base with stakeholders, yes, as we have in Accra, to see how best we can bring people from the Assembly, people from the health centre and other practitioners whose expertise will be useful in terms of our project. So we have, I don't think we have the full team here, but I think 2-3 weeks ago we have our team meeting with the Takoradi stakeholders. And today we decide to bring them on board so that we get to know ourselves and then get to know what different assemblies or different metropolitan assemblies are doing in terms of climate change, more specifically methane and the health implications. I'll try and then reach a few more people to see if they can join. But essentially, we at our meeting, we got a benefit of seeing the updated work that has been done from the Accra initial workshop that we did. And based on your feedback, your useful comments and, and feedback that was used to improve and, and shape the initial work that has been done in terms of the, the mobile app that I want to develop and make sure is suitable in terms of the different context we find ourselves in, and useful in terms of the different population groups that we have. So we may have that advantage. But the idea is also listen to you, your feedback at today's meeting and see how best we can in the end come up with something that is more acceptable culturally sensitive to our local context. So I think that is basically what we've done so far and I'm happy to, you know, revert back to you.

Int: Thank you. JC has just joined us?

Res9: Thank you very much. My name is BKJC. I'm working with the numerical weather prediction unit. I'm glad being part of this team to learn more about the air quality.

Int: In our Sekondi-Takoradi meeting a couple of weeks ago, I remember quite clearly that E and F, who are not here with us today, but who was an engineer from an environmental technological background. Both were sort of mentioning about this issue of how you actually measure methane emissions in the private sector. And since then, I just wanted to tell you that I've reached out to a colleague in the UK who does quite a bit of innovation around measuring methane on local scale. And we're hoping to try and find some opportunities maybe to do a small project to, you know, look at what some options might be. So I wonder actually for our GMAC colleagues here today, it might be cool to organise another, you know, conversation at one point about how we do that. And we also sort of, we had someone who was, I think it might have been F mentioning about the fact that the, the Environmental Protection Agency does actually have some measures around methane and various different environmental condition measures that we might need to get our heads around too. So I feel like these conversations are a really an excellent starting point for identifying what some future work might look like as well. And I've certainly learned a lot just from hearing about what everybody does in their roles and everybody's experiences. So it's fantastic to have everyone in the room today. Now there was a little survey that you might have seen that I sent round last in the last couple of emails and that survey was around our positionality.

<Displays personality matters slide>

Int: So I just wanted to explain what that actually means and why I sent around that little survey. And I'll also show you a QR code in case you haven't done it today. Basically, one of the things we're talking about in our session today is about developing some design options for self-reporting respiratory and mental health outcomes. And we really need to consider our personal lived experience and what perspectives we bring to this exercise. So for example, if you're somebody who has experience with your own mental health or the mental health of others, that is something that we bring to that we bring to our understanding of the work that we're doing today. So that was why we have encouraged people to tell us a little bit about themselves and their positionality.

<Displays About you slide>

Int: So if you haven't had a chance to complete the survey, you can do so now with this QR code. And I'll also just quickly put the actual link in the chat. This is all anonymous, so we can't identify who people are from this little survey. But it's more just to understand ourselves as a team and how we all, how we all can contribute to these sorts of activities through our own lived experience. Before I go into the updates, just a little refresher of what we're doing here.

<Displays Methane Early Warning Network Slide><Displays Main Feature (Refresher) slide>

1. Register a user profile including health conditions, demographic characteristics;
2. Set alerts, up in for push functions, for ozone in your area to receive recommendations for Health Protection;
3. Receive prompts to self-report daily respiratory and mental health outcomes health outcomes including text/visual scales (e.g. Emotion wheels);
4. Advanced option for setting bespoke thresholds for alerts (e.g. If particularly susceptible to us from attacks might lower threshold for Health Protection recommendations.)

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<Displays Your Suggestions Slide>

Int: And actually, we synthesised, you know, J and myself synthesised all of the feedback from our stakeholder meetings and came out with some common themes that emerged around suggestions.

‘A picture tells 1000 words’

* Education Model: start with simple picture-based image we've touch animation guiding user attention to links between health, sources of pollutants and environmental/metallurgical condition - > fed back to CK;
* Outcome: CK will adopt an ‘agile’ approach, users are guided through a simple module with options for ‘find out more’ boxes with backs, and additional links to ‘find even more’ – 3 tiered.
* Self-reporting health and well-being:
* Outcome: we will give users the option of both numeric and picture-based reporting, but we need your help to co-design and trial the visual material!

Int: So in other words, your, your recommendations to us have fundamentally changed how we're going to present information through this web app. And we have to thank you for your very useful and insightful thoughts around what our first suggestions or our first images actually looked like and what future functions should look like in the app.

<Displays Co-Design Following your Feedback slide>

Int: Now I will warn you that our design team have done some excellent work, but it is quite a lot. I will send a follow up e-mail after this meeting to capture your feedback if we don't get a chance to hear from everybody today only because there's quite a lot of content. And what they did was they actually came up with two different approaches for us. So after I, after we spoke in our last meeting and we talked about what an educational module might look like, I went away and I did lots and lots of sketches.

<Displays Sketches slide>

Int: They're pretty messy, but they were a starting point for our design and development team, and I sent them all of these sketches. You can see in the top left-hand corner that I tried to synthesise in a kind of holistic way, like how you might move through. So the arrows are sort of showing you how you might move through close-ups on different components of a story, more like a narrative. And then in the other pictures, I've got close-ups of certain bits of that narrative. So on the right at the top, there's a suggestion to consider shutting the window. That might be a health recommendation. And that links to, you know, an understanding of pollution through some of the images at the bottom. So this was the sort of content that I gave them, and actually I was really impressed with what they came up with. And they've given me two educational modules to pilot with you all today. So what I'll do is I'll go through both of them. They're kind of similar, but there are some important design differences. And then at the end, I'll ask you to consider which of these two options you prefer. One of them is a little bit more like someone has illustrated or used photographs within the design elements and the other one is a bit more like stock silhouettes and design. So you'll see what I mean, but we'll go through them and then we'll see what the preference is from everybody in the team as to which we go with. So what I'm going to do is I'm going to stop talking now and I'm just going to, like I did last time, take you through all of the images as though you were using it on an app.

<Displays Educations Module #1 slide>

<Displays Air Pollution can impact your health and well-being slide>

<Displays Ozone in the air can make it hard to breathe slide>

<Displays Where Ozone it come from? Slide>

<Displays Ozone is produced when sunlight mixes with emissions from factories, cars, houses and agriculture Slide>

<Displays Methane is an important emission that contributes to the formation of ozone in the air that we breathe Slide>

<Displays Methane in the air comes from oil production, indoor cookers, waste processing and cows Slide>

<Displays How can I protect my health? slide>

< Displays There lots of things you can do to protect your health on days when ozone levels might make it hard to breathe Slide>

<Displays – Close the window, consider lighter exercise today, exercise lighter in the morning, exercise in the morning rather than the afternoon, use your preventative inhaler today, pack your blue inhaler if you're going out. Slide>

<Displays – Find out More. Slide>

Int: That was the first version and the idea with that is that it's just image based. And then the ‘Find out more’ would come at the end of the of the story. Now, when I saw these, I had some immediate thoughts that we might like to discuss, but I'll show you the second version first. But just to keep in mind that, you know, we are very aware that some of the references, the images might, you know, come across as very Eurocentric. And we have the opportunity again to feedback to our design and development team to consider how we can make these a little bit more global in nature and a bit more relevant to the communities that we're talking about as well. So again, I'll just go through the next version and then we'll have a little chat about which we prefer, recommendations for how we might make changes and improve and everything.

<Displays - Educational Module #2 slide>

<Displays - Air Pollution can impact your health and well-being slide>

<Displays - Ozone in the air can make it hard to breathe slide>

<Displays - Where Ozone it come from? slide>

<Displays - Ozone is produced when sunlight mixes with emissions from factories, cars, houses and agriculture slide>

<Displays - Methane is an important emission that contributes to the formation of ozone in the air that we breathe slide>

<Displays – Methane in the air comes from oil production, indoor cookers, waste processing and cows.

<Displays - How can I protect my health? slide>

< Displays There lots of things you can do to protect your health on days when ozone levels might make it hard to breathe slide>

<Displays – Close the window, consider lighter exercise today, exercise in the morning rather than the afternoon, use your preventative inhaler today, pack your blue inhaler if you're going out. slide>

<Displays – Find out more slide>

Int: Again, this version has the information at the end. And I mean, these words are just gibberish for now, but it might be that a three-tiered layer that is something where it's a bit more bespoke to the exact contents of each slide. So take your blue inhaler if you're going outside, the links at the bottom might relate to asthma management. They might take you to healthcare services, they might be things like, you know - Is someone in your family having a respiratory emergency? Here's where to go. It could be any number of things like that. So that's just sort of some of the differences in the two layouts. What I will ask you to do, has everybody has everybody used the raise hand function in teams before? What I would like is for everyone to have a little think about which of these two options they prefer and then raise hands. So if we start with the first option, number one is on the left, it's the one that has the giant cooker down the bottom and the man coughing into his hand like this at the top. Can I ask you if you had a preference for that set of slides to raise your hand using the raise hand function? Or if you can't use that function for whatever reason on your phone, you can always type in the chat to say number one. OK, yeah, we've got 5 for option number 1, but M has made a comment. Now M has said prefers #1 but not the coughing into the hands. And S has said not everybody uses the blue inhaler to relieve attacks. So you'd suggest if we incorporate it, you need to rephrase it for the for the inhaler that you use in emergencies. This is exactly why we've got you in the conversation, S, because these are the sorts of things that I wouldn't know as a non-medical person. OK, so that's five preferences then for the first one, can I ask everyone to put their hands down again, please? For the second option, can I ask you to raise your hand if your preference was for the second option? We have one for the second option. So the preference is really for the first. Interesting. So the next thing to think about is why. And at this point, I'd like to open the conversation and get some feedback from yourselves. But please, yeah, anybody who has some feedback on that content, it would be fantastic to get some insight as to what your, you know, what your preferences are and why those preferences are the case.

Res8: H, can I jump in just briefly? I have some remarks to make, even though I went for the first one. I think from our discussions 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? I don't know if there's a way so you can sort of relate to it. And then also the in terms of the animations, the characters that we have there. I don't know if you can blend with some, look up pictures, you know, for instance, if it's a dump site, people usually go to scavenge and all of that so that people can know that yes, depending on how close you are, your exposure rates could also be different and all of that. So it's about bringing in that dump site and also maybe mixing, having different pictures or characters animations to depict that.

Int: Thank you E. I think that's a really important observation. I'm sure E would agree that we need to capture all of the major sources of methane for the relevant places in the world. So we might need to have a bit more of a think about some of those images and make sure we're being inclusive. S has also said - I prefer the first one because it held my attention better. I like the way the images came up. I also think the font sizes were bigger in the first one. Yeah, they might actually have been S. So that's quite important for accessibility, isn't it? And inclusivity, making sure that the text is large enough. And you know, I think most well most of the people in the conversation today were also in the first conversation. So in in the first meeting we had a few weeks ago, a few months ago. Is there a general feeling that this is a bit better than what it looked like last time?

Res8: Yes, I think it's much improved. We have a variety of resources now. And I think it also captures some of the early discussions we had

Int: And I will send around a little survey after this just to capture some people's ideas because I think sometimes you need to stare at images a little bit to really have a think about them. But yeah, so please, if was there anybody else who wanted to feedback on why they had a preference for one or the other of those versions of the educational module before we move on? Well, we'll, we'll move on then. And thank you for that input. Now the next, the next bit of what I've got to present is around the map.

<Displays Map Development slide>

Int: You'll remember from the last time that we talked about part of this project being educational and around the, the representation of data on a map. So what we what we want to be able to show is what environmental condition looks like in an area and also what the health outcomes are like in that area. And this was part of the remit sort of part of what we were asked to do by Welcome Trust; by our funders. We have to create a platform for understanding the impact that methane has on health. Part of that is around self-reporting and sending people alerts and recommendations, but part of it is also really about visualising the data to have an educational function. And when we showed this to some of our colleagues recently from Lincolnshire, we got some really varied responses. So I'll tell you that probably we got, I would say more positive responses from the Lincolnshire group. Whereas when we had a meeting with North Lincolnshire and Northeast Lincolnshire, we got some comments about the average educational age of people in North Lincolnshire. So one of my colleagues works with groups that have very low educational attainment. And I mean, like, I think she said something like, you know, the verbal, well written, written literacy of an 8 year old sort of level of literacy for regions in North Lincolnshire where there's a lot of poverty in North Lincolnshire. And that got us thinking about, OK, well, what do these maps need to look like to be able to support those communities? And, we got a sense that, OK, for some of those communities in North Lincolnshire, maybe we need to take that similar approach to the agile design of having a little bit more simple images and then having options for diving a bit deeper into the technical side of things for people who are interested. So I'll be really, really interested to see what this group makes of these maps. There's quite a lot of content, but I'll explain it as we go.

<Displays Map Data slides>

Int: There are three images here from left to right. The first image on the left shows you a few things. It shows you a scale that indicates what a colour means on the map and colour on this map relates to kilogramme per hour emissions of methane. So areas on the orange spectrum have higher methane emissions compared to areas on the purple to grey spectrum. There is an option at the top here. This will be a drop down box where this arrow is and it will allow you to display methane, temperature, ozone or health outcomes on the map. Down the bottom, we have a time scale, so you can either press play to watch a changing image of what any of these, you know, say methane or temperature, a changing image of the average values for that measure over time. Or you can drag this bar across to have a look specifically at what average methane looked like in 2020, for example. Now, I suspect our GMAC colleagues may be interested in this as to why we've gone for yearly values. It is a lot more complicated than we thought to try and get daily or even weekly or even monthly values for methane. This is something that will improve over time as the new satellite methane sat comes online for other parts of the world. But right now, that satellite is only operating with full effect in America, which means that right now we're limited to the Sentinel 5P satellite missions, which I'm sure some of you know is quite limiting, but that's a conversation for another time. But that is just to make clear why we've gone for that granularity of data. In the middle, we've got some filter options. So it's an advanced option where you can actually select what you want to see. And then on the right, we have an option for if you click on an area name and what will come up is some information about the area, it will tell you all about the area. And that includes ozone, that includes methane, temperature. And then there's this slightly controversial health profile down the bottom. Now originally when I saw this, the design company had gone for something called a relative risk value, which is actually an epidemiological disease terminology that I didn't really think was appropriate. So we asked for it to be a health profile and vulnerability here, if your vulnerability is over 1 for say respiratory conditions, it means more than usual. Under 1 means less than usual. And the feedback that we had from our Lincolnshire teams was that this is completely meaningless to compute to community members. And we had some really innovative suggestions, like if you're trying to indicate vulnerability, why don't you have like 100 tiny little people and show the proportion of people who are likely to have a health condition coloured in. So you can imagine if it's 20%, you'd have 20 people out of 100 coloured in. Because visually that shows what health risk is like in an area without having to use all the words and everything. And also, down here it does say rate per population of acute, chronic mental health, respiratory health. Actually, you would have a breakdown for each of those. So it wouldn't just be a dump of a single number representing those. So I'll keep going through these, but please at any point do interrupt me if you want to make a comment or you can put a comment in the comment box. So we kind of agreed in other stakeholder meetings, and again, I'll be interested to see what you think that this looks really pretty, but there might be some difficulties or challenges for community members in understanding what some of this content is. Just some other examples for other areas. And then I mentioned that agile approach where you drill through to more information. So this is just some of some of what that map might look like. So before we move on, I'll ask you to have a little think and take any comments or suggestions around those maps. What do you think? Are they useful? Are they too complicated? What can we do differently?

Int: E?

Res4: OK, so I have few comments on the map; especially concerning to myself. I was thinking where most of the communities that are closer, they have a lot of landfills; especially they have a community especially the landfill community, where they have most of the rubbish over there. By looking at the map, it was just mostly showing some of the regional capitals like Kumasi and Suyani and some other towns. I was thinking like those communities that are close to these landfills should be 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, right? So those who designed the maps should also go create those communities, especially those who are very close to their landfills and know how the methane levels are; especially in <?Sokbandi?> where if the person doesn't know the geographical location of all, is not able to use the map, where has to locate where <?Sokobandi?> is before you could know the levels. So I was thinking these communities should be giving much more attention and then how you should message in a clear way. <?Sokobandi?> and other stuff can also be shown.

Int: That's a really useful observation that the maps that we've prepared to share with you maybe don't capture all of the areas that we'd like to capture. And that's definitely something we need to think about how we do that. Whether you zoom in on areas, we'll have to have a little think about, but that's really helpful. We definitely need to make sure that we're representing those communities that live closest to the landfill sites. Do we have any other reflections?

Res8: AH has joined.

Int: I'll just, I'll just have a look at S’s here and then we'll and then we'll skip to an introduction. S says - In response to E’s suggestion, I wonder if it's possible to use a GPS where the phone can take your location automatically. Yeah, that's definitely something that we're looking at. Because she said - Because everywhere there are communities that are vulnerable, for example, places in Accra. Yeah, that's a really good suggestion. A, did you want to introduce yourself?

Res10: My name is Dr AH. I'm a senior lecturer at the Department of Physics, University of Ghana and I also had the air quality lab in this department. Nice to meet all of you.

Int: Thank you, A, and sorry you're having internet troubles, but I will absolutely circulate all of these slides and give people the opportunity to input via a little social survey after this as well for people who haven't had the opportunity to have a look at all of the content in the meeting. And like I say, if people have other thoughts about the map, we can always capture that at a later point in time. So we'll move on to the next little component here. And this is the last little task really, and it's around visual self-assessment.

<Displays Visual Self-assessment slide>

Visual Analogue Scales

* Used to measure experiences that are typically difficult to measure conventionally e.g. pain;
* Involve a 100 millimetre horizontal continuum from none to extreme state.
* Tend to be the most reliable for measuring change in an individual rather than comparing between individuals.

Int: I know we have some colleagues with us today who work in hospitals and with patients, and I think your insights will be really, really important for considering this content. Basically, there is a way of capturing people's experiences, whether that is to do with their physical health or their mental health, using visual scales that aren't the traditional numeric scales. And this can be really useful for things like measuring the experience of pain for children. You can see, you know, a visual scale of faces that helps them be able to point to how much pain they're in. Typically, it's 100 millimetre horizontal line. At one end of the line, you have none. At the other end of the line, you have some sort of extreme state. So if it was pain, you would have no pain at one end, and at the other end you would have a lot of pain. And this approach tends to be the most reliable way for measuring change for an individual. The reason we want to use this in the ME-NET app is the whole purpose isn't to compare, well for the person anyway, isn't necessarily to compare themselves to anybody else. It's to help them monitor their own health experiences. Over time, they might mean that they can compare how they are on one day to how they are on another. And that's when visual analogue scales are really, really useful. And I've just included some literature there on visual analogue scales for anybody who is interested in having a look. What I would like to do is present some of the content that we've come across and give you some opportunities to feedback.

<Displays Co-Design slide>

* We will present some content, including variations on validated measures, and some novel measures;
* Give you the opportunity to vote on options and give you more detailed feedback;
* This process will inform the visual self-assessment tools embedded in the ME-NET platform!

Int: What I would like to do is present some of the content that we've come across and give you some opportunities to feed back. But actually, since I prepared this presentation, we've already had quite a bit of feedback on some of the suggestions. So I'll kind of go through the material, but I'll also update you as to where we are with the development of these survey items. Because we know that visual self-assessment and these analogue scales are really commonly used for pain and general well-being. There are scales for happiness and sadness, anxiety, confusion, boredom. There are some pictures related to psychosis, but we're not sure how we feel about those at this point. And we don't have any kind of validated picture based scales for respiratory symptoms. So the first thing we did was to have a look at what visual analogue scales tend to look like. And this is what they tend to look like.

<Displays Visual analogue scales slide>

Int: There are two versions. One of them is vertical, one of them is horizontal. And really importantly, we like the idea of these scales versus scales that have a happy/sad dynamic. And the reason for this is we consulted with some clinical psychologists about the strengths and weaknesses of different approaches. And they said, actually it's not very helpful to have a scale with happy at one end and start on the other. Because a really common presentation and symptom for mental health that can be no emotion. So you can have no emotion, you know, not happy at all, extremely happy. Not happy at all doesn't mean sad. It's neutral and you need to be able to capture that dynamic. Like not sad at all. Extremely sad is very different to saying - Oh, I'm really happy. So that was why we've gone for this option versus the happy/sad spectrum. However, there's still a little bit of a little bit of subjectivity here. So there are two approaches that are validated that psychologists and psychiatrists use with patients. One of them is the vertical, one of them is the horizontal. And we were wondering about which of these approaches is more appropriate. So I've suggested raising hands. But really what I would prefer is just to ask for your feedback at this point as to which of these approaches you think would be better. And if you imagine it pops up on a phone and you get to pull a continuum up or down to report how you're feeling from not happy at all to extremely happy, what do you think would be the best approach? Would you go for the vertical at the top where you would say, slide a scale up and down? Or would you go for the horizontal on the bottom where you'd slide a scale from left to right? So that's the vertical from top to bottom or the horizontal from left to right. What do people think would be better to have in an app and why? I suppose I'm thinking maybe say, S, M, S, those of you who work with patients, do you have a preference for how you think those patients might interact with an application or does it just not matter? Is it irrelevant? A?

Res10: So for me, 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. So I think the most popular one is on the horizontal scale where you just drag, you know, from the not happy to the extremely happy. I mean, most scales that I have dealt with are horizontal.

Int: Thank you, S might agree with you - left to right just because we write numbers from 0 to 10 horizontally. And I mean, look, that's, that's actually quite in line with what other stakeholders have said. And in fact, actually in one of our meetings, yeah, horizontal, E, thank you. In one of our other meetings, actually, someone suggested that it was a little bit not neutral like if you have a scale from up to down, up and down has a meaning like is up is better than down. And I thought, oh gosh, that's an interesting view. So we've had quite a few, a few different reasons why people tend to prefer the horizontal. So it's interesting to know that this group also feels that way. Again, I won't ask you to raise your hand, but just in general, and you can put this in the chat. Do you think the now I'm referring to these images as widgets, but we can call them, we can call them images. Do you think these widgets or smiley faces and sad faces, do you think they're easy to understand? Because these are measures that are validated by psychologists to be used with patients universally, but that doesn't mean they're necessarily appropriate. Do you feel for your communities that those images would actually make sense? And again, you can just put a yes or no in the chat, if you like, or share your thoughts verbally.

<Displays Respiratory systems slide>

1. Shortness of breath
2. Coughing
3. Chest tightness
4. Fatigue

Int: Now we, we kind of had a look to see how symptoms related to respiratory health or illness are represented in images and we didn't find any validated scales using visual images. But what we did find was quite a lot of health advice online. So websites that had, you know, advice for supporting children with asthma or something like that. And those websites tended to have images on them. And a lot of these images were in relation to showing children. It might be, you know, point to something, or it might be asking parents to indicate what their child's experiences were. So there are actually images being used in this space, but they're not developed to the same point. And the nice thing about those little smiley faces is that they are gender neutral, and they don't communicate an ethnicity or anything like that. They're culturally really quite neutral, whereas a lot of the images, you know, we haven't found anything like that for respiratory symptoms. So the sorts of things we've found are, you know, visual ways of showing coughing. I thought the one on the left was probably the most universal, you know, the most neutral.

<Displays Respiratory widgets slide>

Int: I thought some of these were interesting. The ones at the top showing shortness of breath. I'm not really sure what the arrows are meant to be there on that third little picture, breath going in and out. Some of them are a little bit clearer than others. I’ve just noticed J has just joined us. And as you can see, they're very much tailored to try to communicate with children, to catch the images that children might associate with. So yeah, these are the sorts of images that I was finding, and they were mainly on health related websites. So some of them were NHS associated, some of them were, you know, community groups. There was quite a wide range, others look like, you know, similar. It was interesting to see the sorts of symptoms that were being represented, some specific to women's bodies and there seemed to be some crossover as well. So things like chest pain being represented with these funny little, I don't know, electricity looking zappy images. So that was the sort of thing I found. And then and then the next thought was, OK, well, what might this look like in a format that you could use for self-reporting similar to those smiley faces for happiness and sadness and all of that. Could we develop something similar to help people who don't really want to use that numeric scale of one to 10 to actually to just very rapidly self-report their respiratory symptoms? And we started looking at how we might do that. And actually, we have a company that we're working with called Widget. And that company is a company we can actually commission to develop some widgets for us. But that is not something that we necessarily think we can do right now. That might be sort of future project, but we can purchase from the existing widgets that they have and we can add those into the application. So we're not starting from scratch for now. We then thought about, OK, well those scales don't exist for respiratory health. Maybe we'd have to develop them from scratch, which you know, is an additional cost which we would need to look at in the future. We then thought about, OK, well those scales don't exist for respiratory health. But maybe what we can do is work with existing little images for mental health, and that might actually improve the inclusivity of the work we're doing, the accessibility of the application, if it's just very clear.

<Displays Mental health symptoms slide>

1. Anxiety
2. Depression
3. No effect
4. Intrusive thoughts/sounds
5. Paranoia
6. Hearing/seeing things others can't
7. Energy levels
8. What else?

<Displays Mental health widgets options slide>

1. Adapting existing resources for the ME\_NET platform;
2. Developing our own widgets (probably not visible now);
3. Maybe we can trial how existing widgets are received in the application for self-reporting.

Int: So we know already that there are little faces, little widget images for things like anxiety, depression, no emotion. But part of the work we're doing is trying to determine, see the difference in air quality impact for conditions like anxiety and depression compared to say conditions like more severe mental health like psychosis. And I had a couple of meetings with some clinical psychologists who I work with at the university, and we talked about what were the important symptoms to try to capture for psychosis. Common symptoms associated with psychosis of things like intrusive thoughts and sounds that feel like they're coming from outside of your own mind, paranoia, hearing or seeing things that others can't see and being aware of that very low energy levels. There was also symptoms related to feeling like you're alone or that your experience in a crowd is very different to other people's. So there's like all sorts of symptoms like that that are related to more extreme mental health conditions, say like schizophrenia with a psychosis element. And we kind of thought, I wonder if there's anything out there that actually captures those experiences and what we found. So we thought about should we just use existing widgets or should we try to develop new ones? But of course, there's the cost associated with that that we didn't anticipate with this project. So we thought about using this pack, which is designed to help mental health clinicians do mental health assessments, but this is in a psychiatric or a physical healthcare setting. So it's actually within a healthcare setting as opposed to on a phone. And that's quite an important distinction because there might be images in this pack that are appropriate for a healthcare setting compared to looking at app on your phone. And something we've had to think about is images that might be triggering, images that might be very difficult to understand if they weren't explained to you by a healthcare professional. And these are the sorts of images that are in the pack. So we would encourage you today to think about the little experience you have that might be with patients, it might be with people in your life who you know, experience mental health challenges. And just to think, are these images clear?

<Displays Mental widgets exercise slide>

Int: Do you think that they would be clear to people that you know or patients that you work with? And could there be any potential negative consequences of using images like this? So I'll just put up, we have 3 survey items about these images, how you interpret them, how others might interpret them, and any negative unintended consequences. And I'll just quickly also put the link to this little survey in our chat and then I'll go back to those questions to give you a moment to think about them so you can have a little look at the widgets while considering your answer to those questions. And I've also noticed that we have had LD join us, which is fantastic. I would invite you to introduce yourself, there are some people in this team who you know, others that you are meeting for the first time?

Res 12: OK, so my name is LD. I was supposed to join the STM team two weeks ago also last week, but I couldn't. So doctor gave me the link this afternoon to join you, I’m a STM Metro Environmental Officer.

Int: Thanks so much for joining us. So yes, just have a little look at those images and I'll give you a moment to complete the survey and I'll have a look at people's survey responses. However, if you'd like a bit more time to think about it and this was something certainly that our other colleagues felt they needed, you can also take your time to think about those images and respond after the meeting. But I'll just have a little look to see if anyone's putting responses in there. Oh, we've got an introduction from J, which is great, J says - I've been representing Ghana on the Global Methane Initiative as the lead person for energy since 2014. I was with the Ghana Energy Commission as the Director for Energy Planning and Policy since 2016 till 2020, then left and joined the Institute for Oil and Gas at the University of Cape Coast as a lecturer in sustainable energy and climate change. J, thank you for introducing yourself. So people felt that some of some of those widgets were easier to understand than others. So things like the intrusive thoughts, paranoia, selective eating were a little bit difficult. And a few people said that actually without the text alongside the images that it would probably be really, really hard to understand a lot of them and that the image that the text was quite important. So they were considerations that we had and I'll, I'll admit that we're a little bit undecided on where to go at this point for the visual self-assessment component. And it might be that actually a more useful approach in the future would be developing these sorts of images with the communities that we want to work with. But that can be pretty hard remotely. S says - My big challenge with the mental health widgets is that one or two word explanations, they are not suitable for the population you represent. That's really, really important. And actually, I'll be honest, the feedback that we've had so far about these widgets suggests to me that we probably shouldn't use them so far anyway, but we'll go through the data in a bit more depth once we've had all of our meetings. E?

Res1: OK, so I was asking that is filling the survey form enough? I mean with the inputs on the widgets for the mental health reactions.

Int: Thank you. S has said - this wouldn't be suitable for the population that you represent. How do you remotely capture people's well-being? M says - They may not capture paediatric mental health issues. That's a really good point. So, I mean, I guess then we're sort of left with having to make some decisions about how we capture mental health experiences. Possibly we go for something a bit more simplified, you know, something about well-being and maybe it's a little bit. But yeah, it is a hard one because you sort of think, oh, well, pictures could make it more accessible for some people, but then those pictures have to be really good. And if they're not good, they could make it harder for people to engage with the activity. So that's something that we definitely need to think a little bit more about. And it might be that we have to use quite a simplified version of any images to start with. OK, so I'll just go through the remainder of what we're doing today. Then that was that was all of the content that I had to share with everyone.

<Displays Next steps slide>

Int: <Discusses follow up survey and transcription>

<Displays Future Meetings and themes slide>

<Displays Final Components, Questions, Concerns slide>

Int: But just to say, this has been so far a really, really interesting project. We're having a really good time with it, but it's also really challenging. So something that we will need to think about for the operation of the app is the kind of data we can use. And just because we've got a few a few minutes extra at the end of this meeting, I thought I'd just tell you a little bit about that. What we've been realising is that it's quite challenging to capture methane data for Ghana. So we're challenged with how to develop an ozone alerts function and it may be that we end up using something like air quality, which we do have access to. So particulate matter and other measures of air quality, which we definitely have for Ghana, but that's a work in process. So what I would say is if anybody has close connections to the Environmental Protection Agency or is aware of other data sets that we might not know about, please do let us know. We are really keen to use the best data that we can for Health Protection. But saying that it might not be ozone data, it might be something else. We're really open to whatever we can use to support community mental health. I think I've gone through everything I wanted to go through.

Res4: OK, so this is E from Ghana Meteorological Agency. This is a challenge and a question as well. I want to know if there are measures that are being put in place. I mean bring us equipment that can capture us the local, I mean the grand data to validate this satellite models that we are trying to forecast and meeting to the people. Because for EPA, I'm sure they will have data, but it will be solely based for Accra. For the other regions, I don't have any idea of. And for Ghana Meteorological Agency, we have a lot of synoptic stations all over the regions, which I think if the measures are being put in place to help or get us this maybe local or ground equipment to measure this methane is going to, is going to help us in a long way validate this satellite focus that we have.

Int: Thank you E. So I mentioned earlier I've been attending some events in the UK, like an event in Birmingham at the Exhibition Centre where all of the big air quality companies came together and they shared all of their technology and their ideas around how to do this. Now I know there are some options for ground measuring ground concentrations and emissions of methane that can be used for assimilation and validation of satellite data. And what I'm doing is exploring opportunities for funding. So E, I might follow this up with an e-mail to yourself because I have another colleague in the UK and we're very, very interested in looking at opportunities to see if we could work together on a project to fund getting some equipment for this purpose. But we need to have a chat about what the like, what the most suitable equipment might be and what the funding opportunities might be. So do you mind if I send you an e-mail follow up to this so we can continue that conversation? And if anyone else wants to be part of that conversation, say, ED, if you wanted to be part of a conversation. I know Felix, when we spoke a few weeks ago, was also pretty keen. But I certainly think we need to start thinking realistically. A good thing about this project is it's sort of uncovered some of the challenges around measuring air quality, and that means that there's more work to be done. So we need to start thinking about how we might fund that, what that project might look like, and certainly who should be involved. Another thing to very briefly mention that I mentioned in in a meeting a couple of weeks ago is that there is a satellite company called GHG Sat and they do have some satellite data at the ground level for methane in Ghana. But I haven't been able to figure out exactly where in Ghana yet. And I have been emailing them to request access to that data because they can release it for research purposes. So I'll continue to follow that up because if we can get that data, that would be a really good starting point too. And the company, I met them in person, and they said they were really keen, but I also know they're really busy. So I just have to keep bothering them to see what kind of data access we can get. OK, well, I'm happy to leave things here for today if everybody else is, but just to say thank you so much again for your time. And if everyone's happy, we can continue these meetings as a larger group from a few different regions. And hopefully that way we can work towards some future collaborations. Well, great to see everybody and I'll follow this up with an e-mail in the next day or two and thanks again for being so wonderfully engaged with this project.

Res8: I was going to say thanks to everyone for the time and the knowledge you've shared.

Int: Thanks, everyone.

Interview Ends