

Supplementary material

1. Interview questions guide for medical professionals and members of the Department of Science, Technology and Environment (DSTE) working on the Puducherry State Adaptation plan

COMMON QUESTIONS

Table S1: Common interview question guide based on the participant group.

Target group	Themes	Aims	Questions
COMMON	Participant information	To get the basic demographic and professional information about the participant	<ol style="list-style-type: none"> 1. Age 2. Nationality 3. Place of residence 4. Educational background and speciality 5. Occupation 6. Years in occupation 7. Professional experience related to climate change and/or health
	Background knowledge-climate change	To establish level of knowledge about climate change with 'warm up' questions	<ol style="list-style-type: none"> 1. What comes to mind when you think of climate change? 2. What do you think are physical manifestations of climate change? 3. Have you experienced or been aware of any climate change events in the past few years? 4. What, according you, are the most common consequences of climate change?- Which aspects of life do they affect most severely?
	Climate change and health, climate change and CVDs	To establish knowledge/ awareness about climate change and health and climate change and CVDs	<ol style="list-style-type: none"> 1. Have you ever thought about the health impacts of climate change? 2. What aspects of human health do you think climate change will have the biggest impact on? 3. Are you aware about the impacts of climate change on NCDs such as cardiovascular diseases? <ol style="list-style-type: none"> 3.1. If yes to above question, what do you know about it? How do you know about it (eg

			through research or through professional experience?)
	Policies and plans	To establish knowledge and awareness levels about policies and plans on the issue of climate change and health	<ol style="list-style-type: none"> 1. Are you aware or have you been part of any policies/plans/programs on the issue of climate change and health? 2. If yes, what were/are they? -What diseases or health topic did it focus on? What was the work done (aim)? Do you think it was successful and beneficial? 3. Do you know any plans/programs specifically targeting climate change and heart diseases? (can be from any sector). 4. Do you know about the national/state climate change adaptation plan? 5. If yes, do you know of the role health plays in it?
	Challenges and outlook	To understand challenged faced, potential solutions and planned changes	<ol style="list-style-type: none"> 1. Are you aware of any upcoming or recent changes to the health adaptation plans or any other relevant policy that target climate change and health? 2. Do you know any policies which can be used to increase awareness and research on the impact of climate change on CVDs in India? 3. According to you, what are the biggest drawbacks and challenges faced- why do you think health or NCD impacts of climate change are not a priority? 4. What can be done to change that? 5. Can you think of some measures to mitigate the impacts of climate change? <ul style="list-style-type: none"> - Your contribution to mitigating the impact, whether it's individual or you think it should

			<p>be more at a governmental level?</p> <ul style="list-style-type: none"> - Examples can be green healthcare facilities etc
Medical Professionals	Climate change and health-medical experience	To understand perceptions on the extent to which climate/temperature affects patient health	<ol style="list-style-type: none"> 1. Do you think climate, especially temperature affects health based on hospital admissions and mortality? 2. Can you explain what you have observed (eg, more patients on particularly hot days). 3. Which diseases have you observed to be the most sensitive to climate/temperature? 4. Based on your day to day observations, do you see an association between temperature and CVDs? 5. Do you think we will see an increase in the CVD deaths attributable to temperature in the future?
	Population vulnerability	To understand views on how different people are affected based on demography	<ol style="list-style-type: none"> 1. Which people have you observed to be the most vulnerable to temperature? (eg, age, gender, occupation, SE status etc) 2. Do you see a big gender difference in CVD patients with and without the influence on external temperatures? 3. Have you observed an association between age/gender and temperatures? For example, are a certain group of people more susceptible to heat or cold? 4. Do the public and private sectors work together during disasters? <ul style="list-style-type: none"> - How is the communication, facility and equipment sharing?
	Education and training	To understand level of training and awareness among	<ol style="list-style-type: none"> 1. Have you ever been explicitly trained, either during medical school or

		doctors on climate sensitive diseases	<p>professionally, on climate sensitive diseases?</p> <ol style="list-style-type: none"> If yes, where did the course take place (India or abroad, college or professional) and what did it cover (broadly) If yes, did the course include CVDs? Did it include gender differences in terms of symptoms? Do you think such a course is needed or would be beneficial?
	Measures to be taken	To discuss possible measures to be taken to increase awareness and preparedness on climate sensitive diseases	<ol style="list-style-type: none"> Assuming that we will be seeing an increase in CVD mortalities attributable to temperature in the future, what measures do you think can be taken to prepare and adapt to it? <ul style="list-style-type: none"> In hospitals, in medical schools, Give an example..early warning systems, emergency cardio bays in hospitals, awareness drives etc What policy measures do you feel would benefit with the issue of climate sensitive diseases? For CVDs?
Health department (policy makers, ministerial representatives)	Current policies	To understand current health policies and whether climate change is included in them- include CVD policies and training	<ol style="list-style-type: none"> Do any of the current health policies include climate change? Are there any specific policies on climate sensitive diseases? <ul style="list-style-type: none"> Guidelines for disasters Guidelines for heat If yes, do any policies include NCDs or CVDs specifically?
	Challenges and outlook	To understand current challenges and future plans	<ol style="list-style-type: none"> The national adaptation plan recently added health as one of its climate change missions- why do you think this was not always a priority?

			<ol style="list-style-type: none"> 2. FOR PUDUCHERRY- Why is there no health mission in the state adaptation plan? Are there plans to include it? If yes, what diseases will be focused on? 3. Are any activities being planned around climate sensitive diseases especially CVDs? <ul style="list-style-type: none"> - Awareness programs - Education and training in medical schools? 4. Are there any plans to develop and expand heat action plans nationally? (eg. Ahmedabad heat action plan) 5. Which diseases will be a priority area for climate sensitivity in terms of policy and research? 6. Is there any research or study being conducted on the health impacts of climate change? Are there any plans to do so? 7. CVD effects and most other effects of climate change affect vulnerable populations most-how do you plan to address some of these challenges? <ul style="list-style-type: none"> - Rural vs urban exposures and requirements differ. Are there plans that specifically target different populations? - What about different communities? Do you feel different communities have different needs to protect themselves against the climate? Can you elaborate? - What about different SE groups?
Department of Science, Technology and Environment	Current policies	To understand the development process of the adaptation plan and how health is	<ol style="list-style-type: none"> 1. The adaptation plan has recently added a health mission, but it does not have a comprehensive list and guidelines for climate

		included in current policies	<p>sensitive disease management?</p> <ol style="list-style-type: none"> 2. The adaptation plan is an intersectional plan with involvement from many departments. Does the steering committee have regular meetings to review and stay perpared, if so how often? <ul style="list-style-type: none"> - Review meetings? - Do you make changes to the plan based on new evidence or incidences? 3. Is there a reason that NCDs such as CVDs, despite having a huge burden of disease are not explicitly included and researched in terms of climate attributable burden? 4. What plans/programs/campaigns are presently ongoing that deal with climate-health adaptation? Are there any specific to CVDs? 5. Can you tell me about any plans or policies that have been previously implemented on the topic of climate sensitive diseases? <ul style="list-style-type: none"> - Were they successful and effective? - What is the present status of these? - What were the biggest challenges faced? 6. CVD effects and most other effects of climate change affect vulnerable populations most-how do you plan to address some of these challenges? <ul style="list-style-type: none"> - Rural vs urban exposures and requirements differ. Are there plans that specifically target different populations?
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			<ul style="list-style-type: none"> - What about different communities? Do you feel different communities have different needs to protect themselves against the climate? Can you elaborate? - What about different SE groups?
	Challenges and outlook	To understand challenges faced and future plans	<ol style="list-style-type: none"> 1. What is the biggest challenge in formulating and implementing climate sensitive disease policies or policies related to climate impacts on health? 2. Are there any plans to include NCDs and CVDs as a separate component of climate sensitive diseases? 3. Are there research projects planned on this topic to inform priority setting and policy formulation? 4. What measures do you think need to be taken to help formulate better , more comprehensive climate change policies that are informed by health research?
			<p>The adaptation plan is an intersectional plan with involvement from many departments. Does the steering committee have regular meetings to review and stay prepared, if so how often?</p> <ol style="list-style-type: none"> 1. Review meetings? 2. Do you make changes to the plan based on new evidence or incidences? 3.
EDUCATION- either department or medical college educators	Current practices	To understand current medical curriculum and whether climate change is included in it	<ol style="list-style-type: none"> 4. Does the current medical school curriculum include climate change with respect to diseases that are sensitive to it? 5. Do you feel this needs to be taught?

			<ol style="list-style-type: none"> 6. Do you think temperature affects diseases? 7. What diseases do you think are most sensitive to climate change that need to be included in the curriculum? 8. If yes to above questions, does it include gender differences?
	Challenges and outlook	To understand challenges in teaching students about climate change and plans for future along with suggestions	<ol style="list-style-type: none"> 1. Are there any plans to include climate sensitive diseases in the curriculum? 2. What other measures do you think can be taken with respect to the training of medical workers to reduce the burden of climate sensitive diseases? <ul style="list-style-type: none"> - Ex, emergency bays, more ambulances or staff during days of particular temperature etc

2. Framework with themes and relevant categories

Table S2: Structural codes and framework matrix

Theme	Sub-theme	Categories
Climate change and health: systems knowledge and perceptions	Climate change as an acute and growing problem for India	
	Domino effect on impacts of climate change ultimately converges at health	
Role of institutions	Political and institutional barriers	Limited knowledge and awareness on climate change and health related policies
		Disengaged leadership and low political prioritization of climate change and health
		Weak inter-departmental integration and co-ordination for climate change and health

	Educational and informational barriers	Gaps in climate change and health in higher education curricula
		Need to strengthen inter-sectoral information dissemination
		Scepticism and low awareness on non-conventional health impacts of climate change
	Technical barriers to research	Insufficient resources and workforce dedicated to research
		Underdeveloped transdisciplinary research capacity
		Research slowed by availability and access to quality data
Socio-cultural dynamics, outreach and engagement	Need for alternate solutions, targeted campaigns and programs at all levels	
	Role of experts and famous personalities in awareness building	
	Climate informed health policies and seasonal workplace guidelines	
	Integrating climate change in the curriculum and continuing educational courses	

3. Additional supporting quotes

- i. Institutional framework: Limited knowledge and awareness on climate change and health related policies

“Priority areas means, uh, for example, climate change in the health department, there is no clear cut guidelines is there. There is no clear cut guidelines, there is no clear cut programs are not there regarding climate and health.”#16, Practicing physician

- ii. Institutional barriers: Disengaged leadership and climate change not seen as immediate health concern

“When we practice medicine, because we are more concerned with treating the patient rather than you know, going and finding out the cause and prevent the incident in happening. So there the problem is a disconnect between, uh, what is happening (and) the preventive aspects, we were not able to quantify, especially in our setup here in India.” #2, Medical doctor/academic

- iii. Institutional barriers: Integration of climate change-health as a separate, inter-departmental body

“Because one thing is, it is not about criticizing some other officer, it is like they have to do their work, not other department's work. So then the head should accept that they have to spare their times [for] this climate change work.. It depends on who the nodal officer is, who the higher officer is, and who the head of the bureaucracy is. So when people are okay with working on this, things would be fine. But people don't care things will be the other way. So, in short, I would say that it has to come from the top down approach.” #9, Environmentalist

- iv. Technical barriers: Insufficient resources and workforce dedicated to research

““The UT of Puducherry, we do not have much data. So we need to focus and we need manpower. We do not have the funding also it's a problem now. Sometimes they provide funds; sometimes they do not give that adequate funds.” #1, Practicing physician/policy advisor.

- v. Technical barriers: Availability and access to quality data slowing down research progress

“The state government has the, uh, database. We may not have a line list. So without line list we cannot call it as database, but they will have each primary health center how many patients with NCDs, diabetes, hypertension, stroke, they have the data. So that is there. But, uh, I think last two to three years only they started screening households for diabetes, hypertension and cervical cancer, but not specifically targeting high risk groups. For the private side, we don't have the database on how many are-It's not like a tuberculosis program. We have the line list, total line list of whether they are part of the public health

program or the private. So there we will have a database of patients but not for the non-communicable diseases.” #3, Medical doctor/academic

“Puducherry as so many medical colleges, but all of them do not supply data to the government. They may have their own data. That’s the problem: actually we have to integrate everyone” #1, Practicing physician/policy advisor.

- vi. Technical barriers: Need for more resources and workforce dedicated to research

“One is like, if you know, India should actually allocate more funds from the GDP towards the health sector. Actually, if you speak, there is not much of research work going on. Probably in the last like three to four years, it might have picked up... Most of the Indian government funding is going to the Central Institutes. For example, if you go to any government, hospital, state run government hospital, they don't have any separate data entry and don't have any separate research. You should bringing the students into the studies, which are happening only in the institutions not in the state run hospitals. Because they actually- many funds are- see now also funds are coming to state. They're giving directly to the institutes. But no one knows where the fund goes. Ultimately, it doesn't reach the students. It disappears at the level of consultants.”#14, Practicing cardiologist

- vii. Technical barriers: Scepticism and low awareness on non-explicit health impacts of climate change

“When it comes to non communicable disease, one is this relationship it's also is not synced into us...Once people know that this is going to happen, then actually there's a percolation of knowledge that 'climate change is affecting this, and you have to look for it.' But as of now, if I go and tell a clinician that climate change is affecting NCDs, or cardiovascular disease, they will be laughing at me. They tell it's the lifestyle diseases, which is affecting them. So I'll be a fool actually for talking to them...Even if I work on it and show, if I don't have expertise, they're going to snub me off tell that "no, it's only a remote, it could be this, it could be a confounding, it could be a bias.” #4, Medical doctor/academic

- viii. Technical barriers: Need for transdisciplinary research capacity

“One important thing that I would like to register is we ourselves need to participate in certain workshops which are done by certain other people, for

example, DST [Department of Science and Technology] from New Delhi. For example, in the last two years, the only technical work that we've done for our city, is like this vulnerability assessment. But...we in our cell, or even officials here, we are not pre-sensitized with all these things. So only when we take up learnings from outside, we can execute that for our city, for our state.” #9, Environmentalist

ix. Specific challenges in studying the cardiovascular impacts of climate change

“But non communicable disease, like cardiovascular disease, no one tells complaints noone also correlates all those things. They just think of diabetes, hypertension, cholesterol, and all these things maybe because of the elevated sugar, and the BP it might have got the ,uh, cardiac complaint. Now one doesn't correlates all the things since he has gone in the rainy-rain or since he has got the cold. Noone correlates. And I think we should also think about all those things.” #13, Practicing physician

“In hospitals, even this point of you know, we are expecting more of even this trend of increased changing of our climate and (that) has to be made aware to people. (When we were discussing on the topic of climate change) when it went to the clinicians, they're like, "how is it going to help me? It's not going to help me". They are very careful with the infectious disease...”#4, Medical doctor/academic