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## Tackling chronic respiratory disease in low-resource settings

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# CHAPTER

# 13

## GENERAL DISCUSSION



## GENERAL DISCUSSION

Chronic respiratory disease (CRD) constitutes a major burden of disease globally. Evidence-based lung health interventions are often ineffective, as they commonly misalign with their local context and then fail to be implemented into routine practice.<sup>1-4</sup> The aim of this thesis was to generate evidence on how to effectively combat CRD in low-resource settings across the globe, while leveraging characteristics of the local context to facilitate successful implementation. To this end, we first sought to understand the burden of CRD and related risk factors in diverse low-resource contexts. We then focused on how to implement context-driven, evidence-based lung health solutions. This chapter recapitulates the thesis' main findings, discusses how these findings relate to each other, to the literature to date, and to the current major global health challenges. Lastly, it provides recommendations for the four stakeholder groups introduced in the first chapter.

### Main findings – the FRESH AIR expedition

#### *Part I – Understanding the problem; exploring chronic respiratory disease in its local context*

First, findings from our study on COPD in Kyrgyzstan (**chapter 2**) reinforced the important role of context; mountainous areas faced a significantly higher COPD prevalence and exposure to risk factors compared to neighbouring low altitude areas. Second, typically in low-resource settings the risk factors for developing CRD co-occur and interrelate, such as household air pollution, malnutrition, and a history of tuberculosis. There is increasing evidence that the effects already manifest in-utero. Therefore, in an opinion paper (**chapter 3**), we called for an increased focus on prevention early in life, and for optimising lung health already before birth. Third, besides differences in exposure to risk factors, low-resource settings also remarkably differed from high-resource settings regarding the socioeconomic burden of CRD. In our health economics study across low-resource settings in Uganda, Kyrgyzstan, Vietnam, and Greece (**chapter 4**), we found CRD-related absenteeism to be low compared to presenteeism and activity impairment; CRD-patients commonly showed up at work at the expense of lower productivity. Last, in our systematic review on guidelines for smoking cessation across settings globally (**chapter 5**), the identified similarities and differences illustrated how contextual differences (in health infrastructure, risk factor distribution, medication availability, culture, etc.) may play a role in recommendations for smoking cessation care.

In conclusion, Part I demonstrated a generally high prevalence of CRD and related risk factors in low-resource settings, and it highlighted several contextual differences in which CRD is embedded.

*Part II – Towards a solution; facilitating implementation success of lung health programmes by engaging and leveraging their local context*

In our systematic review (**chapter 6**) we identified five factors critical to the implementation success of CRD-related interventions in low-resource settings. These were consolidated in a practical implementation tool. While conducting the literature search, not only an abundance of evidence was revealed on the lack of success in implementation of cleaner cooking interventions, but also a clear lack of the use of all the evidence. Therefore, we urged in a commentary (**chapter 7**) for the actual use of implementation evidence in future research and practice, and indicated which stakeholders should take on which role. To practice what we preached, we (taking the role of researchers) teamed up with national and international colleagues to create an overview of all available literature; we conducted a systematic umbrella review ('review part B' of chapter 6) resulting in hands-on tools to serve implementers of cleaner cooking solutions in the field. As for the more complex methodology involved in this umbrella review of narrative and systematic reviews, we published the protocol (**chapter 8**) separately from the results (**chapter 9**). Compatibility of the intervention with the local context, such as beliefs and needs, was identified as a critical factor in both implementation reviews. However, evidence was not available on *how* to map the context to understand it in the first place. Hence, we developed and validated an evidence-based step-by-step guide to doing so: the SETTING-tool (**chapter 10**). We applied the tool in six low-resource settings on three continents in a mixed-method study to identify relevant beliefs and behaviours regarding CRD (**chapter 11**). We found that chronic respiratory symptoms were mostly attributed to infectious disease, while chronic disease was under-recognised. We also identified shared and context-specific perceived causes for CRD and related norms. These findings were used to design the implementation strategy of a subsequent lung health intervention: a train-the-trainer programme promoting awareness about CRD and related risk factors (**chapter 12**). This programme proved to be feasible and acceptable, as well as effective in raising awareness about and taking action against CRD. It laid the foundation for the implementation of a cleaner cooking intervention to reduce household air pollution, which had above-average implementation success rates.

In conclusion, Part II synthesised the literature into several practical tools to facilitate the implementation success of lung health interventions. We also developed and validated a step-by-step guide to systematically map local contexts. Findings of the application of this approach were used to design context-driven strategies of a successfully implemented lung health awareness programme.

## Tackling chronic respiratory disease in low-resource settings

### ***Understanding the problem; chronic respiratory disease in its context***

#### *Understanding the prevalence*

At the start of the FRESH AIR project, reliable data on the prevalence of asthma and COPD in low-and middle-income countries were scarce, and even unavailable for many of our study settings. For example, when we conducted the COPD prevalence study in Kyrgyzstan, lung function reference values for such central-Asian highland populations were lacking. However, they were expected to differ substantially from Caucasian reference values due to the altitude. This made it difficult to determine what to classify as airway obstruction. Fortunately, several large international lung health studies took off over the recent years, such as RESPIRE, Breathe Well, GEC0, and Pure Air.<sup>5-8</sup> Their evidence will contribute to understanding the distribution of the burden of CRD across the globe, and hence, to developing strategies to combat CRD and adequately prioritise resources.

#### *Understanding risk factors*

Interestingly, when our Kyrgyz prevalence study confirmed household air pollution as a risk factor for COPD, a causal relation between household air pollution and CRD was still being debated.<sup>9,10</sup> Only several years later, the relation became considered as well-established.<sup>11,12</sup> Household air pollution as an established risk factor changed the way we view the solution to COPD; smoking cessation does not protect the many young, non-smoking women who spend hours daily in a smoky kitchen. A systemic approach is needed, including accelerating access to cleaner fuels and alleviating other disadvantageous environmental factors.

In our analysis, 'altitude' also showed to be an independent risk factor for COPD. We considered the possibility that lower ambient oxygen levels at higher altitudes increase lung volumes (the FVC) more than the airways (the FEV<sub>1</sub>),<sup>13</sup> thereby decreasing the FEV<sub>1</sub>/FVC ratio (a traditional way to diagnose COPD). We also speculated altitude to be an umbrella risk factor for disadvantageous factors that we had been unable to account for, such as poor nutrition and a history of tuberculosis. Later, a meta-analysis combined our findings with others and confirmed the latter hypothesis: altitude itself was not found to be a risk factor.<sup>14</sup>

#### *Understanding the importance of timing*

As simultaneous evidence showed that disadvantageous factors can impair lung development even in-utero, we called for a life-course approach to respiratory health, starting to optimise lung health even before birth. Recent studies about air pollution and the placenta reinforced this call; for example, black carbon particles were found to be able to cross the placenta.<sup>15</sup> The fact that air pollution has in-utero effects fundamentally changes the way to assess the success of lung health interventions, especially regarding the timing of these assessments. The benefits of cleaner cooking solutions may foremostly manifest in the yet unborn generation, as the lungs

in older generations may have already been irreversibly damaged. Also, traditional outcome measures such as ‘COPD’ should be complemented or replaced by measures that account for the effects of early exposure to air pollution, such as a reduced maximum attained lung capacity. Furthermore, to detect the benefits of cleaner cooking solutions, funding institutes should facilitate longer-term research to evaluate effects beyond the common timespans of only several years.

#### *Understanding the importance of defining*

Interestingly, an international expert group recently proposed an operational definition for “early COPD”. It was defined as an “age <50 years with  $\geq 10$  pack-years of tobacco consumption”, combined with one or more spirometry or computed tomography related criteria.<sup>16</sup> This definition does not serve a major part of the world’s population, as it ignores the three billion people at risk of CRD due to solid fuel smoke exposure (and relies on diagnostic devices that are largely unavailable in low-resource settings). Use of this definition would lead to wide-scale underdiagnoses in exactly those settings suffering from underdiagnoses already, leading to a vicious circle: CRD does not seem to pose a high burden and is therefore not prioritised by policymakers, research funders, healthcare professionals and communities. Hence, awareness of CRD and available (diagnostic) resources are low, which leads to an underdiagnosis, and so forth. This elite definition of early COPD reinforces the importance of increasing research focus beyond high-income settings, so that its practical implications serve populations globally.

#### *Understanding the indirect burden*

Besides the direct burden, data on the indirect burden of CRD are also still scarce. Our FRESH AIR study was the first international study to assess the CRD-related work productivity and activity impairment (WPAl) across low-resource settings.<sup>17</sup> Of note, the WPAl-questionnaire was applied so scarcely in low-and middle-income countries, that its validated form turned out to be suboptimal in practice. For example, those who answered negatively to the question ‘Do you work for pay?’ were excluded from the further questionnaire. However, in low-and middle-income countries many work informally, for example in subsistence farming, and were unnecessarily excluded. We reported our learnings and discussed these with colleagues from the RESPIRE research project,<sup>5</sup> who could timely adapt their questionnaire.

#### ***Enhancing implementation success by engaging and leveraging the local context***

As described in the introduction of this thesis, we interpreted ‘context’ broadly as a set of characteristics and circumstances that surround the implementation effort.<sup>18</sup> These characteristics entailed many aspects, ranging from the political climate to geographical influences to health infrastructures. Both our implementation reviews pointed out that alignment with the local beliefs, perceptions and behaviours is a critical implementation factor.<sup>19,20</sup> We chose this contextual aspect as a further focus of study.

### *Leveraging the local context to fuel implementation*

Uncovering CRD-related beliefs, perceptions, and behaviours in low-resource settings in Uganda, Kyrgyzstan, Vietnam, and Greece resulted in shared- and context-specific themes. An example of a context-specific norm that we identified in Greece was *filotimo* (to help those around you). We learnt to capitalise on this norm for the pulmonary rehabilitation programme. Patients did not want to miss a single rehabilitation session in order to be there for their peers, which resulted in a high participation rate.<sup>21</sup> In our Vietnamese settings, we discovered that exercise was perceived to cause lung disease (the Vietnamese word *Lao* for tuberculosis resembled the word *Lao Lữc* for overwork). We needed to address this belief before patients were open to participation in the pulmonary rehabilitation programme. These examples, and the others presented throughout the chapters of this thesis, illustrate how contextual factors can be used to fuel the implementation success of lung health programmes.

### *Addressing the poor awareness about chronic respiratory disease and engaging stakeholders*

Our context-mapping study also revealed an important theme that was shared across the different FRESH AIR contexts: the relatively poor awareness about CRD compared to infectious disease. As mentioned earlier, the vicious circle of poor awareness, underdiagnosis, and inadequate prioritisation for CRD must be broken. In FRESH AIR, we tried to do so by engaging important stakeholders (a critical implementation factor<sup>19</sup>) throughout the entire process. Our local team and our consortium partner, the International Primary Care Respiratory Group (IPCRG), had managed to engage the Kyrgyz Ministry of Health in our FRESH AIR stakeholder group. Discussing the high COPD prevalence we had found in our study in combination with the CRD-related work productivity loss in Kyrgyzstan made a strong case for action. Consequently, the IPCRG, the Ministry, and the local FRESH AIR team collaboratively organised the first central-Asian conference to raise CRD awareness. Nurses, physicians, and other professionals were empowered to take action through context-driven, affordable measures. Such measures ranged from teaching local communities about how to prevent exposure to risk factors, to establishing pulmonary rehabilitation programmes. Besides the national Ministry, FRESH AIR also engaged with the World Bank as an international stakeholder, who committed to distributing 14,000 cleaner cooking stoves in Kyrgyzstan to reduce exposure to HAP and improve lung health.<sup>22</sup>

### *Think globally, act locally*

By mapping the local settings and demonstrating how findings can be used to improve implementation success, we aimed to provide knowledge and tools that can be used globally to combat CRD. In the FRESH AIR study, we were able to immerse at the local levels and leverage our contextual findings effectively, thanks to the collaboration between local community workers and (inter)national academic workers. A limitation of this approach was the use of multiple languages. On the other hand, the involvement of the community researchers provided us

with the necessary trust from the communities, and thorough awareness of important local networks, needs, and prevailing themes. The academic team members ensured to underpin the research activities with evidence-based methods and frameworks. The international researchers helped to point out remarkable themes that were considered normal by the national and community researchers.

Concurrently, our collaboration has built and strengthened research capacity in the settings. Throughout the FRESH AIR study, multiple local researchers have enrolled in international PhD-trajectories, and the Department of Respiratory Medicine at the National Center for Cardiology and Internal Medicine in Bishkek has opened a FRESH AIR research centre.

#### *The challenge of implementing the implementation tools*

The evidence-based tools we had developed were a response to repetitive calls for more and better implementation research in low-resource settings,<sup>23-26</sup> underpinned by adequate frameworks,<sup>27</sup> and the need to align interventions and their implementation strategy with the local context.<sup>28-30</sup> We are not naïve to believe that these tools will implement themselves, their actual implementation remains challenging. We use the tools' own contents to support their implementation process: the publication in a journal with a wide reach (contributing to "facilitating access to knowledge and information"<sup>19</sup>) is certainly not enough. Especially not for the local targeted settings where – even if locals can read in English – a 'European Respiratory Journal' would not be on top of their list of sources. Collaboration with "engaged stakeholders" to "facilitate access to the knowledge" and "align with the local needs" is essential. The use of the tools has already been facilitated by liaising with other teams and actively sharing knowledge, for example as was done for the implementation of a Ugandan study into music and dance as a means of pulmonary rehabilitation.<sup>31</sup> Together with a large international party in the field of cleaner cooking we are currently exploring a collaboration of how to transfer the evidence of the related tools into a user-friendly format (helped by communication experts), and get them into use.

### **Tackling chronic respiratory disease in the context of the world's major health challenges**

The world is currently facing two major global health challenges: a COVID-19 pandemic, and even larger, a climate emergency. Below, the findings of this thesis are discussed in light of these challenges.

#### ***Chronic respiratory disease and the COVID-19 crisis***

The COVID-19 pandemic has reinforced the need for broad, life-course approaches to improving health. Like for CRD, mortality for COVID-19 is higher where education levels are lower, air quality is worse, and poverty levels are higher.<sup>32-35</sup> A pessimist would say that due to the

pandemic awareness about CRD has been even further overshadowed by awareness about infectious disease. An optimist would believe that a focus on strengthening health systems and tackling COVID-19's risk factors, which largely overlap with those of CRD, would benefit both communicable and noncommunicable diseases. However, as this thesis demonstrated for COPD and asthma, high-income settings are much better equipped to do so than low- and middle-income settings. At the time of writing, the Netherlands is administering COVID-19 booster shots ('the third dose', or second dose in case of the Janssen vaccination), while only 3.5% of all people in low-income countries have received a first dose;<sup>36</sup> many healthcare workers across the globe are still attending their patients unprotected. Not only does the unequal distribution of resources deny the global goal to "leave no one behind" [principle two of universal values of United Nations Sustainable Development Goals]. It also allows for more COVID-19 mutations and complicates attempts to control the pandemic, also in high-resource settings.<sup>37</sup> Global collaboration should be promoted and to do this effectively, context-driven strategies are needed locally, leveraging local beliefs. Evidence from this thesis could contribute to designing and implementing such strategies.

Fortunately, the COVID-19 crisis also provides hope; it has demonstrated the ability of humankind to rigorously and rapidly adapt behaviour to improve health once the sense of urgency is sufficiently high.

### ***Chronic respiratory disease and the climate crisis***

#### *How the climate crisis impacts chronic respiratory disease*

Besides the 'acute' COVID-19 crisis, findings from this thesis may also be used to approach the much larger 'chronic' health crisis. The climate crisis is considered "code red for a healthy future"<sup>37-40</sup> and the "single biggest health threat facing humanity."<sup>41</sup> This September, more than 230 medical journals called for emergency action, as the climate crisis is a health emergency that affects all human health indicators.<sup>42</sup>

Chronic respiratory health is impacted by this crisis via numerous direct and indirect pathways. For example, CO<sub>2</sub> emissions from burning fossil fuels are coupled to emissions of air pollutants.<sup>37-39,41,42</sup> Extreme weather events, hotter temperatures, and drought are contributing to more intense and more frequent wildfires, thunderstorms, and sandstorms.<sup>43</sup> This also leads to air pollution. Besides, higher temperatures result in higher levels of ground-level ozone pollution and longer, more intense pollen seasons, triggering asthma exacerbations. The climate crisis also affects other health outcomes, thereby increasing the likelihood of contracting comorbidities such as cardiovascular disease and affecting mental wellbeing. Comorbidities further deteriorate CRD-related outcomes. Moreover, the climate crisis threatens food security, and inflicts poverty and inequity, leading to poorer access to adequate care.<sup>37</sup> Hence, respiratory health heavily relies on a healthy climate.

*Towards a solution: tackling shared risk factors*

Solutions to CRD and the climate crisis often go hand in hand, yet complex dynamics play a role.<sup>44</sup> Limiting fossil fuel use reduces greenhouse gas emissions and concurrently reduces a major risk factor for CRD: air pollution. However, certain types of particulate matter in the atmosphere can protect the earth from warming up.<sup>39</sup> WHO launched new air quality guidelines in September 2021 recommending lower levels of key air pollutants.<sup>45</sup> Additionally, household air pollution is currently on its decline globally as people escaping from poverty switch to cleaner fuels.<sup>12</sup> This means that with lower levels of air pollution we will have to further intensify our efforts to target global warming.

The dynamics between the other main risk factor for CRD – tobacco – and the climate crisis are also complex. First, the life cycle of tobacco (from cultivation to disposal) involves 84 Mt of CO<sub>2</sub> equivalent (eq) emissions yearly, 0.2% of the global total.<sup>46</sup> Second, tobacco cultivation increasingly competes with essential commodities for resources such as land and water, placing pressure on food security. While the global population is rising, a changing climate is increasing crop failure and higher ambient CO<sub>2</sub> levels are decreasing the nutritional yield per crop.<sup>37</sup> Third and foremost, speculatively the largest part of tobacco's footprint would be revealed when accounting for the healthcare-related emissions caused by tobacco. To my knowledge, the global tobacco-related healthcare emissions have not yet been assessed, but these would be significant. Tobacco smoking is the second largest risk factor for disease burden,<sup>47</sup> and the healthcare sector is estimated to be responsible for 4.4-5% of the total global CO<sub>2</sub> emissions (ranging from the production of medication to transportation of patients).<sup>48,49</sup>

To summarise, combatting air pollution and tobacco use will mutually benefit CRD and the climate crisis. This could be done using a broad, life-course approach as outlined in this thesis, engaging important stakeholders. This thesis' tools may also contribute to designing implementation strategies for global collaborative action against the climate crisis; local, context-driven action is required to achieve a global mission.

*Towards a solution: tackling the paradoxical harm of chronic respiratory disease treatment*

Lastly, beyond tackling shared risk factors for CRD and the climate crisis, an important medical opportunity lies in CRD treatment. The world's ageing population causes the global number of CRD patients to rise.<sup>50</sup> To combat CRD, we strive to make inhaler treatment widely accessible, including in lower-resource settings. However, the commonly used pressurised metered dose inhalers (pMDIs) contribute substantially to greenhouse gas emissions.<sup>51</sup> pMDIs contain gases with fluorinated compounds; these are highly potent greenhouse gases that remain in the atmosphere for years.<sup>52</sup> Approximately 800 million pMDIs were used globally in 2018 – equalling the average annual use of almost 4 million USA passenger cars – and numbers are increasing every year.<sup>53</sup> To most patients, the environmentally-friendly dry powder inhalers (DPIs) are

equally effective and acceptable options, and can even be cheaper.<sup>54</sup> A systemic approach is required to ensure that the treatment of CRD patients does not pose healthy people at risk of developing CRD. Hence, all stakeholders must encourage the use of DPIs rather than pMDIs when clinically acceptable. Of note, the ERS position statement on asthma and the environment launched in May 2021<sup>43</sup> refrains from making this recommendation. This could be a missed opportunity, considering the urgency of the climate crisis and its consequences for CRD. Especially healthcare professionals have the duty to protect health and to do no harm in the first place: *primum, non nocere*. Healthcare professionals have a unique position in society to advocate for stronger measures: they reach most of the world's population, and, as a large representative poll in the United Kingdom indicated, healthcare professionals are regarded the most trusted professionals to tell the truth.<sup>55</sup>

## Recommendations

Findings from this thesis demonstrate the crucial importance of engaging relevant stakeholders in both conducting the studies and in implementing lung health programmes. The knowledge generated in this thesis can serve policymakers, healthcare professionals, researchers, and community members in the evidence-based implementation of lung health interventions (figure 1). Importantly, like in the FRESH AIR study, these different stakeholders should continuously interact to exchange needs and solutions. Speculatively, our findings can also support the context-driven design of implementation strategies for interventions targeting the COVID-19 and climate crisis.

Of note, our studies have focused on several factors that were proven critically important to successful implementation, but these factors were not comprehensive. As reported in chapter 6, other factors should also be considered, such as the setting's political climate or the local health infrastructure. Additionally, it would be interesting to gain knowledge on a 'dose-response' relation: to what extent does a contextual factor need to be studied to successfully design an implementation strategy, and to obtain which degree of success?

Other questions that remain unanswered are to what extent the approaches can be used for mapping contexts for other chronic diseases, or for high-income settings. Plausibly, also high-income settings could draw lessons from this thesis given that similar risk factors and factors influencing potential solutions occur. For example, 23% of all particulate matter in the Netherlands is attributable to woodstove use, surpassing particulate matter emissions from road traffic.<sup>56</sup> Also in this high-income country, woodstove use is strongly related to cultural beliefs and traditions. Lastly, now that settings have been mapped and evidence-based tools have been developed, a clear challenge remains as described above: embedding these tools in practice.

## Conclusion

Overall, this thesis has navigated from context-assessment (epidemiology, health economics, anthropology, comparison of guidelines) to the development of evidence-based tools to design context-driven implementation strategies for CRD programmes in low-resource settings. It has demonstrated how the application of the approach can enhance implementation success. Additionally, we have developed an overview of the FRESH AIR study settings' characteristics with shared and context-specific themes to be considered prior to the implementation of CRD programmes.

### Policymakers

– have been provided with scientific evidence to help set the right goals and prioritise scarce resources. To increase implementation success, they have been equipped with practical implementation tools for lung health interventions in general, for cleaner cooking interventions in specific, and for mapping local contexts. Furthermore, evidence demonstrates that they should intensify ambitions to tackle chronic respiratory disease by addressing air pollution and tobacco use. These efforts co-benefit the global COVID-19 and climate crisis.

### Healthcare professionals

– have been provided with evidence about the prevalence or chronic respiratory disease and its risk factors. This can help to prioritise the right preventive, diagnostic, and treatment measures. Also, they can use the train-the-trainer awareness programme to teach their communities. They are provided with the same practical tools as the policy makers. They can use their unique position in society to call for resolute action against chronic respiratory disease in light of the global COVID-19 and climate crisis.

### Researchers

– have been provided with new evidence-based approaches for (research into) effective implementation strategies. The systematic FRESH AIR approach facilitates comparison of findings to other settings. Awareness of the early onset of lung impairment helps to set adequate study outcomes and durations. Researchers can build on this thesis' findings, e.g. by testing the tools for other chronic diseases or high-income settings. They should prioritise studying topics that co-benefit the COVID-19 and climate crisis.

### Community members

like Asel have been trained by a context-driven awareness programme about chronic respiratory disease, and have been empowered to reduce exposure to risk factors to improve their health outcomes. They should speak up to demand better air quality, equal distribution of resources, and climate-friendly treatments to chronic respiratory disease. All additional evidence generated by this thesis should, above all, ultimately tackle chronic respiratory disease and hence benefit community members.

FIGURE 1. Recommendations for different stakeholders; all stakeholders should continuously communicate and collaborate.

Data have been collected using the same method in highly diverse settings across the globe, enhancing their generalisability. Our findings regarding the burden of CRD and the risk factors

can help to adequately prioritise scarce resources. Other contextual findings and the implementation tools serve to improve the implementation success of CRD programmes, thereby preventing the waste of scarce resources and ultimately optimising health outcomes. This thesis responds to repetitive calls for implementation evidence about non-communicable disease in low-resource settings, where the burden of disease is highest, yet research quality and quantity are lowest. Now the challenge remains to implement the evidence into practice; we aim to promote this using the implementation evidence that the tools themselves contain. We will, therefore, continue to collaborate with both locally and internationally engaged stakeholders and employ context-driven strategies.

Of note, understanding the context also means understanding how everything is interrelated: risk factors are related to socioeconomic factors and hence to prevalence, prevalence to the socioeconomic burden and to health beliefs and behaviours. It is simply impossible to target one aspect, such as household air pollution, and ignore the others, such as poverty and nutrition. A broad life course approach to tackling CRD is needed, starting preconception. Everyone in society has a role; policymakers can enhance clean air policies, educators can raise the CRD awareness of healthcare professionals, which they, in turn, can spread among their communities. Lastly, it is important to see CRD in relation to the COVID-19 and climate crisis. This means we should increase efforts to tackle the shared risk factors air pollution and tobacco. We should also treat CRD in a climate friendly manner, promoting inhaler use without greenhouse gases when clinically acceptable. Policymakers, healthcare professionals, researchers, and community leaders should speak up to spread awareness about CRD in relation to the COVID-19 and climate crisis. They should express concerns without polarising our society, and propose solutions. To leave no one behind, we rely on strong global collaborations. Moreover, we rely on context-driven approaches to achieve a global mission. Only then we can effectively tackle CRD in low-resource settings in light of the current major global health challenges.

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