

## NHMRC-GACD: Non-Communicable Disease Prevention in Cities 2023

### Letter of Intent (LOI)

#### Part 1: General information

1. Project title:

**Air pollution and non-communicable disease: City-wide implementation to reduce transport emissions.**

2. GACD agency(ies) to which you are applying. Please note that you can only submit one application across the GACD for this funding call; however, you can request that two or more funding agencies co-fund the same proposal.

#### NHMRC

3. Approximately how much are you requesting from each of the funding agencies that you are applying to (in USD):

**\$ 625,000 USD** (Source of currency conversion: NAB on 15/3/2023)

4. Scientific team

	Name	Institution	Country	Implementation science expert
1	Prof Mark Stevenson	University of Melbourne	Australia	Yes
2	Assoc Prof Cuong Viet Pham	Hanoi University of Public Health	Vietnam	Yes
3	Assoc Prof Jason Thompson	University of Melbourne	Australia	Yes
4	Dr. Dang Ngoc Tran	University of Medicine and Pharmacy at Ho Chi Minh City	Vietnam	Yes
5	Dr. Kerry Nice	University of Melbourne	Australia	Yes
6	Dr. Thanh Ho	University of Melbourne	Australia	Yes
7.	Dr Nhung Thi Trang Nguyen	Hanoi University of Public Health	Vietnam	Yes

5. Is there anyone affiliated with industry involved in this project? (Yes/No)

**Yes**

6. Country(ies) where the project will be implemented:

**Vietnam**

7. Please select from the dropdown menu the region(s) of the world where the research project will be implemented.

- Central and Eastern Europe
- East Asia and Pacific**
- Latin America and Caribbean
- Middle East and North Africa
- North America
- South Asia
- Sub Saharan Africa
- Western Europe

8. Which NCD risk factors associated with city environments will be the focus of your project?

**o Air pollution**

- Disrupted sleep
- Excessive alcohol
- Hypertension

**o Insufficient physical activity**

- Mental stress
- Poor diet
- Tobacco use
- Other \_\_\_\_\_

9. Which of these, best describes the setting(s) in which your research will be conducted?

**o City centre**

- City slum
- Informal settlement

**o Peri urban environment**

- Other \_\_\_\_\_

10. Will your research focus on any of the following vulnerable groups?

- People in situations of homelessness
- People in humanitarian crisis
- LGBTQ+
- Indigenous populations
- People with disability

**o Older adults**

**o Children or young people**

- Racial/ethnic minorities
- None of the above

11. Which of the following theme(s) applies to your intervention(s) of focus?

**o Theme 1: Behavioural change interventions**

- Theme 2: Interventions that focus on modifying the built environment
- Theme 3: Interventions that improve access to primary and secondary prevention services

12. Does your project use a digital health intervention? (Yes/No)

**Yes**

13. Do you explore climate change resilience and/or planetary health impacts in your proposal? (Yes/No)

**Yes**

14. Does your proposal explore outcomes outside of the health or environmental sectors? If so, which?

- No, we do not explore outcomes outside these sectors
- Social services

**o Transportation**

- Waste management
- Other \_\_\_\_\_

15. Will your project focus on Indigenous communities? (Yes/No)

**No**

## **Part 2: Implementation science proposal (One page total)**

**Summary of the Research:** Air pollution is a significant population health problem, causing 4.2 million premature deaths worldwide per year.<sup>1</sup> Populations living in low- and middle-income countries (LMICs) are disproportionately exposed to the burden of air pollution with 89% (of the 4.2 million premature deaths) occurring in the South-East Asia (SEA) and Western Pacific Regions (WPR).<sup>1</sup> Vietnam, a LMIC in SEA, is struggling with a rising prevalence of air pollution, ranking 36th out of 118 countries with the most polluted air and its two biggest cities, Hanoi and Ho Chi Minh City (HCMC), are among the most polluted cities in SEA<sup>2</sup> with road transport a leading cause of the air pollution. Air pollution in Vietnam leads to numerous noncommunicable diseases, resulting in 60,000 deaths per year.<sup>3</sup> We propose to implement smartphone technology that has been shown to be efficacious in changing behaviours with the potential for significant reductions in air pollution if city-level implementation is achieved.

**Which implementation science and key questions will the proposal answer?** The proposal will deliver an implementation trial which targets reductions in motor vehicle emissions in two large urban areas in Vietnam namely, Hanoi and HCMC. The implementation trial involves innovative technology that influences driver behaviours. The technology, that was developed by scientists from the University of Melbourne, in collaboration with industry partners, and has been robustly evaluated (using randomised control trials) highlighting the utility of personalised feedback and financial incentives in influencing driver behaviours.<sup>4-7</sup> The important question to be answered in this trial will be "... the role the technology, when implemented extensively in LMIC cities, can facilitate changes in driver behaviour leading to reduced transport emissions." Emission reduction strategies are urgently needed in Vietnam to mitigate the burden of non-communicable disease attributed to air pollution and second, to respond to the urgent climate implications arising from the car park of fossil fuelled motor vehicles that are exclusively used in both Hanoi and HCMC.

**Why are answering these questions important?** Vietnam now has 4.9 million cars and 60 million motorbikes<sup>8</sup>, almost all are fossil fuelled with limited emission control technology and no effective strategies to mitigate the emissions arising from the exponential growth in motor vehicles. It is not surprising therefore, the quality of air in Vietnam is some of the worst, globally. Implementing an innovative, proven, technology that will mitigate transport emissions in Vietnam will contribute substantially to reducing one of the leading risk factors for non-communicable disease.

**How will you answer the questions? Implementation science framework?** Our implementation framework will consist of two stages: i) a trial to evaluate the process of implementation and its impact on reduced motor vehicle emissions and ii) to assess the population translation and capacity building to implement the implementation trial. In the first stage, we plan to deploy the smartphone app to 4000 Vietnamese motor vehicle drivers in the respective Vietnamese cities. Based on the practical experience and model calculations accrued to date (using a sample of Australian drivers) the trial will lead to up to 400 Tonnes CO<sub>2</sub>-eq in the 6 months (without including the reductions in NO<sub>2</sub> and PM<sub>10</sub> and PM<sub>2.5</sub>) of deployment as a consequence of behaviour change leading to improved driving efficiency by the trial participants. This would equate to 25,000 tonnes of CO<sub>2</sub>-eq if the trial was extended to 25,000 drivers over the preceding 6-month period. In addition to emission reductions, the trial will also lead to safer driving with the potential to reduce the burden of road injury. The second stage will involve the implementation of a 'Pathway to Impact' framework to ensure the proposed output from the trial is extensively translated. Importantly, at each stage of the pathway, the various stakeholders, government and industry partners will be involved in the planning, design, delivery, and translation of the research program.

<sup>1</sup> WHO. Ambient (Outdoor) Air Pollution. Accessed 27 June 2022, [https://www.who.int/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health)

<sup>2</sup> International Trade Administration. Vietnam - Country Commercial Guide - Environmental Technology. <https://www.trade.gov/country-commercial-guides/vietnam-environmental-technology>

<sup>3</sup> WHO. Air pollution in Viet Nam. <https://www.who.int/vietnam/health-topics/air-pollution>

<sup>4</sup> Mortimer D, Harris A, Wijnands JS, Stevenson M. Persistence or reversal? The micro-effects of time-varying financial penalties. *Journal of Economic Behavior & Organization*. 2021/08/01/ 2021;188:72-86.

<sup>5</sup> Mortimer D, Wijnands JS, Harris A, Tapp A, Stevenson M. The effect of 'smart' financial incentives on driving behaviour of novice drivers. *Accident Analysis & Prevention*. 2018/10/01/ 2018;119:68-79.

<sup>6</sup> Stevenson M, Harris A, Mortimer D, et al. The effects of feedback and incentive-based insurance on driving behaviours: study approach and protocols. *Injury prevention : journal of the International Society for Child and Adolescent Injury Prevention*. 2018/02// 2018;24(1):89-93. doi:10.1136/injuryprev-2016-042280

<sup>7</sup> Stevenson M, Mortimer D, Wijnands JS, Harris A. Changing driver behaviour with feedback and financial incentives: a randomised trial. *Accident Analysis & Prevention*. 2020 (Under review);

<sup>8</sup> Vietnam Register. Summary of Vehicle Data in the Nationwide. Vietnam Register. <http://www.vr.org.vn/thong-ke/Pages/tong-hop-so-lieu-phuong-tien-giao-thong-trong-ca-nuoc.aspx>