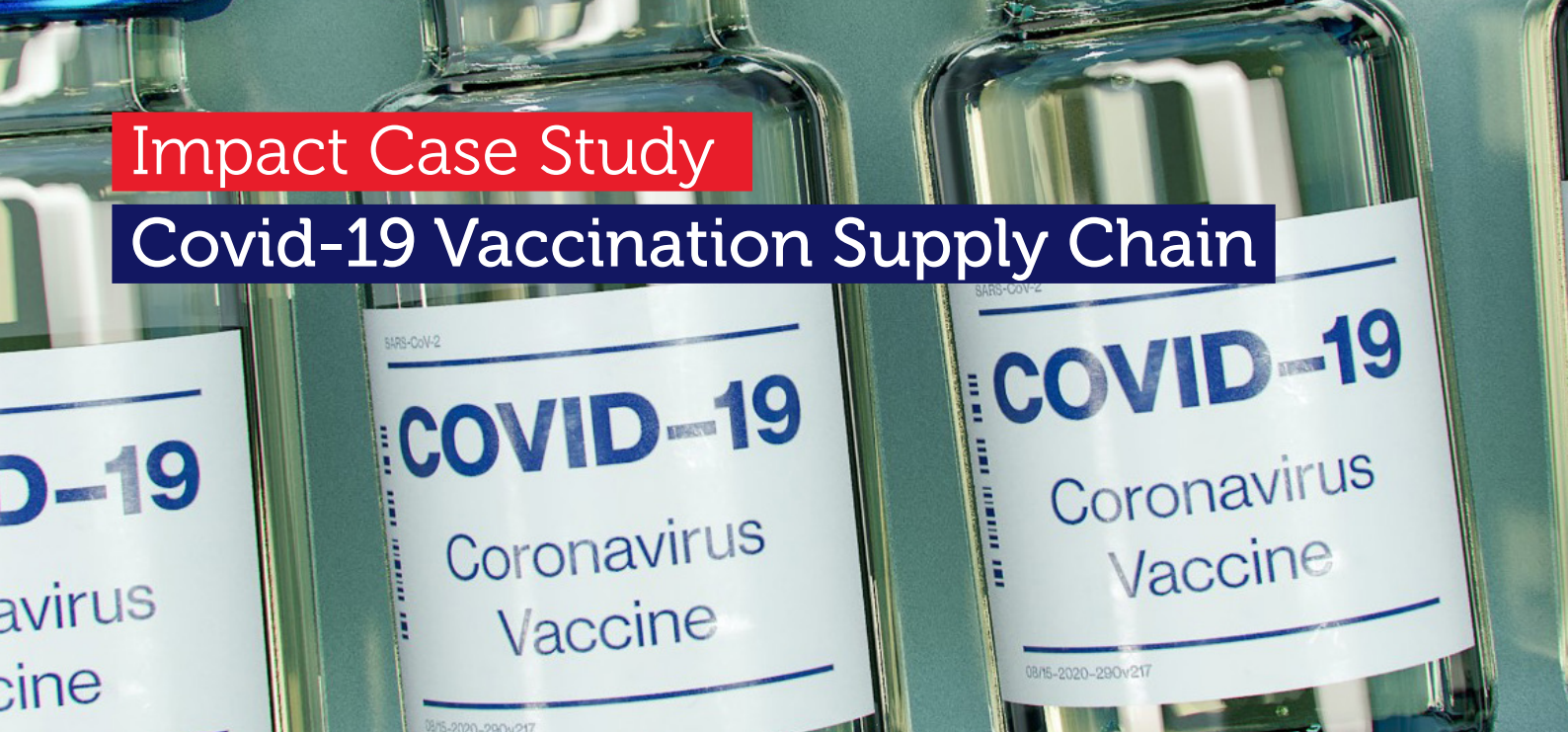# Impact Case Study

Covid-19 Vaccination Supply Chain

Introduction and background

When vaccines began to be available for Covid-19, supply was limited and the logistics for distributing the available doses to those most vulnerable on a pandemic scale were not always clear.

At the start of RMIT's Covid-19 Vaccine Supply Chain project, the research team, led by Professor Babak Abbasi, reviewed several government reports and policies around vaccine supply chains in order to better understand the existing systems and opportunities for improvement.

The team noted that existing distribution approaches were not optimal for Australia's pandemic circumstances, particularly given the huge imbalance at the time between supply and demand.

The study demonstrated that a new model would need to be developed, so that decision-makers had support when allotting vaccines to areas and groups most in need.

The research

Large scale and timely allocation and distribution of COVID-19 vaccines is a very complex task, and has to respond with agility to changing situations, and risks in the population.

The Covid-19 vaccination supply chain research project aimed to develop a model to make the decision-making process less difficult and more effective.

Professor Abbasi worked on this task with RMIT colleagues Dr Olga Kokshagina, Professor Prem Chhetri, and Dr Masih Fadaki, and Professor Naima Saeed of Norway's University of Agder.

The goal was to develop a decision-making model that would help government bodies in charge of health policy and vaccine distribution to optimise the timely, large-scale allocation of the limited vaccine supplies to medical centres around the country. Victoria was used as the case study to develop the model for a variety of scenarios.

The result is a conceptual mathematical model which can be used to inform decisions based on vital health factors such as exposure risk, susceptibility rate, and operational constraints – including the capacity and catchment area of each medical centre, available vaccine stocks, and the capacity to transship vaccines between centres.

The matter of transshipment is important, as governments and vaccine providers need to negotiate the guidelines of varying vaccine package sizes in response to localised need.

The conceptual model developed in this study integrates a centralized booking system, risk profiling and prioritization, and a vaccine distribution system which together aim to reduce the lead-time and enhance quick response.

The project also made recommendations on how healthcare providers and government entities should collaborate to establish more efficient logistical capabilities.

Funding support and/or institutional support

What's next...

RMIT UNIVERSITY

Project outcomes

Publications

A paper has been submitted to Decision Support Systems Journal (A* in ABDC) and is under review after two R&R rounds. The paper is available to the research and professional community through SSRN (formerly Social Science Research Network), while it is under review.

SSRN noted on 3 November 2021 that the paper had been viewed more than 2500 times, and was the most downloaded paper in its decision sciences and healthcare category for some periods.

- SSRN, "Modeling Vaccine Allocations in the COVID-19 Pandemic: A Case Study in Australia", 9 December 2020

Media

- The Conversation, "We modelled how a COVID vaccine roll-out would work. Here's what we found", 30 November 2020

As at November 2021, this article had been viewed more than 96184 times.

- World Economic Forum, Vaccine roll-out: This model found 3 key factors for success, 7 December 2020
- The research was also covered by MSN and Gizmodo Australia

Overview of the impact

Alongside the decision-making model created by the research team, the Covid-19 vaccination supply chain project has had wider effects on teaching and the international community.

- On 25 May 2021, when New Zealand was at the vaccine allocation planning stage, the New Zealand Ministry of Health (Epidemiology and Data Analytics COVID-19 Immunisation team) viewed a presentation of the research.
- The team developed a web-based interactive tool, based on the project's vaccine allocation model. The tool can be used for demonstration purposes with future industry partners – and can be deployed more immediately to teaching analytics concepts and decision-making. The team plans to use the tool at the RMIT Open Day and for some other industry events in 2022.

Next steps

The project team intends to extend their research by applying for further funding. One of the things the COVID-19 pandemic has taught us is that vaccine creation and distribution needs to be timely – the RMIT research team believe they can continue to contribute to global efforts in this space.

What's next...

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