MEDIA RELEASE

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MYOPERICARDITIS RISK AFTER COVID-19 VACCINATION IS LOW ACCORDING TO INTERNATIONAL STUDY

- *New analysis of over 11 studies covering 395 million COVID-19 vaccine doses reveals that the risk of myopericarditis (heart inflammation) following COVID-19 vaccination is comparable to or lower than the risk following non-COVID-19 vaccinations.*
- *Findings by researchers from NUHCS, NUH and the NUS Yong Loo Lin School of Medicine should inform the public of the rarity of myopericarditis, highlighting that the benefits of vaccination far outweigh the risk of this rare adverse event.*

Singapore — Globally, more than 10 billion doses of COVID-19 vaccines have been administered as of March 2022. While most side-effects of the vaccine are mild and self-limiting, myopericarditis (inflammation of the heart) is increasingly being reported after COVID-19 vaccination. A new study published in *The Lancet Respiratory Medicine*[1], found that the overall risk of myopericarditis following COVID-19 vaccination is very low, affecting 18 people per million vaccine doses. This confirms that the risk is comparable to or lower following COVID-19 vaccination than some of the other non-COVID-19 vaccines.

A team of researchers from the National University Heart Centre, Singapore (NUHCS), the National University Hospital (NUH) and the Yong Loo Lin School of Medicine, National University of Singapore (NUS Medicine), examined international databases, looking at more than 400 million vaccination doses, to compare the risk of myopericarditis following vaccination against COVID-19 and other diseases such as influenza and smallpox. They found no statistically significant difference between the incidence of myopericarditis following COVID-19 vaccination (18 cases per million doses) and other vaccinations (56 cases per million doses).

“Our research suggests that the overall risk of myopericarditis appears to be no different for this newly approved group of vaccines against COVID- 19, compared to vaccines against other diseases. The risk of such rare events should be balanced against the risk of myopericarditis from infection and these findings should bolster public confidence in the safety of COVID-19 vaccinations,” says Dr Kollengode Ramanathan, Senior Consultant in the Department of Cardiac, Thoracic & Vascular Surgery at NUHCS and the corresponding author of the study.

Myopericarditis is a condition that causes inflammation of the heart muscle and, in some cases, severe permanent heart damage. It is most often caused by viruses but can also occur after vaccination in rare instances. There have been reports of myopericarditis following mRNA-based COVID-19 vaccination, especially in adolescents and young adults. This study aimed to determine whether this increase in reporting was due to a true increase in incidence or a result of improved reporting systems and recall bias.

[1] https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(22)00059-5/fulltext

Researchers analysed more than 20 studies from international databases with reported incidences of myopericarditis following any type of vaccination between January 1947 and December 2021. Of these, 11 studies looked specifically at COVID-19 vaccinations, covering over 395 million COVID-19 vaccine doses – nearly 300 million of which were mRNA vaccines. The rest of the studies covered other vaccinations such as smallpox (2.9 million doses), influenza (1.5 million doses), and others[2] (5.5 million doses).

Among people who received COVID-19 vaccines, the incidence of myopericarditis was significantly higher in males (vs females), in people younger than 30 years (vs 30 years or older), after receiving an mRNA vaccine (vs non-mRNA vaccine), and after a second dose of vaccine (vs a first or third dose).

To put the findings into context with the risk of myopericarditis following COVID-19 infection, the authors conducted a post-study analysis. Among 2.5 million patients who were hospitalised with COVID-19, many of whom had clinical or radiological suspicion for myopericarditis, 1.1% had myopericarditis. However, while these figures provide a frame of reference, the authors note that the results are not directly comparable with the number of cases of myopericarditis following COVID-19 vaccination due to different units of measurement.

“The occurrence of myopericarditis following non-COVID-19 vaccination could suggest that myopericarditis is a side effect of the inflammatory processes induced by any vaccination and is not unique to the SARS-CoV-2 spike proteins in COVID-19 vaccines or infection,” says Dr Jyoti Somani, an infectious diseases specialist at the National University Hospital, and a co-author of the study. She adds, “This also highlights that the risks of such infrequent adverse events should be offset by the benefits of vaccination, which include a lower risk of infection, hospitalisation, severe disease, and death from COVID-19.”

Mr Ryan Ruiyang Ling, co-author and medical student at NUS Medicine, says, “The scale of mass global vaccination and enhanced surveillance might account for the increased reporting of this adverse event in the context of COVID-19 vaccination. Nonetheless, certain subpopulations – those of male sex or younger age and those receiving an mRNA vaccine, particularly the second dose – appear to be at increased risk of myopericarditis following COVID-19 vaccination. These findings are important additions to the conversation when weighing the risks and benefits of COVID-19 vaccination during this pandemic.”

The authors acknowledge some limitations with this study, particularly noting that the findings include only a small proportion of children under the age of 12 who have only recently been eligible for vaccination, and that results of this study cannot be generalised to this age group. In addition, comparisons have been made across different time periods for different vaccines. Diagnostic tools might have differed or not been available leading to lower reporting of cases in earlier studies.

Dr Ramanathan says, “There are several areas to which future research can build on our current study. Firstly, most of the studies included in our review did not report on outcomes of

[2] Other viral vaccines in this study included: varicella, yellow fever, oral polio vaccine, measles, mumps and rubella, meningococcal, diphtheria, pertussis and tetanus, Bacillus Calmette-Guerin, hepatitis, and typhoid.

patients younger than 12 years receiving vaccination against COVID-19, as vaccination of this younger age group is relatively recent. Future research investigating the incidence of myopericarditis in this age group would inform clinical decision making for vaccinating children against COVID-19. More research also needs to be conducted to better understand the risk-benefit profile of COVID-19 vaccines in the context of protection against infection, hospitalisation and severe disease, and its potential adverse effects. The impact of booster vaccines will require further research as well."

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About National University Heart Centre, Singapore

The National University Heart Centre, Singapore (NUHCS) brings together the resources, expertise and capabilities in the areas of Cardiology, Cardiothoracic and Vascular Surgery to better meet the needs of the growing number of patients with heart disease. A key centre for the treatment and management of complex cardiovascular diseases, its core clinical programmes include heart failure, structural heart disease, acute coronary syndrome, vascular medicine and therapy, women's heart health and heart rhythm.

Comprising a team of cardiovascular specialists and experts from a multitude of medical and surgical disciplines, the NUHCS provides a comprehensive and holistic approach to the treatment of patients with heart problems. This approach is backed by cutting edge knowledge and information gathered by the Cardiovascular Research Institute (CVRI).

The CVRI focuses on developing niche research work in creating new knowledge in support of NUHCS' core clinical programmes by working in close collaboration with both local and international renowned research institutes such as the Agency for Science, Technology and Research (A*STAR) and New Zealand's Christchurch School of Medicine and Health Sciences.

Partnerships are formed with various medical institutes as NUHCS is a selected training centre for international physicians. Education and training ensures that our medical professionals are kept abreast. Nurturing the next generation, our specialists are also actively involved in conducting workshops and teaching programmes for our medical undergraduates.

For more information, visit: https://www.nuhcs.com.sg.

About the National University Hospital (NUH)

The National University Hospital is a tertiary hospital and major referral centre with over 50 medical, surgical and dental specialties, offering a comprehensive suite of specialist care for adults, women and children. It is the only public hospital in Singapore to offer a paediatric kidney and liver transplant programme, in addition to kidney, liver and pancreas transplantation for adults.

The hospital was opened on 24 June 1985 as Singapore's first restructured hospital. Each year, the Hospital attends to more than one million patients.

As an academic health institution, patient safety and good clinical outcomes are the focus of the Hospital. It plays a key role in the training of doctors, nurses, allied health and other healthcare professionals. Translational research is pivotal in the Hospital's three-pronged focus, and paves the way for new cures and treatment.

A member of the National University Health System, it is the principal teaching hospital of the NUS Yong Loo Lin School of Medicine and the NUS Faculty of Dentistry.

About the NUS Yong Loo Lin School of Medicine (NUS Medicine)

The NUS Yong Loo Lin School of Medicine is Singapore's first and largest medical school. Our enduring mission centres on nurturing highly competent, values-driven and inspired healthcare professionals to transform the practice of medicine and improve health around the world.

Through a dynamic and future-oriented five-year curriculum that is inter-disciplinary and inter-professional in nature, our students undergo a holistic learning experience that exposes them to multiple facets of healthcare and prepares them to become visionary leaders and compassionate doctors and nurses of tomorrow. Since the School's founding in 1905, more than 12,000 graduates have passed through our doors.

In our pursuit of health for all, our strategic research programmes focus on innovative, cutting-edge biomedical research with collaborators around the world to deliver high impact solutions to benefit human lives.

The School is the oldest institution of higher learning in the National University of Singapore and a founding institutional member of the National University Health System. It is Asia's leading medical school and ranks among the best in the world (Times Higher Education World University Rankings 2021 by subject and the Quacquarelli Symonds (QS) World University Rankings by Subject 2021).

For more information about NUS Medicine, please visit https://medicine.nus.edu.sg/

About the National University Health System (NUHS)

The National University Health System (NUHS) aims to transform how illness is prevented and managed by discovering causes of disease, development of more effective treatments through collaborative multidisciplinary research and clinical trials, and creation of better technologies and care delivery systems in partnership with others who share the same values and vision.

Institutions in the NUHS Group include the National University Hospital, Ng Teng Fong General Hospital, Jurong Community Hospital and Alexandra Hospital; three National Specialty Centres - National University Cancer Institute, Singapore (NCIS), National University Heart Centre, Singapore (NUHCS) and National University Centre for Oral Health, Singapore (NUCOHS); the National University Polyclinics (NUP); Jurong Medical Centre; and three NUS health sciences schools – NUS Yong Loo Lin School of Medicine (including the Alice Lee Centre for Nursing Studies), NUS Faculty of Dentistry and NUS Saw Swee Hock School of Public Health.

With member institutions under a common governance structure, NUHS creates synergies for the advancement of health by integrating patient care, health science education and biomedical research.

As a Regional Health System, NUHS works closely with health and social care partners across Singapore to develop and implement programmes that contribute to a healthy and engaged population in the Western part of Singapore.

For more information, please visit http://www.nuhs.edu.sg.