



One Vaccination Needle Size Does Not Fit All

Friday, 9 February 2024

The Medical Research Institute of New Zealand (MRINZ) has made a major breakthrough in determining what needle length is required to ensure successful intramuscular (IM) deposition of vaccines.

‘**IM Vaccination Needle Length: A Call To Arms**’, summarising MRINZ research, published today in the prestigious medical journal *The Lancet*, has reported that the standard 25 mm needle length is unlikely to result in vaccine delivery in the muscle in a sizeable proportion of adults. This is a particular problem in obese adults, for whom in up to 45%, the standard 25 mm needle may be inadequate to ensure IM deposition of vaccine.

Most vaccines, including COVID-19, Hepatitis B, Diphtheria/Tetanus/Pertussis, and Influenza vaccines, are administered by IM injection, with the deltoid muscle of the arm being the preferred injection site in adults. Selecting the proper needle length to ensure the vaccine is deposited in the muscle is crucial to reduce the severity of injection-site reactions, and for some vaccines, to ensure an optimal immune response.

MRINZ research over the last two years using ultrasound measurement of the skin-to-deltoid-muscle distance, has determined that both arm circumference and BMI (Body Mass Index) measurements can be used by healthcare professionals to choose the right needle length to ensure successful IM vaccination.

Based on the recommended New Zealand deltoid vaccination site, the longer 38mm needle is the preferred choice for an arm circumference of larger than 35cm for men, and 30cm for women.

This fills a considerable evidence gap, in which there was previously no way to reliably select those people who may require a longer needle, resulting in a lack of specific recommendations in worldwide immunisation guidelines.

Professor Richard Beasley, MRINZ Director states, “Currently vague vaccination guideline terms such as ‘large arms’, can lead to a needle that is too short being used and vaccine being deposited in the subcutaneous tissue instead of the deltoid muscle. This potentially causes a greater reaction to the vaccine, and for influenza vaccine in particular a lesser immune response.”

“Our MRINZ research team have been solidly working towards providing vaccinators with clear, practical, evidence-based guidance on how they can choose the appropriate needle length to ensure vaccines are deposited in the deltoid muscle of all eligible New Zealanders, particularly those most at risk of significantly worse health outcomes, such as individuals with obesity.”

Global rates of obesity continue to increase, with approximately one third of adults in Aotearoa New Zealand and Australia being affected. As a result, ensuring that vaccinations are being conducted with needles that are of a sufficient length for people with obesity is a public health priority both nationally and internationally.

“It is of national significance that our findings can now be used to update New Zealand guidance for vaccine needle length selection” says Professor Beasley.

“However, our New Zealand specific findings may not apply to other populations in other countries that use different deltoid vaccination sites. For this reason, ongoing research is urgently required to determine measurement frameworks that can be used to enable appropriate needle length selection to ensure optimal vaccine delivery worldwide.”

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KEY POINTS AT A GLANCE

1. Guidelines for intramuscular (IM) vaccination differ internationally with respect to the location of the deltoid injection site and the needle length used. Instructions based on vague terms such as 'large arms' can lead to a needle that is too short being used and vaccine delivery occurring in the subcutaneous tissue instead of the recommended deltoid muscle, potentially causing a greater local reaction and a lesser immune response.
2. Injection site reactions are of public health importance as they contribute to vaccine hesitancy and refusal, which can lead to reduced vaccine uptake and as a result an increased prevalence of vaccine-preventable disease.
3. MRINZ researchers are looking to provide vaccinators with clear, practical, evidence-based guidance on which needle length to use to ensure vaccines reach the deltoid muscle of all eligible New Zealanders, particularly those most at risk of significantly worse health outcomes.
4. ['IM 'Vaccination Needle Length: A Call to Arms'](#), summarises a programme of MRINZ work, reporting that the standard 25 mm needle length is unlikely to result in vaccine delivery in the muscle in a sizeable proportion of New Zealand adults. This is a particular problem in obese adults, for whom in up to 45%, the standard 25 mm needle may be inadequate to ensure IM deposition of vaccine.
5. With global rates of obesity increasing steadily, ensuring vaccinations are being conducted with needles that are of a sufficient length for people with obesity is a public health priority both here in Aotearoa and worldwide.
6. IM Vaccination Needle Length: A Call To Arms, published in the Lancet on Thursday 8 February 2024 is authored by MRINZ researchers, Marjan Doppen, Ciléin Kearns, Thomas Hills, Mark Weatherall, and Richard Beasley. The wider MRINZ Needle Length programme has been funded by the Health Research Council of New Zealand Independent Research Organisation funding, and the Ruth Maud Ring Spencer Estate, proudly managed by Perpetual Guardian.

LINK: [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(23\)02222-5/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(23)02222-5/fulltext)

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Medical Research Institute of New Zealand

Rangahautia Te Ora

The Medical Research Institute of New Zealand (MRINZ) is Aotearoa New Zealand's leading independent medical research institute. MRINZ research is guided by a simple philosophy: it must challenge dogma, increase knowledge, and have the potential to improve clinical practice and outcomes, both in Aotearoa New Zealand, and internationally. Committed to contributing toward a more equitable society that celebrates Te Ao Māori and upholds Te Tiriti o Waitangi, MRINZ's research teams are dedicated to investigating important public health problems, delivering high quality evidence on which to improve the management of disease and patient care.

Professor Richard Beasley, MRINZ Director

Richard Beasley, MBChB, MD, DSc, CNZM, is a physician at Wellington Regional Hospital, Director of the Medical Research Institute of New Zealand, Professor of Medicine at Victoria University of Wellington, and Visiting Professor, University of Southampton, United Kingdom. He was previously the Deputy Chair of the Health Research Council of New Zealand.

Richard Beasley is available for interview.

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