



# Te Niwaha

## Research Project Impact Case Study

Hurts less, lasts longer: Applying Māori and Pacific patient-centered models to implement subcutaneous injections of high dose penicillin to prevent RHD

### Short Research Title

Reducing barriers, improving lives: A new approach to rheumatic fever treatment

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## Introduction

### Research purpose:

This research addresses the urgent need for a more effective and acceptable way to deliver secondary prophylaxis, preventing acute rheumatic fever (ARF) from progressing to rheumatic heart disease (RHD), which can cause severe heart damage, complications, and death. Currently, preventing RHD requires monthly intramuscular (IM) penicillin injections, but the pain and discomfort of this treatment make it difficult for patients to adhere, contributing to ongoing health inequities. Māori and Pacific children and young adults are disproportionately affected, highlighting the need for improved treatment options. This project aims to improve penicillin delivery for ARF/RHD patients through the SCIP trial, which replaces painful monthly injections with a high-dose subcutaneous injection. A prior study showed that SCIP maintains effective penicillin levels for at least three months, significantly reducing the need for frequent injections. This project will not only assess SCIP's effectiveness but also implement and evaluate a rangatahi Māori and Pacific patient and whānau-centred model of care. This approach aims to provide culturally safe, responsive penicillin delivery (IM and SCIP), enhancing patient experience and improving long-term health outcomes.

### Research Approach:

This research takes a two-pronged approach. First, it expands the SCIP trial into new regions (starting with the Waikato), to compare adherence rates and patient experiences between SCIP and standard injections. Second, it implements and evaluates a rangatahi Māori and Pacific-centred service model. This model includes community-based delivery, dedicated kaimahi support, cultural safety training, and tailored resources. Collaborations include the University of Auckland, Te Whatu Ora, National Hauora Coalition, Community Health providers (Tuuhono Hauroa, Te Ngaakau-aa-Kiwa Charitable Trust), Cure Kids and The Kids Research Institute Australia.

### Alignment with Te Niwha:

This research aligns with **Te Niwha's mission** by building New Zealand's infectious disease research capability through scientific excellence combined with mātauranga Māori and Pacific knowledge. It develops culturally responsive, practical solutions to improve health outcomes.

The project also supports **Te Niwha's investment objectives** by fostering collaboration between researchers, clinicians, Māori, and Pacific communities, enhancing research translation, reducing health inequities, and addressing key gaps in infectious disease prevention and care.

## Results

To date SCIP has been administered to 78 participants (65 in the Wellington region and 13 in the Waikato region). Many participants have chosen to remain on SCIP, which has amounted to the delivery of over 350 SCIP. This has been possible through the employment of two research nurses in Wellington and one in the Waikato. Our study nurses have started training Community Nurses to ensure that SCIP can remain to be offered to participants once the study ends. We have also Localities approvals to deliver SCIP in the South Island and have trained local nurses in the SCIP procedure – nurses in Oamaru and Dunedin are now delivering SCIP to participants in these regions.

In addition, we have employed two whānau navigators in the Waikato region to implement and evaluate the rangatahi Māori and Pacific patient and whānau centred model of care, which is offered to all patients in the Waikato region who are on secondary prophylaxis (IM or SCIP). Our whanau navigators are currently supporting 21 whanau and are preparing for the first peer support group meeting at the end of March.

### **Papers published:**

1. Cooper, J., et al. (2024). "'Hurts less, lasts longer"; a qualitative study on experiences of young people receiving high-dose subcutaneous injections of benzathine penicillin G to prevent rheumatic heart disease in New Zealand." *PLoS One* 19(5): e0302493.

Key insights - A qualitative study interviewed 20 Māori and Pacific young people receiving SCIP. The findings were that SCIP was well tolerated, less painful than traditional IM injections and participants had a strong preference for the longer three-month dosing interval.

### **Manuscripts currently submitted and under review:**

1. Preprint available at: [Subcutaneous injections of penicillin \(SCIP\): Convenient and effective treatment for Māori, Pacific Peoples and their whānau in preventing rheumatic heart disease | medRxiv](#) under review with *PLoS One*.

Key insights – A qualitative study interviewed 10 Māori and Pacific young people who had been receiving SCIP for more than 12 months and found that SCIP significantly reduced treatment burden, improved quality of life, and enhanced adherence, through reduced injection frequency, flexibility, whānau-centred care, and strong patient-healthcare provider relationships.

2. High-dose subcutaneous benzathine penicillin offers a cost-saving alternative to traditional intramuscular injections for preventing rheumatic heart disease. Under review with *Open Forum Infectious Diseases*.

Key insights – This study models the treatment administration and societal costs of four-weekly IM BPG and 10-weekly SCIP for preventing disease progression in children and young adults with acute rheumatic fever. Results show SCIP offers cost-savings to society across all age-groups and three adherence scenarios.

3. High dose, subcutaneous injections of benzathine penicillin G (SCIP) to prevent rheumatic fever: a single arm, phase IIa trial of safety and pharmacokinetics. Under review with *Journal of Infection*.

Key insights - Phase-IIa trial involving 55 participants and 182 SCIP doses, pharmacokinetic modelling based on 169 blood samples showed that high-dose subcutaneous penicillin injections are safe, well-tolerated, and maintain protective penicillin levels more effectively than intramuscular injections, making SCIP a promising alternative for preventing recurrent acute rheumatic fever.

### Impact

#### Current impact:

This research is already delivering significant benefits by offering a less painful, more convenient alternative to monthly IM. SCIP has been administered to 78 patients across Wellington and Waikato, supported by trained research nurses and whānau navigators. Early findings show reduced treatment burden, improved adherence, and stronger trust between patients, families, and healthcare providers. The rangatahi Māori and Pacific whānau-centred model has enabled culturally responsive care and greater patient engagement. Results have been shared through published and submitted manuscripts, and hui with stakeholders contributing to national discussions on improving secondary prophylaxis delivery.

#### Future impact:

Implementing SCIP successfully could be life-changing for those living with ARF/RHD locally and globally. The research has strong potential to influence national and international policy. The adoption of SCIP in New Zealand would improve health outcomes and equity for Māori and Pacific communities. Economic modelling shows the potential healthcare savings, further supporting system-wide uptake. The patient-centred model developed can also guide delivery of other infectious disease treatments in underserved populations.

#### Pathway to impact:

Ongoing engagement with Te Whatu Ora, Kids Research Institute Australia, Pu Manawa (Rheumatic fever network of NZ), community providers, the Ministry of Health, and Māori and Pacific health leaders will help ensure the integration of SCIP into routine care. Continued training of community nurses. Analysis of dried blood spots to show penicillin levels across extended timeframes, also investigating if any breakthrough streptococcal infections occurred (none detected in throat swabs). Dissemination of research findings to international bodies, ensures both local and global influence.

#### Conclusion:

SCIP offers a safe, effective, and culturally responsive alternative to monthly injections, improving adherence and quality of life for Māori and Pacific young people with ARF/RHD. This work has the potential to transform secondary prophylaxis delivery in Aotearoa and globally, reducing health inequities.

#### Future directions:

Expanding SCIP delivery nationally and in Australia, including training more community nurses and integrating SCIP into standard care pathways. Additionally, the rangatahi Māori and Pacific-centred model will be adapted based on feedback to use nationwide.