Nurse-led school-based clinics for rheumatic fever prevention and skin infection management: evaluation of Mana Kidz programme in Counties Manukau

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ABSTRACT

AIM: To evaluate registered nurse-led school clinics in 61 primary and intermediate schools in Counties Manukau.

METHODS: The evaluation (conducted August–December, 2014) collated evidence concerning service delivery, outcomes, value for money and effectiveness.

RESULTS: 97% (23,756/24,497) of eligible children were consented, 11% (20,696/191,423) of throat swabs taken (February 2013–September 2014) were culture positive for Group A Streptococcus (GAS); 20,176 were treated. Mana Kidz teams treated (includes cleaning and covering alone) 17,593 skin infections and actioned 4,178 school health referrals. A pre-programme cross sectional GAS pharyngeal prevalence demonstrated a relative risk 1.8 (1.3–2.3) (95%CI) of being pharyngeal GAS positive in 2013 compared to 2014. Hospitalisations for acute rheumatic fever (ARF) and skin infections for children aged 5–12 years living in Counties Manukau are declining and this appears to be temporally related to the introduction of the Mana Kidz programme.

Effective engagement with children, parents/whānau and improved health literacy was demonstrated, especially knowledge about sore throats, ARF, medication adherence and skin infection. The programme was delivered at $280 per participating child in the 2013/14 financial year.

CONCLUSION: Mana Kidz is an effective programme with a substantial contribution to health care for children, aged 5–12 years, identified at increased risk of poor health outcomes.

Counts Manukau District Health Board (CMDHB) is recognised as having a young, socioeconomically deprived and ethnically diverse population. Children living in the district consistently have higher admission rates for infectious diseases than the New Zealand average in the context of persistent barriers to accessing primary health care. Serious skin infection is a common medical hospitalisation in the 0–14 year age group and rates of ARF/rheumatic heart disease are among the highest in the country. ARF is a preventable chronic disease considered to be a barometer of healthcare access and literacy.

Funding from the Ministry of Health (MoH) for a school-based throat swabbing service (as part of the rheumatic fever prevention programme), supported by additional funding from CMDHB, provided an opportunity to roll out a comprehensive school-based health service. The model...
built on the lessons learnt from a previous randomised control trial and a pilot study was undertaken in a decile 1 South Auckland school in 2011.

The programme, named “Mana Kidz”, is an example of a multi-provider collaborative approach to service delivery being delivered by a network of 12 providers, including Public Health Nurses (PHN), Primary Health Organisations (PHOs) and Non-Government Organisations (NGOs).

The Mana Kidz model was implemented over 6 months from September 2012. Priority schools were identified through the development of a school scoring system using four risk factors for ARF. Mana Kidz is now operating in 61 schools (including 89% of decile 1 primary and intermediate schools in Counties Manukau), reaching approximately 24,000 children, of whom approximately 50% are Pacific and 39% Māori.

Mana Kidz provides a team of one registered nurse and a whānau support worker (WSW), who are based in school during term time. The service includes daily assessment and treatment of sore throats and skin infections. In addition, other health care needs can be addressed effectively, eg, hearing and vision and child protection issues. The model also provides the opportunity for wider family/whānau to be assessed. A manual of operations is used by all providers and standing orders are in place for the registered nurses for treatment of defined conditions by a delegated authority.

The programme evaluation in 2014 was led by the Kinnect Group with CMDHB, National Hauora Coalition, and University of Auckland providing support to the external evaluation team.

Methods

An evaluation framework was developed with explicit evaluative criteria. The evaluative criteria were addressed through the collection of evidence from a range of sources, including quantitative indicators such as performance monitoring data, research study data, hospitalisation data as well as qualitative data from surveys and focus groups.

Cross-sectional studies of pharyngeal GAS and a skin infection census, as part of studies funded by the HRC Partnership Programme, have been performed annually in a subset of the school programme. For pharyngeal GAS burden, a multi-variable analysis of changes from (pre-programme) May 2013 (n=1,299) to May 2014 (n=1,751) in Counties Manukau was performed.

Hospitalisation data were extracted from the encrypted National Minimum Dataset for people domiciled in Counties Manukau. The definition used to identify incident ARF cases was consistent with the Ministry of Health’s algorithm and included ICD 10 code I00–I02, primary diagnosis only and excludes any admissions where that person has been admitted with any acute rheumatic fever or chronic rheumatic heart disease diagnosis from July 1989. The codes used to define skin infections (primary diagnosis only) were as defined by O’Sullivan.

To gauge their understanding of key health concepts, students and parents of students were surveyed across three schools in Manurewa at two time points; prior to the programme starting in May 2013 and then again in May 2014. There were 439 parents who responded to the May 2013 parent survey. In 2014, a total of 235 parents responded.

Students were asked to complete a 10-item questionnaire. In 2013, the 457 student questionnaires were completed by students aged between 7–13 years and in 2014, 608 students completed the same questionnaire. In order to make the age distribution of the sample comparable, the results from the students aged 8–12 years were compared.

Six family/whānau focus groups were undertaken across six schools. In total, 34 mothers and grandmothers took part. Fifty-three percent identified as Pasifika, 35% as Māori, and 12% as New Zealand Pākehā, English or European. Participating schools were selected to ensure a range of clinic performance were included: three where the programme is working well; two where the programme was facing challenges; and one somewhere in the middle.

In addition, stakeholder interviews were undertaken. Stakeholders identified included: provider management representatives (“provider”); nurses and WSW (“Mana Kidz staff”); and staff from six parti-
pating schools (‘school staff’). In total, 36 stakeholders took part (18 school staff, 11 providers, and 7 Mana Kidz staff).

**Results**

At the time of the evaluation, Mana Kidz was operating in 61 schools in CMDHB. As at September 2014, 97% of all eligible children were consented into the programme (23,756 children).

Between February 2013 and September 2014, the programme completed 191,423 throat swabs, of which 20,696 (10.8%) tested positive for Group A Streptococcus (GAS) and 20,176 were treated. Over time the number of GAS positive swabs remained similar (Figure 1), but the percentage of GAS positive swabs decreased (Figure 2).

In 2013, 23,318 possible skin infection presentations were assessed. Of these, 6,774 skin infections were treated (the vast majority with topical cleaning and covering; if antibiotics were needed, fusidic acid (Foban) or, more rarely, cephalaxin or flucloxicillin were used). In 2014, for the first 9 months to 30 September, a total of 10,823 skin infections were treated.

![Figure 1: Number of throat swabs returning positive result for GAS—Feb 2013 to September 2014 (school children only).](image1)

![Figure 2: Percentage of throat swabs GAS+ by month.](image2)
Figure 3: ARF Hospitalisation rate, by financial year, for CMDHB residents, by age.

Admission rate/100,000 for ARF, by financial year, by age group, as per MoH algorithm

Source: NMDS extracted CMDHB. ARF ICD code I00–I02. Primary diagnosis of ARF. Excludes any admissions where that person has been admitted with any ARF or chronic RHD diagnosis from July 1989. Denominators: Statistics New Zealand projected population updated 2013 (based on 2006 census).

Figure 4: ARF Hospitalisation rate for CMDHB residents, 5–12 years, by ethnicity.

Source: Numerator: NMDS extracted CM Health. ARF ICD code I00–I02. Primary diagnosis of ARF. Excludes any admissions where that person has been admitted with any ARF or chronic RHD diagnosis from July 1989. Denominators: Statistics New Zealand projected population updated 2013 (based on 2006 census).

In 2013, the teams received 2,700 child health referrals for conditions or issues other than skin infections and sore throats, and actioned ~1,500 of them. In 2014, for the first 9 months to 30 September, a total of 2,651 referrals were received and 2,130 actioned.

Analysis of the first two years’ data from the ongoing cross-sectional prevalence study was performed to account for school clustering, and for age and gender differences. There was evidence of a difference in the rates of pharyngeal GAS between 2013 and 2014 (p=0.01) with the adjusted estimates of rates of 26% (95%CI 20–34%) and 14% (11–18%) for 2013 and 2014 respectively.

The cross-sectional skin prevalence study did not show any difference in rates of skin
infection between 2013 and 2014 (p=0.4). Although there was a raw 28% reduction, the effect was not consistent across the three schools and when the school effect was incorporated, a difference could not be demonstrated. The adjusted estimates of rates were 19% (95%CI 10%–39%) and 14% (7%–29%) for 2013 and 2014 respectively. The relative risk (95%CI) of having a skin infection in 2013 compared to 2014 was 1.4 (0.7–2.7).

Hospital admission rates for ARF, by age, are shown in Figure 3, and by ethnicity for the 5–12-year-old age group in Figure 4. Hospital admission rates for skin infections, by ethnicity for the 5–12 year old age group are shown in Figure 5. These data are for all children living in Counties Manukau, regardless of where they were diagnosed and treated for ARF or skin infection, or attending a Mana Kidz school.

**Qualitative findings**

Based on survey and focus group findings, families knew about the school clinics, how to access services, and saw the services as worthwhile and valuable. Teams were reported to be culturally competent, have positive, trusting relationships with children, families and schools, and effective in engaging with children, parents/whānau.

Key health information was delivered to parents/whānau and children in a range of ways, and schools reported collaborating with Mana Kidz teams to promote knowledge and awareness. However, opportunities were identified to better integrate Mana Kidz within existing whole-school approaches to health promotion. Almost all Mana Kidz staff indicated a desire to undertake more health promotion, but indicated resource constraints as key barrier.

Health literacy of children and parents/whānau was found to be improving in Mana Kidz schools on the basis of repeated survey results. The percentage of parents who had heard of ARF or RHD increased from 71% in 2013 to 89% in 2014. In 2014, 56% of parents indicated that they had learned anything new about sore throats or skin infections in the past year. Free-text responses predominately mentioned learning that sore throats can lead to ARF and the seriousness of this (55% of those who indicated they had learned anything new).

Mana Kidz providers were reported by key stakeholders to be working in partnership with school staff, special education needs coordinators and/or social workers in schools. Focus group feedback also suggested that the programme had increased access to social support services, as nurses refer family/whānau for further assistance (eg, home insulation, nutrition, immunisation, mental health and other needs). Cases of children disclosing abuse to Mana Kidz staff have reportedly been high (numbers were not available). Feedback suggests that the daily presence of Mana Kidz staff in the schools, and the regular contact that children have with them, means that strong and trusting relationships develop.
Focus groups also indicated that parents are now more likely to present to a GP or school health team, where appropriate, for sore throats and skin infections. Key stakeholders reported that there was an increase in unmet needs being identified in school clinics (eg, cellulitis, scabies, notifications of abuse, oral health, head lice, housing needs, nutrition, mental health and other needs). All stakeholders noted that access to primary care is challenging for families. Focus groups and key stakeholder interviews found that Mana Kidz provided an opportunity for children to engage with primary health care during school hours, which they may not otherwise have had. Overall feedback suggests there is scope for Mana Kidz teams to be increasing referrals to primary care to address unmet needs.

Sometimes we overlook that children can't access primary care... it has to be with an adult. This way we are accessing the children that aren't accessing healthcare. (Provider)

It's all about removing the barriers, they [Mana Kidz staff] don't say they can't do things. They are very flexible – will make the situation work for our Pasifika and Māori families. (School staff)

The vast majority of school staff, as well as Mana Kidz staff, reported that children's skin conditions have improved vastly since the start of the programme. Key stakeholders reported skin abrasions and infections are dealt with early, and that children look healthier. Impetigo and scabies, which were commonplace in most of the schools prior to the programme, are reported by school staff members to have vastly reduced.

You can see difference in children's health. Skin infections used to get so bad that kids were not able to walk. That way it was obvious. We do not see this anymore. (School staff)

**Funding**

The Mana Kidz programme is funded from a variety of sources, including Ministry of Health, CMDHB and the Middlemore Foundation for Health Innovation. The overall total cost of the programme was approximately $6.7 million for the 2013/14 financial year, which equates to $280 per participating child, per year.

Investment in the programme has been at 58% of the rate initially estimated to implement the service model originally piloted at Wiri Central School, resulting in a lower staffing ratio. Further, Mana Kidz has a wider scope of responsibilities and experienced higher than expected incidence of GAS throat infection and skin infections.

**Discussion**

This evaluation was undertaken to inform decision makers about the value (or otherwise) of delivering targeted primary care services in a school-based setting for primary and intermediate-aged children. The programme’s level of participation and uptake of treatment is exceptionally high, reflecting the lack of access to adequate health care for this group, and the unmet need for earlier, more accessible care.

The output of the school teams, in terms of volume of assessments, is high. Unfortunately, the ability to assess the impact of the school-based programme on key health outcomes was limited by the timing of the evaluation. It is early in the programme to be assessing changes in the prevalence of Group A streptococcal pharyngitis and skin infections, and too soon to expect a statistically supportable reduction in ARF and skin infection hospitalisations for the schools where the programme has been implemented though trends to date are suggestive of success.

Early indications from an on-going, cross-sectional study showed a marked statistically significant reduction in pharyngeal GAS burden. While there is no published literature paralleling pharyngeal GAS prevalence reduction with an ARF drop, it is expected that as the prevalence of pharyngeal GAS infection decreases, a reduction in hospitalisations for ARF should eventually be achieved.

A parallel reduction in the percentage of positive GAS throat swabs taken in the Mana Kidz programme lends some support to a possible interpretation that Mana Kidz contributed to a reduction in the GAS load within its target population from 2013 to 2014. However, this is not certain given the total positive swab numbers have remained...
the same, while the total number of swabs has increased. The number of throat swabs taken is dependent on many factors, such as presentation of sore throats for swabbing, circulating strains, school factors and season.

ARF, in the 5–14-year-old age group, was increasing before the start of school programmes. The district-level data presented provides some ecological evidence that rates of ARF have fallen in recent years, but due to the small numbers, it is too soon to know whether this represents a real decrease or a small number variation. While the data is limited by small numbers, it appears the decrease in the 5–12 year olds is driven by a reduction in cases for Māori children, while the rates for Pacific children remain similar to preceding years in the data available to inform the evaluation. However, the latest data point, for the financial year 2014/15, shows the rate of ARF for Pacific children is lower than the preceding years (Appendix). An HRC-funded study will assess the impact of Mana Kidz on ARF rates in the school programme using Auckland Regional Rheumatic Fever Register Data with 88,880 person years pre the school clinic intervention, and 79,200 post intervention, allowing 80% power to detect a 50% difference at the 5% level of significance.

Recent data provided by Auckland Regional Public Health Service (ARPHS) shows a 29% reduction in probable or confirmed cases of ARF notified to ARPHS for children living in Counties Manukau aged 5–12 years, between 2013/14 and 2014/15 financial years. This adds support to the reduction suggested by our data.

Skin infections were found to be a significant component of the daily operation of Mana Kidz clinics, with the number and complexity of cases being greater than anticipated. Unfortunately, the detail about the type of treatment received was not readily available to inform the evaluation, although staff were clear that the majority of children were treated with the cleaning and covering of lesions. There have been concerns raised about antibiotic stewardship and the proportion of skin infections treated with antibiotics is being quantified more precisely. Preliminary results from a recent audit suggest that only 4% of assessed skin infections were treated with antibiotics.

Qualitative feedback from the broader programme is that there was an improvement seen in children’s skin conditions that temporally relates to the commencement of this programme. Although the cross-sectional prevalence study undertaken in three schools found a raw 28% reduction in skin infections, it did not show a significant reduction once the school effect was incorporated, suggesting significant school-to-school variation in the implementation of the programme.

The schools included in the cross-sectional study may not be representative of the other schools in the programme. A repeat cross-sectional prevalence study in May 2015 will provide useful insights into the impact on skin infections now skin infections are being identified and treated more systematically in these schools. Hospitalisations should reduce due to early detection and treatment of skin infections under the Mana Kidz programme.

The data presented shows fewer hospitalisations for Māori and Pacific children with skin infections at a district level, although it is too soon to determine if this reflects a real decrease. Again, while this apparent decrease is temporally associated with the introduction of the programme (and there were no other major primary care or health promotion initiatives underway in the district to address skin infections), attribution is always problematic. There is ongoing work being undertaken to look at the impact of Mana Kidz on skin infections hospitalisations for children in Mana Kidz schools using a pre and post-intervention design.

Feedback from parents/whānau, school staff and Mana Kidz teams consistently indicates that Mana Kidz is an important and effective programme that is making a substantial contribution to health outcomes for vulnerable children. For many low income families, who are unable to afford the costs and/or time off work to visit a GP or pick up medicines, access to primary health care at school makes a difference to their children’s health. Mana Kidz is improving awareness, knowledge and healthy behaviours in relation to sore throats and skin infections. It should be
noted that the Ministry of Health launched an awareness campaign during the time this programme was being evaluated, and may have contributed to increased awareness of sore throats and rheumatic fever.

Mana Kidz teams were found to be engaging effectively with school communities, including children, parents/whānau and school staff, and there are emergent indications that this is beneficial not only in terms of direct access to primary health care for immediate health issues, but also increasing children’s and families’ future propensity to access primary care services. There are high levels of stakeholder satisfaction with the programme from parents/whānau, children, teachers, provider staff and management.

It is too soon to quantify the long-term reduction in health service utilisation that might be attributable to the Mana Kidz programme. However, results from the programme to date indicate a credible prospect that resources invested in the programme could contribute to a reduction in the long-term burden associated with preventable hospitalisations and reduced necessary health expenditure downstream. There is an opportunity for school clinic data to be collected, coded and compiled for the programme overall in order to better demonstrate the nature and extent of needs identified.

Conclusions

Mana Kidz is an innovative way of delivering high-quality primary health care for targeted conditions, within high-needs communities, to overcome barriers to access for at-risk populations. Mana Kidz demonstrably contributes to reducing health disparities and improving the wellbeing of families/whānau, particularly in Māori and Pasifika communities. These children are those most likely to get ARF as well as suffer from other preventable illnesses.

Appendix

Figure 6, Figure 7 and Figure 8 include data for the latest financial year (2014/2015). In addition the denominator has been updated to reflect the estimated resident counts from the 2013 census which includes correcting the preceding years to be in line with the 2013 results.

Figure 6: ARF Hospitalisation rate for CM residents, by age.

Source: NMDS extracted CMDHB. ARF ICD code I00–I02. Primary diagnosis of ARF. Excludes any admissions where that person has been admitted with any ARF or chronic RHD diagnosis from July 1989. Denominator: Statistics NZ Population Projections 2014.
Figure 7: ARF Hospitalisation rate for CM residents, 5–12 years, by ethnicity.

Source: NMDS extracted CMDHB. ARF ICD code I00–I02. Primary diagnosis of ARF. Excludes any admissions where that person has been admitted with any ARF or chronic RHD diagnosis from July 1989. Denominator: Statistics NZ Population Projections 2014.

Figure 8: Hospitalisation rate for skin infection 5–12 years, CM residents, by ethnicity.

Competing interests: Nil

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