

## Enhancing child health systems in the Northern Territory to improve anaemia outcomes

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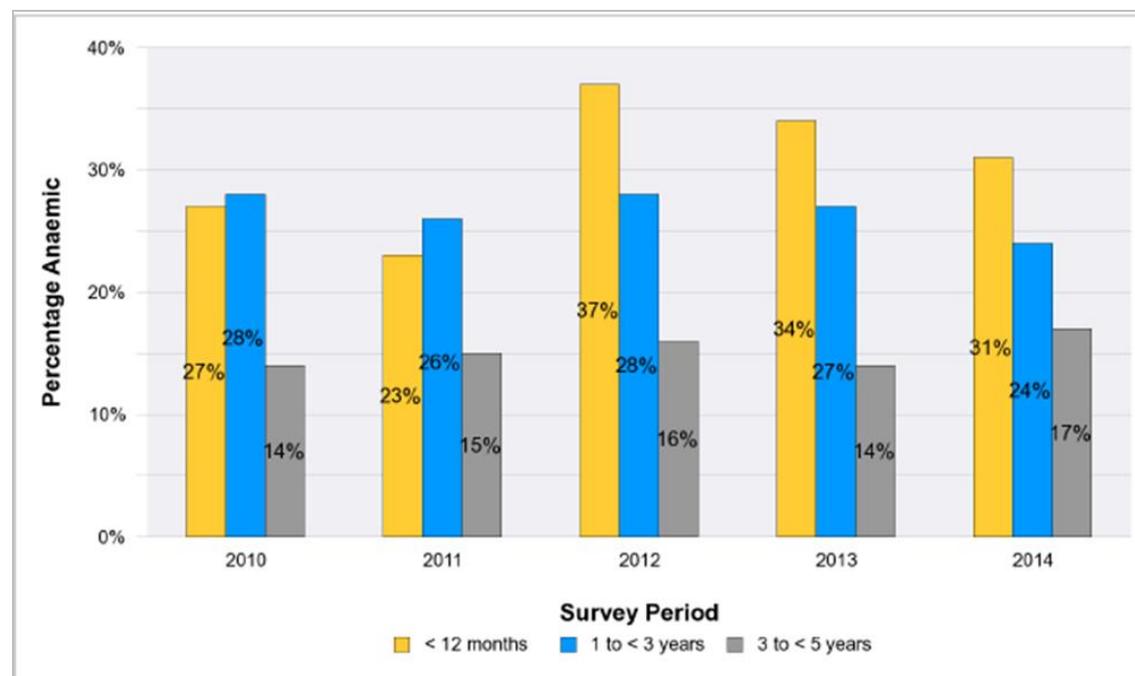
### Synopsis

Health care delivery is recognised as being complex, where preventing adverse outcomes is vital and a systems approach is considered to be a potential solution to complex problems.<sup>1</sup> Developing a systems approach means understanding the multiple factors that contribute to adverse outcomes and the importance of monitoring outcomes and processes to solve complex problems. A more systematic approach to the problem of anaemia, was identified as the solution to improving identification of anaemia and its management in children aged 6-24 months in the Northern Territory (NT). The processes were developed, implemented and evaluated initially in four communities across the NT. Based on this preliminary analysis, it can be seen that where the systematic approach is implemented well, rates of anaemia appear to be reducing.

### Background

Anaemia is highly prevalent in children less than 2 years of age in remote (NT) and has remained a persistent problem over many years. For the past 3 years, just less than one-third of children aged less than 12 months have been measured to have anaemia.<sup>2</sup>

Figure 1 Prevalence of Anaemia in Children Under 5 in Remote Northern Territory <sup>2</sup>



Anaemia has serious consequences for health and development, in particular affecting brain development and learning ability during the critical early years.<sup>3</sup> Delayed brain development due to iron-deficiency anaemia may be permanent, even after treatment, resulting in permanent learning difficulties.<sup>4</sup>

Anaemia has persisted despite children having very frequent contact with health services. In a study of two large remote health centres in the NT, the number of times an infant attended their health centre on average, was 28 times in the first year of life.<sup>5</sup> Health staff adherence to anaemia treatment was documented to be poor with only 30% of children identified with anaemia receiving full treatment according to current protocols.<sup>6</sup>

The Healthy Under 5 Kids (HU5K) Program provided the platform and reach for targeting children under two years in remote Primary Health Care Centres (PHCC) in NT. The HU5K program is a schedule of visits at key age milestones that was developed to provide a universal and consistent platform of care, support and information for parents, to address key determinants of child health. The project was integrated within the HU5K Program to facilitate a standardised approach to identification, treatment and monitoring of anaemia.

## Aim

To improve rates of identification and treatment of anaemia in children under two years of age according to current protocols, by developing a systematic approach to identification and treatment, including regular monitoring and feedback to staff.

## Method

The treatment protocol for iron deficiency anaemia was already available, hence existing protocols were used for identification and treatment of anaemia; outlined in the Central Australian Remote Practitioners Association (CARPA) Manual, 6<sup>th</sup> Edition. Routine testing for haemoglobin (Hb) is carried out at each 6 month HU5K visit, most often by a remote area nurse (RAN) or Aboriginal Health Practitioner (AHP). Anaemia is diagnosed if a child's haemoglobin level is < 105 g/L for children aged 6-11 months or <110g/L for children aged 1-4 years.<sup>7</sup>

The treatment protocol varies according to the degree of anaemia and weight of the child. It includes: iron administration given orally or by intramuscular injection; albendazole (deworming) once a day for 3 days; and folic acid if indicated.<sup>7</sup> A follow-up Hb measure is required one month post-treatment to assess outcome. Dietary advice is also recommended to encourage healthy eating and intake of iron rich foods.

Two new tools were developed to facilitate a standardised approach to management of anaemia as outlined in current protocols:

- The Anaemia Care Plan, to guide health practitioners through the treatment process, was uploaded into the electronic medical record Primary Care Information System (PCIS)
- A monthly reporting template was developed in excel to enable monitoring of each child's haemoglobin level and management if anaemic.

Child Health Nurses (CHNs) in the Outreach Teams were central to the testing and refinement of the tools. They provided training in the new tools and have completed the monthly reports and submitted them to the project leader throughout the project. CHNs also used these reports to provide feedback to each PHCC at the end of each month.

The project commenced in four health centres in remote NT in December 2013, chosen in consultation with PHCC staff to represent a range of community size, location and staff resources available. Two communities in the Top End and two in Central Australia were chosen. One large community with approximately 120 children less than 2 years of age which had dedicated child health staff, two communities with approximately 40 children less than 2 years of age with access to outreach child health trained staff, and one community with approximately 15 children less than 2 years of age which also had access to outreach child health trained staff. Outreach child health nurses were available to support the local health staff implement the testing and management of anaemia following existing protocols.

Monthly feedback provided to PHCC staff highlights the number of children aged 0-2 years who have:

- been tested for anaemia when due using a haemoglobinometer
- been identified with anaemia (haemoglobin less than specified cut-offs according to current protocol)
- had correct treatment initiated (Anaemia Care Plan)

- completed treatment.

## Results

The project commenced in December 2013 and there was a lead-in period of approximately 2 months used to test and refine the reporting tool, and to establish the project in each of the four communities. The Project Manager briefed each PHCC involved and Child Health Nurses engaged local health staff and outlined the importance of anaemia treatment for young children. The results following are related to the 10 month period from February 2014 to the end of November 2014.

The four communities have each provided monthly reports consistently, with all four submitting 8-10 out of the 10 monthly reports required. Since project commencement, an additional twenty-one PHCCs have voluntarily started to complete and submit these reports, hence the reporting process was accepted and is feasible for staff to do.

The major benefit of the monthly reports, has been in clearly identifying the children who have not been tested and/or not treated if found to be anaemic. It is now very clear for PHCC staff to see each child in the population of children under 2 years of age, whether they have been tested when due, and whether the Anaemia Care Plan (ACP) has been commenced if treatment was required. Staff are not only becoming increasingly aware of anaemia in general but also more aware of which children require further follow-up for testing or treatment.

An extract of a monthly report is shown in Figure 2 to demonstrate the key information collected. Where the haemoglobin measure is below the anaemia cut-off for age, it is highlighted in red; whether treatment (ACP) has been commenced is shown (Yes or No) and whether treatment has been completed is also shown (Yes or No). In this case, no child has completed treatment. This is because the ACP will be completed in the next month, when each component of the ACP has been completed including a repeat haemoglobin measure one month after treatment has been completed. It is also clear in the comments column which children have not had testing or treatment when due.

Figure 2 Extract from a Monthly Report

Sort Hb	Reports/ Instructions		Version 4
Hb g/L	Anaemia Care Plan Y/N	Anaemia Care Plan Completed	Comments
87	Y	N	still on care plan for anaemia
97	N	N	No hb attended
97	N	N	Hb not done since September 2013
98	Y	N	
102	Y	N	on care plan
105	N	N	no hb attended since February
106	Y	N	overdue visits for iron injections
108	Y	N	COMMENCED ON ANAEMIA CARE PLAN not yet completed
112	N	N	not done July
115	N	N	not attended at check in July
117	N	N	Not done July
119	N	N	not been re done since June

The ACP has been well adopted although there was a time-lag in its availability with it being uploaded ready for use in early March 2014. Staff awareness of the ACP is increasing, and training continues by the outreach Child Health Nurses.

Implementation has varied by PHCC, and by month within individual Health Centres. Testing when due appears to have improved in 3 out of the 4 communities and commencing an ACP if child was found to be anaemic increased in every community. Where this process has been implemented well, there appears to have been a reduction in anaemia.

## Discussion

The systematic approach designed to identify and manage anaemia in young children has been shown to be feasible, is acceptable to health care staff and based on the small numbers of children reported appears to be improving treatment outcomes.

The most important aspect of this systematic approach has been making the children who need to be tested or have been identified to have anaemia clearly visible to health care staff. Staff work hard to do good work in remote communities, however monitoring these children in this systematic way provides timely feedback than can ensure children do not miss out on testing or treatment if needed. The reports assist staff to identify where children have not been tested when due, why this may have been the case. Using this systematic approach enables staff to review and identify where any problems may be that hinder success at any step. These can be different for each community, so staff can then plan appropriate responses to address the problem in that community.

Standardisation of treatment according to protocols through the use of the Anaemia Care Plan is beneficial. With high staff turnover in remote PHCCs it can be difficult to ensure all staff are aware of protocols. The ACP enables staff to be guided through the correct treatment protocol and helps ensure consistency of care regardless of staff attending, particularly when the child is required to return for several treatment visits. A further benefit will be to enable timely reporting due to treatment now being recorded in a standardised manner that is extractable.

Staff commitment to the project process is important for success. Competing work priorities are one reason given for staff being unable to complete the monthly reports, if not done. Of concern, is the time commitment required for CHNs to complete these reports. Each report involves manually reviewing the medical record of each child in that community PHCC, and entering data from the record into the excel spreadsheet. Work is progressing to develop management reports that will be generated directly from PCIS to overcome this issue.

The monthly reports are proving valuable in identifying children with anaemia and providing a task list for clinical staff of children who need follow-up for testing or treatment. The additional PHCCs that have voluntarily begun participation in the program, represent nearly half of the government health centres in the NT. Staff feedback indicates an increased awareness of anaemia and awareness of the importance of treating it as a result of this process.

These results are preliminary and it has not been possible to do statistical analysis on the very small numbers of children involved. Since the project has now expanded to include additional PHCCs, analysis of the treatment outcomes will be possible in future. Early indications are that across the NT, where this systematic process has been implemented, anaemia rates are reducing.

## Conclusion

Early identification of anaemia in young children, and providing complete treatment when diagnosed, is important to their healthy development. A systematic approach was developed to assist staff to adhere to existing protocols for anaemia treatment. The monthly reports developed have been effective in assisting staff to identify children with anaemia, and have ensured that children with anaemia remain visible until treatment is complete. The Anaemia Care Plan has facilitated a standardised approach being followed according to current protocols and more consistent recording of treatment information. Consistent implementation of this systematic approach is considered likely to reduce anaemia in young children. Work continues to integrate the monitoring and reporting process into usual care practices.

## Recommendations

- Utilise a systematic approach to help improve service delivery
- Facilitate standardisation of treatment through adopting clear protocols
- Monitor process indicators and treatment outcomes and provide regular feedback to staff

## References

1. Kappagoda Astika. The power of systems thinking in medicine. *Medical Journal of Australia*. 2014;200(4):189.
2. Department of Health Northern Territory. Healthy Under 5 Kids Program Growth and Nutrition Report. Darwin: Department of Health 2014.
3. Black Maureen M, Quigg Anna M, Hurley Kristen M, Reese Pepper Margery. Iron deficiency and iron-deficiency anemia in the first two years of life: strategies to prevent loss of developmental potential. *Nutrition Reviews*. 2011;69(Suppl 1):64-70.
4. Lozoff B, Beard J, Connor J, Felt B, Georgieff M, T. S. Long-Lasting Neural and Behavioural Effects of Iron Deficiency in Infancy. *Nutrition Reviews*. 2006;64(5 Pt 2):S34-91.
5. Bar-Zeev Sarah J, Kruske Sue G, Barclay Lesley M, Bar-Zeev Naor H, Carapetis Jonathan R, Kildea Sue V. Use of health services by remote dwelling Aboriginal infants in tropical northern Australia: a retrospective cohort study. *BMC Pediatrics*. 2012;12:19.
6. Aquino D, Marley J V, Senior K, Leonard D, Joshua A, Huddleston A, et al. Early Childhood Nutrition and Anaemia Prevention Project. Darwin: The Fred Hollows Foundation., 2013.
7. CARPA 2014. CARPA Standard Treatment Manual. 6th ed. Alice Springs:Centre for Remote Health

## Presenter

**Heather Ferguson** is the Child Health Nutritionist in the Child Youth Health Strategy Unit of the Northern Territory Department of Health. Her focus is on improving the identification and management of childhood anaemia and growth faltering and is developing a systematic approach for monitoring and treatment of these problems in children under 2 in the remote NT. She has also begun work on identifying the determinants of anaemia and growth faltering which go beyond the accepted issues of nutrition and infection in childhood, to early determinants in pregnancy. Originally graduating as a dietitian with a Bachelor of Science and Postgraduate Diploma of Dietetics from Deakin University, Heather has worked in industry and now in public health in the government sector. Her qualifications include a Master of Public Health from the University of Melbourne and the Master of Business Marketing from the University of Technology Sydney.