HEALTHY SKIN WORKSHOP BACKGROUND BRIEFING PAPER

Developing a framework to enable a coordinated approach to Healthy Skin in the Top End

> ***Scabies is a proxy for poverty and disadvantage, affects populations with low visibility and little political voice, and causes stigma and discrimination***
> ***The Lancet 2014***

The Healthy Skin Workshop is being convened by Menzies School of Health Research in partnership with Rheumatic Heart Disease Australia (RHDA), One Disease and Telethon Kids.

Purpose:

The Healthy Skin Workshop will bring together representatives from key sectors including policy, clinical practice, research and the community to discuss the development of recommendations and proposed next steps which will contribute to the formation of evidence based policy. This will include a review of National and local initiatives and identify areas of previous work to inform recommendations for promotion of Healthy Skin in Indigenous communities.

Aims:

- To bring together representatives from different sectors involved in 'healthy skin' to share knowledge and experiences
- To provide education about diagnosis and treatment to health care providers
- To provide information and strategic direction for policy to improve skin health in northern Australia

Outcomes:

- Using a mind map, develop and expand key elements of a model that contributes to healthy skin
- Develop a summary document outlining current knowledge and future directions

Participants:

An invitation has been extended to key sector participants including:

- Health care providers – primary and tertiary
- Research
- Public health
- Environmental health
- Housing
- NGOs – One Disease
- Community members

A full participant list will be provided in the post-workshop report.

Specific objectives:

- To share information on strategies for the prevention of skin infections and the promotion of Healthy Skin and the current issues and activities in this area across Australia by using a mind map
- To commence an open dialogue on issues relating to Healthy Skin with a specific focus on areas where service provision could be improved by bringing together stakeholders from policy, clinical practice and research to improved outcomes for those affected by poor skin health
- To commence:
    - an assessment of the current national and jurisdictional policy contexts with respect to housing, environment, education, research and clinical and public health management

- a review of international experience and recommendations
- To build relationships with and amongst key stakeholders, and to develop a platform for ongoing engagement.

Process:

Following a series of short, targeted presentations which highlight new and emerging research findings, clinical and public health practice, education strategies and community engagement, participants will be asked to:

- Assess current gaps using a mind map
- Expand on priority areas
- Make recommendations for potential reorientation of health services and systemic changes.
- Consider what an ideal model of care may look like

Briefing paper:

The background briefing paper provides participants with:

- The Mindmap that will be expanded in the facilitated session – Pillars of Healthy Skin
- Considerations for healthcare and infrastructure system design/redesign applicable
- Primary health care systems and policy areas applicable in the context of Healthy Skin
- Current research activity/priorities.

PILLARS OF HEALTHY SKIN: MINDMAP

Each pillar will be accompanied by targeted questions which are prompts to guide thinking. For each of the elements, participants will undertake a brief assessment of the current situation and work to identify any gaps in service delivery and priorities for programs in the future.

Background to Healthy Skin (Guidelines for the Community Control of Scabies, Skin Sores, Tinea and Crusted Scabies in NT)

The Healthy Skin workshop will focus on issues related to scabies, crusted scabies, skin sores (impetigo) and tinea.

Scabies is endemic in many remote Aboriginal communities, and underlies a large proportion of streptococcal skin infections. Control of scabies is therefore critical in controlling streptococcal skin infections and their sequelae. Outbreaks of acute post streptococcal glomerulonephritis (APSGN) have been documented in the NT with large periodic outbreaks involving numerous communities. APSGN occurs following streptococcal skin infection and is characterised by oedema (most noticeably of the face), haematuria and hypertension. NT studies have shown that children who have had APSGN are 6 times more likely to develop chronic kidney disease (CKD) as adults.

The incidence of acute rheumatic fever (ARF) and prevalence of rheumatic heart disease (RHD) in Top End communities are among the highest in the world. Low incidence of streptococcal pharyngitis and high incidence of streptococcal skin infections and ARF in Indigenous communities have led to the hypothesis that ARF can occur as a complication of streptococcal skin infection. For further information see the Australian Guideline for Prevention, Diagnosis and Management of Acute Rheumatic Fever and Rheumatic Heart Disease (2nd edition). The high rate of streptococcal infection is therefore likely to be a significant contributing factor to the high prevalence of CKD and RHD in the NT. Control of scabies is essential for prevention of streptococcal skin infection.

SCABIES KEY FACTS

- Up to 7 in 10 Indigenous children suffer from scabies at least once before their first birthday.
- 1 in 270 Indigenous people in the NT suffer crusted scabies
- If untreated people with crusted scabies have a 50% mortality rate over 5 years

SCABIES PREVENTION & CONTROL

- Crusted Scabies a highly contagious and chronic form of the skin disease, scabies. People with Crusted Scabies become engulfed with millions of scabies mites because their body is unable to launch an immune response to control mite replication. They often suffer in silence with pain and disfigurement (crusting and rotting flesh) similar to the social stigma of leprosy. If left untreated these individuals have a 50% mortality rate over 5 years.
- Crusted scabies patients are core transmitters of scabies spreading it to others in their household and community. Elimination of crusted scabies is a crucial step to addressing scabies which is endemic in remote Indigenous communities.

Programs in the NT – East Arnhem Region Healthy Skin Workshop Darwin 2004

EARHS Project commenced in 2004 with the aim of developing community based control of skin infections. The control had to be sustainable, properly evaluated and integrated into routine service delivery. The project provided screening for scabies, skin sores and tinea and was accompanied by treatment and follow-up services. Key outcomes following the introduction of this program:

- skin sores rates dropped by 40%: from 460 children in every 1000 to 276 children in every 1000
- infected scabies dropped from 59%: from 37 children in every 1000 to 15 children in every 1000
- integration of outreach services linked to baby health clinics

- improved relationships with community health workers (CHWs) and the wider community
- established outreach services lead by CHWs

Key recommendations:

- Urgent need for practical and feasible treatment for community management of endemic scabies
- Further investigation of gold standard approaches that encompass alternate treatments for both skin sores and scabies at the community level
- Build on existing relationships
- Complete a full analysis and prepare Guidelines

Programs in WA- Healthy Skin Healthy Lives workshop Perth 2012

The workshop, which brought together researchers, healthcare providers, policy makers and other key stakeholders, focused on two key questions: (i) What is the current status and base of knowledge in relation to scabies and skin sore control in remote Aboriginal populations? (ii) Given what is known, if skin infections in WA's remote Aboriginal communities are determined to be a health priority, which actions can be taken now to significantly decrease the burden of skin infections in these communities over the next few years?

The outcome of the workshop brought forward the following set of key principles, which should be considered as the basis for any future control program:

(i) Community-based ivermectin and/or permethrin mass drug administration campaigns might have a role to play in significantly lowering the prevalence of scabies and related skin infections in high burden communities in WA. However, such an intervention should be considered only secondary to other community-level interventions that aim to improve routine healthcare delivery mechanisms and its capabilities to systematically screen and treat for scabies and associated skin infections, particularly in infants;

(ii) The screening and clinical management of skin infections can be improved by developing and implementing guidelines and clinical algorithms for healthcare providers, health workers and community workers;

(iii) Monitoring mechanisms specific to the early detection and treatment of 'hyper-transmitters' should be put in place;

(iv) Any program aiming to improve the control of skin infections in remote Aboriginal communities must be multi-facetted and comprehensive in a way that it also addresses the broader determinants that underlie this health issue. No single intervention or strategy in itself is sufficient for the sustainable control of skin infections;

(v) A commitment to community participation, education and empowerment are essential in terms of reducing skin infection rates and supporting the acceptability and sustainability of any interventions;

(vi) The monitoring and evaluation of intervention outcomes should go beyond measuring the prevalence of skin infections and should also consider other possible benefits that may result from the program.

DRIVERS FOR CHANGE/POLICY CONTEXT

Aboriginal and Torres Strait Islander Health Performance Framework 2014 Report, Commonwealth

Environmental factors noted as key areas for monitoring and improvement

'Towards a strategy that supports future advocacy of primary health care' - Public Health Association of Australia (PHAA) response to establishment of new Primary Health Networks, May 2015

Following substantial changes to Federal government policy and funding leading to defunding of Australian Medicare Local Alliances and the creation of new Primary Health Networks, the Public Health Association of Australia has held a series of National forums to identify current issues in primary healthcare service provision and the need for strong advocacy. The PHAA has developed a Communiqué in primary health care that provides recommendations to the Federal government regarding primary health care in the proposed Primary Health Networks that builds on primary health care work undertaken by Medicare Locals.

One of the key recommendations of the National forums is to improve primary prevention through:

- A systematic approach to primary prevention and a focus on improving the social determinants of health for everyone
- Government investment in primary prevention
- Investment in front line services that include health promotion
- Capacity building in primary prevention in the primary health care arena with relevant stakeholder organisations including:
    a. Local governments
    b. Non-government organisations
    c. Proposed PHNs
- Support for the use of existing knowledge, data to drive improved primary prevention
- Advocate/champion primary prevention and social determinants approaches at systems levels

Aboriginal and Torres Strait Islander health organisations Online Services Report—key results 2013–14, Published May 2015.

Participants from Primary Health Centres across the country were asked to identify service priorities:

- Sixty-one per cent of all organisations reported a service delivery gap in their communities for mental health and social and emotional health and wellbeing.
- Recruitment, training and support of Aboriginal and Torres Strait Islander staff (68%) and staffing levels (58%) were commonly reported as challenges to providing quality services.

The columns provide the percentage of organisations who nominated these health service gaps in their top 5. Environmental health services, early childhood development and maternal and child health figure prominently in these priority areas and are impacted by the social determinants of health.

Table 7.1: Health service gaps, by type of gap, 2012–13 and 2013–14

Service gap	2012–13	2013–14
Mental health/social and emotional health and wellbeing	61.9	60.6
Alcohol, tobacco and other drugs	48.1	50.6
Youth services	47.3	50.6
Environmental health services (including housing)	**40.8**	**41.3**
Prevention/early detection of chronic disease	45.4	41.3
Dental services	43.1	40.1
Early childhood development and family support	**30.0**	**33.8**
Access to health services (including transport)	29.6	30.1
Nutrition services (including lack of access to affordable healthy food)	26.5	29.4
Services to support healthy ageing	29.6	24.9
Maternal and child health	**21.9**	**23.8**
Disability services	21.5	21.9
Palliative care	18.1	16.7
Treatment of injury and illness	9.6	9.3
Pharmacy services	7.3	2.2

Note: Organisations were asked to select the top 5 health service gaps faced by the community they served.

Source: AIHW OSR data collection 2013–14.

IACS – International Alliance for the Control of Scabies

IACS was formed in 2012 and is a global network committed to the control and elimination of human scabies in order to improve the health and well-being of all those living in affected communities. 4 major areas noted for development:

- Advocacy and funding
- Control strategies
- Epi and surveillance
- Research priorities

HEALTHY SKIN AUSTRALIA - A TIMELINE OF EVENTS

YEAR AND EVENT – HEALTHY SKIN PROGRAMS	
2000	East Arnhem Regional Healthy Skin Project initiated
2003	Healthy Skin program launched
2007	Darwin Healthy Skin round table
2008	East Arnhem Regional Healthy Skin Project: Final report 2008
2010	Healthy Skin Guidelines 2nd ed.
2012	WA Healthy Skin Healthy Lives workshop
2015	Health Skin Guidelines 3rd ed. Revision of
2016	Menzies Healthy Skin workshop Stage 1

About the hosting institutions:

OneDisease: http://onedisease.org/
MISSION: is to eliminate Crusted Scabies from remote Indigenous communities. We believe no Australian should die of a preventable disease.

RHDAustralia: www.rhdaustralia.org.au
RHDA was established in 2009 as the National Coordination Unit to support control of rheumatic heart disease in Australia. Funded under the Australian Department of Health's Rheumatic Fever Strategy, RHDAustralia is based at Menzies School of Health Research in Darwin. RHDA's aim is to reduce death and disability from acute rheumatic fever (ARF) and rheumatic heart disease (RHD) in Australian Aboriginal and Torres Strait Islander people.

Menzies: www.menzies.edu.au
MISSION: To break the cycle of disease and improve health outcomes for people in Australia and the Asia-Pacific region, particularly Aboriginal and Torres Strait Islander communities, through excellence and leadership in research, education and capacity development.
Menzies Australia's only medical research institute dedicated to improving Indigenous health and wellbeing. Menzies was established in 1985 and is now a major partner of CDU and constitutes a school within the University's Institute of Advanced Studies. Menzies works to address critical issues such as mental health, nutrition, substance abuse, child health and development, as well as chronic diseases such as cancer, kidney disease and heart disease.

Telethon Kids: http://telethonkids.org.au/
VISION: To improve the health and wellbeing of children through excellence in research.
The Telethon Kids Institute is one of the largest, and most successful medical research institutes in Australia, comprising a dedicated and diverse team of more than 500 staff and students. Established in 1990 by Founding Director Professor Fiona Stanley, the Institute was among the first to adopt a multidisciplinary approach to major health issues: clinical research, laboratory sciences and epidemiologists all under the one roof, to tackle complex diseases and issues in a number of ways.

KEY RESOURCES/ARTICLES (to be expanded during the day)

see also http://www.menzies.edu.au/page/Research/Indigenous_Health/Skin/Healthy_Skin_Workshop_2016/ for links to resources

MIND MAP PILLARS			
PUBLIC HEALTH & CLINICAL	**PUBLICATION/RESOURCE**	**KEY POINTS**	**TAKE HOME MESSAGE**
	Managing Crusted Scabies in Remote Aboriginal Communities 2014 EDITION Chronic disease case management of crusted scabies to break the cycle of recurrences and transmission NT CDC Healthy Skin Program Guidelines (planning a healthy skin day) The first is the original Galiwinku permethrin study - Carapetis Et al - includes Chris Connors and Vicki (paper attached). Factors supporting sustainability of community based scabies control program Wong et al Aust J Dermatol 2002 (paper attached) Outcome of an interventional program for scabies in an Indigenous Community Wong et al MJA 175 Oct 2001 (paper attached) Healthy Skin publications available via the Lowitja website http://www.crcah.org.au/search/site/healthy%20skin	Confirm diagnosis Patient treatment Household treatment Chronic care plan	• Key factor to success is building rapport & building capacity for self-management
ENVIRONMENTAL	Managing households with recurrent scabies	This document guides clinical and community staff on strategies to break the cycle of recurrent infections.	• Time spent on individual early case management of these children and households can lead to improved outcomes, interruption of transmission and reduced workload for clinics in the long run. • Done well this public health activity can lead to rapid improvements in health and quality of life for the family and bring the family, community and

			health centre closer together.
RESEARCH ARTICLES	• Short-course oral co-trimoxazole versus intramuscular benzathine benzylpenicillin for impetigo in a highly endemic region: an open-label, randomised, controlled, non-inferiority trial • The Global Epidemiology of Impetigo: A Systematic Review of the Population Prevalence of Impetigo and Pyoderma • Prevalence of scabies and impetigo worldwide: a systematic review • Mass Drug Administration for Scabies Control in a Population with Endemic Disease • Whole genome sequencing reveals extensive community-level transmission of group A Streptococcus in remote communities • Impact of an Ivermectin Mass Drug Administration on Scabies Prevalence in a Remote Australian Aboriginal Community		
HOUSING	NSW Housing for Health Health Habitat Cwth Department of Families, Community Service & Indigenous Affairs National Indigenous Housing Guide IMPROVING THE LIVING ENVIRONMENT FOR SAFETY, HEALTH AND SUSTAINABILITY	**HOUSING FOR HEALTH PRIORITIES** The Housing for Health process aims to assess, repair or replace health hardware so that houses are safe and the occupants have the ability to carry out healthy living practices (HLPs). All works carried out in the Housing for Health program are prioritised in terms of health benefit. The priorities are: • Safety - Immediate life threatening dangers, particularly electrical, gas, fire, sewage and structural safety issues are addressed as the highest priority. • Healthy Living Practices - After safety issues have been addressed, the prioritised list of Healthy Living Practices from 1 (most important) to 9 provides a focus for prioritising repair and maintenance: • Washing people - ensuring there is adequate hot and cold water and that the shower and bath work. • Washing clothes and bedding - ensuring the laundry is functional	

		with separate taps for waste for the washing machine and tub. • Removing waste safely - ensuring drains aren't blocked and that the toilets are working. • Improving nutrition - assessing the ability to prepare and store food, making sure the stove works and improving the functionality of the kitchen. • Reducing overcrowding - ensuring health hardware (particularly hot water systems and septic systems) can cope with the actual number of people living in a house at any time. • Reducing the impact of animals, vermin or insects - on the health of people, for example, ensuring adequate insect screening. • Reducing dust - to reduce the risk of respiratory illness. • Controlling temperature - looking at the use of insulation and passive design to reduce the health risks, particularly to small children, the sick and the elderly. • Reducing trauma - being non-life threatening issues.	
RESEARCH	**REPORTS** East Arnhem Regional Healthy Skin Project: Final Report 2008		
OTHER LINKS	IACS – International Alliance for Control of Scabies		

Outcome of an interventional program for scabies in an Indigenous community

Li-Chuen F Wong, Beth Amega, Christine Connors, Ruth Barker, Mary Elizabeth Dulla and Bart J Currie

ABSTRACT

Objective: To implement an intervention program for reducing the prevalence of scabies in a large Northern Territory Aboriginal community.

Design: Prospective, longitudinal screening, intervention and follow-up study.

Participants and setting: All children aged 5 years and under in one of the largest Aboriginal communities in the Northern Territory, total population, approximately 2200 (95% Indigenous).

Main outcome measures: A decrease in prevalence of scabies, infected scabies and non-scabies pyoderma over seven months.

Results: The number of children aged 5 years and under screened intially and at the three follow-up screenings ranged from 201 to 242 (more than 98% of those eligible on each occasion). The prevalences of scabies, infected scabies and non-scabies pyoderma before intervention were 35%, 12% and 11%, respectively. At 6 weeks postintervention these had decreased to 3%, 1% and 4%, respectively; low prevalences were maintained at four and seven months.

Conclusions: This intervention, which was based on community motivation, involvement and control, successfully reduced the prevalence of scabies. Continuing community health education and regular screening will be crucial in controlling scabies. The methods and results of this study may be helpful in developing a coordinated program for all remote Aboriginal communities in the area.

MJA 2001; 175: 367-370

SCABIES IS ENDEMIC in many remote Aboriginal communities, with prevalences of up to 50% in children and up to 25% in adults.[1] Crusted scabies is highly infectious, and affected patients have a mortality rate of up to 50% over five years.[2] Scabies underlies 50%–70% of streptococcal pyoderma, which accounts for high rates of severe group A streptococcus infection within the tropical north ("Top End") of the Northern Territory of Australia.[3,4-8] Further, post-streptococcal disease rates in Aboriginal Australians are among the highest in the world.[1,3,8] Control of scabies is therefore crucial. Treating families in isolation will have only limited success because of high levels of movement between houses and communities. It is necessary to treat entire communities.

METHODS

Sample

We screened children aged five years and under who were present in the community at the time of each screening. This group was identified by the health clinic population records.

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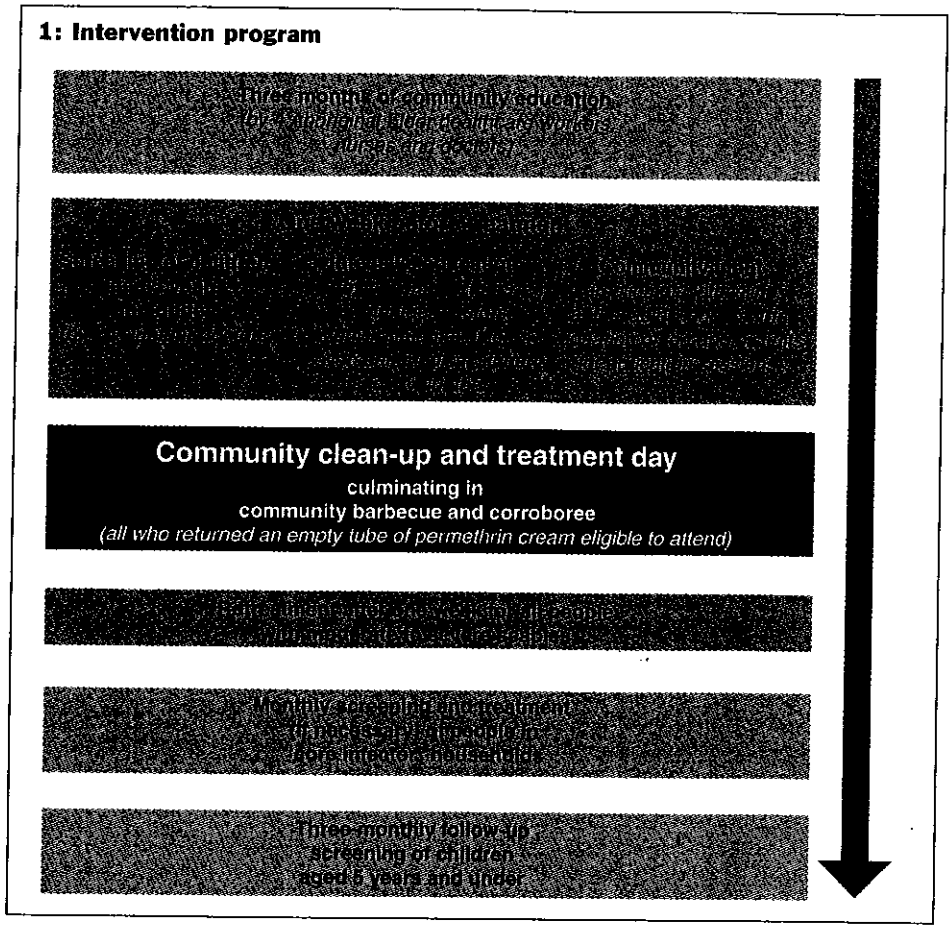
Intervention

Education: From three months before the intervention, the message "healthy house makes healthy skin makes healthy body" was reinforced at the clinic by four Aboriginal Elder healthcare workers, nurses, and doctors while they were attending to patients. Posters and leaflets designed by local Indigenous artists were used.

One week before the treatment day, a team (described in Box 1) began giving intensive community education sessions. Team members had been briefed by the volunteer doctors on scabies and skin sores, as well as the health message to be delivered to the community, which included the importance of personal hygiene as well as regular housecleaning, washing and airing of mattresses and clothes. Correct application of 5% permethrin cream was demonstrated (total body coverage, including hands, feet and genital areas), while common myths (eg, that the cream was poisonous and would change the colour of the skin) were dispelled.

Screening: During these community education sessions, children aged five



years and under were screened by the two doctors, who used a written protocol to record the presence and severity of scabies and non-scabies pyoderma. Screening took place in the open, in full view of parents and relatives, following verbal consent from the children's families.

Scabies was diagnosed by the presence of papular lesions or burrows in the hands, feet, genitalia, scalp and buttocks. Scabies was classed as mild, moderate or severe on the basis of the number of body areas involved and whether hyperkeratosis (crusting) was present. Pyoderma was diagnosed clinically, as in previous studies.[3] Children with infected scabies were given a single dose of benzathine penicillin intramuscularly.

Community clean-up: 50 community volunteers were placed into teams, with each team responsible for delivering, on treatment day, the donated soaps, washing powders, detergents and 5% permethrin cream to their allotted houses.

Community input: Environmental officers erected clotheslines for houses. A well-known local artist designed the "anti-scabies" logo and teachers from the local school screen-printed this logo onto T-shirts for the volunteers (see *Journal cover*). The store donated biscuits and tea for the education sessions and supplied the food for a community barbecue.

Treatment and clean-up day: Treatment day was 20 June 2000. The store, bank, school and council closed in support. Residents swept and mopped their floors with detergent, washed their clothes and sheets, and aired their mattresses in the sun. In the afternoon, all community members were encouraged to apply the 5% permethrin cream, which was left on overnight and washed off with water the following morning. Babies aged two months or less were treated with a mixture of half 5% permethrin cream and half 10% crotamiton cream. On returning an empty tube of cream, people were given a sticker bearing the "anti-scabies" logo, which entitled them to attend the community barbecue that evening. An estimated 1100 people attended the barbecue, making it one of the largest community functions ever held. A corroboree led by the Elders ended the day.

Follow-up: In accordance with the Territory Health Services *Guidelines for community control of scabies and skin sores*,[9] children identified with moderate or severe scabies were treated again the following week. Adults living in the same house as these children were also re-treated and examined for crusted scabies, and their houses were fumigated with synthetic pyrethroid (Raid 25%) by an environmental officer to eliminate remaining mites in the house. All children in the community aged five years and under were screened again at follow-up visits at six weeks, four months and seven months after the intervention.

Ethical approval

Approval was obtained from the Joint Institutional Ethics Committee of the Royal Darwin Hospital and the Menzies School of Health Research.

Statistical analysis

Prevalences of scabies, infected scabies and non-scabies pyoderma before and after intervention were compared by the χ^2 test with Yates' correction. Risk reductions with 95% confidence intervals (CI) were calculated with EpiInfo.[10]

RESULTS

Scabies and pyoderma

Our findings are summarised in Box 2. More than 98% of children aged five years and under in the community were screened at each visit. Most of those screened at follow-up visits were the same individuals examined initially. Before the intervention, 35% had scabies, about a third had infected scabies, and non-scabies pyoderma was found in 11%.

At six weeks after the intervention, there was a highly significant reduction of scabies (relative risk [RR], 0.09; 95%

2: Prevalence of scabies, infected scabies and non-scabies pyoderma in children aged five years and under in a large Aboriginal community, before treatment in June 2000, and at six-week, four-month and seven-month follow-up

	Before treatment	Follow-up		
		Six-week	Four-month	Seven-month
Number screened	217	201	220	242
Total with scabies	76 (35%)	6 (2.9%*)	11 (5%*)	10 (4.1%*)
Mild	*19 (25%)*	*1 (16.6%)*	*1 (9%)*	*5 (50%)*
Moderate	*36 (47%)*	*2 (33.3%)*	*9 (82%)*	*3 (30%)*
Severe	*21 (28%)*	*3 (50%)*	*1 (9%)*	*2 (20%)*
Infected scabies	25 (11.5%)	2 (0.9%)	2 (0.9%)	5 (2.0%)
Non-scabies pyoderma	24 (11%)	9 (4.4%†)	10 (4.5%)	8 (3.3%‡)

* $P<0.0001$ in comparison to preintervention. † $P=0.02$ in comparison to preintervention. ‡ $P=0.002$ in comparison to preintervention.

CI, 0.04–0.019), infected scabies (RR, 0.09; 95% CI; 0.02–0.36) and non-scabies pyoderma (RR, 0.40; 95% CI, 0.19–0.85), with low levels sustained at four months and seven months. Rescreening detected scabies in a subgroup of children previously diagnosed and treated, but living in a household with adults with moderate to severe or crusted scabies.

Community involvement

This intervention fostered a sense of community pride, and led to initiatives such as the monthly "best backyard" competition (first prize, a washing machine).

DISCUSSION

Empowerment and involvement of the whole community facilitated a successful intervention, which reduced the prevalence of scabies. Residents were involved in the intervention (ie, distributing medication, participating in the community clean-up and helping to organise the barbecue) because it was implemented within the community setting. We conducted our study in a community representative of the other communities in the Top End, suggesting that our successful intervention program could be adapted for other areas with endemic scabies.

Education about personal and household cleanliness is important, not only in decreasing streptococcal infection and maintaining scabies control, but also for general health and well-being. As with previous successful scabies control programs, our intervention did not involve antiscabetic treatment for dogs.[3,11] The cycles of scabies transmission in dogs and humans do not appear to significantly overlap in Aboriginal communities.[12] Human scabies infestations acquired from infested dogs are short-lived and resolve spontaneously.[13] Therefore, control of the scabies epidemics in Aboriginal communities requires that resources be used to treat humans rather than dogs.[1]

We screened only children aged five years and under because:

- the paediatric population is a sensitive marker of scabies in the general population;
- young children are much easier to screen for cultural reasons (eg, there is no embarrassment involved with them removing their clothes in the open), and such limited screening saves considerable time and resources; and
- detection of infested children indicates which households have adults with moderate to severe or crusted scabies.

Permethrin cream (5%) is currently considered the drug of choice for treating scabies.[14] However, if its use in future intervention programs becomes widespread, it will be important to monitor for evidence of emerging resistance. Treatment of scabies with ivermectin is increasingly popular, but most studies have excluded children and pregnant women. Further, one report has shown that a single application of permethrin was superior to ivermectin.[15] Fatal idiosyncratic sensitivity to ivermectin has been reported in animals, and concerns were raised about a possible association with increased death rates among elderly patients.[16] This convenient oral medication was used in our program only as adjunctive treatment for crusted scabies.

Future work

Two doctors will continue the future rescreening. The women Elders and Aboriginal healthcare workers will continue to spread the "healthy skin" message within the community, as well as advising anyone with suspicious symptoms to seek medical attention. Patients with severe or crusted scabies are "core infectors" in the community; they are difficult to cure and often require multiple doses of ivermectin and topical therapy.[17] Their households will be reviewed on a monthly basis.

Our scabies control study has involved the largest population to date, with previous programs in Aboriginal communities having involved smaller communities of 250 to 1660 residents. Treatment of individual communities in isolation will result in only short-term improvement. A coordinated scabies eradication program involving all communities in the region is needed to achieve sustainable benefits. The Cooperative Research Centre for Aboriginal and Tropical Health is currently developing a "Healthy Skin" program that will support communities in the region in undertaking their own scabies education and treatment programs.

Overcrowded housing is a main contributor to the high prevalence of scabies in Aboriginal communities. Sustainable improvements in Aboriginal health require fundamental changes that address social and economic inequalities. The disparity in resources for Aboriginal communities compared with mainstream Australia has been well described.[18] Our project highlights the need for more hardware conducive to health, such as washing machines, clotheslines, taps and toilets, within the community. Without such basic items, health outcomes will continue to be poor.

COMPETING INTERESTS

Donations were made by Westmead Hospital Charitable Trust, Lever-Rexona Ltd, Warner-Lambert Ltd and TNT Express. None of these organisations has had any input into the design of the study, data collection, analysis, interpretation or the writing of this report.

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BOOK REVIEW

A star in the firmament of malignant haematology

Clinical bone marrow and blood stem cell transplantation. Kerry Atkinson (editor). Cambridge: Cambridge University Press, 2000 (xxi + 1500 pp, $599). ISBN 0 521 62288 3.

IN THE EARLY 1990S, when this haematologist was in training, bone marrow transplantation (BMT) was an arcane and cabbalistic world. Only by chance would one be directed to the key papers that defined clinical practice and decision making. There were few texts that described this fascinating and rich body of knowledge. This book does that and then some!

With BMT now at a crossroads, this book represents a very clear exposition of where we are at and how we got there. As well as its historical introduction, there are sections covering biological background, clinical results, major transplant-related problems, organ-specific complications and laboratory services, as well as a fascinating conclusion covering many developing areas. The extensive author list contains many world leaders in the field, including many Australian contributors.

Background biology is lucidly presented. The chapters on cytogenetics and molecular biology are wonderful summaries of complex areas, and are of interest to haematologists beyond the transplant community. Organ-specific complications are mainly written about by clinicians at St Vincent's Hospital in Sydney. These chapters benefit from a practical clinical approach, and often include useful clinical management algorithms.

The coverage of clinical indications for, efficacy of and complications of various forms of BMT is encyclopaedic. Key papers are thoroughly discussed and the results often presented in sufficient detail to convince the sceptic.

For me, the chapter on the psychosocial implications of BMT was outstanding and makes for sobering reading. How many BMT units warn their patients that there are several studies consistently showing that a third of survivors will have sexual dysfunction years after their procedure?

This book makes a complex field accessible to all. It provides a panoramic overview of malignant haematology and I hope it will find buyers outside those institutions looking for a book to upgrade the new transplant registrar's knowledge base! It is hugely enjoyable, informative, encyclopaedic, and reflects well the deep fascination of those who work in this demanding area.

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NB: A longer version of this review can be read on the MJA website at <www.mja.com.au>

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RESEARCH REPORT

Factors supporting sustainability of a community-based scabies control program

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SUMMARY

Scabies remains a major problem in Aboriginal communities within the Northern Territory of Australia. Secondary skin infection with Group A streptococcus (GAS) is very common and post-streptococcal disease rates remain high. Treating families in isolation will have only limited success, as reinfection frequently occurs as a result of the high levels of movement between households and communities. We describe the results of a successful community intervention to reduce scabies and GAS skin infection in one of the largest Aboriginal communities in the Northern Territory, 15 months post-intervention, and we discuss factors that have led to the success and sustainability of the program.

Key words: Aborigines, community intervention, primary health care, pyoderma, streptococcal infections.

INTRODUCTION

Scabies is endemic in many remote Aboriginal communities with prevalence rates up to 50% in children and 25% in adults.[1] It underlies 50–70% of streptococcal pyoderma, accounting for the high rates of severe Group A streptococcus (GAS) infection within the tropical north (top end) of the Northern Territory of Australia.[2,3] Post-streptococcal disease rates in Aboriginal Australians are amongst the highest in the world.[1,2,4] Rates of end-stage renal failure in the Aboriginal people of the Northern Territory are 21 times that seen in the general Australian population and have recently been shown to be associated with post-streptococcal glomerulonephritis in childhood.[5]

Crusted scabies is characterized by localized or generalized areas of hyperkeratosis and hyperinfestation with scabies mites. Patients with crusted scabies previously had a 5-year mortality rate of 50%, predominantly from secondary sepsis.[6] These patients are 'core infectors' of other community members.[2] Response to standard topical 5% permethrin cream is often inadequate in crusted scabies and multiple doses of oral ivermectin may be required.[6]

Scabies transmission occurs through direct skin contact with infected persons. Transmission through exposure to infested clothing and bedding is less efficient but probably still significant in the community setting.[7] Inadequate 'health hardware' (washing machines, toilets, taps, showers) and chronic overcrowding, with as many as 32 people sharing one house, contribute significantly to scabies transmission in Aboriginal communities.[8] Treating families in isolation will have only limited success because of high levels of movement between houses and communities. Therefore, it is necessary to treat entire communities.

Recently, we have published a description of a community scabies intervention program for one of the largest Aboriginal communities in the Northern Territory.[9] In that paper, sustained reduction in the prevalence of scabies within the community was described for 7 months post-intervention. The purpose of this paper is to present results of scabies screening 15 months post-intervention and to discuss factors that have contributed to the success and sustainability of the program.

METHODS

Education, screening and community clean up were as previously published.[9] In brief, the message of 'healthy houses'

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makes 'healthy skin makes healthy kids' was disseminated 3 months prior to treatment day. One week prior to the treatment day, intensive education was carried out in the community by the 'team' comprising four women elders, two volunteer doctors, two environmental officers, one volunteer and one overseas medical student. Volunteer doctors briefed the team members on the diagnosis of scabies and/or skin sores, as well as the health message to be delivered to the community. This included the importance of personal hygiene and regular housecleaning, as well as the correct application of 5% permethrin cream.

Children 5 years and under were screened using a printed protocol during these community education sessions by the two doctors, for the presence/severity of scabies, secondarily infected scabies and non-scabies pyoderma. Children with infected scabies and non-scabies pyoderma were given single dose intramuscular (IM) benzathine penicillin initially and at follow-up visits.

The single community treatment day was planned with a community clean up. Teams were formed from 50 community volunteers, with each team responsible for delivering the donated washing items and scabicide 5% permethrin cream to their allocated houses.

A well-known local artist designed the 'antiscabies' logo seen on the T-shirts for the volunteers (Fig. 1). The local store donated the food for the education sessions around the community as well as for the community barbecue.

The Community Treatment/Clean-up Day occurred in June 2000. Residents cleaned their houses, washed their clothes/sheets and exposed to the sun their mattresses. In the afternoon, all community members were encouraged to apply the 5% permethrin cream. This was left on overnight and washed off with water the following morning. Babies 2 months and under were treated with a mixture of 50:50 5% permethrin cream and 10% crotamiton cream, applied in a similar manner to that on the adults. A sticker bearing the antiscabies logo was issued on return of an empty tube of cream. This entitled people entry to the community barbecue held that evening (Fig. 2).

In accordance with the Guidelines for Community Control of Scabies and Skin Sores (Territory Health Services, September 1997),[10] children identified with moderate/severe scabies were treated again the following week. Only adults living in the same house as these children were re-treated and screened for crusted scabies.

Follow-up screening of all children occurred at 6 weeks after the community treatment day, and then at 3 monthly intervals for 15 months. From 12 months post-intervention, screening included children up to 6 years of age. Children found to have scabies and/or skin sores were treated at each follow-up visit with permethrin 5% cream and single dose IM benzathine penicillin, respectively.

Figure 1 Logo for 'Scabies Day', June 2001, created by the well-known local artist Timothy Dumoo (reproduced with the artist's permission).

Figure 2 Children with 'antiscabies' sticker: ticket of admission to the community barbecue (published with the permission of the community elders).

Figure 3 Children rescreened during follow-up visits (published with the permission of the community elders).

A second community clean-up day was initiated by community members and held 1 year after the first treatment/community clean-up day. A repeat community scabies treatment was not required because of the sustained lower prevalence of scabies.

Approval was obtained from the Joint Institutional Ethics Committee of the Royal Darwin Hospital and the Menzies School of Health Research.

RESULTS

Scabies and pyoderma

Our findings are summarized in Table 1. More than 94% of children aged 5 years and under in the community were screened at each visit. The majority of those screened at each follow up were the same individuals as those initially screened.

The prevalence of scabies pre-intervention was 35%, falling to below 5% at each subsequent visit until 10 months post-intervention. One year after treatment day, the prevalence of scabies had increased to 9% and at 15 months after the treatment day, it was 12% (still significantly lower than pre-intervention). Children with scabies showed a consistent trend towards milder disease post-intervention.

The prevalence of infected scabies has fallen from 11.5% pre-intervention to 0.5% 15 months after the treatment day. Non-scabies pyoderma was 11% pre-intervention and 1.6% at 15 months post-intervention, although it had risen back to pre-intervention levels before the second clean-up day.

Community involvement

Community involvement and initiative was achieved as part of this 'Healthy Skin' intervention. This included local council initiatives such as the monthly 'best backyard' competition, with prizes such as a washing machine.

DISCUSSION

Our program has been successful in reducing and maintaining a lower rate of community scabies for 15 months post-intervention. The prevalence of scabies at 15 months post-intervention is around one-third of the pre-intervention rate. Similar programs have been tried in other Aboriginal communities with variable results.[2,11,12] The majority of these programs have been successful in achieving an initial reduction in scabies and pyoderma. However, the sustainability of these programs has been problematic, with a rise in scabies prevalence back towards pre-intervention levels within 1 year in some cases. We believe the success of our program relies on three factors: regular rescreening, community education and community involvement.

Regular rescreening facilitates a continued focus on scabies/skin sores, maintaining the priority for community members and local health staff. Rescreening also provides an opportunity for follow up of children with recurrent scabetic infestation, and aids in the identification of households with recurrent infestation. This information is helpful in finding crusted scabies within the community.

The follow-up visits in our program have also been used as opportunities for community education (Fig. 3). Community workers, elders, council members, visiting health officers and local health staff reinforce the message 'healthy house makes healthy body makes healthy skin' during these visits. Furthermore, greater community awareness regarding the symptoms and signs of scabies/skin sores has resulted in more people seeking treatment at the health clinic in between follow-up visits (RB, pers. comm. with clinic health staff, 2001).

Community involvement and empowerment facilitated the program's success. The intervention was implemented in the community setting as opposed to being run through the health centre. Council initiatives like the 'best backyard' competition aided in keeping the focus of the project community based. The community-initiated clean-up days played an integral part in promoting improved personal and household hygiene. This was important in decreasing the prevalence of non-scabies pyoderma, as seen in the marked reduction in cases after the second community-initiated clean-up day. Regular feedback of results to the Council, health-clinic staff and the wider community promoted ownership of the program. Discussions with different sectors of the community (e.g. health-clinic workers, Aboriginal

Table 1 Prevalence of scabies and severity, infected scabies and non-scabies pyoderma in children ≤5 years old in a large Aboriginal community (June 2000–September 2001)†

	Pre-intervention ($n=217$)	6 weeks later ($n=201$)	3 months later ($n=220$)	6 months later ($n=242$)	9 months later ($n=251$)	1 year later ($n=200$)	15 months later ($n=177$)
Total scabies	76/217 (35)‡	6/201 (2.9) $P<0.0001$	11/220 (5) $P<0.0001$	10/242 (4.1) $P<0.0001$	6/251 (2.3) $P<0.0001$	17/200 (8.5) $P<0.0001$	21/177 (11.8) $P<0.0001$
Mild	19/76 (25)	1/6 (16.6)	1/11 (9)	5/10 (50)	5/6 (83)	12/17 (70)	16/21 (76)
Moderate	36/76 (47)	2/6 (33.3)	9/11 (82)	3/10 (30)	1/6 (17)	3/17 (18)	4/21 (19)
Severe	21/76 (28)	3/6 (50)	1/11 (9)	2/10 (20)	0/6 (0)	2/17 (12)	1/21 (5)
Infected scabies	25/217 (11.5)	$P<0.0001$	2/201 (0.9) $P<0.0001$	2/220 (0.9) $P<0.0001$	5/242 (2) $P<0.0001$	2/251 (0.7) $P=0.0003$	4/200 (2) $P<0.00011/177$ (0.5)
Non-scabies pyoderma	24/217 (11)	9/201 (4.4) $P=0.02$	10/220 (4.5) $P=0.02$	8/242 (3.3) $P=0.002$	23/251 (9.1) NS	26/200 (13) NS	3/177 (1.6) $P=0.0005$

†Expanded from reference 9, Wong L-CF *et al.* Outcome of an interventional program for scabies in an indigenous community. MJA 2001; 175: 367–370. Copyright 2001. *The Medical Journal of Australia*: reproduced with permission. ‡Numbers in parentheses indicate percentages.
NS, not significant in comparison to pre-intervention.

health workers, women elders, Council and environmental workers) were essential in tailoring the program to the changing needs of the community.

The authors are unanimous in believing that, consistent with Aboriginal culture, an essential aspect to the success of the program was the development of personal relationships between team members, as opposed to a purely working partnership. For example, during the follow-up visits, a vital element was the social times spent together (going out bush fishing and to collect bush tucker).

The program's small yearly budget of around $15 000 contrasts favourably with the high cost of hospital support for a patient with post-streptococcal glomerulonephritis or rheumatic fever. For example, the cost of medical air transport from a remote Aboriginal community to Darwin for treatment is about $3500. In addition, at $500/day, an estimated hospital stay of 1 week for a patient would also cost $3500. This does not factor in complications and chronic sequelae. The cost of maintaining an adult from a remote community on dialysis is in excess of $75 000 per patient per year, not including medication, relocation, housing, transport and hospitalization.[5] Added to the financial expense is the immeasurable cost of family dislocation exacerbated by separation from a patient's homeland.

In future, two doctors will continue the screening. The women elders and Aboriginal health-care workers will continue to spread the 'healthy skin' message within the community, as well as advising anyone with suspicious symptoms to seek medical attention. Another scabies/community clean-up intervention is planned for June 2002.

The sustainability of our program will depend on continued community awareness about prevention and early treatment of scabies and skin sores. Greater awareness of the importance of functioning health hardware (taps, showers, toilets) to assist in maintaining personal and household cleanliness is important given the overcrowded living conditions. The women elders and Aboriginal health workers are confident of diagnosing, educating and treating scabies/skin sores. Eventually, it is hoped that they will assume complete responsibility for the running of the program.

It is of interest that the program had a substantial impact on non-scabies pyoderma as well as on pyoderma attributed clinically to underlying scabies. This is explained by a likely general reduction in streptococcal burden in the community following both the decrease in scabies and the hygiene interventions. However, while scabies and scabies-related pyoderma remained consistently significantly lower than pre-intervention for the 15 months, the non-scabies pyoderma had returned to pre-intervention levels by 9 months. This increase of non-scabies pyoderma occurred because GAS was not eradicated and, given the continuing underlying overcrowding and socioeconomic disadvantage, GAS, as expected, rose back towards pre-intervention levels. It subsequently decreased significantly again after the second clean-up day at 12 months, supporting the need for continuing programs for sustainable improvements.

Although our program has been successful in reducing the prevalence of scabies in this community, the lower rates may be unsustainable unless all related communities within the area achieve a similar reduction in scabies prevalence. Currently, the Co-operative Research Centre for Aboriginal and Tropical Health is undertaking further research into factors supporting sustainable 'healthy skin' programs, with the aim of supporting communities in the region in effectively implementing their own scabies education and treatment programs.

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