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Appendix

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Appendix to: Lokuge B, Kopczynski A, Woltmann A, et al. Crusted scabies in remote Australia, a new way forward: lessons and outcomes from the East Arnhem Scabies Control Program. *Med J Aust* 2014; 200: 644-648. doi: 10.5694/mja14.00172.

Appendix 1

Detailed methodology and data tables for article:

Crusted scabies in remote Australia, a new way forward: Lessons and outcomes from the East Arnhem Scabies Control Program

Detailed methodology

Participants:

Cases: Beginning in August 2011, the East Arnhem Scabies Control Program (EASCP) used active case finding to identify all potential cases of crusted scabies in participating East Arnhem communities. This involved investigating households and patients identified by health centres as having recurrent episodes of scabies or crusted scabies, and examining the NT hospital admission database and related discharge summaries for patients from the region treated in the past six years for crusted scabies.

For all suspected cases found through active surveillance, an experienced EASCP clinician confirmed or excluded the diagnosis of crusted scabies based on the following criteria:

1. Presence of characteristic crusted areas of skin and/or de-pigmented and fissured skin in areas of past crusting (i.e. chronic stigmata of crusted scabies); and

2. One or more past admissions to hospital with crusted scabies and/or skin scrapings positive for scabies mites. Diagnoses were verified by visiting dermatologists and infectious disease specialists.

Beginning in August 2011, a novel crusted scabies preventative protocol (see related article for details) was piloted by EASCP in one community and extended to two further East Arnhem communities with endemic scabies by June 2013. The timing of the protocol's introduction in these three communities was driven by the capacity of EASCP to provide ongoing clinical staff to support implementation of the preventative regime. The timing of enrolment of cases was driven by clinical criteria (that is identification and confirmation of crusted scabies in a case and obtaining consent to acute and preventative treatment).

Between August 2011 and June 2013, EASCP had data sharing agreements to access clinical records and operational capacity to deploy the preventative program in three communities. Monitoring data presented here are based on the seven cases confirmed and managed by EASCP in these three communities between August 2011 and June 2013.

Contacts: EASCP monitoring paired each confirmed case with a household contact to serve as "sentinels" of recurrent active crusting and infectivity in cases. Contacts were confirmed to have the same primary residence as the cases with which they were paired. The diagnosis of crusted scabies was excluded in contacts by an experienced EASCP clinician and verified by visiting specialists. These contacts often had a recurrent history of scabies and were referred to EASCP for management. In the first 18 months of EASCP monitoring, capacity constraints allowed for only one contact per case to be audited and followed up. Where multiple contacts were known to EASCP, the contact with the most extensive history of scabies presentations was included.

Main outcome measures and data sources:

EASCP monitoring data used clinical records from health centres in the community of primary residence, referral hospital admissions (Royal Darwin and Gove District Hospitals), and EASCP clinical records from fortnightly skin checks and preventative case management.

EASCP hospital admission data for cases and contacts were obtained from the NT hospital admissions database, restricted to admissions with a principle diagnosis of ICD10 code B86- (scabies).

EASCP monitoring recorded outpatient presentations (health centre and EASCP outreach) as likely recurrent crusted scabies if: a diagnosis of recurrent crusted scabies was recorded for the presentation and/or skin shedding and infections were noted in areas of past crusting and/or if treatment for crusted scabies was initiated. This approach captures clinically diagnosed recurrences of crusting and related complications. Importantly, these search parameters for outcome measures were consistent for intervention (during case management) and control periods (prior to case management).

Contact presentations to health centres were recorded as an event if a diagnosis of scabies (+/- skin sores) was recorded, or treatment for scabies (+/- skin sores) initiated. Again the search parameters were consistent during the intervention and control periods.

To avoid double counting, each new presentation was recorded as an episode (follow-up visits for multi-dose treatments were counted only once) and only one episode was recorded if presentations led to referrals (to hospital/health centre) for management. During the intervention period, we also recorded EASCP program notes related to client satisfaction with the treatment regime and adverse effects.

Period of data analysis:

From the program's launch in August 2011, for the purposes of this analysis, the intervention period commenced on the date on which EASCP preventative case management was initiated in each case (done on clinical grounds by EASCP) through to June 2013. A matching (i.e. same duration as intervention) number of months in each case was also examined immediately prior to the intervention (i.e. the control period). In each contact we reviewed clinical records for the months corresponding to those reviewed in paired cases for their intervention and control periods.

Statistical analyses:

We examined the change, if any, in the number of clinical events for each matched pair during the period before compared with the period during case management. We used the Wilcoxon signed-rank test to determine whether the difference in paired clinical events of interest before and after case management was statistically significant.

Ethics statement:

This project received research ethics approval from the board of Miwatj Health Aboriginal Corporation, with community representatives from all included communities. EASCP monitoring data was extracted and is presented in a non-identifiable form. This project was approved by the Human Research Ethics Committee of Northern Territory Department of Health and Community Services and Menzies School of Health Research (Approval number HREC2013/2055).

Detailed Tables

Table I Characteristics of patients with crusted scabies managed by EASCP in three communities

Confirmed cases	**7**
Clinical state at first encounter with EASCP	
Clinically well. No active crusted scabies	1
Active recurrence of crusted scabies at time of first review by EASCP.	6
How recurrence was detected in those with recurrence at first encounter with EASCP?	
Self-presentation to clinic/hospital/EASCP for recurrence	2
Found by EASCP through active surveillance. Did not present to clinic	4
Grade of crusting in those with CS recurrence at first encounter	
Grade 1 (minimal skin shedding and TBSA[a] affected)	1
Grade 2 (moderate skin shedding and TBSA[a] affected)	3
Grade 3 (highly infectious – extensive skin shedding and TBSA[a] affected)	2
Treatment strategy consented to for recurrence noted at first EASCP encounter	
Requested hospitalisation	2
Did not consent to hospitalisation (agreed to outpatient treatment)	4

Note a: Total body surface area

Table II Audit of presentations of cases managed by EASCP and paired contacts

Case								Range	Median
Household	**1**	**2**	**3**	**4**	**5**	**6**	**7**		
Age group (0-19, 20-39, 40-59, 60 plus)	40-59	40-59	40-59	40-59	40-59	20-39	40-59		
Immune defect found	No	No	No	No	Neuro -pathy	No	No		
Months of clinic records reviewed	72	13	142	38	13	26	7	7 to 142	26
Clinic and hospital presentations per year	4	9	1	6	4	5	8	1 to 9	5
Contacts								**Range**	**Median**
Age group (0-4, 5-9, 10-14, 15-19, 20 plus)	0-4	10-14	5-9	0-4	5-9	0-4	5-9		
Relationship to case	Grand child	Child	Grand child	Grand child	Grand child	Niece	Niece		
Crusted scabies excluded	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Months of clinic records reviewed	30	124	100	31	61	12	12	12 to 124	31
Clinic and hospital presentations for recurrent scabies per year	6	3	4	8	0.4	11	5	0.4 to 11	5.0
Combined case and contact presentations for crusted scabies and scabies per year	10	12	5	14	4	16	13	4 to 16	12.3
Contacts								**Range**	**Median**
Household	**1**	**2**	**3**	**4**	**5**	**6**	**7**		
Recorded treatments for scabies (+/-sores) in first year of life	10	10	5	11	n/a	5	n/a	5 to 11	10 (for those with data)
History of more than 3 clinic presentations for scabies/sores in 3 months	yes	yes	yes	multip le	no	yes	no	5 of 7	
Extensive/whole body/all over scabies or sores documented	no	4	13	yes	No	4	yes	5 of 7	
Weight-loss/ FTT[a] noted during scabies presentations.	no	yes	yes	yes	no	yes	yes	5 of 7	
Notification of child to family services where recurrent scabies/sores is documented as a reason for referral.	no	yes	yes (2)	yes	no	yes	yes	5 of 7	

Note a: FTT – Failure to thrive

Table III Individual case program evaluation data

Cases										
Household	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Total**	**Change**	**Significance**
Pre-intervention										
Months audited (pre and post intervention)	17	13	19	14	13	20	3	99		
EASCP[a]/Clinic presentations for recurrences of crusting (n)	4	5	1	6	4	5	2	27		
Hospital admissions for recurrences of crusting (n)	1	4	0	1	0	3	0	9		
Days in hospital	25	64	0	11	0	73	0	173		
Combined outpatient and hospital recurrences of crusted scabies (n)	5	9	1	7	4	8	2	36		
Combined outpatient and hospital recurrences of crusted scabies (rate per year)	3.5	8.3	0.6	6	3.7	4.8	8	4.4		
Intervention period										
EASCP[a]/Clinic diagnosed recurrences of crusting (n)	3	3	2	3	1	4	0	16	-41%	p=0.040 (significant)
Hospital admissions for recurrences of crusting (n)	1	2	0	0	0	1	0	4	-56%	p=0.085 (non-sig)
Days in hospital	3	20	0	0	0	12	0	35	-80%	p=0.087 (non-sig)
Combined outpatient and hospital recurrences of crusted scabies (n)	4	5	2	3	1	5	0	20	-44%	p=0.025 (significant)
Combined outpatient and hospital recurrences of crusted scabies (rate per year)	2.8	4.6	1.3	2.6	0.9	3	0	2.4	-44%	p=0.025 (significant)

Note a: EASCP – East Arnhem Scabies Control Program

Table IV Individual contact and combined case and contact program evaluation data

Contacts										
Household	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Total**	**Change**	**Significance**
Months audited (pre and post intervention)	17	13	19	14	13	20	3	99		
Pre-intervention										
Hospital admissions for severe infected scabies	0	0	1	0	0	2	0	3		
Days in hospital	0	0	10	0	0	13	0	23		
Clinic presentations for scabies +/- sores (n)	4	3	5	4	1	6	2	25		
Combined clinic and hospital presentations for scabies (+/- sores)	4	3	6	4	1	8	2	28		
Combined clinic and hospital presentations for scabies (+/- sores) (rate per year)	2.8	2.8	3.8	3.4	0.9	4.8	8.0	3.4		
Intervention period										
Hospital admissions for severe infected scabies	0	0	0	0	0	0	0	0	-100%	p=0.159 (non-sig)
Days in hospital	0	0	0	0	0	0	0	0	-100%	p=0.159 (non-sig)
Clinic presentations for scabies +/- sores (n)	1	1	1	1	0	3	0	7	-72%	p=0.017 (significant)
Combined clinic and hospital presentations for scabies (+/- sores)	1	1	1	1	0	3	0	7	-75%	p=0.017 (significant)
Combined clinic and hospital presentations for scabies (+/- sores) (rate per year)	0.7	0.9	0.6	0.9	0	1.8	0	0.8	-75%	p=0.017 (significant)

Combined paired events for cases and sentinel contact										
Household	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Total**	**Change**	**Significance**
Pre-intervention	9	12	7	11	5	16	4	64		
Intervention period	5	6	3	4	1	8	0	27	-58%	(p = 0.016) Significant