Trachoma surveillance annual report, 2007 A report by the National Trachoma Surveillance and Reporting Unit

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Abstract

Trachoma screening was conducted in 2007 in trachoma-endemic regions and communities in the Northern Territory, South Australia and Western Australia. Aboriginal children aged 1 to 9 years were examined using the World Health Organization grading criteria. Screening in the Northern Territory was conducted by the primary health staff from the Healthy School Age Kids program, the Australian Government Emergency Intervention and Aboriginal Community Controlled Health Services with 60 of the 117 communities screened in 5 regions (1,703 children). In South Australia, the Eye Health and Chronic Disease Specialist Support Program and a team of eye specialists screened eight out of 91 communities in areas serviced by 5 Aboriginal Controlled Health Services (128 children). In Western Australia, population health unit and primary health care staff screened 62 out of 167 communities in 4 regions (1,666 children). Active trachoma prevalence rates varied between the regions with reported prevalence ranging from 5%–26% in the Northern Territory, 0%–21% in South Australia and 4%–22% in Western Australia. Comparisons of 2006 and 2007 regional active trachoma prevalence showed no consistent pattern in changes. Only a small amount of data were reported for the surgery and environmental improvement components of the World Health Organization recommended trachoma control activities of surgery (for trichiasis), antibiotic treatment (with azithromycin), facial cleanliness and environmental improvement. Reporting for the antibiotic treatment and facial cleanliness components has improved since 2006; however, many gaps still exist. A method to monitor bacterial resistance to azithromycin has been implemented. Baseline data collected by pathology services found similar results to national data collected by the Advisory Group on Antibiotic Resistance. *Commun Dis Intell* 2008;32:388–399.

Keywords: active trachoma, antibiotic resistance, facial cleanliness, Northern Territory, SAFE strategy, South Australia, trachoma-endemic, Western Australia

Introduction

Trachoma is the most common infectious cause of blindness worldwide.[1] It is caused by specific strains of the bacteria *Chlamydia trachomatis* that in time leads to scarring of the eyelid, inturned eyelashes (trichiasis) and blindness.[2] Trachoma occurs predominantly in developing countries where living conditions are crowded and hygiene is poor.[3] Australia is the only developed country where trachoma still exists.[2]

In its resolve to eliminate blinding trachoma by 2020, the World Health Organization (WHO) recommends the adoption of a 4 component strategy: surgery (for trichiasis), antibiotic treatment (with azithromycin), facial cleanliness and environmental improvement (SAFE).[4] Based on the SAFE strategy, the Communicable Diseases Network Australia (CDNA) in 2006 developed the *Guidelines for the Public Health Management of Trachoma in Australia*.[2]

In 2006 the Australian Government awarded the tender to establish the National Trachoma Surveillance and Reporting Unit (NTSRU) to the Centre for Eye Research Australia (CERA). The NTSRU is responsible for providing high quality national information on trachoma prevalence based on data received from state and territory jurisdictions.

Screening was conducted at remote Aboriginal communities during 2007 in trachoma-endemic regions in the Northern Territory, South Australia and Western Australia. Data from communities and regions were reported to the NTSRU. This current report compares 2007 data with results from the screening in 2006. It comments on the jurisdictions' implementation of the CDNA guidelines 'minimum best-practice approach' and makes recommendations regarding future reporting.[2]

Methods

The WHO simplified trachoma grading classification system was used when reporting results of screening.[5] Active trachoma includes WHO grades trachomatous inflammation follicular (TF) and/or trachomatous inflammation intense (TI).

Trachoma at ≥10% is considered to be endemic hence the use of this threshold.[2]

A detailed account of the methods used has been documented in the 2007 surveillance report.[6]

In brief, in 2007, screening was conducted once in regions of the Northern Territory and Western Australia, and twice in three of the 5 Aboriginal Community Controlled Health Services (ACCHS) in South Australia. Data were reported for active trachoma prevalence, antibiotic treatment of children and household and community contacts, facial cleanliness, trachomatous trichiasis (TT), surgery for trichiasis, and trachoma control activities.

A method to assess the bacterial resistance to azithromycin has been implemented and baseline data have been collected (Annex: Antibiotic resistance).

Northern Territory

Most of the screening for trachoma was conducted between March and October 2007 by the Healthy School Age Kids (HSAK) program in the 5 regions where active trachoma is believed to be present (Map 1). Primary health care staff from the Maternal, Child and Youth Health program of the Department of Health and Families conducted screening in partnership with community health centres and the ACCHS.

In July 2007, the Australian Government Emergency Intervention (AGEI) conducted Child Health Checks in the Northern Territory. A decision was made by the AGEI clinical advisory panel that trachoma screening was only to be conducted where members of the intervention teams had appropriate skills and training to do so. Communities that were visited by the AGEI were not revisited by the HSAK program and this contributed to the smaller number of communities and children that were screened in 2007.

South Australia

Screening for trachoma was conducted twice in 2007, from February to July and again from July to December. Two ACCHS were visited only once in 2007. Data for a 6th ACCHS were reported in 2006 but were not reported in 2007 due to another program providing services in this area. Screening was undertaken by the project coordinator of the Eye Health and Chronic Disease Specialist Support Program and a team of ophthalmologists and optometrists in areas serviced by 5 ACCHS (Map 2). Data for 2 ACCHS were reported together in 2006. Similarly data for some communities were combined or pooled in 2006. In 2007 data for all ACCHS and communities were reported separately making comparisons difficult.

Some Aboriginal children who were identified for screening were seen in schools, while others were brought to the clinics by family members, Aboriginal health workers and other clinic staff.

Western Australia

Screening for trachoma was conducted between August and September 2007 in 4 population health regions where active trachoma is believed to be present (Map 3). Population health units collected data in partnership with primary health care staff from state government and ACCHS.

In 2007, 6 communities from the Goldfields region reported as 3 pairs; results for trachoma prevalence, clean faces and treatment counted each pair as 1 community.

Data analysis and reporting

A community was defined as an area which has a school. The denominator for the number of communities within each region or area serviced by an ACCHS was derived from school lists from each state and territory department of education.[7–9] For South Australia, schools in areas serviced by the Nganampa, Oak Valley and Tullawon ACCHS were grouped together by the NTSRU to match the reporting of school district categories used by the Department of Education. Key representatives from each state and territory nominated those communities that were believed not to have trachoma, those that had been screened, and those that may have trachoma and so should have been screened but had not.

Community coverage was calculated using the number of communities that were screened as a proportion of those that were identified by each state or territory to 'possibly have trachoma'. Communities reported as 'believed not to have trachoma' and those that reported zero prevalence in both 2006 and 2007 were not included in this calculation.

Australian Bureau of Statistics (ABS) 2006 Census data regarding the number of Aboriginal people residing in a region or enrolled in pre– and primary schools, were used to calculate 2007 high and low series population growth projections.[10,11]

Screening coverage was calculated using the number of children who were examined for trachoma as a proportion of those who were reported to be currently in the community/school by the population health units. Where the reported number of children in the

community was not provided (Northern Territory and South Australia), the ABS school enrolment 2007 projections were used. The screening coverage for Oak Valley and Tullawon was combined for 2007 data because data for these ACCHS were reported together in 2006.

The prevalence includes active trachoma detected by trachoma screening programs and in some instances detected through other sources such as clinics and other health checks. Thus, the reported prevalence may not truly reflect the population prevalence. Regional prevalence figures of active trachoma are reported on maps of each state and territory (Maps 1–3). In South Australia the prevalence of active trachoma is based on the first round of screening.

Chi square tests were used to measure and compare prevalences/proportions of active trachoma for communities that examined 10 or more children in both 2006 and 2007. Where numbers were less than five in any cell, a Fishers exact test was used. Statistical comparisons for the Pilbara region could not be made because in 2006 follicular trachoma was not graded according to the WHO grading system. Comparisons between each state and territory need to be interpreted with caution because of the variation in data collection and reporting.

Results

National perspective

Community coverage between 2006 and 2007 varied between each state and territory with higher coverage in Western Australia and consistently low coverage in South Australia (Tables 1 and 2).

A comparison between 2006 and 2007 regional prevalence data found a statistically significant decrease in prevalence in 4 regions and a statistically significant increase in 1 region (Table 2). Many communities from each state or territory still reported active trachoma prevalence ≥10% (Table 3).

Data were reported for 103 of 165 communities for both 2006 and 2007. Data from 39 communities were reported in 2006 only and 23 in 2007 only. In 2006, data for some communities were combined, leaving 34 communities from which data were reported in 2006 only, of which 19 (56%) had an active trachoma prevalence ≥10%.

Of the 27,171 Aboriginal people aged 30 years or over residing in these jurisdictions, only 987 (4%) were examined for trichiasis, of which 17 (2%) were found to have trichiasis.

Information on the implementation of SAFE trachoma control activities was not reported for any communities in South Australia. Data on activities were reported for few communities from the Northern Territory and Western Australia; however the distribution of antibiotics was reported for most communities in Western Australia (Table 4).

Northern Territory

Of the 117 communities in the 5 trachoma-endemic regions, 92 (79%) were identified as possibly having trachoma, of which 47 (50%) were screened in 2007 (Table 1). Data were reported from the 47 communities and an additional 13 that were screened but were identified as believed not to have trachoma (Table 1 and Map 1).

Table 1. Screening in communities believed not to have trachoma and those that possibly have trachoma, 2007, by state or territory

	Number of communities			Total
	Northern Territory	South Australia	Western Australia	
Believed not to have trachoma				
Screened	13	0	2	15
Not screened	12	0	97	109
Subtotal	25	0	99	124
Possibly have trachoma				
Screened with no trachoma found	16	2	19	37
Screened with trachoma found	31	6	37	74
Reported screened but no data received	4	0	4	8
Not screened	41	83	8	132
Subtotal	92	91	68	251
Total*	117	91	167	375

* Based on the number of schools provided by the Department of Education in the Northern Territory, South Australia and Western Australia.

Table 2. Community coverage, screening coverage and active trachoma prevalence of Aboriginal children aged 1 to 9 years, 2006 and 2007, by state and territory, region and Aboriginal Community Controlled Health Service

State and territory and region	2006 data						2007 data					
	Community coverage	%	Screening coverage	%	Active trachoma	%	Community coverage	%	Screening coverage	%	Active trachoma	%
Northern Territory												
Alice Springs Remote	23/31	74	530/1,382	38	94	18	15/31	48	231/1,402	16	46	20
Barkly	4/7	57	105/437	24	22	21	4/7	57	68/443	15	18	26
Darwin Rural*	15/25	60	522/1,407	37	84	16	11/25	44	377/1,427	26	25	7
East Arnhem†	7/8	88	879/1,187	73	22	3	7/8	88	465/1,204	39	23	5
Katherine*	11/22	50	218/1,344	16	65	30	10/22	45	562/1,363	41	104	19
Subtotal	60/93	65	2,254/5,757	39	287	13	47/93	51	1,703/5,839	29	216	13
South Australia (Screening 1)												
Ceduna/Koonibba	1/26	4	18/131	14	1	6	1/26	4	16/134	12	1	6
Nganampa	10/11	91	27/255	11	5	19	6/11	55	76/260	29	10	13
Oak Valley & Tullawon	‡		28/NA		7	25	‡		34 /NA		7	21
Pika Wiya	5/29	17	51/77	66	6	12	0/29	0	0/79	0	NS	
Umoona Tjutagku	1/25	4	6/49	12	1	17	1/25	4	2/50	4	0	0
Subtotal	17/91	19	130/512		20	15	8/91	9	128/523		18	14
Western Australia												
Goldfields*	6/14	43	231/873	26	43	19	10/14	71	227/1,047	22	8	4
Kimberley*	30/33	91	1,048/1,586	66	192	18	27/33	82	1,006/1,584	64	164	16
Midwest	6/6	100	167/981	17	32	19	5/6	83	127/201	63	28	22
Pilbara	9/15	60	273/935	29	146§	53	14/15	93	306/545	56	50§	16
Subtotal	51/68	75	1,719/4,375	39	413	24	56/68	82	1,666/3,377	49	250	15
Australia												
Total	128/252	51	4,103/10,644		720	18	111/252	44	3,497/9,739		484	14

NA Not available.

NS Not screened.

* $p<0.05$, † $p<0.01$ = statistical significance between 2006 and 2007 active trachoma prevalence

‡ Communities in areas serviced by these Aboriginal Community Controlled Health Services were reported with communities from the Nganampa Aboriginal Community Controlled Health Service.

§ Change in grading.

Of the 5,839 children reported by the ABS to be enrolled in schools, 1,703 (29%) were examined for trachoma and 216 of these had active trachoma (prevalence = 13%, 95% CI, 11%–15%) (Table 2). Twenty-nine of the 60 communities screened (48%) had no children with active trachoma; of those with active trachoma, 20 (33%) had a prevalence ≥10% (Table 3).

Data for facial cleanliness were reported for some communities (Table 5), and the use of resources or programs to promote clean faces was reported for few communities (Table 4). Four of the 31 communities (13%) that required treatment complied with the CDNA antibiotic treatment guidelines (Table 6).

Data on trichiasis were reported for the Katherine region only, but no cases were found. However, a community-based survey of trachoma was conducted in 5 communities in this region by an independent team from CERA and the Fred Hollows Foundation. Six people were found to have trichiasis and an additional person was reported to have undergone surgery.[12]

Table 3. Community prevalence of active trachoma in Aboriginal children aged 1 to 9 years, 2006 and 2007, by state or territory

Community prevalence	Number and percentage of communities where active trachoma data were reported						Total	
	Northern Territory		South Australia		Western Australia			
	n	%	n	%	n	%	n	%
2006 data								
0%	30	42	0		5	9	35	26
1 to <5%	7	10	0		3	6	10	8
5 to <10%	7	10	2	25	8	15	17	13
≥10%	28	39	6	75	37	70	71	53
Total	72	100	8	100	53	100	133	100
2007 data								
0%	29	48	2	25	20	36	51	41
1 to <5%	7	12	0		0		7	6
5 to <10%	4	7	2	25	5	9	11	9
≥10%	20	33	4	50	30	55	54	44
Total	60	100	8	100	55	100	123	100

Table 4. Number of communities where SAFE trachoma control activities were reported, 2007, by state or territory

SAFE trachoma control activities	Number and percentage of communities						Total N=124	
	Northern Territory N=60		South Australia N=8		Western Australia* N=56			
	n	%	n	%	n	%	n	%
Surgery	–		–		5	9	5	4
Antibiotics	7	12	–		44	78	51	41
Facial cleanliness resources	1	2	–		24	43	25	20
Facial cleanliness programs	5	8	–		21	38	26	21
Environmental improvement	1	2	–		6	11	7	6
Other	4	7	–		8	14	12	10

* Includes the paired communities from the Goldfields.

N Number of communities that reported trachoma screening data, including the community that provided treatment data only.

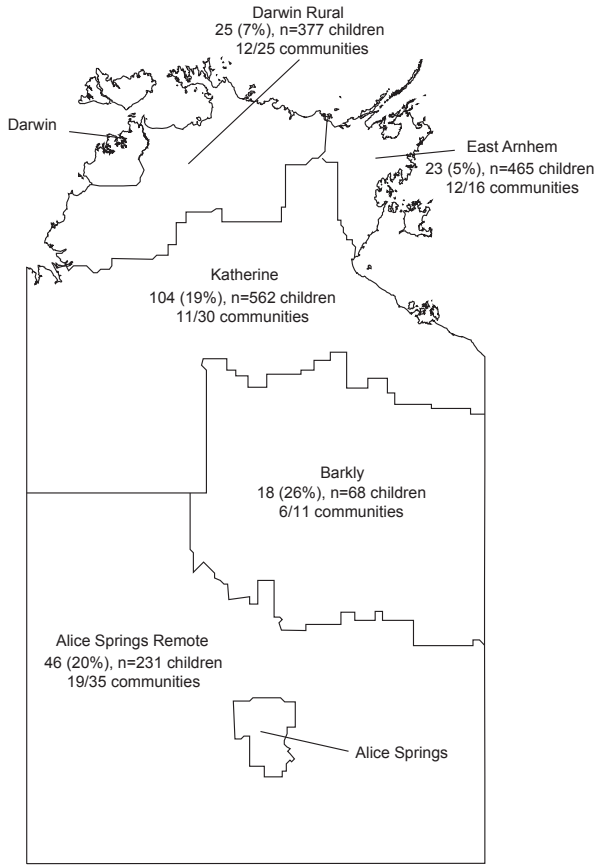
– Data not reported.

Of the 20 communities where sufficient children were examined to compare 2006 and 2007 trachoma data, prevalence was found to have increased significantly ($p<0.05$) in 6 communities and decreased significantly in four.

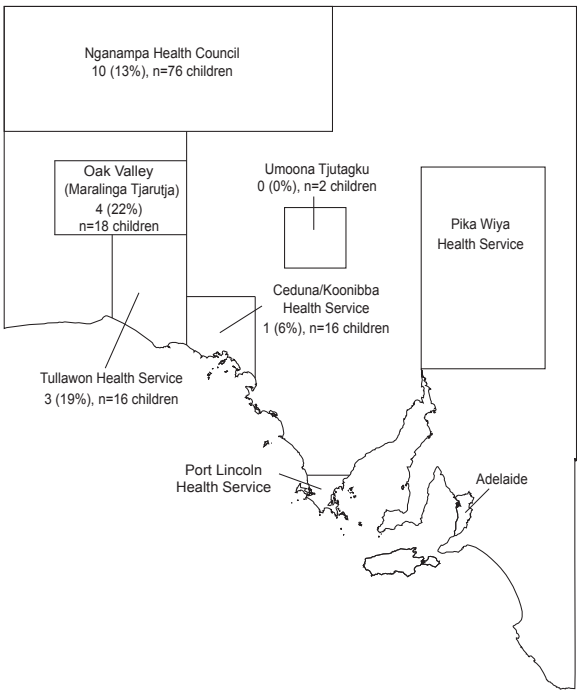
South Australia

Of the 91 communities in the 5 ACCHS, all were considered as possibly having trachoma, of which eight (9%) were screened in 2007 and reported data (Table 1 and Map 2). Data from 6 communities in

Map 1. Number of Aboriginal children with active trachoma (prevalence) aged 1 to 9 years, number examined and communities where trachoma data were reported, Northern Territory, 2007, by region



Map 2. Number of Aboriginal children with active trachoma (prevalence) aged 1 to 9 years and number examined, South Australia, 2007, by Aboriginal Community Controlled Health Service



Nganampa, Oak Valley and Tullawon = 6/11 communities

Ceduna/Koonibba = 1/26 communities (denominator also includes communities in Port Lincoln)

Umoona Tjutagku = 1/25 communities

Pika Wiya = 0/29 communities

Table 5. Number of resident Aboriginal children aged 1 to 9 years, those enrolled in schools, and communities and children examined for facial cleanliness, Northern Territory, 2007, by region

	Alice Springs remote	Barkly	Darwin rural	East Arnhem	Katherine	Total
Regional population (ABS)						
Resident children*	1,792	652	2,116	1,889	1,964	8,413
Children enrolled in schools†	1,402	443	1,427	1,204	1,363	5,839
Facial cleanliness						
Communities screened	13	6	9	4	2	34
Children examined	135	53	94	59	35	376
Prevalence of clean faces	49%	98%	91%	97%	100%	79%

* Projected 2007 population data for the whole region based on the Australian Bureau of Statistics 1.4% low series population growth rate in the Northern Territory.

Table 6. Number of communities with active trachoma and compliance with treatment according to Communicable Diseases Network Australia (CDNA) guidelines, Northern Territory, 2007, by region

Region	Number and percentage of communities					
	With active trachoma	%	Treated	%	Treated according to CDNA guidelines	%
Alice Springs Remote	9/19	47	5/9	56	3/9	33
Barkly	2/6	33	1/2	50	1/2	50
Darwin Rural	7/12	58	0/7	0	0/7	0
East Arnhem	5/12	42	1/5	20	0/5	0
Katherine	8/11	67	2/8	25	0/8	0
Total	31/60	52	9/31	29	4/31	13

areas serviced by 3 ACCHS (Nganampa, Tullawon and Umoona Tjutagku) were reported from the second round of screening.

Of the 444 children reported by the ABS to be enrolled in schools from the ACCHS areas where screening was conducted, 128 (29%) were examined for trachoma during the 1st screening and 18 of these had active trachoma (prevalence = 14%, 95% CI, 8%–20%) (Table 2). Fifty-nine children (13%) were examined during the second screening with nine having active trachoma (prevalence=15%, 95% CI, 6%–24%). From the 1st screening, two of the 8 communities screened had no children with active trachoma. Of those with active trachoma, four (50%) had a prevalence ≥10% (Table 3). During the second screening two of the 6 communities had no children with active trachoma. Of those with active trachoma four (75%) had a prevalence ≥10%.

Data for facial cleanliness were reported for all communities (Table 7), but the use of resources or programs to promote clean faces was not reported for any communities (Table 4). Although all of the children who were found to have active trachoma were treated within 2 weeks of examination, no household or community contacts were treated in 2007, clearly not complying with the CDNA treatment guidelines.

Adults were examined for trichiasis when they were at the ACCHS clinics for a diabetes examination. Data were reported for 11 communities during the 1st screening and 10 during the second. Data were reported for trichiasis but not for trachoma screening for some communities. Overall, 329 Aboriginal people were examined for trichiasis during the 1st screening, and 277 during the second; no cases of trichiasis were reported.

No significant changes were found in the 3 communities where sufficient children were examined to compare 2006 and 2007 trachoma data.

Western Australia

Of the 167 communities in the 4 trachoma-endemic regions, 68 (41%) were identified as possibly having trachoma, of which 56 (82%) were screened in 2007 (Table 1). Data were reported for the 56 communities and an additional two that were screened but were identified as believed not to have trachoma (Table 1 and Map 3). Data for treatment but not for screening were reported for 1 community.

Map 3. Number of Aboriginal children with active trachoma (prevalence) aged 1 to 9 years, number examined and communities where trachoma data were reported, Western Australia, 2007, by region

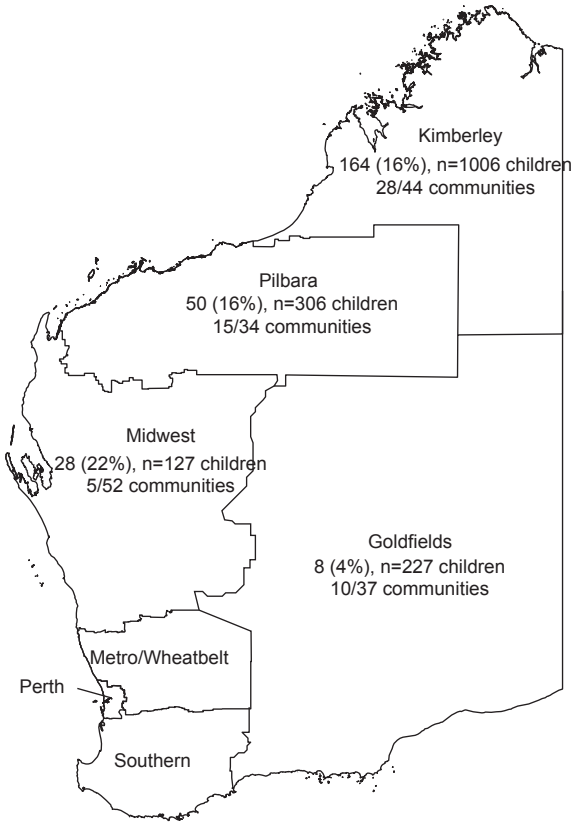


Table 7. Number of resident Aboriginal children aged 1 to 9 years, those enrolled in schools, and communities and children examined for facial cleanliness (Screening 1 and 2), South Australia, 2007, by Aboriginal Community Controlled Health Service

	Ceduna/ Koonibba	Nganampa	Oak Valley (Maralinga Tjarutja)	Pika Wiya	Tullawon	Umoona Tjutagku	Total
Regional population (ABS)							
Resident children*	165	349	NA	75	NA	76	665
Children enrolled in schools†	134	260	NA	79	NA	50	523
Facial cleanliness (Screening 1)							
Communities screened	1	4	1	0	1	1	8
Children examined	16	76	18	0	16	2	128
Prevalence of clean faces	100%	76%	100%		100%	100%	86%
Facial cleanliness (Screening 2)							
Communities screened	0	4	0	0	1	1	6
Children examined	0	34	0	0	23	2	59
Prevalence of clean faces		71%			100%	100%	83%

NA There were no data available from the Australian Bureau of Statistics for these locations because they had a very low population count.

* Projected 2007 population data for the whole region based on the Australian Bureau of Statistics 1.9% low series population growth rate in South Australia.

† Projected 2007 Australian Bureau of Statistics enrolment data for the whole region for pre– and primary school children based on the Australian Bureau of Statistics 1.9% low series population growth rate in South Australia.

In communities where screening was conducted, 1,666 (49%) of the 3,377 children believed to be attending school at the time of trachoma screening were examined for trachoma. Of these, 250 had active trachoma (prevalence = 15%, 95% CI, 13%–17%) (Table 2). Twenty of the 55 communities screened (36%) had no children with active trachoma. Of those with active trachoma 30 (55%) had a prevalence ≥10% (Table 3).

Data for facial cleanliness were reported for most communities (Table 8), and the use of resources and programs to promote clean faces was reported for many communities (Table 4). Eight of the 35 communities (23%) that required treatment complied with the CDNA treatment guidelines (Table 9).

Data on trichiasis were reported for the Goldfields region only. Adults were examined during an annual influenza vaccination program and no cases of trichiasis were found.

Table 8. Number of resident Aboriginal children aged 1 to 9 years, those enrolled in schools, and communities and children examined for facial cleanliness, Western Australia, 2007, by region

	Goldfields	Kimberley	Midwest	Pilbara	Total
Regional population					
Resident children*	1,163	2,824	1,218	1,178	6,383
Children enrolled in schools†	889	2,213	999	952	5,053
Facial cleanliness					
Communities screened	3	28	5	15	51
Children examined	104	1,006	127	306	1,543
Prevalence of clean faces	96%	81%	87%	78%	82%

* Projected 2007 population data for the whole region based on the Australian Bureau of Statistics 1.8% low series population growth rate in Western Australia.

† Projected 2007 Australian Bureau of Statistics enrolment data for the whole region for pre– and primary school children based on the Australian Bureau of Statistics 1.8% low series population growth rate in Western Australia.

Table 9. Number of communities with active trachoma and compliance to treatment according to the Communicable Diseases Network Australia guidelines, Western Australia, 2007, by region

Region	Number and percentage of communities					
	With active trachoma	%	Treated	%	Treated according to CDNA guidelines	%
Goldfields	3/7	43	3/3	100	1/3	33
Kimberley	19/28	68	17/19	89	4/19	21
Midwest	5/5	100	4/5	80	1/5	20
Pilbara	8/15	53	8/8	100	2/8	25
Total	35/55	64	32/35	91	8/35	23

CDNA Communicable Diseases Network Australia.

Of the 33 communities where sufficient children were examined to compare 2006 and 2007 trachoma data, prevalence was found to have increased significantly ($p<0.05$) in 1 community and decreased significantly in 3. For the Kimberley region, it was difficult to determine if there was a significant change due to missing data for the number of children examined in 2006. Although 2007 rates appeared to decrease in the Pilbara region this is almost certainly due to a change in the trachoma grading criterion used for screening in this region in 2007.

Discussion

Of the 375 communities in trachoma-endemic regions of Australia, 251 were identified as possibly having trachoma. Of these, 111 (44%) were screened in 2007. Screening was not conducted or not reported for the majority of communities (56%). A concerted effort to delineate which communities have trachoma and which do not is required before confident estimates can be made of the extent of trachoma in Australia.

Direct comparisons cannot be made between each state and territory because methods used in screening programs varied. For example, although in the Northern Territory 60 communities were screened, many of these communities had data for fewer than 10 children. Similarly, in South Australia, few communities were visited and, in those that were, few children were seen.

The screening coverage of children could not be calculated accurately as the number of children enrolled in school within a given region was not always provided. The coverage rate was 23% of the ABS estimate of the number of children resident in the area, or 31% of the ABS estimate of the number of children enrolled in schools.

Overall, of the 72 communities that were reported as having active trachoma, 47 (65%) were reported as giving antibiotic treatment. However very few (17%) complied fully with the CDNA guidelines. The distribution of antibiotics was lowest in the Northern Territory, however it is unclear whether this was due to a reporting issue or distribution issue or both. The data show a clear lapse in best practice adherence to the national guidelines by each state and territory.

Poor facial hygiene is an important risk factor for trachoma and the promotion of facial cleanliness is a key component of the SAFE strategy. Reporting of facial cleanliness data has improved since 2006. Regional means range between 45% and 100% of children having clean faces. However, the 2007 data still have many gaps. In the Northern Territory, data for only 34 out of 60 communities (57%) were reported to the NTSRU as it was considered a sensitive issue by some. Moreover, resources and programs for promoting facial cleanliness have not been reported for many communities. Such programs are important in order to integrate behavioural change regarding hygiene.

Only South Australia reported the systematic screening for trichiasis while the Northern Territory and Western Australia each provided data for 1 region only. Although seen relatively infrequently in communities, age specific prevalence rates of 5% to 10% are reported for some Aboriginal communities.[3,12] The routine screening and reporting of trichiasis in endemic areas needs to be strengthened. This is starting to occur for 2008 data collection, with more regions examining adults for trichiasis during an annual influenza vaccination program.

Of the 103 communities where data for trachoma were reported in both 2006 and 2007, 55 (53%) had examined sufficient children (≥10 examined) to make comparisons. Where comparison was possible, no consistent changes in prevalence were found as there were both increases and decreases.

It is apparent that the 4 components of the SAFE strategy trachoma control measures are not being implemented formally or comprehensively.

Each state and territory should identify all communities that are in need of screening for trachoma and aim to examine all children aged 1 to 9 years in these communities. The monitoring of trachoma can be successful only if meaningful and consistent data are collected with high rates of screening coverage (80+%) of all communities at risk of trachoma. Similarly, the lack of data regarding trichiasis and surgery for trichiasis provides an incomplete picture of what is happening at the end stages of this disease. This information is required before one could claim the elimination of blinding trachoma.

With collaboration and cooperation from each state and territory the NTSRU hopes to build a sustainable and effective monitoring system by which the elimination of trachoma can be documented.

Annex

Antibiotic resistance

Although *Chlamydia* remains sensitive to azithromycin, some studies have shown antibiotic resistance developing in other bacteria following community-based azithromycin treatment.[13,14] For these reasons, CDNA recommended that some monitoring of azithromycin resistance in other bacteria be conducted. The organism usually monitored for this purpose is *Streptococcus pneumoniae*. Resistance to azithromycin can be predicted by testing resistance to erythromycin and this is the recommended method.[15]

Data sources

The NTSRU contacted 3 pathology services to monitor macrolide resistance from specimens collected from Indigenous people:

- the Institute of Medical Veterinary Science (IMVS), South Australia;
- the Northern Territory Government Pathology Service (NTGPS); and
- the Western Diagnostics Pathology Service (WDPS), Northern Territory.

Following the IMVS requirements, the NTSRU obtained consent from 4 services that collected specimens from Indigenous people in South Australia and Central Australia: Ngaanyatjarra Health Service, Nganampa Health Council, Pika Wiya Health Service and the Royal Flying Doctors Service (South Australia). The NTGPS reported specimens collected from outpatients or those in the emergency room of the Alice Springs hospital.

Information on Indigenous status was only reported from the NTGPS as it is not routinely collected by the other 2 pathology services. IMVS and WDPS collected data for specimens from those regions or health services that serve predominantly Aboriginal people.

Sampling framework

The participating laboratories and health services reported erythromycin resistance (defined as both intermediate and high level resistance) for any invasive and non-invasive *S. pneumoniae* isolates collected from all specimen sites within the specified 3 month period (1 July to 30 September). Western Diagnostics laboratories collected data from 1 October to 31 December in 2007.

Data on patients' age, gender, region of residence, and specimen source were reported by each pathology service when available. Isolates were de-identified for personal and community data therefore regional information is reported in the tables.

Data analysis

Each participating laboratory performed antimicrobial susceptibility tests according to their routine standardised methodology (calibrated dichotomous sensitivity test, Clinical and Laboratory Standards Institute, agar dilution or minimum inhibitory concentration testing methods are identified in other sources).[15,16]

Results

Overall, 17 of 62 isolates (27%) were reported to be resistant or have intermediate resistance (Table 10). The numbers were too small to explore any regional variation in susceptibility rates.

Discussion

In a 3 month period only a small number of specimens were able to be identified as being from Aboriginal people or communities, however, a 6 month period will be used for 2008.

As part of the NTSRU monitoring of treatment of Aboriginal people with azithromycin in endemic areas, few data were reported in 2006 and the timing of administration of antibiotics was not specified as this was not a requirement of the 2006 report. No data were reported from the Northern Territory but 36 were reported to be treated in South Australia and 305 were reported to be treated in Western Australia. Reporting of treatment in 2007, when the antibiotic resistance data were collected, revealed that 328 people were reported to be treated in the Northern Territory from March to October, 18 in

Table 10. Erythromycin susceptibility of *Streptococcus pneumoniae* isolates, 2007, by pathology service

Pathology service/ region	Number and percentage of isolates						Total	%
	Resistant	%	Intermediate	%	Susceptible	%		
Institute of Medical Veterinary Science								
Nganampa	5	50	0		5	50	10	100
Ngaanyatjarra	0		0		2	100	2	100
Pika Wiya	0		0		1	100	1	100
Subtotal	5	38	0		8	62	13	100
Northern Territory Government Pathology Service								
Alice Springs	1	17	1	17	4	66	6	100
Alice Springs remote	3	27	0		8	73	1	100
Barkly	0		0		2	100	2	100
Darwin	0		0		1	100	1	100
Nganampa	0		1	50	1	50	2	100
Subtotal	4	18	2	9	16	73	22	100
Western Diagnostics Pathology Service								
Alice Springs	0		0		1	100	1	100
Alice Springs remote	1	33	0		2	67	3	100
Darwin	1	11	0		8	89	9	100
Darwin rural	2	29	0		5	71	7	100
East Arnhem	1	33	0		2	67	3	100
Katherine	1	25	0		3	75	4	100
Subtotal	6	22	0		21	78	27	100
Total	15	24	2	3	45	73	62	100

South Australia from February to July and 11 from July to December, and 1,675 in Western Australia between August and September.

The 2005 AGAR *S. pneumoniae* Survey reported antibiotic resistance to erythromycin in invasive and non-invasive isolates from 20 institutions around Australia. Laboratories collected up to 100 consecutive significant isolates starting from 1 January 2005.[17] South Australia reported 20.9% resistance in 392 isolates (12.3% in the 73 invasive strains and 22.9% in the 319 non-invasive strains). Western Australia reported 16.2% resistance in 296 isolates (11.1% in the 54 invasive strains and 17.4% in the 242 non-invasive strains). No data were reported for the Northern Territory. The 27% resistance (95% CI, 16%–39%) that was found in this study is comparable to the 22.7% resistance (95% CI, 20%–25%) reported by the AGAR survey.

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Data collection

The organisations that collected and/or reported data were:

Northern Territory

Aboriginal Community Controlled Health Services staff

Australian Government Emergency Intervention

Centre for Disease Control, Northern Territory Department of Health and Community Services

Healthy School Age Kids program: Top End and Central Australia

South Australia

Aboriginal Health Council of South Australia, Eye Health and Chronic Disease Specialist Support Program

Country Health South Australia

Ceduna/ Koonibba Health Service

Nganampa Health Council

Oak Valley (Maralinga Tjarutja) Health Service

Tullawon Health Service

Umoona Tjutagku Health Service

Western Australia

Aboriginal Community Controlled Health Services staff

Communicable Diseases Control Directorate, Western Australian Department of Health

Goldfields Population Health Unit

Kimberley Population Health Unit

Midwest Population Health Unit

Pilbara Regions Population Health Unit

Trachoma reference group

The NTSRU is advised by the Trachoma Reference Group, members of which include representatives from the following organisations:

Centre for Disease Control, Alice Springs, Northern Territory Department of Health and Community Services

Centre for Disease Control, Darwin, Northern Territory Department of Health and Community Services

Communicable Disease Control Directorate, Western Australian Department of Health

Country Health South Australia, Eye Health and Chronic Disease Specialist Support Program, Aboriginal Health Council of South Australia

National Aboriginal Community Controlled Health Organisation

Office for Aboriginal Torres Strait Islander Health, Australian Government Department of Health and Ageing

Surveillance Branch, Office of Health Protection, Australian Government Department of Health and Ageing

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References

1. Resnikoff S, Pascolini D, Etya'ale D, Kocur I, Pararajasegaram R, Pokharel GP, et al. Global data on visual impairment in the year 2002. *Bull World Health Organ* 2004;82:844–851.
2. Communicable Diseases Network Australia. *Guidelines for the Public Health Management of Trachoma in Australia*. Canberra: Commonwealth of Australia, 2006.
3. Taylor HR. Trachoma: *A blinding scourge from the Bronze Age to the Twenty First Century*. Melbourne: Centre for Eye Research Australia, 2008.
4. Mariotti SP, Pararajasegaram R, Resnikoff S. Trachoma: looking forward to Global Elimination of Trachoma by 2020 (GET 2020). *Am J Trop Med Hyg* 2003;69 (Suppl):33–35.
5. Thylefors B, Dawson CR, Jones BR, et al. A simple system for the assessment of trachoma and its complications. *Bull World Health Organ* 1987;65:477–483.
6. Tellis B, Dunn R, Keeffe JE. National Trachoma Surveillance and Reporting Unit: Trachoma Surveillance Report 2006. *Commun Dis Intell* 2007;31:366–374.
7. Department of Employment Training and Education: Northern Territory Government. Education and Training Directory: Available from: http://directory.ntschools.net/DeetDirectory/SchoolSearch.aspx
8. Department of Education and Children's Services: Government of South Australia. Sites and locations: Available from: http://www.decs.sa.gov.au/decs
9. Department of Education and Training: Government of Western Australia. Alphabetical list of Western Australian schools by Education district: Available from: http://www2.eddept.wa.edu.au/dev60cgi/sdrrwcgi.exe?sdr0860
10. Australian Bureau of Statistics. 2006 Census of Population and Housing. Cat. No. 2068.0 – 2006 Census Tables. Canberra: ABS, 2006.
11. Australian Bureau of Statistics. Population Distribution, Aboriginal and Torres Strait Islander Australians, 2006. ABS Cat. No. 4705.0. Canberra: ABS, 2006.
12. Roper KG, Michel CE, Kelly PM, Taylor HR. Prevalence of trachoma in Aboriginal communities in the Katherine region of the Northern Territory in 2007. *Med J Aust* 2008;189:409.
13. Chern KC, Shrestha SK, Cevallos V, Dhami HL, Tiwari P, Chern L, et al. Alterations in the conjunctival bacterial flora following a single dose of azithromycin in a trachoma endemic area. *Br J Ophthalmol* 1999;83:1332–1335.
14. Leach AJ, Shelby-James TM, Mayo M, Gratten M, Laming AC, Currie BJ, et al. A prospective study of the impact of community-based azithromycin treatment of trachoma on carriage and resistance of *Streptococcus pneumoniae*. *Clin Infect Dis* 1997;24:356–362.
15. Performance Standards for Antimicrobial Susceptibility Testing; Seventeenth Informational Supplement. Clinical and Laboratory Standards Institute; Wayne, Philadelphia: January 2007;26(3).
16. Bell SM, Gatus BJ, Pham JN, Fisher GT, Rafferty DL. Antibiotic susceptibility testing by the CDS method: A manual for medical and veterinary laboratories 2006. South Eastern Area Laboratory Services; Randwick, New South Wales: May 2007. Available from: http://web.med.unsw.edu.au/cdstest/GTF_CDS_site/WebPages/HomeLevel/ManualFrames.htm
17. Gotlieb T, Collignon P, Robson J, Pearson J, Bell J. *Streptococcus pneumoniae* Survey: 2005 Antimicrobial Susceptibility Report: The Australian Group on Antimicrobial Resistance; Australia: August 2006. Available from: http://www.agargroup.org/surveys/SPNEUMO 05 CDI REPORT.pdf