

## Annual reports

# TRACHOMA SURVEILLANCE IN AUSTRALIA, 2009

A REPORT BY THE NATIONAL TRACHOMA SURVEILLANCE AND REPORTING UNIT

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### Abstract

Trachoma is highly prevalent in remote Indigenous communities in Australia. The National Trachoma Surveillance and Reporting Unit was established in 2006 as a result of a Federal Government initiative to provide comprehensive surveillance data from regional and remote Indigenous communities considered by the jurisdictional population health staff to be 'At Risk' for endemic trachoma, defined as a trachoma prevalence of 5% or more. This report details the findings from the 2009 trachoma screening program together with trends in trachoma prevalence and screening coverage since 2006. Aboriginal children aged 1–9 years resident in At Risk communities were examined for trachoma using the World Health Organization (WHO) simplified trachoma grading criteria. In the Northern Territory, screening was conducted by staff from the Healthy School Age Kids program and the Aboriginal Community Controlled Health Services. In South Australia, screening was conducted by the Eye Health and Chronic Disease Specialist Support Program and a team of visiting ophthalmologists and optometrists. In Western Australia, screening was conducted by staff from State Government population health units and Aboriginal Community Controlled Health Services. In the Northern Territory, 53 of 86 At Risk communities were screened and data were reported for 2,283 children. In South Australia, 12 of 72 At Risk communities were screened and data were reported for 149 children. In Western Australia, 68 of 74 At Risk communities were screened and data were reported for 1,684 children. The prevalence of active trachoma ranged from 1%–44% in the Northern Territory, 0%–57% in South Australia and 13%–15% in Western Australia. Trend analysis across all three jurisdictions combined found that neither the prevalence of trachoma nor community screening coverage changed significantly between 2006 and 2009. When trend analysis was done by jurisdiction, there was a significant decrease in trachoma prevalence and a significant increase in community screening coverage only for Western Australia over the same 4 year period. The implementation of the WHO Surgery, Antibiotics, Facial cleanliness

and Environmental improvement (SAFE) strategy has been variable. Surgery referral processes for trichiasis were reported as available in all screened communities in the Northern Territory and South Australia but only in 35% of screened communities in Western Australia. Antibiotics were distributed according to Communicable Diseases Network Australia guidelines in 89% of communities where treatment was indicated. Facial cleanliness programs and resources were reported as poorly implemented in South Australia and Western Australia while minimal data were reported for environmental conditions in all jurisdictions. No significant change was found in bacterial resistance to azithromycin from 2007 to 2009. Significant gaps remain in community screening coverage and in the full implementation of the SAFE strategy. However, the parallel increase in community screening coverage and decrease in trachoma prevalence in Western Australia suggests that the SAFE strategy might have had an effect in reducing trachoma prevalence in that jurisdiction. *Commun Dis Intell* 2010;34(4):375–395.

**Keywords:** active trachoma, antibiotic resistance, facial cleanliness, Northern Territory, SAFE control strategy, South Australia, surveillance, control activities, endemic, Western Australia, At Risk

### Introduction

This is the 4th report of the National Trachoma Surveillance and Reporting Unit (NTSRU). The report presents data from the 2009 screening program conducted in At Risk communities from those Northern Territory, South Australia and Western Australia regions with endemic trachoma and compares 2009 data with those from screening conducted from 2006 to 2008 inclusive.<sup>1–3</sup> The report focuses on data for Aboriginal children aged 1–9 years and Aboriginal adults aged 40 years or more—unless otherwise specified—to comply with Communicable Diseases Network Australia (CDNA) guidelines.<sup>4</sup> It comments on each jurisdiction's implementation of the CDNA trachoma guidelines 'minimum best-practice approach', and makes recommendations regarding future reporting and management.

## Methods

### Screening sample

As had been the practice in past surveys, key representatives from each jurisdiction confirmed the categorisation of communities as 'At Risk' or 'Not At Risk' for trachoma, using regional historical reports of trachoma. The large urban regions were not classed as At Risk. Due to limited information on prior screening for trachoma for many remote communities in South Australia, all remote communities in that jurisdiction were categorised as At Risk.

### Definitions

The World Health Organization (WHO) has defined the elimination of blinding endemic trachoma in a community as being a prevalence of active trachoma less than 5% in children aged 1–9 years or a prevalence of operable trichiasis of less than 0.1% in the population.<sup>4</sup> According to the CDNA guidelines, screening should be conducted annually in Communities At Risk until the prevalence of active trachoma is less than 5% for 5 consecutive years.

The WHO simplified trachoma grading system was used to report results of screening.<sup>5</sup> Active trachoma includes WHO grades TF (trachomatous inflammation follicular) and/or TI (trachomatous inflammation intense).

### Data collection

In brief, data were reported for prevalence of active trachoma, antibiotic treatment of children, their household contacts and community members, facial cleanliness, and trachomatous trichiasis (TT). The implementation of the Surgery, Antibiotics, Facial cleanliness and Environmental improvement (SAFE) trachoma control strategy was also reported.

For the 2009 screening period, the data collection form was revised to report data for trichiasis for people aged less than 40 years, 40–54 years and 55 years and over age groups to be consistent with the CDNA recommended age groups. A single region in the Northern Territory that reported trichiasis data in 2009, used the 2008 form, which included adults aged less than 30 years and from 30–49 years.

Because of conflicting reports on the development of resistance to macrolide antibiotics in respiratory pathogens resulting from community-wide use of azithromycin to treat trachoma,<sup>6–8</sup> the NTSRU has monitored antibiotic resistance in Aboriginal communities for 4 years (2006 to 2009 inclusive). Three pathology services have previously assisted

this monitoring by collecting and reporting data to the NTSRU: Institute of Medical Veterinary Science (IMVS), Northern Territory Government Pathology Service (NTGPS) and Western Diagnostics Pathology Service (WDPS). For the 2009 screening period, the IMVS and WDPS pathology services reported antibiotic resistance (defined as both intermediate and high level resistance to the macrolide antibiotic erythromycin) for any invasive and non-invasive isolates of *Streptococcus pneumoniae* in specimens collected from those regions or health services that predominately service Aboriginal people. Resistance to erythromycin identifies resistance to azithromycin. Specimens were collected over a 6 month period from 1 July to 30 December 2009.

### Northern Territory

Screening for trachoma was conducted between February and November 2009 in 5 regions. The Healthy School Age Kids (HSAK) program conducted most of the screening in the Top End and in Central Australia in collaboration with primary health care staff from the Aboriginal Community Controlled Health Services (ACCHS).

Indigenous children at a school in Alice Springs were screened for the first time in 2008 by the trachoma coordinator in conjunction with the Australian Government Emergency Intervention (AGEI) and the Central Australian Aboriginal Congress. The school was not re-screened in 2009.

In the 2007 and 2008 screening years, health personnel from the AGEI conducted Child Health Checks throughout the Northern Territory. The data from screening for trachoma by the AGEI were not regarded as reliable or consistent by the Northern Territory authorities and were not included in any of the NTSRU reports. The communities that were visited by the AGEI were not revisited by the HSAK program in 2008 and this contributed to the smaller number of communities from which data were reported for active trachoma in 2008. In 2009, the HSAK program was responsible for the screening of all of At Risk communities throughout the Northern Territory.

Ophthalmologists examined Aboriginal adults for trichiasis when they conducted outreach visits in the regions.

### South Australia

Screening for trachoma was conducted between April and December 2009 in regions serviced by 6 ACCHS. The Ceduna/Koonibba region includes communities in the Eyre school district located south-east of the Ceduna/Koonibba Health

Service. This incorporates communities serviced by the Port Lincoln ACCHS region where screening has not been conducted. The Pika Wiya region includes communities from within the Flinders school district, and two communities from the Northern Country school district that were re-assigned by the Eye Health and Chronic Disease Specialist Support Program (EH&CDSSP) coordinator.

In 2006, data from communities in regions serviced by Oak Valley ACCHS were reported along with data from communities from the Tullawong ACCHS; these data have been combined in Table 1 so comparisons can be made for each year between 2006 and 2009.

It is anticipated that screening in South Australia will be expanded in the 2010 screening round with the reclassification of regions in South Australia to include urban regions and to increase their number to 11 (personal communication R Zadow, 2010).

A state-wide co-ordinated screening program was not implemented in South Australia. The project coordinator of the EH&CDSSP assisted a screening team of ophthalmologists and optometrists in recording information on active trachoma from these selected communities. Some communities were visited twice in the 2009 screening period and in these instances, data from both screening events were reported. However, only the first round of data was used for determining trachoma prevalence. Aboriginal children who were screened were usually seen in schools. Others examined were brought to the clinics by family members, Aboriginal health workers and clinic staff.

Data from the Pika Wiya region were collected by the mainstream Health Service and forwarded to the EH&CDSSP coordinator to be included in this report.

The screening team of eye specialists also visited ACCHS clinics twice in 2009 to examine adults for trichiasis.

#### Western Australia

Screening for trachoma was conducted between August and September 2009 in four regions. Population health units collected data in partnership with primary health care staff from state government health services and ACCHS. Adults were examined for trichiasis as part of an annual influenza vaccination program.

#### Data analysis and reporting

In 2009, as in the previous report, a community was defined as a group of people where there was a school; larger communities where two or more schools are located were counted as a single community instead of reporting data for each school-associated community separately. Community coverage was calculated using the number of communities that were screened as a proportion of those that were identified by each jurisdiction as At Risk for trachoma. Communities that were reported as Not At Risk were usually not screened and were not included in this report.

The 2006 Australian Bureau of Statistics (ABS) Census data for the number of Aboriginal people resident in a region were used to calculate the 2009 high and low series population projections.<sup>9,10</sup>

**Table 1: Number of communities screened for trachoma, the Northern Territory, South Australia and Western Australia, 2009, by trachoma risk and state or territory**

Communities	Northern Territory		South Australia		Western Australia		Total	
	n	%	n	%	n	%	n	%
<b>Not At Risk</b>								
Screened	1	20	0		1	2	2	4
Not screened	4	80	0		46	98	50	96
Total Not At Risk	5		0		47		52	
<b>At Risk</b>								
Screened with no trachoma found	14	16	5	7	22	30	41	18
Screened with trachoma found	39	45	7	10	47	64	93	39
Not screened	33	38	60	83	5	7	98	42
Total At Risk	86		72		74		232	
Total communities	91		72		121		284	

Source: Data were collected by the Healthy School Age Kids program in the Northern Territory, the Eye Health and Chronic Disease Specialist Support Program in South Australia and Population Health Units in Western Australia.

Screening coverage was calculated using the number of children who were examined for trachoma in 2009 as a proportion of those who were estimated to be resident in Communities At Risk.

The prevalence of active trachoma in Aboriginal children aged 1–9 years was calculated using the number of children examined as the denominator and prevalence 95% confidence intervals (CI) were calculated.

CDNA guidelines recommend providing azithromycin treatment to affected children, their households and in certain instances, to community members. In some communities, although some treatment was distributed, the treatment strategy was not reported, and it was not possible to determine whether CDNA treatment guidelines were followed. In other communities, the data indicated that treatment was only given to affected children, without household or community contacts being offered treatment. These communities were regarded as not following the CDNA guidelines.

For comparisons to be made, eligible communities had to report comparable data for at least 2 years. The P-trend command in Stata<sup>11</sup> that calculates a

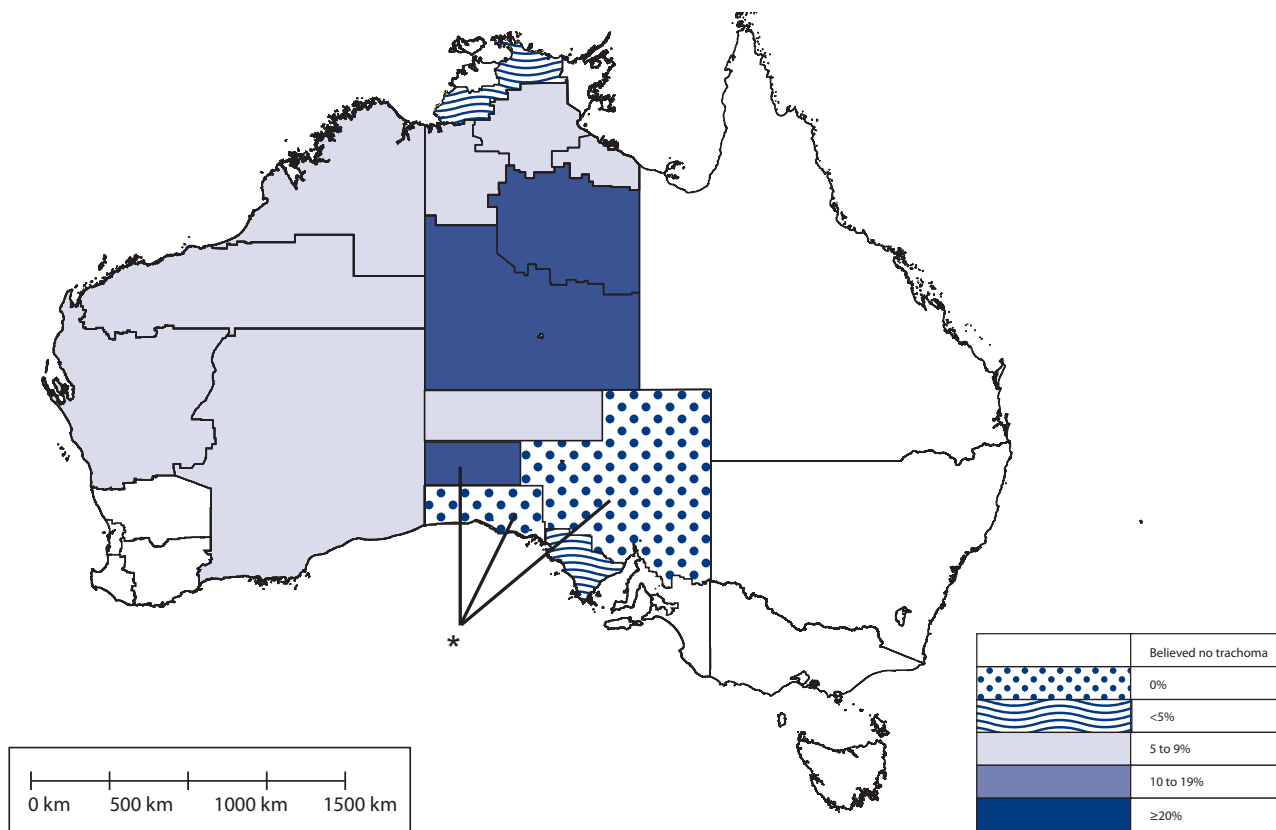
chi-square statistic for trend was used to detect a trend in the prevalence of active trachoma from 2006 to 2009 for communities that examined 10 or more children. Analysis could not be conducted on 2006 data for two regions in Western Australia: the Pilbara (where follicular trachoma was not graded according to the WHO grading system) and the Kimberley region (where the number of children examined from each community was not reported). In the 2008 report, comparisons of the prevalence of active trachoma were not possible for four of the seven communities in the Katherine region in the Northern Territory as data were provided for children aged 0–15 years without separately providing data for the children in the 1–9 year age group.

## Results

### Overview

Data were received from a total of 15 regions with At Risk communities: five regions in the Northern Territory, six in South Australia and four in Western Australia. Other jurisdictions were not included in this screening program (Map).

**Map: Prevalence of active trachoma in Australia for children 1 to 9 years, 2009, by region**



Note that Pika Wiya and Umoona Tjutagku regions show a combined prevalence in the above figure.

\* Less than 5 children were screened in these regions.

## Trachoma screening

Of the 15 regions, nine had a prevalence of trachoma of  $\geq 5\%$  (Table 2). Data were reported for 134 of the 232 Communities At Risk (58%) within these regions in 2009 (Table 1). Of the 4,116 Aboriginal children aged 1–9 years for whom data were reported, 575 had active trachoma, resulting in an overall trachoma prevalence of 14% (95%CI 13%–15%) (Table 2). A total of 80 communities (60%) had a prevalence of active trachoma  $\geq 5\%$  (Table 3).

If those 4,116 children screened were a representative sample of all 20,155 children resident in all At Risk communities, then based on the estimated prevalence of trachoma, the additional number of children with potentially undiagnosed trachoma across the three jurisdictions lies between 2,045 and 2,448.

There has been no detectable trend in the prevalence of trachoma when data from all three jurisdictions were grouped together.

While there appeared to have been a significant rising trend in the prevalence of active trachoma in the Northern Territory since 2006, this might be misleading if the reported trachoma prevalence (29%) in the Northern Territory in the 2008 report was a biased result. Such bias could have arisen because of the absence of data from those At Risk communities screened as part of the AGEI program. Data from these communities were not reported to the NTSRU in 2008. Review of the earlier NTSRU published reports reveals that many of the communities examined as part of the AGEI program were those with a lower prevalence of trachoma. As data from these 'lower prevalence' communities were not included in the 2008 NTSRU report, the estimated trachoma prevalence of 29% could have been spuriously high.

A repeat analysis of the trend in trachoma prevalence in the Northern Territory that excluded the 2008 data indicated that the rising trend seen previously was no longer evident. Tables 4 and 5 summarise the trend in trachoma prevalence—Table 4 includes the 2008 data while Table 5 excludes 2008 data.

Trachoma prevalence in Western Australia has been observed to be decreasing over the same 4 year period and the small number of children screened in South Australia has not allowed that jurisdiction to make a useful contribution to the overall trend analysis.

Not all screened communities where data were reported implemented the components of the SAFE strategy according to the CDNA guidelines. Surgery referral processes for trichiasis were available in all communities screened in the Northern Territory and South Australia, but were only available for 35% of Western Australia communities. Use of facial

cleanliness programs and resources was well documented in the Northern Territory but no data were reported for South Australia and data were reported from only 44% of screened communities in Western Australia. In only three of the 135 communities screened (2%) were the environmental conditions present in the community reported as 'good', a subjective assessment made by primary health care staff involved in the screening program (Table 6).

Antibiotic treatment was reported to have been distributed in 89 of the 100 communities (89%) in which treatment for trachoma was indicated (Table 7), including six communities where active trachoma was found in children aged 10–14 years. Overall, 70 communities (70%) were treated according to CDNA guidelines. This included treating children found to have active trachoma, their household contacts and community members. In the remaining 19 communities requiring treatment, children found to have active trachoma were treated but household or community contacts were not treated. Treating only children with active trachoma is not in accordance with CDNA guidelines. There has been no significant change in azithromycin resistance between 2005 and 2009.

In terms of overall screening coverage, a significant falling trend was noted in the Northern Territory, a significant rising trend was seen in Western Australia while no trend was detected in South Australia. No trend in community coverage over the period could be detected across all three jurisdictions combined.

## Trichiasis screening

Trichiasis screening was carried out in only 49 of 232 (21%) communities in the three jurisdictions. Overall, trichiasis was found in 46 of the 1,212 adults examined giving a prevalence of 4% (95%CI 3%–5%).

If those 1,212 adults screened for trichiasis were a representative sample of the 26,382 adults at risk of trichiasis in all three jurisdictions, then the additional number of adults with undetected trichiasis in the three jurisdictions, based on the estimated prevalence of trichiasis, lies between 741 and 1,271.

## Northern Territory

Data for active trachoma were reported for 5 (83%) of six regions categorised as trachoma endemic in 2009: Alice Springs Remote, Barkly, Darwin Rural, East Arnhem and Katherine. The 6th region, a town camp in Alice Springs that was screened as part of the 2008 program, was not screened in 2009 as this town camp is usually screened by Central Australian Aboriginal Congress and not by the HSAK program.

**Table 2: Community coverage, screening coverage and active trachoma prevalence of Aboriginal children aged 1 to 9 years, 2006 to 2009, by state or territory, region and Aboriginal Community Controlled Health Service**

State or territory and region	Number of Communities At Risk (2009)	Community coverage Number of communities screened (% of Communities At Risk)						Screening coverage Number of children examined (% of children in Communities At Risk)						Prevalence of active trachoma Children 1 to 9 years (% prevalence)					
		2006		2007		2008		2009		2006		2007		2008		2009			
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%		
<b>Northern Territory</b>																			
Alice Springs†	–	–	–	1	100	–	–	–	–	45	22	–	–	–	18	40	–		
Alice Springs Remote	30	25	83	19	63	18	60	23	77	530	35	231	15	459	29	586	37		
Barkly†	8	6	67	6	67	2	25	3	38	105	20	68	13	87	26	64	18		
Darwin Rural	16	15	94	12	75	11	69	14	88	522	27	377	19	907	45	877	43		
East Arnhem	12	12	100	12	100	4	33	6	50	879	78	465	41	232	20	250	21		
Katherine†	20	11	52	11	52	7	35	7	35	218	12	562	31	732	50	506	34		
Total NT	86	69	78	60	67	43	49	53	62	2,254	33	1,703	24	2,462	36	2,283	34		
<b>South Australia</b>																			
Ceduna/Koonibba	21	1	5	1	5	1	5	1	5	18	1	16	1	121	6	48	2		
Nganampa	10	8	80	4	40	6	60	8	80	27	8	76	23	167	50	90	27		
Oak Valley†	2	2	100	2	100	2	100	2	100	28	108	34	131	25	93	7	26		
Pika Wiya	33	5	15	–	–	1	3	1	3	51	1	–	–	37	1	4	0.06		
Umoona Tjutagku	6	1	17	1	17	1	17	–	–	6	7	2	2	15	17	–	–		
Total SA	72	17	24	8	11	11	15	12	17	130	1	128	1	365	4	149	2		
		20	15	18	14	6	2	19	13	287	13	216	13	713	29	309	14		

**Table 2: Community coverage, screening coverage and active trachoma prevalence of Aboriginal children aged 1 to 9 years, 2006 to 2009, by state or territory, region and Aboriginal Community Controlled Health Service, continued**

State or territory and region	Number of Communities At Risk (2009)	Community coverage Number of communities screened (% of Communities At Risk)						Screening coverage Number of children examined (% of children in Communities At Risk)						Prevalence of active trachoma Children 1 to 9 years (% prevalence)											
		2006		2007		2008		2006		2007		2008		2006		2007		2008		2009					
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%				
<b>Western Australia</b>																									
Goldfields†	21	6	30	10	50	13	65	20	95	231	24	227	23	238	23	321	31	43	19	8	4	18	8	46	14
Kimberley**†	31	28	82	25	83	32	94	30	97	1,048	51	1,006	58	1,169	55	930	43	192	18	164	16	175	15	141	15
Midwest	6	6	100	5	83	6	100	6	100	167	90	127	68	122	64	177	91	32	19	28	22	12	10	23	13
Pilbara§	16	9	56	14	88	16	100	12	75	273	36	306	40	294	37	256	32	146	53	50	16	73	25	37	14
Total WA	76	49	64	54	75	67	88	68	89	1,719	43	1,666	45	1,823	44	1,684	40	413	24	250	15	278	15	247	15
<b>Australia</b>		<b>135</b>	<b>57</b>	<b>122</b>	<b>52</b>	<b>121</b>	<b>51</b>	<b>133</b>	<b>57</b>	<b>4,103</b>	<b>21</b>	<b>3,497</b>	<b>18</b>	<b>4,650</b>	<b>23</b>	<b>4,116</b>	<b>20</b>	<b>720</b>	<b>18</b>	<b>484</b>	<b>14</b>	<b>997</b>	<b>21</b>	<b>575</b>	<b>14</b>

– Data not reported.

\* Only children aged 5-9 years were screened in this region for the 2008 reporting period.

† Barkly had 9 communities At Risk of trachoma in 2006 and 2007; Katherine had 21 communities At Risk in 2006 and 2007; Kimberley had 30 Communities At Risk in 2007 and 34 in 2008; Goldfields had 20 communities At Risk in 2008; and Alice Springs had 1 community At Risk in 2008.

‡ Communities in regions serviced by the Oak Valley Aboriginal Community Controlled Health Services were reported with communities from the Tullawon Aboriginal Community Controlled Health Services.

§ Change in grading from 2007.

Source: Data were collected by the Healthy School Age Kids program in the Northern Territory, the Eye Health and Chronic Disease Specialist Support Program in South Australia and Population Health Units in Western Australia.

Of the 91 communities in the endemic regions in the Northern Territory, 86 (95%) were categorised as being At Risk for trachoma and five (5%) as Not At Risk. Of the 86 At Risk communities, 53 (62%) were screened and reported data. No active trachoma was found in 14 communities (26%), while 30 communities (57%) had a prevalence of active trachoma  $\geq 5\%$  and nine communities (17%) had a prevalence less than 5% (Table 3).

Estimates of the trend in the prevalence of active trachoma in the Northern Territory were made from 2006 to 2009. Due to the uncertainty concerning the

validity of the 2008 Northern Territory data, trend estimates for the Northern Territory have been made with and without the 2008 data. When the 2008 data were included in the trend estimate, a significant rising trend was evident for the Northern Territory. However when the 2008 data were excluded, that rising trend was no longer seen.

Two regions, Alice Springs Remote and Barkly, showed a significant rising trend in trachoma prevalence while Darwin Rural and Katherine showed a significant falling trend. No trend was observed in East Arnhem.

**Table 3: Community prevalence of active trachoma in Aboriginal children aged 1–9 years, 2006 to 2009, by state or territory**

Community prevalence of active trachoma (%)	Number and percentage of communities where trachoma data were reported						Total	
	Northern Territory		South Australia		Western Australia		n	%
	n	%	n	%	n	%	n	%
<b>2006 data</b>								
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 to <20	6	8	3	38	6	11	15	11
20 to <50	12	17	3	38	19	36	34	26
$\geq 50$	10	14	0		12	23	22	17
Total	72	100	8	100	53	100	133	100
<b>2007 data</b>								
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 to <20	8	13	2	25	12	22	22	18
20 to <50	11	18	2	25	16	29	29	24
$\geq 50$	1	2	0		2	4	3	2
Total	60	100	8	100	55	100	123	100
<b>2008 data</b>								
0	4	9	7	64	16	24	27	22
1 to <5	4	9	1	9	7	10	12	10
5 to <10	4	9	2	18	8	12	14	12
10 to <20	6	14	1	9	7	10	14	12
20 to <50	16	37	0		21	31	37	31
$\geq 50$	9	21	0		8	12	17	14
Total	43	100	11	100	67	100	121	100
<b>2009 data</b>								
0	14	28	5	42	22	32	41	31
1 to <5	9	15	1	8	3	4	13	9
5 to <10	3	6	1	8	8	12	12	8
10 to <20	8	15	2	17	14	20	24	18
20 to <50	10	19	1	8	17	25	28	21
$\geq 50$	9	17	2	17	5	7	16	12
Total	53	100	12	100	69	100	134	100



Table 4: Prevalence of active trachoma in Aboriginal children aged 1 to 9 years, 2006 to 2009, by region and state or territory

State or territory and region	Prevalence of active trachoma						Test for trend*						
	2006		2007		2008		2009						
	%	95% CI	n	%	95%CI	n	%	95%CI	n				
<b>Northern Territory</b>													
Alice Springs	18	15, 21	530	20	15, 26	—	40	27, 55	45	—	—	—	—
Alice Springs Remote	21	14, 30	105	26	17, 38	231	34	30, 39	459	33	30, 37	586	↑ P <sub>trend</sub> = 0.0001
Barkly	16	13, 19	522	7	5, 10	68	67	56, 76	87	44	31, 57	64	↑ P <sub>trend</sub> = 0.0001
Darwin Rural	3	2, 4	879	5	3, 7	377	20	18, 23	907	2	1, 3	877	↓ P <sub>trend</sub> = 0.0001
East Arnhem	30	24, 36	218	19	16, 22	465	4	2, 8	232	1	0, 3	250	P <sub>trend</sub> = 0.44
Katherine	13	11, 14	2,254	13	11, 14	562	39	36, 43	732	13	10, 16	506	↓ P <sub>trend</sub> = 0.02†
Total NT	13	11, 14	2,254	13	11, 14	1,703	29	27, 31	2,462	14	12, 15	2,283	↑ P <sub>trend</sub> = 0.0000†
<b>South Australia</b>													
Ceduna/Koonibba	6	1, 26	18	6	1, 28	16	0	0, 3	121	4	1, 14	48	P <sub>trend</sub> = 0.57
Nganampa	19	8, 37	27	13	7, 23	76	2	1, 6	167	14	8, 23	90	P <sub>trend</sub> = 0.44
Oak Valley	12	5, 23	51	22	9, 45	18	13	3, 36	16	100	—	4	—
Pika Wiya	25	13, 43	28†	19	7, 43	16	0	0, 9	37	0	—	4	—
Tullawon	17	3, 56	6	0	—	2	0	0, 30	9	0	—	3	—
Umoona Tjutagku	15	10, 23	130	14	9, 21	128	0	0, 20	15	13	8, 19	149	↓ P <sub>trend</sub> = 0.01
Total SA	15	14, 16	3,830	14	13, 15	3,497	21	20, 23	4,650	14	13, 15	4,116 <sup>  </sup>	P <sub>trend</sub> = 0.12 <sup>**</sup>
<b>Western Australia</b>													
Goldfields	19	15, 25	231	4	2, 7	227	8	5, 12	238	14	11, 19	321	P <sub>trend</sub> = 0.49
Kimberley <sup>§</sup>	18	16, 20	1,048	16	14, 18	1,006	15	13, 17	1,169	15	13, 18	930 <sup>§</sup>	P <sub>trend</sub> = 0.56
Midwest	19	14, 26	167	22	16, 30	127	10	6, 16	122	13	8, 19	177	↓ P <sub>trend</sub> = 0.03
Pilbara <sup>  </sup>	53	47, 59	273	16	12, 21	306	25	21, 30	294	14	10, 19	256	P <sub>trend</sub> = 0.69
Total WA	18	16, 20	1,446 <sup>¶</sup>	15	13, 17	1,666	15	13, 17	1,823	15	13, 16	1,684	↓ P <sub>trend</sub> = 0.03 <sup>¶</sup>
Australia	15	14, 16	3,830	14	13, 15	3,497	21	20, 23	4,650	14	13, 15	4,116 <sup>  </sup>	P <sub>trend</sub> = 0.12 <sup>**</sup>

\* Test for trend in this table was done using a chi-square statistic for trend across the groups (ptrend command in Stata<sup>11</sup>).

† The trend analysis for Katherine did not include the communities screened in 2006 to 2009 that recorded data for children aged 0–15 years.

‡ Communities in the Oak Valley and Tullawon Aboriginal Community Controlled Health Services were reported together in 2006, therefore these data could not be compared with 2007 and 2008.

§ For 2009 the Kimberley region only reported the screening of children aged 5–9 years.

|| The trend analysis for Pilbara did not include the data from 2006 because a different grading system was used in the Pilbara in that year.

¶ The trend analysis for Western Australia trachoma prevalence over the 4 year period used community numbers for Katherine and Pilbara corrected as indicated in footnote ||.

\*\* The trend analysis for Australian trachoma prevalence over the 4 year period used community numbers for Katherine and Pilbara corrected as indicated in footnotes † and ||.

n Number of children examined.

– Data not reported.

Note: For communities with ≤5 children examined 95% CI were very large and have not been included in the table. Comparisons could not be made for regions where <10 children were examined.

Source: Data were collected by Healthy School Age Kids program in the Northern Territory, the Eye Health and Chronic Disease Specialist Support Program coordinator and the screening team in South Australia, and population health units in Western Australia.  
ptrend <0.05 = statistically significant change.

**Table 5: Prevalence of active trachoma in Aboriginal children aged 1 to 9 years, 2006 to 2009, but excluding 2008 data, by region and state or territory**

State or territory and region	2006			Prevalence of active trachoma 2007			2009			Test for trend*
	%	95% CI	n	%	95% CI	n	%	95% CI	n	
<b>Northern Territory</b>										
Alice Springs	18	15, 21	—	20	15, 26	—	33	30, 37	—	↑ $P_{trend} < 0.0001$
Alice Springs Remote	21	14, 30	530	26	17, 38	231	44	31, 57	586	↑ $P_{trend} = 0.002$
Barkly	16	13, 19	522	7	5, 10	377	2	1, 3	877	↓ $P_{trend} < 0.0001$
Darwin Rural	3	2, 4	879	5	3, 7	465	1	0, 3	250	$P_{trend} = 0.63$
East Arnhem	30	24, 36	218	19	16, 22	562	13	10, 16	506	↓ $ptrend < 0.001^{\dagger}$
Katherine	13	11, 14	2,254	13	11, 14	1,703	14	12, 15	2,283	$P_{trend} = 0.31^{\dagger}$
Total NT	13	11, 14	2,254	13	11, 14	1,703	14	12, 15	2,283	$P_{trend} = 0.31^{\dagger}$
<b>South Australia</b>										
Ceduna/Koonibba	6	1, 26	18	6	1, 28	16	4	1, 14	48	$P_{trend} = 0.77$
Nganampa	19	8, 37	27	13	7, 23	76	14	8, 23	90	$P_{trend} = 0.74$
Oak Valley	—	—	‡	22	9, 45	18	100	—	4	—
Pika Wiya	12	5, 23	51	—	—	NS	0	—	4	—
Tullawon	25	13, 43	28 <sup>†</sup>	19	7, 43	16	0	—	3	—
Umoona Tjutagku	17	3, 56	6	0	—	2	—	—	—	—
Total SA	15	10, 23	130	14	9, 21	128	13	8, 19	149	$P_{trend} = 0.53$
<b>Western Australia</b>										
Goldfields	19	15, 25	231	4	2, 7	227	14	11, 19	321	$P_{trend} = 0.18$
Kimberley <sup>§</sup>	18	16, 20	1,048	16	14, 18	1,006	15	13, 18	930 <sup>§</sup>	$P_{trend} = 0.09$
Midwest	19	14, 26	167	22	16, 30	127	13	8, 19	177	$P_{trend} = 0.13$
Pilbara <sup>  </sup>	53	47, 59	273	16	12, 21	306	14	10, 19	256	$P_{trend} = 0.52$
Total WA	18	16, 20	1,446 <sup>  </sup>	15	13, 17	1,666	15	13, 16	1,684	↓ $ptrend = 0.03^{\dagger}$
Australia	15	14, 16	3,830	14	13, 15	3,497	14	13, 15	4,116 <sup>§</sup>	$P_{trend} = 0.20^{**}$

\* Test for trend in this table and in Table 5 was done using a chi-square statistic for trend across the groups (ptrend command in Stata<sup>††</sup>).

† The trend analysis for Katherine did not include the communities screened in 2006 to 2009 that recorded data for children aged 0–15 years.

‡ Communities in the Oak Valley and Tullawon Aboriginal Community Controlled Health Services were reported together in 2006, therefore these data could not be compared with 2007 and 2008.

§ For 2009 the Kimberley region only reported the screening of children aged 5–9 years.

|| The trend analysis for Pilbara did not include the data from 2006 because a different grading system was used in the Pilbara in that year.

†† The trend analysis for Western Australia trachoma prevalence over the revised 3 year period used community numbers for Pilbara corrected as indicated in footnote ||.

\*\* The trend analysis for Australian trachoma prevalence over the revised 3 year period used community numbers for Katherine and Pilbara corrected as indicated in footnotes † and ||.

n Number of children examined.

– Data not reported.

Note: For communities with ≤5 children examined 95% CI were very large and have not been included in the table.

Comparisons could not be made for regions where <10 children were examined.

Source: Data were collected by Healthy School Age Kids program in the Northern Territory, the Eye Health and Chronic Disease Specialist Support Program coordinator and the screening team in South Australia, and population health units in Western Australia.

**Table 6: Implementation of trachoma control activities (SAFE strategy), 2009, by state or territory**

SAFE trachoma control activities	Number of communities from which trachoma control activities were reported						Total	
	Northern Territory		South Australia		Western Australia		n	%
	n	%	n	%	n	%		
Surgery referral process for trichiasis	54	100	12	100*	24	35	90	67
Antibiotics distributed	34	63	10	77	48	70	92	68
Facial cleanliness resources used	41	76	0		31	45	72	53
Facial cleanliness programs implemented	48	89	0		30	43	78	58
Environmental conditions reported as 'good' <sup>†</sup>	0		0		3	4	3	2
Total number of communities from which trachoma screening data were reported	54		12		69		135	

\* Note an extra community that screened only adults for trichiasis was found to have a surgery process for trichiasis available.

† 'Good' was a subjective assessment made by primary health care staff involved in screening.

Source: Data were collected by the Healthy School Age Kids program in the Northern Territory, the Eye Health and Chronic Disease Specialist Support Program in South Australia and Population Health Units in Western Australia.

**Table 7: Reported treatment for trachoma, 2009, by state or territory**

Communities	Northern Territory		South Australia		Western Australia		Total	
	n	%	n	%	n	%	n	%
<b>Treated in compliance with CDNA guidelines*</b>								
Community-based	9	39	0		12	26	21	30
Household-based	14	61	0		34	72	48	69
Strategy not reported <sup>†</sup>	0		0		1	2	1	1
Total treated	23		0		47		70	
<b>Not treated in compliance with CDNA guidelines</b>								
Children only	11	55	7	100	1	33	19	63
No treatment reported	9	45	0		2	67	11	37
Total not following CDNA	20		7		3		30	
Total communities	43		7		50		100	

\* Includes three communities in the Northern Territory and three in Western Australia where active trachoma was found in children aged 10–14 years without being detected in children aged 1–9 years.

† Communities carried out treatment but the strategy was not reported.

Note: The Communicable Diseases Network Australia (CDNA) guidelines recommend that treatment of children and household or community contacts aged greater than 6 months be completed in as short a timeframe as possible where population mobility is high.

Source: Data were collected by the Healthy School Age Kids program in the Northern Territory, the Eye Health and Chronic Disease Specialist Support Program in South Australia and Population Health Units in Western Australia.

Of the 6,638 children aged 1–9 years reported to be resident in Communities At Risk (Table 8), 2,283 (34%) were examined for trachoma, and 309 had active trachoma (14%, 95% CI, 12%–15%) (Table 2). Of the 1,900 children examined for facial cleanliness 1,403 had clean faces (74%, 95% CI 72%–76%) (Table 8).

Antibiotic treatment was reported to have been distributed according to the CDNA guidelines in 23 of the 43 communities (53%) in which treatment for trachoma was indicated (Table 7). This included three communities where active trachoma was found in children aged 10–14 years and one Not at Risk community that was screened.

**Table 8: Number of resident Aboriginal children aged 1 to 9 years, and number examined for facial cleanliness, Northern Territory, 2009, by region**

	Alice Springs Remote	Barkly	Darwin Rural	East Arnhem	Katherine	Total
<b>Population data</b>						
<b>Children resident</b>						
in region*	1,843	670	2,176	1,943	2,019	8,651
in Communities At Risk	1,599	346	2,041	1,171	1,480	6,638
in Communities At Risk from which data were reported†	1,898	327	3,291	808	993	7,317
<b>Facial cleanliness</b>						
Communities from which data were reported/Communities At Risk	23/30	3/8	14/16	6/12	3/20	49/86
Children examined	586	64	877	250	123	1,900
Clean faces (%)	352 (60%)	44 (69%)	683 (78%)	223 (89%)	101 (82%)	1,403 (74%)

\* Projected 2009 population data based are based on 2006 Australian Bureau of Statistics data with a 1.4% low series population growth rate in the Northern Territory.

† Number of children in Communities At Risk 'from which data were reported' may be greater than the number from the Australian Bureau of Statistics projected data as the former were provided by the Healthy School Age Kids program derived from school enrolment data or from Community Health Centre population data.

Source: Data regarding active trachoma and clean faces were collected by the Healthy School Age Kids program.

Overall, 6,457 persons were identified as requiring treatment with azithromycin according to the CDNA guidelines. Of these, 3,055 (47%) were reported to have been treated. Those treated included children found to have active trachoma, their household contacts and community members.

The reporting of trachoma control activities was similar to that reported in 2008. There is still a lack of reporting of the Environmental component of the SAFE strategy, with only one (2%) of the 53 communities having data reported in terms of current environmental conditions.

Data on trichiasis were reported for the Alice Springs Remote region only. Of the adults aged  $\geq 30$  years resident in Communities At Risk, 350 (11%) were examined and 13 (4%) had trichiasis (Table 9). Another 2 adults were reported to have undergone surgery for trichiasis within 12 months prior to the date of reporting.

### South Australia

All 72 communities in the 6 ACCHS regions of South Australia that were visited (Ceduna/Koonibba, Nganampa, Oak Valley (Maralinga Tjarutja), Pika Wiya, Tullawon and Umoona Tjutagku), were categorised as being At Risk of trachoma in 2009. Of these 72 communities, 12 (17%) were visited and had data reported (Table 1). Five communities (42%) had no active trachoma while 6 (50%) had a prevalence of active trachoma  $\geq 5\%$  (Table 3).

Of the 9,347 children aged 1–9 years reported to be resident in these Communities At Risk (Table 10), 149 (2%) were examined for trachoma, and 19 had active trachoma (13%, 95% CI 8%–19%) (Table 2). Of the 151 children examined for facial cleanliness, 118 (78%, 95% CI 71%–84%) had clean faces (Table 10).

Antibiotic treatment was reported to have been distributed in all seven of the communities in which treatment for trachoma was indicated (Table 7). Treatment was given to 19 children aged 1–9 years found to have active trachoma. However, CDNA guidelines were not followed as household or community treatment was not given despite the presence of trachoma in these children. The same non-adherence to the CDNA treatment guidelines was noted in the 2006, 2007 and 2008 reports.

Trend in the prevalence of active trachoma was examined for two out of 12 communities where data were reported for at least two of the years between 2006 and 2009. No significant trend in trachoma prevalence was found in either community over this period (Table 4).

Data for trichiasis were reported for all 6 ACCHS regions. Of the 10,653 adults aged  $\geq 40$  years resident in Communities At Risk in these regions, 395 (4%) were examined, and 10 (3%, 95% CI 1%–5%) had trichiasis. Two adults were reported to have undergone surgery for trichiasis within 12 months prior to the date of reporting (Table 11).

**Table 9: Trichiasis screening reported for Aboriginal adults aged ≥30 years, Northern Territory, 2009, by region**

	Alice Springs Remote	Barkly	Darwin Rural	East Arnhem	Katherine	Total
<b>ABS projection</b>						
<b>Adults resident:</b>						
in region*	3,571	1,319	3,343	3,355	3,084	14,672
in Communities At Risk	3,052	550	3,217	2,347	2,067	11,233
<b>Trichiasis</b>						
Communities from which data were reported/Communities At Risk	25/30	0/8	0/16	0/12	0/20	25/86
Adults examined (% of the resident adults in Communities At Risk)	350 (11%)	–	–	–	–	350 (3%)
Trichiasis (%)	13 (4%)	–	–	–	–	13 (4%)
Trichiasis surgery within 12 months prior to the date of reporting	2	–	–	–	–	2

– Data not reported

\* Projected 2009 population data based are based on 2006 Australian Bureau of Statistics data with a 1.4% low series population growth rate in the Northern Territory.

† Adults were seen by an ophthalmologist during specialist outreach visits.

Source: Data regarding trichiasis were collected by eye health professionals as part of specialist outreach visits.

**Table 10: Number of resident Aboriginal children aged 1 to 9 years, and number examined for facial cleanliness in South Australia, 2009, by Aboriginal Community Controlled Health Service**

	Ceduna/Koonibba*	Nganampa	Oak Valley	Pika Wiya†	Tullawon	Umoona Tjutagku	Total
<b>Population data</b>							
<b>Children resident:</b>							
in ACCHS region‡	2,112	339	9	6,781	18	88	9,347
in Communities At Risk	2,112	339	9	6,781	18	88	9,347
in Communities At Risk from which data were reported	68	92	–	4	3	–	167
<b>Facial cleanliness</b>							
Communities from which data were reported/ Communities At Risk	1/21	8/10	1/1	1/33	1/1	0/6	12/72
Children examined	48	92	4	4	3	0	151
Clean faces (%)	38 (79%)	73 (79%)	0 (0%)	4 (100%)	3 (100%)	0 (0%)	118 (78%)

– Data not reported.

\* Includes Aboriginal children from communities in the Eyre school district and incorporates communities serviced by the Port Lincoln Aboriginal Community Controlled Health Services region where screening has not been conducted.

† Includes Aboriginal children from communities in the Flinders school district and two from the Northern Country school district, which were reassigned by the Eye Health and Chronic Disease Specialist Support Program coordinator.

‡ Projected 2009 population data based are based on 2006 Australian Bureau of Statistics data with a 1.9% low series population growth rate in South Australia.

Note: All communities in South Australia were considered At Risk, therefore the number of children resident in the region and in Communities At Risk is the same.

Source: Data regarding clean faces and number of children in Communities At Risk from which data were reported were collected and provided by the Eye Health and Chronic Disease Specialist Support Program coordinator and the screening team.

**Table 11: Trichiasis screening reported for Aboriginal adults aged  $\geq 40$  years in South Australia, 2009, by Aboriginal Community Controlled Health Service**

	Ceduna/ Koonibba*	Nganampa	Oak Valley (Maralinga Tjarutja)	Pika Wiya†	Tullawon	Umoona Tjutagku	Total
<b>Regional population</b>							
Adults resident: in region‡	2,454	368	25	7,660	18	128	10,653
in Communities At Risk	2,454	368	25	7,660	18	128	10,653
<b>Trichiasis</b>							
Communities from which data were reported/Communities At Risk	2/21	6/10	1/1	1/33	1/1	1/6	12/72
Adults examined	85	222	12	20	35	21	395
With trichiasis	4	6	0	0	0	0	10
Prevalence of trichiasis	5%	3%	0%	0%	0%	0%	3%
Trichiasis surgery within 12 months prior to the date of reporting	1	1	0	0	0	0	21

– Data not reported.

\* Regional population data of Aboriginal adults, and the number of Communities At Risk, include adults and communities in the Eyre school district in South Australia and incorporates those serviced by the Port Lincoln Aboriginal Community Controlled Health Services region where screening has not been conducted.

† Regional population data of Aboriginal adults, and the number of Communities At Risk, include adults and communities in the Flinders school district in South Australia and 2 communities from the Northern Country school district, which were reassigned by the Eye Health and Chronic Disease Specialist Support Program coordinator.

‡ Projected 2009 population data based are based on 2006 Australian Bureau of Statistics data with a 1.9% low series population growth rate in South Australia.

Note: All communities in South Australia were considered At Risk, therefore the number of adults resident in the region and in Communities At Risk is the same.

In 2009 insufficient information was reported on the implementation of the SAFE trachoma control strategy to allow a useful assessment to be made.

### Western Australia

Of the regions in Western Australia, four were categorised as being trachoma endemic in 2009: Goldfields, Kimberley, Midwest and Pilbara. From these regions, 74 At Risk communities were identified and of these, 69 (93%) were screened and reported data (Table 1). Of the 69 screened communities, 22 (32%) had no active trachoma, 44 (64%) had a prevalence of active trachoma  $\geq 5\%$ , 2 (3%) had a prevalence of less than 5% and one community reported screening only 1 child who was in the 10–14 years age group (Table 3).

Of the 4,170 children aged 1–9 years reported as resident in Communities At Risk (Table 12), 1,684 (40%) were examined for trachoma, and 247 (15%, 95% CI 13%–16%) had active trachoma (Table 2). Of the 1,576 children examined for facial cleanliness 1,228 (78%, 95% CI 76%–80%) had clean faces (Table 12). The Facial cleanliness component of the SAFE strategy was less well implemented this year than in 2008.

Data on trichiasis were reported for all four regions, and of the 4,496 adults aged  $\geq 40$  years resident in Communities At Risk, 467 (10%) were examined, and 23 (5%, 95% CI 3%–7%) had trichiasis. No adults were reported to have undergone surgery for trichiasis within 12 months prior to the date of reporting (Table 13).

The Antibiotic component of the SAFE trachoma control strategy was more comprehensively implemented in screened communities than the Surgery and Environmental improvements components.

Antibiotic treatment was reported to have been distributed according to the CDNA guidelines in 47 of the 50 communities (94%) in which treatment for trachoma was indicated (Table 7), including one community where active trachoma was found in children aged 10–14 years. The reporting of azithromycin antibiotic treatment in trachoma endemic jurisdictions has improved from 2006 to 2009 in South Australia and Western Australia (Table 14).

Overall, 1,512 persons were identified as requiring treatment according to the CDNA guidelines. Of these, 1,459 (96%) were reported to have been

**Table 12: Number of resident Aboriginal children aged 1 to 9 years, and number examined for facial cleanliness, Western Australia, 2009, by region**

	Goldfields	Kimberley <sup>†</sup>	Midwest	Pilbara	Total
<b>Population data</b>					
<b>Children resident:</b>					
in region*	1,201	2,915	1,256	1,216	6,588
in Communities At Risk	1,031	2,146	195	798	4,170
in Communities At Risk from which data were reported <sup>†</sup>	343	941	234	256	1,774
<b>Facial cleanliness</b>					
Communities from which data were reported/Communities At Risk	20/21	29/31	6/6	12/16	67/74
Children examined	295	838	187	256	1,576
Clean faces (%)	181 (61%)	682 (81%)	152 (81%)	213 (83%)	1,228 (78%)

\* Projected 2009 population data based are based on 2006 Australian Bureau of Statistics data with a 1.8% low series population growth rate in Western Australia.

† Number of children in Communities At Risk from which data were reported were provided by the Population Health Units from each region.

‡ Only children aged 5–9 years were screened in this region.

Source: Data regarding active trachoma and clean faces were collected by the Population Health Units and staff from Aboriginal Community Controlled Health Services in Western Australia.

**Table 13: Trichiasis screening reported for Aboriginal adults aged ≥40 years, Western Australia, 2009, by region**

	Goldfields	Kimberley	Midwest	Pilbara	Total
<b>ABS projection</b>					
<b>Adults resident:</b>					
in region*	1,316	2,940	1,421	1,446	7,123
in Communities At Risk	1,131	2,088	264	1,013	4,496
<b>Trichiasis</b>					
Communities from which data were reported/Communities At Risk	3/21	4/31	3/6	2/16	12/74
Adults examined (% of the resident adults in Communities At Risk)	84 (2%)	293 (14%)	47 (18%)	43 (4%)	467 (10%)
Trichiasis (%)	0 (0%)	21 (7%)	2 (4%)	0 (0%)	23 (5%)
Trichiasis surgery within 12 months prior to the date of reporting	–	–	–	–	–

– Data not reported

\* Projected 2009 population data based are based on 2006 Australian Bureau of Statistics data with a 1.8% low series population growth rate in Western Australia

Source: Data regarding trichiasis were collected by the population health units and staff from Aboriginal Community Controlled Health Services in Western Australia.

**Table 14: Percentage of people treated with azithromycin (total treated/total requiring treatment) in jurisdictions where trachoma is regarded as endemic, 2006, 2007, 2008 and 2009**

State or territory	2006*		2007		2008†		2009	
	n	%	n	%	n	%	n	%
Northern Territory	–/287		328/533	62	3,069/4,860	63	3,055/6,457	47
South Australia‡	19/20	95	18/18	100	7/7	100	19/19	100
Western Australia§	396/471	84	1,675/2,084	80	2,917/3,013	97	1,459/1,512	96
Total	415/778	53	2,235/2,635	85	5,993/7,880	76	4,533/7,988	57

– Data not reported.

\* No jurisdiction reported the number of household or community contacts treated.

† An additional 871 people were treated in 4 communities in the Katherine region (Northern Territory) and they have not been included in the total because the number of people requiring treatment was not provided.

‡ Number of children found to have active trachoma at the first screening have been reported; no household or community contacts were treated irrespective of the presence of trachoma.

§ Treatment data were reported for only two of the 4 regions in 2006.

treated with azithromycin, including children found to have active trachoma, their household contacts and community members (Table 14).

Estimates of trend in trachoma prevalence were made from 2006 to 2009 and a significant downward trend in trachoma prevalence was observed in Western Australia whether or not data from 2008 were included in the analysis. The trend in trachoma prevalence in the Pilbara was estimated with data from 2006 excluded as a non-standard definition of trachoma was used in that region in 2006. In addition, as only children aged 5–9 years were examined in the 31 communities screened in the Kimberley, these communities were not compared with communities from other regions where children aged 1–9 years were examined. After these adjustments, the Midwest region was the only region to display a significant downward trend in trachoma prevalence (Table 4).

### Antibiotic resistance

Overall, 39 of the 119 *S. pneumoniae* isolates (32.8%, 95% CI, 24%–42%) were reported to be resistant to azithromycin (Table 15).

Azithromycin resistance reported from 2007 to 2009 was not significantly different from the 22.7% resistance found in isolates reported in the AGAR survey in 2005 (Table 16).<sup>12</sup>

### Discussion

In 2009, 13 of the 15 regions screened for trachoma in Australia had a prevalence of trachoma of  $\geq 5\%$ . These data clearly indicate that trachoma is still endemic in regional and remote Australia. Current estimates of trachoma prevalence indicate that there

was likely to be a large pool of Indigenous children with active trachoma that was undiagnosed and untreated in regional and remote Australia in 2009, unless treatment was given outside the current jurisdictional trachoma programs.

Community screening coverage has not improved overall since 2006 and remains consistently lower in South Australia than in the other jurisdictions. However, while screening coverage has fallen in the Northern Territory and South Australia since 2006, it has improved in Western Australia over this period.

Comparisons over the period from 2006 to 2009 must be interpreted with caution due to the year-to-year variation in methods, data collection and reporting, and the small numbers of children examined in some communities. Furthermore, when comparing trachoma prevalence over time for the three jurisdictions, care must be taken to ensure the screening process has been consistent across the years. During 2006, screening in the Pilbara region in Western Australia used a different trachoma grading system from that used from 2007 onwards. The 2006 grading system overestimated the prevalence of trachoma and so was excluded from the trend analysis for this region. Reports from the Katherine region in the Northern Territory for the 2006–2008 screening periods detailed combined screening data for children aged 0–15 years in some communities. In this instance, all communities where this occurred were removed from any trend analysis. After these exclusions, the trend analysis of prevalence for 2006–2009 showed a significant increase in trachoma prevalence in the Northern Territory and a significant decrease in South Australia and Western Australia. No significant change in trachoma prevalence was observed for all three jurisdictions combined.



**Table 15: Azithromycin resistance and susceptibility to *Streptococcus pneumoniae* isolates collected from Aboriginal people, 2009, by pathology service and region**

	Resistant		Intermediate		Susceptible		Total	
	n	%	n	%	n	%	n	%
<b>Institute of Medical Veterinary Science</b>								
Goldfields	1	9	0		0		1	100
Nganampa	10	91	0		11	100	21	100
Subtotal	11	50	0		11	50	22	100
<b>Western Diagnostics Pathology Service</b>								
Alice Springs	7	25	0		9	13	16	100
Alice Springs Remote	2	7	0		0	0	2	100
Darwin	2	7	0		9	13	11	100
Darwin Rural	5	18	0		21	30	26	100
East Arnhem	6	21	0		17	25	23	100
Katherine	5	18	0		11	16	16	100
Pilbara	1	4	0		0	0	1	100
Kimberley	0		0		1	1	1	100
Unknown	0		0		1	1	1	100
Subtotal	28	29	0		69	71	97*	100
<b>Total</b>	<b>39</b>	<b>33</b>	<b>0</b>	<b>0</b>	<b>80</b>	<b>67</b>	<b>119</b>	<b>100</b>

\* Resistance data were not provided for 9 samples and have not been included.

Source: Data provided by the Institute of Medical Veterinary Science and Western Diagnostics Pathology Service.

**Table 16: Comparison of azithromycin resistance (resistant and intermediate) to invasive and non-invasive *Streptococcus pneumoniae* isolates collected from Aboriginal people, 2005 to 2009, by state or territory**

State or territory	AGAR monitoring				NTSRU monitoring			
	2005		2007		2008		2009	
	%	Number resistant/ total tested	%	Number resistant/ total tested	%	Number resistant/ total tested	%	Number resistant/ total tested
New South Wales/ACT	27.8	162/583		NR		NR		NR
Northern Territory		NR	23.4	11/47	20.9	48/230	28.7	27/94
Queensland	28.2	80/284		NR	0.0	0/1		NR
South Australia	20.9	82/392	40.0	6/15	20.0	4/20	47.6	10/21
Victoria	14.5	35/221		NR		NR		NR
Western Australia	16.2	48/296		NR	20.0	1/5	66.7	2/3
Unknown		0		0	0.0	0/5	0.0	0/1
Australia (95%CI)	22.7% (21,25)	404/1,776	27.4 (18,40)	17/62	20.7 (16,26)	53/256	33.1 (25,42)	39/118

NR Not reported

No trend was detected in azithromycin resistance between 2007 and 2009 (Ptrend=0.17).

However, when compared with data from previous screening years, data for the 2008 screening period showed an abrupt and marked increase in trachoma prevalence in the Northern Territory and a similar marked decrease in South Australia. The increase

in prevalence in the Northern Territory might have been due in part to the non-inclusion of communities examined during the AGEI in 2008. These communities were not re-screened by HSAK and data collected by the AGEI were not reported to the NTSRU

due to limited training of AGEI staff collecting the data. Examination of trachoma prevalence prior to 2008 in those communities screened by AGEI showed that the majority appeared to have a very low prevalence of trachoma. Therefore, the exclusion of these lower prevalence communities from the 2008 report might have resulted in a spuriously high prevalence being observed for the Northern Territory in that year. This is supported by data from the 2009 screening period when the HSAK resumed screening of all Northern Territory communities. In 2009, the prevalence of trachoma returned to a level in keeping with the prevalence levels observed prior to the involvement of the AGEI. The sharply lower trachoma prevalence observed in South Australia in 2008 might have been influenced by the larger number of children screened in that year compared with any other year. However, the true reason for the marked fall in trachoma prevalence in South Australia in 2008 remains unclear.

Because of the uncertainty with the 2008 data, a second analysis was conducted with the 2008 data excluded to estimate the trend in trachoma prevalence from 2006 onwards. When the 2008 data were excluded, no significant trend in trachoma prevalence was observed in the Northern Territory or South Australia but a significant falling trend still occurred in Western Australia. Again, no significant change in trachoma prevalence was observed overall in the three jurisdictions. In summary, the findings indicated that Western Australia was the only jurisdiction to display a decrease in trachoma prevalence since 2006, while there was no change in trachoma prevalence in the Northern Territory, South Australia or in all three jurisdictions combined.

CDNA guidelines recommend that for trachoma control, antibiotic treatment for all children with active trachoma, and provision of treatment to their household members and community members as appropriate, is necessary. Such treatment is critical in preventing the spread of trachoma by stopping the cycle of re-infection that can occur if household or community contacts are not treated along with affected children. However, in 2009 only 70% of the 100 communities where treatment was required received it according to these guidelines. In 19% of communities, treatment was given only to children with trachoma and in the remaining 11% no data were reported on treatment of children or their contacts. South Australia is the only jurisdiction that continues to treat affected children only without providing household or community treatment. This treatment strategy is not in accord with the CDNA guidelines.

The data indicate that household and community treatment according to the CDNA guidelines has improved from 2006 to 2009 in Western Australia,

with 47 of 50 (94%) communities being treated in 2009 compared with 41 of 52 (79%) in 2008. However, similar improvement in treatment strategy was not observed in South Australia or the Northern Territory. Treatment was reported to have been distributed according to the CDNA guidelines in only 23 of 43 (53%) of Northern Territory communities in 2009, compared with 35 of 41 communities (85%) in 2008. No change in antibiotic resistance of *S. pneumoniae* has been detected over this time.

Implementation of the Surgery, Antibiotics and Facial cleanliness components of the SAFE trachoma control strategy has improved since 2006; however implementation of these components could be strengthened further. In 2009, 67% of screened communities reported having an existing referral process for trichiasis surgery. All screened communities in the Northern Territory and South Australia had this referral process available, but in Western Australia it was only available in 35% of the screened communities. In 2009, 68% of the 135 screened communities treated children with trachoma but did not necessarily treat household and community contacts. The use of facial cleanliness programs and resources is a key component of the SAFE strategy. These components were reported to be present and used in just over half (56%) of the screened communities in 2009. Further improvement is necessary in the promotion of facial cleanliness, a major factor in preventing the transmission of trachoma. The Environmental improvement component of the SAFE strategy was poorly reported overall and most reports indicated that environmental conditions were poor. In only three (2%) of the 135 screened communities did reports indicate that the environmental conditions were good. Both the reporting of this component and measures to improve environmental conditions need attention.

The reporting of trichiasis data has not changed since 2008. Only 4% of eligible adults in At Risk communities were examined in each year. In 2009, trichiasis data were reported from 49 (21%) of the 232 At Risk communities in all three jurisdictions. Trichiasis data were reported from 29% of At Risk communities in the Northern Territory, with all of these communities coming from one region while data were reported from 16% of At Risk communities in Western Australia and 17% of At Risk communities in South Australia.

The number of adults found to have trichiasis was 49 from 1,212 adults screened, giving a trichiasis prevalence of 4% (95% CI 3%–5%). If these 1,212 adults are a representative sample of all 26,382 adults resident in At Risk communities, the additional number of adults with undetected trichiasis in these communities is likely to lie between 741 and

1,271. These people are at high risk of blindness and would be very likely to benefit from surgical intervention.

In summary, jurisdictions have collected data from communities where trachoma was still thought to be present. Gaps in data collection and limitations in the reporting of data remain although some improvement has occurred over the 4 year survey period.

Recommendations for the future include reviewing assumptions that communities classified as Not At Risk in 2006 remained so in 2009 and that Aboriginal children in urban communities are Not At Risk of trachoma. It is strongly recommended that at least some of the communities presently classified as Not At Risk are included in the next round of screening. Concerted efforts are needed to screen all communities classified as At Risk and to screen all children in those communities. Compliance with the CDNA guidelines for treatment of children and household and community contacts is attainable and should be emphasised. Screening for trichiasis must be improved and alternative methods for making surgery for trichiasis readily available should be a priority. In terms of data reliability, an increase in both community screening coverage and the number of children screened will enable more reliable estimates of the prevalence and distribution of trachoma. Implementation of these recommendations would be a major advance towards the elimination of blinding endemic trachoma by 2020.

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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 Families, Northern Territory

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

Pika Wiya 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

#### *Antibiotic resistance*

Institute of Medical Veterinary Science

Northern Territory Government Pathology Service

Western Diagnostics Pathology Service

### National Trachoma Surveillance Reference Group

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

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

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

Communicable Diseases 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 and Torres Strait Islander Health, Australian Government Department of Health and Ageing

Western Australian Country Health Service

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## Abbreviations

ABS	Australian Bureau of Statistics
ACCHS	Aboriginal Community Controlled Health Service(s)
AGEI	Australian Government Emergency Intervention
CDNA	Communicable Diseases Network Australia
CI	Confidence interval
EH&CDSSP	Eye Health and Chronic Disease Specialist Support Program
HSAK	Healthy School Age Kids program
IMVS	Institute of Medical Veterinary Science
NR	Not reported
NTGPS	Northern Territory Government Pathology Service
NTSRU	National Trachoma Surveillance and Reporting Unit
SAFE	Surgery, Antibiotics, Facial cleanliness, and Environmental improvement
TF	Trachomatous inflammation – follicular
TI	Trachomatous inflammation – intense
TT	Trachomatous trichiasis
WDPS	Western Diagnostics Pathology Service
WHO	World Health Organization

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