

SURVEILLANCE REPORT FOR ACTIVE TRACHOMA, 2006

NATIONAL TRACHOMA SURVEILLANCE AND REPORTING UNIT

Betty Tellis, Jill E Keeffe, Hugh R Taylor

Abstract

The National Trachoma Surveillance and Reporting Unit (NTSRU) was established in November 2006 to improve the quality and consistency of data collection and reporting of active trachoma in Australia. Active trachoma data collected in 2006, prior to the commencement of the NTSRU, were reported by the Northern Territory, South Australia and Western Australia. In most regions, Aboriginal children aged 5–9 years were screened for signs of active trachoma, following the World Health Organization simplified trachoma grading system. In the Northern Territory the Healthy School Aged Kids program conducted school-based screening for active trachoma in 74 schools in five regions (n=2,253). In South Australia Aboriginal school children presented for active trachoma screening when an eye team visited five Aboriginal Community Controlled Health Services (n=275). In Western Australia population health units in collaboration with staff from population health care services, conducted school based screening for active trachoma in 53 schools in four regions (n=1,719). Regional active trachoma prevalence for 2006 varied between the states and the Northern Territory with reported prevalences ranging from: Northern Territory = 2.5%–30%, South Australia = 0%–25%, and Western Australia = 18%–53%. Few data were reported on facial cleanliness or other aspects of the SAFE strategy, and no data were reported for trichiasis. *Commun Dis Intell* 2007;31:366–374.

Keywords: active trachoma, Australia, Northern Territory, South Australia, Western Australia, trachoma surveillance, SAFE strategy.

Introduction

Trachoma is the most common cause of infectious blindness with Australia the only developed country to still have blinding endemic trachoma.^{1,2}

Thirty years ago the National Trachoma Eye Health Program found hyperendemic prevalence (>20%) of active trachoma in Aboriginal children.³ Recent surveys that spanned 1989–1996 reported a similar story.^{4,5} A review of the National Aboriginal and

Torres Strait Islander Eye Health Program in northern and western Australia in 2003, found prevalence of active trachoma similar to those of 30 years ago.⁶

The Communicable Diseases Network Australia (CDNA) published the *Guidelines for the Public Health Management of Trachoma in Australia* to standardise methods for data collection and reporting of active trachoma prevalence and management.² This follows the principals of the World Health Organization (WHO) SAFE strategy for trachoma control that includes Surgery for trichiasis, Antibiotics for active trachoma, screening for Facial cleanliness and Environmental improvement.⁷

The National Trachoma Surveillance and Reporting Unit (NTSRU) was established in November 2006 with funding from the Australian Government to improve the overall quality and consistency of data collection and reporting on trachoma in Australia.

The NTSRU is responsible for:

- collecting trachoma data from the Northern Territory, South Australia and Western Australia;
- providing high quality national information on trachoma prevalence based on data received from the states and the Northern Territory;
- monitoring and reporting on antibiotic resistance to azithromycin where trachoma control activities are currently being undertaken;
- establishing a database that is to be consistent with the CDNA trachoma guidelines that is to be secure and confidential; and
- developing data collection forms that are culturally appropriate using language consistent with the policy in the CDNA trachoma guidelines and agreed to by the Trachoma Reference Group.

The NTSRU is advised by the Trachoma Reference Group and informed by the CDNA guidelines and existing surveillance units already in operation throughout Australia.

The purpose of this paper is to present data from the first surveillance report compiled by the NTSRU.

Methods

Case definition

Active trachoma refers to the presence of trachomatous inflammation-follicular (TF) and/or trachomatous inflammation-intense (TI), using the World Health Organization simplified trachoma grading classification system.⁸ Later stages of trachoma are trachomatous scarring (TS), trachomatous trichiasis (TT) and corneal opacity (CO) (Appendix 1). Signs of trachoma are not mutually exclusive and should be graded independently. People are classified by their worst eye.

Hyperendemic prevalence usually refers to a prevalence of active trachoma of 20% or more in children aged 1–9 years.

Screening and data collection

Trachoma data for 2006 were reported by the Northern Territory, South Australia and Western Australia prior to the uniform adoption of the CDNA guidelines and the establishment of the NTSRU.²

Data for 2006 on screening of Aboriginal children for trachoma in schools or communities reported some or all of the following:

- date screening was conducted;
- trachoma grading classification used;
- number of schools or communities that conducted screening within the region of the state or territory;
- number of children that were examined in the school or community;
- age ranges of children examined less than 5 years, 5–9 years and 10–15 years;
- prevalence of active trachoma in children;
- number of children examined for clean faces;
- cases of trachomatous scarring; and
- information about treatment with azithromycin for affected children and their household and community contacts.

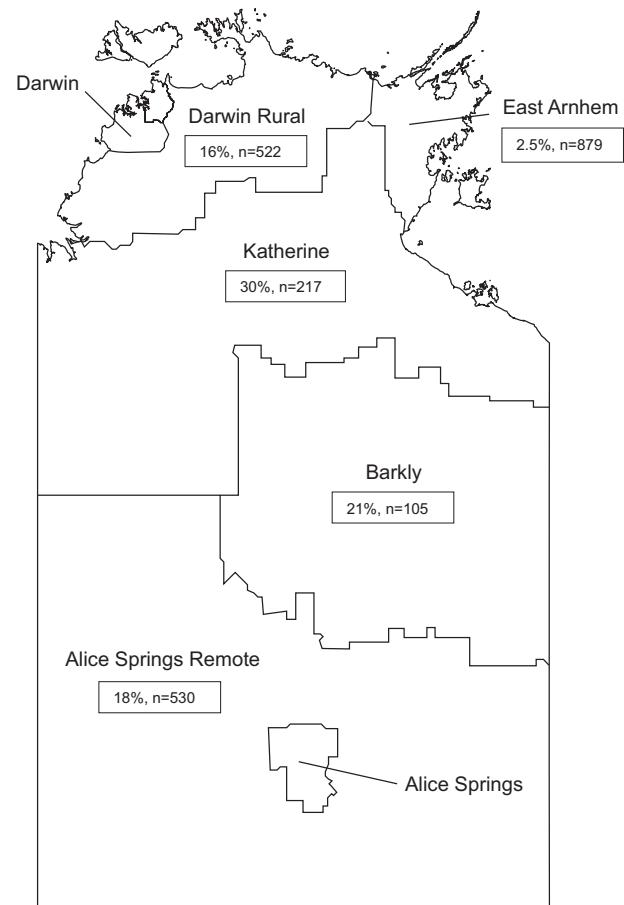
Data on TT and trichiasis surgery were not reported for 2006, however these will be reported in future surveillance reports.

Each state and territory determined the communities to be targeted for trachoma screening. School or community names were replaced with individual codes so that data from individual communities cannot be identified in this report.

Northern Territory

Trachoma screening was conducted from March to December 2006 by the Healthy School Aged Kids program in the Top End and Central Australia. Aboriginal Community Controlled Health Organisations (ACCHOs) also conducted screening. Population health workers screened Aboriginal children in all health regions (Map 1).

Map 1. Prevalence of active trachoma in Aboriginal children, Northern Territory, 2006, by region

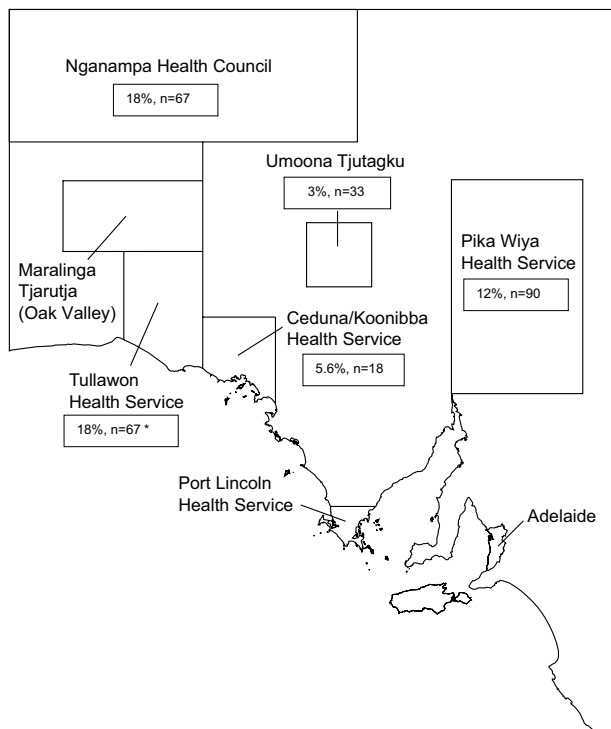


South Australia

Five areas serviced by Aboriginal Community Controlled Health Services (ACCHS) were visited by the screening team: Nganampa, Tullawon, Ceduna/Koonibba, Umoona Tjutagku and Pika Wiya (Map 2). The community of the Maralinga Tjarutja (Oak Valley) ACCHS was reported with the Tullawon ACCHS data. Screening for active trachoma was conducted twice throughout the year, from March to July and from August to December 2006 by all of these ACCHS, except the Ceduna/

Koonibba community that was visited once and the Umoona Tjutagku community that was visited three times. The screening team visited from 1–4 communities on each visit, and in many cases the combined data of groups of communities were reported. The data were reported by the Eye Health and Chronic Disease Specialist Support Program. Some children were seen at school and others were brought to the clinics by family members, Aboriginal health workers and other clinic staff when the ophthalmologists, optometrists and the screening coordinator visited the communities.

Map 2. Prevalence of active trachoma in Aboriginal children, South Australia, 2006, by Aboriginal Community Controlled Health Services

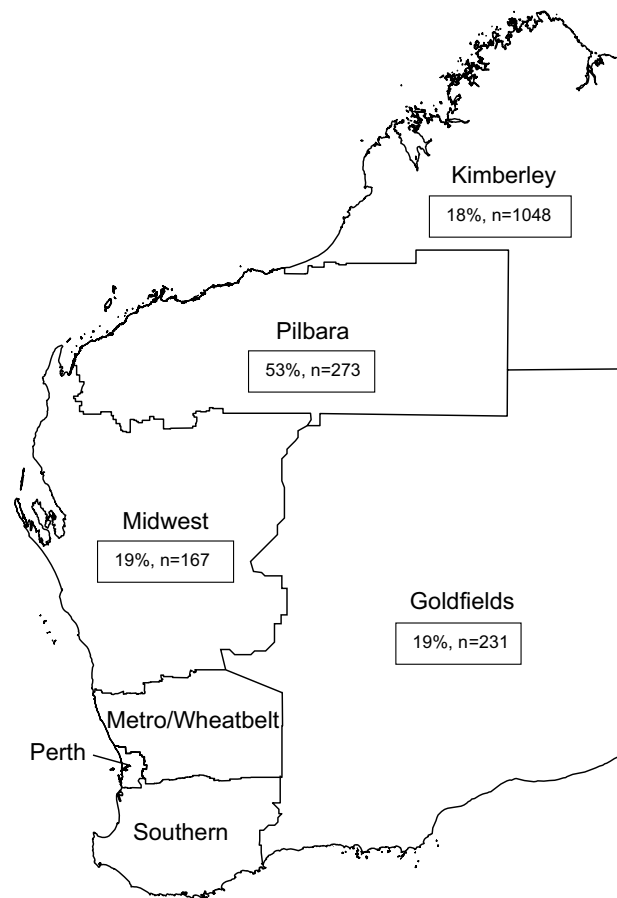


* The prevalence for Tullawon ACCCHS includes data from Maralinga Tjarutja (Oak Valley) Aboriginal Community Controlled Health Services.

Western Australia

Trachoma screening was conducted from March to November 2006 by population health units working in collaboration with staff from primary health care services in four population health regions where trachoma is endemic, i.e. the Kimberley, Pilbara, Midwest and the Goldfields (Map 3). Only the Kimberley reported data on facial cleanliness, and only the Kimberley and Midwest regions reported data on treatment with antibiotics; details are reported in the results.

Map 3. Prevalence of active trachoma in Aboriginal children, Western Australia, 2006, by region



Data analysis

The state and territory maps used to present prevalence by region and ACCCHS were created in Adobe illustrator version 10. Information from state and territory sources was used to define boundaries for regions and ACCCHS.^{9–11}

The proportion of children screened from within regions of the Northern Territory, South Australia and Western Australia was calculated using the Australian Bureau of Statistics (ABS) 2001 Census data.¹² The number of Aboriginal children reported by the ABS as being enrolled in pre- and primary schools was used as the denominator. In South Australia, the ABS 2001 Census data were reported for two out of three regions: Ceduna and Port Augusta. Children from the Ceduna/Koonibba and Tullawon ACCCHS were reported within the Ceduna region and children from the Nganampa, Umoona Tjutagku and Pika Wiya ACCCHS were reported within the Port Augusta region.

Regional prevalence figures were computed by aggregating community data of the number of children affected compared with the number of children

screened for active trachoma (Maps 1–3). In South Australia the prevalence was based on data from all occasions that the communities were visited. The proportion of communities with prevalences of 0%, 1% to <5%, 5% to <10%, 10% to <20%, 20% to <50% or ≥50% were reported in tables to illustrate communities with endemic and hyperendemic trachoma.

Results

The ABS 2001 Census data provide a means of comparison for the number of children examined within regions and ACCHS.¹² The number of endemic and hyperendemic communities within each region or ACCHS are reported as well as the number of communities that reported zero prevalence of active trachoma.

Northern Territory

A total of 2,253 Aboriginal children aged 1–9 years were screened in 73 schools or communities. Trachoma was graded using the WHO grading classification.

Prevalence by region varied from 2.5% to 30% (Map 1). The proportion of children examined in regions in the Northern Territory also varied: Alice Springs Remote = 42%, Barkly = 17%, Darwin Rural = 33%, East Arnhem = 74% and Katherine = 20% (Table 1). In the Northern Territory, 30 schools/communities reported zero prevalence of active trachoma, six reported prevalences between 10% and 19% and 22 reported prevalences ≥20% (Table 2). Five children in the Northern

Table 1. Number of Aboriginal children screened and the prevalence of active trachoma, Northern Territory, 2006, by region

| | Alice Springs Remote | Barkly | Darwin Rural | East Arnhem | Katherine |
|---|----------------------|--------|--------------|-------------|-----------|
| Aboriginal population of children 0–14 years* | 2,720 | 1,187 | 3,228 | 2,802 | 2,835 |
| ABS school enrolment data† | 1,273 | 616 | 1,573 | 1,190 | 1,065 |
| Children targeted for screening | NR | NR | NR | NR | NR |
| Examined for active trachoma‡ | 530 | 105 | 522 | 879 | 217 |
| Active trachoma prevalence§ (%) | 18 | 21 | 16 | 2.5 | 30 |

* Data from the Australian Indigenous Geographical Classification Maps and Census Profiles, 2001.

† Australian Bureau of Statistics data of Aboriginal children enrolled in Government, Catholic and other non-government pre- and primary schools.

‡ Children aged 1–9 years were examined for active trachoma in Northern Territory schools/communities.

§ The number of children examined for active trachoma was used as the denominator to calculate the prevalence of active trachoma.

NR Not reported.

Table 2. Prevalence of active trachoma in Aboriginal children aged 1–9 years for communities, Northern Territory, 2006, by region

| Community prevalence of active trachoma (%) | Number and proportion of communities with active trachoma* | | | | | | | | | |
|---|--|-----|--------|------|--------------|-----|-------------|------|-----------|-----|
| | Alice Springs Remote | | Barkly | | Darwin Rural | | East Arnhem | | Katherine | |
| | n | % | n | % | n | % | n | % | n | % |
| 0 | 11 | 41 | 3 | 50.0 | 7 | 44 | 4 | 33.3 | 5 | 46 |
| 1 to <5 | 2 | 7 | 1 | 16.7 | 0 | 0 | 4 | 33.3 | 0 | 0 |
| 5 to <10 | 1 | 4 | 0 | 0.0 | 2 | 12 | 4 | 33.3 | 0 | 0 |
| 10 to <20 | 4 | 15 | 0 | 0.0 | 1 | 6 | 0 | 0.0 | 1 | 9 |
| 20 to <50 | 7 | 26 | 1 | 16.7 | 3 | 19 | 0 | 0.0 | 1 | 9 |
| ≥50 | 2 | 7 | 1 | 16.7 | 3 | 19 | 0 | 0.0 | 4 | 36 |
| Total | 27 | 100 | 6 | 100 | 16 | 100 | 12 | 100 | 11 | 100 |

* Of the 73 schools/communities that reported data, 30 of these communities had less than five children screened.

Territory were reported as having TS. Results of screening provided no information on facial cleanliness or TT.

Treatment

No information about antibiotic treatment was reported for 2006.

South Australia

A total of 275 Aboriginal children were examined in 17 schools/communities that were funded by the Eye Health and Chronic Disease Specialist Support Program. Data were reported for children aged 1–9 years, however it was acknowledged that the ages of the children could not be verified. The classification system used to grade trachoma was not specified.

Prevalence by ACCHOs varied from 3% to 18% (Map 2). The proportion of children examined in schools/communities in South Australia varied between the ACCHS and the screenings; in the first screening Ceduna = 12%, Port Augusta = 7% and in the second screening Ceduna = 10% and Port Augusta = 7.4% (Table 3). In the first series of screening in South Australia no schools/communities reported zero prevalence of active trachoma, three reported prevalences between 10% and 19% and three reported prevalences $\geq 20\%$ (Table 4). In the second round of screening in South Australia three schools/communities reported zero prevalence of active trachoma, one reported prevalence of 12.8% and two reported prevalences $\geq 20\%$. In their third round of screening, the Umoona Tjutagku ACCHS reported zero prevalence of active trachoma for the children that were examined. Results of screening provided no information on facial cleanliness or TT.

Table 3. Number of Aboriginal children screened and the prevalence of active trachoma, South Australia, 2006, by regions serviced by an Aboriginal Community Controlled Health Service

| | Ceduna/Koonibba | | Port Augusta | |
|---|-----------------|-------------|--------------|-------------|
| | Screening 1 | Screening 2 | Screening 1 | Screening 2 |
| Aboriginal population of children 0–14 years* | 775 | 775 | 2,310 | 2,310 |
| ABS school enrolment data† | 380 | 380 | 1,186 | 1,186 |
| Children targeted for screening | NR | NR | NR | NR |
| Examined for active trachoma‡ | 46 | 39 | 84 | 88 |
| Active trachoma prevalence§ (%) | 17 | 31 | 6 | 10 |

* Data from the Australian Indigenous Geographical Classification Maps and Census Profiles, 2001.

† Australian Bureau of Statistics data of Aboriginal children enrolled in Government, Catholic and non-government pre- and primary schools.

‡ The ages of the children screened could not be verified.

§ The number of children examined for active trachoma was used as the denominator to calculate the prevalence of active trachoma.

NR Not reported.

Table 4. Prevalence of active trachoma in Aboriginal children, South Australia, 2006, by communities serviced by an Aboriginal Community Controlled Health Service

| Community prevalence of active trachoma (%) | Number of communities* | | | | |
|---|------------------------|-----------------|-----------|----------|-----------|
| | Ceduna/Koonibba | Umoona Tjutagku | Tullawon† | Nganampa | Pika Wiya |
| 0 | 0 | 0 | 0 | 0 | 0 |
| 1 to <5 | 0 | 0 | 0 | 0 | 0 |
| 5 to <10 | 1 | 0 | 0 | 0 | 1 |
| 10 to <20 | 0 | 1 | 0 | 2 | 0 |
| 20 to <50 | 0 | 0 | 1 | 1 | 1 |
| ≥ 50 | 0 | 0 | 0 | 0 | 0 |

* Data were provided for groups of communities, and in one of these groups only four children were screened.

† Includes data from the Maralinga Tjarutja (Oak Valley) boriginal Community Controlled Health Service.

Treatment

All children found to have active trachoma were referred to the clinics to be treated with antibiotics, except in the March screening of Ceduna/Kooniba where this information was not known.

Western Australia

A total of 1,719 Aboriginal children were screened from 53 schools/communities reported by Western Australia (Map 3). Data from the Pilbara region graded active trachoma as the presence of one or more follicles under the upper eyelid, and the Goldfields region did not specify the grading system that was used; others used the WHO grading classification.

Regional prevalence varied from 18% to 53% (Map 3). The proportion of children examined in regions in Western Australia varied: Kimberley = 62%, Pilbara = 33%, Midwest = 14% and the Goldfields = 21% (Table 5). Five schools/communities reported zero prevalence of active trachoma, six reported prevalences between 10% and 20% and 31 reported prevalences $\geq 20\%$ (Table 6).

The Kimberley was the only region that provided data on facial cleanliness; of the 1,272 children examined for clean faces 939 were aged 1–9 years and 88% of them had clean faces. Reports from screening provided no information regarding TT.

Table 5. Number of Aboriginal children screened and the prevalence of active trachoma, Western Australia, 2006, by region

| | Kimberley | Pilbara [†] | Midwest | Goldfields |
|---|-----------|----------------------|---------|------------|
| Aboriginal population of children 0–14 years* | 5,101 | 1,702 | 2,335 | 2,284 |
| ABS school enrolment data [†] | 2,466 | 837 | 1,195 | 1,099 |
| Children targeted for screening | 2,624 | NR | NR | NR |
| Examined for active trachoma [§] | 1,521 | 273 | 167 | 231 |
| Active trachoma prevalence (%) | 16 | 51 | 19 | 19 |

* Data from the Australian Indigenous Geographical Classification Maps and Census Profiles, 2001.

† Australian Bureau of Statistics data of Aboriginal children enrolled in Government, Catholic and non-government pre- and primary schools.

‡ Grading of TF ≥ 1 follicle under the upper eyelid.

§ Data for children aged 1–14 years were reported for the Kimberley and Pilbara regions, children aged 1–9 years were reported for the Midwest; and the Goldfields did not specify the ages of the school children screened.

|| The number of children examined for active trachoma was used as the denominator to calculate the prevalence of active trachoma.

NR Not reported.

Table 6. Prevalence of active trachoma in Aboriginal children aged 1–9 years for communities, Western Australia, 2006, by region

| Community prevalence of active trachoma (%) | Number and proportion of communities with active trachoma* | | | | | | | |
|---|--|-----|----------------------|-----|---------|-----|------------|-----|
| | Kimberley | | Pilbara [†] | | Midwest | | Goldfields | |
| | n | % | n | % | n | % | n | % |
| 0 | 1 | 3 | 1 | 10 | 1 | 17 | 2 | 33 |
| 1 to <5 | 3 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 to <10 | 5 | 16 | 1 | 10 | 1 | 17 | 1 | 17 |
| 10 to <20 | 5 | 16 | 0 | 0 | 1 | 17 | 0 | 0 |
| 20 to <50 | 12 | 39 | 2 | 20 | 2 | 32 | 3 | 50 |
| ≥ 50 | 5 | 16 | 6 | 60 | 1 | 17 | 0 | 0 |
| Total | 31 | 100 | 10 | 100 | 6 | 100 | 6 | 100 |

* Of the 53 communities that reported data one, had fewer than five children screened (4 children), however the Kimberley did not provide information on the number of children screened within each community.

† Grading of TF = ≥ 1 follicle under the upper eyelid.

Treatment

The Kimberley Population Health Unit treated all children who showed clinical signs of active trachoma, with antibiotics at the time of screening provided consent had been granted. In some schools where the prevalence in the 1–9 year age group was greater than 10%, children aged 10–14+ years were treated with antibiotics regardless of their infection status. Household contacts of affected children were followed up in the community and given treatment with azithromycin. Where local knowledge was available to the Health District 90% of household contacts were treated with antibiotics. Of the 22 schools with active trachoma prevalence above 10%, 20 required community-wide treatment; in the remaining two communities cases were clustered.

The Midwest Population Health Unit treated affected children as soon as possible after the completion of screening using the WHO criteria.

Discussion

This report confirms previous reports that trachoma continues to be endemic in the Northern Territory, South Australia and Western Australia.^{4,6} Most regions and ACCHS reported endemic trachoma for the communities that were screened in 2006, while hyperendemic trachoma was reported for 57 of the 133 schools or communities. The different grading criterion used by the Pilbara region may have led to an overestimation of active trachoma prevalence. Similarly, the small number of children examined in many communities may have resulted in imprecise estimates of the extent of active trachoma in other areas.

The proportion of children screened in each region showed that in most cases less than half of the children enrolled in pre- and primary schools were examined.¹² No specific information is available about the screening of children aged less than 5 years and school aged children who were not at school. As active trachoma is highest in young children, it would be advisable if children under five years were examined and accurately represented in the prevalence.¹³ Limited information regarding the target population to be screened makes it difficult to accurately assess the screening coverage rates for children in trachoma endemic areas.

Some regions or ACCHS, such as East Arnhem (NT) and Ceduna/Koonibba (SA), reported <10% prevalence of active trachoma for all communities that were screened. Similarly, there were communities in each state and territory that reported zero prevalence of active trachoma. Repeated screening of communities or regions for some years is required before they can be desig-

nated as 'trachoma free'. The CDNA guidelines state that annual screening of endemic communities is required until active trachoma is less than 5% for five consecutive years.² The states and territory have not reported historical data for those communities that were no longer targeted for screening because trachoma is thought to be no longer present.

There were almost no data reported on facial cleanliness. The lack of facial cleanliness has been found to be a risk factor for reinfection and this is a key component of the SAFE strategy.^{14,15} If children are not being examined for clean faces at the same time as they are screened for active trachoma, it is difficult to assess the success of health promotion campaigns that aim to break the cycle of reinfection.⁷ Appropriate programs to promote awareness of the disease and implement environmental improvements need to be negotiated with individual high risk communities.¹⁶

Few data were reported on treatment of children with active trachoma and their household and community contacts. Where this information was provided, the timing of antibiotic administration after screening was not always specified. In some cases guidelines have been implemented differently in different regions.⁵ For example, in some areas azithromycin was reported to have been given to affected children and sometimes to family members. It seems possible that the incomplete implementation of the SAFE strategy, and restricted antibiotic coverage, may explain the relatively small change in active trachoma observed over time in some communities, compared with the successful control of trachoma reported from other countries.^{17,18}

Reporting data on later stages of trachoma is also important as this gives an indication of the history and progression of the disease in endemic communities. No data were reported on the presence of trichiasis or the performance of trichiasis surgery. The Surgery component of the SAFE strategy for treatment of the end stage of trachoma is important as without any intervention and follow-up, trichiasis will go on to cause irreversible blindness.¹⁹ Without this information we have an incomplete picture of the full cycle of the disease and as a consequence are unable to adequately address the changes that need to be made to trachoma control programs.

The 2006 data reported were collected prior to the uniform adoption of the CDNA guidelines and the establishment of the NTSRU. The CDNA guidelines call for reporting of screening and trachoma control activities in children and adults. According to the CDNA guidelines, trachoma should be reported in children aged <5, 5–9, and 10–15 years and the WHO simplified grading should be used.²

The collection of data regarding trichiasis and trichiasis surgery will indicate the extent of the end stage of this disease and the implications for blindness in Aboriginal adults. Compliance with the CDNA guidelines on all aspects of the SAFE strategy, and specifically the treatment of affected children and household and community contacts, is critical to eliminate trachoma.

This report is confined to reported data on the trachoma screening of children with almost no information on facial cleanliness and treatment. The adoption of standardised methodology and coverage of communities will provide better data on the prevalence of active trachoma so that Australia is able to contribute compatible information for the global trachoma reports.² In 2007, reporting of data should specify the areas and communities that have trachoma and those where the absence of trachoma has been established. Data on all components of the SAFE strategy as well as monitoring of antibiotic resistance in remote Aboriginal communities will also be provided in future surveillance reports.

Acknowledgements

Funding

The National Trachoma Surveillance and Reporting Unit is supported by funding from the Australian Government Department of Health and Ageing.

Trachoma Reference Group

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

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

Surveillance Policy and Systems Section, Office of Health Protection, Australian Government Department of Health and Ageing

Centre for Disease Control, NT Department of Health and Community Services

Communicable Disease Control Directorate, Department of Health, Western Australia

Kimberley Population Health Unit, Department of Health, Western Australia

National Aboriginal Community Controlled Health Organisation

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

Co-opted members as required

Public Health Laboratory Network

Data collection

The organisations that assisted in the collection and/or reporting of the data were:

Northern Territory

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

Healthy School Aged Kids Program: Top End

Healthy School Aged Kids Program: Central Australia

South Australia

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

Country Health South Australia

Ngananampa Health Council

Maralinga Tjarutja (Oak Valley) Health Service

Tullawon Health Service

Ceduna/Koonibba Health Service

Umoona Tjutagku Health Service

Pika Wiya Health Service

Western Australia

Communicable Diseases Control Directorate, Department of Health, Western Australia

Population Health Units and Aboriginal Community Controlled Health Services staff in the Goldfields, Kimberley, Midwest and Pilbara regions

Author details

Betty Tellis¹

Associate Professor Jill E. Keefe^{1,2}

Professor Hugh Taylor^{1,2}

1. Centre for Eye Research Australia, Department of Ophthalmology, University of Melbourne

2. Vision Cooperative Research Centre

Corresponding author: Ms Betty Tellis, Centre for Eye Research Australia, University of Melbourne, 32 Gisborne Street, EAST MELBOURNE VIC 3002. Telephone: +61 3 9929 8704. Facsimile: +61 3 9662 3859. Email btellis@unimelb.edu.au

References

1. Thylefors B, Negrel AD, Pararajasegaram R, et al. Global data on blindness. *Bull World Health Organ* 1995;73:115–121.
2. Communicable Diseases Network Australia. *Guidelines for the public health management of trachoma in Australia*. Canberra: Commonwealth of Australia, 2006.
3. Royal Australian College of Ophthalmologists. *The National Trachoma and Eye Health Program*. Sydney: Royal Australian College of Ophthalmologists, 1980.

4. Taylor HR. Eye Health in Aboriginal and Torres Strait Islander Communities. Canberra: Commonwealth of Australia, 1997.
5. Mak DB, O'Neill LM, Herceg A, et al. Prevalence and control of trachoma in Australia, 1997–2004. *Commun Dis Intell* 2006;30:236–247.
6. Taylor V, Ewald D, Liddle H, et al. Review of the implementation of the National Aboriginal and Torres Strait Islander Eye Health Program, 2003.
7. Mariotti SP, Pararajasegaram R, Resnikoff S. Trachoma: Looking forward to Global Elimination of Trachoma by 2020 (GET 2020). *Am J Trop Med Hyg* 2003;69:33–35.
8. 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.
9. Northern Territory Government: Department of Health and Community Services. Territory Health Services outlets in the Northern Territory: Available from: http://www.nt.gov.au/health/map_outlets.shtml Last updated 2002.
10. Aboriginal Health Council of South Australia Inc. Aboriginal Community Controlled Health Services: Available from: <http://www.ahcsa.org.au/content/4,2005>
11. Department of Indigenous Affairs of Western Australia. Western Australian Map Pack: Available from: www.dia.wa.gov.au, 2006.
12. Australian Bureau of Statistics. Australian Indigenous Geographical Classification Maps and Census Profiles, 2001. ABS Cat.No. 4706.0.30.001, 2002.
13. Taylor HR, Siler JA, Mkocho HA, et al. The natural history of endemic trachoma: A longitudinal study. *Am J Trop Med Hyg* 1992;46:552–559.
14. Taylor HR, Rapoza PA, West SK, et al. The epidemiology of infection in trachoma. *Invest Ophthalmol Vis Sci* 1989;30:1823–1833.
15. Emerson PM, Burton M, Solomon AW, et al. The SAFE strategy for trachoma control: using operational research for policy, planning and implementation. *Bull World Health Organ*. 2006;84:613–619.
16. Lansingh VC, Weih LM, Keeffe JE, et al. Assessment of trachoma prevalence in a mobile population in Central Australia. *Ophthalmic Epidemiol* 2001;8:97–108.
17. Ngondi J, Onsarigo A, Matthews F, et al. Effect of 3 years of SAFE (surgery, antibiotics, facial cleanliness, and environmental change) strategy for trachoma control in southern Sudan: a cross-sectional study. *Lancet* 2006;368:589–595.
18. Kumaresan JA, Mecaskey JW. The global elimination of blinding trachoma: Progress and promise. *Am J Trop Med Hyg* 2003;69:24–28.
19. West SK. Blinding trachoma: Prevention with the safe strategy. *Am J Trop Med Hyg* 2003;69:18–23.

Appendix

World Health Organization simplified grading classification system

TRACHOMA GRADING CARD

– Each eye must be examined and assessed separately.
– Use binocular loupes (x 2.5) and adequate lighting (either daylight or a torch).
– Signs must be clearly seen in order to be considered present.

The eyelids and cornea are observed first for inturned eyelashes and any corneal opacity. The upper eyelid is then turned over (everted) to examine the conjunctiva over the stiffer part of the upper lid (tarsal conjunctiva).


The normal conjunctiva is pink, smooth, thin and transparent. Over the whole area of the tarsal conjunctiva there are normally large deep-lying blood vessels that run vertically.

TRACHOMATOUS INFLAMMATION – FOLLICULAR (TF): the presence of five or more follicles in the upper tarsal conjunctiva.

Follicles are round swellings that are paler than the surrounding conjunctiva, appearing white, grey or yellow. Follicles must be at least 0.5mm in diameter, i.e., at least as large as the dots shown below, to be considered.

TRACHOMATOUS INFLAMMATION – INTENSE (TI): pronounced inflammatory thickening of the tarsal conjunctiva that obscures more than half of the normal deep tarsal vessels.

The tarsal conjunctiva appears red, rough and thickened. There are usually numerous follicles, which may be partially or totally covered by the thickened conjunctiva.



Normal tarsal conjunctiva (x 2 magnification). The dotted line shows the area to be examined.




Trachomatous inflammation – follicular (TF).



Trachomatous inflammation – follicular and intense (TF + TI).

TRACHOMATOUS SCARRING (TS): the presence of scarring in the tarsal conjunctiva.


Scars are easily visible as white lines, bands, or sheets in the tarsal conjunctiva. They are glistening and fibrous in appearance. Scarring, especially diffuse fibrosis, may obscure the tarsal blood vessels.



Trachomatous scarring (TS)

TRACHOMATOUS TRICHIASIS (TT): at least one eyelash rubs on the eyeball.


Evidence of recent removal of inturned eyelashes should also be graded as trichiasis.



Trachomatous trichiasis (TT)

CORNEAL OPACITY (CO): easily visible corneal opacity over the pupil.

The pupil margin is blurred viewed through the opacity. Such corneal opacities cause significant visual impairment (less than 9/18 or 0.3 vision), and therefore visual acuity should be measured if possible.



Corneal opacity (CO)

TF – give topical treatment (e.g. tetracycline 1%).
TI – give topical and consider systemic treatment.
TT – refer for eyelid surgery.

**WORLD HEALTH ORGANIZATION
PREVENTION OF BLINDNESS AND DEAFNESS**

Support from the partners of the WHO Alliance for the Global Elimination of Trachoma is acknowledged.