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Progress of the Northern Territory Emergency Response Child Health Check Initiative:

**preliminary results from the Child Health Check and
follow-up data collections**

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Progress of the Northern Territory Emergency Response Child Health Check Initiative:

**preliminary results from the Child Health Check and
follow-up data collections**

**Aboriginal and Torres Strait Islander Determinants and Outcomes Unit,
Australian Institute of Health and Welfare
Office for Aboriginal and Torres Strait Islander Health,
Australian Department of Health and Ageing**

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The DoHA has been working closely with the AIHW, the Northern Territory Department of Health and Families (NT DHF) and the Aboriginal Medical Services Alliance Northern Territory (AMSANT) on the evaluation of the Northern Territory Emergency Response Child Health Check Initiative (NTER CHCI). The Australian Government would like to thank these organisations, with particular thanks to Dr Fadwa Al-Yaman (AIHW), Dr Indrani Pieris-Caldwell (AIHW), Dr Steve Guthridge (NT DHF), Ms Shu Li (NT DHF), and Dr Liz Moore (AMSANT).

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Responsibility for the report remains with the Department of Health and Ageing.

Abbreviations

AIHW	Australian Institute of Health and Welfare
ACCHOs	Aboriginal Community Controlled Health Organisations
AMSANT	Aboriginal Medical Services Alliance of the NT
BMI	body mass index
BSL	blood sugar level
CHC	Child Health Check
CHCI	Child Health Check Initiative
dB	decibels
DoHA	Department of Health and Ageing
ENT	Ear, Nose and Throat
FACS	Family and Community Services
Hb	haemoglobin
HRN	Hospital Registration Number
PHC	Primary Health Care
MBS	Medicare Benefits Scheme
NT	Northern Territory
NT DEET	Northern Territory Department of Employment, Education and Training
NT DHF	Northern Territory Department of Health and Families
NTER	Northern Territory Emergency Response
SIDS	sudden infant death syndrome

Executive summary

This is the second progress report to provide findings on health conditions identified and referrals made during Child Health Checks (CHCs) that were undertaken as part of the Northern Territory Emergency Response (NTER) Child Health Check Initiative (CHCI). In addition, for the first time, results from three follow-up CHCI data collections – the Chart Review, Audiology and Dental collection – are provided.

This report provides a preliminary analysis of the data available as at 17 October 2008. The purpose of publishing these data is to describe the extent to which Aboriginal and Torres Strait Islander children who had a CHC as part of the NTER have received the follow-up services they need and to identify emerging issues that require attention. While the data presented here are of sufficient quality and completeness to provide a snapshot of the extent of follow-up as at 17 October 2008, there are caveats made throughout the document that should be noted. These stem from several factors, principally:

- The data collections are new and their validity and reliability are still being established.
- The data are being collected as a by-product of clinical and administrative processes in the health care setting rather than a research process and are not a substitute for data derived from rigorous, scientific research.
- Delays sometimes occur in data transmission to the AIHW, so more services may have been provided as at 17 October than are reported here.

Child Health Check data collection

As of 17 October 2008, an estimated total of 12,263 valid CHCs have been performed through the NTER and Medicare Benefits Scheme (MBS) Item 708 since the implementation commenced on 1 July 2007. Data to monitor and evaluate the CHCI were only collected for children who received a check that was specifically funded through the NTER. There were no MBS data analysed in this report apart from that used to calculate the overall number of checks. The 'coverage', or proportion of the estimated 16,259 children aged 15 years or less living in the prescribed area with a current CHC (NTER and MBS CHCs) for the 12 months to 31 August 2008, is 74% (11,972).

A total of 10,251 CHCs had been entered into the CHC database as at 17 October 2008. A number of these checks, however, belonged to the same child, because children are eligible to have CHCs every 9 months as long as they are aged 15 years or less at the time of the check. To enable a description of the findings from the CHC collection according to the number of children who had various health conditions and referrals, the unit of analyses for the information presented in Chapter 2 is a 'child'. For those children who had undertaken more than one CHC, only their latest CHC was used in order to provide the most up-to-date information on the health conditions and referral status of these children. The information provided in Chapter 2 of this report relates to 8,997 children who had received at least one valid CHC as at 17 October 2008, after excluding 889 children whose information was provided on non-standard CHC forms. This compares with the 7,733 children whose data were analysed in the May 2008 progress report.

Health conditions—key findings

The prevalence of 25 health conditions in children who had CHCs are summarised below.

- Three in four (75% or 6,760) children were identified as living in a household with a smoker.
- Seventy-three per cent (483) of children aged less than 1 year were at risk of sudden infant death syndrome (SIDS) due to bed sharing, while 35% (229) were at risk due to soft sleeping surfaces and loose bedding.
- Forty-three per cent (3,883) of children had at least one type of oral health condition. In particular, 40% (3,618) of children were reported to have untreated caries.
- Thirty-eight per cent (3,406) of children had a reported history of recurrent chest infection.
- One in three (30% or 2,702) children was reported to have ear disease.
- Thirty-one per cent (2,753) of children had at least one type of skin condition. In particular, 10% (895) of children were reported to have skin sores (four or more) and 8% (714) of children had scabies.
- Fifteen per cent (1,387) of children were found to have anaemia.
- Sixteen per cent (1,409) of children were due for immunisations.

In general, there has been little change between the May 2008 progress report and this report in the proportion of children identified with various conditions. This is because an additional 1,264 children are included in the present analyses.

Referrals and treatment

The proportion of children who were referred to each of 21 follow-up health service types is discussed in this report, as well as the proportion of children who received a vaccination during their CHC. Key findings are summarised below.

- Just over two in three (69% or 6,246) children were referred for at least one type of follow-up service.
- Just under two in five (39% or 3,498) children who received a health check required a Primary Health Care clinic follow-up.
- Thirty-five per cent (3,131) of children received a dental referral.
- Fourteen per cent (1,261) of children were given a tympanometry and audiology referral.
- Twelve per cent (1,089) of children were referred to a paediatrician.
- Nine per cent (799) of children were referred to an Ear, Nose and Throat (ENT) specialist.
- Seven per cent (592) of children received a vaccination during their CHC.

The discrepancy between the number of children diagnosed with particular health conditions and the number referred to relevant follow-up services (e.g. 43% (3,883) with oral health problems compared with 35% (3,131) given a dental referral) is most likely explained by the fact that where an existing referral was already in place for the identified problem, a new referral was not made.

In general, there has been little change between the May progress report and this report in the proportion of children referred to various types of follow-up services.

Follow-up: chart review

Follow-up of CHC referrals through existing Primary Health Care (PHC) or specialist services available in the Northern Territory often commenced soon after the checks were completed. The Australian Government provided additional follow-up funding to both Aboriginal Community Controlled Health Organisations (ACCHO) and Department of Health and Families (DHF) service providers and the Chart Review data collection reflects the commencement of this specifically funded follow-up phase by the clinicians providing children with their follow-up care. These chart reviews involved assessment of the health records of children who had received a CHC to ascertain whether the children had the follow-up care that had been recommended during the CHC.

As at 17 October 2008, 4,387 (46%) children who had participated in a health check also had a chart review. The results from the analyses indicate that:

- Eighty-nine per cent (3,911) of children had one or more health conditions with a referral, while 11% did not require follow-up care.
- Of the 3,911 children with a chart review and referral, 33% (1,275) had been seen at least once for all of their health conditions and 52% (667 out of 1,275) of these children required further action at the time of their chart review. Approximately 28% (1,108 out of 3,911) of children had been seen for some of their health conditions with a referral. Of them 84% (930 out of 1,108) needed further action at chart review.
- About 39% (1,528 out of 3,911) of the children with a referral at CHC had not yet been seen for any of their health conditions.
- There were 508 children with a skin condition who had a PHC referral; 89% (450) of these children had been seen at least once at the time of their chart review. Of the 489 children with ear conditions and with a referral to PHC, 86% (421) had been seen at PHC. Over 90% (239) of the 264 children who had a PHC referral for their oral health condition had been seen at least once at the time of their chart review.
- There were 1,319 children with oral health problems who had a referral to a specialist or other service, and 21% (278) of them had been seen at least once by the relevant service at the time of chart review. Approximately 43% (285 out of 671) of children who had a specialist or other service referral for ear problems had been seen by that service, while 50% (76 out of 151) of the children with cardiac and respiratory abnormalities had been seen.
- In terms of specific referrals that children had, 77% (1,601) of the children with a referral to PHC had been seen, while 37% (166) of children with referrals to paediatrician and 21% (284) with a dental referral had been seen. Furthermore, 35% (132) of children with an ENT referral and 44% (201) with a tympanometry and audiology referral had been seen by appropriate services.
- Approximately 21% (784) of children had an initial chart review within 3 months of their CHC, while 42% (1,581) had an initial chart review 9 months or more after their CHC. The variation in elapsed time can partly be explained by the differences in timing when CHC and follow-up services were rolled out into different communities.

Follow-up: audiology

Audiological testing is done to assess hearing and is repeated during the course of care provided for children with ear disease to measure change in response to treatment. Audiology is not in itself a therapeutic intervention but part of a larger process of care. It is expected that the need for further action following audiological assessment will be a common occurrence.

As at 17 October 2008, 1,814 unique audiology forms for children within the applicable age range had been received; information from 1,627 of these forms had been entered into the Audiology database. The unit of analysis for the Audiology data collection used throughout this report is a 'child'. The 1,627 forms provide information on the results of audiology checks for 1,323 individual children, and show the following:

- Twenty per cent (328) of children who had been referred for follow-up audiology services during their CHC had received an audiology check.
- Fifty-one per cent (672) of all Indigenous children who had an audiology check were reported to have bilateral or unilateral hearing loss.
- Forty-seven per cent (621) of children had conductive hearing loss, 2% (32) had sensorineural hearing loss and 2% had mixed hearing loss.
- Twenty-three per cent (310) of children had mild hearing loss in the better ear, 10% (134) had moderate hearing loss and less than 1% (6) had severe or profound hearing loss.
- Sixty-eight per cent (899) of children had middle ear conditions, with the most common type being otitis media with effusion (28% (376) of the children who had an audiology check had this type of middle ear condition in at least one ear).
- Sixty-nine per cent (913) of children required further action following the audiology check.

Of those children who had an audiology examination, 68% (898) had also had a CHC while 32% (415) had not had a CHC. The proportion of children with either unilateral or bilateral hearing loss was higher among those who had had a CHC (55% or 490) compared with those who had not (49% or 201).

Follow-up: dental

The CHCs identified oral health problems in 43% (3883) of children and 35% (3131) of children received a dental referral. As at 17 October 2008, dental forms for 1,900 occasions of service had been received by either the AIHW (134 forms) or the NT DHF Child Oral Health Team (1,766 forms). Forms received by this date are analysed in this report.

The NT DHF holds all dental check forms for the checks it has undertaken. The NT DHF provided the AIHW with already tabulated information from 1,766 forms, as it encountered technical difficulties in electronically transferring the unit record data. The AIHW separately analysed data on the 134 dental forms provided to the AIHW by Aboriginal Community Controlled Health Organisations (ACCHOs) and combined this with the tabulated information provided by the NT DHF. As tabulated data received by AIHW could not be linked with the CHC data, it was not possible to use the dental forms received to provide an estimate of how many children who had CHC referrals received follow-up dental care. However, the following observations can be made regarding the dental services provided to

children, the problems treated and the proportion of occasions of care (number of dental services received) requiring follow-up:

- A diagnostic component was involved in 74% (1,407) of occasions of care.
- A preventative component was involved in 38% (714) of occasions of care.
- A restorative component was involved in 31% (592) of occasions of care.
- A surgical component was involved in 11% (210) of occasions of care.
- Oral health education was involved in 35% (656) of occasions of care.
- Untreated caries were treated in 34% (650) of occasions of care.
- Treatment of dental hygiene issues (including plaque and calcification) was involved in 14% (264) of occasions of care.
- Further follow-up was required in 47% (898) of occasions of care.

Conclusions

The purpose of the follow-up data collections is to measure the extent to which children who had a CHC have received the follow-up care that they needed.

Data from the Chart Review, Audiology and Dental data collections show that by 17 October 2008, a large volume of follow-up care had been provided, including:

- 77% (1,601) of children with a referral to PHC had been seen at least once;
- There had been 1,627 audiology checks performed on 1,323 children, with 69% (913) requiring further action; and
- 1,900 occasions of dental service delivery provided to 1,529 children¹.

While these dental and audiology services have been provided with specific NTER follow-up service delivery funding, the primary care follow-up has been achieved through a combination of existing PHC services and NTER-specific funding.

The data also show the extent to which follow-up services are still required. Many children (1,528) have yet to be seen for referrals and for those that have been seen, there is a continuing need for follow-up care. In particular, there are a large number of referrals outstanding for more specialised services, such as dental care.

The fact that many of the children (1,597 out of 2,383 or 67%) who have received some follow-up care require further action is due to the chronic nature of many of the conditions being treated. More fundamentally, many ear, skin, physical growth and oral health problems are the result of poor living conditions, poverty, overcrowding and lack of adequate nutrition. While these conditions can be ameliorated through health interventions, their prevention requires change to these broader determinants of health.

¹ This assumes that there is no overlap between children seen by a DHF dental clinician and those seen by a ACCHO dental clinician.

Future data collection and evaluation

Child Health Check and follow-up data will continue to be collected until 30 June 2009. It is expected that the final data set on CHCs and follow-up services will be available for analysis from September 2009.

The Department of Health and Ageing will commission an independent evaluation of the CHCI. As part of this, the DoHA and its evaluation partners will be taking advice on the feasibility of conducting an evaluation of the outcomes of the program to determine whether there has been measurable change in the health status of children who received a check and whether this can be attributed to the program.

1 Introduction

The Northern Territory Emergency Response (NTER) was announced by the former Australian Government on 21 June 2007 in response to the *Little Children are Sacred* report by the NT Board of Inquiry into the Protection of Aboriginal Children from Sexual Abuse (2007). The NTER involves a wide range of measures which are designed to protect children and make communities safe, as well as create a better future for Aboriginal people in the Northern Territory.² One of these measures is the Child Health Check Initiative (CHCI) which involves both the provision of Child Health Checks (CHCs) and follow-up medical care.

The role of the Department of Health and Ageing (DoHA) in relation to the NTER is to undertake voluntary CHCs, respond to follow-up care needs, provide additional child special services and improve alcohol and other drug services.³

The NTER is a targeted response that covers areas of the NT that have been prescribed in legislation; a map of the prescribed areas is available at Appendix 1. The CHCs and follow-up care are available to children in the prescribed areas who are aged 15 years or less. In addition, children aged 16 years are eligible for follow-up care if they were aged 15 years at the time of their initial CHC. Note that children who did not have a CHC are still eligible for the follow-up services that are being funded through the CHCI.

The Australian Institute of Health and Welfare (AIHW) is undertaking the data management, analysis and reporting of information collected as part of the CHCI. To do so, the AIHW has created four data collections:

- the Child Health Check data collection;
- the Chart Review data collection;
- the Audiology data collection; and
- the Dental data collection.

The data collection forms used by health services to record information for these collections were created by the DoHA in consultation with the Northern Territory Department of Health and Families (NT DHF), the Aboriginal Medical Services Alliance of the Northern Territory (AMSANT) and the AIHW.

In May 2008, the first progress report on the CHCI data was released⁴. This report presented results from the analysis of data from CHCs undertaken from July 2007 to mid May 2008. No follow-up data were available for inclusion in the report at that time.

In this second progress report, information from all four data collections is provided. Specifically, updated information on the outcomes of the CHCs is presented, as are details on the key findings from the three follow-up collections. In addition, information provided to the AIHW by the NT DHF on children (as at 15 May 2008) who had received hospital-related

² See <<http://www.facsia.gov.au/nter/resources.htm>> for further details.

³ Further information on the DoHA's role in the NTER can be found at <<http://www.health.gov.au/internet/main/publishing.nsf/Content/health-oatsih-nt>>.

⁴ The report can be found on the DoHA website: <www.health.gov.au/internet/main/publishing.nsf/Content/nterchciProgressReport>.

services following their CHC is presented in Appendix 2. The time period covered in this report is from July 2007 to mid-October 2008.

These data provide a snapshot as of 17 October 2008 of the extent of follow-up service delivery provided through what is often referred to as 'phase 2' of the NTER health-related services. Since July 2007, the health components of the NTER have evolved from their initial focus on the roll-out of CHCs into a program of follow-up service delivery (phase 2) which will continue through until 30 June 2009. From 1 July 2008, implementation of the longer term responses to Indigenous health needs in the NT began with the Expanding Health Service Delivery Initiative (phase 3). While the initial NTER CHCs were provided by teams of doctors and nurses recruited and deployed by the Australian Government, from late 2007 the CHCs were increasingly integrated with the delivery of follow-up services provided by the NT DHF and Aboriginal Community Controlled Health Organisations (ACCHOs).

The follow-up data were collected by staff of the NT DHF and ACCHOs as part of the delivery of those follow-up services. This occurred under tight timelines and with competing service delivery demands. It should be noted that the rollout of the CHCs and the follow-up services did not commence in all regions at the same time – the initial focus was Central Australia and then the Top End, which influenced the extent of data collection and service delivery across regions.

1.1 Overview of the data collections

A summary of the key characteristics of the four data collections covered in this report is provided in Table 1.1.

Aboriginal and Torres Strait Islander children aged 15 years or less who live in the prescribed areas of the Northern Territory are eligible for a NTER CHC. These checks have been undertaken from mid-July 2007 and data collection relating to these checks will continue until 30 June 2009. After this time, the usual process of providing checks under the Medicare Benefits Schedule without a separate data collection will continue. Since children can receive a CHC every 9 months, some children in the NT have had more than one NTER CHC (as discussed in Chapter 2).

As part of the follow-up care, chart reviews are being conducted for those children who had a CHC. These chart reviews capture information about follow-up care that has been received since the child had a CHC and any outstanding issues requiring follow-up. Audiology and dental follow-up services are also being provided as part of the CHCI. These services are available to all children who had a CHC, as well as to other Indigenous Australian children living in the prescribed areas of the NT who are aged 15 years or less.⁵ Children without a referral from a CHC will have been referred for these services through the existing Primary Health Care services or from some other point of referral within the NT health system.

⁵ Since all children who had a CHC are eligible for the audiology and dental follow-up services, some of the children who received these follow-up services were aged 16 at the time of service provision. Thus the maximum age for the corresponding follow-up collections is 15 years for those who had not had a CHC and 16 years for those who were 15 years of age at the time of the CHC.

Table 1.1: Overview of the AIHW CHCI data collections

	Child Health Check data collection	Chart Review data collection	Audiology data collection	Dental data collection
Relevant component of the NTER CHCI	Child Health Checks	Initial and exit chart reviews	Audiology follow-up services	Dental follow-up services
Who is eligible?	Indigenous Australian children in prescribed areas of the NT aged 15 years or less	Children who had a CHC (with the exception of those children whose CHC was undertaken during the follow-up phase of the NTER CHCI with no follow-up actions identified at that time)	Children who had a CHC and other children in prescribed areas of the NT aged 15 years or less	Children who had a CHC and other children in prescribed areas of the NT aged 15 years or less
Topics covered in the collection	Broad range of topics including health conditions identified, and referrals made, during the CHCs	Whether child has been seen for conditions identified during the CHC and whether there are any outstanding conditions that require follow-up	Type and degree of hearing loss (if any), middle ear conditions (if any) and whether any further actions are required	Types of dental services provided, problems treated, number of deceased, missing and filled teeth, and whether any further actions are required
How information is transferred to the AIHW	Paper forms (majority) and electronically	Paper forms	Paper forms	Paper forms and electronically (majority)

Data for the four collections are transferred to the AIHW in different ways. For the CHC data collection, the majority of information has been transferred via paper forms. Nonetheless, the capacity to transmit CHC data electronically has been finalised and is available for use. Information for the Chart Review and the Audiology collections are provided to the AIHW via paper forms, while information for the Dental collection can be provided either electronically or by a paper form. Part of the dental data in this report was provided by the NT DHF in the form of pre-populated tables and the other part was extracted from the AIHW's Dental database.

1.2 Data purpose, context and quality

Interpretation of the data presented in this report should take into consideration the purpose of the data collections, the context in which the data were collected, and the quality of the data.

1.2.1 Data purpose

The four CHCI data collections were designed to track the implementation of the CHCs and follow-up care, and to evaluate the program. The aims for the evaluation have been agreed in consultation with the NT DHF, AMSANT and AIHW. In summary, the evaluation aims to measure some components of the implementation of the NTER CHCI and, as far as possible, its impact on and outcomes for the target population. More specifically, the evaluation aims to:

1. Assess the extent to which the CHCs reached the target population.
2. Identify the prevalence and, if possible, the severities of health conditions found through the CHCs and validate these findings with data from other sources.
3. Identify the extent to which requested primary care, allied health and specialist follow-up services have been received, gaps in existing health service delivery, and barriers to the completion of follow-up treatment.
4. Explore the possibility of undertaking more complex evaluative analyses which could include questions about:
 - a. Whether or not the NTER CHC Initiative has led to improvements in health service delivery for Aboriginal and Torres Strait Islander children;
 - b. Health status of children in relation to the social determinants of health and access to comprehensive Primary Health Care; and/or
 - c. Treatment outcomes.

The data presented in this progress report relate to the first three of these objectives. The fourth objective is expressed in exploratory terms because these tasks are more ambitious and are dependent on the quality of the data collected during the initial CHCs and the follow-up service delivery.

1.2.2 Data context and quality

As detailed more fully in the May 2008 progress report, the data that have been collected as part of the CHCI are a by-product of a clinical process. That is, those health professionals providing the CHCs and follow-up services documented the results of those checks and services on standard data collection forms, with the completed forms being forwarded to the AIHW. Thus the data shown in this report provide information about the health conditions identified, the referrals made and the follow-up services received for those children seen by health professionals as part of the NTER CHCI.

There are important limitations to the data presented in this report that should be taken into account when interpreting the information provided. The limitations that apply to each data collection are discussed in more detail in subsequent chapters, as well as in Appendix 3. It should also be noted that the data presented here are preliminary, and that:

- The data are captured as part of the process of service delivery and they may not be representative of the children who are yet to receive follow-up services.
- Some data which will inform our understanding of the extent of follow-up are not yet available in a form that will enable more thorough analysis. Much of the dental data are only available in aggregate format at present and are not yet linked to the CHC data. The linking of CHC data with acute care services data has only been done once and at a time when limited data were available. Future analyses will be more complete.
- The follow-up data reported here are new and the ability to analyse and interpret these data sets fully is still developing.
- The data presented in this report show that there has been an increase in the number of referrals made for children from the numbers reported in May 2008 progress report. However, no statistical testing has been done to determine whether this is a significant increase or not.

In general, it should be noted that the CHCs and the follow-up services were voluntary and, at this stage, nothing is known about how the children who participated compare with those who did not participate. That is, the children who received CHCs and follow-up services are not a random sample of children; rather, they are a group of children who live within the prescribed areas of the NTER CHCI whose families agreed to their participation in a CHC and/or to receive an audiology check or dental service. Therefore, the data presented in this report are not representative of all Aboriginal and Torres Strait Islander children in the NT.

The extent of missing data should also be taken into account when using and interpreting data shown in this report. Where possible, the percentage of missing data is shown in tables presented in this report.

1.3 Report structure

The information presented in the remainder of this report has been divided into the following chapters:

- Chapter 2 presents the key findings from the CHC collection, including details on the health conditions recorded, and referrals made during the CHCs.
- Chapter 3 presents information about the Chart Review data collection and results from the analysis of these data.
- Chapter 4 presents information about the Audiology data collection, including results on the type and degree of hearing loss, types of middle ear conditions and whether any further action was required. Changes in hearing loss status and requirements for follow-up services across time are also presented, together with results from a data set that linked the Audiology and CHC data collections.
- Chapter 5 presents key findings from the Dental data collection, including details on the services provided and the problems treated.

At the end of each chapter, a discussion bringing out the main points is presented along with some policy implications.

A number of appendixes are also included in this report. They provide information on the data quality issues that may affect the interpretation of information presented from each data collection, as well as region-specific results from the CHC data collection.

2 Child Health Check data collection

2.1 Introduction

The Child Health Check (CHC) data collection contains information on a broad range of topics, including the child's medical history, family medical history, the child's housing situation and health status at the time of their health check. Information is also recorded on whether vaccinations, treatment and referrals were provided during the CHC. These Child Health Checks (CHCs) are based on existing health checks available to Aboriginal and Torres Strait Islander children aged 14 years or less through Medicare (i.e. Medical Benefits Scheme (MBS) item number 708).

The MBS 708 CHCs were introduced across Australia in May 2006 and have continued in parallel. Children who had received a MBS 708 health check in the previous 9 months did not require another health check. The first of the Northern Territory Emergency Response (NTER) CHCs was undertaken in mid-July 2007 and they have been ongoing since. Like the MBS 708 health check, children are eligible to receive a CHC every 9 months.

To date, the results of detailed analyses of the CHC data have been provided to the Department of Health and Ageing (DoHA) by the Australian Institute of Health and Welfare (AIHW) in two 'Health Conditions and Referrals' reports, as well as in the May 2008 progress report titled *Progress of the Northern Territory Emergency Response Child Health Check Initiative: Health Conditions and Referrals*. Detailed information on the purpose, interpretation and quality of CHC data is provided in the latter report.

In order to provide an update of the key findings from the CHC data collection, this chapter provides information on the coverage of the NTER CHCs as at 17 October 2008. In addition, summary information is provided on the number and types of health conditions identified during the CHCs, as well as the number and types of referrals made as part of those health checks. A regional breakdown of these findings is also provided in appendixes 4 and 5 of the report. As in the May 2008 progress report, data from the Barkly and Katherine regions are combined due to low numbers.

It must be noted that the data presented in this report are not a substitute for estimates of prevalence derived from rigorous, scientific research. The use and interpretation of these data should be guided by this general caveat and by discussion within the May 2008 progress report that compares specific CHC findings with data from other sources.

Further information on data quality and its effects on interpretation are provided in Appendix 3.

2.2 Coverage of NTER Child Health Checks

As of 17 October 2008, an estimated total of 12,263 valid CHCs have been performed through the NTER and MBS Item 708 health checks since the implementation commenced on 1 July 2007.

When measuring the 'coverage' or proportion of children who have received a CHC, two figures are important. The first is the estimated population of children aged 15 years or less

living in the NTER prescribed areas. This figure has been revised down to 16,259 from the higher figure of 17,182 used in the May progress report. The change is based on recent advice from the Australian Bureau of Statistics. The second figure is the number of checks performed. Because it is over a year since the commencement of the NTER CHCs, many of the initial checks occurred over a year ago and their continuing clinical relevance declines over time. As well, new children without a CHC are coming into the population and older children with a CHC are moving out. Coverage is therefore estimated using the number of checks that have occurred within the last 12 months, allowing a couple of months for delays in reporting. The estimated CHC coverage for the 12 months 1 August 2007 to 31 July 2008 is 74% of the estimated 16,259 children aged 0 to 15 years living in the prescribed areas. This coverage figure counts only one CHC per child.

Data to monitor and evaluate the CHCI were only collected for children who received a check that was specifically funded through the NTER. There was no MBS data analysed in this report apart from that used to calculate the overall number of checks and coverage as provided above.

2.3 CHC forms received

Table 2.1 provides information on the number of forms received by the AIHW as at 17 October 2008 by region. These numbers have been adjusted to take into account duplicate copies of forms and forms from children outside the applicable age range.

Table 2.1: Number of NTER Child Health Check forms received^(a) by region

Region	Child Health Checks received		Total population aged 0–15 years ^(b)	Proportion of population ^(c)
	Number	Per cent	Number	Per cent
Central Australia ^(d)	2,574	25.1	3,934	65.4
Arnhem	2,411	23.5	3,350	72.0
Barkly/Katherine ^(e)	2,625	25.6	3,787	69.3
Darwin Rural ^(f)	2,641	25.8	5,188	50.9
All regions	10,251	100.0	16,259	63.0

(a) Numbers have been adjusted for duplicate copies of forms and forms from children outside the applicable age range.

(b) Estimated Indigenous resident population figures for 2006 for children aged 15 years or less who live in communities and town camps covered by the NTER CHCI. These estimates were provided by DoHA.

(c) This rate of coverage does not take into account health checks that were made available under Medicare item 708.

(d) Includes one CHC form that was transferred to the AIHW electronically.

(e) Includes 841 non-standard CHC forms.

(f) Includes 71 non-standard CHC forms.

Source: AIHW CHCI Community log as at 17 October 2008.

Overall, the AIHW had received 10,251 CHC forms. By region, the largest proportion of children for which CHC forms had been received was from the Arnhem region (72%), followed by Barkly and Katherine regions combined (69%) and Central Australia (65%). CHC forms had been received for one in two children in the Darwin Rural region (51%).

2.4 CHC forms processed

As at 17 October 2008, all 10,251 CHC forms received had been entered into the CHCI database. As mentioned previously, children aged 15 years or less living in prescribed areas of the NTER CHCI are eligible to have CHCs every 9 months. Thus, there are a number of children within the CHC collection who have received multiple checks. A number of these checks, however, were undertaken less than 9 months following the child's initial health check. In these instances, the health check was classed as 'invalid' and was excluded from analyses. Of the 10,251 CHCs processed as at 17 October 2008, 308 were invalid (Table 2.2).

Table 2.2: Number of valid^(a) and invalid^(b) Child Health Check forms processed as at 17 October 2008

Child Health Checks	Number
Valid CHCs	9,943
1st CHC ^(c)	9,885
2nd CHC	58
Invalid CHCs ^(d)	308
Total number of CHCs provided	10,251
Total number of children who received one or more CHCs	9,885

(a) All first Child Health Checks and all multiple Child Health Checks undertaken 9 months or more following the previous check.

(b) All multiple Child Health Checks undertaken less than 9 months following the previous check.

(c) Includes 1 CHC that was transferred to the AIHW electronically and 889 CHC non-standard, incomparable forms.

(d) Includes 23 non-standard CHC forms.

Source: AIHW analysis of the NTER Child Health Check data received as at 17 October 2008.

To enable a description of the findings from the CHC collection according to the number of children who had various problems, the unit of analysis for the information presented in the remainder of this chapter is a 'child'. Where a child has had more than one CHC (58 children with valid second checks), only the most recent valid CHC was included in the analyses in order to provide the most up-to-date information on the health conditions and referral status of children who had CHCs.

Of the 9,885 children who received at least one valid CHC, 889 children had their data collected using a non-standard, incomparable form. These forms are not included in the analyses presented in the remainder of this chapter because the CHC forms received from this service were in a different format to the standard CHC form; thus, only a very limited amount of information from the non-standard forms has been entered into the AIHW's CHC database to date. The analyses presented in the remainder of this chapter represent 55% (8,997) of the 16,259 children in the scope of the NTER CHCI. Data from the regions of Barkly and Katherine have been combined due to low numbers.

2.5 Demographic characteristics

The distribution of the 8,997 children according to region is shown in Table 2.3. The regions contributing most CHCs were Central Australia and Darwin Rural (both 28%), whereas the regions contributing the smallest proportion of CHCs were Barkly and Katherine combined (19%).

Table 2.3: Demographic characteristics, Indigenous Australian children^(a) who had a CHC as part of the NTER CHCI

	Number	Per cent
Region		
Central Australia	2,495	27.7
Arnhem	2,301	25.6
Barkly/ Katherine	1,714	19.1
Darwin Rural	2,487	27.6
Total	8,997	100.0
Age group		
0–5 years	4,015	44.6
6–11 years	3,582	39.8
12–15 years	1,400	15.6
Total	8,997	100.0
Sex		
Male	4,546	50.5
Female	4,308	47.9
Missing	143	1.6
Total	8,997	100.0

Note: Excludes non-standard CHC forms.

Source: AIHW analysis of NTER CHCI Child Health Check data entered as at 17 October 2008.

Of the 8,997 children for whom data had been processed, 45% of the children were aged 0 to 5 years, 40% were aged 6 to 11 years, whereas 16% were aged 12 to 15 years. The sex distribution of children was just over 50% boys and just under 48% girls, while sex was missing for nearly 2% of children.

2.6 Health conditions

Table 2.4 presents an overview of the prevalence of health conditions identified among Indigenous Australian children in scope of the NTER CHCI based on the analyses of CHC data processed as at 17 October 2008. In addition, Appendix 4 presents the prevalence of these health conditions by region. Details about these measures and, where applicable, comments about their data quality can be found in the May 2008 progress report.

Three in four (75%) children aged 0 to 15 years lived in a household where one or more persons smoked. Bed sharing was considered a risk factor for sudden infant death syndrome (SIDS) in 73% of children aged less than one year and soft sleeping surfaces and loose bedding was a risk factor for 35% of these children. Four in ten (40%) children had untreated caries, 38% of children had a history of recurrent chest infections, and 30% of children had ear disease. Fifteen per cent of children aged 0 to 15 years had anaemia and 16% of children were due for an immunisation. In addition, 9% of children were underweight, 10% had 4 or more skin sores, and 8% had scabies (Table 2.4).

Table 2.4: Health conditions, Indigenous Australian children who had a NTER Child Health Check

Health condition	Relevant age (years)	Yes (%)	No (%)	Unsure (%)	Missing (%)	Total (%)	Total (no.)
Ears and eyes							
Ear disease ^(a)	All	30.0	67.7	0.0	2.3	100.0	8,997
Trachoma ^(b)	6–15	7.9	91.2	0.0	0.9	100.0	2,523
Visual impairment ^(c)	6–15	0.7	89.0	0.0	10.3	100.0	4,982
Oral health							
Untreated caries	All	40.2	50.0	0.1	9.7	100.0	8,997
Gum disease	All	5.4	84.8	0.1	9.7	100.0	8,997
Other oral health issue	All	3.8	86.4	0.0	9.8	100.0	8,997
Any oral health issue	All	43.2	47.1	0.0	9.8	100.0	8,997
Skin							
Skin sores (4 or more)	All	9.9	84.7	0.0	5.3	100.0	8,997
Scabies	All	7.9	86.7	0.0	5.4	100.0	8,997
Ringworm	All	6.2	88.4	0.0	5.4	100.0	8,997
Any skin problem	All	30.6	64.1	0.0	5.3	100.0	8,997
Cardiac and respiratory							
History of rheumatic heart disease ^(d)	All	1.2	89.0	5.3	4.6	100.0	8,831
History of asthma	All	5.7	84.3	4.6	5.4	100.0	8,997
History of recurrent chest infection	All	37.9	53.1	4.4	4.6	100.0	8,997
Anaemia							
Anaemia ^(e)	All	15.4	74.8	0.0	9.7	100.0	8,997
Physical growth							
Stunting ^(f)	All	4.1	90.5	0.0	5.4	100.0	8,997
Underweight ^(g)	All	9.1	87.3	0.0	3.6	100.0	8,997
Wasting ^(h)	0–4	8.6	84.5	0.0	7.0	100.0	3,274
Overweight ⁽ⁱ⁾	2–15	5.3	89.5	0.0	5.3	100.0	7,699
SIDS risk factors							
Prone sleeping	Less than 1	22.7	62.4	3.3	11.6	100.0	662
Soft sleeping surfaces and loose bedding	Less than 1	34.6	50.5	2.9	12.1	100.0	662
Overheating	Less than 1	15.0	68.6	4.2	12.2	100.0	662
Bed sharing	Less than 1	73.0	14.7	0.8	11.6	100.0	662

(continued)

Table 2.4 (continued): Health conditions, Indigenous Australian children who had a NTER Child Health Check

Health condition	Relevant age (years)	Yes (%)	No (%)	Unsure (%)	Missing (%)	Total (%)	Total (no.)
Other							
Regular smoker ⁽ⁱ⁾	12–15	7.4	87.2	1.1	4.4	100.0	1,400
Smoker in household ^(k)	All	75.1	22.3	0.5	2.1	100.0	8,997
Immunisation due	All	15.7	76.8	2.6	4.9	100.0	8,997

- (a) Defined as having symptoms (e.g. perforation, bulging) or a diagnosis (e.g. otitis media, otitis externa) of ear disease in at least one ear.
- (b) Includes only those children who are known to have been screened for trachoma as part of the CHC (i.e. 51% of children in the age range).
- (c) Defined as having a visual acuity score of less than '6/12' in at least one eye.
- (d) This question was not included in one of the versions of the Child Health Check form.
- (e) Defined as a haemoglobin (Hb) level less than 110g/L.
- (f) Defined as below minus two standard deviations from mean height for age of reference population.
- (g) Defined as below minus two standard deviations from mean weight for age of reference population.
- (h) Defined as below minus two standard deviations from mean weight for height of reference population.
- (i) Defined as equal to or greater than the 95th percentile in relation to Body Mass Index (BMI)-for-age relative to the reference population.
- (j) In some but not all of the form versions, this was defined as one or more cigarettes per day.
- (k) In most but not all of the form versions, the question referred to a 'regular' smoker in the household.

Note: Excludes non-standard CHC forms.

Source: AIHW analysis of NTER CHCI Child Health Check data entered as at 17 October 2008.

The prevalence of the health conditions specified in Table 2.4 among Indigenous Australian children who had received a CHC as at 17 October 2008 are similar to the prevalence of the same conditions reported in the May 2008 progress report.

2.7 Referrals and vaccinations

This section provides an overview of the referrals that were made during the CHCs, as well as the percentage of children who received a vaccination during their health check. Other data on the treatments that children received during their health check were provided on the CHC form in free text form. AIHW is currently working on coding and analysing those data. As shown, the percentage of missing data for the various types of referrals ranged from 10% to 30%. In earlier versions of the CHC form, it was not possible to distinguish between when a non-response could be interpreted to mean that either no referrals had been made or the question had been skipped. It is likely that in the vast majority of cases, a non-response meant the former, but was coded in the database as the latter. For the latest version of the CHC form, the referrals question has been restructured and the level of missing data for this version has dropped to 9% or less for each of the referral types. Thus, it can be assumed that the high proportion of missing responses for each referral type is due to poor question format in earlier versions of the CHC form.

Table 2.5 presents an overview of the number and types of referrals made to follow-up services as part of the CHC. In addition, a regional breakdown of the number and types of referrals made is provided in Appendix 5. Details about these referrals and comments about their data quality can be found in the May 2008 progress report.

The results indicate that over two in three (69%) children were referred to at least one type of service for follow-up. In particular, almost four in ten (39%) children were referred for Primary Health Care (PHC) clinic follow-up, 35% were referred for dental services, 14% to

tympanometry and audiology services and 12% to a paediatrician. Seven per cent of children received a vaccination during the CHC.

Table 2.5: Referrals and vaccinations, Indigenous Australian children who had a NTER Child Health Check

Type of referral or vaccination	Yes (%)	No (%)	Missing (%)	Total (%)	Total (no.)
Primary Health Care (PHC) clinic follow-up	38.9	51.1	10.0	100.0	8,997
Paediatrician	12.1	60.5	27.4	100.0	8,997
Dental	34.8	37.8	27.4	100.0	8,997
Ears, Nose and Throat (ENT)	8.9	63.8	27.4	100.0	8,997
Tympanometry and audiology	14.0	58.6	27.4	100.0	8,997
Optometrist or ophthalmologist	1.3	71.4	27.4	100.0	8,997
Mental health services	0.4	69.7	29.9	100.0	8,997
Drug and alcohol	0.0	70.1	29.9	100.0	8,997
Occupational therapist	0.1	70.1	29.9	100.0	8,997
Speech therapist	0.4	69.7	29.9	100.0	8,997
Physiotherapist	0.1	70.0	29.9	100.0	8,997
Cardiologist	0.4	72.5	27.1	100.0	8,997
Cardiac investigations	3.2	69.7	27.1	100.0	8,997
Radiology investigations	0.3	72.6	27.1	100.0	8,997
Pathology investigations	1.9	71.0	27.1	100.0	8,997
Dietician or nutritionist	0.6	72.3	27.1	100.0	8,997
Surgeon	0.4	72.5	27.1	100.0	8,997
Emergency department or hospital	0.2	72.7	27.1	100.0	8,997
Social worker	0.7	71.9	27.4	100.0	8,997
Family and Community Services (FACS)	0.6	72.0	27.4	100.0	8,997
Other referral ^(a)	0.4	72.5	27.1	100.0	8,997
Any referral ^(b)	69.4	11.7	18.9	100.0	8,997
Treatment					
Provision of vaccination during health check	6.6	75.2	18.2	100.0	8,997

(a) Includes responses such as gynaecologist, obstetrics, dermatologist, prosthetic department, podiatrist and paediatric liaison nurse.

(b) Defined as having one or more referrals for any of the above-mentioned services.

Note: Excludes non-standard CHC forms.

Source: AIHW analysis of NTER CHCI Child Health Check data entered as at 17 October 2008.

The proportion of children who were referred to each of the follow-up services included in Table 2.5 above is similar to the proportion of children who were referred for such services in the May 2008 progress report.

2.8 Discussion

Since the release of the May 2008 progress report, data for an additional 1,264 CHCs have been included in the data set for analysis. The inclusion of these data has not altered the rates of conditions identified in the current report to any great extent from those reported in the previous report.

The interpretation of CHC data on conditions identified needs careful consideration of the context in which the data were collected as well as other data sources. These matters are covered in some detail in the May 2008 progress report. Readers interested in understanding the prevalence of health conditions are advised to consult this report and the references provided therein.

By 17 October, 69.4% of children had received at least one type of referral whereas in the May 2008 progress report, 66.9% of children had received at least one referral. It is not clear why there should be an apparent increase in the propensity to make referrals in later child health checks in the absence of a change in the rate of health conditions identified. Further analysis will be done on change over time in the rate of referrals to determine if there is a trend and to explore possible explanations.

3 Follow-up: chart reviews

3.1 Introduction

Follow-up care in response to referrals made during the Child Health Checks (CHCs) commenced through usual service delivery by Aboriginal Community Controlled Health Organisations (ACCHOs) or Northern Territory Department of Health and Families (NT DHF) Primary Health Care (PHC) or specialist service providers. The Australian Government provided additional follow-up funding to these organisations and the Chart Review data collection was done at the commencement of this specifically funded follow-up phase by the clinicians providing children with follow-up care. These chart reviews involved assessment of the health records of children who had had a Child Health Check (CHC) to ascertain whether the children had the follow-up care that had been recommended during the CHC.

The chart review process consists of two stages – an ‘initial chart review’ and an ‘exit chart review’. The purpose of the initial chart review is to:

- ascertain whether the child had been seen at least once for conditions for which they had received a referral during the CHC;
- ascertain whether the child had any other conditions at the time of the chart review that required follow-up; and
- indicate any follow-up care still required.

The initial chart review served to establish an action plan for follow-up for each child as well as enable measurement of the extent to which follow-up through usual care had been achieved.

At the end of the follow-up care period or when a child's course of follow-up care is completed, the primary care workers conducted an exit chart review with the purpose of determining if the child has been followed-up in the period between the initial and exit chart review by the specified clinician(s), and if any further follow-up action is required. The data presented in this chapter suggest that a number of exit chart reviews have been completed prematurely. Despite this, the collection provides a valuable snapshot of the extent of follow-up service delivery to date. Future analysis of these data will be needed to evaluate the extent of premature exit chart reviews and their impact on findings about the extent of the follow-up achieved.

The following sections of this chapter present information on:

- the demographics of children who had referrals for follow-up care and their health conditions;
- the health conditions of children who received referrals;
- the type of services to which children were referred;
- whether children had been seen at least once by the services for which they had referrals;
- whether the children required additional follow-up care since initial or exit chart reviews; and

- the time elapsed since the CHC and initial chart review, and initial and exit chart reviews.

The information presented throughout this chapter refers to children.

3.2 Information about the collection

The Chart Review data collection contains the following information:

- the health conditions of children for whom referrals were made;
- whether the child has been seen for the condition and by whom;
- types of referral children received and whether the child had been seen;
- whether children required further follow-up, for what conditions, and what type of clinician; and
- time elapsed since CHC and initial chart review, and initial and exit chart review.

Two types of forms were used for conducting chart reviews:

- a blank form where information related to a child's health conditions, referrals and follow-up activity was completed by those conducting the chart reviews; and
- a pre-populated form which contained information from the AIHW CHC database. This form was sent to the health service where the child had received a health check and provided information on conditions identified at CHC and referrals that had been made. The health workers conducting chart reviews needed to consult the child's health record and complete information on whether the child had been seen for their referrals and whether they needed further follow-up.

3.3 Data quality

A chart review was conducted only for children who had a CHC through which consent was obtained to allow information to be passed on to the AIHW. Thus, chart review records were matched against CHC records to ensure that only children who have had a CHC were included in the analyses and reporting of results. In determining eligibility of children for the analyses in this chapter, a number of decisions were made with regard to duplicate forms and forms with missing Hospital Registration Numbers (HRNs). A detailed description of data issues is given in Appendix 3. Some issues that may affect interpretation of the analyses are discussed below.

As six different versions of chart review forms have been used in data collection, the meaning of the questions on referrals and conditions was somewhat different in earlier versions. For example, health conditions with a referral or follow-up were mentioned on the earlier form only if a child had been seen for that condition. In the most recent version, conditions for which a child had a referral or follow-up were listed regardless of whether the child had been seen or not. The earlier forms may underestimate the number of health conditions for which children had had a referral or follow-up.

In some instances, information on health condition was missing despite a referral being made to a specific service (e.g. a dental service). In these instances a decision was made to

infer the condition to be oral health. Similarly, if the information was missing for a referral but a condition was given as dental, a dental referral was inferred.

The date of chart review was outside the valid range of chart review dates or missing in 619 records. These records were treated as missing and excluded from the analysis when calculating time elapsed between CHC and initial chart review, and initial and exit chart review.

It should also be noted that some exit chart reviews were completed before children had had all their follow-up care completed. This resulted from the changes made to the funding arrangements. Some organisations were funded until 30 September 2008 to conduct follow-up services, though the funding was later extended to 30 June 2009. By the time the these changed funding arrangements were communicated, some organisations had already completed exit chart reviews, resulting in some exit chart reviews being finished prematurely, before the completion of all follow-up care.

Information from chart review data may not provide a complete picture of follow-up care received by children as care received at hospital and outreach service settings are not captured by these data.

3.4 Chart review forms processed

Table 3.1 shows the distribution of the number of CHCs and chart review forms processed by region. Note that the number of CHC forms includes non-standard, incomparable health check forms. Chart reviews have been completed for about 46% of eligible children who have had a CHC in all regions. The highest proportion was in Barkly/Katherine (66%) followed by Central Australia (48%) and Darwin Rural (44%).

Table 3.1: Number of Child Health Checks and chart review forms processed^(a) by region, Indigenous Australian children who had a NTER Child Health Check and chart review

Region	Number of forms processed		% of CHCs with matching chart reviews as at 17 October 2008
	Child Health Checks	Chart reviews	
Central Australia	2,437	1,176	48.3
Arnhem	2,262	1,069	47.3
Barkly/Katherine	2,391	1,034	43.2
Darwin Rural	2,510	1,108	44.1
All regions	9,600^{(b) (c)}	4,387^{(c) (d)}	45.7

(a) Includes the first valid CHC where a child has had multiple checks.

(b) Includes non-standard, incomparable forms.

(c) Excludes records with missing HRN.

(d) Excludes duplicates and records not matched to CHC.

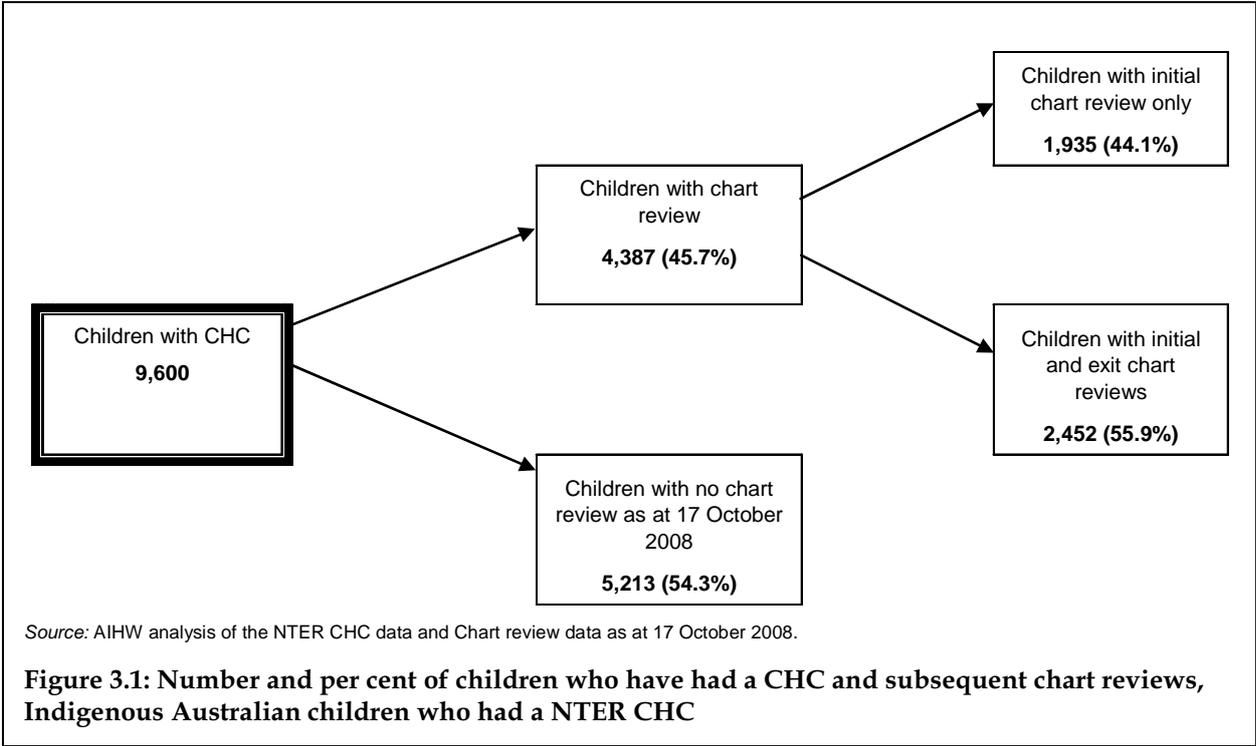
Source: AIHW analysis of the NTER CHCI data and Chart review data as at 17 October 2008.

A child was eligible for a chart review only if the child had already had a CHC. In order to ascertain that children who had a chart review also had a CHC, the two data sets needed to be linked and for this, valid and unique HRNs were required in both collections. Of the 9,943 valid CHC forms that were processed as at the 17th October 2008, 285 CHC forms had missing HRNs. These CHC forms could not be linked with the Chart Review database. In addition, 58 children had a second CHC as at 17 October 2008 (as discussed in Chapter 2).

For these children, only their initial CHC was selected for data linkage as follow-up services are based on the referrals that were made during the child’s initial health check. The final CHC data set used for the linkage of the two collections contained CHC records for 9,600 children. This differs from the final CHC data set used for the analyses of health conditions and referrals presented in Chapter 2 of this report (8,997 children) because the CHC data set used for linkage purposes includes non-standard CHC forms that were otherwise excluded from analyses.

Of the 9,600 children who had had CHCs and were eligible for chart reviews, 4,387 (46%) children had a chart review. A further 5,213 children had no chart review (Figure 3.1).

Of the 4,387 children who had chart reviews, 1,935 (44%) had an initial chart review while 2,452 (56%) had both an initial and an exit chart review.



3.5 Demographic characteristics

Table 3.2 shows the demographic characteristics of children who had a chart review as at 17 October 2008. Data from the regions of Barkly and Katherine were combined due to low numbers. Overall, the highest per cent of chart reviews were from Central Australia (27%) but children in Darwin Rural region (34%) had the highest proportion of both initial and exit chart reviews completed.

Forty-four per cent of initial chart reviews were completed for children aged 0 to 5 years and 43% were completed for children aged 6 to 11 years. Similarly, 44% of initial and exit chart reviews were completed for children aged 0 to 5 years and 41% for children aged 6 to 11 years. A small proportion (14%) of chart reviews were conducted for children aged 12 to 15 years (Table 3.2).

Slightly more male than female children had chart reviews (51% and 49% respectively) (Table 3.2).

Table 3.2: Demographic characteristics, Indigenous Australian children who had a NTER CHC and a chart review

Demographics	Initial chart review only		Initial and exit chart reviews		Total chart reviews	
	Number	Per cent	Number	Per cent	Number	Per cent
Region						
Central Australia	739	38.2	437	17.8	1,176	26.8
Arnhem	660	34.1	409	16.7	1,069	24.4
Barkly/ Katherine ^(a)	268	13.9	766	31.2	1,034	23.6
Darwin Rural	268	13.9	840	34.3	1,108	25.3
Total	1,935	100.0	2,452	100.0	4,387	100.0
Age group						
0–5	843	43.6	1,074	43.8	1,917	43.7
6–11	840	43.4	1,008	41.1	1,848	42.1
12–15 ^(b)	252	13.0	367	15.0	619	14.1
Missing	0	0.0	3	0.1	3	0.1
Total	1,935	100.0	2,452	100.0	4,387	100.0
Sex						
Male	1,002	51.8	1,239	50.5	2,241	51.1
Female	930	48.1	1,204	49.1	2,134	48.6
Missing	3	0.2	9	0.4	12	0.3
Total	1,935	100.0	2,452	100.0	4,387	100.0

(a) Regional distribution of follow-up data collection reflects the progressive rollout of CHCs and follow-up services which commenced in Central Australia and then began in the Top End before other regions.

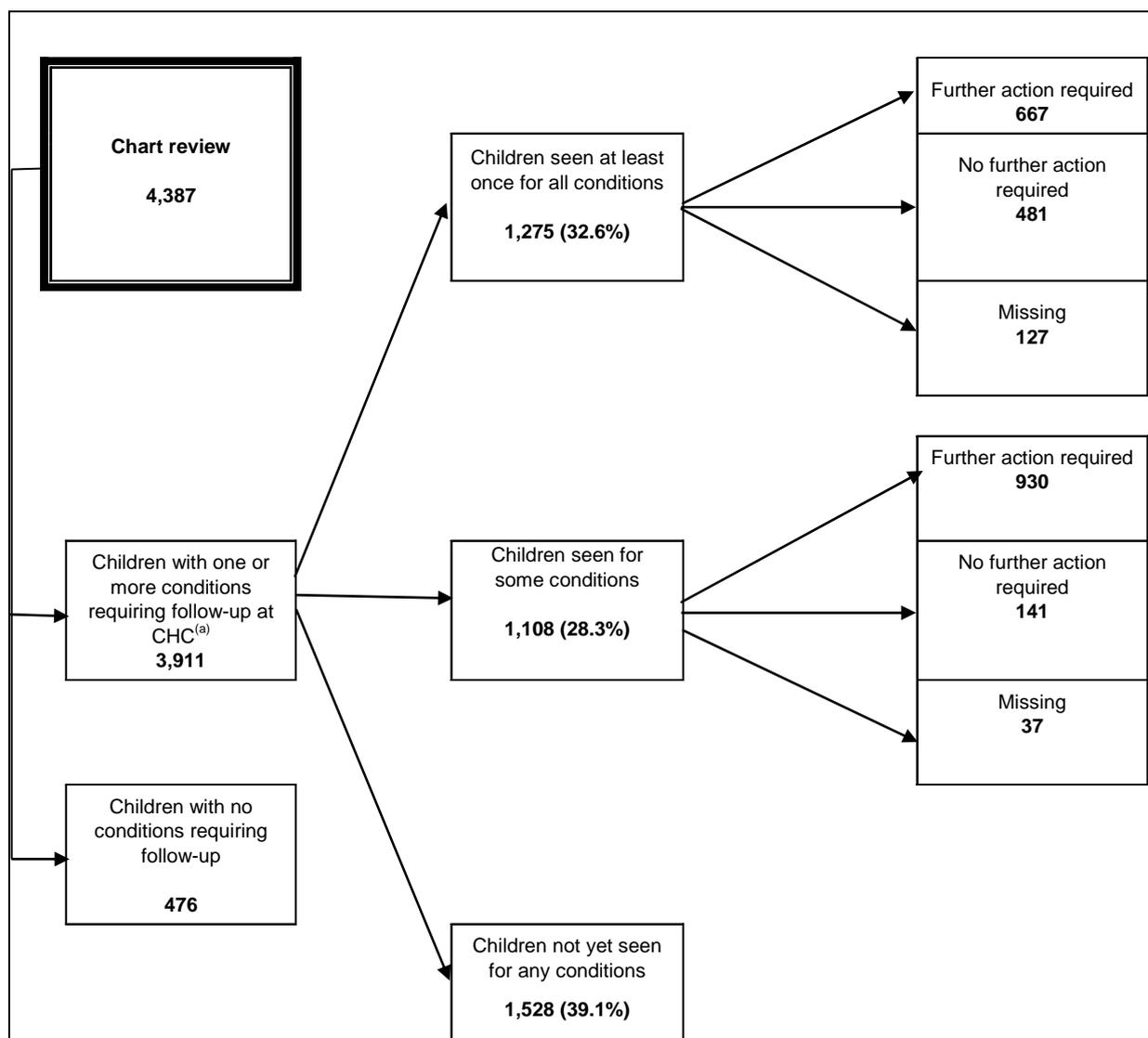
(b) Age at time of Child Health Check. At Chart review, some of these children are likely to be aged 16 years.

Source: AIHW analysis of the NTER CHCI data and Chart review data as at 17 October 2008.

3.6 Children requiring follow-up

Of the 4,387 children who had a chart review (initial or both initial and exit), 3,911 (89%) had health conditions with a referral, and of this group 62% (2,440) had two or more conditions requiring follow-up care. About 11% (476) of children with a chart review did not require follow-up care. Figure 3.2 shows distribution of children who had a chart review and the number for which follow-up was required.

The Primary Health Care workers noted during the chart review whether the children had been seen at least once for their referral. Of the 3,911 with a referral or follow-up for one or more conditions, 1,275 (32.6%) had been seen at least once for all of their condition(s). Of the 1,275 children who had been seen at least once for all of their condition(s), 667 (52.3%) still required further action at the time of their chart review. Approximately 1,108 (28.3%) of children had been seen for some of their conditions with a referral or follow-up and of these 930 (83.9%) needed further action at chart review (see Figure 3.2).



(a) As stated on the child's chart review form.

Source: AIHW analysis of the NTER CHCI data and Chart Review data as at 17 October 2008.

Figure 3.2: Number of Indigenous Australian children with a condition requiring follow-up and whether they had been seen for all, some or none of their conditions at the time of chart review (initial or initial and exit)

In addition to the conditions which had a referral or follow-up as identified during CHC, the Primary Health Care workers were asked to note other health conditions that had been identified since the CHC and required follow-up. Accordingly, there were 940 or 21% of the 4,387 children requiring follow-up care for conditions identified since their CHC.

3.7 Health conditions

Information was recorded during the chart review process on conditions for which children were given a referral during the CHC. Table 3.3 lists the conditions that had a referral to Primary Health Care (PHC) and specialist or other health service and whether the child has been seen at least once for these conditions. This information needs to be interpreted with caution as children may have been seen for the health conditions for which they had a referral, but without necessarily completing a course of care for that condition. This may also explain why some children who had been seen by PHC or specialist and other services still required further follow-up care at chart review.

As shown in Table 3.3, the children were referred to PHC mainly for skin and ear conditions, anaemia, some oral health problems, cardiac and respiratory abnormalities, and immunisation. Of the 508 children with a skin condition who had a PHC referral, 89% had been seen at least once at the time of their chart review. There were 489 children with ear conditions and with a referral to PHC, 86% of them had been seen at PHC. Over 90% of the 264 children who had a PHC referral for their oral health condition had been seen at least once at the time of their chart review.

The main health conditions for which children had referrals to a specialist or other services at initial or exit chart reviews are ear conditions, oral health, cardiac and respiratory abnormalities, growth problems, eye conditions and underweight. There were 1,319 children with oral health problems who had a referral to a specialist or other service. Of these 1,319 children, 21% had been seen at least once by the relevant service at the time of chart review. Approximately 43% (285 out of 671) of children who had a specialist or other service referral for ear problems had been seen by that service, while 50% (76 out of 151) of the children with cardiac and respiratory abnormalities had been seen (Table 3.3).

Table 3.3: Health conditions with referrals to PHC and specialist or other services, by whether the child has been seen at least once at chart review (initial or initial and exit), Indigenous Australian children who had a NTER CHC

Health condition	Primary Health Care (PHC)				Total number with PHC referral	Specialists and other services				Total number with specialist/ other referral
	Child seen ^(a)		Child not yet seen ^(b)			Child seen ^(a)		Child not yet seen ^(b)		
	no.	%	no.	%		no.	%	no.	%	
Ears	421	86.1	68	13.9	489	285	42.5	386	57.5	671
Eyes	43	81.1	10	18.9	53	13	24.5	40	75.5	53
Oral health	239	90.5	25	9.5	264	278	21.1	1,041	78.9	1,319
Skin	450	88.6	58	11.4	508	9	50.0	9	50.0	18
Cardiac and respiratory abnormalities	158	77.5	46	22.5	204	76	50.3	75	49.7	151
Abdominal abnormality	4	100.0	0	0.0	4	3	60.0	2	40.0	5
Anaemia	404	85.4	69	14.6	473	7	38.9	11	61.1	18
High BSL	27	25.0	81	75.0	108	3	33.3	6	66.7	9
Nutrition	16	100.0	0	0.0	16	1	20.0	4	80.0	5
Underweight	35	79.5	9	20.5	44	12	38.7	19	61.3	31
Overweight	14	70.0	6	30.0	20	3	30.0	7	70.0	10
Growth problems	88	68.2	41	31.8	129	23	32.9	47	67.1	70
Substance use	3	75.0	1	25.0	4	0	0.0	0	0.0	0
Immunisation due	197	77.6	57	22.4	254	4	57.1	3	42.9	7
Investigative tests	1	50.0	1	50.0	2	2	40.0	3	60.0	5
Other conditions	204	82.9	42	17.1	246	48	46.6	55	53.4	103

(a) Some children had more than one related condition (i.e. ear condition can include bulging and otitis media). If the child had been seen for any of the conditions, then it was considered that the child had been seen for that condition.

(b) This group also includes unsure, not stated and missing.

Source: AIHW analysis of the NTER CHCI data and Chart review data as at 17 October 2008.

3.8 Type of referral

Chart review forms also provide information on specific types of services to which children were referred for their health conditions identified at their CHC. Information on whether children were seen by medical or other services is given in Table 3.4.

Of children who had been referred to PHC, 77% had been seen at least once for their referrals. Dental referrals had been made for 1,332 children and 21% of them had been seen. Over 300 children had referrals to each of the following: tympanometry and audiometry, Ear, Nose and Throat (ENT) specialist and paediatrician. Over 44% of the children with a referral to tympanometry and audiometry had been seen at either initial or exit chart review, 35% of

the children had been seen by an ENT specialist for their referral and 37% had been seen by a paediatrician.

Table 3.4: Type of referrals of Indigenous Australian children who had a NTER Child Health Check and whether they have been seen at chart review (initial or initial and exit)

Type of referral	Whether the child has been seen			Total	
	Yes (%)	No (%)	Unsure (%)	%	no.
Primary Health Care	77.4	16.3	6.3	100.0	2,069
Paediatrician	36.6	54.7	8.6	100.0	453
Dental	21.3	68.7	10.0	100.0	1,332
Ear, Nose and Throat specialist	35.1	53.2	11.7	100.0	376
Tympanometry and audiometry	44.3	49.6	6.2	100.0	454
Optometrist or ophthalmologist	18.4	69.4	12.2	100.0	49
Mental health services	21.4	32.1	46.4	100.0	28
Occupational therapist	25.0	50.0	25.0	100.0	4
Speech therapist	12.5	87.5	0.0	100.0	16
Physiotherapist	40.0	20.0	40.0	100.0	5
Cardiologist	0.0	40.0	60.0	100.0	5
Dietician or nutritionist	18.8	62.5	18.8	100.0	16
Surgeon	44.4	55.6	0.0	100.0	9
Urologist / renal physician	100.0	0.0	0.0	100.0	1
General practitioner or district medical officer	75.0	25.0	0.0	100.0	4
Social worker	0.0	71.4	28.6	100.0	7
FACS	24.1	27.6	48.3	100.0	29
Housing	0.0	95.5	4.5	100.0	22
Other clinician	27.3	66.7	6.1	100.0	33
Cancelled appointment	0.0	100.0	0.0	100.0	2
No referral	3.8	3.1	93.1	100.0	160

Source: AIHW analysis of the NTER CHCI data and Chart review data as at 17 October 2008.

3.9 Further action required

As at 17 October 2008, there were 2,452 children for whom there are completed initial and exit chart reviews, and 1,221 (50%) of these children still had conditions requiring further action at exit chart review. The health conditions of children for which further action was required and the type of clinician needed to be seen for their health conditions are shown in Tables 3.5 and 3.6.

Of the 1,221 children who had an exit chart review and had conditions requiring follow-up, further action was needed for 638 (52%) children with oral health conditions, 428 (35%) with ear conditions, 125 (10%) with anaemia and 117 (10%) with cardiac and respiratory abnormalities (Table 3.5).

The fact that many children require continuing follow-up at the point of their exit chart review is not surprising. Many of the conditions being treated are chronic in nature and

require continuing attention over time regardless of the additional intensity of care that may have been available through the additional NTER-funded follow-up services.

The extent of action required at the point of the exit chart review may also reflect a data collection problem that is discussed below in the 'Time elapsed' section.

Table 3.5: Conditions for which children required further follow-up at exit chart review

Health condition	Number of children^(a)	Per cent
Ears	428	35.1
Eyes	44	3.6
Oral health	638	52.3
Skin	89	7.3
Cardiac and respiratory abnormalities	117	9.6
Anaemia	125	10.2
High BSL	39	3.2
Nutrition	9	0.7
Underweight	40	3.3
Overweight	5	0.4
Growth problems	80	6.6
Immunisation due	63	5.2
Investigative tests	5	0.4
Other conditions	140	11.5
Total number of children requiring further action at exit chart review	1,221	100.0

(a) This figure does not equal the sum of all children with conditions as there were multiple conditions reported per child.

Source: AIHW analysis of the NTER CHCI data and Chart review data as at 17 October 2008.

Table 3.6 shows the number of children who had referrals to a variety of clinicians and other service providers at exit chart review. Of the 1,221 children requiring further action at exit chart review, 477 (39%) needed to be seen at PHC clinics. Other referrals included 598 (49%) children for dental, 39 (3%) for tympanometry and audiometry, 250 (21%) for ENT specialists and 136 (11%) for paediatricians.

Table 3.6: Type of outstanding referrals, Indigenous Australian children who had a NTER CHC and exit chart review

Type of referral	Number	Per cent
Primary Health Care Clinic	477	39.1
Paediatrician	136	11.1
Dental	598	49.0
Ear, Nose and Throat specialist	250	20.5
Tympanometry and audiometry	39	3.2
Optometrist or ophthalmologist	22	1.8
Mental health services	4	0.3
Speech therapist	7	0.6
Physiotherapist	4	0.3
Cardiologist	16	1.3
Dietician or nutritionist	14	1.1
Surgeon	7	0.6
General practitioner or district medical officer	30	2.5
Registered nurse	22	1.8
Aboriginal health worker	3	0.2
Australian Hearing	3	0.2
FACS	5	0.4
Other clinician	20	1.6
Missing	103	8.4
Total number of children requiring further action at exit chart review	1,221	100.0

Source: AIHW analysis of the NTER CHCI data and Chart review data as at 17 October 2008.

3.10 Time elapsed

The date of the chart review is a proxy for when Australian Government NTER-funded follow-up commenced in the primary care setting. Prior to this, follow-up had occurred through usual care processes. The following tables measure time elapsed between the CHC and the initial chart review and, for those children who had an exit chart review, the time elapsed between the initial and exit chart reviews. Two points should be noted when interpreting data on time elapsed between CHC and initial chart review or initial and exit chart reviews:

- The analyses on elapsed time are based on all records except those with missing or invalid dates of chart reviews. When the date of chart review was in 2007, which was before the Australian Government NTER-funded follow-up program started, the chart review date was considered invalid. It is possible that the date given in this instance may be the date of CHC rather than the date of chart review.
- Some exit chart reviews were completed before children had had all their follow-up care completed. This was due to some organisations being funded until 30 September 2008 to conduct follow-up services, then the funding later being extended to 30 June 2009.

However, by this time exit chart reviews for some children had already been completed. As a result some exit chart reviews may have been completed before completion of all follow-up care.

Table 3.7 shows the distribution of time elapsed since CHC to initial chart review and Table 3.8 shows the mean and median time between the CHC and the initial chart review in different regions.

Approximately 21% of the children had an initial chart review within 3 months of their CHC. A quarter (25%) of the children had their initial chart review 6–9 months after the CHC and for 42% the chart review occurred 9 months or more after the CHC.

Table 3.7: Time elapsed since CHC to initial chart review, Indigenous Australian children who had a NTER CHC

Time lapsed	Number	Per cent
<3 months	784	20.8
3 to <6 months	469	12.5
6 to <9 months	931	24.7
9 months or longer	1,581	42.0
All children^(a)	3,765	100.0

(a) Excludes records with missing and invalid date of CHC or initial Chart review.

Source: AIHW analysis of the NTER CHCI data and Chart review data as at 17 October 2008.

The overall time elapsed between the CHC and initial chart review for all regions had a mean of 215 days and a median of 250 days. Central Australia had the longest mean (251 days) and median (299 days) time elapsed between the CHC and initial chart review. Darwin Rural region had the shortest respective mean and median elapsed times of 139 and 105 days. The regional variation in time between CHC and chart review can be explained to some extent by the differences in timing of the roll-out of CHCs and the introduction of follow-up services. The NTER CHCs were first conducted in Central Australia from July 2007 and the commencement of NTER-funded follow-up care did not start in any region until February 2008.

Table 3.8: Average time elapsed between CHC and initial chart review, by region, Indigenous Australian children who had a NTER CHC

Region	Number ^(a)	Mean (days)	Median (days)
Central Australia	1,032	251	299
Arnhem	1,021	220	236
Barkly/ Katherine	1,030	225	274
Darwin Rural	682	139	105
All regions	3,765	215	250

(a) Excludes records with missing and invalid date of CHC or initial chart review.

Source: AIHW analysis of the NTER CHCI data and Chart review data as at 17 October 2008.

Almost all children who had had both initial and exit chart reviews had their exit chart review within 3 months of their initial chart review (Table 3.9).

Table 3.9: Time elapsed between initial and exit chart review, Indigenous Australian children who had a NTER CHC

Time lapsed	Number ^(a)	Per cent
<3 months	1,681	99.8
3 to <6 months	3	0.2
All children^(a)	1,684	100.0

(a) Excludes records with missing and invalid date of initial or exit chart review.

Source: AIHW analysis of the NTER CHCI data and Chart review data as at 17 October 2008.

The mean number of days elapsed between initial and exit chart review in all regions was 6. In Darwin Rural, time elapsed between initial and exit chart review was 18 days whereas it was only 2 days in the Arnhem region (Table 3.10).

This finding raises questions about whether the Chart Review data collection is working as intended. There are two reasons for completing an exit chart review. Either the child has reached a point where they no longer require follow-up or the end of the NTER-funded follow-up period has been reached. Given the data showing a high level of outstanding action required at the point of exit chart review, it is unlikely that many of the children had had their course of follow-up completed. This means that many of the exit chart reviews may have been generated prematurely. There are two reasons for this. The first is that there has been a degree of confusion about the policy on when exit chart reviews should be completed. The second is confusion created by the change in the end date of the follow-up period from 30 September 2008 to 30 June 2009. Future analyses of chart review data will need to take these problems into account.

Table 3.10: Average time elapsed between initial and exit chart review, by region, Indigenous Australian children who had a NTER CHC

Region	Number ^(a)	Mean (days)
Central Australia	372	7
Arnhem	366	2
Barkly/ Katherine	694	3
Darwin Rural	252	18
All regions	1,684	6

(a) Excludes records with missing date of initial or exit chart review.

Source: AIHW analysis of the NTER CHCI data and Chart review data as at 17 October 2008.

3.11 Discussion

During the follow-up phase of the CHCI, chart reviews were undertaken by clinicians providing children with follow-up care. These chart reviews involved assessment of the health records of children who had had a CHC to ascertain whether the children had the follow-up care that had been recommended during the CHC. As at 17 October 2008, 46% (4,387 out of 9,600) of children who had a health check had also had a chart review. The results from the analyses indicate that:

- Eight-nine per cent of children had one or more health conditions with a referral while 11% did not require any follow-up care.
- Of the 3,911 children with a referral, 33% (1,275) had been seen for all of their health conditions and 52% (667 out of 1,275) still required further action at the time of their chart review. Approximately 28% (1,108 out of 3,911) of children had been seen for some of their health conditions with a referral. Of these, 84% (930 out of 1,108) needed further action at chart review.
- About 39% (1,528 out of 3,911) of the children with a referral at CHC had not yet been seen for any of their health conditions, while 77% (1,171 out of 1,528) of these still needed further action.
- There were 508 children with a skin condition who had a PHC referral; 89% of these children had been seen at least once at the time of their chart review. Of the 489 children with ear conditions and with a referral to PHC, 86% had been seen at PHC. Over 90% of the 264 children who had a PHC referral for their oral health condition had been seen at least once at the time of their chart review.
- There were 1,319 children with oral health problems who had a referral to a specialist or other service, and 21% of these had been seen at least once by the relevant service at the time of chart review. Approximately 43% (285 out of 671) of children who had a specialist or other service referral for ear problems had been seen by that service, while 50% (76 out of 151) of the children with cardiac and respiratory abnormalities had been seen.
- In terms of specific referrals that children had, 77% of the children with a referral to PHC had been seen while 37% of children with referrals to a paediatrician, and 21% with a dental referral had been seen. Furthermore, 35% children with an ENT referral and 44% with a tympanometry and audiology referral had been seen by appropriate services.
- Approximately 21% of the children had an initial chart review within 3 months of their CHC, while 42% had an initial chart review 9 months or more after their CHC.
- On average, exit chart reviews were conducted within less than 3 months of an initial chart review and the average gap was just 6 days. As noted above, this may indicate problems with the data collection that require further analysis once a more complete data set is available.

A key finding from this analysis is that 77% of children with a referral to PHC have been seen at least once since their CHC. These services have been provided by the existing NT DHF and ACCHOs primary care services in combination with additional Australian Government NTER-provided resources. This finding gives a positive picture of the reach and accessibility of PHC services, noting that use of these services is voluntary and that there will be some proportion of children or their families who will not seek care or will have moved since their check.

Three notes of caution need to be added. First, it is not possible to claim that this degree of follow-up has been provided to all children who had a CHC as we do not know how representative the chart review data are at this point in time. Second, the exit chart review data point to a large amount of continuing action required. This underlines the chronic nature of many of the conditions experienced by children, as well as the continuing detrimental impact of poor social, economic and environmental living conditions. Third, we do not know how extensive or intensive this contact with primary care has been and

therefore cannot draw conclusions as to its impact, particularly with regard to more complex and chronic conditions. The picture with specialist follow-up care is less positive than that for primary care. Thirty-seven per cent of children with a specialist paediatric referral have been seen at least once, 36% of children with an ENT referral have been seen at least once, and only 21% of children with a dental referral have been seen. Audiological services are discussed in the next chapter; however the chart review data provide a relatively positive picture of 44% of children with a referral to tympanometry and audiometry having been seen. The extent of follow-up measured through the Audiology collection is less than half this number which may be related to delays in data transfer in the Audiology collection or to problems with the chart review data. The cautions noted above also apply to these data.

4 Follow-up: audiology

4.1 Introduction

Middle ear disease is common in NT Aboriginal children with 30% aged 0 to 15 years diagnosed with ear disease through the Child Health Check (CHC) process. It is recognised that this may be an underestimate as other studies have found much higher rates (see the May 2008 progress report for a discussion of these data and relevant references on this topic).

Middle ear disease can lead to short and long-term hearing impairment, with implications for schooling and employment. Some forms of ear disease, especially chronic suppurative otitis media (CSOM), can be challenging to treat effectively, requiring intensive, long-term ear cleansing and antibiotics, which is labour intensive for primary health care staff. Older children, with chronic tympanic membrane (ear drum) perforations with hearing loss may benefit from surgery.

Audiology checks are required to determine level of hearing impairment, recommend rehabilitation strategies such as hearing aids and classroom modification, and to monitor response to primary care and surgical treatment. Hence, a child may have multiple audiology checks throughout their treatment program. The design of the Northern Territory Emergency Response (NTER) audiology follow-up to the Child Health Checks (CHCs) is based on a model of three visits to each community.

Given the high prevalence of ear disease and its serious long-term consequences, the Australian Government funded the Northern Territory Government to provide the following:

- Primary Health Care (PHC) follow-up;
- hearing health workers;
- audiologists;
- Ear, Nose and Throat (ENT) surgery; and
- infrastructure, such as hearing booths.

The Northern Territory Department of Health and Families (NT DHF) developed a follow-up model that includes engagement with communities on ear health and hearing, providing community based family support and support for clinical care and workforce development, enhanced PHC capacity, and increased specialist ENT consultations, outreach and surgery.

As part of the evaluation framework for the Child Health Check Initiative (CHCI), the Australian Government is working with the NT DHF and the Aboriginal Community Controlled Health Organisations (ACCHOs) to monitor whether children received the follow-up services they required. Monitoring of follow-up services required for ear disease is being done through the Audiology data collection reported on in this chapter and the Chart Review data collection reported in the previous chapter. In addition, ENT information will be captured through data linkage with the NT DHF hospital database, where consent has been obtained.

When using and interpreting data from the Audiology collection, it must be noted that the children who received an audiology check were not a random sample; rather, they were

identified as needing such services through either the CHC or through another process. Thus, the findings from the Audiology data collection are not representative of the Northern Territory Aboriginal child population or the Aboriginal population of children within prescribed areas of the NTER CHCI.

The rollout of the NTER follow-up audiology program commenced in Central Australia and the regional data presented in this chapter reflect that fact. Testing will become more evenly distributed as the roll-out of the program reaches other regions and as facilities become available in those locations.

4.2 Information about the collection

Information for the Audiology data collection is being transferred to the Australian Institute of Health and Welfare (AIHW) on paper forms.

The type of data items that are included in the Audiology collection are as follows:

- details about the child (Hospital Registration Number (HRN), date of birth and sex);
- community ID and date of service;
- whether the child had received previous audiology checks since mid-July 2007 and, if so, the type of intervention and extent of change in hearing level since that check;
- outcomes from the audiology check; and
- whether further action was required.

The unit of measurement in the Audiology data collection is an 'occasion of service'; thus any child can have more than one record in the Audiology collection.

4.3 Audiology forms received

The AIHW had received a total of 2,014 audiology forms as at 17 October 2008. After the data had been entered into AIHW's Audiology database, a check was done for forms that were inadvertently sent more than once and for forms for children outside the applicable age range. After such forms had been removed, the adjusted number of audiology forms received was 1,814 (Table 4.1). The largest proportion of audiology forms were received from the Central Australia region (63%), while 18% were received from the Barkly and Katherine regions combined, and 9% were received from both the Arnhem and Darwin Rural regions. This regional distribution reflects the fact that NTER-funded audiology services commenced in the Central Australia region. Testing is underway in other regions as facilities become available.

Table 4.1: Number of audiology forms received^(a), by region

Region	Number	Per cent
Central Australia	1,145	63.1
Arnhem	167	9.2
Barkly/Katherine	333	18.4
Darwin Rural	169	9.3
All Regions	1,814	100.0

(a) This excludes duplicate forms and forms for children outside of the applicable age range that were found during the processing stage. It includes 187 forms that have not yet been processed.

Source: AIHW Community log as at 17 October 2008.

4.4 Audiology forms processed and number of checks

By 17 October 2008, information from 1,627 of the 1,814 forms had been entered into the AIHW's Audiology database. As indicated earlier, the unit of measurement for the Audiology data collection is an 'occasion of service'. Using information on the child's HRN as provided on the audiology forms, the data indicate that 1,060 children had one audiology check, 224 children had two checks, 37 children had three checks, and two children had four checks. In total, 1,323 children had one or more audiology checks.

Table 4.2: Number of audiology checks per child, Indigenous Australian children who had an audiology check as part of the NTER CHCI

Audiology checks	Number	Per cent
1 audiology check ^(a)	1,060	80.1
2 audiology checks	224	16.9
3 audiology checks	37	2.8
4 audiology checks	2	0.2
Total number of children who received one or more audiology checks	1,323	100.0
Total number of audiology checks provided	1,627	n.a.

(a) Includes 10 cases where HRN was missing.

n.a. not applicable

Source: AIHW analysis of NTER CHCI Audiology data entered as at 17 October 2008.

To enable a description of the findings from the audiology checks according to the number of children who had various problems, the unit of analysis for the information presented in the remainder of this chapter is a 'child' and relates to 1,323 children. In addition, due to low numbers, data from the regions of Barkly and Katherine are combined.

4.5 Demographic characteristics

Of the 1,323 children who had an audiology check, 65% of children had their check in Central Australia, 17% in Barkly and Katherine combined, 13% in Darwin Rural, and 5% in Arnhem (Table 4.3). Three in five (60%) children who had an audiology check were aged 6 to

11 years, while 24% were aged 0 to 5 years and 16% were aged 12 to 16 years. The distribution of audiology tests across age groups reflects the availability of appropriate testing facilities for children less than 4 years of age. Note that only those 16-year-old children who were 15 years old when they had a CHC were included in the analyses. For children who did not have a CHC, the maximum age for the audiology checks is 15 years. A higher proportion of boys (53%) than girls (46.5%) had an audiology check.

Table 4.3: Demographic characteristics, Indigenous Australian children who had an audiology check as part of the NTER CHCI

	Number	Per cent
Region		
Central Australia	862	65.2
Arnhem	62	4.7
Barkly/ Katherine	230	17.4
Darwin Rural	169	12.8
Total	1,323	100.0
Age group		
0–5 years	317	24.0
6–11 years	788	59.6
12–16 years ^(a)	208	15.7
Missing	10	0.8
Total	1,323	100.0
Sex		
Male	706	53.4
Female	615	46.5
Missing	2	0.2
Total	1,323	100.0

(a) Includes children aged 16 years at the time of their audiology check who were aged 15 at the time of their Child Health Check.

Source: AIHW analysis of NTER CHCI Audiology data entered as at 17 October 2008.

4.6 Ear health and requirements for further action

As noted earlier, a number of children had more than one audiology check as part of the NTER CHCI. The data presented in this section of the report are based on results from the latest audiology check for each child to ensure that the most up-to-date information is provided.

4.6.1 Hearing loss status

As part of the audiology check, health professionals were asked to indicate whether the child had hearing loss and the type of hearing loss. The first section of Table 4.4 shows that half (51%) of the children who had an audiology check had hearing loss. In particular, bilateral hearing loss was recorded for 34% of children and unilateral hearing loss for 17% of children.

Forty-three per cent of children had no hearing loss, and this information was missing for 6% of children.

The most common type of hearing loss was conductive hearing loss, with 47% of children who had an audiology check recorded as having this type of hearing loss. A smaller proportion of children who had an audiology check had sensorineural (2%) and mixed (i.e. both conductive and sensorineural) (2%) hearing loss.

Audiologists were also asked to indicate the degree of hearing loss present in the child's better ear. Three in five (61%) children had no hearing impairment in the better ear, whereas about one in four (23%) children had a mild level of hearing loss, 10% had a moderate level and 1% had a severe or profound level of hearing loss.

It must be noted that missing data includes unsure, not stated, invalid, and not tested responses. Those children who were not tested were either too young for the test battery or were uncooperative; all these children will be targeted for retesting.

Table 4.4: Hearing loss, Indigenous Australian children who had an audiology check as part of the NTER CHCI

	Number	Per cent
Hearing loss		
None	572	43.2
Unilateral	227	17.2
Bilateral	445	33.6
Missing ^(a)	79	6.0
Total	1,323	100.0
Type of hearing loss		
None	572	43.2
Conductive	621	46.9
Sensorineural	32	2.4
Mixed (both conductive and sensorineural)	21	1.6
Missing ^(a)	77	5.8
Total	1,323	100.0
Degree of hearing loss^(b)		
None ^(c)	803	60.7
Mild ^(d)	310	23.4
Moderate ^(e)	134	10.1
Severe ^(f)	5	0.4
Profound ^(g)	1	0.1
Missing ^(a)	70	5.3
Total	1,323	100.0

(a) Missing includes not stated, unsure, invalid and 'not tested' responses.

(b) Based on better ear.

(c) Defined as 0–15 dB in soundproof conditions and 0–25 dB in non-soundproof conditions.

(d) Defined as 16–30 dB in soundproof conditions and 26–35 dB in non-soundproof conditions.

(e) Defined as 31–60 dB in soundproof conditions and 36–60 dB in non-soundproof conditions.

(f) Defined as 61–90 dB in soundproof conditions and 61–90 dB in non-soundproof conditions.

(g) Defined as 91 dB+ in soundproof conditions and 91 dB+ in non-soundproof conditions.

Source: AIHW analysis of NTER CHCI Audiology data entered as at 17 October 2008.

4.6.2 Middle ear conditions

A question on the audiology form asked whether the child had a middle ear condition in either ear. Two in three (68%) children who had an audiology check had a middle ear condition in at least one ear.

Middle ear conditions were also examined by type (Table 4.5). Note that since eustachian tube dysfunction was only specifically listed as an option in version 5 of the form (for other versions, it could be indicated in the 'other' response option), the prevalence of this condition may be underestimated.

Table 4.5: Type of middle ear condition, Indigenous Australian children who had an audiology check as part of the NTER CHCI

Type of middle ear condition	Yes (%)	No (%)	Unsure (%)	Missing (%)	Total (%)	Total (no.)
Eustachian tube dysfunction ^(a)	9.5	85.2	3.2	2.2	100.0	1,323
Acute otitis media	7.6	87.2	3.1	2.1	100.0	1,323
Chronic suppurative otitis media	11.0	83.7	3.0	2.3	100.0	1,323
Otitis media with effusion	28.4	66.4	2.9	2.3	100.0	1,323
Dry perforation	21.9	73.5	2.3	2.3	100.0	1,323
Other	5.4	89.1	3.2	2.3	100.0	1,323

(a) This response option was included in version 5 of the audiology form but not in earlier versions; however, this response could be given in the 'other' response option in the earlier versions.

Note: This is a single response item; however, 11 children were reported to have more than one type middle ear condition in a single ear.

Source: AIHW analysis of NTER CHCI Audiology data entered as at 17 October 2008.

4.6.3 Requirements for further action

As part of the audiology check, audiologists were asked to indicate what, if any further follow-up the child required. Overall, at least one type of further action was required for 69% of children after their audiology check. The most common types of further action required were: case management by Primary Health Care (PHC) services (44%); case management by an ENT specialist (41%); and ongoing monitoring by Northern Territory hearing services (35.5%) (Table 4.6). It must be noted that children may have received referrals to more than one of these services. For instance, a child may have been case managed by a PHC worker and an ENT specialist simultaneously.

Table 4.6: Type of further action required^(a) after audiology check, Indigenous Australian children who had an audiology check as part of the NTER CHCI

Type of further action required	Yes (%)	No (%)	Missing (%) ^(b)	Total (%)	Total (no.)
Case management by Primary Health Care services	44.1	55.3	0.7	100.0	1,323
Case management by Ear, Nose and Throat specialist	41.4	58.0	0.7	100.0	1,323
Ongoing monitoring by Northern Territory hearing services	35.5	63.9	0.7	100.0	1,323
Referral to Australian Hearing (rehabilitation)	10.0	89.3	0.7	100.0	1,323
Referral to Department of Education, Employment and Training hearing advisory support	24.6	74.8	0.7	100.0	1,323
Other	3.3	96.1	0.7	100.0	1,323
At least one further action required	69.0	30.3	0.7	100.0	1,323

(a) This is a multiple response item; some children had more than one further action required.

(b) Includes invalid and not stated responses.

Source: AIHW analysis of NTER CHCI Audiology data entered as at 17 October 2008.

4.7 Change across time

As shown in Table 4.2, 263 children had two or more audiology checks as part of the CHCI as at 17 October 2008. The average period of time between the first and second check was 3 months (87 days).

To determine whether or not the child had two audiology checks, HRNs and dates of service were used. As mentioned previously, there was an item on the audiology form that asked whether or not the child had a previous audiology check and whether any change in hearing levels had occurred since this check; however, given the large proportion of missing responses (as discussed in Appendix 3), this item was not used for its intended purpose. In order to determine whether any change had occurred over time, the results from the first of the audiology checks were compared with the results from the second check.

4.7.1 Hearing loss status

Of those children who had had at least two audiology checks, 24% had no hearing loss at the time of their first check compared with 32% at the time of their second check (Table 4.7). The proportion of children who had bilateral hearing loss decreased from the first to the second check (55% compared with 43%), while the proportion who had unilateral hearing loss increased (17% to 21%).

Table 4.7: Hearing loss at first and second check, Indigenous Australian children who had at least two audiology checks as part of the NTER CHCI

Hearing loss	1st check		2nd check	
	Number	Per cent	Number	Per cent
None	64	24.3	83	31.6
Unilateral	45	17.1	56	21.3
Bilateral	144	54.8	114	43.4
Missing ^(a)	10	3.8	10	3.8
Total	263	100.0	263	100.0

(a) Missing includes not stated and 'not tested' responses.

Source: AIHW analysis of NTER CHCI Audiology data entered as at 17 October 2008.

Change in the degree of hearing loss among children who had at least two audiology checks was also examined. It must be kept in mind that since this measure is based on the child's better ear, most children with unilateral hearing loss were classed as having no hearing impairment.

Table 4.8 shows that 39% of children with at least two audiology checks had no hearing loss at the time of their first check, which improved to 57% by the time of their second check.

Table 4.8: Degree of hearing loss^(a) at first and second check, Indigenous Australian children who had at least two audiology checks as part of the NTER CHCI

Degree of hearing loss	1st check		2nd check	
	Number	Per cent	Number	Per cent
None ^(b)	103	39.2	149	56.7
Mild ^(c)	105	39.9	72	27.4
Moderate ^(d)	47	17.9	33	12.6
Severe ^(e)	1	0.4	1	0.4
Profound ^(f)	0	0.0	0	0.0
Missing ^(g)	7	2.7	8	3.0
Total	263	100.0	263	100.0

(a) Based on better ear.

(b) Defined as 0–15 dB in soundproof conditions and 0–25 dB in non-soundproof conditions.

(c) Defined as 16–30 dB in soundproof conditions and 26–35 dB in non-soundproof conditions.

(d) Defined as 31–60 dB in soundproof conditions and 36–60 dB in non-soundproof conditions.

(e) Defined as 61–90 dB in soundproof conditions and 61–90 dB in non-soundproof conditions.

(f) Defined as 91 dB+ in soundproof conditions and 91 dB+ in non-soundproof conditions.

(g) Missing includes not stated and 'not tested' responses.

Source: AIHW analysis of NTER CHCI Audiology data entered as at 17 October 2008.

In order to determine exactly what changes in hearing loss had occurred at an individual level, Table 4.9 presents data for children who had no hearing loss and children who had at least some hearing loss, whose level of hearing loss had improved, deteriorated, or stayed the same from their first to second check. An improvement in hearing loss was defined as a degree of hearing loss at the child's second check that had improved by at least one level out of five since their first check, whereas deteriorated hearing loss was defined as a degree of

hearing loss at the child's second check that had worsened by at least one level since their first check.

The results show that the degree of hearing loss had improved for over half (54%) of all children who had some level of hearing loss at the time of their first check (Table 4.9). There was a small proportion (9%) of children whose level of hearing loss had deteriorated and a third (34%) whose level of hearing loss had not changed between their first and second check.

Table 4.9: Changes in degree of hearing loss^(a) between first^(b) and second check, Indigenous Australian children who had at least two audiology checks as part of the NTER CHCI

Degree of hearing loss	Number	Per cent
At least some level of hearing loss at 1st check		
Improved ^(c)	82	53.6
Deteriorated ^(d)	14	9.2
No change ^(e)	52	34.0
Missing ^(f)	5	3.3
Total	153	100.0

(a) Based on better ear.

(b) Excludes children for whom information on degree of hearing loss was missing on their first check.

(c) Defined as a degree of hearing loss at the child's second check that had improved by at least one level since their first check.

(d) Defined as a degree of hearing loss at the child's second check that had worsened by at least one level since their first check.

(e) Defined as a degree of hearing loss at the child's second check that was the same as the degree of hearing loss at their first check.

(f) Includes children for whom information on the degree of hearing loss was missing on their second check.

Source: AIHW analysis of NTER CHCI Audiology data entered as at 17 October 2008.

4.8 Linkage of information from the Audiology and Child Health Check data collections

The AIHW created a data set that linked information from the CHC and the Audiology data collections in order to answer the following questions:

- Among those children who had a CHC, how many were referred for either audiology/tympanometry⁶ or Ear, Nose and Throat (ENT) follow-up services, and how many had an audiology check?
- Among those children who had an audiology check, how many had a CHC and how many were referred for either audiology/tympanometry or ENT follow-up services during their CHC?
- Was the hearing loss status and number of middle ear conditions present among children who had a CHC different to those children who did not have a CHC?

In order to link the two data collections, valid and unique HRNs are required in both collections. Among the 9,943 valid CHC forms that were processed as at the 17th October 2008, 285 CHC forms had missing HRNs. These CHC forms could not be linked with the

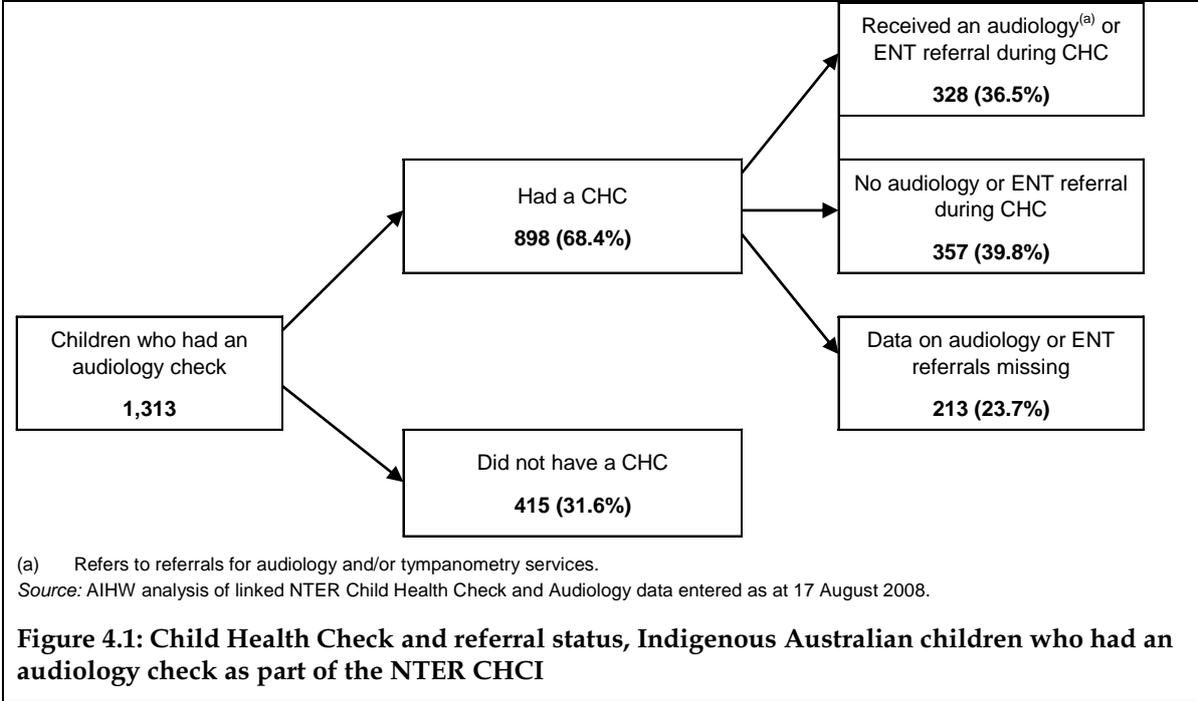
⁶ For simplicity, referrals for 'audiology or tympanometry' services are referred to as a referral for 'audiology' services in the remainder of this chapter.

Audiology database. In addition, 58 children had a second CHC as at 17 October 2008 (as discussed in Chapter 2). For these children, only their initial CHC was selected for data linkage as follow-up services are based on the referrals that were made during the child’s initial health check. The final CHC data set used for the linkage of the collections contained CHC records for 9,600 children. This differs from the final CHC data set used for the analyses of health conditions and referrals presented in Chapter 2 of this report (8,997 children) because the CHC data set used for linkage purposes includes non-standard CHC forms that were otherwise excluded from analyses.

In relation to the 1,627 audiology forms that had been processed as at 17 October 2008, the HRN was missing on 10 of these forms and these could not be linked with the CHC database. In addition, there were 263 children who had multiple audiology checks (304 checks in total); as was done for the CHC data, only the first of the audiology checks was included for data linkage purposes. In total, data from the Audiology collection for 1,313 children could be used in the linkage of the data sets.

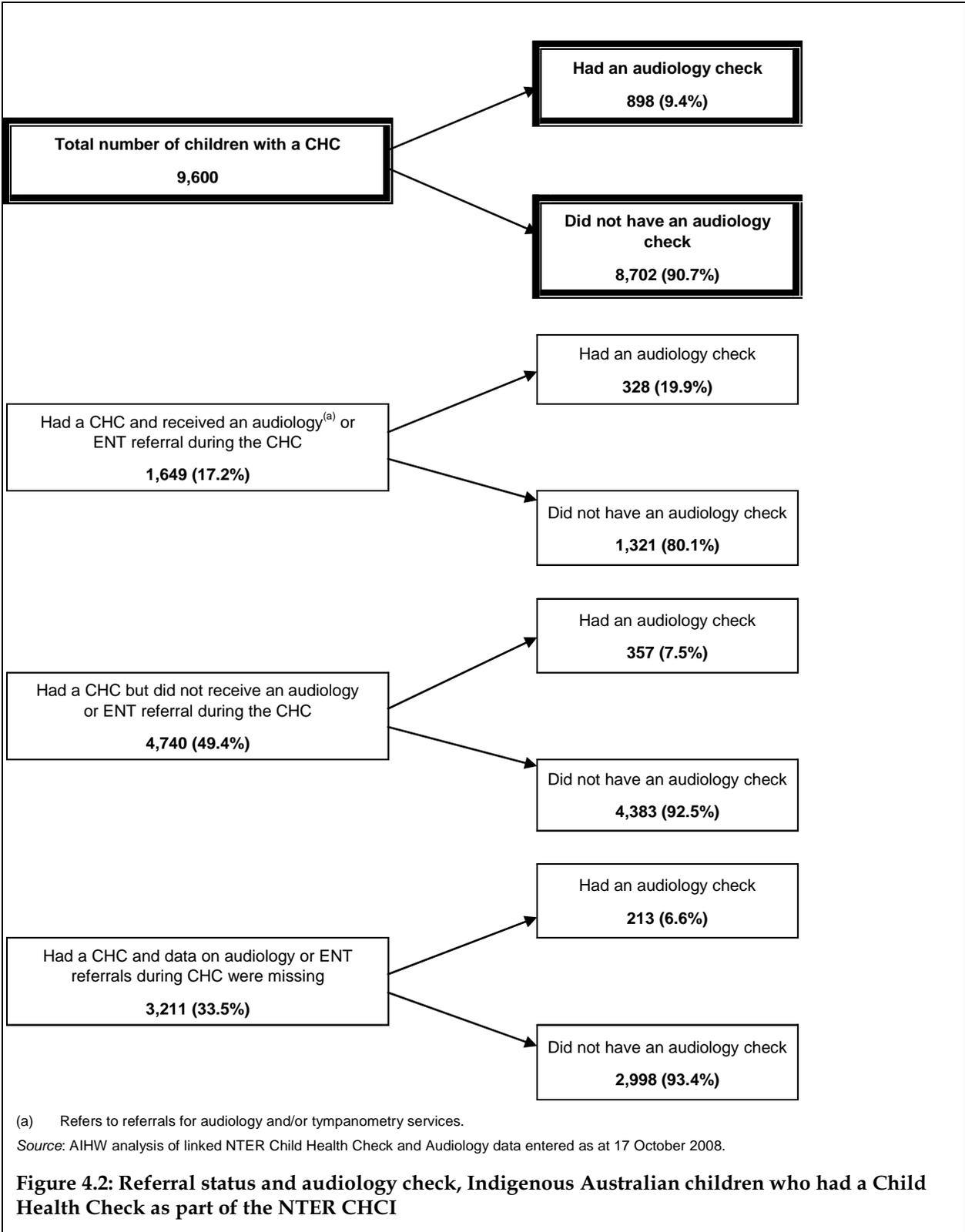
4.8.1 Link between audiology checks and Child Health Checks

As mentioned earlier in this chapter, audiology checks were available to children who had a CHC, as well as to other Indigenous Australian children in the prescribed areas of the NT. As shown in Figure 4.1, 68% (898) of children who had an audiology check had also had a CHC, while 32% had not had a CHC. Among those 898 children who had both an audiology check and a CHC, 37% had received an audiology or ENT referral during the CHC, 40% had not received such a referral and information on these referrals was missing for the remaining 24%.



4.8.2 Link between CHC referrals and audiology checks

Figure 4.2 shows the percentage of children who had a CHC and whether they had an audiology or ENT referral, split according to whether or not they had an audiology check.



Overall, 9% (898 out of 9,600) of children who had a CHC had also had an audiology check. Among those children who had a CHC and who had received a referral during that check for audiology or ENT services, 20% had an audiology check. For those children without a referral to one of these services, 8% had an audiology check. Information on referrals to audiology or ENT services from the CHC was missing for 34% of the 9,600 children. Of these children, 7% had an audiology check.

4.8.3 Audiology check results of children who had or had not had a previous Child Health Check

Tables 4.10 and 4.11 show the hearing loss status and number of ear conditions identified among children who had at least one audiology check, with or without a previous CHC.

The proportion of children who had no hearing loss was higher among those who had not had a CHC (47%) compared with those who had (39%). Likewise, there was a smaller proportion of children with conductive hearing loss among those who had not had a previous CHC (43%) compared with those who had (51%) (Table 4.10).

Table 4.10: Hearing loss by whether or not a Child Health Check was undertaken, Indigenous Australian children who had an audiology check as part of the NTER CHCI

	CHC		No CHC	
	Number	Per cent	Number	Per cent
Hearing loss				
None	351	39.1	193	46.5
Unilateral	150	16.7	60	14.5
Bilateral	340	37.9	141	34.0
Missing ^(a)	57	6.3	21	5.1
Total	898	100.0	415	100.0
Type of hearing loss				
None	351	39.1	193	46.5
Conductive	459	51.1	178	42.9
Sensorineural	17	1.9	14	3.4
Mixed (both conductive and sensorineural)	15	1.7	9	2.2
Missing ^(a)	56	6.2	21	5.1
Total	898	100.0	415	100.0
Degree of hearing loss^(b)				
None ^(c)	494	55.0	244	58.8
Mild ^(d)	243	27.1	101	24.3
Moderate ^(e)	108	12.0	49	11.8
Severe ^(f)	3	0.3	2	0.5
Profound ^(g)	1	0.1	0	0.0
Missing ^(a)	49	5.5	19	4.6
Total	898	100.0	415	100.0

(a) Missing includes not stated and 'not tested' responses.

(b) Based on better ear.

(c) Defined as 0–15 dB in soundproof conditions and 0–25 dB in non-soundproof conditions.

(d) Defined as 16–30 dB in soundproof conditions and 26–35 dB in non-soundproof conditions.

(e) Defined as 31–60 dB in soundproof conditions and 36–60 dB in non-soundproof conditions.

(f) Defined as 61–90 dB in soundproof conditions and 61–90 dB in non-soundproof conditions.

(g) Defined as 91 dB+ in soundproof conditions and 91 dB+ in non-soundproof conditions.

Source: AIHW analysis of NTER CHCI Audiology data and Child Health Check data entered as at 17 October 2008.

The proportion of children with at least one type of middle ear condition was higher among those who had a CHC (70%) compared with those who had not (63%) (Table 4.11).

Table 4.11 Middle ear conditions by whether or not a Child Health Check was undertaken, Indigenous Australian children who had an audiology check as part of the NTER CHCI

At least one middle ear condition ^(a)	CHC		No CHC	
	Number	Per cent	Number	Per cent
Yes	632	70.4	262	63.1
No	238	26.5	134	32.3
Unsure	15	1.7	6	1.5
Missing	13	1.5	13	3.1
Total	898	100.0	415	100.0

(a) If the same middle ear condition was present in both ears, the condition was counted only once.

Source: AIHW analysis of NTER CHCI Audiology data and Child Health Check data entered as at 17 October 2008.

4.9 Discussion

Twenty per cent of children who had been referred for follow-up audiology services during their CHC had received an audiology check. In relation to the findings of the audiological assessments:

- Fifty-one per cent of children had either bilateral or unilateral hearing loss;
- Sixty-eight per cent of children had at least one middle ear condition, with the most common type of middle ear condition being otitis media with effusion (28%).

As noted above, audiological assessment forms an integral part of the treatment pathway for ear disease. This is indicated by the results:

- Sixty-nine per cent of children required further follow-up action following the audiology check;
- Of those children who had at least two audiology checks who required at least some further action following their first check, eight in ten (82%) still required further follow-up action at the time of their second check.

In relation to whether or not children had received audiological assessments following a referral from a CHC, of the 1,649 children who had received a referral to audiology/tympanometry or ENT follow-up services during their CHC, 328 (20%) children had had an audiology check.

This finding contrasts with that found in the chart review data discussed in Chapter 3 which found that 44% of children with a referral to tympanometry and audiometry had been seen at least once. The reasons for this discrepancy are not known at this stage. On face value, the Audiology data collection seems to be the more robust as it is based on unique records of occasions of service. One possible explanation for the discrepancy is that there have been contacts with audiologists noted in the children's records that did not involve audiological assessment.

The prevalence of hearing loss identified through this collection is a cause for concern. It has previously been noted that 'The burden of hearing loss is high in Aboriginal populations, but the true prevalence is unclear. The long-term impact of variable degrees of hearing loss in childhood on language development and socioeconomic circumstances is also unclear. However, based on limited studies available overseas with lesser degrees of hearing loss,

and the currently understood burden and severity of ear disease seen in Aboriginal populations, it is likely that ear disease through chronic infection substantially impacts on the developmental future of Aboriginal children' (Couzos and Murray, 2nd edition 2003:196).

This data collection and the ability to link it to CHC data as well as follow-up service delivery through acute care provides an important opportunity to improve understanding of this problem and inform action. Future analyses will attempt to achieve this.

5 Follow-up: dental

5.1 Introduction

The Northern Territory Department of Health and Families (NT DHF) and Aboriginal Community Controlled Health Organisations (ACCHOs) have been funded by the Australian Government to undertake follow-up dental services as part of the Child Health Check Initiative (CHCI). These services are being provided to children who had a Child Health Check (CHC), as well as other Indigenous Australian children aged 15 years or less who live within the prescribed areas of the Northern Territory.

In this chapter of the report, a description of the Dental data collection is provided. The number of dental forms received by either the Australian Institute of Health and Welfare (AIHW) or the Helping Hands Oral Health Team of the NT DHF as at 17 October 2008 is also indicated. References to NT DHF in this chapter refer to its Helping Hands Oral Health Team. In addition, key findings from the analyses of the dental data are presented.

When interpreting data from this collection, it should be noted that the children who received a dental check were not a random sample; rather, they were identified as needing such services through either the CHC or through another process. Thus, the findings from the Dental data collection are not representative of the Northern Territory Aboriginal child population or the Aboriginal population of children within prescribed areas of the Northern Territory Emergency Response (NTER) CHCI. It should also be noted that all children were provided with a consent form for 'dental treatment'. As a diagnostic check does not require the completion of a consent form for treatment, a high proportion of children had a diagnostic check. If treatment was required, this was often done in a second visit within a few days of the first, upon receipt of a consent form for treatment signed by a parent or guardian. This means that there are a higher number of occasions of service than if these occasions of service were combined. It also probably reduced the proportion of occasions of service in which problems were treated and services were provided.

5.2 Information about the collection

The unit of measurement of the Dental data collection is an 'occasion of service'. Some children were seen by a dental clinician more than once in a relatively short space of time, usually because assessment and treatment required more than one occasion of service. Therefore, any one child can have more than one record in the Dental data collection.

The information captured as part of the Dental data collection includes:

- details about the child (Hospital Registration Number (HRN), date of birth and sex);
- community ID;
- type(s) of services provided;
- problem(s) treated;
- whether any further actions were required at the end of the occasion of service;

- the number of deciduous decayed, missing and filled teeth/surfaces (for children aged 0 to 10 years); and
- the number of permanent decayed, missing and filled teeth/surface (for children aged 7 years and over).

Information on the last two points above is not yet available for services conducted by either the ACCHOs or the NT DHF. All data available for analysis have been analysed.

5.3 Dental forms received and processed

Information about the dental services provided through ACCHOs is sent to the Australian Institute of Health and Welfare (AIHW) on paper forms. Information about dental services provided by the NT DHF is transmitted to the AIHW in a secure electronic format.

Unfortunately, a series of technical difficulties has prevented the NT DHF from electronically transmitting data to the AIHW in time for analysis in this report. The NT DHF provided the AIHW with its own analyses of the data it has received for checks undertaken by Helping Hands Oral Health Teams. As at 17 October 2008, all paper forms received by the AIHW from ACCHOs have been processed. As shown in Table 5.1, this represents 134 occasions of service provided to 112 children. The figures provided by the NT DHF represent all data provided to the Helping Hands Oral Health Team as at 17 October 2008. As shown in Table 5.2, as at 17 October 2008, 1,766 occasions of service had been provided to 1,417 children.⁷

As at 17 October 2008, 1,900 dental checks are represented by the data held by the AIHW and the NT DHF combined.

5.4 Demographic characteristics

Demographic analyses were conducted separately for services provided by the ACCHOs, the data for which is held by the AIHW, and services provided by the NT DHF. The ACCHO and NT DHF data sets have not yet been combined. Since the same child may have received a check in each data set, it is possible that the number of children who had received a dental check by 17 October 2008 is smaller than the number of children in the two tables combined. This contingency would not impact on the counts of the total occasions of service, services provided, problems treated or the number of occasions of service which required further follow-up.

As shown in Table 5.1, approximately 75% of the checks conducted by the ACCHOs took place in the Arnhem region, while approximately 25% were conducted in a combination of the Barkly and Katherine regions. One in four (26%) checks were conducted on children aged 0 to 5 years, 64% were on children aged 6 to 11 years and 10% were on children aged 12 to 15 years. A higher proportion of checks were for girls (58%) than boys (40%). Data on the sex of the child were missing for less than 2% of occasions of service.

⁷ Approximately 564 additional children for whom consent was not obtained also received follow-up dental care across 726 occasions of service. Data from these children are excluded from all analyses in this report.

Table 5.1: Demographic characteristics, Indigenous Australian children who had a dental check provided by an ACCHO as part of the NTER CHCI

	Occasions of service		Children	
	Number	Per cent	Number	Per cent
Region				
Central Australia	0	0.0	0	0.0
Arnhem	101	75.4	79	70.5
Barkly/Katherine	33	24.6	33	29.5
Darwin Rural	0	0.0	0	0.0
Total	134	100.0	112	100.0
Age group				
0–5 years	35	26.1	33	29.5
6–11 years	86	64.2	68	60.7
12–15 years	13	9.7	11	9.8
Total	134	100.0	112	100.0
Sex				
Male	54	40.3	49	43.8
Female	78	58.2	62	55.4
Missing	2	1.5	1	0.9
Total	134	100.0	112	100.0

Source: AIHW analysis of NTER CHCI Dental data entered as at 17 October 2008.

As shown in Table 5.2, of the 1,766 dental checks conducted by the NT DHF, 35% were in Central Australia, 25% were in Arnhem, 10% were in the Barkly and Katherine regions combined, and 27% were in Darwin Rural. Data on region is missing for 3% of children. Note, however, that for data collected by the NT DHF, sometimes the child's 'home region' was recorded instead of the region in which the check was conducted. It is unclear to what degree this occurred or how often the child's 'home community' was in a region other than the one in which they received their dental check.

Approximately one in five (21%) checks were conducted on children aged 0 to 5 years, 60% were on children aged 6 to 11 years and over 18% were on children 12 to 15 years, as shown in Table 5.2. Data on age group is missing for 1% of checks. A higher proportion of checks were for boys (53%) than girls (47%).

Table 5.2: Demographic characteristics, Indigenous Australian children who had a dental check provided by NT DHF as part of the NTER CHCI

	Occasions of service		Children	
	Number	Per cent	Number	Per cent
Region^(a)				
Central Australia	625	35.4	474	33.5
Arnhem	436	24.7	378	26.7
Barkly/Katherine	174	9.8	157	11.1
Darwin Rural	481	27.2	367	25.9
Missing	50	2.8	41	2.9
Total	1,766	100	1,417	100.0
Age group				
0–5 years	365	20.7	305	21.5
6–11 years	1063	60.2	823	58.1
12–15 years	326	18.5	277	19.5
Missing	12	0.7	12	0.8
Total	1,766	100	1,417	100.0
Sex				
Male	929	52.6	733	51.7
Female	837	47.4	684	48.3
Total	1,766	100	1,417	100.0

(a) When completing the dental check form, the region in which the check was conducted was sometimes recorded. In other instances, the 'home region' of the child was recorded. All dental checks in this table were conducted within the prescribed region of the Northern Territory Emergency Response.

(b) Includes all dental checks where child's HRN (Hospital Record Number) is unknown.

Source: Data tables provided to the AIHW by the NT DHF on 5 November 2008.

5.5 Dental services provided

As part of the dental check, health professionals were asked to record which dental services were provided. Three in four (74%) occasions of service involved a diagnostic component. Almost 38% of occasions of service involved a preventative component, 31% involved a restorative component and 11% involved a surgical component. Less than 2% of occasions of service involved a periodontic component, an endodontic component, an orthodontic component or work on a crown or bridge. No occasions of service involved a prosthetic. Just over 6% of occasions of service involved some other type of treatment. Missing data were not able to be recorded for checks conducted by the NT DHF; refer to Appendix 3 for further information.

Table 5.3: Dental services provided by dental clinicians, by occasions of service for Indigenous Australian children

Dental services provided ^(a)	Yes		No	
	Number	Per cent	Number	Per cent
Diagnostic	1,407	74.1	493	25.9
Preventative	714	37.6	1,186	62.4
Periodontic	19	1.0	1,881	99.0
Surgery	210	11.1	1,690	88.9
Endodontic	31	1.6	1,869	98.4
Restorative	592	31.2	1,308	68.8
Crown or bridge	4	0.2	1,896	99.8
Prosthetics	0	0.0	1,900	100.0
Orthodontic	2	0.1	1,898	99.9
Other	115	6.1	1,785	93.9

(a) See Glossary for a description of different services.

Source: AIHW analysis of NTER CHCI Dental data entered as at 17 October 2008 combined with data tables provided to the AIHW by the NT DHF on 5 November 2008.

5.6 Problems treated

As part of the dental check, health professionals were asked to record which problems were treated. Over one in three (35%) checks involved the provision of oral health education. Similarly, 34% of checks treated previously untreated caries. Fourteen per cent of checks treated inadequate dental hygiene (including plaque and calcification). Less than 2% of checks treated gum disease, broken or chipped teeth due to trauma, abnormal teeth growth, missing teeth, or mouth infection or mouth sores. Other problems were treated in 7% of the occasions of service.

Table 5.4: Dental problems treated by dental clinicians, by occasions of service for Indigenous Australian children

Problems treated	Yes		No	
	Number	Per cent	Number	Per cent
Oral health education	656	34.5	1,244	65.5
Untreated caries	650	34.2	1,250	65.8
Gum disease	14	0.7	1,886	99.3
Broken or chipped teeth due to trauma	27	1.4	1,873	98.6
Abnormal teeth growth	19	1.0	1,881	99.0
Missing teeth	4	0.2	1,896	99.8
Mouth infection or mouth sores	26	1.4	1,874	98.6
Dental hygiene (including plaque and calcification)	264	13.9	1,636	86.1
Other	132	6.9	1,768	93.1

Source: AIHW analysis of NTER CHCI Dental data entered as at 17 October 2008 combined with data tables provided to the AIHW by the NT DHF on 5 November 2008.

5.7 Further follow-up required

As part of the dental check, health professionals were asked to assess whether further follow-up was required. Children in approximately 47% of occasions of service were assessed as requiring further follow-up. As shown in Table 5.5, the Arnhem region had the greatest proportion of occasions of service requiring follow-up (65%), followed by Darwin Rural (63%), Barkly/Katherine (39%), and Central Australia (25%). Occasions of service where the region is unknown had the smallest proportion of occasions of service requiring follow-up (18%).

Table 5.5: Occasions of service requiring follow-up treatment by region

Region	Occasions of service requiring follow-up		Occasions of service not requiring follow-up		Total occasions of service	
	Number	Per cent	Number	Per cent	Number	Per cent
Central Australia	155	24.8	470	75.2	625	100.0
Arnhem	350	65.2	187	34.8	537	100.0
Barkly/Katherine	80	38.6	127	61.4	207	100.0
Darwin Rural	304	63.2	177	36.8	481	100.0
Unknown	9	18.0	41	82.0	50	100.0
All regions	898	47.3	1,002	52.7	1,900	100.0

Source: AIHW analysis of NTER CHCI Dental data entered as at 17 October 2008 combined with data tables provided to the AIHW by the NT DHF on 5 November 2008.

5.8 Discussion

For all dental checks completed, 74% occasions of service involved a diagnostic component; 38% involved a preventative component; 31% involved a restorative component; and 11% of occasions of care involved a surgical component.

For all dental checks completed, oral health education was provided in 35%; untreated caries were treated in 34% of occasions; and dental hygiene issues (including plaque and calcification) were treated in 14%.

Forty-seven per cent of occasions of service were completed with the child still requiring further follow-up.

Because of the problems with finalising the electronic transfer of data from NT DHF, only limited analysis of these data is possible.

It is not possible from these data to determine the extent of follow-up to dental referrals from the CHCs.

Glossary of dental data terms

Diagnostic

Examinations (initial, periodic and emergency oral exams; consultations; written reports; referrals)

Radiographical examination and interpretation (intraoral radiographs; skull radiographs)

Other diagnostic services (bacteriological examination; antibiotic sensitivity test; biopsy; casts)

Preventative

Dental prophylaxis (removal of plaque; removal of calculus; recontouring of existing restorations)

Topical fluoride (application of fluoride solution or gel; instruction on self-application)

Other preventive services (dietary advice; oral hygiene instruction; fissure sealing; mouthguards)

Periodontics

Treatment of gums (treatment of acute infection; root planing; surgical removal of soft tissue)

Oral surgery

Extractions (removal of permanent or deciduous tooth, tooth fragment)

Surgical extractions (removal of erupted, unerupted tooth; incision; removal of bone; fragments)

Surgery for prostheses (preparation for removable prosthesis)

Treatment for maxillo-facial injuries (repair of skin; wiring of teeth)

Endodontics

Pulp treatments (pulp capping; pulpotomy; extirpation or debridement of root canal)

Periradicular surgery (periapical curettage; apicectomy)

Other endodontic services (bleaching; removal of root filling)

Restorative

Amalgams (filling of 1, 2, 3+ surfaces)

Glass ionomer, silicate and composite resins (filling of 1, 2, 3+ surfaces)

Gold foil (filling of cavity with small increments of gold foil)

Inlays/onlays (construction and insertion of inlay or onlay)

Other restorative services (recementing of inlay; temporary filling, crown, bridge)

Crown and bridge

Crowns (resin; porcelain; gold jacket; amalgam core for crown; cast post)

Bridges (enamel bonded – metal frame, cast metal and porcelain, cast metal & resin)

Repairs and other services (recementing crown, bridge; removal of crown; repair of crown)

Prosthodontics

New dentures and denture components (upper and lower, partial dentures; tooth replacement)

Denture maintenance (adjustment; relining; remodelling; rebasing)

Denture repairs (reattaching tooth; replacing clasp; repairing base)

Implant prostheses (implants to stabilise & retain prostheses)

Occasion of service

Refers to occasions of examination, consultation, treatment or other service provided to a patient

Orthodontics

Removable appliances (passive, active; one, two arches)

Fixed appliances (partial, full arch banding; space maintainer)

Extra-oral appliances (harness appliances)

Attachments (restoration with wire hook)

Other

Emergencies (palliative emergency treatment; sedative dressing)

Drug therapy (drug administration – intravenous, intramuscular, oral; drug prescription)

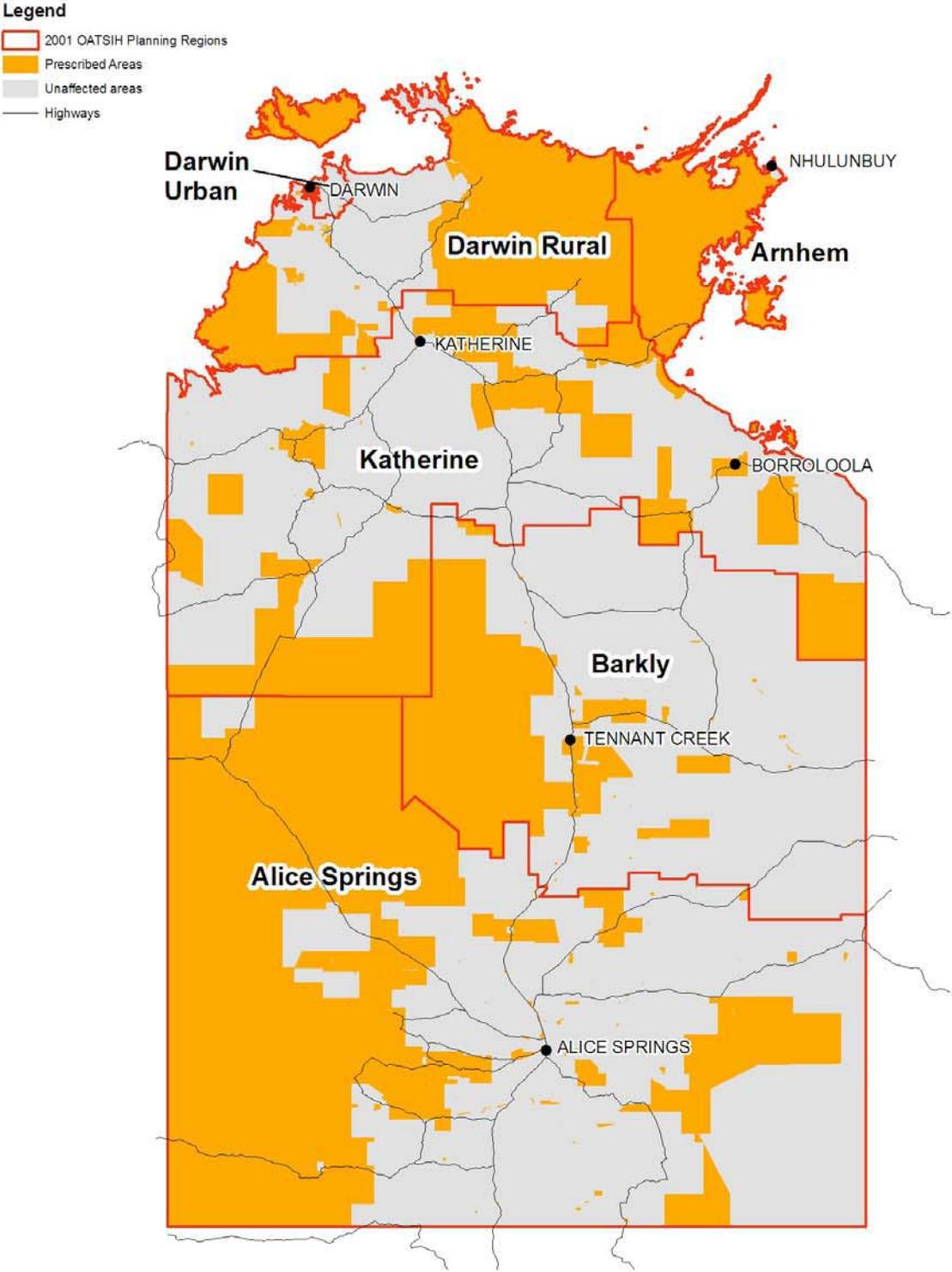
Professional visits (home; hospital)

Anaesthesia and sedation (local; sedation – intravenous, inhalation; general – inhalation)

Occlusal therapy (occlusal adjustment; mounting of diagnostic casts; splinting)

Other services (splinting; post-operative care)

Appendix 1: Prescribed NTER areas



Appendix 2: Hospital-related follow-up

Chapters 3 to 5 of this report presented information from Chart Review, Audiology and Dental data collections on follow-up activities of children who had had a Child Health Check (CHC). While most up-to-date follow-up services received by children are captured by these collections, there are other services provided such as hospital-related services on which the Australian Institute of Health and Welfare (AIHW) did not receive data as part of the collections it holds.

The Northern Territory Department of Health and Families (NT DHF) matched AIHW CHC data to the central data set held by the NT DHF to identify additional follow-up services provided to children who had had a CHC. The matched results indicate that 226 out of 5,146 children who had had a CHC (as at 15 May 2008) had received 381 hospital-related services following their CHC.

Children receiving these services may or may not have been referred directly to them from their CHC. It is most likely that these services were provided subsequent to other referrals to, for example, an Ear Nose and Throat specialist, dentist or paediatrician. It is also possible that these services may have been provided for conditions occurring subsequent to or unrelated to referrals made during a CHC.

This section provides a description on the number of children who received these health services and types of health service received.

Among 5,146 children, 226 (4.4%) children have received 381 episodes of hospital-related services that were identified from NT DHF data sets. About 64% of the children received one service only while the remaining 36% received two or more such services (Table A2.1).

Table A2.1: Number of children who had a CHC and received the hospital-related services

Number of services received	Number of children	Per cent
1	144	63.7
2	47	20.8
3	18	8.0
4	7	3.1
5	4	1.8
6	3	1.3
7	1	0.4
8	2	0.9
Total number of children	226	100.0
Total number of services received	381	

Source: AIHW analysis of NT DHF linked data as at 24 October 2008.

Among different types of hospital services provided 46% were for hospital outpatient clinics and mental health services, 33% were outreach services and 15% were hospital

admissions. Furthermore, about 7% of services were pathology tests or radiology examinations (Table A2.2).

Table A2.2: Number of hospital-related health services provided by service type

Type of service	Number	Per cent
Hospital outpatient and mental health services	174	45.7
Outreach services	125	32.8
Hospital admissions	56	14.7
Pathology and radiology	26	6.8
Total	381	100.0

Source: AIHW analysis of NT DHF linked data as at 15 May 2008.

A similar data linkage is planned to occur by the end of 2009 and this will capture more children who had received referral services other than those provided through the CHC process. This will also enable more detailed analysis of specific services received, including the health conditions for which these services were provided.

Appendix 3: Data quality and its effect on interpretation

A3.1 Child Health Check data collection

The data included in the Child Health Check (CHC) collection are a by-product of a clinical process – a voluntary, comprehensive check of each child’s health, wellbeing, and social and environmental living conditions. The aim of the checks was to detect, treat or refer children for clinically significant problems rather than establish a definitive measure of disease prevalence in the population.

There are important limitations and data quality issues that must be considered when interpreting findings from the CHC collection. As with most data collected as a by-product of primary care service delivery, the accuracy of the review of medical records and the clinical screening examination was not assessed for any of the conditions reported. Thus, conditions that require specific clinical training or further investigation for accurate ascertainment may be under-reported. It must also be noted that the Child Health Checks (CHCs) were voluntary and, at this stage, nothing is known about how the children who participated compare with those who did not participate.

It must also be noted that in the analyses presented in this report, the number of missing cases is included in the denominator when calculating rates. Thus, the rates represent a minimum level and may underestimate the true prevalence of the conditions and/or referrals. Furthermore, the quality of the CHC data relating to individual items varies based on the level of missing data, which ranges from 1% to 30%.

When interpreting the CHC data, the age group to which the question applies must also be considered, as not all questions were asked of all children (e.g. the questions on SIDS risk factors were to be answered for those less than 1 year of age). In addition, a small number of the questions were not included in each version of the form. Thus the number of children for whom data were collected varies among the different items from as high as 8,997 (the number of children for whom data were entered by 17 October 2008) to as low as 662 (for the risk of sudden infant death syndrome (SIDS) items). For each item, as well as for each comparison by region, the number of children for whom the question was relevant is shown. Note that only the number of children to whom the question was relevant is considered when determining prevalence rates.

Unlike the May 2008 public release report, this report links information from the CHC collection with the Chart Review, Audiology and Dental collections to determine whether follow-up medical care was provided to those children who were referred for such services at the time of their CHC. In order to allow for cases to be accurately linked across collections, valid Hospital Registration Numbers (HRNs) are required. The extent to which the HRNs that have been provided are valid, however, has not yet

been examined.⁸ Thus the use and interpretation of the results that are based on the analyses of linked data should take these caveats into account.

Finally, the data presented in this report are not a substitute for estimates of prevalence derived from rigorous, scientific research; the use and interpretation of these data should be guided by this general caveat and by the discussion within the May 2008 progress report that compares specific CHC findings with data from other sources.

Further information and detail on the CHC form, data quality and interpretation of the findings are provided in the May 2008 progress report.

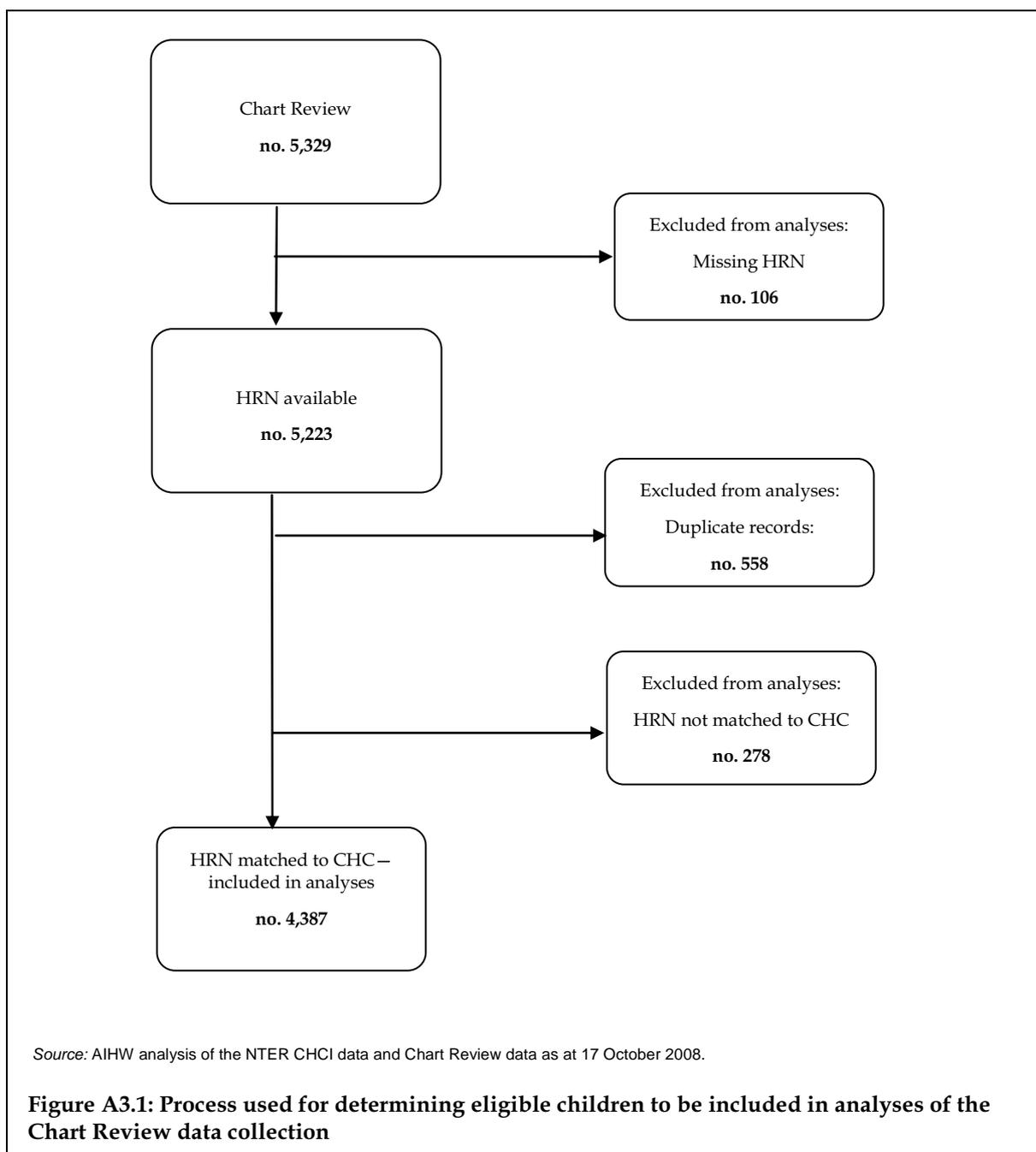
A3.2 Chart Review data collection

A chart review was conducted only if a child had a CHC. Therefore, chart review records were matched against the CHC records to ensure that children were eligible for inclusion in the analyses. In determining eligibility of children for the analyses in this section of the report, a number of decisions were made with regard to the duplicate records and records with missing information. This process is shown in Figure 3.1.

As at 17 October 2008, 5,391 chart review forms have been received by the Australian Institute of Health and Welfare (AIHW) of which 5,329 (99%) had been entered into the AIHW Chart Review database. These records were processed to identify duplicates and records with missing HRNs. There were many ways that records were duplicated during chart reviews. For some children the same form was sent twice with identical information and in that case the first form was used in the analyses. Some duplicate chart review forms had one form containing more complete information than the other (i.e. valid chart review date). In this case, the form with more complete information was taken. There were instances when a child had two chart reviews but had different community identification numbers and these were checked against the CHC database to ascertain the correct form. On the chart review form, there was provision to include information from both initial and exit chart reviews. Often the exit chart review information was recorded on a photocopy of a completed initial chart review form which had already been sent to AIHW. When this occurred, two records have been created for the same child on the AIHW database; one containing initial chart review information and the other containing both initial and exit information. In this case, the records containing initial chart review information only were treated as duplicates.

The cleaned chart review data set was matched to the CHC data set to ensure that all children who had a chart review are on the AIHW CHC database. This means that a number of chart review forms which indicated that the child had a CHC but were not able to be matched were excluded from the analyses. Note that the criteria used for determining eligibility of children with CHCs and chart reviews reduced the number of children eligible for the analyses (Figure A3.1).

⁸ However, it is clear that some communities had problems in matching HRNs on pre-populated chart review forms with HRNs in their records. As well, an examination of the HRNs indicate that some have more or less digits than expected.



Other data issues that may affect interpretation of the analyses are discussed below.

There are many different versions of chart review forms that have been used in data collection. In earlier versions, the health conditions with a referral or follow-up were mentioned on the form only if a child had been seen for that condition. In the most recent version, conditions for which a child had a referral or follow-up were listed regardless of whether the child had been seen or not. The earlier forms may underestimate the number of health conditions for which children had a referral or follow-up.

The chart review forms were designed to capture the type of referrals as well as the conditions for which a referral had been made. Sometimes, the information on referrals was written under the conditions column or conditions were listed under type of referrals. To the best of our abilities, we have addressed these issues when analysing the data. For example, when counting health conditions for which a child had been seen, we considered conditions that were listed under referrals as well. However, if the same condition was listed in both referral and condition columns, information from conditions column only is counted.

In some chart review forms the condition or the referral was not specified. For example, instead of providing a specific cause, the condition was given as dental or ear. Similarly for referral it was stated as dental or eye. This limits the ability to analyse the data by specific conditions or clinicians.

There were a reasonable number of records for which the date of chart review was outside the valid range of chart review dates. These records were treated as missing and excluded from the analysis when calculating time elapsed between CHC and initial chart review, and initial and exit chart review.

Records with missing HRNs and those without a matching record on the CHC database need to be investigated later to see if other available information such as date of birth, sex, community ID and date of CHC can be used to determine whether they are on the CHC database.

A3.3 Audiology data collection

Since April 2008, when the first of the audiology forms were received, the AIHW has been providing feedback to the NT DHF on a number of the data quality issues observed on the forms, such as missing date of birth, sex, HRN, or inconsistent item response.⁹ In turn, the NT DHF has been providing the AIHW with additional information or corrected forms, depending on the problem.

Through this data cleaning process, some further data quality issues became apparent. That is, among the audiology checks sent back to the NT DHF for data cleaning purposes, there were some that were subsequently identified as belonging to non-Indigenous Australian children, adults, or children whose audiology checks were incomplete. Hence, the AIHW was advised to delete these cases from its Audiology data collection. These cases were only identified out of the small number of forms that were sent back to the NT DHF for other data cleaning purposes, thus the question arises as to the how many more forms with the same data quality issues exist throughout the entire Audiology collection.

There has also been a data quality issue surrounding questions on the audiology form that ask about previous audiology checks (i.e. question 3 on the form). There have been a number of cases where the form indicated that the child had not had a previous audiology check (or that they were unsure if they had had one), while other information indicated that they had.¹⁰ Consequently, information on the following

⁹ To date, all audiology forms have been provided by the NT DHF.

¹⁰ To determine whether the child had had a previous audiology check, AIHW examined the HRNs on all forms received. Furthermore, after the AIHW made the NT DHF aware that there were some problems with the way this section was being completed, the NT

items – whether any ear intervention had occurred since the child’s last check and whether there had been any significant improvement or deterioration since that check – were not provided. Because of this, rather than rely on responses to these questions to determine if any one child had more than one audiology check, the analyses presented in this section have made use of HRNs for this purpose.

To date, five different versions of the audiology form have been used to collect information for the Audiology data collection. Since the question on the child’s HRN was omitted from the first version of the form, all of the checks that had initially used that version have been replaced by the NT DHF. Thus the Audiology data collection currently consists of information collected on four different form versions, with 3% of forms using the second version, 14% using the third version, 11% using the fourth version and 72% using the fifth version. The changes that have occurred across these different versions have been largely centred on the question about previous audiology checks, with this question added in version 3 and a change in the wording of this question made in version 4. In addition, the response options for the ‘middle ear condition’ question have changed across versions, with an ‘other’ response added in version 3, and ‘eustachian tube dysfunction’ added in version 5.

Another data quality issue relates to the level of missing or ‘not tested’ responses to the questions on the audiology check findings. That is, 6% of forms were missing a response on whether the child had hearing loss, 6% were missing a response in relation to the ‘type of hearing loss’ question, and 5% for the ‘degree of hearing loss’ question. It must be noted that missing includes unsure, not stated, invalid, and not tested responses. Those children who were ‘not tested’ were either too young for the test battery or were uncooperative. All of these children will be targeted for retesting.

The interpretation and use of data from the Audiology collection should also take into account the fact that the children who received an audiology check were not a random sample; rather, they were identified as needing such services through either the CHC or through another process. Thus, the findings from the Audiology data collection are not representative of the Northern Territory Aboriginal child population nor the Aboriginal population of children within prescribed areas of the NTER CHCI.

A3.4 Dental data collection

Dental data was processed in two separate databases, one held by the AIHW and one held by the NT DHF. Raw data was not combined. In estimating the total number of children who had dental checks, the number of children in each database was simply combined. There is a chance that this estimate is too high, because some children might have had a check by DHF and from an ACCHO. Since the AIHW holds a relatively small proportion of the total data, the likelihood is that any overestimation of the total number of children would be a small overestimation.

The dental forms have a space in which to record the community in which the check was conducted. For data collected by the NT DHF, sometimes the child’s ‘home community’ was recorded instead of the community in which the check was

DHF provided the AIHW with a list of HRNs for children who had had more than one audiology check.

conducted. It is unclear to what degree this occurred or how much this affects the groupings by region.

The extent of missing data is unclear in the Dental collection. The prevalence rates represent a minimum level for each condition and may therefore underestimate the true proportion of services provided and problems treated. The way the dental forms were designed and uploaded onto NT DHF databases has resulted in a situation in which missing data cannot be separated from 'no' responses for some questions. The questions on 'dental services provided' and 'problems treated' (sections 5.4 and 5.5 of this report) may be impacted. Analysing the data provided by the ACCHOs, the AIHW found a small proportion of missing data for the 'problems treated' question but not the 'dental services provided' question. The extent to which the data is missing in the data set held by NT DHF is unclear.

For the variable measuring whether or not further follow-up treatment was required, most clinicians were informed that this variable meant 'follow-up for a specific purpose'. However, a small number of clinicians, probably 5% or less, may have interpreted this question as including general check-ups, which all children should have regularly. Therefore, the reported number of occasions of service which ended with the child requiring follow-up treatment might be slightly higher than the number of occasions of service which ended with the child actually requiring follow-up for a specific purpose.

The interpretation and use of data from the Dental data collection should also take into account the fact that the children who received a dental check were not a random sample; rather, they were identified as needing such services through either the CHC or through another process. Thus, the findings from the Dental data collection are not representative of the Northern Territory Aboriginal child population nor the Aboriginal population of children within prescribed areas of the NTER CHCI.

Appendix 4: Health conditions identified during CHCs by region

Table A4.1: Health conditions in Central Australia, Indigenous Australian children who had a NTER Child Health Check

Health condition	Age range (years)	Yes (%)	No (%)	Unsure (%)	Missing (%)	Total (%)	Total (no.)
Ears and eyes							
Ear disease ^(a)	All	33.3	64.4	0.0	2.3	100.0	2,495
Trachoma ^(b)	6–15	8.2	90.6	0.0	1.1	100.0	802
Visual impairment ^(c)	6–15	0.8	92.4	0.0	6.8	100.0	1,349
Oral health							
Untreated caries	All	33.5	44.0	0.1	22.4	100.0	2,495
Gum disease	All	2.5	75.2	0.0	22.3	100.0	2,495
Other oral health issue	All	2.7	74.9	0.0	22.3	100.0	2,495
Any oral health issue	All	35.6	42.0	0.0	22.4	100.0	2,495
Skin							
Skin sores (4 or more)	All	8.9	77.2	0.0	13.9	100.0	2,495
Scabies	All	5.6	80.4	0.0	14.0	100.0	2,495
Ringworm	All	3.9	82.1	0.0	14.0	100.0	2,495
Cardiac and respiratory							
History of rheumatic heart disease ^(d)	All	1.4	87.8	4.6	6.2	100.0	2,329
History of asthma	All	4.2	85.0	3.3	7.5	100.0	2,495
History of recurrent chest infection	All	34.3	55.2	3.5	7.0	100.0	2,495
Anaemia							
Anaemia ^(e)	All	15.2	71.9	0.0	12.9	100.0	2,495
Physical growth							
Stunting ^(f)	All	3.0	90.4	0.0	6.5	100.0	2,495
Underweight ^(g)	All	4.2	91.6	0.0	4.2	100.0	2,495
Wasting ^(h)	0–4	3.4	88.8	0.0	7.8	100.0	963
Overweight ⁽ⁱ⁾	2–15	9.6	84.9	0.0	5.6	100.0	2,080
SIDS risk factors							
Prone sleeping	Less than 1	11.3	74.8	3.5	10.4	100.0	230
Soft sleeping surfaces and loose bedding	Less than 1	30.4	55.2	3.5	10.9	100.0	230
Overheating	Less than 1	13.0	72.6	3.0	11.3	100.0	230
Bed sharing	Less than 1	71.3	16.5	1.3	10.9	100.0	230

(continued)

Table A4.1 (continued): Health conditions in Central Australia, Indigenous Australian children who had a NTER Child Health Check

Health condition	Age range (years)	Yes (%)	No (%)	Unsure (%)	Missing (%)	Total (%)	Total (no.)
Other							
Regular smoker ^(j)	12–15	6.3	86.8	1.5	5.5	100.0	400
Smoker in household ^(k)	All	57.6	37.3	1.1	3.9	100.0	2,495
Immunisation due	All	12.5	78.7	3.5	5.3	100.0	2,495

(a) Defined as having symptoms (e.g. perforation, bulging) or a diagnosis (e.g. otitis media, otitis externa) of ear disease in at least one ear.

(b) Includes only those children who are known to have been screened for trachoma as part of the CHC (i.e. 51% of children in the age range).

(c) Defined as having a visual acuity score of less than '6/12' in at least one eye.

(d) This question was not included in one of the versions of the Child Health Check form.

(e) Defined as a haemoglobin (Hb) level less than 110g/L.

(f) Defined as below minus two standard deviations from mean height for age of reference population.

(g) Defined as below minus two standard deviations from mean weight for age of reference population.

(h) Defined as below minus two standard deviations from mean weight for height of reference population.

(i) Defined as equal to or greater than the 95th percentile in relation to Body Mass Index (BMI)-for-age relative to the reference population.

(j) In some but not all of the form versions, this was defined as one or more cigarettes per day.

(k) In most but not all of the form versions, the question referred to a 'regular' smoker in the household.

Note: Excludes non-standard CHC forms.

Source: AIHW analysis of NTER CHCI Child Health Check data entered as at 17 October 2008.

Table A4.2: Health conditions in Arnhem region, Indigenous Australian children who had a NTER Child Health Check

Health condition	Age range (years)	Yes (%)	No (%)	Unsure (%)	Missing (%)	Total (%)	Total (no.)
Ears and eyes							
Ear disease ^(a)	All	33.6	63.4	0.0	3.1	100.0	2,301
Trachoma ^(b)	6–15	4.0	95.6	0.0	0.3	100.0	595
Visual impairment ^(c)	6–15	0.5	81.5	0.0	18.0	100.0	1,300
Oral health							
Untreated caries	All	48.2	45.7	0.0	6.1	100.0	2,301
Gum disease	All	7.0	86.9	0.0	6.1	100.0	2,301
Other oral health issue	All	3.4	90.5	0.0	6.1	100.0	2,301
Any oral health issue	All	50.2	43.6	0.0	6.1	100.0	2,301
Skin							
Skin sores (4 or more)	All	8.6	88.3	0.0	3.0	100.0	2,301
Scabies	All	8.3	88.6	0.0	3.0	100.0	2,301
Ringworm	All	8.0	89.0	0.0	3.0	100.0	2,301
Cardiac and respiratory							
History of rheumatic heart disease ^(d)	All	1.1	88.2	5.7	5.0	100.0	2,301
History of asthma	All	5.1	83.2	5.5	6.2	100.0	2,301
History of recurrent chest infection	All	35.8	54.2	5.5	4.6	100.0	2,301
Anaemia							
Anaemia ^(e)	All	16.6	70.7	0.0	12.7	100.0	2,301
Physical growth							
Stunting ^(f)	All	5.4	89.3	0.0	5.3	100.0	2,301
Underweight ^(g)	All	13.3	83.3	0.0	3.3	100.0	2,301
Wasting ^(h)	0–4	13.1	80.5	0.0	6.4	100.0	810
Overweight ⁽ⁱ⁾	2–15	1.8	92.2	0.0	6.0	100.0	2,006
SIDS risk factors							
Prone sleeping	Less than 1	34.4	47.8	3.2	14.6	100.0	157
Soft sleeping surfaces and loose bedding	Less than 1	39.5	43.3	2.5	14.6	100.0	157
Overheating	Less than 1	18.5	60.5	4.5	16.6	100.0	157
Bed sharing	Less than 1	73.2	12.1	0.0	14.6	100.0	157

(continued)

Table A4.2 (continued): Health conditions in Arnhem region, Indigenous Australian children who had a NTER Child Health Check

Health condition	Age range (years)	Yes (%)	No (%)	Unsure (%)	Missing (%)	Total (%)	Total (no.)
Other							
Regular smoker ^(j)	12–15	8.1	88.7	1.2	2.0	100.0	346
Smoker in household ^(k)	All	85.8	12.2	0.1	1.8	100.0	2,301
Immunisation due	All	19.1	72.8	1.6	6.6	100.0	2,301

(a) Defined as having symptoms (e.g. perforation, bulging) or a diagnosis (e.g. otitis media, otitis externa) of ear disease in at least one ear.

(b) Includes only those children who are known to have been screened for trachoma as part of the CHC (i.e. 51% of children in the age range).

(c) Defined as having a visual acuity score of less than '6/12' in at least one eye.

(d) This question was not included in one of the versions of the Child Health Check form.

(e) Defined as a haemoglobin (Hb) level less than 110g/L.

(f) Defined as below minus two standard deviations from mean height for age of reference population.

(g) Defined as below minus two standard deviations from mean weight for age of reference population.

(h) Defined as below minus two standard deviations from mean weight for height of reference population.

(i) Defined as equal to or greater than the 95th percentile in relation to Body Mass Index (BMI)-for-age relative to the reference population.

(j) In some but not all of the form versions, this was defined as one or more cigarettes per day.

(k) In most but not all of the form versions, the question referred to a 'regular' smoker in the household.

Note: Excludes non-standard CHC forms.

Source: AIHW analysis of NTER CHCI Child Health Check data entered as at 17 October 2008.

Table A4.3: Health conditions in Barkly and Katherine regions, Indigenous Australian children who had a NTER Child Health Check

Health condition	Age range (years)	Yes (%)	No (%)	Unsure (%)	Missing (%)	Total (%)	Total (no.)
Ears and eyes							
Ear disease ^(a)	All	29.6	69.3	0.0	1.2	100.0	1,714
Trachoma ^(b)	6–15	13.2	85.1	0.0	1.7	100.0	589
Visual impairment ^(c)	6–15	1.0	93.9	0.0	5.1	100.0	922
Oral health							
Untreated caries	All	38.7	57.9	0.4	3.0	100.0	1,714
Gum disease	All	7.8	88.5	0.4	3.3	100.0	1,714
Other oral health issue	All	6.8	89.8	0.0	3.4	100.0	1,714
Any oral health issue	All	44.9	51.7	0.0	3.4	100.0	1,714
Skin							
Skin sores (4 or more)	All	9.9	89.3	0.0	0.9	100.0	1,714
Scabies	All	5.7	93.4	0.0	0.9	100.0	1,714
Ringworm	All	5.5	93.6	0.0	0.9	100.0	1,714
Cardiac and respiratory							
History of rheumatic heart disease ^(d)	All	1.1	89.4	6.2	3.2	100.0	1,714
History of asthma	All	5.7	83.8	6.8	3.7	100.0	1,714
History of recurrent chest infection	All	33.0	57.2	6.7	3.2	100.0	1,714
Anaemia							
Anaemia ^(e)	All	15.9	77.7	0.0	6.4	100.0	1,714
Physical growth							
Stunting ^(f)	All	3.4	90.4	0.0	6.2	100.0	1,714
Underweight ^(g)	All	6.0	88.8	0.0	5.2	100.0	1,714
Wasting ^(h)	0–4	5.5	86.2	0.0	8.3	100.0	638
Overweight ⁽ⁱ⁾	2–15	5.7	88.8	0.0	5.5	100.0	1,447
SIDS risk factors							
Prone sleeping	Less than 1	22.9	61.8	4.2	11.1	100.0	144
Soft sleeping surfaces and loose bedding	Less than 1	34.7	49.3	3.5	12.5	100.0	144
Overheating	Less than 1	13.9	69.4	6.3	10.4	100.0	144
Bed sharing	Less than 1	78.5	10.4	0.7	10.4	100.0	144

(continued)

Table A4.3 (continued): Health conditions in Barkly and Katherine regions, Indigenous Australian children who had a NTER Child Health Check

Health condition	Age range (years)	Yes (%)	No (%)	Unsure (%)	Missing (%)	Total (%)	Total (no.)
Other							
Regular smoker ^(j)	12–15	9.8	85.8	1.2	3.1	100.0	254
Smoker in household ^(k)	All	74.8	23.7	0.4	1.1	100.0	1,714
Immunisation due	All	15.6	78.6	3.6	2.2	100.0	1,714

- (a) Defined as having symptoms (e.g. perforation, bulging) or a diagnosis (e.g. otitis media, otitis externa) of ear disease in at least one ear.
- (b) Includes only those children who are known to have been screened for trachoma as part of the CHC (i.e. 51% of children in the age range).
- (c) Defined as having a visual acuity score of less than '6/12' in at least one eye.
- (d) This question was not included in one of the versions of the Child Health Check form.
- (e) Defined as a haemoglobin (Hb) level less than 110g/L.
- (f) Defined as below minus two standard deviations from mean height for age of reference population.
- (g) Defined as below minus two standard deviations from mean weight for age of reference population.
- (h) Defined as below minus two standard deviations from mean weight for height of reference population.
- (i) Defined as equal to or greater than the 95th percentile in relation to Body Mass Index (BMI)-for-age relative to the reference population.
- (j) In some but not all of the form versions, this was defined as one or more cigarettes per day.
- (k) In most but not all of the form versions, the question referred to a 'regular' smoker in the household.

Note: Excludes non-standard CHC forms.

Source: AIHW analysis of NTER CHCI Child Health Check data entered as at 17 October 2008.

Table A4.4: Health conditions in Darwin Rural region, Indigenous Australian children who had a NTER Child Health Check

Health condition	Age range (years)	Yes (%)	No (%)	Unsure (%)	Missing (%)	Total (%)	Total (no.)
Ears and eyes							
Ear disease ^(a)	All	23.8	74.0	0.0	2.2	100.0	2,487
Trachoma ^(b)	6–15	6.0	93.7	0.0	0.4	100.0	537
Visual impairment ^(c)	6–15	0.6	89.4	0.0	9.9	100.0	1,411
Oral health							
Untreated caries	All	40.6	54.5	0.0	4.9	100.0	2,487
Gum disease	All	5.3	89.9	0.0	4.8	100.0	2,487
Other oral health issue	All	3.1	91.9	0.0	5.0	100.0	2,487
Any oral health issue	All	43.0	52.2	0.0	4.9	100.0	2,487
Skin							
Skin sores (4 or more)	All	12.3	85.8	0.0	2.0	100.0	2,487
Scabies	All	11.5	86.6	0.0	1.9	100.0	2,487
Ringworm	All	7.4	90.5	0.0	2.1	100.0	2,487
Cardiac and respiratory							
History of rheumatic heart disease ^(d)	All	1.2	90.4	4.8	3.5	100.0	2,487
History of asthma	All	7.9	84.8	3.4	3.9	100.0	2,487
History of recurrent chest infection	All	46.8	47.3	2.7	3.2	100.0	2,487
Anaemia							
Anaemia ^(e)	All	14.2	79.7	0.0	6.2	100.0	2,487
Physical growth							
Stunting ^(f)	All	4.5	91.8	0.0	3.7	100.0	2,487
Underweight ^(g)	All	12.2	85.8	0.0	2.0	100.0	2,487
Wasting ^(h)	0–4	12.4	82.0	0.0	5.6	100.0	863
Overweight ⁽ⁱ⁾	2–15	4.0	91.8	0.0	4.2	100.0	2,166
SIDS risk factors							
Prone sleeping	Less than 1	28.2	58.8	2.3	10.7	100.0	131
Soft sleeping surfaces and loose bedding	Less than 1	35.9	51.9	1.5	10.7	100.0	131
Overheating	Less than 1	15.3	70.2	3.8	10.7	100.0	131
Bed sharing	Less than 1	69.5	19.1	0.8	10.7	100.0	131

(continued)

Table A4.4 (continued): Health conditions in Darwin Rural region, Indigenous Australian children who had a NTER Child Health Check

Health condition	Age range (years)	Yes (%)	No (%)	Unsure (%)	Missing (%)	Total (%)	Total (no.)
Other							
Regular smoker ^(j)	12–15	6.3	87.3	0.5	6.0	100.0	400
Smoker in household ^(k)	All	83.0	15.6	0.3	1.1	100.0	2,487
Immunisation due	All	15.7	77.6	1.9	4.9	100.0	2,487

- (a) Defined as having symptoms (e.g. perforation, bulging) or a diagnosis (e.g. otitis media, otitis externa) of ear disease in at least one ear.
- (b) Includes only those children who are known to have been screened for trachoma as part of the CHC (i.e. 51% of children in the age range).
- (c) Defined as having a visual acuity score of less than '6/12' in at least one eye.
- (d) This question was not included in one of the versions of the Child Health Check form.
- (e) Defined as a haemoglobin (Hb) level less than 110g/L.
- (f) Defined as below minus two standard deviations from mean height for age of reference population.
- (g) Defined as below minus two standard deviations from mean weight for age of reference population.
- (h) Defined as below minus two standard deviations from mean weight for height of reference population.
- (i) Defined as equal to or greater than the 95th percentile in relation to Body Mass Index (BMI)-for-age relative to the reference population.
- (j) In some but not all of the form versions, this was defined as one or more cigarettes per day.
- (k) In most but not all of the form versions, the question referred to a 'regular' smoker in the household.

Note: Excludes non-standard CHC forms.

Source: AIHW analysis of NTER CHCI Child Health Check data entered as at 17 October 2008.

Appendix 5: Referrals and vaccinations from CHCs by region

Table A5.1: Referrals and vaccinations in Central Australia, Indigenous Australian children who had a NTER Child Health Check

Type of referral or vaccination	Yes (%)	No (%)	Missing (%)	Total (%)	Total (no.)
Referrals					
Primary Health Care clinic follow-up	37.1	48.6	14.3	100.0	2,495
Paediatrician	9.9	67.9	22.2	100.0	2,495
Dental	29.0	48.8	22.2	100.0	2,495
Ear, Nose and Throat (ENT)	10.2	67.6	22.2	100.0	2,495
Tympanometry and audiology	17.3	60.4	22.2	100.0	2,495
Optometrist or ophthalmologist	1.6	76.2	22.2	100.0	2,495
Mental health services	0.5	68.7	30.8	100.0	2,495
Drug and alcohol	0.0	69.1	30.9	100.0	2,495
Occupational therapist	0.1	69.1	30.9	100.0	2,495
Speech therapist	0.4	68.7	30.9	100.0	2,495
Physiotherapist	0.0	69.1	30.9	100.0	2,495
Cardiologist	0.5	77.3	22.2	100.0	2,495
Cardiac investigations	3.7	74.1	22.2	100.0	2,495
Radiology investigations	0.5	77.3	22.2	100.0	2,495
Pathology investigations	1.3	76.5	22.2	100.0	2,495
Dietician or nutritionist	0.6	77.2	22.2	100.0	2,495
Surgeon	0.5	77.3	22.2	100.0	2,495
Emergency department or hospital	0.3	77.5	22.2	100.0	2,495
Social worker	0.6	77.2	22.2	100.0	2,495
Family and Community Services (FACS)	1.1	76.6	22.2	100.0	2,495
Other referral ^(a)	1.1	76.7	22.2	100.0	2,495
Any referral ^(b)	67.9	16.2	15.9	100.0	2,495
Treatment					
Provision of vaccination during health check	8.3	69.7	22.0	100.0	2,495

(a) Includes responses such as gynaecologist, obstetrics, dermatologist, prosthetic department, podiatrist and paediatric liaison nurse.

(b) Defined as having one or more referrals for any of the above-mentioned services.

Source: AIHW analysis of the NTER CHCI Child Health Check data entered as at 17 October 2008.

Table A5.2: Referrals and vaccinations in Arnhem region, Indigenous Australian children who had a NTER Child Health Check

Type of referral or vaccination	Yes (%)	No (%)	Missing (%)	Total (%)	Total (no.)
Referrals					
Primary Health Care clinic follow-up	39.1	48.5	12.4	100.0	2,301
Paediatrician	13.5	54.2	32.3	100.0	2,301
Dental	38.4	29.4	32.2	100.0	2,301
Ear, Nose and Throat (ENT)	9.5	58.2	32.3	100.0	2,301
Tympanometry and audiology	9.7	57.9	32.3	100.0	2,301
Optometrist or ophthalmologist	0.8	66.8	32.3	100.0	2,301
Mental health services	0.1	67.5	32.4	100.0	2,301
Drug and alcohol	0.0	67.7	32.3	100.0	2,301
Occupational therapist	0.0	67.6	32.3	100.0	2,301
Speech therapist	0.3	67.4	32.3	100.0	2,301
Physiotherapist	0.0	67.6	32.3	100.0	2,301
Cardiologist	0.5	67.7	31.9	100.0	2,301
Cardiac investigations	3.0	65.1	31.9	100.0	2,301
Radiology investigations	0.1	68.0	31.9	100.0	2,301
Pathology investigations	3.1	65.1	31.9	100.0	2,301
Dietician or nutritionist	0.1	68.1	31.9	100.0	2,301
Surgeon	0.2	67.9	31.9	100.0	2,301
Emergency department or hospital	0.1	68.0	31.9	100.0	2,301
Social worker	0.1	67.5	32.3	100.0	2,301
Family and Community Services (FACS)	0.3	67.3	32.3	100.0	2,301
Other referral ^(a)	0.1	68.1	31.9	100.0	2,301
Any referral ^(b)	70.4	6.6	23.0	100.0	2,301
Treatment					
Provision of vaccination during health check	5.7	70.8	23.5	100.0	2,301

(a) Includes responses such as gynaecologist, obstetrics, dermatologist, prosthetic department, podiatrist and paediatric liaison nurse.

(b) Defined as having one or more referrals for any of the above-mentioned services.

Source: AIHW analysis of the NTER CHCI Child Health Check data entered as at 17 October 2008.

Table A5.3: Referrals and vaccinations in Barkly and Katherine regions, Indigenous Australian children who had a NTER Child Health Check

Type of referral or vaccination	Yes (%)	No (%)	Missing (%)	Total (%)	Total (no.)
Referrals					
Primary Health Care clinic follow-up	45.0	49.9	5.1	100.0	1,714
Paediatrician	13.5	73.6	12.9	100.0	1,714
Dental	39.8	47.3	12.9	100.0	1,714
Ear, Nose and Throat (ENT)	9.7	77.4	12.9	100.0	1,714
Tympanometry and audiology	19.3	67.9	12.9	100.0	1,714
Optometrist or ophthalmologist	1.9	85.2	12.9	100.0	1,714
Mental health services	0.4	86.8	12.9	100.0	1,714
Drug and alcohol	0.0	87.1	12.9	100.0	1,714
Occupational therapist	0.1	87.0	12.9	100.0	1,714
Speech therapist	0.8	86.3	12.9	100.0	1,714
Physiotherapist	0.3	86.8	12.9	100.0	1,714
Cardiologist	0.4	87.2	12.4	100.0	1,714
Cardiac investigations	4.5	83.1	12.4	100.0	1,714
Radiology investigations	0.5	87.0	12.4	100.0	1,714
Pathology investigations	2.6	84.9	12.4	100.0	1,714
Dietician or nutritionist	1.6	86.0	12.4	100.0	1,714
Surgeon	0.5	87.1	12.4	100.0	1,714
Emergency department or hospital	0.4	87.2	12.4	100.0	1,714
Social worker	2.5	84.6	12.9	100.0	1,714
Family and Community Services (FACS)	0.7	86.4	12.9	100.0	1,714
Other referral ^(a)	0.3	87.3	12.4	100.0	1,714
Any referral ^(b)	73.6	18.5	7.9	100.0	1,714
Treatment					
Provision of vaccination during health check	6.8	81.5	11.7	100.0	1,714

(a) Includes responses such as gynaecologist, obstetrics, dermatologist, prosthetic department, podiatrist and paediatric liaison nurse.

(b) Defined as having one or more referrals for any of the above-mentioned services.

Source: AIHW analysis of NTER CHCI Child Health Check data entered as at 17 October 2008.

Table A5.4: Referrals and vaccinations in Darwin Rural region, Indigenous Australian children who had a NTER Child Health Check

Type of referral or vaccination	Yes (%)	No (%)	Missing (%)	Total (%)	Total (no.)
Referrals					
Primary Health Care clinic follow-up	36.2	56.9	6.9	100.0	2,487
Paediatrician	12.1	50.0	37.9	100.0	2,487
Dental	33.9	28.2	37.9	100.0	2,487
Ear, Nose and Throat (ENT)	6.4	55.6	37.9	100.0	2,487
Tympanometry and audiology	11.1	51.1	37.9	100.0	2,487
Optometrist or ophthalmologist	0.9	61.1	38.0	100.0	2,487
Mental health services	0.6	61.2	38.2	100.0	2,487
Drug and alcohol	0.0	61.7	38.2	100.0	2,487
Occupational therapist	0.0	61.7	38.2	100.0	2,487
Speech therapist	0.3	61.4	38.2	100.0	2,487
Physiotherapist	0.1	61.7	38.2	100.0	2,487
Cardiologist	0.1	62.2	37.8	100.0	2,487
Cardiac investigations	1.9	60.4	37.8	100.0	2,487
Radiology investigations	0.2	62.1	37.8	100.0	2,487
Pathology investigations	0.8	61.4	37.8	100.0	2,487
Dietician or nutritionist	0.3	62.0	37.8	100.0	2,487
Surgeon	0.4	61.8	37.8	100.0	2,487
Emergency department or hospital	0.1	62.2	37.8	100.0	2,487
Social worker	0.2	61.8	38.0	100.0	2,487
Family and Community Services (FACS)	0.3	61.7	38.0	100.0	2,487
Other referral ^(a)	0.0	62.2	37.8	100.0	2,487
Any referral ^(b)	67.1	7.2	25.7	100.0	2,487
Treatment					
Provision of vaccination during health check	5.5	80.5	14.0	100.0	2,487

(a) Includes responses such as gynaecologist, obstetrics, dermatologist, prosthetic department, podiatrist and paediatric liaison nurse.

(b) Defined as having one or more referrals for any of the above-mentioned services.

Source: AIHW analysis of NTER CHCI Child Health Check data entered as at 17 October 2008.

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