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

Final report on results from the Child Health Check and follow-up data collections

Indigenous Determinants and Outcomes Unit,
Australian Institute of Health and Welfare

Office for Aboriginal and Torres Strait Islander Health,
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Any enquiries about or comments on this publication should be directed to:

Head, Indigenous Determinants and Outcomes unit
Australian Institute of Health and Welfare, GPO Box 570, Canberra ACT 2601
Phone: (02) 6244 1162
Email: publications@aihw.gov.au

Director, Remote Service Development and Evaluation Section, Remote Health Services Development Branch, Department of Health and Ageing
Phone (02) 6289 1050

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

Abbreviations

ABS	Australian Bureau of Statistics
ACCHOs	Aboriginal Community Controlled Health Organisations
AIHW	Australian Institute of Health and Welfare
AMSANT	Aboriginal Medical Services Alliance of the NT
BMI	body mass index
CHC	Child Health Check
CHCI	Child Health Check Initiative
CRANA	Council of Remote Area Nurses of Australia
dB	decibels
DoHA	Department of Health and Ageing
EARHSP	East Arnhem Regional Skin Project
ENT	Ear, Nose and Throat
FACS	Family and Community Services
GAA	Growth Assessment and Action
Hb	haemoglobin
HRN	Hospital Registration Number
HSAK	Northern Territory's Healthy School-Age Kids
ID	Identification
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

Summary

This is the third and final progress report on the Child Health Check Initiative (CHCI). It builds on two previous progress reports published in May and December 2008 and provides further information on the extent to which children who received a Child Health Check (CHC) under the Northern Territory Emergency Response (NTER) received the follow-up services they need. The questions answered in this report include:

1. What proportion of children in NTER prescribed areas who were eligible to receive CHCs actually received these checks?
2. What health conditions were identified among Indigenous children who had CHCs?
3. What health services are needed for Indigenous children in NTER prescribed areas as identified by referrals received at CHCs?
4. To what extent have Indigenous children who had a CHC received the follow-up services they need?
5. What is the extent and type of unmet or continuing need for services among Indigenous children in the prescribed areas?

Key findings

1. Of 16,259 children aged 0–15 years in the prescribed areas of the NTER, 10,605 (65%) had at least one valid CHC between 10 July 2007 and 30 June 2009 for which the AIHW received data. A further 4,000 checks were provided under the Medicare Benefits Schedule, but data on these children are not included in this report.
2. During the health checks, about 97% of children had at least one health condition or risk factor identified and 99% received some form of management for their health conditions. The most common health conditions were oral health problems (43%), ear disease (30%) and skin problems (30%).
3. Over three quarters (76%) of children who had a CHC lived in households where a smoker was present.
4. Among children who had a CHC, 70% received at least one referral for a health condition. The most common referral types were primary health care (39%) and dental (35%).
5. Of 7,797 children who had a complete chart review for their first CHC, 36% required further follow-up for a health condition.
6. There were 3,517 children who received an audiology check and 54% had some hearing loss.
7. There were 3,355 children who received a dental check and 54% had treatment for untreated caries.
8. Comparisons of the data over time show that most health conditions had fairly high to reasonable recovery rates. The appearance of new cases of common conditions in the target population after the first CHC, however, indicates that these conditions continue to highly prevalent among these children. This reinforces the knowledge that improving health outcomes for Indigenous children requires not only short-term treatment of health conditions, but also longer term initiatives to address underlying causes of ill health such as socio-economic disadvantage, housing conditions and education levels.

These findings will inform an evaluation of the Child Health Check Initiative to be completed by June 2010.

Overview

This is the third and final progress report on the Child Health Check Initiative (CHCI), which commenced in July 2007 as part of the Australian Government's Northern Territory Emergency Response (NTER) to the *Little children are sacred* report by the NT Board of Inquiry into the Protection of Aboriginal Children from Sexual Abuse. The CHCI was one component of the health-related measures under the NTER and included funding for CHCs and follow-up service delivery.

The Australian and NT Government's continuing commitment to a number of measures commenced under the NTER is set out in the Closing the Gap in the Northern Territory National Partnership Agreement, which was signed in July 2009.

During 2008–09, funding for CHC Primary Health Care follow-up service delivery was integrated with the Expanding Health Service Delivery Initiative (EHSDI) which commenced on 1 July 2008 and is now funded until 2011–12. Australian Government funding for follow-up dental services commenced in 2007–08 and was also extended until 2011–12. Australian Government-funded hearing and Ear, Nose and Throat (ENT) specialist follow-up commenced in 2007–08. Specialist ENT follow-up care will continue until 2009–10.

Although the CHCI was specifically funded by the Australian Government, the whole health system of the Northern Territory has been involved in the effort to offer Child Health Checks (CHCs) to over 16,000 children in remote communities, and to respond to the large number of referrals generated by those checks.

This report builds on two previous progress reports published in May and December 2008 to provide further information on the extent to which children who received a CHC under the NTER have received the follow-up services they need. The data in the report reflect the continuing transition over the period since December 2008 from a focus on CHCs, to a sustained focus on increased primary health care and specialist service delivery in response to referrals from those checks, as well as the pre-existing unmet need for services.

This report will inform an independent evaluation of the CHCI and the EHSDI which commenced in June 2009 and which will report by June 2010. The evaluation consultants will assess the impact of the CHCI and the EHSDI on the trajectory of the NT health system with regard to child health and primary health care development. The CHCI component of the evaluation will focus on the impacts of the CHCs in terms of coverage, diagnosis of health conditions, effectiveness of follow-up services, and impacts on service delivery, health status and treatment.

The evaluation consultants will draw on this report and other data sources to produce a CHCI interim quantitative evaluation report. The final evaluation report will then draw together the quantitative and qualitative aspects of the CHCI evaluation, including findings from a small number of case studies. The Evaluation Design Report is available on the Australian Government's Department of Health and Ageing's website at www.health.gov.au.

The evaluation is being conducted within scope of an agreement to undertake monitoring and evaluation activity relating to the expansion and reform of the Northern Territory primary health care system, endorsed by the NT Aboriginal Health Forum partners. These are the Northern Territory Department of Health and Families, the Aboriginal Medical Services Alliance of the Northern Territory and the Australian Government Department of Health and Ageing.

One key plank of this new system—the Northern Territory Aboriginal Health Key Performance Indicators—has reached its first milestone, with the vast majority of primary health care providers in the jurisdiction reporting against 12 indicators between August and October 2009. These data will play an important role in monitoring key aspects of the primary health care system. Public reporting of these data will be possible once the data are of sufficient quality.

Data quality

The data in this report come from the following five data sources used to monitor the implementation and impact of the CHCI:

- the Child Health Check data collection
- the Chart Review data collection
- the Audiology data collection
- the Dental data collection
- the Northern Territory Department of Health and Families data warehouse.

Information about each data source is provided at the start of the relevant chapter. There are important differences between the five sources of data available that need to be considered when interpreting the data.

The report includes data available to the Australian Institute of Health and Welfare (AIHW) on services provided up to 30 June 2009. Due to time lags in data processing and transmission, this understates the number of services actually provided to children at that point in time.

Data from the CHCs about the proportions of children with various health conditions are not rigorous scientific estimates of disease prevalence. Readers interested in how the CHC data compare with other data sources are directed to Appendix 3 of the May 2008 NTER CHCI progress report. A list of these data sources is given in Appendix 6 of this report.

Progress since the last report

In the 11 months between 17 October 2008 (the data cut-off date for the December progress report) and the analysis cut-off date for services provided up to 30 June 2009, an additional 1,226 valid CHCs had been entered into the NTER CHC database at the AIHW. This is a relatively small number compared with the 9,943 provided in the period from July 2007 to October 2008 because most children in the target group were offered a CHC in that earlier period.

A comparison of data from the December progress report with data in this report shows the following:

- The overall pattern of the most common health conditions and risk factors identified through the CHC remains largely unchanged: 76% of children live in a household with a smoker; 43% have at least one type of oral health condition; 37% have a reported history of recurrent chest infection; 30% have at least one type of skin condition; 30% have ear disease of some kind; and 16% of children have anaemia.

- The pattern of referrals also remains largely unchanged, with 70% of children having at least one referral. Thirty-nine per cent of children were referred to primary health care follow-up; 35% to dental follow-up; 14% to tympanometry and audiology services; 12% to a paediatrician; and 10% to an Ear, Nose and Throat specialist.
- The amount of audiology services delivered more than doubled between the two reports: from 1,323 to 3,517 children who received at least one audiology service; from 1,627 to 4,495 in the number of occasions of service provided; and from 20% to 44% in the proportion of children with an audiology related referral at their CHC who had received at least one audiology check.
- For the 719 children who received more than one audiology check, there were encouraging signs of improvement between their first and latest check.
  - The proportion of children with no hearing loss increased from 25% at the time of their first check to 31% at the time of their latest check.
  - The proportion of children with hearing loss in both ears decreased from 46% at their first check to 42% at their latest check.
  - The proportion of children with a moderate (15%) and mild (29%) degree of hearing impairment at their first check decreased at their latest check (to 11% and 25%, respectively).
- The amount of dental services delivered more than doubled between the two reports: from 1,529 to 3,355 children who received at least one dental service; and from 1,900 to 5,106 in the number of occasions of service provided.
- Thirty-eight per cent of children who were referred for dental care from their CHC had been seen at least once.

It is important to note that NTER CHCI follow-up dental and audiology services are available to all children less than 16 years of age living in the prescribed areas, regardless of whether they had a CHC. Children who were previously identified with an oral health problem or an ear disease, however, were more likely to receive these follow-up services than those who were not identified with such a problem. This indicates that services are appropriately biased towards those children with an identified need.

The follow-up services required by children who had a CHC go well beyond the primary health care, hearing and dental services funded by the Australian Government under the NTER. Data from the NT DHF show that 1,526 children who had a CHC referral had received 3,485 hospital services by 30 June 2009, mainly in outpatient clinics but including paediatrician, internal medicine, ENT, orthopaedic, optometrist and allied health services.

Some of these services could have been as a result of a direct referral from a CHC, or as a result of referrals initially made to a primary care provider that subsequently led to secondary and tertiary services. In addition, some of these services may have been unrelated to a specific referral from a CHC or conditions identified during a CHC.

Each of the data collections indicate that children have a continuing high need for services, even after receiving some form of follow-up care. In the CHC collection, there are 159 children who have had two child health checks. Although the numbers are too small to draw strong conclusions, when the results are compared across the two checks, the rate of recovery from the health conditions found at the first check seems reasonable. For example, 91% of skin sores and 74% of anaemia had resolved between checks. The overall prevalence of ear disease and oral health problems among the children at the second check, however, remained largely unchanged because of the appearance of the same conditions in different children.

A need for continuing follow-up care was also identified for 76% of children who had an audiology check and 35% of children who had a dental check. When the Chart Review collection is also considered, almost half the children (46%) received an additional referral for follow-up services after their initial round of referrals at their Child Health Check. These new referrals were for a familiar pattern of conditions with ear disease, oral health, skin conditions, anaemia and growth problems being the most common. At the time of the completion of the chart review process, 36% (2,820) of children had conditions requiring further action with dental, primary health care, audiology and ENT services at the top of the list.

Conclusions

When the status of follow-up for children who had referrals from their Child Health Check is considered as a whole, three conclusions may be drawn.

First, a large volume of follow-up services—particularly primary health care, dental and audiology service—have been provided to thousands of children living in some of the most remote areas of Australia. This has required a major expansion of all aspects of service delivery from physical infrastructure such as hearing booths and clinics, to workforce recruitment and training, to logistics and accommodation. The Australian Government Department of Health and Ageing will continue to monitor dental and ENT follow-up as part of the Closing the Gap Northern Territory National Partnership Agreement.

Second, there was a considerable number of outstanding referrals from CHCs at 30 June 2009, though many of checks were completed more than 12 months previously. This underlines a continuing need for capacity building for high-demand, specialised services (dental care, paediatric specialist services and Ear Nose and Throat specialist services), as well as lower-demand specialised services (speech therapy and ophthalmology).

The third conclusion relates to the continuing high need for services among children who had received at least some form of follow-up care by 30 June 2009. This high level of continuing need, despite the delivery of various forms of initial follow-up care, underlines the need for long-term expansion in health care services in the Northern Territory and the challenge of turning investment into improved health outcomes for Indigenous children. However, difficulties in reducing the prevalence of many health conditions point to the need to address broader social determinants of health - education, employment, income, housing, nutrition, tobacco and alcohol use.

This report is the third and final in this series of CHCI progress reports. The transition to a sustainable, long-term approach to monitoring and reporting on primary health care system performance is underway as part of a long term plan for system reform in the Northern Territory. This is proceeding under the Northern Territory Aboriginal Health Forum and its partner organisations: the Northern Territory Department of Health and Families, the Aboriginal Medical Services Alliance of the Northern Territory and the Australian Government Department of Health and Ageing.

The Child Health Check Initiative and the Expanding Health Service Delivery Initiative are being independently evaluated during 2009–10 with a final evaluation report due in June 2010. This evaluation will inform future monitoring and evaluation activity.

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. The NTER involved a wide range of measures that are designed to protect children and make communities safe, as well as create a better future for Aboriginal people in the Northern Territory (FAHCSIA 2009).

Continuing Australian and Northern Territory Government commitment to a number of the measures commenced under the NTER is set out in the Closing the Gap in the Northern Territory National Partnership Agreement, signed in July 2009. The Agreement commits the NTER to a 3-year development phase and includes:

- continuation of the expanded primary health care services initiatives
- providing ear and hearing services, in particular, the completion of Ear, Nose and Throat specialist care
- continuing follow-up dental care for children
- substantially strengthening the Mobile Outreach Service to address child abuse-related trauma (not included in this report).

The CHCI was one component of the health-related measures under the NTER. It included:

- Child Health Check teams deployed by the Australian Government during 2007–08
- funding for the Northern Territory Government Department of Health and Families (NT DHF) to provide CHCs, follow-up primary health care (PHC) and follow-up ear health and dental health services
- funding for Aboriginal Community Controlled Health Organisations (ACCHOs) to provide Child Health Checks, follow-up primary health care and, in a limited number of locations, follow-up dental health services
- capital works to provide additional clinic and staff accommodation.

The CHCI was initially focused on the roll-out of CHCs, and subsequently evolved into a program of follow-up service delivery (phase 2). 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). Although 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 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 roll-out 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.

The 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

- the Dental data collection.

The data collection forms used by health services to record information for these collections were created by the Department of Health and Ageing (DoHA) in consultation with the 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 released (DoHA 2008a). 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 that report. In December 2008, a second progress report containing information from all four data collections was released, including updated information on the outcomes of the CHCs and details on the key findings from the three follow-up collections (DoHA & AIHW 2008b). The December 2008 report covered the period between July 2007 and mid-October 2008.

This report presents information from the NTER CHCI data collections over the period from 10 July 2007 to 30 June 2009 (with the exception of the Chart Review collection, where information is presented up to 2 November 2009). It presents the most recent information on children's health conditions based on their latest CHCs, audiology checks and dental checks. In addition, because a number of children have received more than one CHC since last year, changes in health conditions over time are able to be traced by comparing information from their first check with their most recent check. This report also provides updated information on the follow-up care that was provided to children who received referrals at their CHC.

This introduction presents background information about the CHCI data collection including an overview of their content and some discussion of data limitations affecting interpretation of findings.

1.1 Measurement of the coverage of Child Health Checks

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. The initial figure used in May 2008 analyses was 17,182 children. However, based on advice from the Australian Bureau of Statistics (ABS), this estimate was revised to 16,259 after the first progress report was published, and this figure was used for the second progress report. It is expected that this population may have been changed since then as new children without a CHC are coming into the population and older children with a CHC are moving out. However, because it is difficult to quantify the exact scope of such changes, this report still used 16,259 as the estimated total population who are eligible for receiving a health check.

The second figure is the number of checks performed. Because it is 2 years since the commencement of the NTER CHCs, many of the initial checks occurred some time ago and their clinical relevance has declined. Coverage is therefore estimated using the number of checks that have occurred within the last 15 months.

As at 30 June 2009, an estimated total of over 14,000 valid health checks have been performed through the NTER and Medicare Benefit Scheme (MBS) Item 708 health checks since the CHCI was commenced on 10 July 2007. CHC coverage peaked at 74% in November 2008 and counts checks conducted between 1 August 2007 and 30 November 2008. The estimated CHC coverage as at 30 June 2009 is 33% for last 15 months (from April 2008 to June 2009). This coverage figure counts only one CHC per child. This figure does not include other types of wellness checks provided to children in the prescribed areas, such as the Healthy School Aged Kids (HSAK) checks and the Healthy Under 5 Kids Program (incorporating the former Growth Assessment and Action, or GAA program).

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

1.2 Overview of the data collections

A summary of the key characteristics of the four data collections that are part of the NTER CHCI is provided in Table 1.1.

Table 1.1: Overview of the AIHW CHCI data collections

	Child Health Check data collection	Chart Review data collection[(a)]	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 early follow-up phase of the NTER CHCI and identified no follow-up actions)	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)

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

As part of the follow-up care, chart reviews are being conducted for those children who had a NTER CHC. These chart reviews capture information about follow-up care that has been received since the child had a CHC and any outstanding referral 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 children living in the prescribed areas of the NT who are aged 15 years or less[1]. Although many children are given a referral to these services at a CHC, others are referred for these services through existing primary health care services or from some other point of referral within the NT health system.

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 ability to transmit CHC data electronically is available. Information for the Chart Review data and Audiology data collections are provided to the AIHW via paper forms, while information for the Dental collection has been provided in either electronic or paper form.

1.3 Linkage of CHCI data with other data collections

The four CHCI data collections maintained by the AIHW provide a valuable source of information on the extent of health checks and follow-up care provided to Indigenous children under the NTER. However, it is recognised that not all follow-up services provided to children who had a CHC are captured across the three CHCI follow-up collections. In order to identify these additional follow-up services, the AIHW conducted a round of data linkage with the NT DHF hospital service records in September 2009 as described in Chapter 6.

1.4 Data purpose, quality and limitations

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.

1.4.1 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 the AIHW. In summary, the evaluation aims to measure some components of the implementation of the NTER CHCI and, as far as

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[1] Because 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 aged 15 years at the time of the CHC.

possible, its impact on and outcomes for the target population. More specifically, the evaluation aims to achieve the following objectives:

1. Assess the extent to which the CHCs reached the target population.
2. Identify the prevalence of health conditions among children living in the prescribed areas of the NTER who volunteered for a CHC.
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. the health status of children in relation to the social determinants of health and access to comprehensive primary health care
    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.

1.4.2 Data collection and quality

As detailed more fully in previous progress reports, particularly the May 2008 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.

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 the tables presented in this report.

1.4.3 Interpretation and data limitations

There were several items included in the CHC that are not reported on here because of high levels of missing data and difficulties in assessing the validity of the data collected. These include mental health and sexual health issues in adolescents. This limits the scope of issues identified through the CHC.

The most crucial point to note is that the children who received CHCs and follow-up services are not a random sample of children living in the Northern Territory. They are a group of Indigenous 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. It must therefore be emphasised that the rates of health conditions presented in this report relate specifically to this subset of the population, and are not equivalent to the prevalence rates of these conditions among all Indigenous children in the NT, or all children in the prescribed areas of the NTER. At this stage, broader prevalence rates cannot be calculated from the CHCI data because nothing is known about the characteristics of children in prescribed areas compared with those not in prescribed areas, or the differences between children whose families volunteered for a CHC and those who did not.

The second point is that, by nature of the collection process, there is an unavoidable lag between date of service provision and date of data receipt. Therefore, there will be a number of services that have been provided to children by this date that have not yet been recorded and received by the AIHW. These services cannot be included in the analyses.

Thirdly, as mentioned above, not all children who have received a service can be captured in the follow-up databases because of the nature of the collections. The Audiology and Dental data collections capture information on children who have had a check done by a member of a specific audiology or dental team, but services conducted by other providers are not captured.

Many children are also missing from the follow-up data provided in this report owing to lack of clarity in the consent-obtaining protocols. If children or their families have not given consent for their information to be used in unit record form, they cannot be presented by demographic characteristics or referral type, but only in aggregated form. This may limit the usefulness of the information.

The Dental collection, in particular, is more limited than the other collections because of practical difficulties in obtaining the appropriate consent for the transmission of de-identified client-level records to the AIHW. The dental data also lack a measure of oral health status (the number of decayed, missing or filled teeth). These problems are currently being rectified, with more complete data expected to be available in the future.

Because of the data limitations mentioned above, this report is likely to understate the extent of health checks and services provided to children at any particular time.

Finally, the data in each CHCI collection are derived from different data collection processes and, although the same data items may be available from several sources (i.e. the Chart Review collection has data items that can cross reference some data from the Dental, Audiology and NT DHF data collections), none of the collections are sufficiently complete for these data to be reconciled at this point in time. For this reason, the focus of analysis in this report is on the general trends and patterns of service delivery. The December 2008 report noted the preliminary nature of the analysis presented there and caution is urged in making comparisons between that report and the current report.

The limitations that apply to each data collection are discussed in more detail in subsequent chapters, as well as in Appendix 2.

1.4.4 Comparisons with other data sources

There are several other data sources that cover similar topics to the CHCI collections. These data sources often differ from the CHC data collection in many critical aspects, such as methodology, study population, time period, age groups, geographic areas, and the definitions and classification of diseases. A comparison between the results of CHC data and other studies are helpful for validating the health problems identified through the CHCI. A list of these studies can be found in Appendix 6.

1.5 Report overview and structure

This report presents updated information on children who had CHCs and the extent of follow-up audiology and dental care they received up until 30 June 2009. In addition, information provided to the AIHW by the NT DHF on children who had received other health services following their CHC is also presented. The report provides information to answer key questions such as:

- What proportion of children in NTER prescribed areas who were eligible to receive CHCs actually received these checks?
- What health conditions were identified among Indigenous children who were seen at CHCs?
- What health services are needed for Indigenous children in NTER prescribed areas as identified by referrals received at CHCs?
- To what extent have Indigenous children who had a CHC received the follow-up services they need?
- What is the extent and type of unmet or continuing need for services among Indigenous children in the prescribed areas?

The current report follows a structure similar to that of the second progress report. 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 any changes over time. The chapter also examines health management activities conducted during the CHCs, including referrals made to follow-up services.
- Chapter 3 presents information on follow-up services based on the information from the Chart Review data collection.
- 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.
- Chapter 6 presents information on follow-up services provided by hospital services.

At the end of each chapter, a discussion brings out the main points, along with some policy implications. The report also includes the following appendixes:

- Appendix 1: a map of the regions covered by the NTER CHCI;
- Appendix 2: data quality issues that may affect the interpretation of information presented from each data collection ;
- Appendix 3: region-specific results on health conditions;
- Appendix 4: region-specific referrals from the CHC data collection;
- Appendix 5: how to select records and count referrals of children in CHC and Chart Review databases for analysis of follow-up care for children;
- Appendix 6: a description of other similar studies;

- Appendix 7: Classification on the management of health condition in the CHC;
- Appendix 8: The latest versions of the data collection forms.

2 Child Health Check data collection

2.1 Introduction

The Child Health Check data collection was created in order to manage and analyse information recorded at CHCs funded through the Northern Territory Emergency Response. NTER CHCs were modelled on existing MBS 708 health checks, which were introduced across Australia in May 2006 and have continued in parallel with the NTER CHCs. The first of the NTER CHCs was undertaken in mid-July 2007 and they were available to children until the end of June 2009. Children are eligible to receive a CHC or MBS 708 health check every 9 months.

The MBS 708 CHC was designed to encourage doctors to carry out regular and comprehensive checks of Indigenous children to enable early detection of disease. In the Northern Territory, wellness checks for Indigenous children were already conducted through the GAA checks, which target children less than 5 years of age, and the Healthy School-Age Kids (HSAK) checks. These checks differ from the MBS 708 Child Health Check in various ways including the scope of items covered and in the role played by doctors.

In March 2009, the NT DHF began piloting a new targeted approach to children in their first years called the 'Healthy Under 5 Kids' program for remote areas. The aim of the new program is to ensure early detection and early intervention of potential health problems, while engaging parents in partnership for the care of their children. The program has been developed in such a way that doctors are engaged in seeing healthy children, rather than only when they become ill. The timing of the involvement of doctors has been designed to coincide at developmentally significant times that also meet the minimum timing for the MBS 708 Child Health Checks.

The HSAK program occurs at various times throughout the year and has a screening component. Although some of the screening components meet the requirements of the MBS 708 Child Health Checks, they do not meet all the mandatory requirements particularly in relation to the involvement of doctors.

One of the ACCHOs has also developed a new health check program that is conducted by clinical staff in remote community clinics. The program has a focus on developmental assessments and ensuring that children are reaching their age appropriate developmental milestones.

The evaluation of the NTER CHCI will inform the continuing evolution of an evidence-based, sustainable approach to child wellness checks. At this time, however, it is not possible to count the number of wellness checks provided to children through these different mechanisms or to compare the results or measure overall coverage. The information presented in this report needs to be considered in this light.

This chapter reports on updated key findings from the CHC data collection as at 30 June 2009. An analysis cut-off date falling several months later, at 18 September 2009, was chosen to allow time for most of the final CHCs to be recorded in the data collection. The following sections provide information on the number of NTER CHC forms received and processed and the demographic characteristics of children they represent. The chapter then presents summary information on the number and types of health conditions identified during the

CHCs, how these conditions were managed or treated in the course of the CHC, and whether children were referred to specialists or for further treatment. A regional breakdown of these findings is also provided in Appendices 3 and 4 of the report.

2.2 Information about the data collection

Information collected at most CHCs was recorded on a standard questionnaire created specifically for NTER CHCs, although some communities used non-standard forms. Almost all CHC forms sent to the AIHW were paper-based and were manually entered into the CHC database.

The 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.

Some of the key data items included in the CHC collection are:

- variables identifying the child, including Hospital Registration Number (HRN), sex, and date of birth and/or age
- variables relating to the CHC event, including community identification number and date of check
- data items relating to developmental and social environment of the child
- data items describing immunisation status, current and previous health conditions, risk factors and results from a full medical examination at the time of the CHC
- variables relating to treatment, advice and referrals given at the time of the CHC.

2.3 Data interpretation and limitations

The data presented in this chapter relate to a very specific subset of the Northern Territory children (Indigenous children within the prescribed NTER areas who volunteered for a CHC). The checks were voluntary and children who participated are not likely to be representative of all Indigenous children living in the NT.

The figures in this report are also not a substitute for estimates of prevalence derived from rigorous scientific research. The data included in the CHC collection are a by-product of a clinical process, the aim of which was to detect, treat or refer children for clinically significant problems rather than to establish a definitive measure of disease prevalence in the population.

The extent of missing data should be taken into account when interpreting the data. The number of missing cases is included in the denominator when calculating rates, which means that these rates represent a minimum level and may understate the true prevalence of the conditions and referrals.

It is important to note that detection of diseases can be influenced by several factors such as the cooperation of children during the check, the doctor's knowledge on particular diseases and the availability of medical equipment for testing. Constrained by these factors, the diagnosis on some diseases in the CHCs may not be reliable. This is especially true for ear diseases because the diagnosis of some common types of ear diseases requires the medical equipment 'tympanometry', which was not always available to doctors who conducted the CHCs. The audiology data collection (Chapter 4) provides more accurate picture on ear disease which was determined by Audiologist through the audiology tests.

CHC forms do not include information about existing referrals a child may have at the time of their health check. Therefore any discrepancy between the number of children diagnosed with particular health conditions and the number referred to relevant follow-up services for those conditions (which may be lower) 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.

Lastly, this report may slightly understate the extent of health checks provided to children due to delays between delivery of a service and the recording of that service in the collection. There may be a small number of checks performed by 30 June 2009 that had not been recorded in the collection by the analysis cut-off date, and therefore could not be reported here. This is, however, unlikely to significantly affect health condition rates. Further discussion of data quality and its impact on interpretation can be found in Appendix 2.

2.4 CHC forms received and processed

Table 2.1 provides information on the number of CHCs performed before 30 June 2009 that had been recorded in the database by the AIHW by the analysis cut-off date. The information is presented by region. These numbers do not include duplicate copies of forms and forms from children outside the applicable age range.

Table 2.1: Number of NTER Child Health Check forms received and processed, by region

	Total CHC forms received[(a)]		Total valid CHCs[(b)] processed	
Region	**Number**	**Per cent**	**Number**	**Per cent**
Central Australia	2,644	22.6	2,557	22.9
Arnhem	2,659	22.7	2,544	22.8
Barkly/Katherine[(c)]	3,561	30.4	3,325	29.8
Darwin Rural[(d)]	2,831	24.2	2,739	24.5
All regions	**11,695**	**100.0**	**11,165**	**100.0**

(a) Excludes duplicate copies of forms and forms from children outside the applicable age range, but includes multiple valid and invalid checks.

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

(c) Includes 1,700 non-standard CHC forms received, 1,653 of which were valid.

(d) Includes 124 non-standard CHC forms received, 112 of which were valid.

Source: AIHW analysis of NTER CHCI Child Health Checks performed on or before 30 June 2009.

The AIHW received 11,695 NTER CHC forms, after excluding duplicates and forms for children who were aged over 15 years. The numbers of CHC forms received for Arnhem, Central Australia and Darwin Rural were fairly similar (between 2,644 and 2,831), while a greater number of forms was received for the combined Barkly/Katherine region (3,561).

As at the analysis cut-off date, all 11,695 CHC forms received had been entered into the CHCI database. However, not all of these forms were classed as 'valid' checks. As mentioned previously, children aged 15 years or less who live in the prescribed areas of the NT are eligible to have CHCs every 9 months, and there are a number of children within the CHC collection who have undertaken multiple checks. Some 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 11,695 CHCs performed before 30 June 2009, 530 were deemed invalid for this reason. Excluding these forms from the analysis resulted in a total of 11,165 valid CHCs in the database.

2.5 Demographic characteristics

2.5.1 Children and coverage by region

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 CHC data collection is a 'child'. Where a child has had more than one CHC, 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.

There were a total of 10,605 children who had received at least one valid CHC (Table 2.2). The proportion of children was fairly evenly spread among the four regional groupings. The region contributing the largest proportion of children was Barkly/Katherine (28%), while the region contributing the smallest proportion was Arnhem (23%).

The estimated coverage of the NTER CHCs by region is shown in Table 2.2. It should be noted that there are significant uncertainties associated with population estimates of Indigenous children in the NT, so estimates of coverage need to be treated with caution. The overall coverage of the NTER CHC was estimated to be 65% of the total population in the regions covered by the CHC. Estimated coverage varied by region with over three-quarters of children (77%) in the Barkly/Katherine region and almost three-quarters of children (73%) in the Arnhem region had a CHC. The proportion for Central Australia was lower (64%), and Darwin Rural (52%) had the lowest proportion of children who had a CHC.

There is a difference between the coverage quoted in the text in Section 1.1 and the coverage indicated in Table 2.2. This is because Table 2.2 uses 'coverage' to describe the number of children who received an NTER CHC from July 2007 to 30 June 2009, whereas the 'coverage' discussed in Chapter 1 relates to the number of children who received a CHC or MBS check over a 15-month period between 1 April 2008 and 30 June 2009.

Table 2.2: Number and proportion of children who had a valid NTER Child Health Check and coverage of NTER CHCs by region

			Coverage of NTER CHCs	
	Total children[a] who had a valid CHC		Total population aged 0–15 years[b]	Proportion of population who had a valid CHC[c]
Region	Number	Per cent	Number	Per cent
Central Australia[d]	2,502	23.6	3,934	63.6
Arnhem	2,462	23.2	3,350	73.5
Barkly/Katherine	2,932	27.6	3,787	77.4
Darwin Rural	2,709	25.5	5,188	52.2
All regions	**10,605**	**100.0**	**16,259**	**65.2**

(a) Includes children for whom a valid Child Health Check form was received.

(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 the DoHA.

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

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

Source: AIHW analysis of NTER CHCI Child Health Checks performed on or before 30 June 2009.

2.5.2 Children by age group and sex

Of the 10,605 children who received at least one valid CHC, 1,232 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 for these children were in a different format to the standard CHC form and only a very limited amount of information from the non-standard forms has been entered into the AIHW's CHC database.

Excluding children whose CHCs were recorded on non-standard forms resulted in a final figure of 9,373 children whose data could be included in analyses. The analyses presented in the remainder of this chapter represent an estimated 58% of the population of 16,259 children in the scope of the NTER CHCI.

Of the 9,373 children for whom one or more valid CHC forms were processed, 45% were aged 0–5 years, 40% were aged 6–11 years and 16% were aged 12–15 years. The data contains a slightly higher proportion of male than female children (51% compared with 48%) (Table 2.3). The number of forms where sex was missing has fallen from nearly 2% for the December 2008 progress report to 0.4% in the current report.

Table 2.3: Indigenous children who had an NTER CHC, by age group and sex

	Number	Per cent
Age group		
0–5 years	4,170	44.5
6–11 years	3,724	39.7
12–15 years	1,479	15.8
Total	**9,373**	**100.0**
Sex		
Male	4,805	51.3
Female	4,531	48.3
Missing	37	0.4
Total	**9,373**	**100.0**

Note: Excludes children with non-standard CHC forms.

Source: AIHW analysis of NTER CHCI Child Health Checks performed on or before 30 June 2009.

2.6 Health conditions and risk factors

This section presents an overview of the number of health conditions identified among Indigenous children included in the scope of the NTER CHCI who had a check on or before 30 June 2009. Where a child has had more than one CHC, only health conditions recorded at the latest check are included in analyses.

It should be noted that the definition and classification of the health conditions used in the CHC database were developed in consultation with the Office for Aboriginal and Torres Strait Islander Health (OATSIH) and medical expertises based on the understanding that clinicians were trained to use the Central Australian Rural Practitioners Association (CARPA) standard treatment manual when providing CHCs. The definitions used in CHC are specified in the footnotes of Table 2.4 and they may differ from those used in other studies.

Over three in four (76%) children aged 0 to 15 years lived in a household where one or more persons smoked. Two in five (40%) children of this age had untreated caries, 37% had a history of recurrent chest infections, 30% had a skin problem and 30% had an identifiable ear disease. Sixteen per cent of children aged 0 to 15 years had anaemia and 15% were due for an immunisation. In addition, 10% of children had four or more skin sores and 9% were underweight (Table 2.4).

Over one-third of infants less than 1 year old (37%) were at risk of SIDS due to loose bedding, while almost one-quarter (24%) were at risk due to prone sleeping, and almost three-quarters (74%) due to bed sharing. The prevalence of the health conditions specified in Table 2.4 is similar to those reported in the May and December 2008 progress reports.

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

Health condition	Relevant age (years)	Number	Per cent
Ears and eyes			
Ear disease[(a)]	All	2,811	30.0
Trachoma[(b)]	6–15	202	7.3
Visual impairment[(c)]	6–15	37	0.7
Oral health			
Untreated caries	All	3,765	40.2
Gum disease	All	507	5.4
Other oral health issue	All	337	3.6
Any oral health issue	All	4,037	43.1
Skin			
Skin sores (four or more)	All	925	9.9
Scabies	All	742	7.9
Any skin problem	All	2,847	30.4
Cardiac and respiratory			
History of rheumatic heart disease[(d)]	All	116	1.3
History of asthma	All	528	5.6
History of recurrent chest infection	All	3,484	37.2
Anaemia			
Anaemia[(e)]	All	1,462	15.6
Physical growth			
Stunting[(f)]	All	381	4.1
Underweight[(g)]	All	861	9.2
Wasting[(h)]	0–4	296	8.7
Overweight[(i)]	2–15	418	5.2
SIDS risk factors			
Prone sleeping	Less than 1	168	23.6
Soft sleeping surfaces and loose bedding	Less than 1	263	37.0
Overheating	Less than 1	118	16.6
Bed sharing	Less than 1	525	73.8
Other			
Regular smoker[(j)]	12–15	107	7.2
Smoker in household[(k)]	All	7,102	75.8
Immunisation due	All	1,444	15.4
Total number of children who had at least one of the above conditions		**9,112**	**97.2**
Total number of children in CHC		**9,373**	**100.0**

(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. 52% 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 110 g/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.

Notes

1. Excludes non-standard CHC forms.
2. For information on the number of children who did not have these health conditions, and the number of uncertain and missing responses to this question, see Table A3.1.

Source: AIHW analysis of NTER CHCI Child Health Checks performed on or before 30 June 2009.

2.7 Management of health conditions and clinical investigations

A key function of the NTER CHCs was not only to identify health conditions in Indigenous children, but also to play a role in beginning to manage those conditions. This was achieved through further testing, on-site treatment and medical procedures, advice, prescriptions, vaccinations and referrals to other professionals. Although information on the management of health conditions is recorded during CHCs, analysing much of the data has been difficult for two reasons:

- the information is recorded in a number of different questions on the CHC form
- the information is provided in free-text format and therefore needed to be coded before it could be analysed.

As such, previous analyses undertaken on the management of health conditions during CHCs, discussed in previous reports on the collection, have been largely restricted to referrals and vaccinations.

To allow for a more comprehensive analysis of the management of health conditions, the AIHW devised an approach to code the relevant free-text information provided on the CHC forms, which is detailed in Appendix 7. All the tests and procedures described in this section were coded using this approach except for haemoglobin and blood sugar levels. These were reported as concentrations, which were entered as numbers into the CHC database. It was assumed that haemoglobin or blood sugar level tests were not administered if no numbers were provided on the form for these tests.

The information in this section covers clinical investigations, vaccinations, medications, medical procedures, health advice and referrals provided to these children.

2.7.1 Overview of the management of health conditions during CHC

Overall, the health conditions of 9,267 (99%) children were managed at their CHC by at least one type of management activity listed in Table 2.5. During the CHC, children were treated on site if they had a mild health conditions. Children with severe health conditions or chronic health conditions were referred to primary health care and medical specialists for further treatment or follow-up. Some children may also have received preventive treatment (such as de-worming medication) and health advice although they may not have been identified as having any health conditions.

About 91% of children received at least one clinical measurement, 70% had at least one referral and 69% received advice. In addition, 53% were treated with medications, 7% received vaccinations, further tests were ordered for 6%, and 4% were treated with a medical procedure. In addition, 69 (1%) children were also prescribed other materials for their health needs, such as a toothbrush, stirrup strapping or hyperfix during the CHC.

Table 2.5: Type of health management received by Indigenous children during the NTER CHC

Type of management	Number of children	Per cent of children who received management
Tests done: clinical measurements	8,568	91.4
Referrals (excluding tests ordered)	6,516	69.5
Health advice given	6,509	69.4
Medications other than vaccinations	4,989	53.2
Vaccinations	626	6.7
Tests ordered	541	5.8
Medical procedures	328	3.5
Other [(a)]	69	0.7
Total children who received at least one type of management [(b)]	**9,267**	**98.9**
Total children who received CHCs	**9,373**	**100.0**

(a) Including prescribing other materials for children health needs, such as a toothbrush, stirrup strapping or hyperfix.

(b) One child can have more than one type of management.

Source: AIHW analysis of NTER CHCI Child Health Checks performed on or before 30 June 2009.

2.7.2 Clinical investigation

Tests done on-site (clinical measurement)

There were 8,568 children (91%) who received at least one test at the time of their health check (Table 2.6). The most common tests performed on-site were haemoglobin tests (91%), blood sugar level tests (28%) and urine tests (24%).

Table 2.6: Children who received a clinical test during a NTER Child Health Check, by test type.

Type of test	Number of children	Per cent of children who received a test[a]
Blood test		
Haemoglobin (Hb)	8,495	90.6
Blood sugar level (BSL)	2,608	27.8
Other blood test	13	0.1
Urine test	2,280	24.3
Audiometry, tympanometry and hearing tests	300	3.2
Microbiological/immunological test	32	0.3
Diagnostic radiology/imaging	6	0.1
Electrocardiogram	<5	0.0
Children who received at least one test	*8,568*	*91.4*
Total children who received CHCs	**9,373**	**100.0**

(a) Each child can have more than one type of test.

Source: AIHW analysis of NTER CHCI Child Health Checks performed on or before 30 June 2009.

Tests ordered (further investigation)

Some children needed further tests to identify their health conditions fully. Further investigation was ordered for 541 children (6%) during their health checks. These included 294 (3%) cardiac investigations, 234 (3%) pathology tests and 28 (less than 1%) radiology examinations (Table 2.7).

Table 2.7: Children for whom further testing was arranged, by test type

Type of investigation arranged	Number of children	Pre cent of children who had a test ordered
Cardiac investigations	294	3.1
Pathology	234	2.5
Radiology	28	0.3
Children for whom further tests were ordered	*541*	*5.8*
Total children who received CHCs	**9,373**	**100.0**

Source: AIHW analysis of NTER CHCI Child Health Checks performed on or before 30 June 2009.

2.7.3 Vaccinations, medications and prescriptions

During their CHC, 4,989 (53%) children were treated with at least one medication (Table 2.8). The most frequently used medication was de-worming treatment (31%), followed by medication for skin diseases (20%) and antibiotics (14%). There were 626 children (7%) who received a vaccination. Overall, 8,344 medications were given to children during the CHC.

Table 2.8: Medications administered during CHC, by medication type, and provision of vaccinations to Indigenous children who had a NTER Child Health Check

Type of medication	Number of children treated	Per cent of children who were treated	Number of medications	Per cent of total medication
Medication for de-worm treatment	2,938	31.4	2,939	35.2
Medication for skin diseases	1,838	19.6	2,152	25.8
Antibiotic	1,346	14.4	1,425	17.1
Medication for blood, blood-forming organs and immune mechanism	670	7.1	685	8.2
Medication for ear disease	457	4.9	458	5.5
Medication for endocrine/metabolic and nutritional disease	371	4.0	394	4.7
Medication for neurological disease	132	1.4	134	1.6
Medication for other diseases	155	1.7	157	1.9
Total medication used in CHC	**. .**	**. .**	**8,344**	**100.0**
Children who were treated by at least one medication [(a)]	4,989	53.2	. .	. .
Provision of vaccination during health check	626	6.7	. .	. .
Total children who received CHCs	**9,373**	**100.0**	. .	. .

(a) One child can have more than one type of medication.

. . Not applicable

Source: AIHW analysis of NTER CHCI Child Health Checks performed on or before 30 June 2009.

2.7.4 Medical procedures

There were 328 (4%) children had at least one medical procedure during their CHC. The most commonly performed procedures were skin dressing (42%) and ear cleaning (47%) (Table 2.9).

Table 2.9: Medical procedures performed during NTER Child Health Checks, by procedure type.

Type of procedure	Number	Per cent[(a)]
Skin dressing	155	42.0
Cleaning ear	175	47.4
Other procedures	39	10.6
Total procedures performed in CHC	**369**	**100.0**
Children who were treated with at least one medical procedure	328	3.5
Total children who received CHCs	**9,373**	**. .**

(a) Represents either the percentage a procedure represents out of total procedures, or the percentage of children treated out of total children. One child can have more than one type of medical procedure.

. . Not applicable

Source: AIHW analysis of NTER CHCI Child Health Checks performed on or before 30 June 2009.

2.7.5 Health advice

Among 9,373 children who attended a CHC, 6,509 (69%) children or their guardians, received at least one piece of health advice. They were most likely to receive advice on diet and nutrition (59%), physical activity and exercise (36%), smoking (33%) and alcohol use (14%) (Table 2.10).

Table 2.10: Health advice given, by type of advice, to Indigenous children who had a NTER Child Health Check

Type of advice	Number	Per cent of children[(a)]
Diet and nutrition	5,487	58.5
Physical activity/exercise	3,337	35.6
Smoking	3,090	33.0
Alcohol	1,338	14.3
Injury prevention	1,127	12.0
Parenting	981	10.5
Sun protection	895	9.6
Dental care	704	7.5
Social issues	646	6.9
Substance use prevention and treatment	619	6.6
Breast/bottle feeding	566	6.1
Learning difficulties/education issues	549	5.9
Safe sex advice	507	5.4
SIDS prevention	394	4.2
Support for mother	371	4.0
Mental health issues	370	4.0
Skin care	175	1.9
Personal hygiene issues	147	1.6
Other advice[(b)]	144	1.5
Subtotal children who received at least one type of health advice during CHC	6,509	69.4
Total children who received CHCs	**9,373**	**100.0**

(a) One child can have received more than one type of advice.

(b) Other advice is defined if the 2nd and 3rd characters in ICPC-2 Code are '45'. For example: A45016 is Advice/education on treatment.

Source: AIHW analysis of NTER CHCI Child Health Checks performed on or before 30 June 2009.

2.7.6 Referrals

Seven in ten (70%) children were referred to at least one type of service for follow-up. In particular, almost four out of 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, 12% to a paediatrician, and 10% to an Ear, Nose and Throat (ENT) specialist (Table 2.11).

The proportion of children who were referred for each of the follow-up services in this reporting period is similar to the proportion of children who were referred for such services in the May and December 2008 progress reports.

Table 2.11: Referrals of Indigenous children who had a NTER Child Health Check

Type of referral	Number	Per cent of children
Primary Health Care (PHC)(a)(b)	3,622	38.6
Paediatrician	1,131	12.1
Dental	3,293	35.1
Ears, Nose and Throat (ENT) specialist	896	9.6
Tympanometry and audiology	1,316	14.0
Optometrist or ophthalmologist	117	1.2
Mental health services	43	0.5
Speech therapist	36	0.4
Physiotherapist	9	0.1
Cardiologist	29	0.3
Dietician or nutritionist	50	0.5
Surgeon	34	0.4
Urologist/renal physician	4	0.0
Occupational therapist	5	0.1
Social worker	65	0.7
Family and Community Services (FACS)	53	0.6
Housing	15	0.2
Other clinician(c)	33	0.4
Tests ordered(d)	541	5.8
Subtotal children with at least one referral(e)	*6,516*	*69.5*
Total children who received CHCs	**9,373**	**100.0**

(a) Includes Primary Health Care (PHC) clinic, general practitioner or district medical officer, registered nurse, Aboriginal health worker and well baby clinic.

(b) Each child with multiple types of PHC referral is counted as having only one PHC referral.

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

(d) Includes pathology, echo-cardiology and radiology.

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

Source: AIHW analysis of NTER CHCI Child Health Check data for checks performed on or before 30 June 2009.

Child Health Check teams were not required to make referrals to specialist or allied health services if a referral was already in place and the child's name was on a waiting list. This means that for some conditions there were fewer referrals related to that condition than there were children identified with that condition.

2.8 Changes over time

It is important to know if the health conditions of children have improved since they received their first CHC. The health conditions listed at the first and last checks for children who have valid multiple CHCs can be compared to determine if there had been any change in these conditions 9 months or more after their first CHC.

There were 159 children with valid multiple CHCs. The majority of these children recovered from the health conditions that were diagnosed at their first CHC by the time they had their latest CHC (Table 2.12). All children with trachoma and ringworm at their first check were no longer suffering from these conditions at their latest check. Other diseases with high levels of recovery included scabies (93% had recovered), skin sores (91%) and anaemia (74%). In addition, about 96% of children whose immunisation was due at their first CHC had been vaccinated according to the *National immunisation schedule* when they had their latest check.

Although most conditions had fairly high recovery rates, the appearance of new cases in the target population maintained the prevalence rates of these health conditions at similar levels between first and latest health checks. The number of children with common health conditions, such as oral health problems, anaemia, and ear disease, are similar at both checks.

As discussed in Section 2.7, the detection of diseases can be influenced by several factors such as cooperation of children during the check, doctor's knowledge of particular diseases, and availability of medical equipment for testing. For these reasons, some diseases such as otitis media with effusion (OME) were not able to be diagnosed even when they were present in children at their first or the last check. Therefore, the differences in the diseases detected between two health checks may not be a true reflection on the actual prevalence of the diseases. It is also not known if the reasons these children were offered a second CHC were the same as or different from, the reasons triggering the offer of the original CHC.

Furthermore, these results should be treated with caution because the numbers of children with multiple checks is quite small. Conclusions about whether certain health conditions are becoming more or less common cannot be addressed with existing data and this would require more detailed data collection.

Table 2.12: Changes in health conditions between first and latest Child Health Check, for Indigenous children who had at least two CHCs[(a)(b)]

	Children with the condition diagnosed at first check	Children who had not been diagnosed with same health condition at their latest check		Children with a new condition diagnosed at their latest check		Total children with the condition diagnosed at their latest check
	Number	Number	Per cent	Number	Per cent[(c)]	Number
Ears and eyes						
Ear disease[(d)]	45	30	66.7	34	69.4	49
Trachoma[(e)]	5	5	100.0	1	100.0	1
Oral health						
Untreated caries	72	25	34.7	16	25.4	63
Any oral health issue	76	26	34.2	14	21.9	64
Skin						
Skin sores (4 or more)	23	21	91.3	9	81.8	11
Scabies	14	13	92.9	3	75.0	4
Ringworm	12	12	100.0	7	100.0	7
Any skin problem	49	39	79.6	16	61.5	26
Anaemia						
Anaemia[(f)]	31	23	74.2	28	77.8	36
Physical growth						
Growth problem	32	18	56.3	15	51.7	29
Other						
Immunisation due	24	23	95.8	9	90.0	10
Total children	**159**	. .	. .	. .	. .	**159**

(a) Excludes children with multiple CHCs who were not found to have a health condition at either CHC.

(b) Health conditions with fewer than five children found to have a condition at both their first or latest CHC are not shown as separate categories.

(c) This represents the proportion of children with the condition at their latest check for whom it was newly diagnosed, out of the total children with that condition at the latest check.

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

(e) Includes only those children who are known to have been screened for trachoma as part of the CHC (i.e. 52% of children in the age range).

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

. . Not applicable

Source: AIHW analysis of NTER CHCI Child Health Check data for checks performed on or before 30 June 2009.

2.8 Regional analysis

This section presents an overview of health outcomes and referrals by regional grouping. Detailed tables presenting prevalence of health conditions by region are included in

Appendix 3, while detailed tables on referrals and vaccinations by region are contained in Appendix 4.

2.8.1 Health conditions

One-third of children (33%) who had a CHC in Central Australia were identified with ear disease at their check. Central Australian children also demonstrated the highest proportion of overweight children aged 2–15 years (10%). However, fewer children aged 0–15 years were diagnosed with stunting (3%) or as being underweight (4%).

Just over one-third (34%) of children whose CHC was performed in Arnhem were identified with ear disease. One in two children (50%) had an oral health problem, including 48% who had untreated caries. Eight per cent had ringworm. Over one in eight (13%) were diagnosed as underweight, and wasting was diagnosed in 13% of children aged 0–4 years. Arnhem had high rates of infants under 1 year of age who were exposed to SIDS risk factors such as prone sleeping (33%), loose bedding (44%) and overheating (21%). As recorded at their CHC, there was a smoker in the household of 86% of children in Arnhem, while 18% were due for immunisations. Fewer children in this region than in other regions aged 6–15 years were diagnosed with trachoma (4%) and fewer children aged 2–15 years compared with those in other regions were overweight (2%).

Among children who had a CHC in the Barkly/Katherine regions, one in twelve (8%) had gum disease and one in eight (12%) aged 6–15 years had trachoma. Over three-quarters (77%) of infants under 1 year old were at risk of SIDS from bed sharing. Almost one in ten children (9%) aged 12–15 years was a regular smoker. Fewer children in this region were diagnosed with scabies (6%).

In the Darwin Rural region, over one-third (34%) of children who had a CHC were identified with a skin condition, including 12% with skin sores, 11% with scabies and 8% with ringworm. A history of recurrent chest infection was identified in close to half (46%) of children in this region. There are a larger proportion of children in Darwin Rural who are underweight (13%) and a larger proportion of children aged 0–4 years who show signs of wasting (13%). Children in this region aged less than 1 year old were at high risk for SIDS risk factors such as prone sleeping (32%), loose bedding (42%) and overheating (22%). Eighty-three per cent of children had a smoker in the household. Trachoma was relatively rare in children from this region (5%).

2.8.2 Referrals and vaccinations

Just over two-thirds of children (68%) who had a CHC in Central Australia received at least one referral at the time of their check. The most common referral type for this region was primary health care (38%), while 29% received a dental referral. One in nine children (11%) received an ENT referral, while 17% received a tympanometry and audiology referral.

Nearly seven in ten children (69%) from Arnhem received one or more referrals at their CHC. A similar proportion of children in this region received primary health care and dental referrals (both 38%). Thirteen per cent were referred to a paediatrician and one in nine (11%) were referred to an ENT specialist.

Almost three-quarters of children (74%) from Barkly/Katherine who had a CHC received a referral. Under half (46%) of the children who had a CHC in this region were given a primary health care referral and 41% received a dental referral. Almost one in five (19%)

were given a tympanometry and audiology referral. Thirteen per cent were referred to a paediatrician and one in ten (10%) received an ENT referral. Tests were ordered for 8% of children.

Among children who had a CHC in Darwin Rural, 68% were given one or more referrals. CHCs in this region showed similar rates of primary health care (36%) and dental (35%) referrals.

This analysis found differences between regions in the proportion of identified health conditions and referrals given to children at a CHC. Further investigation would be useful to determine if these differences are significant, if they reflect real differences between regions, and to establish possible explanatory factors for these observations. Significant differences in the frequency of health conditions between regions may inform planning and priority setting at the regional level.

2.9 Summary

There were 10,605 children living in the prescribed areas of the NTER had at least one valid CHC check. Of the 9,373 children who had a CHC using the standard form:

- Over three in four (76%) children lived in a household with a smoker.
- Forty per cent had untreated caries, 37% had a history of recurrent chest infections, 30% had ear disease and 16% had anaemia.
- Ten per cent had four or more skin sores, 8% had scabies and overall 30% of children had a skin problem.
- Fifteen per cent were due for immunisation.
- With respect to SIDS risk factors, almost three-quarters (74%) infants under the age of 1 year were at risk due to bed sharing, 37% due to loose bedding and 24% due to prone sleeping.

During their CHC, almost seven out of ten (70%) children were referred to at least one type of service for follow-up care:

- Almost four in ten (39%) children were given a PHC referral.
- Thirty-five per cent of children were given a dental referral, 14% were given a tympanometry and audiology referral, 12% were referred to a paediatrician and 10% were referred to an ENT specialist.

In relation to health management received by children during their CHC:

- Almost all children (99%) received some form of management for their health condition at their CHC with 91% who received a clinical test at their check, 70% received health advice, and 53% were treated with medications.
- Seven per cent of children were vaccinated at their CHC.

Analysis of the data on the 159 children who had multiple health checks showed that:

- Prevalence rates of common health conditions remained at similar levels between first and latest CHCs.
- Many conditions had high recovery rates, including ringworm (100%), scabies (93%), skin sores (91%) and anaemia (74%). This improvement could be due to health conditions healing of their own accord, as well as due to treatment.

However, new cases of these and other health conditions had arisen between the first and latest CHCs which maintained total numbers of children with these conditions at similar levels.

There were differences in the conditions found, risk factors and referrals across regions:

- One in three (33%) children who had a CHC in Central Australia was identified with ear disease and one in ten (10%) children aged 2–15 years were overweight.
- One in two children (50%) from Arnhem who had a CHC had an oral health issue (including 48% with untreated caries). Almost nine out of every ten children (86%) lived with a smoker and almost one in five (18%) were behind in their immunisation schedule.
- One in eight children (12%) aged 6–15 years who had a CHC in the Barkly/Katherine region had trachoma and almost one in ten children (9%) aged 12–15 years smoked regularly.
- Over one in three children (34%) who had a CHC in Darwin Rural had a skin condition and close to half (46%) had a history of recurrent chest infection. Eighty-three per cent of children lived with a smoker.
- Almost three-quarters (74%) of children from Barkly/Katherine received at least one referral at their CHC, compared with 68% for Central Australia and Darwin Rural.
- Thirty-eight per cent of children from Central Australia received a primary health care referral at their CHC and 29% were referred to a dental service.
- The same proportion of children in the Arnhem region had PHC referrals and dental referrals (38%).
- A PHC referral was made for 46% and a dental referral for 41% of children from Barkly or Katherine regions. Almost one in five (19%) children in these regions were given a tympanometry and audiology referral.
- Over one-third of children in Darwin Rural were given PHC (36%) and dental (35%) referrals at their CHC.

In relation to changes between this reporting period and the previous reporting period, the rates of prevalence of health conditions and referrals also remained fairly stable.

3 Follow-up: chart review

3.1 Introduction

As described in Chapter 2, a number of Indigenous children who had CHCs were identified as having at least one health condition during their checks. Children with a health condition were sometimes referred to follow-up care, which was provided by the same health care services that operated before the Child Health Care Initiative, namely Aboriginal Community Controlled Health Organisations (ACCHOs), Northern Territory Department of Health and Families (NT DHF) primary health care services (PHC) and various medical specialists. Health care delivered as a result of a referral from a CHC was funded by the Australian Government as part of the CHCI.

A separate process was established as part of the CHCI to monitor whether children received follow-up care for the referrals received at their CHC. This process is known as 'chart review'. It was anticipated that most children who had a CHC would have a chart review to monitor their follow-up status. The chart review process was designed to be conducted in two stages—an 'initial chart review' and an 'exit chart review'.

The purpose of the 'initial chart review' was to:

- ascertain whether the child had been seen at least once for conditions they received a referral for during their CHC
- ascertain whether the child acquired any other conditions since the health check that required follow-up
- indicate any follow-up care still required.

The initial chart review was used to measure the extent to which follow-up through usual care had already been achieved. An action plan was also developed for follow-up care for each child who needed further health care at the time of their initial chart review.

At the end of the follow-up care period, or when a child's course of follow-up care was completed, the primary care workers conducted an 'exit chart review'. The exit chart review served two purposes:

- to determine if the child had been followed up in the period between the initial and exit chart review by specified clinician(s)
- to see if any further follow-up action was required.

Once an initial and exit chart review had been conducted for a child, that chart review was considered 'complete'.

The collection provides a valuable snapshot of the extent of follow-up service delivery for children in prescribed areas of the Northern Territory who had a CHC.

This chapter:

- describes the information collected in the Chart Review data collection and provides some insight into the interpretation and limitations of this collection
- presents the demographics of children who received chart reviews

- discusses outcomes of follow-up care received by children as a result of the referrals and the health conditions identified at their first CHC.

3.2 Information about the Chart Review data collection

Chart reviews were conducted by health workers in the Northern Territory, and all children who had a CHC were eligible for a chart review.

The health workers reviewed and transferred information from the medical charts of children about the management of their health conditions to the chart review forms, which were then sent to the AIHW. Information from these forms was collated by the AIHW into a Chart Review database which is stored and maintained by the AIHW.

Each chart review form contains the following information:

- details about the child: namely the child's Hospital Registration Number (HRN), date of birth, sex and the date of the CHC
- details of the chart review: namely the dates of their initial and exit chart reviews, and the ID of the community where the chart review was conducted
- health conditions identified at the CHC
- type of referrals and health conditions for which these referrals were made
- whether the child had additional health conditions since the CHC that needed to be followed up
- whether the child was seen for their conditions and by whom, before their initial chart review and whether further follow-up was recommended at the time
- whether further follow-up was required.

3.3 Data interpretation and limitations

There are several limitations to the data presented in this chapter that should be taken into account when interpreting the information provided.

All other chapters in this report present data on services conducted up to 30 June 2009. However, for the Chart Review collection no cut-off date was imposed for conducting the chart review. Instead an analysis cut-off date was imposed, where all valid forms (including those relating to chart reviews conducted after 30 June 2009) could be included in the analysis provided they were received by the AIHW on or before 2 November 2009. Extending the date for valid chart reviews enabled this report to present the maximum amount of information on follow-up care provided to children who had a CHC.

The numbers of follow-up services reported here are based on the follow-up services provided to the children when their chart reviews were conducted. Children may have received follow-up care since their chart review.

There is a time lag between the time when health services were provided and the time when information about such services was sent to the health centre where the chart review was conducted. Therefore the health service information available to health workers at the time a chart review was conducted may have been incomplete. In addition, access to information on certain types of services, such as mental health and social work services, is restricted due to a sensitive nature of such services, thus underestimating the actual service provision.

HRNs were missing from some chart review and CHC forms. Information from these forms could not be used for determining if the child who had a chart review had a valid CHC or any referrals. Therefore, chart review forms and CHC forms with a missing HRN were excluded from the analysis. In other cases, chart review forms were received for children whose CHC forms had not yet been received by the AIHW. These chart review forms were also excluded from the analysis, because consent had not been given to include them in the AIHW database. For these reasons, the number of children reported here as having had chart reviews is lower than those who actually had chart reviews during the period of interest.

On examining the data from complete chart review forms, it was noted that a large number of exit chart reviews were done on the same date as the initial chart reviews. More than 30% of the complete chart review forms that were received reported the same date for the exit chart review as for the initial chart review, and information recorded in the exit chart review was identical to that in the action plan of the initial chart review. This indicated that these exit chart reviews were completed prematurely. As a result, information on initial chart reviews and exit chart reviews can not be analysed separately.

The CHC forms included only information on the type of referral made at CHC, but not the health condition these referrals were made for. Therefore, health conditions for which children were given a referral during CHC can only be identified if these conditions were mentioned on the chart review form. It is not clear whether there were some health conditions for which children were referred to health services that were not mentioned on the chart review forms.

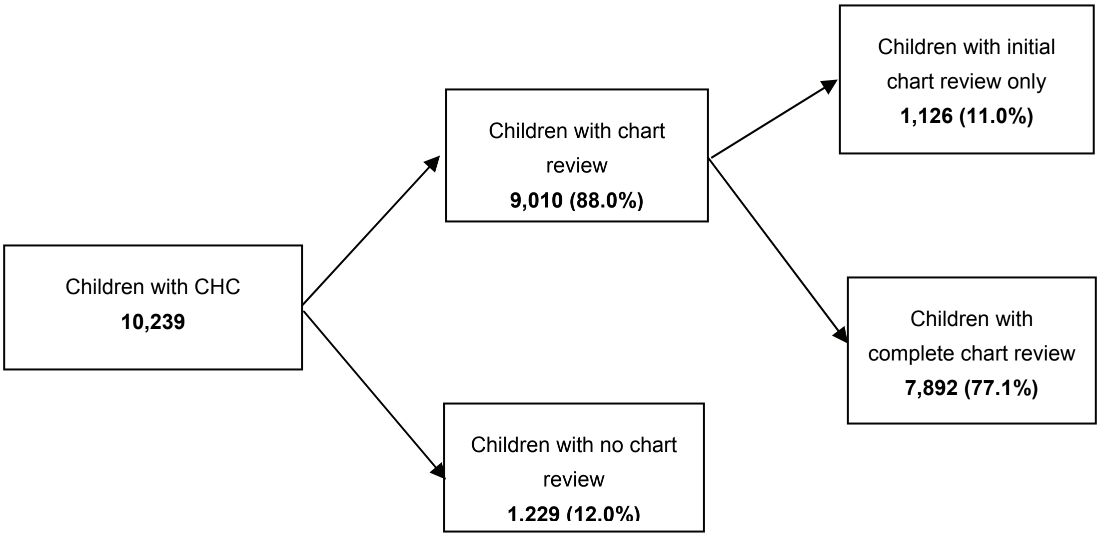
Finally, a considerable amount of information was missing from chart review forms. Some information included on the forms lacked internal consistency and some information was entered in the wrong section of the forms. The AIHW ensured as far as possible that the information entered into the Chart Review database from these forms was correct, but the accuracy of the findings of this chapter will inevitably be affected by these issues.

Given these limitations, it is likely that the findings in this chapter understate the number of children who received follow-up services and the number of these services that had been provided by the time chart reviews were conducted.

3.4 Chart review forms processed

A total of 15,085 chart review forms were received and processed by the AIHW as at 2 November 2009. Some forms contained follow-up information for an initial chart review only, while complete chart review forms contained information for both the initial and exit chart reviews. Exit chart review information from a complete form for a child would normally be entered into the same database record as the initial chart review form. However, some complete chart review forms contained different information for the initial chart review than the originally processed initial chart review, and were therefore entered into the database as a different record. Therefore one database record does not necessarily represent one chart review process. In addition, children with more than one CHC sometimes received an initial and final chart review after each CHC; these were entered as different records. After removing duplicate chart review forms and forms with a missing HRN, there were 9,506 valid chart review records for 9,010 children with valid CHCs.

Of the 10,605 children who had at least one valid CHC, 10,239 children had a valid HRN that could be used to identify their corresponding chart reviews. Among these 10,239 children, 77% had at least one complete chart review (both initial and exit chart review) and 11%had at least one incomplete chart review (an initial chart review only). A small proportion of children (0.1%) had both an incomplete chart review and a complete chart review, each of which were based on different CHCs for the same child. Overall, 88% of the children who had a valid CHC had at least one chart review: either complete or incomplete (Figure 3.1).



Source: AIHW analysis of the NTER CHC data and Chart review data as at 2 November 2009

Figure 3.1: Number and percentage of children who have had a CHC and subsequent chart reviews, Indigenous children who had a NTER CHC

3.5 Demographic characteristics of children with complete chart reviews

The region, sex and age group of children who had both a Child Health Check and a chart review are shown in Tables 3.1 and 3.2. These characteristics were recorded during the child's health check.

The Darwin Rural region had the highest proportion of complete chart reviews (89%) for children who had a CHC. This was followed by Central Australia (87%), Arnhem (66%) and Barkly/Katherine (66%) (Table 3.1).

Table 3.1: Indigenous children who had a NTER CHC and a chart review, by region

	Children who had at least one CHC	Children with initial chart review only		Children with complete chart review		Total children with a chart review	
Demographics		**Number**	**Per cent(a)**	**Number**	**Per cent(a)**	**Number**	**Per cent(a)**
Region							
Central Australia	2,430	68	2.8	2,120	87.2	2,186	90.0
Arnhem	2,379	656	27.6	1,569	66.0	2,222	93.4
Barkly/ Katherine(b)	2,787	312	11.2	1,837	65.9	2,148	77.1
Darwin Rural	2,663	90	3.4	2,372	89.1	2,462	92.5
Total children	**10,239**	**1,126**	**11.0**	**7,892**	**77.1**	**9,010**	**88.0**

(a) Represents the proportion of children who had a chart review among the total children with at least one valid CHC.

(b) 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.

Source: AIHW analysis of the NTER CHCI data and Chart Review data as at 2 November 2009.

Forty-six per cent of children who had initial chart reviews only were aged 0 to 5 years and 41% were aged 6 to 11 years. Forty-five per cent of children who had completed chart reviews were aged 0 to 5 years and 40% children were aged 6 to 11 years. Relatively fewer children aged 12 to 15 years (15%) had had any form of chart review. Slightly more male children (51%) than female children (49%) with CHCs had chart reviews (Table 3.2).

Table 3.2: Indigenous children who had a NTER CHC and a chart review, by age group and sex

	Children with initial chart review only		Children with complete chart reviews		Total children with a chart review	
Demographics	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Age group						
0–5	519	46.1	3,518	44.6	4,035	44.8
6–11	464	41.2	3,163	40.1	3,623	40.2
12–15(a)	143	12.7	1,243	15.8	1,385	15.4
Missing	0	0.0	<5	0.0	<5	0.0
Total children	**1,126**	**100.0**	**7,892**	**100.0**	**9,010**	**100.0**
Sex						
Male	563	50.0	4,036	51.1	4,598	51.0
Female	563	50.0	3,855	48.8	4,411	49.0
Missing	0	0.0	<5	0.0	<5	0.0
Total children	**1,126**	**100.0**	**7,892**	**100.0**	**9,010**	**100.0**

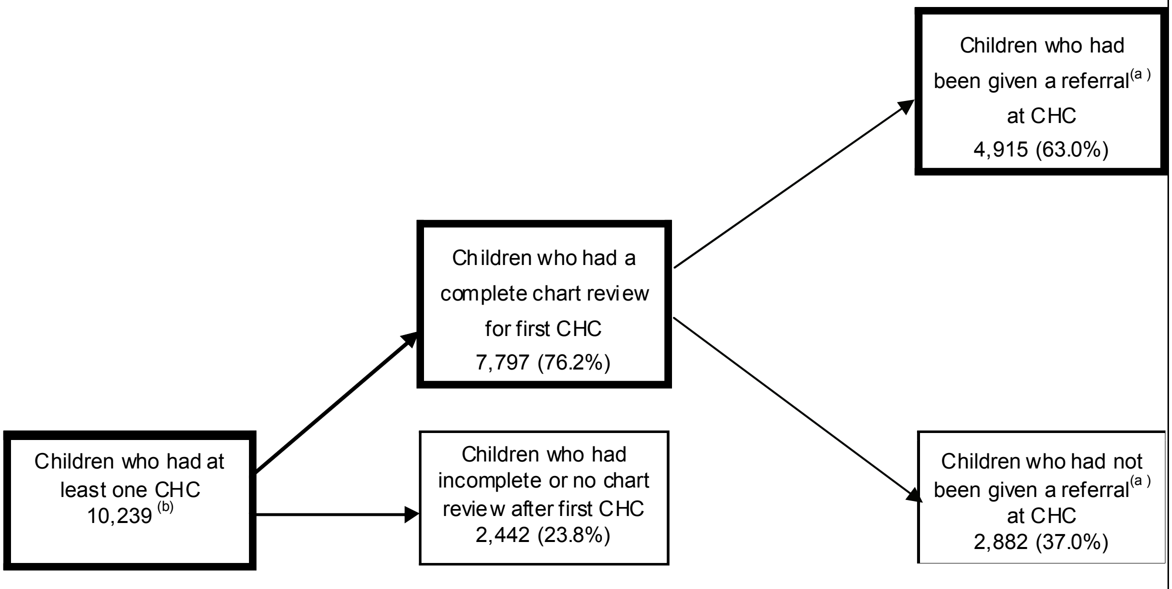
(a) Age at time of the Child Health Check. At the time of chart review, some of these children are likely to be aged 16 years.

Source: AIHW analysis of the NTER CHCI data and Chart Review data as at 2 November 2009.

3.6 Follow-up status of children who received a referral during their CHC

This section presents information on the follow-up status of children who had a CHC and a complete chart review. For children who had more than one CHC, only information on their first valid CHC was used, because most follow-up services were provided in response to referrals made during the child's initial CHC. Data on referrals to tympanometry or audiometry services and referrals to dental services are not presented in this section, because more complete information can be found in Sections 4.8.1 and 5.8.1 of this report as part of the analysis of the CHCI Audiology and Dental follow-up collections.

Among the 10,239 children who had a CHC, 7,797 (76%) had a complete chart review for their first CHC (Figure 3.2). Because over 30% of the complete chart reviews had the exit chart review conducted at the same time as the initial chart review, the information included in those exit chart reviews was identical to that included in the action plan during the initial chart reviews. For these cases, the information in the action plan in the initial chart review was not used so that double counting of referrals could be avoided.



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

(b) Include Valid CHCs only and exclude CHCs with missing or invalid HRN.

Source: AIHW analysis of the NTER CHCI data and Chart Review data as at 2 November 2009.

Figure 3.2: Number of Indigenous children who had a CHC, whether they had a chart review following the check, and whether those with a complete chart review had been given a referral at CHC

Over 90% of the children who had a CHC were identified as having at least one health condition at their first CHC. Although many children were treated during their CHC, over three in five were referred to medical professionals or other services for further treatment or follow-up. Of the 7,797 children who had a complete chart review following their first CHC, 4,915 (63%) had at least one referral recorded in their chart review forms for their health conditions (Table 3.3).

Oral health problems were the most common reason for referral, with over 56% of children receiving a referral for this condition (Table 3.3). Other common reasons for referral included ear diseases (41%), anaemia (18%) and skin disease (16%). Some children had more than one health condition that needed to be followed up, while sometimes children were referred to two or more types of clinicians for one health condition.

The follow-up status of these referrals varied considerably by the type of referral. The most frequently followed-up referrals were for primary health care as 81% of children who were referred to primary health had been seen at least once by the time the chart review was conducted. This was followed by referral to cardiologist (63), paediatricians (58%), ENT (57%) and dieticians or nutritionists (42%).

Although a large number of services had been provided to children in need, there was still a large numbers of children who had not been seen by the clinician or the services they were referred to. Over one-third of children who were referred to speech therapists and optometrists or ophthalmologists had not been seen. The proportion of those referred for follow-up who had been seen was lowest for other clinicians (6%), social workers (10%) and speech therapists (24%) (Table 3.4).

Table 3.3: Children with a complete chart review who received at least one referral at their first CHC, by type of health condition for which the referral was made

Type of condition	Number [(a)] [(b)]	Per cent [(b)]
Oral health	2,740	55.7
Ear diseases	2,025	41.2
Anaemia	869	17.7
Skin	788	16.0
Cardiac/respiratory	738	15.0
Other conditions	687	14.0
Immunisation due	604	12.3
Growth problem	472	9.6
Investigative tests	330	6.7
Eyes	299	6.1
High BSL	221	4.5
SEWB/mental	195	4.0
Underweight	135	2.7
Overweight	68	1.4
Nutrition	22	0.4
Abdominal	20	0.4
Substance use	17	0.3
Total children with at least one referral	**4,915**	**100.0**

(a) Includes only children who had a complete chart review after their first CHC.

(b) Column does not add up to total because one child can be referred for more than one health condition.

Source: AIHW analysis of the NTER CHCI data and Chart Review data as at 2 November 2009.

There were a number of children who received referrals and who had not been seen at all and yet were indicated on their chart reviews as not needing to be seen. It is not clear how and why the clinicians who conducted the chart review determined that children did not need these services any more. It was possible that the children had recovered from their illness or their situations had changed at the time their chart review was conducted. Over 32% of children who were referred to FACS and housing, dieticians or nutritionists, or mental health services no longer required such services (Table 3.4).

There were a number of children who received referrals at their CHC, but such referrals were missing in their chart reviews. Therefore, it was not possible to determine the follow-up status of their referrals (Table 3.4).

Table 3.4: Follow-up status of Indigenous children given referrals during NTER Child Health Checks, by type of referral

Type of referral	Number of children given a referral at their first CHC[a] [b]	Seen		Outstanding [c]		No longer require follow-up [d]		Referral missing [e]	
		No.	%	No.	%	No.	%	No.	%
Primary health care	2,678	2,154	80.4	226	8.4	90	3.4	208	7.8
Cardiologist	19	12	63.2	<5	n.a.	<5	n.a.	<5	n.a.
Paediatrician	864	501	58.0	195	22.6	137	15.9	31	3.6
Ear nose and throat specialist	668	380	56.9	178	26.6	90	13.5	20	3.0
Dietician or nutritionist	24	10	41.7	7	29.2	7	29.2	0	0.0
Tests ordered	415	166	40.0	44	10.6	58	14.0	147	35.4
Surgeon	28	10	35.7	5	17.9	<5	n.a.	12	42.9
FACS and housing	59	21	35.6	13	22.0	19	32.2	6	10.2
Mental health services	36	12	33.3	10	27.8	12	33.3	<5	n.a.
Optometrist or ophthalmologist	76	24	31.6	28	36.8	21	27.6	<5	n.a.
Speech therapist	25	6	24.0	11	44.0	7	28.0	<5	n.a.
Social worker	48	5	10.4	7	14.6	8	16.7	28	58.3
Other clinicians	516	32	6.2	17	3.3	7	1.4	460	89.1

(a) Includes only children who had a complete chart review after their first CHC.

(b) Column does not add up to total as one child can have more than one referral.

(c) Refers to children who had not been seen by the services that they were referred to and still needed such services.

(d) Refers to children who had not been seen by the services that they were referred to, but who no longer required such services.

(e) Refers to children who received referrals at the CHC, but for whom no referrals were mentioned in their chart reviews.

Note: Please refer to Chapter 4 and 5 of this report for information on the follow-up status of children referred to audiometry and dental services.

Source: AIHW analysis of the NTER CHCI data and Chart Review data as at 2 November 2009.

3.7 Additional referrals and health conditions needing follow-up

One of the purposes of initial chart reviews was to identify whether children had any additional conditions which had not been recorded during their CHC, and then to monitor their follow-up status at their exit chart review. Chart reviews can also be used to provide missing information about number and type of referrals for children whose CHC was recorded on non-standard forms.

This section describes these additional referrals made at the chart review and their follow-up status, and incorporates those referrals found during chart reviews for CHCs on non-standard forms. As in the previous section, data on referrals to tympanometry or audiometry services and dental services are not presented because more complete information can be found in Chapters 4 and 5 of this report.

Among the 7,797 children who had a complete chart review for their first CHC, 3,578 (46%) children had an additional referral at their chart review. Ear disease was the most common reason for these referrals, with about 30%of children receiving an additional referral for this condition. Other common reasons for additional referral were oral health (21%), skin problems (12%) and anaemia (11%) (Table 3.5). Some children had more than one additional health condition that needed to be followed up.

Table 3.5: Children with additional referrals at chart review by type of health condition

Type of condition	Number[(a) (b)]	Per cent
Ear disease	1,072	30.0
Oral health	750	21.0
Skin condition	430	12.0
Anaemia	389	10.9
Immunisation due	304	8.5
Eye disease	299	8.4
Growth problem	281	7.9
Cardiac/respiratory abnormality	197	5.5
SEWB/mental	184	5.1
Underweight	108	3.0
Investigative tests	87	2.4
Nutrition	38	1.1
High BSL	31	0.9
Substance use	11	0.3
Overweight	10	0.3
Abdominal	10	0.3
Other conditions [(c)]	1,573	44.0
Total children	**3,578**	**100.0**

(a) Includes only children who had a complete chart review following their first CHC.

(b) Column does not add up to total as one child can be referred for more than one health condition.

(c) Include all health conditions except the health conditions listed above.

Source: AIHW analysis of the NTER CHCI data and Chart Review data as at 2 November 2009.

A high proportion of children given an addition referral to services or practitioners had received follow-up care at the time of the exit chart review. The highest proportion of those who received follow-up by having been seen at least once, were those referred to a surgeon (88%) or to primary health care (87%); followed by those who had a test ordered (72%), referrals to other clinicians (71%), dieticians or nutritionists (70%), paediatrician (69%) and ENT (68%). A relatively low proportion of children who had an additional referral had been seen by an optometrist or ophthalmologist (45%), FACS (31%), a social worker (27%) a speech therapist (21%) or housing (0%)(Table 3.6).

Table 3.6: Follow-up status of Indigenous children given additional referrals during chart review, by referral

Type of referral	Number of children given an additional referral [(a)] [(b)]	Seen		Outstanding [(c)]		No longer require follow-up[(d)]	
		No.	Per cent	No.	Per cent	No.	Per cent
Surgeon	33	29	87.9	<5	6.1	<5	6.1
Primary health care	1,942	1,695	87.3	174	9.0	73	3.8
Tests ordered	82	59	72.0	12	14.6	11	13.4
Other clinicians	294	208	70.7	51	17.3	35	11.9
Dietician or nutritionist	158	110	69.6	33	20.9	15	9.5
Paediatrician	397	272	68.5	67	16.9	58	14.6
Ear nose and throat specialist	825	559	67.8	170	20.6	96	11.6
Urologist/renal physician	15	10	66.7	<5	6.7	<5	26.7
Physiotherapist	12	8	66.7	<5	16.7	<5	16.7
Cardiologist	119	72	60.5	22	18.5	25	21.0
Mental health services	36	20	55.6	9	25.0	7	19.4
Optometrist or ophthalmologist	94	42	44.7	29	30.9	23	24.5
FACS	72	22	30.6	17	23.6	33	45.8
Social worker	30	8	26.7	14	46.7	8	26.7
Speech therapist	43	9	20.9	19	44.2	15	34.9
Housing	10	0	0.0	7	70.0	<5	30.0

(a) Includes only children who had a complete chart review following their first CHC.

(b) Column does not add up to total as one child can be referred for more than one health condition.

(c) Refers to children have not been seen by the services that they were referred to and still need such services.

(d) Refers to children have not been seen by the services that they were referred to, but they are no longer requiring such services

Note: Please refer to Chapters 4 and 5 of this report for information on the follow-up status of children referred to audiometry and dental services.

Source: AIHW analysis of the NTER CHCI data and Chart Review data as at 2 November 2009.

3.8 Further action required

There were 2,820 children who still had conditions requiring further action at exit chart review, representing 36% of children who had a complete chart review for their first CHC. Among children requiring further action, 66% needed dental services, 54% needed to be followed up by primary care, and 47% needed to be seen by either an ENT specialist or an audiologist (Table 3.7).

The fact that many children required 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 intensity of care that may have been available through the additional NTER-funded follow-up services.

Table 3.7: Children with further action required at exit chart review, by type of referral

Type of referral	Number	Per cent
Dental	1,846	65.5
Primary health care	1,531	54.3
Tympanometry and audiometry	583	20.7
Ear, nose and throat specialist	755	26.8
Paediatrician	474	16.8
Tests ordered	112	4.0
Optometrist or ophthalmologist	85	3.0
Other clinician	183	6.5
Dietician or nutritionist	101	3.6
Speech therapist	33	1.2
Cardiologist	64	2.3
FACS	33	1.2
Social worker	27	1.0
Mental health services	32	1.1
Housing	16	0.6
Surgeon	17	0.6
Physiotherapist	10	0.4
Occupational therapist	<5	0.1
Urologist/renal physician	<5	0.1
Total number of children who require further action [(a)]	**2,820**	**100.0**

(a) Column does not add up to total because one child can be referred for more than one health condition.

Source: AIHW analysis of the NTER CHCI data and Chart Review data as at 2 November 2009.

3.9 Time elapsed

The date of a child's chart review indicates when Australian Government NTER-funded follow-up commenced in the primary care setting for that child. Before this, follow-up occurred through the usual care processes. The following tables show the data on the time that elapsed between CHCs and corresponding initial chart reviews. Two points should be noted when interpreting data on time elapsed between CHCs and initial chart reviews.

- The date of the chart review was missing, or outside the valid range of chart review dates in 295 records. In addition, the date of chart review was as same as with the date of the CHC in 969 chart review records. These records were excluded from the analysis when calculating time elapsed between CHC and initial chart review.
- The time elapsed between the initial chart review and the exit chart review was not calculated because more than 30% of the exit chart reviews were completed on the same date as their corresponding initial chart review.

Approximately 13% of the chart reviews had an initial chart review within three months of their CHC (Table 3.8). About 30% of the children had their initial chart review 3 to 9 months after the CHC. For 57%, chart reviews occurred 9 months or more after the CHC

(Table 3.8). The mean elapsed time between the CHC and initial chart review was 286 days, while the median elapsed time was 292 days.

Table 3.8: Time elapsed between CHC and initial chart review

Time lapsed	Number of chart review form [(a)]	Per cent
<3 months	1,025	13.4
3 to <6 months	1,087	14.2
6 to <9 months	1,198	15.6
9 months or longer	4,348	56.8
Total chart review forms	**7,658**	**100.0**

(a) Excludes records with missing and invalid date of CHC or initial chart review and records that the date of chart review was as same as with the date of the CHC.

Source: AIHW analysis of the NTER CHCI data and Chart Review data as at 2 November 2009.

3.10 Summary

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 a CHC to ascertain whether the children had the follow-up care that had been recommended for them during the CHC.

About 88% (9,010 out of 10,239) of children who had a valid health check and had a valid HRN went on to have a chart review. The percentage of children who had a chart review by 2 November 2009 was nearly double that reported in December 2008 (46%).

The data from the chart reviews showed that:

- There were 7,797 (76%) children who had a complete chart review for their first CHC.
- Of those who had a complete chart review 4,915 (63%) had at least one referral recorded in their chart review forms.
- The health condition for which the greatest number of referrals was given was oral health (2,740 or 56% of all referrals).
- The type of service with the greatest number of completed referrals was primary health care (2,678, or 80% of the referrals).
- Of those who had a complete chart review, 3,578 (46%) children had an additional referral made at their chart review.
- The health conditions for which the largest number of additional referrals were given were ear disease (1,072 or 30%) followed by oral health (750 or 21%).
- The highest proportion of those who received follow-up by having been seen at least once, were those referred to a surgeon (88%) or to primary health care (87%).
- There were 2,820 children who still had conditions that required further action when their exit chart review was conducted, representing 36% of children who had a complete chart review for their first CHC.

- The mean time elapsed between a CHC and an initial chart review was 286 days. Fifty-seven percent of these children had a lag of 9 months or longer between their CHC and their initial chart review.

4 Follow-up: audiology

4.1 Introduction

Otitis media and hearing loss are more prevalent and severe among Aboriginal and Torres Strait Islander children compared with other Australian children. The higher prevalence of these conditions among Indigenous children is associated with poverty, crowded housing conditions, inadequate access to water and to functioning sewerage and waste-removal systems (increasing the risk of bacterial and viral infections), passive smoking, nutritional problems and lack of access to primary health care and treatment (AHMAC 2008; Wiertsema & Leach 2009).

Otitis media and hearing loss can have significant impact on children's life. For children in the early years of life, the presence of persistent hearing loss (greater than 3 months) affects speech and language development and learning, and may have serious and ongoing developmental and educational effects. In school aged children, hearing loss associated with otitis media impacts on literacy and numeracy attainment, and behavioural and social development, with life-long consequences for employment, income, and social success (Couzos & Murray 2008).

The effective care of otitis media requires integrated access to primary, diagnosis and assessment; ENT, audiological and rehabilitation, including hearing devices; speech therapy and hearing impaired education specialist program. 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 (Coates et al. 2002).

In response to the high prevalence of ear conditions and their potentially serious long-term consequences for Indigenous Australians, the Australian Government funded the Northern Territory Government to provide the following:

- primary treatment
- community hearing workers
- audiologists
- ear, nose and throat (ENT) surgery
- infrastructure, such as hearing booths.

The NT DHF developed a follow-up model for ear conditions that addressed engagement with communities, provided community based family support, enhanced PHC capacity and delivered community and hospital based audiological and ENT specialist services. Aboriginal Community Controlled Health Organisations (ACCHOs) also provide PHC follow-up services for children with ear diseases. They used the training provided by NT DHF, and adapted ear health programs according to local needs and priorities within funding guidelines.

As part of the evaluation framework for the Child Health Check Initiative (CHCI), the Australian Government is working with the NT DHF and ACCHOs to monitor whether children received the follow-up services they required. Monitoring of follow-up services required for ear conditions is being done through the Audiology data collection reported on in this chapter.

This chapter provides information on the Audiology data collection, data on audiology checks for this and previous reporting periods, and data about hearing collected through the general CHCs. The audiology services described in this report are those that were provided up to and including 30 June 2009. In addition, it provides some insight into the interpretation and limitations of the CHCI audiology data collection. A glossary of audiology data terms used throughout this chapter is provided at the end of this report.

4.2 Information about the collection

Audiology checks are required to assess middle ear function, diagnose hearing loss and recommend rehabilitation such as communication strategies, classroom amplification, individual hearing aids, speech therapy, and educational support. Repeated audiological assessment monitors peripheral hearing system improvements associated with primary and surgical management of otitis media.

The design of the Northern Territory Emergency Response (NTER) audiology follow-up to the CHCs is based on a model of three visits to each community. Hence, a child may have multiple audiology checks across time as appropriate in monitoring clinic management of otitis media. All Indigenous children in the prescribed areas are eligible for audiology checks in recognition that children with some ear conditions were not indentified through the CHC process.

Information for the Audiology data collection is transferred to the Australian Institute of Health and Welfare (AIHW) on paper forms. The data items that are included in the Audiology data collection include:

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

Each record in the Audiology data collection corresponds to a single assessment of middle ear function and peripheral hearing (audiological assessment). A course of care for otitis media may consist of one or a series of audiological assessments to monitor hearing loss and assess middle ear function. Because otitis media in Indigenous children is recurrent, persistent and chronic in nature, and most treatments, including surgery , will show changes over time a child may receive a number of audiological assessments and a child can have more than one record in the Audiology data collection.

4.3 Limitations

Data coverage for the CHCI Audiology data collection is limited to data collected from the audiology services provided by the NT DHF Helping Hands Australian Government Initiative Team. This collection does not capture follow-up audiology services provided through other means. Furthermore, the scope of this collection is limited to children between the aged under 16 years at the time of their audiology check, unless they had received a previous CHC when they had been aged 15 or less.

Children who received an audiology check were not a random sample of Indigenous children in the prescribed areas or of children who had a CHC. Firstly, audiology checks were only provided to children who volunteered for them. Secondly, although all Indigenous children in prescribed areas of the Northern Territory were eligible to receive a CHCI audiology check, children with audiology referrals from the CHC data collection were targeted for follow-up by the audiology outreach team. 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 prevalence of ear conditions among NT Aboriginal children in general is likely to be much lower than among children in the Audiology data collection.

It should be also noted that some children who received the audiology services did not give consent for sharing their audiology check information with the AIHW. The NT DHF therefore provided total numbers for these audiology services to the AIHW for the purpose of monitoring audiology services, rather than data consisting of individual records. Because of this, data for these children were not able to be linked to the CHC database. As such, apart from Table 4.2, the data in this chapter are only derived from audiology service information for which consent was obtained, and therefore the true proportion of children who had audiology referrals at their CHC and received follow-up audiology services may be higher than what is reported here.

More information about data quality and interpretation can be found in Appendix 2 of this report.

4.4 Audiology forms received and processed

By the cut-off date, 4,317 audiology records related to services conducted on or before 30 June 2009 were received by the AIHW. After removing duplicate records and records for children outside the applicable age range, 4,091 processed records remained, representing 4,091 audiology services provided to 3,165 children.

By region, the largest proportion of audiology forms were received from Central Australia (39%), followed by Darwin Rural (23%), Arnhem region (21%) and Barkly/Katherine (18%) (Table 4.1). Data from the regions of Barkly and Katherine are combined owing to small numbers. This regional distribution in part reflects the fact that NTER-funded audiology services commenced in the Central Australia region and started later in other regions.

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

Region	Number	Per cent
Central Australia	1,583	38.7
Arnhem	837	20.5
Barkly/Katherine	749	18.3
Darwin Rural	922	22.5
All Regions	**4,091**	**100.0**

(a) This excludes duplicate forms and forms for children outside of the applicable age range that were found during the processing stage.

Source: AIHW Community log for services on or before 30 June 2009.

Using a child's HRN as provided on the audiology form, the data indicate that 2,446 children had one audiology check, 540 children had two checks, 154 children had three checks, 22 children had four checks, and three children had five checks (Table 4.2). In addition to this, 404 audiology checks were provided to 352 children who did not provide explicit consent for their unit record data to be given to the AIHW, so forms for these checks were not passed on to the AIHW and they were not included in the data collection.

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 3,165 children.

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

	Checks		Children	
	Number	**Per cent**	**Number**	**Per cent**
Audiology checks with consent[(a)]				
1 audiology check[(b)]	*2,446*	*54.4*	*2,446*	*77.3*
2 audiology checks	*1,080*	*24.0*	*540*	*17.1*
3 audiology checks	*462*	*10.3*	*154*	*4.9*
4 audiology checks	*88*	*2.0*	*22*	*0.7*
5 audiology checks	*15*	*0.3*	*<5*	*0.1*
Total checks with consent	**4,091**	**91.0**	**3,165**	**100.0**
Audiology checks without consent	404	9.0	352	. .
Total	**4,495**	**100.0**	**3,517**	**. .**

(a) Consent to transfer children's information to AIHW.

(b) Includes thirteen cases where HRN was missing.

. . Not applicable

Source: AIHW analysis of NTER CHCI Audiology data for services on or before 30 June 2009.

4.5 Demographic characteristics

Just over half of the 3,165 children who had an audiology check were male (52%) and just under half were female (48%) (Table 4.3). Over half (53%) of those who had an audiology check were aged 6 to 11 years, while 29% were aged 0 to 5 years and 18% were aged 12 to 16 years. The distribution of children who had had an audiology check across age groups reflects the availability of appropriate testing facilities for children less than 4 years of age. The largest proportion of children had their check in Central Australia (37%), followed by Darwin Rural (24%), Arnhem (20%) and Barkly/Katherine (19%) (Table 4.3).

Table 4.3: Demographic characteristics, Indigenous children who had an audiology check[(a)] as part of the NTER CHCI

	Number	Per cent
Region		
Central Australia	1,166	36.8
Arnhem	630	19.9
Barkly/Katherine	601	19.0
Darwin Rural	768	24.3
Total	**3,165**	**100.0**
Age group		
0–5 years	922	29.1
6–11 years	1,675	52.9
12–16 years[(a)]	554	17.5
Missing	14	0.4
Total	**3,165**	**100.0**
Sex		
Male	1,631	51.5
Female	1,531	48.4
Missing	3	0.1
Total	**3,165**	**100.0**

(a) Based on the latest checks.

(b) 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 for services on or before 30 June 2009.

4.6 Ear health and requirements for further action

The data presented in this section 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, audiologists were asked to indicate whether the child had hearing loss and the type of hearing loss present. Just over half (54%) of the children who had an audiology check by 30 June 2009 had hearing loss. Thirty-nine per cent of children had no hearing loss and this information was missing for 7% of children. Among those children with hearing loss, bilateral hearing loss was recorded for 66% and unilateral hearing loss for 33% (Table 4.4).

Table 4.4: Hearing loss, Indigenous children who had an audiology check with consent [(a)]

Hearing status	Number	Per cent of children who had an audiology check	Per cent of children with hearing loss
No hearing loss	1,240	39.2	..
Hearing loss	1,718	54.3	..
Unilateral	573	18.1	33.4
Bilateral	1,132	35.8	65.9
As tested by sound field(b)	13	0.4	0.8
Information about hearing loss status missing(c)	207	6.5	..
Total	**3,165**	**100.0**	**..**

.. Not applicable

(a) Consent to transfer children's information to AIHW.

(b) Children tested for hearing loss using a sound field are presented separately, because it is not possible to distinguish unilateral and bilateral hearing loss using this method of testing.

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

Source: AIHW analysis of NTER CHCI Audiology data for services on or before 30 June 2009.

The most common type of hearing loss identified was conductive (91%), whereas only a small proportion of children had sensorineural or mixed hearing loss (both 3%) (Table 4.5). Type of hearing loss status missing includes those children who were not tested. This includes those who were either too young for the test battery or were uncooperative and all of these children will be targeted for retesting.

Table 4.5: Type of hearing loss in Indigenous children for whom hearing loss was not ruled out during an audiology check[(a)]

Type of hearing loss	Number	Per cent of children with hearing loss	Per cent of children who had an audiology check
Conductive	1,564	91.1	49.5
Sensorineural	50	2.9	1.6
Mixed (both conductive and sensorineural)	52	3.0	1.6
Type of hearing loss missing(b)	52	3.0	1.6
Total	**1,718**	**100.0**	**54.3**

(a) Only includes children who were found to have hearing loss during an audiology check or for whom hearing loss information was missing, not stated, invalid, or indicated as unsure or not tested.

(b) Missing includes not stated, unsure, invalid and not tested responses to the question of what type of hearing loss the child had.

Source: AIHW analysis of NTER CHCI Audiology data for services on or before 30 June 2009.

With the introduction of specialised audiological facilities housed inside shipping containers Visual Reinforced Orientation Audiometry (VROA) was used for assessment of children aged 3 years and less. Testing using VROA does not give detailed separate ear information but uses speaker presentation of sound stimuli to provide measure of hearing ability in the 'better ear' (at least). During the CHCI audiology checks sound field measurements identified 13 additional children with hearing loss (Table 4.4). As this response indicates the 'better ear 'it represents a bilateral hearing loss. This category is therefore presented separately.

For children with hearing loss audiologists were also asked to indicate the degree of hearing loss present in their better ear.

It is important to bear in mind that the scoring for hearing loss and degree of hearing impairment were quantified differently. Hearing impairment classification in the Audiology data estimates degree of difficulty associated with hearing loss and links directly to level of recommended rehabilitation support. Hearing impairment classification applies a graded scale mild, moderate, severe and profound, based on degree of deviation in the 'better ear' as recorded through audiometry. During data collection it is calculated as a 3 frequency average (3FA) of the threshold of hearing loss (HTL) at 500Hz, 1000Hz and 2000Hz and is only applied to further describe bilateral hearing loss. Hearing loss includes children with unilateral hearing loss or those with hearing loss that is outside the averaged range used in this calculation, such as very low or high frequency hearing loss. It is therefore possible for a child to be found to have hearing loss (Table 4.4) but no degree of hearing impairment (Table 4.6).

Among children with hearing loss, just under than 40% had no hearing impairment, about 39% had a mild level of hearing loss, 20% had a moderate level, and less than 1% had a severe or profound level of hearing loss (Table 4.6). Eleven of the thirteen children with hearing loss detected by sound field test had mild to profound degree of hearing impairment.

Table 4.6: Degree of hearing impairment in Indigenous children with hearing loss

Degree of hearing impairment	Number	Per cent of children with hearing loss	Per cent of children who had an audiology check
None(a)	684	39.8	21.6
Mild(b)	670	39.0	21.2
Moderate(c)	343	20.0	10.8
Severe(d)	11	0.6	0.3
Profound(e)	5	0.3	0.2
Missing(f)	5	0.3	0.2
Total	**1,718**	**100.0**	**54.3**

(a) Includes some children found to having hearing loss (Table 4.4), because the degree of hearing impairment is calculated as an average across particular frequencies whereas hearing loss in Table 4.4 is assessed from the worst-performing frequency.

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

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

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

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

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

Source: AIHW analysis of NTER CHCI Audiology data for services on or before 30 June 2009.

4.6.2 Middle ear conditions

A question on the audiology form asked whether the child had a middle ear condition in either ear. Three in four (75%) children who had an audiology check had a middle ear condition in at least one ear (Table 4.7). By contrast, 30% of children aged 0—15 years who had a general CHC were found to have ear conditions (Table 2.4). Differences between the ways ear conditions are defined in the CHCs and in the audiology checks are explored in Section 4.8.

Middle ear conditions were also examined by type (Table 4.7). The most common type of middle ear condition present among those children who had had an audiology check was otitis media with effusion (31%), followed dry perforation (19%). The proportion of children with chronic suppurative otitis media (12%) was more than 3 times the level WHO described as a massive health problem. Note that because eustachian tube dysfunction was only specifically listed as an option in version 5 of the form which was used from 16 June 2008 (for other versions, it could be indicated in the 'other' response option), the prevalence of this condition is likely to be understated.

Table 4.7: Type of middle ear condition, Indigenous 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)]	12.3	82.7	3.6	1.4	100.0	3,165
Acute otitis media	7.1	88.2	3.3	1.4	100.0	3,165
Chronic suppurative otitis media	11.7	83.5	3.3	1.5	100.0	3,165
Otitis media with effusion	31.2	64.1	3.3	1.4	100.0	3,165
Dry perforation	19.4	76.1	3.0	1.5	100.0	3,165
Other	13.4	82.3	2.9	1.4	100.0	3,165
At least one type of middle ear condition[(b)]	74.5	22.8	1.6	1.0	100.0	3,165

(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.

(b) Includes middle ear conditions in either the right or left ear.

Note: This is a single response item; however, some children were reported to have more than one type of middle ear condition in either their right or left ear.

Source: AIHW analysis of NTER CHCI Audiology data for services on or before 30 June 2009.

4.6.3 Requirements for further action

As part of the audiology check, audiologists were asked to indicate what further follow-up the child required. Overall, at least one type of further action was required for 76% of children after their audiology check (Table 4.8). The most common types of further action required were: case management by PHC (50%); ongoing monitoring by Northern Territory hearing services (46%); and case management by ENT specialists (44%) (Table 4.8). 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 4.8: Type of further action required[a] after audiology check, Indigenous 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	50.1	49.4	0.4	100.0	3,165
Case management by Ear, Nose and Throat specialist	43.9	55.6	0.5	100.0	3,165
Ongoing monitoring by Northern Territory hearing services	46.4	53.1	0.5	100.0	3,165
Referral to Australian Hearing (rehabilitation)	11.7	87.8	0.5	100.0	3,165
Referral to Department of Education, Employment and Training hearing advisory support	24.2	75.3	0.5	100.0	3,165
Other	17.9	81.5	0.5	100.0	3,165
At least one further action required	75.6	23.9	0.4	100.0	3,165

(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 for services on or before 30 June 2009.

4.7 Changes over time

The results from the first audiology checks were compared with the results from the child's latest audiology check to determine whether any measures changed over time. 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 2), this item was not used for its intended purpose.

Whether or not a child had two audiology checks was determined by identifying audiology checks with the same HRN. There were 719 children who had two or more audiology checks by 30 June 2009 as part of the CHCI (Table 4.2). In order to present the most current information, the data presented compare the first audiology check with the latest check for each child. It should be noted that the average period of time between the first and last check was approximately five and a half months (164 days).

4.7.1 Hearing loss status

Among children who had had at least two audiology checks, 25% had no hearing loss at the time of their first check compared with 31% at the time of their latest check. The proportion of children who had bilateral hearing loss decreased from 46% at first check to 42% at latest check) (Table 4.9).

Table 4.9: Hearing loss at first and latest check, Indigenous children who had at least two audiology checks as part of the NTER CHCI

	First check		Latest check	
Hearing loss	**Number**	**Per cent**	**Number**	**Per cent**
None	178	24.8	220	30.6
Unilateral	167	23.2	160	22.3
Bilateral	332	46.2	305	42.4
Missing[a]	42	5.8	34	4.7
Total	**719**	**100.0**	**719**	**100.0**

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

Source: AIHW analysis of NTER CHCI Audiology data for services on or before 30 June 2009.

The change in the degree of hearing impairment among children who had at least two audiology checks was also examined. The proportion of children with no degree of hearing impairment at their first check (51%) increased to 59% at their most recent check (Table 4.10). The proportion of children with a mild or moderate degree of hearing impairment at their first check (29% and 15% respectively) decreased at their latest check (25% and 11% respectively).

Table 4.10: Degree of hearing impairment[a] at first and latest check, Indigenous children who had at least two audiology checks as part of the NTER CHCI

	First check		Latest check	
Degree of hearing impairment	**Number**	**Per cent**	**Number**	**Per cent**
None[b]	365	50.8	427	59.4
Mild[c]	205	28.5	177	24.6
Moderate[d]	106	14.7	81	11.3
Severe[e]	2	0.3	2	0.3
Profound[f]	0	0	<5	0.1
Missing[g]	41	5.7	31	4.3
Total	**719**	**100.0**	**719**	**100.0**

(a) Based on the 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 unsure, invalid, not stated and not tested responses.

Source: AIHW analysis of NTER CHCI Audiology data for services on or before 30 June 2009.

In order to determine exactly what changes in hearing impairment had occurred at an individual level, Table 4.11 presents data for children who had at least some hearing impairment at the time of their first audiology check, and shows whether their level of hearing impairment had improved, deteriorated, or stayed the same from their first to latest check. An improvement in hearing impairment was defined as a degree of hearing impairment at the child's latest check that had improved by at least one level since their first check, whereas deteriorated hearing impairment was defined as a degree of hearing impairment at the child's latest check that had worsened by at least one level since their first check.

The results show that the degree of hearing impairment improved for more than half (56%) of all children who had some level of hearing impairment at the time of their first check. The level of hearing impairment deteriorated between their first and latest check in one third (33%) of the children with hearing impairment at their first check. Hearing impairment did not change in 7% of the children.

It is not clear what factors caused the changes in degree of hearing impairment among these children. These changes may be attributed to the medical treatment and intervention, and may be also due to the fluctuating nature of hearing loss associated with otitis media.

Table 4.11: Changes in degree of hearing impairment(a) between first and latest check, Indigenous children with some hearing impairment

Degree of hearing impairment	Number	Per cent
Improved(b)	175	55.9
Deteriorated(c)	102	32.6
No change(d)	23	7.4
Missing(e)	13	4.2
Total	**313**	**100.0**

(a) Based on better ear. Includes only those children who had some degree of hearing impairment at their first check.

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

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

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

(e) Includes children for whom information on the degree of hearing impairment was missing on their latest check.

Source: AIHW analysis of NTER CHCI Audiology data for services on or before 30 June 2009.

4.8 Audiology and Child Health Check data collection linkage

Since the December 2008 progress report, the analysis of the Audiology data collection has focused more directly on those children who were identified as having an ear condition at the time of their CHC. Of special interest is the extent to which children with ear disease who were referred for audiology services at the time of their CHC actually received these services. 'Ear disease' is a derived variable created by the AIHW to capture children who suffer any of the following symptoms in either ear: wet perforation, dry perforation, bulging ear drum, otitis media, otitis externa and/or inflamed ear drum.

Note that the proportion of children with otitis media with effusion (OME) identified during CHC may not be as reliable as that diagnosed during an audiology assessment. This is because the two data collections used different methods to diagnose OME: during an audiology test, a child was tested using tympanometry which can detect OME more accurately than the octoscopy which was used in some CHCs.

In order to link the Child Health Check and Audiology data collections, valid and unique HRNs are required in both collections. Among the 10,605 children who had received a CHC as at 30 June 2009, 366 CHC forms with missing or 'incorrect'[2] HRNs were removed for linkage purposes. The number of children in the final CHC data set used for the linkage of collections differs between sections 4.8.1 and 4.8.2. That is, because Section 4.8.1 incorporates the use of ear conditions and referral status information from the CHC, children who had completed a non-standard CHC form were excluded from the final data set because this information was not available. Section 4.8.2, on the other hand, does not incorporate the information from the CHC, so children who had completed a non-standard CHC form were able to be included in analyses. For children who had had two valid CHCs, only their first valid CHC was used for linkage purposes because follow-up services are based on the referrals that were made during the child's initial health check. The total number of children included in the final CHC data sets for sections 4.8.1 is 9,137 and for section 4.8.2 is 10,239.

Of the 3,165 children who had had at least one audiology check as at 30 June 2009, there were 11 children for whom the HRN was missing on thirteen of these forms and these could not be linked with the CHC database. In total, data from the Audiology collection for 3,154 children could be used in the linkage of data sets. As was done for the CHC data, for those children who had had more than one audiology check, only the first audiology check was included for data linkage purposes.

4.8.1 Audiology check status: Ear health and audiology referrals made at Child Health Check

After excluding children with invalid or missing HRN and non-standard CHC forms, there were 9,137 children who had had a CHC as at 30 June 2009. Based on the information on their first CHC forms, 2,746 children were identified as having ear conditions, 6,391 children had no ear condition or information on ear conditions was missing.

Table 4.12 shows audiology referral status and audiology check follow-up of children who had CHCs, split according to whether or not they were identified as having ear conditions at the time of their first CHC. Overall, the proportion of children who had had an audiology check was larger among those who had ear conditions (35%) compared with those who did not (18%), regardless of whether they were referred for such services at their CHC.

As expected, there was a larger number of children with identified ear conditions who were referred for audiology services (923) than those with no ear conditions or missing data about ear conditions (366) at the time of their CHC (Table 4.12). Of those children who had ear conditions identified at the time of their CHC and who were referred for audiology services, 46% received an audiology check (Table 4.12). Of those children who had not been referred for audiology services, there was a larger proportion of children who had received an audiology check who had ear conditions (30%) than those who were not found to have them (17%).

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[2] 'Incorrect' HRNs are those that were identified by the NT DHF as incorrect during data cleaning processes but for which the correct HRN was unknown.

Based on the audiology check forms relating to checks conducted up until 30 June 2009, 44% (561) of children who had received an audiology referral at the time of their CHC had received at least one follow-up audiology check (Table 4.12). This has doubled since the December 2008 progress report, where 20% of children who had an audiology referral had received an audiology check.

Table 4.12: Audiology referral status at CHC by whether audiology check follow-up had been received, ear condition status of Indigenous children who had a Child Health Check

	Children who had an audiology check		Total children [(a)] with or without audiology check
	Number	**Per cent**	**Number**
Children with identifiable ear condition at CHC			
Children with an audiology[(b)] referral	420	45.5	923
Children with no audiology referral or for whom referrals information was missing	541	29.7	1,823
Total children with ear condition	*961*	*35.0*	*2,746*
Children with no ear condition or missing[(c)] ear condition data at CHC			
Children with an audiology[(b)] referral	141	38.5	366
Children with no audiology referral or for whom referrals information was missing	1,038	17.2	6,025
Total children with no ear condition or missing data	*1,179*	*18.4*	*6,391*
Total children with referrals	*561*	*43.5*	*1,289*
Total children	**2,140**	**23.4**	**9,137**

(a) Excluding children with missing or invalid HRN and non-standard CHC forms.

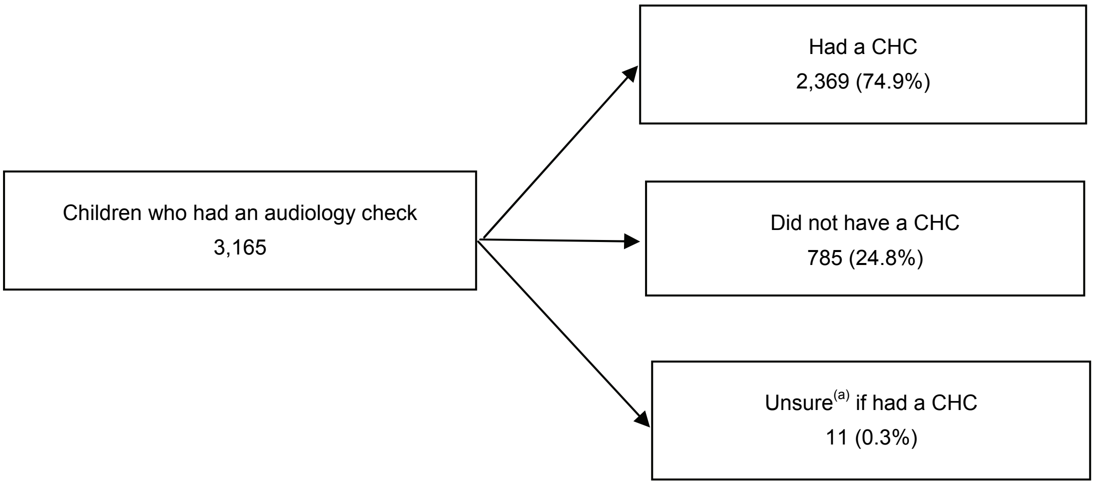
(b) Refers to referrals for audiology and/or tympanometry services. The number of referrals was derived based on the first CHC only.

(c) Missing includes unsure, not stated and not tested responses. The number of ear conditions was derived based on the first CHC only.

Source: AIHW analysis of NTER CHCI Audiology data and Child Health Check data for services on or before 30 June 2009.

4.8.2 Child Health Check status: Audiology check follow-up results

Figure 4.1 shows the percentage of children who had had an audiology check and who had also had a previous CHC, based on audiology check forms received by the cut-off date. Just under three-quarter (75%) children who had an audiology check had had a previous CHC. This is higher than the proportion of children in the December 2008 progress report who had an audiology check and a previous CHC (68%). There were 11 audiology checks for which the HRN was not provided, so it was not known if a previous CHC had been undertaken in these cases.



(a) Includes those children who had an audiology check but were missing an HRN and could not be linked to the CHC database.

Source: AIHW analysis of linked NTER Child Health Check and Audiology data for services on or before 30 June 2009.

Figure 4.1: Audiology check and Child Health Check status, Indigenous children who had an audiology check as part of the NTER CHCI

The proportion of children who had hearing loss was similar among those who had not had a CHC (41%) compared with those who had (37%) (Table 4.13). There was little difference in type of hearing loss and degree of hearing loss among these two groups of children.

Table 4.13: Hearing loss by whether or not a Child Health Check was undertaken, Indigenous children who had an audiology check as part of the NTER CHCI [(a)]

	CHC		No CHC	
	Number	**Per cent**	**Number**	**Per cent**
Hearing loss				
None	876	37.0	318	40.6
Unilateral	441	18.6	137	17.5
Bilateral	884	37.3	271	34.4
Sound field	6	0.25	3	0.38
Missing[(b)]	162	7.1	56	7.5
Total	**2,369**	**100.0**	**785**	**100.0**
Type of hearing loss				
None	876	37.0	318	40.6
Conductive	1,215	51.3	366	46.7
Sensorineural	37	1.6	21	2.7
Mixed (both conductive and sensorineural)	37	1.6	14	1.8
Missing[(b)]	204	8.6	66	8.3
Total	**2,369**	**100.0**	**785**	**100.0**
Degree of hearing loss[(c)]				
None[(d)]	1,379	58.2	481	61.4
Mild[(e)]	547	23.1	151	19.3
Moderate[(f)]	276	11.7	90	11.5
Severe[(g)]	8	0.3	3	0.4
Profound[(h)]	3	0.1	1	0.1
Missing[(b)]	156	6.6	58	7.4
Total	**2,369**	**100.0**	**785**	**100.0**

(a) Exclude children with missing or invalid HRNs. Hearing loss, hearing impairment and type of hearing loss were assessed based on the information in the first audiology check, which was different to what was in the last check reported in the previous section of this chapter.

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

(c) Based on better ear.

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

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

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

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

(h) 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 for services on or before 30 June 2009.

The proportion of children with at least one type of middle ear condition was also similar for those children who had had a CHC (76%) compared with those who had not (72%) (Table 4.14).

Table 4.14 Middle ear conditions by whether or not a Child Health Check was undertaken, Indigenous children who had an audiology check as part of the NTER CHCI

	CHC		No CHC	
At least one middle ear condition[(a)]	**Number**	**Per cent**	**Number**	**Per cent**
Yes	1,790	75.6	563	71.7
No	522	22.0	197	25.1
Unsure	37	1.6	12	1.5
Missing	20	0.8	13	1.7
Total	**2,369**	**100**	**785**	**100**

(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 for services on or before 30 June 2009.

4.9 Discussion

There were 3,517 children who had an audiology check. The AIHW had detailed data on 3,165 of these children among whom:

- Fifty-four per cent had some hearing loss.
- Seventy-five per cent had at least one middle ear condition, the most common type being otitis media with effusion (31%).
- Nineteen per cent had eardrum perforation.
- Nearly 12% had chronic suppurative otitis media, more than 3 times the level WHO described as a massive health problem.
- Seventy-six per cent of children required further action following their most recent audiology check.
- Case management by Primary Health Care services (50%) was the most common type of follow-up action required.

In relation to those 719 children who received at least two audiology checks:

- The proportion with no hearing loss increased between the first (25%) to latest (31%) check.
- The degree of hearing impairment improved between the first and latest check for more than half (56%) of the children who had some level of hearing loss at their first check. This improvement could be due to ear conditions healing of their own accord, as well as due to treatment.

Among children who had a NTER CHC, 1,289 were referred for audiology follow-up:

- About 44% (561) of these children had received an audiology check by 30 June 2009, double the number in the December 2008 progress report. This proportion is likely to increase as more audiology checks are conducted.

5 Follow-up: dental

5.1 Introduction

The May 2008 Northern Territory Emergency Response (NTER) Child Health Check Initiative (CHCI) progress report found that 43% of the children who had received a CHC had been identified as having some kind of oral health problem. In response to these findings, the Australian Government has funded the Northern Territory Department of Health and Families (NT DHF) and several Aboriginal Community Controlled Health Organisations (ACCHOs) to undertake follow-up dental services as part of the CHCI. These services are being provided by outreach teams of dental clinicians from the NT DHF and ACCHOs to children who had a CHC, as well as to other Indigenous children aged 15 years or less who live within the prescribed areas of the Northern Territory. The remaining references to NT DHF in this chapter refer specifically to its Helping Hands Oral Health Team.

This chapter presents the number of dental services that were provided to the Indigenous children in the prescribed areas by 30 June 2009. It also describes the demographic characteristics of those children who participated in the CHCI Dental data collection. Key findings from the analysis of the dental data are also presented, followed by further analyses conducted by comparing the CHC and dental databases. In addition, it provides some insight into the interpretation and limitations of the CHCI dental data collection. A glossary of dental data terms used throughout this chapter is provided at the end of this report.

5.2 Information about the CHCI dental data collection

Information for the dental data collection is transferred to the AIHW both in paper and electronic format. The information captured as part of the collection includes:

- details about the child (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)
- 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 the majority of services conducted by either the ACCHOs or the NT DHF and is therefore not presented in this report.

Two types of measurements are used in this chapter: 'dental check' and 'a child'. 'Dental check' is used as the unit of measurement of dental services provided. It is based on an 'occasion of service', which refers to occasions of examination, consultation, treatment or other service provided to a patient. Another unit of measurement 'a child' is used to present the oral health outcomes of children based on findings from the dental checks.

5.3 Interpretation and limitations of the CHCI Dental data collection

Data coverage for the CHCI Dental data collection is limited to data collected from the dental services provided by the NT DHF Helping Hands Oral Health Team and ACCHO dental outreach teams. However, a very small number of unit records relate to occasions of service provided by other NT DHF Oral Health Services. Furthermore, the scope of this collection is limited to children between the ages of 0 and 15 at the time of their dental check, unless they had received a previous CHC at which they had been aged 15 years or less.

When interpreting data from this collection, it should be noted that the children who received a dental check were not a random sample. Firstly, dental checks were only provided to children who volunteered for them. Secondly, although all Indigenous children in prescribed areas of the Northern Territory were eligible to receive a CHCI Dental check, children with dental referrals from the CHC data collection were targeted for follow-up by the dental outreach teams. Thus, the findings from the Dental data collection are not representative of the Northern Territory Indigenous child population or the Indigenous population of children within prescribed areas of the NTER CHCI. It should also be noted that consent forms were provided for dental treatment for all of these children. Diagnostic checks were sometimes provided in a separate occasion of service from the relevant treatment services. This means that there are more occasions of service than might be the case if these occurred at the same visit. 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.

It should be also noted that a considerable number of children who received the dental services did not give consent for sharing their dental health information with the AIHW. The NT DHF therefore provided total numbers for categories for these dental services to the AIHW for the purpose of monitoring dental services, rather than data consisting of individual records. Because of this, data for these children were not able to be linked to the CHC database. As such, apart from Table 5.1, the data in this chapter are only derived from dental service information for which consent was obtained, and therefore the true proportion of children who had dental referrals at their CHC and received follow-up dental services is higher than is reported here.

As a result of these limitations, the number of follow-up dental services described in this report is understated. More information about data quality and interpretation can be found in Appendix 2 of this report.

5.4 Dental forms received and processed

Information about the dental services provided through ACCHOs is sent to the AIHW on paper forms. Information about dental services provided by the NT DHF is transmitted to the AIHW in a secure electronic format.

In total, 3,738 dental records had been received by the AIHW that related to services conducted on or before 30 June 2009. After removing duplicate records and records for children outside the applicable age range, 3,608 processed records remained. These represented 3,608 occasions of service provided to 2,349 children. Of these 2,349 children, 1,456 had one check, 621 children had two checks, 199 children had three checks and 73 children had four or more checks (Table 5.1). Among these records, 428 dental records were supplied by ACCHOs that received NTER funding to provide dental follow-up services; these services were provided to 262 children. It is possible that some ACCHOs provided follow-up dental services independent of NTER funding arrangements, but these data are not available to the AIHW. All remaining dental data was provided by NT DHF.

According to the data provided by NT DHF, there were 1,006 children for whom consent was not obtained and who received follow-up dental care across 1,498 occasions of service (Table 5.1).

Table 5.1: Number of dental checks[(a)] per child, Indigenous children who had a dental check as part of the NTER CHCI

	Checks		Children	
	Number	Per cent of all checks	Number	Per cent of children with consent[(a)]
Dental checks with consent				
1 dental check[(b)]	*1,456*	*28.5*	*1,456*	*62.0*
2 dental checks	*1,242*	*24.3*	*621*	*26.4*
3 dental checks	*597*	*11.7*	*199*	*8.5*
4 dental checks	*228*	*4.5*	*57*	*2.4*
5 dental checks	*60*	*1.2*	*12*	*0.5*
6 dental checks	*18*	*0.4*	*<5*	*0.1*
7 dental checks	*7*	*0.1*	*<5*	*< 0.1*
Total checks with consent	3,608	70.7	2,349	100.0
Dental checks without consent	1,498	29.3	1,006	. .
Total number of dental checks	**5,106**	**100.0**	**3,355**	**. .**

. . Not applicable

(a) This excludes duplicate forms and forms for children outside of the applicable age range that were found during the processing stage.

(b) Consent to transfer children's information to AIHW.

Source: AIHW analysis of NTER CHCI Dental data for services on or before 30 June 2009.

Table 5.2 shows that the largest proportion of dental records has been received from the Arnhem region (35%), while 23% were received from Central Australia, 22% from Darwin Rural and 18% from the Barkly and Katherine regions combined.

Table 5.2: Number of dental forms received[(a)], by region

Region	Number	Per cent
Arnhem	1,274	35.3
Central Australia	816	22.6
Darwin Rural	795	22.0
Katherine/Barkly	630	17.5
Hospitals	93	2.6
All Regions	**3,608**	**100.0**

(a) This excludes duplicate forms and forms for children outside of the applicable age range that were found during the processing stage.

Source: AIHW Community log for services on or before 30 June 2009.

5.5 Demographic characteristics

As shown in Table 5.3, of the 2,349 children who received a dental check, 33% received a check in Arnhem, 24% in Central Australia, 22% in Darwin Rural, and 18% received a check in the Barkly or Katherine regions. Note, however, that sometimes the child's 'home community' (community in which the child lives) was recorded instead of the community 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.

Table 5.3: Demographic characteristics, Indigenous children who had a dental check as part of the NTER CHCI

	Children	
	Number	Per cent
Region		
Arnhem	770	32.8
Central Australia	571	24.3
Darwin Rural	516	22.0
Katherine/Barkly	426	18.1
Hospitals	66	2.8
Total	**2,349**	**100.0**
Age group		
0–5 years	565	24.1
6–11 years	1,315	56.0
12–15 years	462	19.7
Missing	7	0.3
Total	**2,349**	**100.0**

(continued)

Table 5.3 (continued): Demographic characteristics, Indigenous children who had a dental check as part of the NTER CHCI

	Children	
	Number	Per cent
Sex		
Male	1,170	49.8
Female	1,178	50.2
Missing	<5	<0.1
Total	**2,349**	**100.0**

Note: These figures are based on each child's latest check

Source: AIHW analysis of NTER CHCI Dental data for services on or before 30 June 2009.

Nearly one in four (24%) of the children who had checks were aged 0 to 5 years, while 56% were aged 6 to 11 years and almost 20% were aged 12 to 15 years (Table 5.3). Data on age group is missing for less than 1% of checks. An equal proportion of boys and girls had had a dental check (both 50%).

5.6 Dental services provided and problems treated

As part of the dental check, health professionals were asked to record which dental services were provided. More than nine out of 10 (93%) children who received an NTER CHCI dental check received a diagnostic service. In addition, nearly three in five (59%) of the children who received a dental check received a preventative service, half (50%) received a restorative service and 16% received a surgical service. Less than 2% of children received a periodontic service, endodontic service, orthodontic service, or work on a crown or bridge. No children received a prosthetics service. Seven percent of children received some other type of treatment (Table 5.4).

Table 5.4: Dental services provided by dental clinicians, by number of Indigenous children who received a dental check as part of the NTER CHCI

Dental services provided[(a)]	Number	Per cent
Diagnostic	2,185	93.0
Preventative	1,385	58.9
Restorative	1,183	50.3
Surgery	366	15.5
Endodontic	43	1.8
Periodontic	36	1.5
Crown or bridge	19	0.8
Orthodontic	6	0.2
Prosthetics	0	0.0
Other	174	7.4
Total number of children	**2,349**	**100.0**

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

Note: This is a multiple response item. If a child was provided with a dental service at any one of their dental checks, they were counted once against that particular service. Data about dental services were missing for 1.7% of children.

Source: AIHW analysis of NTER CHCI Dental data for services on or before 30 June 2009.

As part of the dental check, health professionals were asked to record which problems were treated. Approximately half (54%) of children who received a NTER CHCI dental check were treated for previously untreated caries. Half (50%) of the children who received a dental check were provided with oral health education and 24% (about a quarter) were treated for inadequate dental hygiene (including plaque and calcification). Around one in 18 (6%) children were treated for mouth infection or mouth sores and one in 36 (3%) were treated for gum disease. Less than 2% of children were treated for broken or chipped teeth due to trauma, abnormal teeth growth or missing teeth. Nine per cent of children who received a dental check were treated for other problems (Table 5.5).

Table 5.5: Dental problems treated by dental clinicians, by number of Indigenous children who received a dental check as part of the NTER CHCI

Problems treated	Number	Per cent
Untreated caries	1,268	53.9
Oral health education	1,177	50.1
Dental hygiene (including plaque and calcification)	574	24.4
Mouth infection or mouth sores	134	5.7
Gum disease	67	2.8
Abnormal teeth growth	37	1.5
Broken or chipped teeth due to trauma	35	1.4
Missing teeth	13	0.5
Other	222	9.4
Total number of children	**2,349**	. .

. . Not applicable.

Note: This is a multiple response item. If a child was treated for a dental problem at any one of their dental checks, they were counted once against that particular problem. Data about problems treated were missing for 3.4% of children.

Source: AIHW analysis of NTER CHCI Dental data for services on or before 30 June 2009.

5.7 Further action required

As part of the dental check, health professionals were asked to assess whether further follow-up was required. Approximately one-third (35%) of children who received an NTER CHCI dental check were assessed as requiring further follow-up. As shown in Table 5.6, the Arnhem region had the greatest proportion of occasions of service requiring follow-up (51%), followed by Darwin Rural (41%). About the same proportion of occasions of service required follow-up in Katherine and Barkly and in Central Australia (22%).

Table 5.6: Children requiring follow-up treatment at latest dental check, by region

Region	Children requiring follow-up: Number	Children requiring follow-up: Per cent	Total number of children
Arnhem	396	51.4	770
Central Australia	124	21.7	571
Darwin Rural	210	40.7	516
Katherine/Barkly	92	21.6	426
Hospitals	<5	n.a.	66
Total	**825**	**35.1**	**2,349**

Note: These figures are based on each child's latest check.

n.a.: Not available, because the numbers of children in these categories was very small.

Source: AIHW analysis of NTER CHCI Dental data for services on or before 30 June 2009.

5.8 Dental follow-up services among children with a CHC

As the four NTER CHCI data collections become more complete, it becomes possible to track a greater number of children between the collections. Of particular interest is how many children in the CHC data collection have received follow-up dental treatment since their CHC, especially for those children who were identified as having oral health problems and who also received a referral for follow-up dental services[3].

To do this, dental health information from children's first CHC and first dental check was compared. In order to link the CHC and Dental data collections, valid and unique HRNs are required in both collections. Among the 10,605 children who had received a CHC as at 30 June 2009, 366 CHC forms with missing or 'incorrect' HRNs were removed for linkage purposes. The number of children in the final CHC data set used for the linkage of collections differs between Sections 5.8 and 5.9. Section 5.8 excludes children who had completed a non-standard CHC form where no oral health status and referral information was available whereas Section 5.9 includes children who had completed a non-standard form. For children who had two valid CHCs, only their first valid CHC was used for linkage purposes because follow-up services are based on the referrals that were made during the child's initial health check. The total number of children included in the final CHC data sets for Sections 5.8 and 5.9 was 9,137 and 10,239, respectively.

The 9,137 children included in the CHC linkage database for Section 5.8 differs from the final CHC data set used for the analyses of health conditions and referrals presented in Chapter 2 of this report (9,373 children) because the CHC data set used for linkage purposes excludes CHC forms with missing or 'incorrect' HRNs that were otherwise included in analyses.

Once a linkage data set was established using valid CHC records, this could be used to locate particular children present in the dental database and trace their dental follow-up status.

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[3] The definition of 'oral health problem' in the CHC data collection includes: untreated caries; gum disease; broken or chipped teeth; abnormal teeth growth; missing teeth; mouth infection and sores; and plaque and poor dental hygiene.

However, getting the most accurate results with this method requires a complete unit record-level dental database, which is not currently the case. As previously discussed, there are a large number of children (1,006) who are known to have received a dental check but for whom explicit consent was not given for their unit record data to be provided to the AIHW. Information on these children can therefore only be provided in aggregate form to the AIHW, and matching these children to the CHC linkage database must be done by DHF. It is not possible to present disaggregated information on these children in this report.

Of the 2,349 children who had had at least one dental check as at 30 June 2009 for which consent was given to provide the AIHW with unit level data, the HRN was missing for 57 of these records and these could not be linked with the CHC database. In total, data from the Dental collection for 2,292 children could be used in the linkage of data sets. As was done for the CHC data, for those children who had had more than one dental check, only the first of their dental checks was included for data linkage purposes.

5.8.1 Oral health and dental referral status

Data linkage performed by the DHF on the total number of children who have received dental services has shown that almost two in five (38%) of the children who were referred for dental services at their CHC had received at least one follow-up dental check on or before 30 June 2009. This proportion represents the most accurate picture of current dental follow-up care for children who had a CHC.

In this report, however, the AIHW can only present detailed information on a subset of these children: those for whom consent was given to collect unit level data. The following proportions are based on this smaller subset of children. It should be noted that these proportions are understated due to the exclusion of the 1,006 children who did not provide consent. According to the unit record data that the AIHW has received, one in four (25%) children who had received a dental referral at the time of their CHC had received at least one follow-up dental check on or before 30 June 2009.

Of the 9,137 children who had had a CHC as at 30 June 2009, 3,950 children were identified as having an oral health problem, 5,187 children had no oral health problems or information on oral health problems was missing. Table 5.7 shows the dental referral status and dental check follow-up of children who had had a CHC, split according to whether or not they were identified as having an oral health problem at the time of their CHC. Overall, the proportion of children who had had a dental check and gave consent for this information to be provided to the AIHW was larger among those who had an oral health problem at CHC (24%) compared with those who did not (12%), regardless of whether they were referred for such services at their CHC. As expected, there were many more children with an oral health problem who were referred for dental services (2,961) than those with no oral health problem or missing data about oral health problems (262) at the time of their CHC (Table 5.7).

Of those children who had an oral health problem at the time of their CHC and were referred for dental services, 25% had received a dental check for which information could be provided to the AIHW (Table 5.7). Of those children who had not been referred for dental services, or for whom referral information was missing, there was a larger proportion of children with oral health problems who had received a dental check (20%) than those children with no recorded oral health problem (12%).

Table 5.7: Dental referral status at CHC by whether dental check follow-up had been received and oral health status of Indigenous children who had a Child Health Check as part of the NTER CHCI

	Children who had a dental check		Total children
	Number	Per cent	Number
Children with an oral health problem at CHC			
Children with a dental referral	751	25.3	2,961
Children with no dental referral or for whom referrals information was missing[(a)]	202	20.4	989
Total children with oral health problem	*953*	*24.1*	*3,950*
Children with no oral health problem or missing[(b)] oral health problem data at CHC			
Children with a dental referral	55	20.9	262
Children with no dental referral or for whom referrals information was missing[(a)]	568	11.5	4,925
Total children with no oral health problem or missing data	*623*	*12.0*	*5,187*
Total children with dental referral	*806*	*25.0*	*3,223*
Total children	**1,576**	**17.2**	**9,137**

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

(b) Children with missing data on oral health make up 10.1% of the total children who had undertaken a CHC.

Note: These figures are based on each child's first dental and CHC checks. This table only includes data on children for whom consent was given to provide unit record level information to the AIHW.

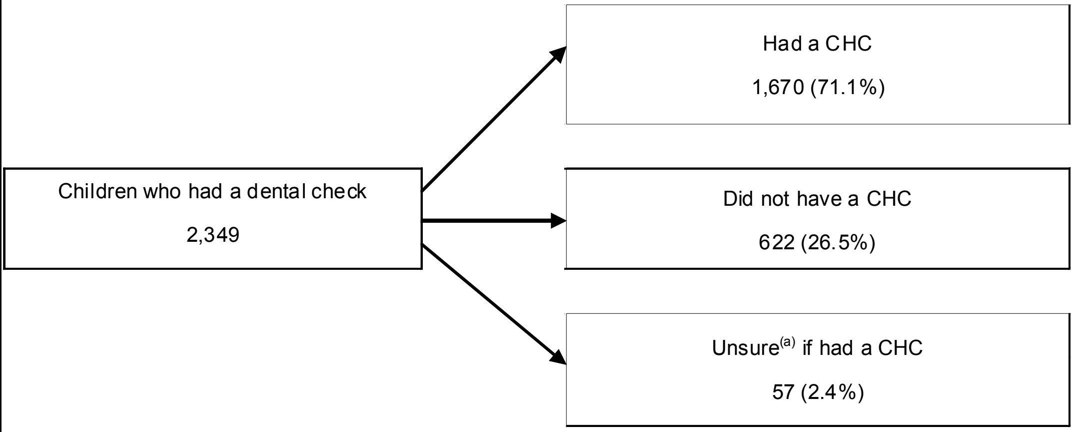
Source: AIHW analysis of NTER CHCI Dental data and Child Health Check data for services on or before 30 June 2009.

5.9 Dental check results for children with or without a Child Health Check

Figure 5.1 shows the percentage of children who had had a dental check, who had also had a Child Health Check first. About seven in 10 (71%) children who had a dental check had previously had a CHC. There were 57 dental checks for which a HRN was not provided; therefore, it was not known if the children who had these checks had previously had a CHC.

Table 5.8 shows the problems treated among children who had at least one dental check, with or without a previous CHC. Although 'problems treated' cannot directly evaluate oral health, it can be used as a proxy measure. There are no dramatic differences in oral health status between these two groups of children, though the proportion of children with untreated caries is nearly ten percentage points higher in those with no CHC than in those who had a CHC. Where there are differences between oral health problems treated, they are very low for both groups of children.

It should be noted that Table 5.8 looks at problems treated across all dental checks provided to children, instead of the first dental check provided. This is because each check, or 'occasion of service', does not accurately reflect all of the services provided during the entire 'course of care' to which it belongs (a 'course of care' is a grouping of related occasions of service). For more information about the interpretation and limitations of the CHCI Dental data collection, see Section 5.3 or Appendix 2.



(a) Includes those children who had a dental check but were missing an HRN and could not be linked to the CHC database.

Source: AIHW analysis of linked NTER Child Health Check and Dental data for services on or before 30 June 2009.

Figure 5.1: Dental check and Child Health Check status, Indigenous children who had a dental check as part of the NTER CHCI

Table 5.8: Problems treated by whether or not a Child Health Check was undertaken, Indigenous children who had dental check as part of the NTER CHCI

	CHC		No CHC	
	Number	**Per cent**	**Number**	**Per cent**
Problems treated				
Untreated caries	797	47.7	357	57.3
Gum disease	905	54.1	347	55.7
Broken or chipped teeth due to trauma	40	2.3	25	4.0
Abnormal teeth growth	25	1.4	10	1.6
Missing teeth	29	1.7	8	1.2
Mouth infection or mouth sores	5	0.2	8	1.2
Dental hygiene (including plaque and calcification)	92	5.5	41	6.5
Other	383	22.9	187	30.0
Total number of children	**1,670**	**..**	**622**	**..**

.. Not applicable

Note: This is a multiple response item. If a child was treated for a dental problem at any one of their dental checks, they were counted once against that particular problem. Data about problems treated were missing for 3.4% of children.

Source: AIHW analysis of NTER CHCI Dental data and Child Health Check data for services on or before 30 June 2009.

5.10 Summary and discussion

There were 3,355 children who received a dental health check as part of the NTER CHCI. Detailed data on services and treatment were available for 2,349 of these children.

Among these children:

- Ninety-three per cent (2,185) received a diagnostic service, 59% (1,385) received a preventative service, 50% (1,183) received a restorative service and 16% (366) received a surgical service.
- Fifty-four per cent (1,268) had treatment for untreated caries; 50% (1,177) were provided with oral health education; 24% (574) were treated for inadequate dental hygiene (including plaque and calcification); 6% (134) were treated for mouth infection or mouth sores; and 3% (67) were treated for gum disease.
- Thirty-five per cent (825) were assessed as requiring further follow-up treatment.

Of the 3,223 children who had received a referral to dental follow-up services during their CHC, 38% had received a dental check (though only 25% of those for whom the AIHW had detailed data had received a dental check):

The proportion of children who had received a follow-up dental check was higher among those children who had an oral health problem (24%) compared with those who did not (12%).

6 Follow-up: hospital services

6.1 Introduction

Chapters 4 and 5 of this report presented information from Audiology and Dental data collections on follow-up activities with audiology and dental services for children who had had a Child Health Check (CHC). Besides these data, the AIHW has been working closely with the NT DHF to find out what other follow-up services may have been provided to these children through NT hospitals. To do so, the AIHW and the NT DHF worked collaboratively to link children who had CHCs with NT DHF databases on follow-up services, using the hospital registration number (HRN). These follow-up data sets include the following:

- Northern Territory hospital inpatient data (hospitalisation)
- Northern Territory hospital outpatient data

This data linkage allowed the AIHW to see what follow-up services had been provided by DHF hospital services to children whose health conditions were identified during their health check and had referrals that were either directly or indirectly made at CHCs.

This chapter reports on the key findings based on the data obtained from the linkage process. The hospital services reported in this chapter include the services provided up to 30 June 2009 only.

6.2 Method of data linkage and data limitations

This section provides a brief description of how this data was linked as well as an overview of the limitations of this linkage.

6.2.1 Method of data linkage

In order to link the CHC and NT DHF data warehouse data sets, valid and unique HRNs are required in both collections. To ensure the HRNs used for data linkage were accurate, all records for CHCs performed up to 30 June 2009 that were in the AIHW CHC database as at 15 September 2009 were validated HRN against the DHF data warehouse using date of birth, sex and community IDs. Once the NT DHF had verified the accuracy of the AIHW database, a repaired CHC data set was sent to the NT DHF to be linked to their hospital data. The data linkage was performed from 30 September to 1 October 2009.

The results of the data linkage were provided to the AIHW from the NT DHF as either individual records (i.e. unit record data) or as totals for various categories listed in NT DHF's records (i.e. aggregate data), depending on whether or not the child was referred for follow-up services from their CHC. That is, it was agreed that unit record data regarding NT hospital inpatients and outpatients would only be provided by the NT DHF for those children who were referred for at least one service following their CHC (regardless of the type of service), because this was the process through which consent for the sharing of such information was obtained. For those children who had not been referred for any services at the time of their CHC, but had nonetheless received follow-up services, only aggregated NT hospital data were provided.

6.2.2 Limitations

There are several limitations to the data presented in this chapter that should be taken into account when interpreting the information provided.

The data obtained from the data linkage process only included the hospital services that can be identified as CHC-related follow-up in the NT DHF hospital data set. The NT DHF believes that the follow-up services received as part of CHCs may not have been appropriately recorded in the NT DHF hospital data set, and therefore the data provided to the AIHW may reflect a subset of the hospital services that NT DHF provided to these children.

The final issue to consider relates to the fact that certain types of services, such as mental health and social worker services, are of a sensitive nature and access to such information is restricted. Follow-up information on these services is therefore not included in these analyses.

Given these limitations, it is likely that the findings presented in this chapter understate the number of children who had received health services and the number of health services provided to children as part of their health checks.

6.3 Hospital services received by children with a referral from CHC

This section presents the number and type of follow-up hospital services provided to children who were referred for at least one type of follow-up service at the time of their first CHC.

It must be noted that unit record data on any number of follow-up hospital services received by that child are presented as long as that child had at least one referral at their first CHC. However, the type of service for which the child was referred does not necessarily correspond to the type of hospital services they received. This is because these services were most likely provided as a result of a secondary referral given to the child when they attended the referral they were given at their CHC.

Table 6.1 shows that 1,526 (24%) children who had a referral at their CHC received 3,485 hospital services between 10 July 2007 and 30 June 2009. Of these, 326 children were hospitalised at least once. The most common causes of hospitalisation were ear disease, diseases of the oral cavity, salivary gland and jaws, and respiratory diseases.

In addition, 1,433 children received health services in hospital outpatient clinics, which mainly consisted of visits to paediatricians, physicians and ENT specialists at these outpatient clinics (Table 6.1).

Table 6.1: Number of follow-up services received by type of service, Indigenous children who had a NTER Child Health Check and were referred for follow-up services

	Number of children who received services		
Type of service	**Number**	**Percent**	**Number of services received**
Hospitalisation			
Ear disease	191	3.0	191
Diseases of the oral cavity, salivary glands and jaws	146	2.3	146
Respiratory disease	6	0.1	6
Other diseases	9	0.1	9
Subtotal for hospitalisation	*326*[(a)]	*5.1*	*352*
Outpatient clinics			
Paediatrician	348	5.5	727
Internal medicine	332	5.2	500
ENT	316	5.0	559
Surgeon	173	2.7	225
Orthopaedic	124	2.0	241
Optometrist or ophthalmologist	67	1.1	122
Allied health services	37	0.6	113
Other specialists	19	0.3	43
Unknown	517	8.1	629
Subtotal for outpatient services	*1,433*[(a)]	*22.6*	*3,159*
Total number of children who received hospital services	**1,526**[(a)]	**24.0**	**3,485**
Total number of children who had at least one referral	**6,353**	**100.0**	**..**

.. Not applicable

(a) Because a child can receive multiple hospital services, these totals do not reflect the sum of all above services.

Source: AIHW analysis of NTER CHCI Child Health Check data and NT DHF linked data for services on or before 30 June 2009.

6.4 Other follow-up services received by children without a referral from CHC

About 30% of children who had a CHC did not receive any referral. Some of these children have had a referral in place or was on a waiting list before the CHC. Therefore, they were not received same referral from Child Health Check teams. In addition, some of these children did not receive a referral although such conditions were identified at their CHC, because their conditions were only deemed necessary for which further treatment or follow-up at a later date.

Because these children did not receive a referral at their CHC, consent for AIHW to receive unit record data on their follow-up services was not obtained. The data reported in this section are the aggregated data that were provided directly by the NT DHF to the AIHW.

There were 986 hospital services that were provided to 774 children who had a CHC, but did not have a referral from the CHC (Table 6.2). These included 111 episodes of hospital care and 875 health services in outpatient clinics. The most common causes of hospitalisation for these children without a referral were ear disease and diseases of the oral cavity, salivary glands and jaws. As with the children with referrals, they were also more likely to visit paediatricians, physicians and ENT specialists in these outpatient clinics (Table 6.2).

Table 6.2: Number of follow-up services received by type of service, Indigenous children who had a NTER Child Health Check and were not referred for follow-up services

	Number of children who received services		
Type of service	**Number**	**Percent**	**Number of services received**
Hospitalisation			
Ear disease	60	2.0	60
Diseases of the oral cavity, salivary glands and jaws	43	1.4	43
Other diseases	8	0.3	8
Subtotal for hospitalisation	*106*[(a)]	*3.5*	*111*
Outpatient clinics			
Paediatrician	142	4.7	349
Internal medicine	130	4.3	156
ENT	128	4.3	201
Surgeon	86	2.9	110
Orthopaedic	67	2.2	140
Optometrist or ophthalmologist	28	0.9	45
Allied health services	9	0.3	29
Other specialist	5	0.2	10
Unknown	265	8.8	340
Subtotal for outpatient services	*668*[(a)]	*22.3*	*875*
Total number of children who received hospital services	**774**[(a)]	**25.8**	**986**
Total number of children who had no referral at CHC	**3,000**	**100**	**..**

.. Not applicable

(a) Because a child can receive multiple types of hospital services, these totals do not add up to the sum of numbers above them.

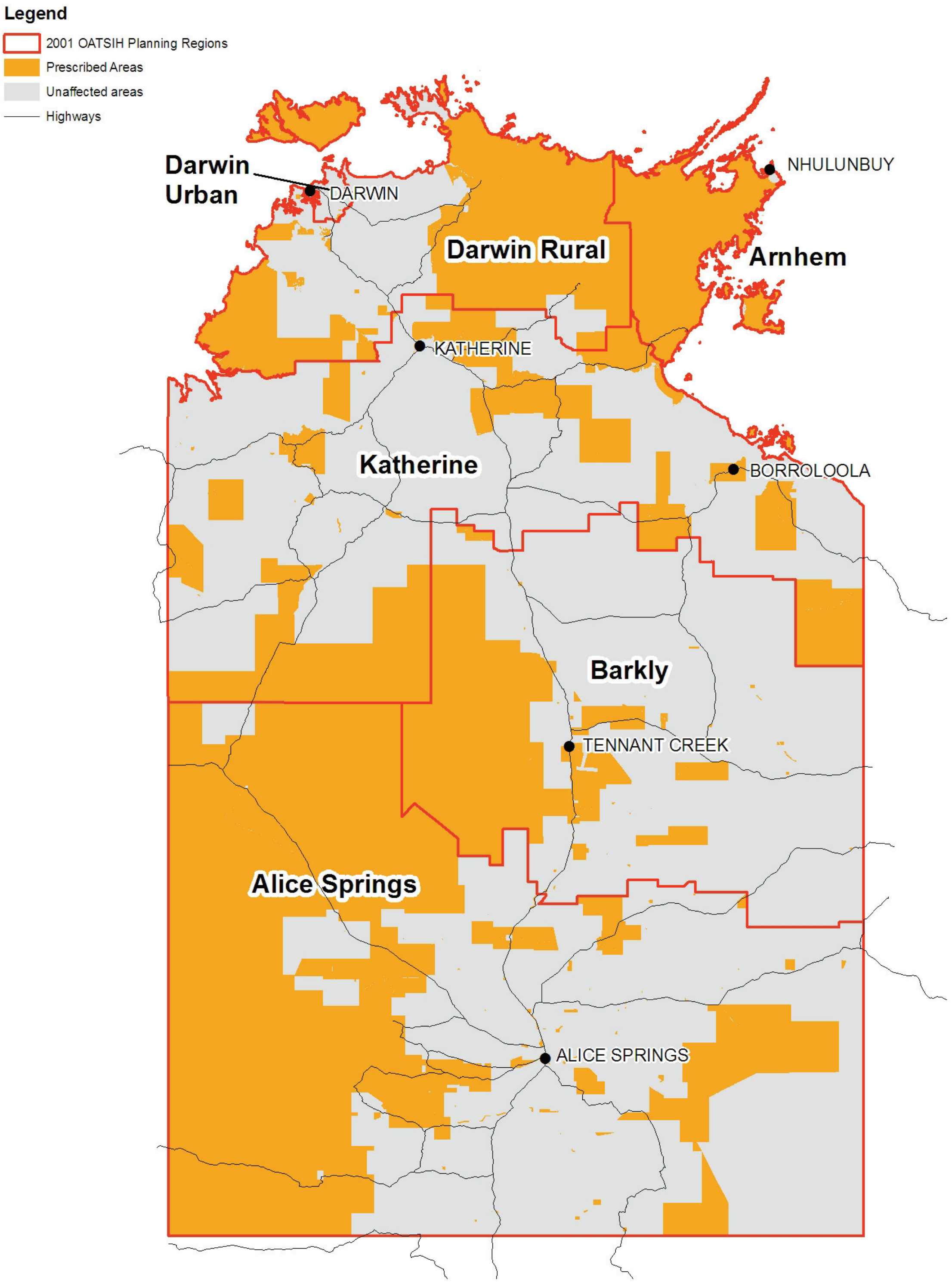
Source: AIHW analysis of NTER CHCI Child Health Check data and NT DHF linked data for services on or before 30 June 2009.

6.5 Summary

Linking the NTER CHCI database and the NT DHF's hospital database revealed that:

- Overall, 1,526 (24%) children who were given referrals during their CHCs received follow-up services in hospitals. Of these, about 5% were hospitalised and 23% visited medical professionals at outpatient clinics.
- Of the children who were not referred for follow-up services during their CHC, 774 (26%) received follow-up services in hospitals. Of these, about 4% were hospitalised and 26% visited medical professionals at outpatient clinics.
- Ear disease was the most common cause of hospitalisation, and ENT specialists were the most commonly visited specialists by children who had a CHC, regardless of whether they were referred for follow-up services or not. This finding is consistent with the high prevalence of ear disease in children who had CHCs.

Appendix 1: Prescribed NTER areas



Appendix 2: Data quality and its effect on interpretation

This appendix provides a discussion of data quality for each data collection. Data quality problems arose for various reasons, particularly from changes in question structure over time, a high proportion of missing responses for some data items and associated difficulties in matching records between data collections. Data repair was undertaken to resolve some of these issues.

A2.1 Child Health Check data collection

Records of CHCs were sent to the AIHW as paper forms in almost all cases, and data from these forms were manually entered into the CHC database. The AIHW developed a system that allows for the receipt of electronically transmitted CHC forms from clinics within the Northern Territory that operate an electronic patient record system. This system was operational from 12 June 2008, but only one valid electronic record was processed over the duration of the CHCI.

Form versions

Over the 2-year period during which the NTER Child Health Checks were conducted (July 2007 to June 2009), six main versions of the health check form have been used by the medical teams conducting the checks. Eight communities in the Katherine East region provided information on CHCs using non-standard forms (referred to as Version 7). Data from 1,700 non-standard forms were received and cannot be analysed at present.

The changes to the forms over time rectified deficiencies of earlier versions; in particular, reducing the high proportions of missing responses for many data items. Changes involved adding several questions and improving the structure of a number of existing questions, as well as adding a response option of 'unsure' to many questions, which allowed health teams who did not have the relevant information to provide an answer to the question, rather than leave it blank. These changes improved quality of information provided using the new forms, but created some difficulties comparing information across versions.

Missing data

Forms received by the AIHW often contained missing or illegible information in one or more fields, resulting in an incomplete CHC database. The proportion of missing responses for a particular data item is an indicator of data quality; high levels pose a problem for analysis and interpretation because they reduce reliability of the results.
A high level of missing responses for a data item was often related to the format of the question and/or the available response options. For instance, when a response was not provided, it was often unclear whether this meant: no testing was undertaken; testing was undertaken but no abnormality was detected or referral given; the health team was unsure

of the correct response; or the question was inadvertently skipped. This ambiguity was one of the main reasons for improvements between form versions, and modifications to question format resulted in a substantial decrease in the proportion of missing responses over the course of the collection of the CHCI data.

The quality of the CHC data for different items in relation to missing responses varied, ranging from 0% to 79%. The extent of missing data must be taken into account when using and interpreting data for each item. Analysis methods were adjusted where appropriate (for instance, by excluding children who were known not to have been screened for a particular condition in calculating prevalence of that condition) to account for high levels of missing responses. Levels of missing data must also be considered when making comparisons across regions.

Data repair

High levels of missing responses were of particular concern among the identification variables (including HRN, date of birth, sex, community ID, and so on) because these are used to identify children and have the potential to create significant problems in CHC analysis and in matching records between data sets.

In an attempt to repair these records, the AIHW performed both internal and external data repair processes. Data records were repaired where possible during data entry based on the information available to the AIHW, and these repairs were documented. Where a response was missing, there was sometimes enough information available to arrive at an approximation. For instance, although the exact age could not be determined for 2.6% of children, sufficient information was available (such as the completion of age specific questions) to determine the age group for all children resulting in no missing data in relation to age group. Missing fields could also be repaired internally where a child had completed two or more checks and identifying information was missing on one but provided on the other.

Where it was not possible for the AIHW to repair data internally, missing information was requested from NT DHF. The AIHW had been receiving data files from the NT DHF since March 2008, which provided missing information on date of birth (DOB), sex and, in some cases, HRN for many records that were originally incomplete. Before the most recent NT DHF external data repair process in September 2009, there were 114 records where the date of birth of the child was missing or wrong, 21 cases where sex of the child was missing or wrong and 216 cases where HRNs was wrong or missing were repaired. Other improvements included changes in the sex or date of birth so that these variables were consistent across the four data collections.

These data repair processes resulted in a CHC data collection with minimal missing responses. Once this clean CHC data set was obtained, this was used as the standard data set to clean and repair the three follow-up data collections through further internal AIHW data repair processes.

Other issues to consider in interpreting data

The data included in the CHC collection were a by-product of a clinical process where health professionals providing the CHCs and follow-up services documented the results of those checks and services on standard data collection forms. 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. As with most data collected in this way, the accuracy of the review of medical records and the clinical screening examination was not assessed. Thus, conditions that require specific clinical training or further investigation for accurate ascertainment may have been under-reported.

Regarding the capacity to extrapolate results of CHC analyses, it must be noted that CHCs were voluntary and, at this stage, nothing is known about how the children who participated compare with those who did not participate. Children who participated were not representative of all Indigenous children living in the NT; they were a group of children living within the prescribed areas of the NTER CHCI whose families agreed to their participation in a CHC. Therefore, conclusions cannot be generalised to the wider NT population.

Another point to note is that CHC forms did not include information about existing referrals a child may have had at the time of their health check. Therefore any discrepancy between the number of children diagnosed with particular health conditions and the number referred to relevant follow-up services for those conditions (which may be lower) 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 considering conclusions based on CHC data, it must also be noted that the number of missing cases was included in the denominator when calculating rates. Thus, the rates represent a minimum level and may understate the true prevalence of the conditions and/or referrals.

The age group to which the question applies must also be considered, because 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. For each item, as well as for each comparison by region, the number of children for whom the question was relevant was shown. Note that only the children to whom the question was relevant were considered when determining prevalence rates.

A2.2 Chart Review data collection

Information gathered at initial and exit chart reviews was sent to the AIHW using paper-based forms, from which AIHW data entry staff manually entered the data into the Chart Review database. A chart review was only conducted for those children who had a Child Health Check through which consent was obtained to allow information to be passed on to the AIHW.

Form versions

Data for the Chart Review collection were captured on three different types of paper-based forms: a ‘Pre-populated Initial and Exit Chart Review’ form where HRN, DOB, and conditions/referrals at the time of CHC were pre-populated by the AIHW based on information provided on the child’s matching CHC; a ‘Blank Initial and Exit Chart Review’ form without this pre-populated information; and an ‘Exit Chart Review’ form, which was to be completed when an initial chart review had not been undertaken.

There were six different versions of the chart review form types 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 last version, conditions for which a child had a referral or follow-up were listed regardless of whether the child had been seen or not. Thus, the earlier forms may have underestimated the number of health conditions for which children had a referral or follow-up. The same issues regarding form modifications and comparability across form versions discussed in the CHC section of this appendix also applied to the Chart Review collection.

Missing data and data repair

On a number of chart review forms, information on health conditions was missing despite a referral being made to a specific service, or vice versa. In these instances, an internal data repair procedure was put in place. For example, if the type of service provided was 'dental' but the type of condition for which the child was seen was missing, 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.

Sometimes referrals made at the CHC were not captured on the corresponding chart review form(s), or a child was seen by a service he/she was referred to at CHC after the exit chart review for that check. To capture the maximum amount of data on referral status and follow-up care provided to children who had a CHC, a master chart review file for each child who had a complete CR after their first CHC was created containing information from all chart reviews for that child. This was used to determine if a child had ever been seen for a referral, or to locate CHC referrals that had not been reported on the initial CR form.

Other issues to consider in interpreting data

About 30% of chart review forms recorded the same date for the initial and exit chart reviews, indicating that the exit chart review had been conducted prematurely, before children had had all their follow-up care completed. This resulted from the changes made to the funding arrangements, because 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 these changed funding arrangements were communicated, some organisations had already completed exit chart reviews prematurely. Hence, the information provided on a number of exit chart review forms was incomplete, or identical to that provided on the initial chart review form and therefore could not be analysed separately.

The chart review forms were designed to capture the type of referral 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 'types of referral' column. To the fullest extent possible, the AIHW has addressed these issues when analysing the data. For instance, when counting health conditions for which a child had been seen, conditions that were listed under referrals were also considered. If, however, the same condition was listed in both the referral and condition columns, only the condition listed in the condition column was counted.

It should also be noted that information from chart review data may not provide a complete picture of follow-up care received by children because care received at hospital is not captured by these data. Furthermore, it is not known how representative the chart review data are, so it is not possible to claim that the degree of follow-up shown in AIHW analyses of this data has been provided to all children who had a CHC.

A2.3 Audiology data collection

Data for the Audiology collection were captured through paper-based forms. The AIHW developed a data entry application and data entry guide that allowed data from the Audiology paper forms to be entered into a secure electronic database. Like the CHC and Chart Review collections, duplicate forms and forms for children outside the applicable age range were excluded from data analysis.

Form versions

To date, five different versions of the audiology form have been used to collect information for the Audiology data collection. However, given 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. The changes that have occurred across these different versions have been largely centred on the question about previous audiology checks (added in version 3 and modified in version 4) and changes to response options for the 'middle ear condition' question. The same issues regarding form modifications and comparability across form versions discussed in the previous section of this appendix apply to the Audiology collection.

Missing data and data repair

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.[4] In turn, the NT DHF has been providing the AIHW with additional information or corrected forms, depending on the problem. The AIHW has also been conducting an internal data repair process, whereby the CHC collection (following its repair based on NT DHF data) is used as the source from which any missing or inconsistent identifying information in the Audiology collection is added or changed. However, this data cleaning process can only be performed on those audiology checks with a valid HRN and a matching CHC. As a result of these data cleaning processes, the level of missing data for the identifying items in the Audiology collection is minimal. That is, for services provided up to 30 June 2009, sex was missing in one record, date of birth and age were missing in seven records and HRN was missing in eight records.

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[4] To date, all audiology forms have been provided by the NT DHF.

Linking data between collections

In order to link the Audiology and Child Health Check data collections to determine the extent of follow-up for children who were referred for audiology services during their CHC, valid and unique HRNs are required in both collections. Among the 10,605 children who had a valid CHC conducted before 30 June 2009, 366 children had a check with a missing HRN. Forms for these children could not be linked with the Audiology database. In addition, any CHCs recorded on non-standard forms were excluded from analysis. Similarly, thirteen audiology forms had a missing HRN, and therefore could not be linked to the CHC database.

Other issues to consider in interpreting data

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 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, so the question arises as to the how many more forms with the same data quality issues exist throughout the entire Audiology collection.

There was also 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), although other information indicated that they had.[5] Consequently, information on the following 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 these inconsistencies, the AIHW could not rely on responses to these questions to determine if any child had more than one audiology check. Instead AIHW analyses used HRNs to identify whether children had multiple checks, because all checks for one child will use the same HRN.

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 or the Aboriginal population of children within prescribed areas of the NTER CHCI.

A2.4 Dental data collection

Data for the Dental collection was captured both electronically and through paper-based forms. A relatively small proportion of records were sent in paper-based form from

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

ACCHOs to the AIHW, while the majority of records are held by NT DHF and sent electronically. Data from these records are combined for AIHW analysis.

Accuracy of data

The NT DHF holds raw data for the dental checks conducted by their health professionals, while the AIHW holds raw data for dental checks conducted by ACCHOs. The NT DHF extracts information from their electronic database and transmits this to the AIHW. This arrangement has created several data analysis complications.

To facilitate the transfer of electronic data from the NT DHF, the AIHW produced detailed data transfer specifications, as well as an encryption program to allow for the secure transmission of data. These specifications were provided to NT DHF in April 2008. These specifications were subsequently changed in August 2008 to allow the submission of data extracted from NT DHF's Titanium database. To date, all NT DHF dental data has been provided to the AIHW in the format of the original specifications outlined in April 2008. However, NT DHF is currently unable to provide data in relation to data items on decayed, missing and/or filled teeth (DMFT) owing to data extraction problems. Although this lack of DMFT data currently poses a significant data quality issue for the data collection, NT DHF is working on solutions that will allow more accurate and complete data transfer to the AIHW in the future.

Secondly, because of the necessity to receive and analyse these interim data transfer submissions, the AIHW modified the dental database to allow it to accept two different kinds of electronic submission. Although this allows data analysis of the current incomplete data provided by NT DHF, if full data extraction from their Titanium database becomes possible, the presence of two different versions of each record in the database may create consistency problems. One significant problem related to this issue is the difference between the units of analysis used in the different submission types: one reports on ‘occasions of service’ while the other reports on ‘course of care’. The fact that NT DHF are currently maintaining two databases for NTER CHCI dental data also means that a ‘switch’ to the other would invariably change the results of our published analyses, because these two databases do not contain identical information for each record (owing to data entry error/interpretation).

Thirdly, because of this arrangement, the AIHW cannot be as confident of the quality of this data collection as for the other CHCI collections. Entry error is common in all databases, but this arrangement eliminates the opportunity for the AIHW to perform its internal controls on the entry process to minimise error.

The fact that the database currently used by the NT DHF to provide the AIHW with NTER CHCI dental data is maintained in an Excel spreadsheet may also be problematic, because an Excel spreadsheet cannot impose the same constraints and checks as a database that uses a data entry front-end application to insert and update records.

Missing data

The Dental data collection should contain information on the types of dental services provided, the problems treated, whether any further action was required, and the number of deciduous or permanent DMFT. However, information on the last two items is not yet available for any of the services conducted by NT DHF. Data for these items are also missing for 43% of services conducted by ACCHOs.

The extent of missing data is unclear in the Dental collection, particularly in the records transferred from NT DHF. 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. Analysing the data provided by the ACCHOs, the AIHW found a small proportion of missing data for the 'problems treated' question (1%) but not the 'dental services provided' question. There is no way at present to determine if this situation is reflected in the NT DHF checks.

Linking data between collections

In order to link the Dental and CHC data collections to determine the extent of follow-up for children who were referred for dental services during their CHC, valid and unique HRNs are required in both collections. Among the 10,605 children who had a valid CHC conducted on or before 30 June 2009, 366 children had CHCs recorded on forms with missing HRNs. These CHC forms could not be linked with the Dental database. In addition, CHCs recorded on a non-standard form could not be included in the analysis. Similarly, 57 dental forms had a missing HRN and therefore could not be linked to the CHC database.

Other issues to consider in interpreting data

The dental forms have a space in which to record the community in which the check was conducted. For some data collected, the child's 'home community' may have been recorded instead of the community in which the check was conducted. It is unclear to what degree this occurred or how much this affects the groupings by region.

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 that ended with the child requiring follow-up treatment might be slightly higher than the number of occasions of service that ended with the child actually requiring follow-up for a specific purpose.

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.

Data on a high proportion of dental checks cannot currently be provided to the AIHW because consent for those children was not confirmed. This situation has resulted in much lower proportions of children receiving services and problems treated than would be expected, and therefore the data probably substantially understate the true extent of follow-up dental care to children who received a CHC.

Like the Audiology collection, 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; they were children identified as needing these services through either the CHC or through another process. Therefore 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 NTER CHCI.

Appendix 3: Health conditions identified during CHCs by region

Table A3.1: Health conditions of Indigenous children who had a NTER Child Health Check in Central Australia

Health condition	Relevant age (years)	Yes (%)	No (%)	Unsure (%)	Missing (%)	Total (%)	Total (no.)
Ears and eyes							
Ear disease[(a)]	All	33.2	64.5	0.0	2.2	100.0	2,502
Trachoma[(b)]	6–15	8.0	90.3	0.0	1.7	100.0	827
Visual impairment[(c)]	6–15	0.8	92.8	0.0	6.4	100.0	1,364
Oral health							
Untreated caries	All	32.6	45.0	0.1	22.3	100.0	2,502
Gum disease	All	2.4	75.3	0.0	22.3	100.0	2,502
Other oral health issue	All	2.6	75.1	0.0	22.3	100.0	2,502
Any oral health issue	All	34.7	43.0	0.0	22.3	100.0	2,502
Skin							
Skin sores (four or more)	All	8.6	77.6	0.0	13.7	100.0	2,502
Scabies	All	5.6	80.6	0.0	13.8	100.0	2,502
Ringworm	All	3.9	82.3	0.0	13.8	100.0	2,502
Any skin problem	All	31.7	54.8	0.0	13.5	100.0	2,502
Cardiac and respiratory							
History of rheumatic heart disease[(d)]	All	1.4	88.4	4.1	6.1	100.0	2,342
History of asthma	All	4.2	85.5	3.1	7.3	100.0	2,502
History of recurrent chest infection	All	35.1	55.0	3.1	6.9	100.0	2,502
Anaemia							
Anaemia[(e)]	All	15.1	72.1	0.0	12.8	100.0	2,502
Physical growth							
Stunting[(f)]	All	2.9	92.4	0.0	4.7	100.0	2,502
Underweight[(g)]	All	4.2	93.3	0.0	2.5	100.0	2,502
Wasting[(h)]	0–4	3.3	91.2	0.0	5.5	100.0	963
Overweight[(i)]	2–15	9.6	86.4	0.0	4.0	100.0	2,082
SIDS risk factors							
Prone sleeping	Less than 1	10.6	75.4	3.8	10.2	100.0	236
Soft sleeping surfaces and loose bedding	Less than 1	30.1	56.4	3.4	10.2	100.0	236
Overheating	Less than 1	12.3	72.9	4.2	10.6	100.0	236
Bed sharing	Less than 1	71.6	16.5	1.3	10.6	100.0	236

(continued)

Table A3.1 (continued): Health conditions of Indigenous children who had a NTER Child Health Check in Central Australia

Health condition	Relevant age (years)	Yes (%)	No (%)	Unsure (%)	Missing (%)	Total (%)	Total (no.)
Other							
Regular smoker[(j)]	12–15	6.6	86.8	1.5	5.1	100.0	408
Smoker in household[(k)]	All	58.2	36.9	1.0	3.9	100.0	2,502
Immunisation due	All	12.5	78.8	3.3	5.4	100.0	2,502
Number of children who had at least one condition		94.8	1.7	0.3	3.2	100.0	2,502
Total number of children in CHC							**2,502**

(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. 52% of children in the age range).

(c) Defined as having a visual acuity score of less then '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 110 g/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 for services up to 30 June 2009.

Table A3.2: Health conditions of Indigenous children who had a NTER Child Health Check in Arnhem

Health condition	Relevant age (years)	Yes (%)	No (%)	Unsure (%)	Missing (%)	Total (%)	Total (no.)
Ears and eyes							
Ear disease[(a)]	All	33.7	63.3	0.0	3.0	100.0	2,462
Trachoma[(b)]	6–15	3.8	95.5	0.0	0.7	100.0	707
Visual impairment[(c)]	6–15	0.5	82.5	0.0	17.0	100.0	1,392
Oral health							
Untreated caries	All	48.0	45.9	0.0	6.1	100.0	2,462
Gum disease	All	6.7	87.2	0.0	6.1	100.0	2,462
Other oral health issue	All	3.1	90.8	0.0	6.1	100.0	2,462
Any oral health issue	All	50.0	43.9	0.0	6.1	100.0	2,462
Skin							
Skin sores (four or more)	All	8.9	88.3	0.0	2.8	100.0	2,462
Scabies	All	8.3	88.9	0.0	2.8	100.0	2,462
Ringworm	All	7.6	89.6	0.0	2.8	100.0	2,462
Any skin problem	All	26.9	70.4	0.0	2.7	100.0	2,462
Cardiac and respiratory							
History of rheumatic heart disease[(d)]	All	1.1	89.0	5.2	4.6	100.0	2,462
History of asthma	All	4.7	82.3	5.2	7.8	100.0	2,462
History of recurrent chest infection	All	33.0	57.4	5.2	4.4	100.0	2,462
Anaemia							
Anaemia[(e)]	All	17.3	70.9	0.0	11.8	100.0	2,462
Physical growth							
Stunting[(f)]	All	5.3	89.8	0.0	4.9	100.0	2,462
Underweight[(g)]	All	13.0	84.0	0.0	3.0	100.0	2,462
Wasting[(h)]	0–4	12.8	80.6	0.0	6.6	100.0	866
Overweight[(i)]	2–15	1.9	92.5	0.0	5.6	100.0	2,142
SIDS risk factors							
Prone sleeping	Less than 1	33.3	49.2	4.0	13.6	100.0	177
Soft sleeping surfaces and loose bedding	Less than 1	43.5	39.5	3.4	13.6	100.0	177
Overheating	Less than 1	20.9	58.8	5.1	15.3	100.0	177
Bed sharing	Less than 1	75.7	11.3	0.0	13.0	100.0	177

(continued)

Table A3.2 (continued): Health conditions of Indigenous children who had a NTER Child Health Check in Arnhem

Health condition	Relevant age (years)	Yes (%)	No (%)	Unsure (%)	Missing (%)	Total (%)	Total (no.)
Other							
Regular smoker[(j)]	12–15	7.7	88.0	1.3	2.9	100.0	376
Smoker in household[(k)]	All	86.2	11.9	0.2	1.7	100.0	2,462
Immunisation due	All	18.0	74.0	1.5	6.4	100.0	2,462
Number of children who had at least one condition		98.3	0.8	0.0	0.9	100.0	2,462
Total number of children in CHC							**2,462**

(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. 52% of children in the age range).

(c) Defined as having a visual acuity score of less then ‘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 110 g/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 for services up to 30 June 2009.

Table A3.3: Health conditions of Indigenous children who had a NTER Child Health Check in Barkly/Katherine

Health condition	Relevant age (years)	Yes (%)	No (%)	Unsure (%)	Missing (%)	Total (%)	Total (no.)
Ears and eyes							
Ear disease[(a)]	All	28.9	70.1	0.0	1.1	100.0	1,788
Trachoma[(b)]	6–15	12.2	85.6	0.0	2.2	100.0	637
Visual impairment[(c)]	6–15	1.0	93.9	0.0	5.0	100.0	972
Oral health							
Untreated caries	All	38.9	57.6	0.3	3.1	100.0	1,788
Gum disease	All	7.6	88.7	0.3	3.4	100.0	1,788
Other oral health issue	All	6.7	89.9	0.0	3.4	100.0	1,788
Any oral health issue	All	45.0	51.6	0.0	3.5	100.0	1,788
Skin							
Skin sores (four or more)	All	9.8	89.3	0.0	0.9	100.0	1,788
Scabies	All	5.5	93.6	0.0	0.9	100.0	1,788
Ringworm	All	5.4	93.7	0.0	0.9	100.0	1,788
Any skin problem	All	28.4	70.7	0.0	0.9	100.0	1,788
Cardiac and respiratory							
History of rheumatic heart disease[(d)]	All	1.3	89.1	6.3	3.2	100.0	1,788
History of asthma	All	5.6	83.8	6.8	3.7	100.0	1,788
History of recurrent chest infection	All	33.1	57.0	6.7	3.2	100.0	1,788
Anaemia							
Anaemia[(e)]	All	16.6	77.3	0.0	6.0	100.0	1,788
Physical growth							
Stunting[(f)]	All	3.5	94.0	0.0	2.5	100.0	1,788
Underweight[(g)]	All	6.0	92.6	0.0	1.4	100.0	1,788
Wasting[(h)]	0–4	5.8	90.4	0.0	3.8	100.0	656
Overweight[(i)]	2–15	6.0	91.9	0.0	2.1	100.0	1,516
SIDS risk factors							
Prone sleeping	Less than 1	24.2	61.1	4.0	10.7	100.0	149
Soft sleeping surfaces and loose bedding	Less than 1	34.9	49.7	3.4	12.1	100.0	149
Overheating	Less than 1	13.4	70.5	6.0	10.1	100.0	149
Bed sharing	Less than 1	76.5	12.8	0.7	10.1	100.0	149

(continued)

Table A3.3 (continued): Health conditions of Indigenous children who had a NTER Child Health Check in Barkly/Katherine

Health condition	Relevant age (years)	Yes (%)	No (%)	Unsure (%)	Missing (%)	Total (%)	Total (no.)
Other							
Regular smoker[j]	12–15	9.0	86.6	1.4	2.9	100.0	277
Smoker in household[k]	All	74.7	23.9	0.4	1.0	100.0	1,788
Immunisation due	All	15.8	78.2	3.5	2.6	100.0	1,788
Number of children who had at least one condition		97.7	1.6	0.2	0.4	100.0	1,788
Total number of children in CHC							**1,788**

(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. 52% of children in the age range).

(c) Defined as having a visual acuity score of less then '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 110 g/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 for services up to 30 June 2009.

Table A3.4: Health conditions of Indigenous children who had a NTER Child Health Check in Darwin Rural

Health condition	Relevant age (years)	Yes (%)	No (%)	Unsure (%)	Missing (%)	Total (%)	Total (no.)
Ears and eyes							
Ear disease[(a)]	All	24.2	73.8	0.0	2.1	100.0	2,621
Trachoma[(b)]	6–15	5.2	93.8	0.0	1.0	100.0	596
Visual impairment[(c)]	6–15	0.6	89.7	0.0	9.7	100.0	1,475
Oral health							
Untreated caries	All	40.9	54.3	0.0	4.8	100.0	2,621
Gum disease	All	5.6	89.6	0.0	4.8	100.0	2,621
Other oral health issue	All	2.9	92.1	0.0	5.0	100.0	2,621
Any oral health issue	All	43.3	51.9	0.0	4.8	100.0	2,621
Skin							
Skin sores (four or more)	All	12.0	86.2	0.0	1.9	100.0	2,621
Scabies	All	11.4	86.8	0.0	1.8	100.0	2,621
Ringworm	All	7.6	90.4	0.0	2.0	100.0	2,621
Any skin problem	All	33.8	64.4	0.0	1.8	100.0	2,621
Cardiac and respiratory							
History of rheumatic heart disease[(d)]	All	1.2	90.5	4.7	3.5	100.0	2,621
History of asthma	All	7.9	84.6	3.5	4.0	100.0	2,621
History of recurrent chest infection	All	45.9	48.2	2.7	3.2	100.0	2,621
Anaemia							
Anaemia[(e)]	All	13.8	80.2	0.0	6.1	100.0	2,621
Physical growth							
Stunting[(f)]	All	4.5	92.4	0.0	3.1	100.0	2,621
Underweight[(g)]	All	12.5	86.1	0.0	1.4	100.0	2,621
Wasting[(h)]	0–4	12.6	82.1	0.0	5.4	100.0	914
Overweight[(i)]	2–15	3.9	92.4	0.0	3.7	100.0	2,276
SIDS risk factors							
Prone sleeping	Less than 1	32.2	56.4	2.0	9.4	100.0	149
Soft sleeping surfaces and loose bedding	Less than 1	42.3	47.0	1.3	9.4	100.0	149
Overheating	Less than 1	21.5	65.8	3.4	9.4	100.0	149
Bed sharing	Less than 1	72.5	17.4	0.7	9.4	100.0	149

(continued)

Table A3.4 (continued): Health conditions of Indigenous children who had a NTER Child Health Check in Darwin Rural

Health condition	Relevant age (years)	Yes (%)	No (%)	Unsure (%)	Missing (%)	Total (%)	Total (no.)
Other							
Regular smoker[(j)]	12–15	6.2	87.3	0.5	6.0	100.0	418
Smoker in household[(k)]	All	83.4	15.2	0.3	1.0	100.0	2,621
Immunisation due	All	15.4	78.1	1.8	4.7	100.0	2,621
Number of children who had at least one condition		98.1	1.2	0.2	0.5	100.0	2,621
Total number of children in CHC							**2,621**

(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. 52% of children in the age range).

(c) Defined as having a visual acuity score of less then ‘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 110 g/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 for services up to 30 June 2009.

Appendix 4: Referrals from CHCs by region

Table A4.1: Referrals of Indigenous children who had a NTER Child Health Check in Central Australia

Type of referral	Yes (%)	No (%)	Missing (%)	Total (%)	Total (no.)
Primary Health Care (PHC)(a)(b)	37.6	48.3	14.1	100.0	2,502
Paediatrician	10.2	67.7	22.2	100.0	2,502
Dental	28.6	49.4	22.0	100.0	2,502
Ears, Nose and Throat (ENT) specialist	11.1	66.7	22.2	100.0	2,502
Tympanometry and audiology	17.1	60.7	22.2	100.0	2,502
Optometrist or ophthalmologist	1.7	76.2	22.1	100.0	2,502
Mental health services	0.5	68.7	30.8	100.0	2,502
Speech therapist	0.3	68.9	30.8	100.0	2,502
Physiotherapist	0.0	69.1	30.8	100.0	2,502
Cardiologist	0.4	77.7	21.9	100.0	2,502
Dietician or nutritionist	0.5	77.6	21.9	100.0	2,502
Surgeon	0.4	77.7	21.9	100.0	2,502
Urologist/renal physician	0.1	78.0	21.9	100.0	2,502
Australian Hearing	0.0	78.1	21.9	100.0	2,502
Occupational therapist	0.1	69.1	30.8	100.0	2,502
Social worker	0.6	77.2	22.2	100.0	2,502
Family and Community Services (FACS)	1.0	76.8	22.2	100.0	2,502
Housing	0.6	77.5	21.9	100.0	2,502
Other clinician(c)	0.5	68.6	30.9	100.0	2,502
Tests ordered(d)	6.2	71.9	21.9	100.0	2,502
Subtotal children with at least one referral(e)	68.3	13.8	17.9	100.0	2,502
Vaccination	8.1	70.2	21.7	100.0	2,502

(a) Includes Primary Health Care (PHC) clinic, general practitioner or district medical officer, registered nurse, Aboriginal health worker and well baby clinic.

(b) Each child with multiple types of PHC referral is counted as having only one PHC referral.

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

(d) Includes pathology, echo-cardiology and radiology.

(e) 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 for services up to 30 June 2009.

Table A4.2: Referrals of Indigenous children who had a NTER Child Health Check in Arnhem

Type of referral	Yes (%)	No (%)	Missing (%)	Total (%)	Total (no.)
Primary Health Care (PHC)(a)(b)	37.7	50.0	12.4	100.0	2,462
Paediatrician	13.1	55.0	31.8	100.0	2,462
Dental	38.0	30.2	31.8	100.0	2,462
Ears, Nose and Throat (ENT) specialist	10.6	57.6	31.8	100.0	2,462
Tympanometry and audiology	9.6	58.5	31.9	100.0	2,462
Optometrist or ophthalmologist	0.8	67.3	31.9	100.0	2,462
Mental health services	0.1	68.0	31.9	100.0	2,462
Speech therapist	0.2	67.9	31.9	100.0	2,462
Physiotherapist	0.0	68.1	31.9	100.0	2,462
Cardiologist	0.4	68.3	31.2	100.0	2,462
Dietician or nutritionist	0.1	68.7	31.2	100.0	2,462
Surgeon	0.2	68.5	31.2	100.0	2,462
Urologist/renal physician	0.0	68.8	31.2	100.0	2,462
Australian Hearing	0.0	68.8	31.2	100.0	2,462
Occupational therapist	0.0	68.1	31.9	100.0	2,462
Social worker	0.1	68.0	31.9	100.0	2,462
Family and Community Services (FACS)	0.2	67.9	31.9	100.0	2,462
Housing	0.0	68.8	31.2	100.0	2,462
Other clinician(c)	0.2	67.9	31.8	100.0	2,462
Tests ordered(d)	6.2	62.6	31.2	100.0	2,462
Subtotal children with at least one referral(e)	69.2	7.8	23.0	100.0	2,462
Vaccination	6.1	71.3	22.5	100.0	2,462

(a) Includes Primary Health Care (PHC) clinic, general practitioner or district medical officer, registered nurse, Aboriginal health worker and well baby clinic.

(b) Each child with multiple types of PHC referral is counted as having only one PHC referral.

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

(d) Includes pathology, echo-cardiology and radiology.

(e) 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 for services up to 30 June 2009.

Table A4.3: Referrals of Indigenous children who had a NTER Child Health Check in Barkly/Katherine

Type of referral	Yes (%)	No (%)	Missing (%)	Total (%)	Total (no.)
Primary Health Care (PHC)(a)(b)	45.9	49.2	4.9	100.0	1,788
Paediatrician	13.1	74.7	12.2	100.0	1,788
Dental	40.6	47.1	12.2	100.0	1,788
Ears, Nose and Throat (ENT) specialist	9.8	77.9	12.2	100.0	1,788
Tympanometry and audiology	19.1	68.7	12.2	100.0	1,788
Optometrist or ophthalmologist	1.8	85.9	12.2	100.0	1,788
Mental health services	0.7	87.0	12.2	100.0	1,788
Speech therapist	0.7	87.0	12.2	100.0	1,788
Physiotherapist	0.3	87.5	12.2	100.0	1,788
Cardiologist	0.4	87.8	11.8	100.0	1,788
Dietician or nutritionist	1.6	86.6	11.8	100.0	1,788
Surgeon	0.5	87.7	11.8	100.0	1,788
Urologist/renal physician	0.1	88.1	11.8	100.0	1,788
Australian Hearing	0.0	88.2	11.8	100.0	1,788
Occupational therapist	0.1	87.7	12.2	100.0	1,788
Social worker	2.4	85.3	12.2	100.0	1,788
Family and Community Services (FACS)	0.7	87.1	12.2	100.0	1,788
Housing	0.0	88.2	11.8	100.0	1,788
Other clinician(c)	0.5	87.2	12.2	100.0	1,788
Tests ordered(d)	7.6	80.6	11.8	100.0	1,788
Subtotal children with at least one referral(e)	74.3	18.1	7.7	100.0	1,788
Vaccination	6.8	81.4	11.9	100.0	1,788

(a) Includes Primary Health Care (PHC) clinic, general practitioner or district medical officer, registered nurse, Aboriginal health worker and well baby clinic.

(b) Each child with multiple types of PHC referral is counted as having only one PHC referral.

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

(d) Includes pathology, echo-cardiology and radiology.

(e) 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 for services up to 30 June 2009.

Table A4.4: Referrals of Indigenous children who had a NTER Child Health Check in Darwin Rural

Type of referral	Yes (%)	No (%)	Missing (%)	Total (%)	Total (no.)
Primary Health Care (PHC)[a][b]	35.6	57.8	6.6	100.0	2,621
Paediatrician	12.2	51.9	35.9	100.0	2,621
Dental	34.9	29.1	35.9	100.0	2,621
Ears, Nose and Throat (ENT) specialist	6.9	57.2	35.9	100.0	2,621
Tympanometry and audiology	11.9	52.3	35.9	100.0	2,621
Optometrist or ophthalmologist	0.9	63.2	35.9	100.0	2,621
Mental health services	0.6	63.2	36.2	100.0	2,621
Speech therapist	0.3	63.4	36.2	100.0	2,621
Physiotherapist	0.1	63.7	36.2	100.0	2,621
Cardiologist	0.1	64.3	35.6	100.0	2,621
Dietician or nutritionist	0.3	64.1	35.6	100.0	2,621
Surgeon	0.4	64.0	35.6	100.0	2,621
Urologist/renal physician	0.0	64.4	35.6	100.0	2,621
Australian Hearing	0.0	64.4	35.6	100.0	2,621
Occupational therapist	0.0	63.8	36.2	100.0	2,621
Social worker	0.2	63.9	35.9	100.0	2,621
Family and Community Services (FACS)	0.3	63.7	35.9	100.0	2,621
Housing	0.0	64.4	35.6	100.0	2,621
Other clinician[c]	0.2	63.6	36.2	100.0	2,621
Tests ordered[d]	3.7	60.7	35.6	100.0	2,621
Subtotal children with at least one referral[e]	67.7	8.1	24.2	100.0	2,621
Vaccination	5.8	80.8	13.5	100.0	2,621

(a) Includes Primary Health Care (PHC) clinic, general practitioner or district medical officer, registered nurse, Aboriginal health worker and well baby clinic.

(b) Each child with multiple types of PHC referral is counted as having only one PHC referral.

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

(d) Includes pathology, echo-cardiology and radiology.

(e) 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 for services up to 30 June 2009.

Appendix 5: How to select records and count referrals of children in Child Health Check and Chart Review databases for analysis of follow-up care for children

The Chart Review collection is useful because it allows the monitoring of follow-up care of children after their CHC. However, in order to trace the follow-up path for each child, it is necessary to match up the chart review (CR) records with CHC records and use consistent terminology and approaches to counting records.

A5.1 Selecting CHC records

Many children have had multiple CHCs. For the purpose of follow-up analysis, only information from the first valid CHC was used for a child who had multiple checks. This is because this is the check at which the majority of diagnoses and referrals were made. Only **the first CHC record for a child** was selected for linking to the Chart Review database.

However, if the first CHC conducted for a child was recorded on a non-standard form and a subsequent CHC for that child was recorded on a standard form, the later CHC was selected instead. This is because non-standard forms did not include information on referrals.

A5.2 Selecting one CR record for each CHC

After a CHC, a child was expected to have an initial and then an exit chart review to assess the follow-up care he or she had received. The ideal scenario was that all children would have an initial and exit CR (together referred to as a 'complete' CR), and that this information could be included in a single CR record for that CHC for that child. However, this was frequently not the case. Some children had only an initial CR. Some children had two 'initial' CR forms sent in for the same CHC. Other children had an exit chart review containing information that was inconsistent with the initial CR form that had been previously processed.

For these reasons, some CHCs were found to have more than one CR record linked to them. The AIHW was advised by DHF that in the event of duplicate CR records, the CR record with the latest CR date or with modifications will be the most correct and up to date.

In accordance with these considerations, the AIHW established a set of selection criteria to select the most appropriate CR records for cases when there were multiple CR records for a CHC for a child. The selection criteria for duplicate CR records are listed below:

- If only the initial CR section of a CR form has been completed, and both the initial and exit CR sections have been completed on another form, then select the form with both initial and exit CR information (this is a complete chart review).

- If both the initial and exit CR sections have been completed in both forms, then select the one with the latest exit CR date.
- If the initial and exit CR dates are the same or missing, select the CR record which was updated most recently. If there is no date of update on the CR form, select the record that was most recently entered in the AIHW database.

A5.3 Linkage between CHC database and CR records and case inclusion for this report

After the CR database was created following the selection process described above, the CR records were linked to the CHC database by HRN and the date of CHC. For the purpose of this report, only children who had a complete chart review after their first CHC were included in the analysis. Children who had only an initial or no chart review following their first CHC were excluded from the linked data set.

A5.4. Counting referrals

A5.4.1 Referrals made at the CHC

'Referrals' given at the CHC were counted using the referral status recorded on the CHC forms, which included only the first CHC for each child. Referrals from subsequent CHCs were counted only if the first CHC was conducted using a non-standard CHC form.

A5.4.2 'Additional' referrals made at CR

There were a number of referrals that were recorded on the CR form, but were not recorded on the corresponding CHC forms. The following possible scenarios could explain these cases:

- A referral given at the CHC was not noted on the CHC forms. The doctor who conducted the CHC wrote a referral letter for the child during the CHC, but this was not recorded on the CHC form.
- When the CHC was recorded on a non-standard form, referral information was recorded in a manner that was not possible to analyse.
- New referrals were made at the initial CR, according to children's need, which were not recorded on their CHC forms.
- A subsequent referral was made by the clinician to whom the child had a referral from the CHC.

In all of the above situations, referrals were considered as **'additional referrals**' given at CR.

A5.5 Creating a ‘master file’ with information from all CRs for a child

A primary aim of the follow-up collections was to determine the extent of follow-up and outstanding referrals for each child at the end of the 2-year initiative. Sometimes referrals were given at a child’s first CHC, but the child was not seen for the referred condition until some point after the exit chart review was conducted. The child’s visit to the service may have been recorded in chart reviews following their subsequent CHCs.

Therefore to capture the most current information about referral and follow-up status for each child, a **Chart Review ‘master file’ for each child** who had a complete chart review after their first CHC was created containing information from all CR records for that child—including CRs conducted after their later CHCs. The process for creating this file was to follow the above CR selection rules to select the most correct CR record for each CHC, and then examine these records collectively, to identify the maximum number of services provided to those children.

A5.6 Determining follow-up status for children with referrals

A referral given to a child at any point in the CHCI process was expected to be followed up. That is, the child was expected to be ‘seen’ by the service to which they were referred. Based on whether or not it was followed up, a referral could be categorised in one of two ways: ‘seen’, or ‘outstanding’.

After identifying the referral status and creating a master CR file, children with referrals were linked to the master CR file by HRN and type of referral. If at any point after a child was referred to a service, a CR form reports that the child has visited that service for their condition, that child is regarded as **‘seen’** for that referral.

On other hand, any referral to a service at which a child has not yet been seen, according to the most current information available, was regarded as **an ‘outstanding’ referral**.

There were two exceptions to the definition of outstanding referral:

- A child had not been seen for a particular referral, but the CR clinician determined that follow-up was no longer necessary (for instance, if a condition resolves of its own accord). In that case, this referral is not considered ‘outstanding’ but was defined as ‘no longer require follow-up’.
- Children received referrals at their CHC, but these referrals were not mentioned in their chart reviews. Therefore, it was not possible to determine the follow-up status of their referrals.

A5.7 Determining whether further action is required for each child

As well as information on a child’s health conditions, referrals and visits to services, a CR form also included a question about whether further action was required for that child. Referrals requiring further action included the following situations:

- referrals that were made at CHC that are outstanding
- additional referrals that were made at CR which are outstanding
- children still need to be followed up after they were seen by the clinician who they were referred.

Appendix 6: Comparisons with other data sources

There are several other data sources that cover similar topics to the CHCI collections. A comparison between the results of CHC data and other studies can be helpful for finding the causes of any discrepancies and modifying health policy and health services planning in order to meet the need of the specific population. However, these data sources often differ to the CHC data collection in many critical aspects, which reduces the comparability of the findings. This appendix discusses comparability of data across different sources and presents some related information on prevalence rates derived from other studies or data sources.

A6.1 Limitations in comparing data

Making comparisons across data sets relies on having data that are comparable in relation to a number of factors such as:

- the method of data collection (e.g. data based on a report provided by the child, parent or carer versus data based on a medical examination or a clinical test)
- the definition of medical conditions considered. For example, what specific types of problems were covered by the definition used, the time span of the condition (e.g. current condition versus history of condition) and whether the condition was present at the time of the data collection versus a recurring problem that may or may not have been evident at the time of data collection
- the age of the children in scope
- the geographical area covered (e.g. national, state/territory or regional)
- the timing of collection (e.g. the years in which the data were collected).

In some cases, the available data considered for comparative purposes could not be used because they differed from the CHCI data in a number of ways. A number of examples follow.

The Western Australian Aboriginal and Child Health Survey (WAACHS)

Although the WAACHS (Zubrick et al. 2004) covered a number of similar topics to that of the CHCI data collection (e.g. ear disease, visual impairment and caries), often the definitions used for these medical conditions differed substantially. For example, the WAACHS measure of ear disease refers to *recurring* ear disease, while the CHCI data on ear disease indicate the percentage of children who had ear disease *at the time of the health check*. In addition, the WAACHS data on medical conditions were reported by parents or carers, rather than based on a medical examination or medical test. Furthermore, there are known differences in prevalence rates for some conditions according to state and territory. For example, data from *The National Aboriginal and Torres Strait Islander Health Survey 2004–05* (ABS 2006) show that, across all age groups, rates of asthma are higher in WA than in the NT. Finally, the WAACHS data were collected in 2004–05 using a sample survey approach. Thus the WAACHS data were not considered comparable with the CHCI data.

Australian Childhood Immunisation Register (ACIR)

Although information on the immunisation status for children aged 0 to 15 years is collected as part of the CHCI, the ACIR presents information on the proportion of children with up-to-date immunisation status at specific ages—namely, 1, 2 and 6 years of age. As well, the criteria used to determine if a child's immunisation status was up to date differ across the two data collections. The ACIR uses a definition of 'overdue' for immunisations not given within 2 months of their due date (ACIR 2007). In contrast, an immunisation that was due was defined in the CHCI as any immunisation not previously given but due by the date of CHC. As a result, the CHCI data on immunisation status shown in Table 2.4 and Appendix 3 are likely to over-state the number of children who would be classed as 'overdue' by the ACIR definition.[6] Because of these differences, the ACIR data are not compared with the data from the CHCI data set.

A6.2 Comparisons made in this appendix

In this appendix, CHCI data presented in Section 2.5 are compared with data from other sources for the following conditions:

- ear disease
- trachoma
- skin sores, scabies and ringworm
- history of rheumatic heart disease
- history of asthma
- anaemia
- stunting, underweight and wasting
- smoker in household.

The outcomes of the comparisons are provided below, along with more detail about the data sources and the comparability of these other data sources with the CHCI data.

Data sources

East Arnhem Regional Healthy Skin Project (EARHSP)

Further context for the CHCI data could be provided by the East Arnhem Regional Healthy Skin Project (EARHSP) data in relation to skin sores, scabies and ringworm. In the EARHSP, children aged 0 to 14 years were screened for skin sores, scabies and ringworm

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[6] The time when vaccines are due is based on age and previous vaccines received, where doses of the same vaccine must be given at particular intervals. CHC teams based immunisation status on age alone. In contrast, the ACIR bases immunisation status on age and period since last vaccine. Thus, in situations where a child was late for their vaccine based on their age, but up to date if their last vaccine was within a certain period, they could be judged as being 'up to date' on the ACIR but 'due' by the CHC criteria.

over a 3-year period, with treatment and follow-up services also provided (Andrews & Kearns 2007, Andrews 2008). A total of 2,329 children—or 88% of the target population group—received one or more skin assessments over the course of the project with a total of 6,038 skin assessments completed.

Data from the EARHSP showed that among Indigenous children aged 0 to 14 years in East Arnhem, the prevalence rate of five or more skin sores in 2007 was 6% (Andrews 2008). This compared with a CHCI rate at May 2008 of 9% among children of the same age in the Arnhem region but who had four or more skin sores. The observed difference in the prevalence rate is in the expected direction given that the CHCI data relate to four or more skin sores, rather than five or more in the EARHSP data. Data on scabies from the EARHSP indicated that the prevalence rate for scabies (based on the number of skin assessments) for Indigenous children aged 0 to 14 years in East Arnhem over the study period from 2004 to 2007 was 13% (Andrews 2008). This was five percentage points higher than the prevalence rate of 8% observed among children aged 0 to 14 years in the Arnhem region according to the CHCI data. Data from EARHSP indicate that among Indigenous children aged 0 to 14 years in East Arnhem, the prevalence of ringworm (based on the number of skin assessments) was 15% over the study period from 2004 to 2007 (Andrews 2008). Findings from the NTER CHCI indicate that in the Arnhem region, 6% of children aged 0 to 14 years had ringworm.

The prevalence rates from the EARHSP data are based on the number of skin assessments done (not the number of children who were assessed). Specifically, the prevalence rates represent a monthly period prevalence, which excludes subsequent skin assessments for the same child that occurs within 30 days of an earlier assessment (Andrews 2008). Thus, any child can be represented in the EARHSP prevalence rates many times. In contrast, the CHCI prevalence rates are based on the number of children who had a Child Health Check, because only the most recent check for each child is used to calculate rates of health conditions.

The age of the children covered in the two data sources differs: the CHCI data relate to children 0 to 15 years of age, whereas the EARHSP data relate to children aged 0 to 14 years. For the purpose of comparison, the CHCI data were re-analysed and only those aged 0 to 14 years were included.

In order to align the geographical coverage of the two data sets as closely as possible, CHCI results for the Arnhem region (rather than for all of the regions covered by the CHCI) are compared with the results from the EARHSP. In addition, CHC data from July 2007 to May 2008 were used, as reported in the first progress report. In order to match the dates of data collection as closely as possible, EARHSP results for skin sores are available for 2007 only (from January until the completion of the program in August), relating to a total 550 skin assessments. In contrast, EARHSP data for scabies and ringworm were only available for the full study period—namely, September 2004 to August 2007. Thus the period of coverage differs more substantially between the two data sets for the comparisons of scabies and ringworm than it does for the skin sores comparisons.

Growth Assessment and Action program (now incorporated into the Healthy Under 5 Kids program)

The Northern Territory’s 2007 Growth Assessment and Action (GAA) program is a monitoring and growth promotion program for children aged 0 to 4 years who live in remote communities of the NT (NT DHCS 2008b). Data from the GAA program in relation to anaemia, and the three physical growth measures of stunting, underweight and wasting could provide useful context to the CHCI data. The GAA data indicate that in 2007, 25% of children aged 6 months to 4 years were anaemic (NT DHCS 2008b, p. 2). A slightly higher rate of anaemia—27%—was observed for children aged 0 to 4 years using the CHCI data. Note the age ranges covered by these two data sources differ slightly. Information on the prevalence of stunting is available for NT children aged 0 to 4 years from data collected as part of the GAA program (NT DHCS 2008b). These data indicate that in 2007, 11%of children aged 0 to 4 years were stunted, while the CHCI data indicate 6% of this same age group were stunted. Data on the prevalence of underweight is also available for NT children from the GAA program (NT DHCS 2008b). These data indicates that in 2007, 14% of children aged 0 to 4 years were underweight. The corresponding figure from the CHCI data is 11%. According to data from the 2007 GAA program, 10% of the children aged 0 to 4 years in rural and remote NT communities were identified as wasting. This was consistent with the 10% calculated for children of the same age using the CHCI data.

Although some non-Indigenous children are included within the ambit of the GAA program, the vast majority of children are Indigenous (96% in the 2007 collection[7]). Meanwhile, only Indigenous children are covered by the NTER CHCI.

The geographic areas covered by these two data collections differ slightly. The dates over which the GAA and CHCI data were collected also differ somewhat, with the 2007 GAA data collected between mid October 2006 and mid April 2007 (NT DHCS 2007) and the CHCI data collected from July 2007 to May 2008.

The GAA prevalence rates are calculated based on non-missing data, which contrasts with the approach used for the CHCI data where missing cases are included in the calculations.

In both the GAA and the CHCI data sets, the prevalence of anaemia was based on a blood test and a child was considered to be anaemic when their Hb level was less than 110 g/L. Note that, unlike the physical growth measures, the GAA anaemia data relate to a subset of children—those aged 6 months to 4 years. Because the CHCI data set does not contain exact age in months for all children (because in some versions of the CHCI form, only the age rather than the date of birth was requested), the CHCI analyses could not be re-analysed to exactly match the age range of the GAA data. Instead, the CHCI data that are compared with the GAA data relate to children aged 0 to 4 years. It should also be noted that the geographic areas differ. The GAA data relate to remote communities, whereas the CHCI data, relate to Indigenous children in the NTER prescribed areas, the majority of whom are remote but some urban regional children are also in scope.

To create the physical growth measures, a reference population must be chosen as a comparison point for the growth pattern observed for each child. In order to produce growth measures that are comparable with that of the GAA, the AIHW has made use of the USA Centres for Disease Control and Prevention 2000 growth charts (CDC 2008) for the reference population, as was done by the NT DHCS in their analysis of the GAA data. These growth charts are used by a number of different states and territories across Australia in the creation of physical growth measures (NT DHCS 2007, 2008a).[8]

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[7] Personal communication from Richard Inglis, Health Services Information Branch, NT Department of Health and Community Services, May 2008.

[8] As detailed in the recent discussion paper released by the NT DHCS (2008a), the NT is considering the future use of the 2006 World Health Organization growth standards rather than the 2000 CDC growth charts.

In addition to the choice of a reference population, the development of physical growth measures relies on a decision about what cut-off points will be used to determine whether a child's growth will be considered adequate or inadequate relative to the 'norm'. For the purposes of the analyses presented in this report, the same cut-off points were used by the NT DHCS and the GAA data (NT DHCS 2007). These cut-offs are as follows:

- stunting: a child was considered to be stunted when their 'height-for-age' score was more than two standard deviations below the mean, relative to the reference population
- underweight: a child was considered to be underweight when their 'weight-for-age' score was more than two standard deviations below the mean, relative to the reference population
- wasting: a child was considered to be wasted when their 'weight-for-height' score was more than two standard deviations below the mean, relative to the reference population.

Healthy School-Age Kids Screening Program

The Healthy School-Age Kids (HSAK) Screening Program is a joint initiative of the NT Department of Health and Community Services and the NT Department of Employment, Education and Training (NT DHCS & NT DEET 2007). The program is for school-aged children in remote areas of the Northern Territory.

Comparisons between data from the Northern Territory's HSAK Screening Program (NT DHCS & NT DEET 2007) and the CHCI could be made in relation to ear disease, trachoma, skin sores, ringworm and anaemia. The HSAK data indicate that 31% of children aged 4 to 5 years who live in remote Indigenous communities in the NT had ear disease (NT DHCS 2008c). The corresponding figure from the CHCI data set for 4 to 5 year olds is similar—33%. Data from the HSAK program indicate that, in 2007, 10% of Indigenous children aged 4 to 15 years in remote areas of the NT had trachoma (NT DHCS 2008c), while the CHCI data suggest that 7% of children aged 6 to 15 years had trachoma. Note these data are not comparable with CHC data, because the instructions on the CHCI form specifically indicate that children who had been screened for trachoma in 2007 as part of the HSAK program were not to be screened again.

Data from the HSAK program indicate that 16% of children aged 4 to 15 years in remote NT Indigenous communities in 2007 had skin sores (NT DHCS 2008c). This is higher than the prevalence rate of 10% observed in the CHCI data for four or more skin sores for children aged 4 to 15 years. However, given that the CHCI data report on the presence of four or more skin sores (rather than *any* skin sores as in the HSAK data), it would be expected that the CHCI prevalence rate would be lower than that observed using the HSAK data.

Data on ringworm were also collected as part of the HSAK program; these data indicate that ,in 2007, 8% of children aged 4 to 15 years in remote NT Aboriginal communities had ringworm (NT DHCS 2008c). This is two percentage points higher than the prevalence rate of 6% observed in the CHCI data for children aged 4 to 15 years. Information on the prevalence of anaemia is also available from the HSAK program. These data indicate that, in 2007, 11% of children aged 4 to 15 years were anaemic (NT DHCS 2008c). This is the same as the CHCI rate of 11% that applies to children of the same ages.

The HSAK data that are discussed in this report were collected in 2007; they relate to all remote Indigenous communities (NT DHCS 2008c). In contrast, the CHCI data, which was collected from July 2007 to May 2008, relate to Indigenous children in the NTER prescribed areas, the majority of which are remote but some urban children in living in town camps are also in scope.

In 2007, HSAK data on ear disease were collected for 170 children aged 4 to 5 years. To align the ages for the two data sets, the CHCI data were re-analysed and a prevalence rate derived for this same age group. For the HSAK collection, ear disease is defined as any abnormality found in at least one ear and includes evidence of acute or chronic infection, as well as other conditions such as wax or foreign bodies in the ear. In contrast, the definition for the CHCI collection is focused specifically on ear disease and does not include other conditions such as wax and foreign bodies in the ear.

The HSAK data on trachoma relate to 2,475 children aged 4 to 15 years, the CHCI data on this health condition were collected for children aged 6 to 15 years and thus the two data sets differ in this regard. More importantly, trachoma screening was not undertaken as part of the CHCs for children who had already been screened for trachoma in 2007 as part of the HSAK program; thus the rates of trachoma from these two data sets are not comparable.

Data on the presence of any skin sores and ringworm were collected for 2,475 children aged 4 to 15 years. The CHCI data on these measures were re-analysed to cover this same age range. The measures of skin sores in the two studies differ: the HSAK program provides information on the prevalence of *any* skin sores, while the measure in the CHCI data relates to the prevalence of four or more skin sores.

Data on anaemia were also collected for 2,475 children in remote Aboriginal communities aged 4 to 15 years as part of the HSAK program. As with the CHCI data, a child was considered to be anaemic when their Hb level was less than 110 g/L.

Morris and colleagues 2001 study on middle ear infection

A comparison between the CHCI data and data based on a sample of Indigenous children from a study by Morris and colleagues on middle ear infection has also been made in past reports. This study found that 91% of children aged 6 to 30 months had some form of middle ear disease (Morris et al. 2005). In the CHC data collection, about 30.3% of children who were aged 0–5 years old had a middle ear condition.

As part of the study by Morris and colleagues, which was undertaken in 2001, the ears of 698 children aged 6 months to 30 months were examined by ear health research officers. The children lived in 29 remote communities in Northern and Central Australia (Morris et al. 2005). This study found that 91% of children who had their ears examined had otitis media, with the rate of perforated ear drums (i.e. severe otitis media) varying considerably between communities and regions.

There are a number of differences between this data collection and the CHCI data collection. In particular, the data collected by Morris and colleagues was part of a research study that was done in 2001 that focused specifically on ear health. Assessments were completed using both tympanometry and pneumatic otoscopy. In contrast, the CHCI ear disease data were collected as part of a general, overall examination of a child's health; these data were collected from July 2007 to May 2008. During the CHCs, assessments of ear health made from July to December 2007 were based on otoscopy results alone; from January 2008 onwards, CHC teams used otoscopes and tympanometers.

Children aged 6 to 30 months were included in the Morris and colleagues study. Because the CHCI database does not have information on age in months for all children, the age ranges of the two studies cannot be aligned; instead, the CHCI data were re-analysed for children aged 1 to 3 years. A total of 1,644 children in this age range are represented in the CHCI database.

The geographical coverage of the two studies differs. Children that were included in the Morris and colleagues study lived in 29 remote communities in the following regions: Darwin Rural, East Arnhem, Katherine and Central Australia. Four of the communities in the Morris and colleagues study were in South Australia and children in the Barkly region and those who lived in out stations were not included. In contrast, the coverage of the CHCI collection included those living in the Barkly region and those living in out stations, but it did not include communities outside the NT.

National Aboriginal and Torres Strait Islander Health Survey (NATSIHS) 2004–05

The NATSIHS, which was conducted by the ABS, collected information on personal and household characteristics for Indigenous persons resident in private dwellings across all states and territories in Australia.

Data on children's conditions from the 2004–05 NATSIHS (ABS 2006) were not comparable with data from the Child Health Checks in most cases because the NATSIHS information relates to long-term conditions (i.e. conditions that had lasted, or were expected to last, for 6 months or more), whereas most of the conditions covered in the CHCI data refer to health conditions that existed at the time of the health check. As well, the information on the children's conditions were reported by parents or carers in the NATSIHS rather than based on the results of a medical examination or clinical test as they were in the CHCI. However, as discussed below, the definitions used and the method of data collection were considered sufficiently similar to allow data from these two sources to be compared for measures of the prevalence of asthma and the presence of a smoker in the household.

Data on the prevalence of asthma were collected in 2004–05 as part of the NATSIHS. These data indicate that 7% of Indigenous children in the NT aged 0 to 14 years had long-term asthma. This is similar to the 6% reported for children the same age in the NT using the CHCI database. Information on the prevalence of children living with a smoker in the household was also collected as part of the 2004–05 NATSIHS. The NATSIHS data indicate that 82% of Indigenous children aged 0 to 14 years in the Northern Territory lived in a household with a regular smoker (AIHW 2007, p. 459). This compares with a rate of 77% for 0 to 14 years olds as observed from the CHCI data.

However, the two data sources differ in a number of other ways. The NATSIHS data were collected in 2004 and 2005 through the use of a sample survey and covered urban, rural and remote regions of Australia. On the other hand, the CHCI data were collected from July 2007 to May 2008 and covered rural and remote areas of the NT in scope of the NTER CHCI.

The NATSIHS data relates to children aged 0 to 14 years. Thus the CHCI data were re-analysed for this subset of children.

Furthermore, the NATSIHS data on asthma were parent/carer-reported data, while the CHCI data on asthma were based on medical records and/or information from parents and carers. No data are provided by the ABS on the rate of long-term asthma among 0 to

14 year olds in the NT. Instead, the ABS report indicates that 14% of Indigenous children in Australia aged 0 to 14 years had long-term asthma (ABS 2006, p. 26). In order to ascertain the relevant rate for the NT, AIHW undertook further analyses of the NATSIHS data.

Top End Rheumatic Heart Disease Register and the Central Australian Rheumatic Heart Disease Register

CHCI data on the prevalence of rheumatic heart disease could be compared with data from the Top End Rheumatic Heart Disease Register and the Central Australian Rheumatic Heart Disease Register. Data from the Top End registry covers the northern part of the NT, including Darwin, East Arnhem, the Katherine region, Alligator, Daly, Finniss and Bathurst-Melville. Data for the NT from the Central Australian registry cover the Barkly and Central Australia regions.

Data from these registers combined indicate that, as at the 31 of December 2005, 0.5% of Indigenous children aged 0 to 14 years had rheumatic heart disease (AIHW 2007, p. 103). In comparison, the CHCI data indicate that 1.1% of Indigenous children aged 0 to 14 years in scope of the NTER CHCI had a history of rheumatic heart disease.

There are a number of differences between these data sources. In particular, the CHCI data set collected information on the history of rheumatic heart disease from health records and/or directly from parents, carers or the children themselves, while the registers collect information from medical providers. As well, the available information from the registers were current as at 31 December 2005, while the CHCI data were collected from July 2007 to May 2008 for children aged 0 to 15 years in scope of having a NTER Child Health Check. Because the data from the registers relate to children aged 0 to 14 years, the CHCI data were re-analysed for this age group for the purpose of the comparisons shown in this report.

Data from the two registers combined indicate that as at 31 December 2005, 99 Indigenous children aged 0 to 14 years were recorded as having rheumatic heart disease. Using estimated resident Indigenous population data for 2001 for the relevant areas, this equates to a rate of rheumatic heart disease of 0.5% (AIHW 2007, p. 103).

Appendix 7: Classification on the management of health conditions in the CHC

The information on the management of health conditions at the CHC was provided in free-text format on the form. To be able to undertake a more comprehensive analysis on management of health conditions, the AIHW adopted the International Classification of Primary Care version 2 (ICPC-2) Plus to code the free text information.

Information on ICPC-2 and ICPC-2 Plus

ICPC-2 is used in more than 45 countries to classify data from primary care settings and it is the national standard in Australia for the reporting of health data from general practice and patient self-report . The structure of ICPC-2 is shown in Table 1. However, it is well recognised that the use of ICPC-2 for the coding of how problems are managed in primary care settings is not ideal because the relevant process codes are “very broad and non-specific”.

Table A7.1: The structure of ICPC-2 and component names

	Chapter																	
Components	A	B	D	F	H	K	L	N	P	R	S	T	U	V	W	X	Y	Z
1.Complaints and symptoms																		
2.Diagnostic, screening and preventative procedures																		
3. Medication, treatment procedures																		
4.Test results																		
5. Administrative																		
6. Referrals and other reason for encounter																		
7-9. Diagnosis, diseases																		

A. General and unspecified	K. Cardiovascular	S. Skin	Y. Male genital (Y chromosome)
B. Blood, blood forming organs and immune mechanism	L. Musculoskeletal (locomotion)	T. Endocrine/metabolic and nutritional	Z. Social problems
D. Digestive	N. Neurological	U. Urological	
F. Eye	P. Psychological	W. Pregnancy, childbearing, family planning (women)	
H. Ear (hearing)	R. Respiratory	X. Female genital (X chromosome)	

ICPC-2 Plus is a clinical terminology that is classified to ICPC-2 but differs in that it allows for greater detail at the data input and analysis stages. It was developed by the Family Medicine Research Unit at the University of Sydney in 1995 and it is updated on a regular basis. It is used in a number of research projects, including the BEACH (Bettering the Evaluation and Care of Health) national data collection program of Australian general practice and National Health Survey for the coding of self-reported health.

Classification group and corresponding ICPC-2 Plus codes

The classification group of management of health conditions in CHC and corresponding ICPC-2 Plus codes are listed in Tables A7.2 to A7.4.

Table A7.2: Medication groups and their corresponding ICPC-2 Plus codes

Type of medication	ICPC-2 Plus code
Medication for de-worm treatment	D50007
Medication for skin diseases	S50001
Antibiotic	A50001 and A50006
Medication for blood, blood forming organs and immune mechanism	B50001 and B50002
Medication for ear disease	H50001
Medication for endocrine/metabolic and nutritional disease	T50001
Medication for neurological disease	N50006
Medication for other diseases	Any code with second and third characters as '50', such as 'A50001'.

Table A7.3: Coding of common 'tests done' (questions 82 to 85)

Groups of tests done on site	ICPC-2 Plus code
Blood test	
Haemoglobin (Hb)	n.a.
Blood sugar level (BSL)	n.a.
Other blood test	Any code with second and third characters as '34', such as 'A34001'.
Urine test	Any code with second and third characters as '35', such as 'A35001'.
Physical function test	Any code with second and third characters as '39', such as 'H39001'.
Microbiological/immunological test	Any code with second and third characters as '33', such as 'A33003'.
Diagnostic radiology/imaging	Any code with second and third characters as '41', such as 'A41002'.
Electrical tracings	Any code with second and third characters as '42', such as 'K42002'.

Table A7.4: Medical procedure groups and their corresponding ICPC-2 Plus codes

Type of medication	ICPC-2 Plus code
Skin dressing	S56001
Cleaning of ear	H51001
Other procedures	Any code with second and third characters as ’51, 52,53, 54, 56, 57, 58, or 59’.

Table A7.5: Coding scheme for ‘other’ referrals’ (question 89)

Code	Type of referral	Examples of terms used on CHC forms
1a	Cardiology	cardiology; cardiologist
1b	Investigations arranged – Cardiac	echo; echocardiogram; cardiac U/S, ECG
2	Investigations arranged – Radiology (except for cardiac related)	X ray; ultrasound; CT scan; MRI
3	Investigations arranged – Pathology	ACR (albumine/creatinine ratio); BGL, BSL, Chlamydia PCR,C+R, CRP, ESR,EUC, fasting BSL, FBC, FBE, Fe status, Gonorrhoea , LFT, MSU, MUC/S, pathologist, RPR, Se elecr, STI screen, UCE, UEC, U/E/C, U+E, MCS, Stool specimen, faeces M&C
4	Dietician or nutritionist	dietician; clinical nutritionist
5	Surgeon	general surgeon; surgeon; paediatric surgeon; neurosurgical review; orthopaedic specialist; paediatric urologist
6	Emergency department or hospital	emergency evacuation arranged; local emergency department; urgent hospital investigation; transferred to hospital, referral to hospital
7	Other medical specialist	gynaecologist; obstetrics; dermatologist; geneticist
8	Other allied services	prosthetic department; podiatrist; paediatric liaison nurse; women’s health nurse

Appendix 8: The latest version of data collection forms

Australian Government
Department of Health and Ageing

NT Aboriginal and Torres Strait Islander CHILD HEALTH CHECK

Community Name: ________________

Community Identification No.: ________________

Date: ________________

Patient details

First name: ________________

Family name: ________________

Other name: ________________

Medicare number: ________________

School year: ________________

Name of school: ________________

Is the patient of Aboriginal or Torres Strait Islander origin?

(For persons of both Aboriginal and Torres Strait Islander origin, mark both Yes boxes)

Yes, Aboriginal ☐

Yes, Torres Strait Islander ☐

Current contact details

Phone: ________________

Address: ________________

Parent/carer

Name: ________________

Phone: ________________

Address (if different to above): ________________

Alternative community contact details

Name: ________________

Phone: ________________

Address: ________________

Patient consent/parent or carer consent

Explanation of health check given ☐

Explanation of how health check data will be used ☐

(This health check is funded by the Commonwealth Government. The health check form will be retained by your clinic. A copy of the form will be provided to the Commonwealth Government so it can evaluate this program and improve services. The Commonwealth Government may share this information with the Northern Territory Government to see if you receive the follow-up services you need. The front page with your name on it will stay with your health service and not be given to the Commonwealth Government. The data will not be reported in a way that could identify you).

Patient/parent/carer consent for sharing of health information with regular health service

Can we look at your clinical medical record to help complete this health check? Yes ☐ No ☐

Can we give the results of this health check to your regular health service? Yes ☐ No ☐

If Yes, which clinic? ________________

Who received consent

GP ☐

Practice Nurse ☐

Health Worker ☐

Other (please specify) ☐

____

Would you like a written copy of the health check and recommendations for you and your child? Yes ☐ No ☐

Form No 2224 (0709)

HRN ______________________ Community ID No ______________

Please fill in HRN and Community ID Number on this page

Patient details

Date of health check ______________________ (dd/mm/yyyy)

1a Date of birth ______________________ (dd/mm/yyyy)

1b Age group (0-5) ☐ (6-11) ☐ (12-15) ☐

2 Sex Male ☐ Female ☐

Details of Doctor conducting check

3 Name ____

4 Doctor employed by

DoHA Child Health Check Team ☐

Local Health Service ☐

Previous Health Checks

5a Has the child had a previous Medicare item 708 health check? Yes ☐ No ☐ Unsure ☐

5b If Yes, date of last health check ______________________ (dd/mm/yyyy)

(Note: must be more than 9 months ago – If less than 9 months this health check is not required)

6a If the child is <1 year, have they received a newborn check? Yes ☐ No ☐ Unsure ☐

6b If Yes, date ______________________ (dd/mm/yyyy)

6c Please specify any outstanding follow-up

____

____

7a If the child is aged 5-15 years, have they had a Healthy School Age Kids screening in 2007? Yes ☐ No ☐ Unsure ☐

7b 5 years ☐ 10 years ☐ 15 years ☐ Annual (for other ages) ☐ Unsure ☐

7c Please specify any outstanding follow-up

____

____

8a If the child is aged 0-5 years, have they had a full Growth Assessment and Action check in the last six months? Yes ☐ No ☐ Unsure ☐

8b If Yes, date of last Growth Assessment and Action check ______________________

8c Please specify any outstanding follow-up

____

____

9a Has the child had a Paediatric review in the last 12 months Yes ☐ No ☐ Unsure ☐

9b Has the child had a DMO/GP review in the last 12 months Yes ☐ No ☐ Unsure ☐

Immunisation Status

10 Is the child's immunisation status up to date for their age group? Yes ☐ No ☐ Unsure ☐

Check patient's immunisation record, health centre records, or call NT Immunisation Helpdesk (Central Region 08 89516928 or 08 89228292, Top End Region 08 89228893)

11 Which vaccines have not yet been received?

Age due	**Circle overdue vaccines**			
Birth	Hep B	BCG		
2 months	Hib	Prevenar	InfanrixPenta	Rotavirus
4 months	Hib	Prevenar	InfanrixPenta	Rotavirus
6 months	Prevenar	InfanrixPenta		
12 months	Hib	MMR	Men C	Hep A
18 months	Varicella	Hep A	Pneumovax23	
4 years	MMR	Infanrix/IPV		
13 years	Boostrix (dTpa)	Varicella *(if not given before or no history of chicken pox)*		
15 years	Pneumovax 23			
10-15 years (female)	HPV 1st dose	HPV 2nd dose	HPV 3rd dose	

Medical History *Obtain from clinic records*

If the child is aged 0-5 years, give birth history

12 What was the mode of delivery? ______________________

13 Gestation (weeks) ______________________

14 Birth weight (grams) ______________________

15a Any complications during or shortly after the delivery? Yes ☐ No ☐ Unsure ☐

15b If Yes, please specify

____

____

For children in all age groups give relevant family medical history

16 Show medical conditions for the patient's parents and grandparents:

Diabetes	Yes ☐	No ☐	Unsure ☐
CVD	Yes ☐	No ☐	Unsure ☐
Rheumatic heart disease	Yes ☐	No ☐	Unsure ☐
Other (please specify)	Yes ☐	No ☐	Unsure ☐

____

____

Past medical history, hospitalisations and injuries

Use health centre records if required

17 Patient's medical history

Growth faltering	Yes ☐	No ☐	Unsure ☐
Recurrent chest infection	Yes ☐	No ☐	Unsure ☐
Pneumonia	Yes ☐	No ☐	Unsure ☐
Rheumatic heart disease	Yes ☐	No ☐	Unsure ☐
Rheumatic fever	Yes ☐	No ☐	Unsure ☐
Asthma	Yes ☐	No ☐	Unsure ☐
Ear infections/otitis media	Yes ☐	No ☐	Unsure ☐
Skin infections	Yes ☐	No ☐	Unsure ☐
Disability	Yes ☐	No ☐	Unsure ☐
Other (please specify)	Yes ☐	No ☐	Unsure ☐

18 Current health problems/issues (use health centre records if required)

19 Allergies/drug intolerances (use health centre records if required)

20 Current medications (including prescription and over the counter)

Relevant Developmental/ Social History

21a Who does the child live with? ______________________

21b Who is the primary carer of the child? ______________________

22a Any concerns about hearing/listening/talking? Yes ☐ No ☐ Unsure ☐

22b If Yes, please specify

____

____

23a Any concerns about vision? Yes ☐ No ☐ Unsure ☐

23b If Yes, please specify

____

____

24a Any concerns about nutrition? Yes ☐ No ☐ Unsure ☐

24b If Yes, please specify

____

____

25a Any concerns about physical activity? Yes ☐ No ☐ Unsure ☐

25b If Yes, please specify

____

____

Education

If the child is aged 0-5 years, give early childhood education

26 Indicate whether the child attends any of the following:

Play group	Yes ☐	No ☐	Unsure ☐
Childcare centre	Yes ☐	No ☐	Unsure ☐
Jet crèche	Yes ☐	No ☐	Unsure ☐
Preschool	Yes ☐	No ☐	Unsure ☐
Other (please specify)	Yes ☐	No ☐	Unsure ☐

____

If the child is aged 6-15 years, give educational progress

27a Does the child attend school? Yes ☐ No ☐ Sometimes ☐

27b If Yes, what year or composite group? ______________________

27c If No, what level completed? ______________________

28a Any concerns about learning or behaviour identified by parent/caregiver? Yes ☐ No ☐ Unsure ☐

28b If Yes, please specify

____

____

Smoking

29a Does anyone living in the household currently smoke regularly (at least once per day)? Yes ☐ No ☐ Unsure ☐

29b If Yes, does anyone smoke inside the house regularly? Yes ☐ No ☐ Unsure ☐

29c If Yes to the above, please state relationship to the child? ____________________

29d If Yes, do they want assistance to quit? Yes ☐ No ☐ Unsure ☐

Current Housing Situation

30 How many people usually sleep at the house (inside and outside)? ____________________

31 How many bedrooms does the house have? ____________________

32 Does the house have running water? Yes ☐ No ☐ Unsure ☐

33 Does the house have a working refrigerator? Yes ☐ No ☐ Unsure ☐

34a Does the house have a working toilet? Yes ☐ No ☐ Unsure ☐

34b If Yes, how many? ____________________

35 Does the house have a working bath or shower? Yes ☐ No ☐ Unsure ☐

36 ***Stressful Life Events** (eg family deaths, exposure to violence, illness of primary carer)

____

____

____

____

____

____

____

* ***Prompt questions could include***

- *Are you having a hard time in your life?*
- *What are your worries?*
- *Any sorry business, what makes you sorry?*
- *Any fighting, drinking too much grog, is there lots of gambling, is there enough money for food, what do you do with your time, do you get lazy (this is how boredom is expressed)?*

History Relevant to Specific Age Groups

Note: If child is aged 6–11 years, please go to Medical Examination section (page 10).
If the child is aged 12–15 years, please go to Adolescent section (page 9).

If the child is aged 0–5 years complete this section *(Write N/A if not relevant)*

Mother's pregnancy

37a Did the mother attend antenatal care during the pregnancy? Yes ☐ No ☐ Unsure ☐

37b If Yes, where did she attend antenatal care? ______________________

38a Were there any complications during pregnancy? Yes ☐ No ☐ Unsure ☐

38b If Yes, please specify

39a Were there any issues with health care during pregnancy? Yes ☐ No ☐ Unsure ☐

39b If Yes, please specify

If the child is aged <2 years, give nutrition details

40a Was the child ever breastfed? Yes ☐ No ☐ Unsure ☐

40b Is the child currently breastfeeding? Yes ☐ No ☐

40c If No, what age was breastfeeding stopped? ____________ months

41a Was the child ever bottle fed? Yes ☐ No ☐ Unsure ☐

41b Is the child currently bottle fed? Yes ☐ No ☐

41c If No, what age was bottle feeding stopped? ____________ months

42a Any worries about feeding? Yes ☐ No ☐ Unsure ☐

42b If Yes, please specify

43 Since this time yesterday has the baby/child had

Breast milk (if breastfeeding) Yes ☐ No ☐

Baby Formula Yes ☐ No ☐

Milk (tin/powdered/fresh) Yes ☐ No ☐

Tea Yes ☐ No ☐

Water Yes ☐ No ☐

Soft drink/flavoured water/cordial/fruit juice Yes ☐ No ☐

Other foods or drinks (please specify) Yes ☐ No ☐

If the child is aged <1 year, give risk factors for SIDS

44 Indicate whether any of the following risk factors for SIDS are relevant for this child:

Prone sleeping	Yes ☐	No ☐	Unsure ☐
Soft sleeping surfaces and loose bedding	Yes ☐	No ☐	Unsure ☐
Overheating	Yes ☐	No ☐	Unsure ☐
Smoking	Yes ☐	No ☐	Unsure ☐
Bed sharing	Yes ☐	No ☐	Unsure ☐

If the child is aged 0-5 years, give history of neonatal screening for hearing

45a Did the child receive neonatal screening for hearing? Yes ☐ No ☐ Unsure ☐

45b If Yes, please specify ____________________

Development (achievement of age-appropriate milestones)

46a Any concerns with Personal-Social development (eg smile, plays, indicates want)? Yes ☐ No ☐

46b If Yes, please specify ____________________

47a Any concerns with Gross Motor development (eg rolls over, sits, stands, walks, jumps, balances)? Yes ☐ No ☐

47b If Yes, please specify ____________________

48a Any concerns with Fine Motor-Adaptive development (eg grasps objects, pincer grasp, stacks objects)? Yes ☐ No ☐

48b If Yes, please specify ____________________

49a Any concerns about language (e.g. laughs, turns to voice, speech, words)? Yes ☐ No ☐

49b If Yes, please specify ____________________

50a Does the parent/carer have any concerns about their infant/child's development? Yes ☐ No ☐

50b If Yes, please specify ____________________

51 **Mother's/primary carer's current well being (support network, stressors/mood, general health)**

52 **Other history of relevance**

If the child is aged 12-15 years, complete this adolescent section *(Write N/A if not relevant)*

Alcohol

53a Any concerns about alcohol (patient drinking alcohol at a risky or harmful level)? Yes ☐ No ☐ Unsure ☐

53b If Yes, please specify ______________________

Smoking/tobacco

54a Does the patient smoke regularly, that is, at least once per day? Yes ☐ No ☐ Unsure ☐

54b If Yes, how many per day? ______________________

Other substance use

55a In the last 12 months did the patient use prescription medicines for non-medical purposes? Yes ☐ No ☐ Unsure ☐

55b If Yes, please specify details (eg type of drug, when)

____

56a In the last 12 months did the patient use other substances/illicit drugs? Yes ☐ No ☐ Unsure ☐

56b If Yes, please specify details (eg type of substance, when)

____

57a Does the patient show signs of depression/anxiety/self harm Yes ☐ No ☐

57b If Yes, please tick all appropriate boxes

Anxiety ☐
Depression ☐
Self harm ☐

57c If Yes, specify details: ______________________

____

General well being

58a Please rate the patient's general well being Good ☐ Poor ☐

58b If Poor, specify issues ______________________

____

Sexual and reproductive health (if applicable)*

Only enquire about, and approach this topic in an appropriate and culturally sensitive manner

59a Is the patient sexually active? Yes ☐ No ☐ Unsure ☐

59b If Yes, does the patient use contraception? Yes ☐ No ☐

59c If Yes, specify details: ______________________

59d Is the patient at risk of STIs? Yes ☐ No ☐

59e If Yes, specify details: ______________________

____

*(*NB: Please ensure that confidentiality/mandatory reporting procedures as per NT legislation have been explained when relevant and necessary.)*

60 Other history considered necessary ______________________

____

For children in all age groups give medical examination details

61 Child's weight ____________ kg

62 Child's height ____________ cm

63 If the child is aged <3 years or if clinically indicated, give head circumference __________ cm

64 If the child is aged 0-5 years is there evidence of growth faltering, i.e. crossing percentiles? Yes ☐ No ☐
(Plot and interpret growth curve)

65 Blood Pressure (please ensure correct cuff size) ________________ (if clinically indicated)

66 Child's pulse rate and rhythm:

Normal ☐
Abnormal ☐
Equal ☐

67a If the child is aged 6-15 years, give visual acuity details

Right 👁 6/__ Left 👁 6/__

(Refer to optometrist/ophthalmologist if unable to read 3 symbols on 6/12 line or 2 lines or more difference, and if HSAK referral not identified)

67b If any abnormality detected was it previously known? Yes ☐ No ☐

68 If the child is aged <8 weeks was red reflex in newborn?

Normal ☐
Abnormal ☐

If the child is aged 6-15 years, give details of trachoma testing
(Only if no HSAK screening in 2007 and trainer screener available)

69a Was the child screened for trachoma? Yes ☐ No ☐
If Yes, please circle all findings

Right 👁 TF, TI, TS, TT, CO, no abnormality Left 👁 TF, TI, TS, TT, CO, no abnormality

69b If any abnormality detected was it previously known? Yes ☐ No ☐

70a Ears

Otoscopy results for the patient

Right ear

Intact ☐
Wet perforation ☐
Dry perforation ☐
Bulging ☐
Other (please specify) ☐

____

Left ear

Intact ☐
Wet perforation ☐
Dry perforation ☐
Bulging ☐
Other (please specify) ☐

____

70b If any abnormality detected was it previously known? Yes ☐ No ☐

Gums and teeth

71 Does the child participate in 'Strong Teeth For Little Kids'? Yes ☐ No ☐

72 Oral health issues for the child:

Untreated caries	Yes ☐	No ☐	If Yes, was this previously known?	Yes ☐	No ☐
Gum disease	Yes ☐	No ☐	If Yes, was this previously known?	Yes ☐	No ☐
Other (please specify)	Yes ☐	No ☐	If Yes, was this previously known?	Yes ☐	No ☐

____

73 Has the child accessed dental services (dentist or dental therapist) in the last 2 years? Yes ☐ No ☐

Skin problems

74 Does the child have any of the following skin problems:

Sores (more than 3)	Yes ☐	No ☐	If Yes, was this previously known?	Yes ☐	No ☐
Scabies	Yes ☐	No ☐	If Yes, was this previously known?	Yes ☐	No ☐
Ringworm	Yes ☐	No ☐	If Yes, was this previously known?	Yes ☐	No ☐
Other (please specify)	Yes ☐	No ☐	If Yes, was this previously known?	Yes ☐	No ☐

____

For children in all age groups perform cardiac auscultation

75a Child's cardiac health:

Abnormality detected Yes ☐ No ☐

75b If Yes, please specify ______________________________

____

If the child is aged 6-15 years

76a Does the child have a known congenital murmur? Yes ☐ No ☐

76b Has the child been screened for RHD? Yes ☐ No ☐

76c Does the child have a known problem with Rheumatic Heart Disease? Yes ☐ No ☐

(Check on review list and having Bicillin 4 weekly).

If cardiac abnormality is detected and is of urgent clinical concern discuss immediately with DMO/Clinical Advisor; if the child is aged <5 years refer to Paediatrician.

For children in all age groups perform respiratory examination

77a Child's respiratory health:

Abnormality/respiratory illness detected Yes ☐ No ☐

77b If Yes, please specify ______________________________

____

77c Was this abnormality/respiratory illness previously known Yes ☐ No ☐

Abdominal examination (if clinically indicated)

78a Child's abdomen:

Abnormality detected Yes ☐ No ☐

78b If Yes, please specify: ______________________________

____

Full newborn examination

(Only to be performed if child aged under 2 months, and newborn check is not recorded as done previously).

79 Was a full newborn examination performed today? Yes ☐ No ☐

80 Observed interaction between parent/carer and child (if indicated)

81 Other examinations conducted by the team

Investigations

Investigation	Tests done	Arrangements (eg referral details)
82 Blood Please do: 1 Finger prick Hb test if not done in last 6 months or if <110g/L at last measure. If Hb <90g/L, do FBC. 2 BSL if indicated for adolescents	Hb results: ______ g/L BSL results: ______ mmoL Other: ______	
83 Urinalysis Please do 1 Dipstick for proteinuria for 10 to 15 year old children. 2 For other age groups as indicated		
84 Echocardiogram Arrange if new cardiac abnormality detected		
85 Other (as required)		

Unique ID No.

Interventions as required

86 Specify treatment provided, including any medications prescribed

87a Was a clinic follow-up required for this patient? Yes ☐ No ☐

87b If Yes, specify date of appointment and details ____________________

____

88a Were any vaccinations provided during this health check? Yes ☐ No ☐

88b If Yes, specify details ____________________

89 Were any referrals provided? Yes ☐ No ☐

89b If Yes, specify details

Paediatrician	☐
Dental	☐
ENT	☐
Tympanometry and Audiology (If bilateral/large perforations and/or concern about hearing/speech)	☐
Optometrist/Ophthalmologist (if unable to read 3 symbols on 6/12 line or 2 or more line differences between eyes)	☐
Social Worker	☐
Mental health services	☐
Drug and Alcohol	☐
Occupational therapist	☐
Speech therapist	☐
Physiotherapy	☐
FACS	☐
Other (please specify)	☐

____

90 Were new arrangements (treatment/follow-up/referral) required for previously known problems? Yes ☐ No ☐

91 Liaison with school/other service provider

____

____

Was advice given to the patient on:

92	**General**		
	Physical activity/ exercise	Yes ☐	No ☐
	Diet and nutrition	Yes ☐	No ☐
	Smoking	Yes ☐	No ☐
	Alcohol	Yes ☐	No ☐
	Parenting	Yes ☐	No ☐
	Sun protection	Yes ☐	No ☐
	Injury prevention	Yes ☐	No ☐
	Mental health issues	Yes ☐	No ☐
	Social issues (possible action plan with health services)	Yes ☐	No ☐
	Learning difficulties/educational issues	Yes ☐	No ☐
93	**Infant issues**		
	Breast/ bottle feeding	Yes ☐	No ☐
	SIDS prevention	Yes ☐	No ☐
	Support for Mother	Yes ☐	No ☐
94	**Adolescent issues**		
	Substance use (including tobacco) prevention and treatment	Yes ☐	No ☐
	Safe sex advice	Yes ☐	No ☐
95a	**Other interventions/advice**	Yes ☐	No ☐
95b	If Yes, please specify ______________________		

Please Sign As Appropriate

Name of Doctor: ______________________ Signature: ______________________

Name of Nurse: ______________________ Signature: ______________________

Name of Aboriginal Health Worker: ______________________ Signature: ______________________

Name of Social Worker: ______________________ Signature: ______________________

Summary Assessment of Patient

Based on consideration of evidence from patient history, examination and results of any investigation

A copy of this summary sheet can be given to the patient

Major Health Problems and Issues

Intervention Action/ Recommendations

Unique ID No.

Pre Populated Chart Review Form (Legend: Y=Yes, N=No, U=Unknown)

Community ID:

HRN: DOB: SEX: CHC DATE: Form #:

Conditions identified at CHC: 1: 2: 3: 4: 5:
(see Instructions for Use page) 6: 7: 8: 9: 10:

Initial chart review (see Step 2 on Instructions page) *Date of Initial chart review*: ___/ ___/ _____ (dd/mm/yyyy)			**Action Plan** (see Step 3 on Instructions page)		**Exit chart review** (see Step 5 on Instructions page) *Date of Exit chart review:* ___/ ___/ ____ (dd/mm/yyyy)		
Referral(s) made or follow-up identified at CHC	**For what condition(s) was the child referred or required follow- up?** (list all conditions that relate to each referral; see Instructions for list of terms)	**Has child been seen for this condition ?**	**Is further action required ?**	**If yes, which clinician does child need to see for this condition?** (see Instructions for list of terms)	**Has child been seen for condition since Initial chart review?**	**Is further action required ?**	**If yes, which clinician does child need to see for this condition?** (see Instructions for list of terms)
………………..	__________	Y / N / U	Y / N / U	__________	Y / N / U	Y / N / U	__________
………………..	__________	Y / N / U	Y / N / U	__________	Y / N / U	Y / N / U	__________
	__________	Y / N / U	Y / N / U	__________	Y / N / U	Y / N / U	__________
…………………	__________	Y / N / U	Y / N / U	__________	Y / N / U	Y / N / U	__________
…………………	__________	Y / N / U	Y / N / U	__________	Y / N / U	Y / N / U	__________
	__________	Y / N / U	Y / N / U	__________	Y / N / U	Y / N / U	__________
………………..	__________	Y / N / U	Y / N / U	__________	Y / N / U	Y / N / U	__________
………………..	__________	Y / N / U	Y / N / U	__________	Y / N / U	Y / N / U	__________
	__________	Y / N / U	Y / N / U	__________	Y / N / U	Y / N / U	__________
…………………	__________	Y / N / U	Y / N / U	__________	Y / N / U	Y / N / U	__________
…………………	__________	Y / N / U	Y / N / U	__________	Y / N / U	Y / N / U	__________
	__________	Y / N / U	Y / N / U	__________	Y / N / U	Y / N / U	__________
………………..	__________	Y / N / U	Y / N / U	__________	Y / N / U	Y / N / U	__________
………………..	__________	Y / N / U	Y / N / U	__________	Y / N / U	Y / N / U	__________
	__________	Y / N / U	Y / N / U	__________	Y / N / U	Y / N / U	__________
…………………	__________	Y / N / U	Y / N / U	__________	Y / N / U	Y / N / U	__________
…………………	__________	Y / N / U	Y / N / U	__________	Y / N / U	Y / N / U	__________
	__________	Y / N / U	Y / N / U	__________	Y / N / U	Y / N / U	__________
Any other conditions currently requiring follow-up? (see Step 2)	Yes / No / Unsure						
If yes, specify condition(s): __________			Yes	__________	Y / N / U	Y / N / U	__________
	__________		Yes	__________	Y / N / U	Y / N / U	__________
	__________		Yes	__________	Y / N / U	Y / N / U	__________
	__________		Yes	__________	Y / N / U	Y / N / U	__________
	__________		Yes	__________	Y / N / U	Y / N / U	__________

1 (version 5)

Version 5: NTER CHCI *AUDIOLOGY* SERVICES FORM

1. Organisation Details

Date of service: _____/_____/________ (dd/mm/yyyy)

ID of Community or Town Camp where this service was provided: _______________

2. Child Details

HRN: _____________ Date of Birth: _____/_____/_______ (dd/mm/yyyy) Sex: ☐ Male ☐ Female

3. Previous Audiology check

Has the child had a previous Audiology check since 11/07/2007?
☐ Yes, please specify date: ____/____/______ (dd/mm/yyyy) If child had more than one previous check, refer to latest one only.
☐ No (go to question 4)
☐ Unsure (go to question 4)

If Yes, has any ear health intervention occurred since that check? ☐ Yes ☐ No ☐ Unsure
If Yes, specify the type of intervention *(please indicate all that apply)*?
☐ Enhanced primary care
☐ ENT consultation
☐ Surgery
☐ Other, please specify ___________________________________
☐ Unsure

If there was a previous Audiology check, has there been any significant change in hearing levels since that check? ☐ **Yes** **If Yes, was there a** ☐ significant improvement **or** ☐ significant deterioration
☐ No significant change
☐ Unsure

4. Summary of audiology findings *(only select one option under each heading)*

Hearing loss
☐ None
☐ Unilateral
☐ Bilateral
☐ Soundfield

Type of hearing loss
☐ None
☐ Conductive
☐ Sensorineural
☐ Mixed (both conductive and sensorineural)

Degree of hearing impairment (based on better ear)

(av. HTL)	***Sound Proof Conditions***	***Non-Sound Proof Conditions***
☐ None	(0 – 15 dB)	(0 – 25dB)
☐ Mild	(16 – 30dB)	(26 – 35dB)
☐ Moderate	(31 – 60dB)	(36 – 60dB)
☐ Severe	(61 – 90 db)	(61 – 90 db)
☐ Profound	(91dB +)	(91dB +)

Middle ear condition

Right	**Left**
☐ None	☐ None
☐ Eustachian Tube Dysfunction	☐ Eustachian Tube Dysfunction
☐ Acute Otitis Media	☐ Acute Otitis Media
☐ Otitis Media Effusion	☐ Otitis Media Effusion
☐ CSOM	☐ CSOM
☐ Dry Perforation	☐ Dry Perforation
☐ Other, please specify __________________	☐ Other, please specify ______________________
☐ Unsure	☐ Unsure

5. Action *(please indicate all that apply)*

☐ No further action required
☐ Case management by Primary Health Centre
☐ Case management by ENT
☐ Ongoing monitoring by NT Hearing Services
☐ Referral to Australian Hearing (rehabilitation)
☐ Referral to Department of Education Employment and Training Hearing Advisory Support
☐ Other, please specify ____

NTER CHCI DENTAL SERVICES DATA COLLECTION FORM

1. Organisation details

Date of Service: ☐☐/☐☐/☐☐☐☐ (dd/mm/yyyy)

ID of Community or Town Camp where this service was provided:

☐☐☐☐☐

2. Consent to provide information to the Commonwealth

This dental service is funded by the Commonwealth Government. Information relating to the dental services provided to you, including any treatment and follow up treatment you receive (for example, surgery) will be kept by your dentist and provided to the Australian Institute of Health and Welfare (AIHW). To ensure you receive any follow up services you need and to evaluate and improve this program, the AIHW may disclose the information it receives to the Commonwealth Government to enable this evaluation, improvement and follow up to occur. Your name will not be provided to the AIHW or the Commonwealth Government and your information will not be reported in any way which could identify you.

Consent given to provide information to the Commonwealth?

☐ Yes ☐ No

If consent is not obtained, no data to be sent to the AIHW.

3. Child's details

HRN: ______________________

DOB: ☐☐/☐☐/☐☐☐☐ (dd/mm/yyyy)

SEX: ☐ Male ☐ Female

(continued on next page)

Please provide HRN and date of service again: HRN:___________________ Date of service:____________________

4. Dental services provided

Indicate all services provided during this occasion of service

☐ 0: Diagnostic
☐ 1: Preventive
☐ 2: Periodontic
☐ 3: Surgery
☐ 4: Endodontic
☐ 5: Restorative
☐ 6: Crown or bridge
☐ 7: Prosthetics
☐ 8: Orthodontic
☐ 9: Other – please specify_______________________________________

5. Problems treated

Indicate all problems treated during this occasion of service

☐ 1: Assessment only
☐ 2: Oral health education
☐ 3: Untreated caries
☐ 4: Gum disease
☐ 5: Broken or chipped teeth due to trauma
☐ 6: Abnormal teeth growth
☐ 7: Missing teeth
☐ 8: Mouth infection or mouth sores
☐ 9: Dental hygiene (including plaque and calcification)
☐ 10: Other – please specify____

6. dmft/DMFT and dmfs/DMFS scores

dmft: if less than 11 years old	d		m		f		dmft	
DMFT: if 7 years or over	D		M		F		DMFT	
dmfs: if less than 11 years old	d		m		f		dmfs	
DMFS: if 7 years or over	D		M		F		DMFS	

7. Follow-up requirements

Does this child require further follow-up in order to complete their treatment plan?

☐ Yes ☐ No

Glossary

Glossary of audiology data terms

Hearing

Hearing is the sense for perceiving sounds and includes regions within the brain where the signals are received and interpreated.

Otitis media

It is a condition with any inflammation, fluid or suppurative infection in the middle ear.

Suppurative

Describes pus produced in response to inflammatory bacterial infections.

Eustachian tube dysfunction

Negative middle ear pressure associated with compromised equalisation impeding middle ear function and causing middle ear fluid accumulation.

Acute otitis media

Describes presence of suppurative (infected) middle ear fluid with intact bulging or recent discharge and or bulging eardrum. May have associated symptoms or signs of infection that include discharge, pain, fever, irritability, vomiting or diarrhoea

Otitis media with effusion

It is the presence of intact eardrum and middle ear fluid without symptoms or signs of infection.

Chronic suppurative otitis media (CSOM)

It is a persistent suppurative discharge from middle ear through a tympanic membrane perforation for more than 6 weeks.

Dry perforation

It refers to a CSOM condition that presents as a hole in the eardrum without any evidence of suppurative otitis media (either acute or chronic).

Persistent

It refers to a hearing loss or otitis media condition that is demonstrated to have been present for 3 months or longer.

Otoscopy

It is the clinical skill of examining the outer and middle ear, including the eardrum, using an otoscope/ auriscope.

Tympanometry

It is an examination used to test the condition of the middle ear and mobility of the eardrum and the conduction bones. It is an objective test of middle-ear function and provides a measure of energy transmission through the middle ear.

Audiometry/ pure tone audiometry

It is the standard technique of testing hearing ability. Pure tone audiometry records a subjective response to threshold (softest) sound stimuli presented through headphone, bone conductor or speaker at discrete frequencies essential for detecting and discriminating speech. Any response deviation from the normal range, at any sound stimuli, in either ear, is described as a hearing loss and the type of hearing loss is diagnosed.

Visual reinforce observation audiometry (VROA)
It is a hearing assessment technique using specialised sound field facilities that is appropriate for smaller children and babies 9 – 36 months). When able to sit and turn head independently children can be conditioned to repeatedly and reliably respond to frequency specific warble tones, presented via speaker, headphone or bone conductor This conditioned response is reinforced through provision of a visual reward (puppet) to obtain threshold (softest) measures. Results obtained via speaker (standard test) do not provide separate ear information but determine adequacy of hearing for speech and language development and reflect the better ear.

Hearing loss
It describes any hearing threshold response (using audiometry) outside the normal range, at any sound stimuli, in either ear. Hearing loss in a population describes the number of children who have abnormal hearing. Hearing loss may affect one ear (unilateral) or affect both ears (bilateral).

Fluctuating hearing loss
It refers to hearing loss that changes significantly over time resulting in inconsistent auditory input. Conductive hearing loss is often associated with fluctuations related to changes in the otitis media condition or the impact it is having on sound conduction through the middle ear.

Hearing impairment
It is classification gives estimate of degree of handicap associated with hearing loss in the better ear and links to predicted consequences and recommended rehabilitation. Hearing impairment classification applies a graded scale mild, moderate, severe and profound, based on degree of deviation from normal thresholds in the "better ear" as recorded through audiometry. During data collection it is calculated as a 3 frequency average (3FA) of the threshold of hearing loss (HTL) at 500Hz, 1000Hz and 2000Hz and is only applied to further describe bilateral hearing loss. It is based on pure tone audiometry on the test day and does not account for language, processing, environmental and early onset factors.

Mild hearing impairment
It is predicted to cause problems with hearing some speech components (below threshold), hearing in background noise, hearing over distance, understanding soft voices and understanding non first (native) language speakers. Speech sounds will easily become inaudible and the listening environment is critical for enabling audibility of speech sounds for oral English, literacy and numeracy. Classroom amplification in combination with appropriate acoustic improvements for noise reduction is demonstrated to offer benefit for mild hearing impairment at school. Individual amplification may also be considered.

Moderate hearing impairment
It is predicted to make most average conversational speech unintelligible, when relying on hearing alone, even in ideal listening conditions. Individuals with this degree of hearing impairment are dependent on complimentary information including visual cues (lip-reading, body language and hand talk) raised speech volume (amplification) and contextual cues. Moderate hearing impairment has major consequences for speech,

language, communication, cognition, literacy, numeracy and auditory processing capabilities.

Severe and profound hearing impairment

It results in all conversational speech sounds being inaudible. Individual amplification required for language acquisition and some children may use sign language as main communication mode.

None hearing impairment

It refers to children where the better hearing ear has an average threshold at 500Hz, 1000 Hz and 2000Hz that is within the normal range for the test conditions. These children may have unilateral hearing loss or hearing loss at frequencies outside this range.

Sensorineural hearing loss

It is a deviation of hearing threshold from the normal range attributable to problems in the inner ear or vestibulocochlear nerve.

Conductive hearing loss

It describes a deviation of hearing threshold from normal associated with reduced conduction of sound through the outer ear, tympanic membrane (eardrum) or middle ear including ossicles (middle ear bones).

Mixed hearing loss

It is a hearing loss that has conductive and sensorineural components combined.

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).

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

Prosthetics

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 and 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: professionals visit patient at their home or hospital.

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