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.