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Demographic Data Quality Assessment for Northern Territory Public Hospitals 2011

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Summary

This data quality survey is the third project conducted by the Northern Territory (NT) Department of Health over a 13 year period to measure the accuracy of demographic information collected by NT public hospitals about hospital inpatients.

The accuracy of hospital information is crucial because demographic and clinical information about hospital inpatients is the foundation on which service delivery performance, evaluation and reporting is based. The information is used by NT and Australian government planners and policy makers, private health care providers, community organisations and researchers for policy development, resource allocation, management and monitoring of health services and health outcomes for our diverse population.

The third NT survey was funded by the Council of Australian Governments, the Australian Health Ministers' Advisory Committee and the NT Department of Health, as part of a national survey conducted between May and July 2011. The national project was managed by the Australian Institute of Health and Welfare and overseen by the National Health Information Standards and Statistics Committee.

The NT component of the survey was conducted by the Health Gains Planning (HGP) Branch of the NT Department of Health. HGP Branch staff interviewed 892 inpatients of the five NT public hospitals during their hospital admission. Patients were asked about their age, sex, Indigenous status, country of birth, and place of residence. In addition, the NT survey included questions about the patient's place of residence one year and five years ago. The survey results were compared with information recorded in the NT hospital information system, which is shared by all NT public hospitals.

The NT 2011 survey found that the high level of accuracy recorded in previous NT surveys had been maintained. The level of accuracy for each data item in 2011 was sex (99%), Indigenous status (98%), country of birth (97%), district of residence (91%), year of birth (91%) and date of birth (83%).

Introduction

Australian hospitals produce a summary for every episode of inpatient care, containing basic demographic information about the patient including date of birth, sex, place of residence, Indigenous status, clinical information about the patient's conditions and the treatment received. The summary data can be used for a range of purposes including managing, funding and planning acute care services; informing government health care policy and private sector investment decisions, and health services research. The accuracy of both demographic and clinical data is important to ensure the reliability of this summary.

In recent years information about demand for, access to and provision of acute care services for Indigenous Territorians has become increasingly important to make informed decisions and evaluate the effectiveness of efforts to improve the health status of, and health services for this most disadvantaged group in Australia.

In 1997 the Northern Territory (NT) Department of Health (DOH, named at the time the Territory Health Services) undertook the first NT demographic data quality study¹ to assess the accuracy of Indigenous status and other demographic data in the NT hospitals' patient information system (named Caresys). The survey interviewed 412 NT public patients during their hospital stay to ask them directly about their basic demographic details, and compared the self-reported responses with what was recorded for each patient in the hospital information system.

Over the following years the importance of reliable statistics on acute care for Indigenous Australians, based on accurate identification of Indigenous patients in hospital records, became increasingly apparent nationally. In particular, many national health funding agreements are based on 'per person' funding, with a higher amount (or 'weighting') for Indigenous patients than other population groups, in recognition of the lower health status of Indigenous people and their greater health care needs. There is a similar weighting for remote residents, in recognition of the higher cost of service delivery in remote areas. Incomplete identification of Indigenous people and incorrect place of residence can therefore have important financial implications and limit resources available for service delivery, as well as under-estimating the demand for, and utilisation of, health services by Indigenous people.

In 2008 the first national data quality survey² of demographic data for hospital inpatients was conducted; funded by the Office of Aboriginal and Torres Strait Islander Health in collaboration with state and territory health departments. The 2008 survey was intended to be the first of a regular series of national surveys to monitor improvement in the accuracy of Indigenous status and other demographic data recorded by hospitals. The 2011 survey was the second national survey and the third survey conducted in the NT. All three NT surveys were restricted to public hospitals (the single private hospital in the NT was not included).

Continued monitoring of demographic data provides confidence in the data collections that measure service activity for patients. Demographic information underpins the foundations of resource management and allocation of funds to provide an equitable service to the community i.e. for service planning, evaluation, research and effective management of hospital services. Demographic information is used as a basis for policy decisions; to monitor and highlight health risks and outcomes relevant in the community, for different population groups, based on age, sex, ethnicity, Indigenous status and remoteness.

High quality demographic information will become more critical when the National Health Reform and activity-based funding are implemented in 2012, as territory and state health authorities will be increasingly funded according to the numbers and kinds of services (their 'casemix') provided.³

The 2011 national survey was commissioned and funded by the Council of Australian Governments and the Australian Health Ministers Advisory Committee, as part of the National Indigenous Reform Agreement⁴ on closing the data gaps. Additional funding was provided for the NT survey by the NT DOH. The national survey was co-ordinated by the Australian Institute of Health and Welfare (AIHW) and was overseen by the National Health Information Standards and Statistical Committee. The AIHW will use the results of the national survey to inform and develop correction factors to adjust acute care statistics for under-identification of Indigenous people in hospital inpatient data.⁵

To reduce the potential for bias during data collection, the national survey design required that the group conducting the survey in each state was independent of the usual data collection process in hospitals. In the NT the survey was conducted by the Health Gains Planning (HGP) Branch, part of the central office of the NT DOH. The HGP Branch is not part of hospital administrative processes or the hospitals policy section of the Department, but uses the hospital datasets for epidemiological and economic analysis, and consequently has interest in understanding the level of under-identification of Indigenous patients and accuracy of other demographic information. The HGP Branch had conducted the previous two NT surveys.

Methodology

Hospital level analysis was performed for all five public hospitals to enable each hospital to view their respective results and make data collection improvements relevant for their hospital. In the previous survey, hospital level analysis was performed for Royal Darwin Hospital (RDH) and Alice Springs Hospital (ASH) but was grouped together for Tennant Creek Hospital (TCH), Katherine Hospital (KH) and Gove District Hospital (GDH).

Ethics committee approval

The AIHW had obtained in-principle ethics approval for the national project from the AIHW Ethics Committee prior to commencement in November 2010. In the NT, ethics approval was provided by the Central Australian Human Research Ethics Committee (approval no. 2011.02.05) and the Human Research Ethics Committee of the NT DOH and the Menzies School of Health Research (approval no. HREC-2011-1511).

Sample size

The AIHW set the optimum survey sample size in each remoteness category based on the proportion of separations recorded for Indigenous people in that remoteness category out of all separations recorded for Indigenous people in each State/Territory.

In addition, a minimum sample size was set by AIHW for the NT because of difficulties experienced in obtaining the optimum number of interviews in the very remote category. The minimum very remote sample target was 58 interviews from GDH and TCH; 68 interviews were completed at these two hospitals (Table 1).

The total of 892 interviews conducted in the NT met the AIHW minimum target in all remoteness categories. Some interviews were removed from the final sample (55 interviews) as the patient had been interviewed previously at either the same or a different hospital (Table 2). A further 28 interviews were removed as there was no hospital information system patient identifier Hospital Record Number (HRN) record matching the interview HRN identifier. The final sample size for analysis was 809 interviews.

Table 1: Target and actual sample size by hospital and remoteness, Northern Territory

Remoteness Category	Hospital	Optimal target sample size	Minimum target sample size	Total interviews	Actual sample
Outer regional	Royal Darwin Hospital	469	120	454	408
	Total outer regional	469	120	454	408
Remote	Alice Springs Hospital	361	80	302	276
	Katherine Hospital	71	50	68	65
	Total remote	432	130	370	341
Very remote	Gove District Hospital	23	18	23	20
	Tennant Creek Hospital	64	40	45	40
	Total very remote	87	58	68	60
Total		988	308	892	809

Survey preparation and schedules

Five HGP Branch staff received survey-specific training by the AIHW, and cross cultural training by NT Health Aboriginal Cultural Awareness Program (ACAP). The cross cultural training provided advice about appropriate body language, timing of questions, dress, eye contact and respect, in order to successfully interact with Indigenous patients. All interviewers held an NT Government Working With Children clearance card.

The AIHW provided interviewer guidelines,⁶ interview questions, a database, and analysis and data comparison guidelines documents.⁷ The interview questions and guidelines were consistent across all hospitals. In the NT, the questions were revised with simplified alternative prompts added to the questionnaires, to be asked as follow-on questions if required. The interview guidelines were also revised for NT purposes, in consultation with ACAP, and approved by the AIHW project co-ordinator. The final NT questionnaire is at Appendix 1. Some adjustments were also made to the patient information brochure supplied by the AIHW, to meet the requirements of the NT Human Research Ethics Committees. A copy of the NT information brochure is at Appendix 2.

An NT-specific survey package developed to assist the interviewers included:

- Locality lists and mapping to NT administrative districts, locality numbers and Statistical Local Area names and numbers;
- A map of the NT with localities marked;
- Details of hospital contacts and hospital maps;
- The information brochure for survey participants that contained information about the survey, contact details for complaints and to thank them for their assistance;
- Interview questionnaires; and
- Interview guidelines.

Hospital contacts were provided with documentation about the project and interview schedules were negotiated. Ward clerks were briefed by the hospital contact.

Exclusion criteria

All public hospital inpatients were eligible to participate, including day only admissions and patients admitted for renal dialysis purposes, except:

- Patients considered by the person in charge of the ward as not well enough or not competent to give consent;
- Unqualified newborns (i.e. newborn babies with no medical problems; they are not classified as 'admitted patients');
- Hospital boarders (e.g. a young child in hospital because his/her mother is an inpatient);
- Patients in adult intensive care units;
- Patients that for any reason presented a risk to the health or safety of the interviewer (e.g. isolated infectious patients and secluded mental health patients);
- Very long stay patients such as those waiting for placement in residential aged care facilities or living in a long term nursing home type bed; or
- Residential aged care clients such as those living in multipurpose services associated with hospitals.

Schedules in small hospitals in remote locations

The interview schedule included two visits to each hospital, two weeks apart, during May and June of 2011, except for GDH which had only one visit scheduled. The optimum number of interviews could not be achieved within the two visits and additional visits were required at all hospitals except GDH.

At TCH, air travel was only available on a Tuesday or Thursday. After the first fly-in visit to Tennant Creek, the single engine plane had to make an emergency landing at Tindal (Katherine) and our interviewer was not happy about flying again. The schedule was adjusted and a different interviewer flew to Tennant Creek, also on a Tuesday, to find only three additional patients. The renal patients were the same as on the previous visit (renal dialysis patients receive dialysis on either Monday and Wednesday or Tuesday and Thursday). The death of a traditional elder at Tennant Creek delayed further interviews for several weeks. Finally, a five day flying and driving trip for two interviewers was organised to visit both ASH and TCH, and the minimum target number of interviews was met.

All interviews were completed by 1 July 2011.

The interview

On arrival at each hospital, interviewers reported to the designated hospital contact officer and were directed to the person in charge of each ward, who provided guidance on whether the patient was well enough to participate. Verbal consent was sought from each patient prior to interview. If consent was not given, the interviewer thanked the patient and concluded the interview. Interpreters and Aboriginal health worker assistance was sought in TCH and ASH after communication difficulties were experienced on the first visit. Their valuable assistance made a marked difference in both the willingness of Central Australian Indigenous people to participate and in the quality of information understood by the interviewers.

Communication with Indigenous people was more difficult in Central Australia (ASH and TCH) than in the Top End hospitals (RDH, KH and GDH). Interviewers asked patients about their age, sex, country of birth, and place of residence, and the HRN was recorded from their hospital bracelet. In addition, the NT survey included questions about the patient's place of residence one year and five years ago. The patients were provided with the information sheet and contact details of the project organisers.

Some patients were not able to provide answers to some of the questions. The interviewers left these questions unanswered on the questionnaire sheet. For the date of birth question, the interviewer had the option of obtaining either the patient's date of birth or their age. If the patient could only provide a year of birth or an estimate, the interviewer recorded the year and ticked the 'estimate' box on the questionnaire.

Data entry

The completed questionnaires were entered into the database provided by the AIHW after some modifications were made to the database by NT project staff to cater for NT purposes. Data entry instructions and standards were developed and the data entry person was given training on procedures to follow. Data entry was challenging as some handwritten answers were difficult to read and had to be referred back to the interviewers for clarification.

It was recognised in the planning stages that interview staff would have difficulty in understanding some community names. To assist in limiting this problem, each interviewer carried a detailed map of the NT, a list of locality names, Aboriginal place names and their corresponding locality numbers. It was planned that the interviewers would check their map and record the locality name and corresponding locality number on the questionnaire sheet.

During the data review many locality numbers did not correspond to the name of the locality entered. In these cases the locality name, after checking the questionnaire, was used as the correct value and was electronically mapped to the locality number in the NT locality reference file.

Validation and linkage with hospital information system records

At interview, the HRN was collected from the patient's hospital bracelet. The HRN is unique for each patient and consistent across all NT public hospitals. No names or other identifying information was collected by interviewers.

The project analyst obtained the individual patient hospital admission records collected and stored in the patient administration system, Caresys, from the NT DOH data warehouse. The Data Warehouse Unit maintains the Inpatient Activity Information Datamart, updated daily from Caresys, which includes current admissions and completed hospital episodes. The information obtained from the warehouse included the HRN, Indigenous status, sex, date of birth, locality of usual residence, country of birth, admission and separation dates, and some summarised clinical information. The HRN on the patient's hospital bracelet, noted on the questionnaire by the interviewer is the same unique patient number as the HRN recorded in the inpatient activity information.

The project analyst used the HRN as the key in matching questionnaire information with hospital admission records. Once the information was matched, comparisons were made between the questionnaire information and the hospital system information.

Some interviews were removed from the final sample (55 interviews) as the patient had been interviewed previously for this study at either the same or a different hospital in the NT.

The HRN recorded at 76 interviews could not be found in the Inpatient Activity Information Datamart. For these interviews, a search of the hospital information HRN's for persons admitted to hospital during the survey period with similar HRN's was undertaken. The interview HRN's were adjusted if the birth date, sex and hospital were in agreement with the interview information. The HRNs for 48 interviews were adjusted for missing digits or reversed digits. These HRNs had been either recorded incorrectly at interview, or on the hospital bracelets, or the handwriting on the questionnaire was illegible. A further 28 interviews were removed as there was no hospital system information HRN that could be matched to the interview HRN. The sample for analysis totalled 809 interviews (Table 2).

Table 2: Interviews removed in validation

Reason for removal of interview questionnaire	Interviews removed	Remaining Interviews
Total Interviews undertaken		892
Duplicate HRN - persons interviewed more than once	55	837
No interview HRN match to any hospital HRN	10	827
No HRN match to any hospital HRN admission before or on interview date	12	815
HRN match but to a different hospital to the interview hospital	6	809
Remaining Interviews		809

Data storage and preparation for analysis

After the information from the interviews was matched with the information from the hospital system, the combined dataset contained one episode per patient with comparable information about Indigenous status, sex, date of birth, locality of usual residence, country of birth, admission and separation dates, HRN and some summarised clinical information.

Assessment of the date of birth and age was necessary to identify if the age or date of birth was an estimate. The AIHW guidelines indicated that an estimate in both the hospital system information and the interview information for each patient should be considered in agreement.

Accuracy rates for date of birth and year of birth exclude patients who were unable to provide any birth date or age information during their interview.

Indigenous status

Indigenous status is collected in the hospital information system using five categories consistent with the National Health Data Dictionary specifications:⁸

1. Aboriginal but not Torres Strait Islander
2. Torres Strait Islander but not Aboriginal
3. Aboriginal and Torres Strait Islander
4. Neither Aboriginal nor Torres Strait Islander
9. Unknown.

For this project, the focus was on whether the patient identifies as Indigenous or not, rather than on whether Aboriginal people were correctly distinguished from Torres Strait Islanders, so during analysis, categories 1,2 and 3 were combined as 'Indigenous'. Indigenous status was then analysed as:

- Indigenous
- Non Indigenous
- Unknown or not collected.

Locality and district of residence

Where possible, interviewers recorded locality of residence as the name of the community or suburb provided by the patient. After the interviews, the interviewers reviewed the locality names and recorded the appropriate NT locality code on the interview sheet. Corrections for invalid locality codes, misspellings, spaces and ordering of words were made in the analysis phase of the project; errors were the result of the interviewer misunderstanding or misspelling the locality or suburb name provided by the patients.

Locality was the most difficult variable to collect as some communities have more than one name. The paper record of interview was retrieved and spelling reviewed for invalid locality names. Survey records for some misspelt communities were compared with the hospital records. If the survey community name was close (in spelling) to the hospital community name, the survey record was adjusted and changes noted on the paper questionnaire. All but 12 interview records were thus assigned a valid locality name and district.

Locality of residence was compared at both community level and administrative district level. There are issues regarding the relevance of measuring accuracy at administrative district level due to the large areas covered by some of the NT rural districts. For example, Alice Springs Rural District covers an area which includes both Ampilawatja (also known as Ammaroo), 320 kilometres (km) north east of Alice Springs, and Kaltukatjara (also known as Docker River), 647 km south west of Alice Springs near the Western Australia border. The two towns are over 950 km apart, however they both fall into the same administrative district and are considered a 'match' when compared at district level.

Communities have been grouped according to administrative districts to allow for comparison with previous studies and because analysis at the district level has been included in many historical reports. There are seven administrative districts: Alice

Springs Rural, Alice Springs Urban, Barkly, Darwin Rural, Darwin Urban, East Arnhem and Katherine.

Alice Springs and Darwin town camps were included in Alice Springs Urban and Darwin Urban districts respectively. Additional categories of interstate, overseas and unknown were added for the purposes of this project. Smaller administrative areas are being introduced in the NT and it is expected that these will be used for future studies.

Comparison at the community/suburb level was tailored to account for the migratory patterns of Indigenous people living in rural communities. If the locality collected at interview and the locality recorded in the hospital record were both within the respective urban areas of Darwin or Alice Springs, or on the Tiwi Islands, the locality collected at interview was considered in agreement with the locality recorded in the hospital information system.

For communities in the rural districts, except the Tiwi Islands, the locality was manually compared and if the distance between the locality recorded in the hospital information system and the locality recorded at interview was less than 50 km, they were considered to be in agreement. This method of comparison was considered more appropriate than comparison at community level used in previous studies.

Country of Birth

The country of birth collection was limited to 2 categories: born in Australia, and born elsewhere.

Calculating measures

All measures have been calculated using STATA statistical software.

Accuracy rate

Accuracy rates were calculated for all interview questions including Indigenous status, country of birth (Australia or overseas), date of birth, year of birth and place of residence (at both the locality and district levels). Comparison was made between the information collected at interview and the information in the hospital information system. The accuracy rate, demonstrated using Table 3, is the number of agreed records (a+d) divided by the total number of records (a+b+c+d). Accuracy rate measures used in NT analysis exclude records where the patient was unable to provide information during the interview except where it is in agreement with the hospital information system.

Correction factors

A correction factor was calculated for Indigenous status. The correction factor estimates the level of under-identification of Indigenous people in hospital data; it is expressed as a ratio of the actual number of Indigenous people (the number who identified as Indigenous at interview) divided by the number identified as Indigenous in the hospital information system. The correction factor can be used to adjust for under-identification when using hospital data to calculate the number of Indigenous hospital in-patients.

Using Table 3 as a template example, the correction factor is calculated as the number identified in the interview (a+b) divided by the number identified in the information system (a+c). If the result is over 1.00, there is under identification in the hospital system.

The Indigenous correction factor calculated from this survey will be used in the next AIHW Health Expenditure Australia report.

Table 3: Calculating measures template

Interview	Hospital system		Total
	Yes	No	
Yes	a	b	a+b
No	c	d	c+d
Total	a+c	b+d	a+b+c+d = n

$$\text{Accuracy rate} = (a+d)/n$$

$$\text{Correction factor} = (a+b)/(a+c)$$

Confidence intervals

Ninety-five percent confidence intervals have been calculated for each accuracy rate in the study. A confidence interval is a statistical measure that indicates the amount of uncertainty about an estimate caused by random variation in the sample of people included in the survey. An estimate based on a large sample will generally be more reliable than one based on a small sample; this is reflected in the width of the confidence interval. In general, the narrower the confidence interval, the more reliable the estimate.

Kappa value

The Kappa statistic⁹ estimates the extent to which the level of agreement that was found was greater than would have been found because of chance alone. The Kappa scale is from 1.00 to -1.00. A Kappa score of 1.00 indicates perfect agreement while a Kappa score of 0.00 indicates that there was no more agreement than would have occurred because of chance alone. A negative Kappa score indicates that there is more disagreement than agreement.

Small numbers in some categories prevented calculation of the Kappa statistic for locality of residence and date of birth. The Kappa statistic discounts records where there are missing or unknown values.

Results

Accuracy results for the total NT (five hospitals combined) were high for sex (99%), Indigenous status (98%), country of birth (97%), year of birth and area of residence (both 91%), and a little lower for the more granular level items locality of residence (88%) and date of birth (83%) (Table 4).

There were variances in accuracy between hospitals for different demographic items (Table 4). At the high end of the scale, GDH had 100% accuracy for Indigenous status and year of birth, while RDH had 99% accuracy for sex. TCH was 100% accurate for country of birth and 97% accurate for district of residence. At the other end of the scale, date of birth, for those who could provide it, was very low for both KH (64%) and TCH (72%).

The Kappa statistics are displayed in Table 5.

Indigenous status

There were a total of 424 (52%) Indigenous and 380 (47%) non-Indigenous patient interviews (Table 6).

Of the Indigenous patients, 414 were accurately recorded as Indigenous in the hospital information system. There were eight Indigenous patients incorrectly assigned to non-Indigenous status in the hospital system, and two Indigenous patients allocated to 'not stated/inadequately described'.

An additional four non-Indigenous patients were assigned to Indigenous status in the hospital system while five other non-Indigenous patients were assigned to 'not stated/inadequately described' status in the hospital system.

The results show that Indigenous status is only slightly under reported in the hospital information system, with a correction factor of 1.01 (a correction factor of 1.00 indicates that no correction is required).

The accuracy rate for Indigenous status was highest at GDH (100%), with all other hospitals over 97% correct (Table 7). The total accuracy rate for Indigenous status was 98%.

Date of birth/Year of birth

Date of birth was problematic to collect as many Indigenous patients were unable to provide it at interview (53 interviews). Patients were more able to provide their age or year of birth. Eighteen patients did not provide year of birth information at interview and were excluded from year of birth accuracy measures (Table 8).

The details of differences in year of birth between hospital information system and interview are presented in Table 9.

At the hospital level, 28 patients interviewed at ASH had incorrect birth year information recorded in the hospital information system, while 24 were incorrect at RDH, 12 at KH, and 4 at TCH. GDH recorded zero incorrect birth years.

Of the patients who provided information at interview, 723 (91%) had correct birth year in the hospital information system (Table 9); 37 (5%) were incorrect by between 1-4 years and ten patients were incorrect by over 15 years.

Excluding eighteen patients who could not provide birth year information, Indigenous patients accounted for 53 (78%) of the incorrect birth years recorded in the hospital information.

Sex

The total number of males interviewed was 383 (47%) and the total number of females was 420 (52%) (Table 10). The level of accuracy for sex across all hospitals was 99%. Sex was not collected for six records at interview and these records have been removed from accuracy calculations.

There were five male patients incorrectly identified as female in the hospital records, and one female patient incorrectly identified as male (Table 10). Details of accuracy rate for sex by hospital were presented in Table 11.

There was only 1% difference in accuracy for Indigenous patients (98%) than non-Indigenous patients (99%) (Table 12).

Place of residence

Locality was not collected at interview for twelve patients and these interviews were removed from place of residence analysis.

Place of residence at locality level was 88% accurate with RDH recording the highest accuracy (92%) at locality level while the lowest accuracy was recorded at ASH (82%) (Table 13).

Locality was less accurate for Indigenous patients with 74 (18%) Indigenous patients recorded incorrectly and 19 (5%) non-Indigenous patients recorded incorrectly in the hospital records (Table 14).

Accuracy for place of residence at the administrative district level was higher at 91%, due to the large areas covered by the districts, especially Alice Springs Rural district. All hospitals except ASH were over 93% accurate at the district level (Table 15).

Accuracy for Indigenous people at administrative district level was lower (87%) than for non-Indigenous people (95%) (Table 16).

There were 58 interstate residents and six overseas residents interviewed. Twelve interstate residents were incorrectly recorded as NT residents and 15 NT residents incorrectly recorded as interstate patients in the hospital information system.

Country of birth

There were 685 patients born in Australia and 121 born elsewhere (Table 17). Country of birth was not reported at three interviews and these were removed from analysis. Sixteen patients who reported at interview that they were born in Australia were incorrectly reported as born overseas in the hospital information system. Another seven patients who reported at interview they were born overseas were reported as born in Australia in the hospital system.

Country of birth was 97% accurate in the hospital information system. KH and TCH were both 100% accurate (Table 18).

Accuracy for Indigenous people was higher (98%) than for non-Indigenous people (95%) (Table 19).

Comparison with previous quality analysis results

This NT 2011 survey found that the high level of accuracy recorded in previous NT surveys conducted in 1997 and 2008 had been maintained (Table 20).

The level of accuracy for sex was identical at 99% in all three studies, as was country of birth at 97%.

Accuracy for Indigenous status increased from 94% in 1997 to 97% in 2008 and 98% 2011.

Year of birth accuracy has trended slightly down from 96% in 1997 to 93% in 2008 and 91% in 2011

The district of residence accuracy has improved from 78% in 1997 to 88% in 2008 and 91% in 2011. The improvement may be a reflection of the intensive locality validation conducted during the 2011 survey, resulting in fewer invalid community names in the interview data than in the previous studies.

Table 4: Accuracy % (95% confidence interval) of hospital demographic data

Data item	Alice Springs Hospital	Gove District Hospital	Katherine Hospital	Royal Darwin Hospital	Tennant Creek Hospital	NT total
Indigenous status	98 (95, 99)	100 (83, 100)	97 (89, 99)	98 (95, 98)	97 (86, 99)	98 (96, 98)
Date of birth	82 (76, 86)	89 (66, 98)	64 (50, 76)	87 (83, 89)	72 (53, 86)	83 (79, 85)
Year of birth	90 (85, 93)	100 (83, 100)	81 (69, 89)	94 (91, 96)	88 (72, 96)	91 (89, 93)
Sex	98 (95, 99)	95 (75, 99)	97 (89, 99)	99 (98, 99)	95 (83, 99)	99 (97, 99)
Locality of residence	82 (77, 86)	89 (66, 98)	89 (79, 95)	92 (88, 94)	87 (72, 95)	88 (85, 90)
District of residence	84 (79, 88)	95 (73, 99)	95 (87, 99)	94 (90, 95)	97 (86, 99)	91 (88, 92)
Country of birth	99 (96, 99)	95 (75, 99)	100 (94, 100)	96 (93, 97)	100 (91, 100)	97 (95, 98)

Table 5: Kappa statistics for agreement between interview and hospital system information

Data Item	Alice Springs Hospital	Gove District Hospital	Katherine Hospital	Royal Darwin Hospital	Tennant Creek Hospital	Total
Indigenous status	0.93	1.00	0.91	0.93	0.93	0.94
Date of birth	0.81	0.88	0.64	0.86	0.71	0.82
Year of birth	0.89	1.00	0.80	0.93	0.87	0.91
Sex	0.96	0.87	0.93	0.99	0.90	0.97
District of residence	0.74	0.02	0.70	0.86	0.01	0.87
Country of birth	0.93	.	.	0.85	1.00	0.87

Note: Where the Kappa value is ".", the Kappa statistic has not been calculated. The background probability is too unstable when there is only one born elsewhere patient in the "born elsewhere" category for Gove District Hospital, and none for Katherine Hospital.

Indigenous status tables

Table 6: Indigenous status at interview compared with Indigenous status in hospital system information

Hospital System	At Interview			Total
	Indigenous	Non Indigenous	Not collected	
Indigenous	414	4	3	421
Non Indigenous	8	371	2	381
Not collected	2	5	0	7
Total	424	380	5	809

Table 7: Indigenous status accuracy rate (%) by hospital

Hospital system	Alice Springs Hospital	Gove District Hospital	Katherine Hospital	Royal Darwin Hospital	Tennant Creek Hospital	Total
Agreement	268	20	63	396	38	785
No agreement	6	0	2	10	1	19
Not collected*	2	0	0	2	1	5
Total	276	20	65	408	40	809
Accuracy rate %	98	100	97	98	97	98

* ie "not collected" at interview and not in agreement with hospital information system.

Birth year tables

Table 8: Birth year accuracy rate (%) by hospital

Hospital system	Alice Springs Hospital	Gove District Hospital	Katherine Hospital	Royal Darwin Hospital	Tennant Creek Hospital	Total
Agreement	243	20	51	379	30	723
No agreement	28	0	12	24	4	68
Not collected*	5	0	2	5	6	18
Total	276	20	65	408	40	809
Accuracy rate %	90	100	81	94	88	91

* ie "not collected" at interview and not in agreement with hospital information system.

Table 9: Birth year difference (in five-year categories) between interview and hospital system information, by Indigenous status

Indigenous status	Difference						Total
	Same year	1-4 years	5-9 years	10-14 years	15- years or more	Not collected	
Indigenous	353	30	4	12	7	18	424
Non Indigenous	365	7	1	4	3		380
Not Collected	5						5
Total	723	37	5	16	10	18	809

Sex Tables

Table 10: Sex at interview compared with sex in hospital system information

Hospital system	At Interview			Total
	Male	Female	Not collected	
Male	378	1	3	382
Female	5	419	3	427
Not collected	0	0	0	0
Total	383	420	6	809

Table 11: Sex accuracy rate (%) by hospital

Hospital system	Alice Springs Hospital	Gove District Hospital	Katherine Hospital	Royal Darwin Hospital	Tennant Creek Hospital	Total
Agreement	271	19	63	406	38	797
No agreement	5	1	2	2	2	12
Total	276	20	65	408	40	809
Accuracy rate %	98	95	97	100	95	99

Table 12: Sex accuracy rate (%) by Indigenous status

Hospital system	Indigenous	Non Indigenous	Not collected	Total
Agreement	415	377	5	797
No agreement	9	3	0	12
Not collected	0	0	0	0
Total	424	380	5	809
Accuracy rate %	98	99	100	99

Place of residence tables

Table 13: Locality of residence accuracy rate (%) by hospital

Hospital system	Alice Springs Hospital	Gove District Hospital	Katherine Hospital	Royal Darwin Hospital	Tennant Creek Hospital	Total
Agreement	224	17	58	370	34	703
No agreement	48	2	7	32	5	94
Not collected*	4	1	0	6	1	12
Total	276	20	65	408	40	809
Accuracy rate %	82	89	89	92	87	88

* ie "not collected" at interview and not in agreement with hospital information system.

Table 14: Locality of residence accuracy rate (%) by Indigenous status

Hospital system	Indigenous	Non Indigenous	Not collected	Total
Agreement	344	355	4	703
No agreement	74	19	1	94
Not collected*	6	6	0	12
Total	424	380	5	809
Accuracy rate %	82	95	80	88

* ie "not collected" at interview and not in agreement with hospital information system.

Table 15: District of residence accuracy rate (%) by hospital

Hospital System	Alice Springs Hospital	Gove District Hospital	Katherine Hospital	Royal Darwin Hospital	Tennant Creek Hospital	Total
Agreement	229	18	62	376	38	723
No agreement	43	1	3	26	1	74
Not collected*	4	1	0	6	1	12
Total	276	20	65	408	40	809
Accuracy rate %	84	95	95	94	97	91

* ie "not collected" at interview and not in agreement with hospital information system.

Table 16: District of residence accuracy rate (%) by Indigenous status

Hospital System	Indigenous	Non Indigenous	Not collected	Total
Agreement	362	357	4	723
No agreement	56	17	1	74
Not collected	6	6	0	12
Total	424	380	5	809
Accuracy rate %	87	95	80	91

* ie "not collected" at interview and not in agreement with hospital information system.

Country of birth tables

Table 17: Country of birth at interview compared with country of birth hospital system information

Hospital System	At Interview			Total
	Australian born	Born elsewhere	Not collected	
Australian born	669	7	2	678
Born elsewhere	16	114	1	131
Not collected	0	0	0	0
Total	685	121	3	809

Table 18: Country of birth accuracy rate (%) by hospital

Hospital System	Alice Springs Hospital	Gove District Hospital	Katherine Hospital	Royal Darwin Hospital	Tennant Creek Hospital	Total
Agreement	272	19	65	387	40	783
No agreement	4	1	0	18	0	23
Not collected*	0	0	0	3	0	3
Total	276	20	65	408	40	809
Accuracy rate %	99	95	100	96	100	97

* ie "not collected" at interview and not in agreement with hospital information system.

Table 19: Country of birth accuracy rate (%) by Indigenous status

Hospital system	Indigenous	Non Indigenous	Not collected	Total
Agreement	417	361	5	783
No agreement	7	19	0	26
Not collected*	0	0	0	0
Total	424	380	5	809
Accuracy rate %	98	95	100	97

* ie "not collected" at interview and not in agreement with hospital information system.

Table 20: Comparison with previous quality analysis accuracy rate (%)

Data Item	1997	2008	2011
Indigenous status	94	97	98
Date of birth	88	n/a	83
Year of birth	96	93	91
Sex	99	99	99
District of residence	78	88	91
Country of birth	97	97	97

Discussion

The first NT demographic data quality study conducted in 1997 in the NT only, interviewed 412 NT public hospital inpatients. The study found a high level of accuracy in the hospital information system for sex (99%), Indigenous status (94%) and country of birth (97%) but lower accuracy for place of residence at the district level (78%) and marital status (77%). The accuracy rate was 88% for date of birth and 96% for year of birth, for those who could provide this information.

The second NT study conducted in 2008 was part of the first national study funded by the Office of Aboriginal and Torres Strait Islander Health of the Australian Department of Health and Ageing. The primary goal was to measure under-identification of Indigenous people in hospital inpatient data, but the study also included other demographic data items, such as sex, country of birth, year of birth and locality of residence. Information reported by patients at interview was compared with records in Caresys for an increased sample of 788 patients. Compared with the 1997 study, accuracy was similar or higher for most variables: sex (99%), Indigenous status (97%), country of birth (98%), year of birth (93%) for those who could provide this information, and district of residence (88%). Marital status was not collected in the 2008 study.

In 2010 the AIHW released the results of national studies in Indigenous identification conducted by the AIHW in collaboration with states and territories¹² and the national best practice guidelines for collecting Indigenous status in health data sets.¹³ The AIHW found that across Australia, in 2007-08, 11% of Indigenous patients were incorrectly identified as non-Indigenous.

It is clear that collection of demographics for our Indigenous population can be challenging. Hospitals experience a high turnover of staff, with some staff having very little exposure to Indigenous people or Indigenous culture. The survey interviewers in this project received cross cultural awareness training prior to commencement of the project. They reported a lack of trust by some Indigenous patients, with some patients refusing to engage in any conversation. There was, however, a marked difference in the level of engagement of Indigenous patients when there was an Aboriginal health worker, interpreter or a known and trusted hospital staff member present.

Our highly mobile Indigenous population makes the collection of residential information difficult in the NT. Many people do not have street addresses and localities can have more than one name. Residential information must be checked and updated with each new admission. Care should also be taken that temporary addresses do not replace the permanent address if the patient's new residence is for less than 6 months. The Admitted Patient Care National Minimum Data Set describes the usual place of address as: *the place where the person has or intends to live for 6 months or more, or the place that the person regards as their main residence, or where the person has no other residence, the place they currently reside.*

A number of patients interviewed (28) were not recognised in the hospital information system. This was partially due to incorrect recording of HRN during the interview. There was little evidence to suggest that their information had not been entered into Caresys at the time of the data extract (see Table 2). There were two patients with a valid record in Caresys but no record in the data extract. Seventeen of the unrecognised patients were interviewed at Royal Darwin Hospital, and eight at Alice Springs Hospital. The extract from the hospital system was undertaken on 19 July, i.e. 19 days after the end of the survey period so all patients should have been entered into the hospital information system, even if there were delays in data entry of admissions.

There is no reliable reference for correct birthdates, making verification for Indigenous people particularly challenging. Some older Indigenous people were 'allocated' a legal birthdate (usually 1 January or 1 July of their estimated birth year) if they were made wards of the state before 1974 and their actual birthdate was not known; these allocated birthdates remain their legal birthdates. More recently, hospitals estimate a birth date of 1 January or 1 July when the birthday is unknown. In this report, hospital record birthdates are considered estimates if the birthday fell on 1 January or 1 July for all years after 1974.

This analysis assumes that the birthday collected at interview is the standard however, in reality, it is not possible to determine which version (the hospital information system or the survey information) is actually correct.

Recommendations

- All hospital admission administrators and others responsible for collecting patient information should receive cross cultural training and seek assistance from an Aboriginal health worker or interpreter if communication is difficult.
- The patient's residential locality must be reviewed at each admission.
- There should be a separate process to validate consistency between Caresys and the inpatient datamart.

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Appendices

Appendix 1: Data quality study questionnaire 2011

Hospital

Ward

Interviewer: Hello... My name is(shake hands if you feel comfortable) I work for the Department of Health. It is my job today to ask you some questions. Are you happy/well enough to answer them?

Consent given

Yes

No

Interviewer: Thank you

Interviewer: Thank you anyway. Goodbye.
Do not proceed if consent is not given.

Please record answers in the space provided next to each question

1. Hospital record number

Record the HRN

Interviewer – I need to look at the number on your bracelet

.....

2. Sex

Tick the answer according to your own judgement

Male

Female

3. Were you (was the patient) born in Australia?

Yes

No

4. What is your Date of birth?

...../...../.....

Day/month/year

Or

When is your birthday?

Date of birth is an estimate

And

Age in Years.....

How old are you?

5. (Are you) (is the patient) of Aboriginal or Torres Strait Islander origin

Or	No	<input type="checkbox"/>
Are you Aboriginal?	Yes, Aboriginal	<input type="checkbox"/>
and		
Are you Torres Strait Islander?	Yes, Torres Strait Islander	<input type="checkbox"/>

Interviewer – if both Aboriginal and Torres Strait Islander, tick both ‘yes’ boxes

Q6, Q7 and - 8
*Interviewer: Check the locality list for the locality or SLA. Record the locality number only.
 If you can't find the locality, ask the patient to point on the map and write the locality name and District in locality section*

6. Where do you (does the patient) usually live? *****	Locality number
Or	Locality
Where do you live now?	SLA name
	District

7. Where did you (the patient) live 1 year ago? *****	Locality number
Or	Locality
Where did you live last year (Interviewer sign 1 year)	SLA name
	District

<p>8. Where did you (the patient) live 5 years ago? *****</p> <p style="text-align: center;">Or</p> <p>Where did you live a long time before that - 5 years <i>(Interviewer sign 5)</i></p>	<p>Locality number</p> <p>Locality</p> <hr/> <p>SLA name</p> <hr/> <p>District</p>
<p>Thank you for your help. <i>Interviewer: Give the patient the AIHW brochure to read later</i> This is for you to read. Goodbye.</p>	
<p>Interviewer</p> <p>Time taken for interview:</p>	<p>.</p>
<p>Comments:</p>	
<p>I certify that the information documented above is a true and accurate record of interview as provided to me. (Interviewer – Please initial & date here)</p> <p>...../...../.....</p>	

Appendix 2: Patient brochure

The information you gave us helps us check if hospital records contain the correct information. Accurate hospital records are needed to improve health care in Australia.

What happens to the information you have given us?

We will compare the information given by everyone who takes part in the study with their information in the hospital information system. This will help us to see how accurate hospital information is in Australia.

We will use this information to write a report to help hospitals improve the accuracy of their information, and help decision makers to plan and deliver better health services for Australians.

Why is the quality of hospital data important?

The information that is collected in hospitals helps governments and the community to make decisions about health services for Australians as a whole and for particular groups of people.

Reliable and accurate hospital information is used to make sure that health programs are provided for people when and where they are needed and that Australians are getting good value for money. For example, hospital information could be used to give a reason for a national program to improve the health of a particular group of people (such as older Australian men or young children).

It's easy to make mistakes. A study in 2007 found that nearly 10% of hospital demographic data contained same incorrect information.

Mistakes in hospital information can mislead governments and medical researchers, and lead to health services and programs that don't meet our health needs.

Your privacy is protected

The AIHW is committed to protecting your privacy—and we cannot be forced to disclose private information, even by a court of law.

The hospital record number, not your name, will be used to match your interview information with your hospital information.

In fact, your name has not been recorded at any stage of the interview process.

On behalf of the AIHW, we again thank you for your time and input.



*Thanks
for your time today*

What is the AIHW?

The AIHW, or Australian Institute of Health and Welfare, is a major national agency set up by the Australian Government to provide reliable, regular and relevant information and statistics on Australia's health and welfare. Our aim is to improve the health and wellbeing of Australians through better health and welfare information and statistics.

We collect and report information on a wide range of health matters such as: the number of people who have cancer or diabetes; the general health of the community; hospital services and waiting times; what Australia spends on health; and the numbers of doctors, nurses and other health professionals in Australia.



This is for you to keep

You can withdraw at any time without penalty

The Northern Territory Department of Health do not need to know, nor will we use your name in this study.

Information already collected by the hospital and information collected for this study, but not your name or patient number, will also be used by the Australian Institute of Health and Welfare for a national report on hospital data quality.

If you have any concerns or complaints regarding the ethical conduct of the study please contact:

Ethics Administrator of the Human Research Ethics Committee of the NT Department of Health and Menzies School of Health Research
Phone: 89227922
Email: ethics@menzies.edu.au

For more information about this project, contact:
Health Gains Planning Branch
Phone: 08 8985 8074
email: nghhealth.gains@nt.gov.au

For more information about the National Survey contact:
Fadwa Al Yaman
Head
Social and Indigenous Group
Australian Institute of Health and Welfare
Address: GPO Box 570/Canberra ACT 2601
Phone: 02 62441146
Web: www.aihw.gov.au

*Thanks
for your time today*



HOSPITALS DATA QUALITY STUDY

Your participation in this survey is completely voluntary

This means you can say no



Australian Government
Australian Institute of Health and Welfare

Appendix 3: Interviewers comments and hints for future survey success

1. It is suggested that the next survey collect the patient name for linking and validation purposes. Collection of the HRN only, meant that difficulties were met in matching the hospital record with interview information when the HRN recorded was not identical to the hospital system HRN. When only the HRN is collected, one digit missed, or two digits transposed makes the interview invalid unless some other means of matching the information can be found. In this survey some invalid HRNs were able to be matched using date of birth but names would have provided a more robust linking method.
2. All interview staff should receive refresher cross cultural training. Cross cultural training proved to be well worth the effort with good advice about appropriate body language, timing of questions, dress, eye contact and respect, in order to successfully interact with Indigenous patients. All interviewers reported on how useful the training was. Some of the Aboriginal words were helpful and advice to speak slowly and just wait for an answer usually worked. Difficulties in understanding the patient were dealt with in a number of ways; by repeating the words, or on one occasion the patient pointed to their bracelet for date of birth. The date of birth was not recorded for that patient. Sometimes the patient told stories about missionaries and things that happened long ago when they did not know their birth date or age.
3. Use of Aboriginal Health Workers or interpreters, or a hospital employee known to the patient resulted in a higher level of engagement with Indigenous patients in Central Australia. It is strongly recommended that similar assistance be utilised for the next survey. The age group of Indigenous patients who had the most trouble understanding was between 30 and 50 years old. Indigenous people over 50 or 60 years of age did not have trouble understanding.
4. One interviewer suggested a hand held device to record answers would have been easier, however other interviewers advised that there was already a fair amount of distrust in the hand written notes, with some patients wanting to see what was written. There is also the possibility that the hand held device is lost or the data becomes corrupt. Hand held devices are not recommended.
5. While all attempts were made to brief the hospital coordinators about the project and to coordinate schedules, it was apparent that some ward clerks at RDH were not made aware of the survey or the reasons for it by the hospital coordinator. Future projects should focus more on keeping the ward clerks informed.
6. Some interviewers who were more familiar with locality names experienced fewer problems in understanding Indigenous patients than those who were less familiar. Those who were familiar had higher quality results than others. It is suggested, for the next survey, that either local staff (from each hospital or region) or interviewers who have prior knowledge of Aboriginal locality names are employed to do the survey.

7. Use of the map and locality lists at the interview was not considered successful as they were clumsy and Indigenous patients were not interested in looking at the map at all to identify where they live. The lists and map were, however, useful for checking locality spelling later. One interviewer suggested that localities should be recorded by NT Geo Code. Another interviewer suggested that the locality list should be in soft copy format so that interviewers could do a search.
8. Interviewers noted that they weren't aware of hospital protocol of washing their hands before entering and after leaving each ward until midway through the survey. It was noted that the protocol is not the same at all hospitals. One interviewer was, for one patient interview, required to wear a gown and stand a few metres away from a patient in a single room. Interviewers should be made aware of hospital protocols for the next survey.
9. Any secure area should be identified prior to the survey. One interviewer entered a ward occupied by asylum seeker detainees and was surprised to be evicted by the security guard after a few minutes. Another interviewer was not sure whether to enter the maternity ward, as the doors were closed. They would have preferred to have been accompanied by a staff member.
10. Some interviewers found it helpful to wear a badge with "INTERVIEWER" and their name printed on it but others noted that patients and hospital security preferred to see the Department of Health security card with their photo.
11. All interviewers reported that the hand out brochures were well received but could have been simpler as some patients had difficulty understanding them.
12. Interviewers discussed the wording of the questions. The words "Can I ask you" seemed to come across as threatening, whereas "Can I have a chat" did not. All interviewers advised it was more respectful to sit down when doing the interview as it was less threatening to the patient.
13. Some patients changed their mind about consent half way through the questions and asked for their question sheet back. They seemed concerned that someone would come to their community looking for them.
14. Some interviewers were assumed by patients to be clinical staff, with patients requesting clinical assistance. Interviewers should refer all assistance requests to hospital staff.
15. Flight schedules in and out of Tennant Creek change on a regular basis. During this project, flights were only available on Tuesdays and turnover of non-renal patients was slow. In the next project, a check on renal dialysis treatment groups should be made to ensure any subsequent trips coincide with a different renal dialysis patient group.

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