INDIGENOUS BIRTH RATES—HOW RELIABLE ARE THEY?

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Government policy is now very much focused on remedying disadvantages among Australia's Indigenous population. Consequently it is important that we have reliable data on the size and characteristics of this population, especially its age distribution. This paper analyses statistics on Indigenous birth rates in the Northern Territory and uncovers some troubling anomalies, to such an extent that a sceptical observer might wonder if the data might not be in some sense made up.

INTRODUCTION

Kevin Rudd's commitment to 'closing the gap' between Indigenous and non-Indigenous standards of living, has highlighted the paucity of Indigenous population data and a 'frank failure of the statistical system'.[1] Government priorities reported in the Australian Government's 2008–09 budget included closing the gaps for life expectancy, mortality for children under five years old, literacy and numeracy, employment outcomes, attainment of Year 12 schooling, and access to quality preschool.[2] Each of these indicators is affected by the Indigenous population's demographic profile, in particular its age composition.

Understanding Indigenous birth rates is critical in understanding the demographic profile of the Indigenous population and, consequently, its relationship with the social-economic world it inhabits. At a more practical level, birth rates are an essential component of the population data used in the denominators of the 'closing the gap' measures. Births data when used for population estimates or projections are presented as reasonably accurate, and are 'adjusted slightly for historically observed registration lags'.[3] Data completeness, or implied coverage, is assessed by comparing the number of registered births with the number of births estimated from the number of children enumerated at the most recent census over a five-year period. This process was first documented by the Australian Bureau of Statistics (ABS) in *Births Australia 1997*,[4] but implied coverage was first reported for South Australia and the Northern Territory in *Births Australia 1993*.[5] Indigenous births data are not published if there is less than 90 per cent implied coverage.

This paper asks whether this assumption of reasonable accuracy is a valid one to make. Using the Northern Territory (NT) as a case study, the paper describes where the data used for Indigenous birth rates come from. It explores what population is being used in order to measure births and asks whether it is one merely invented by demographers. This is timely following the recent release of the NT government's population projections, which show a projected increase in the NT Indigenous population from 64,006 in 2006 to 81,585 in 2021.[6] The paper closes by exploring the implications of using current birth rates for understanding the mechanics of both the size and momentum of population growth and, also, for understanding Indigenous peoples and their high-profile disadvantage.

CALCULATING BIRTH RATES

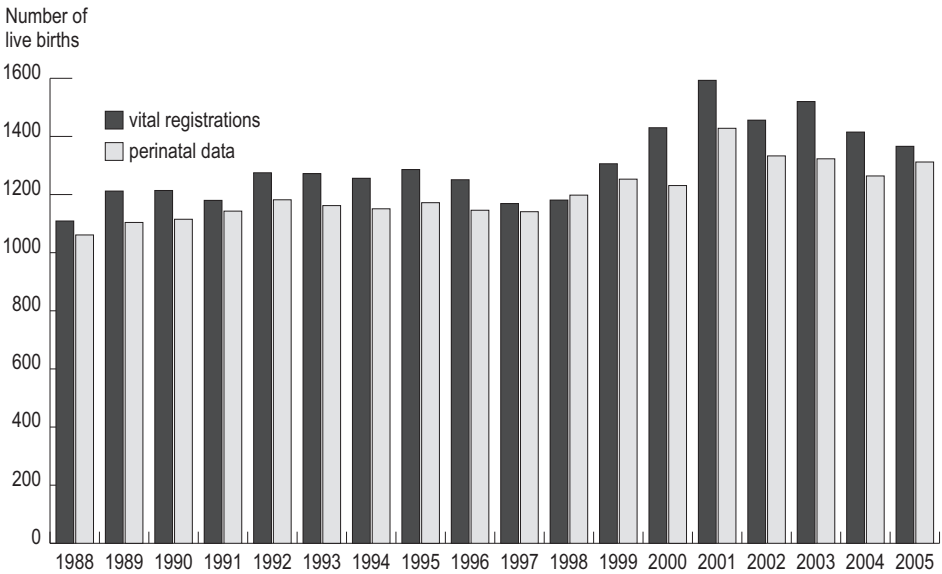
Birth rates are computationally simple to create—the number of births to women in a defined age group in a given year is divided by the total mid-year population of women in that defined age group. The robustness of the rate is affected by the quality of the data used to calculate it. Well-recognised

deficiencies that can affect data quality include the completeness of birth registration, and accuracy of characteristics of the births, including geographic location, date, and demographic characteristics of the mother.[7] The reliability of the rate is also affected by how well the births truly relate to the population at risk, essentially whether the births and population data are for the same group of women. This is a particular problem when matching vital registration and population data for sub-population groups based on Indigenous status as has been shown in Australia,[8] New Zealand[9] and the United States.[10] Matching of the births and population data is further confounded by the fact that data quality issues (of completeness and of accuracy of characteristics) can differentially affect different data sources. Indigenous births and population data are examined to understand where the data used to calculate birth rates come from. At issue is whether 'Indigenous fertility rates' can be viewed as demographic facts, given the data problems that emerge.

BIRTHS DATA

Births data for the NT are available from two sources—vital registrations, from the Registrar of Births, Deaths and Marriages which are managed by the ABS, and perinatal data, from the Department of Health and Families' NT Midwives' Data Collection. The NT Midwives' Collection includes information on all births of at least 20 weeks gestation or 400 grams that take place in the Northern Territory, and are available by time of the birth. The vital registrations are for all births registered to mothers who are normally resident in the Northern Territory, and are available by time of the birth's registration.[11] One would expect a reasonably close match between the two datasets given that they both measure the same outcome, a

Figure 1: Number of live births to Indigenous mothers in the NT Midwives' Collection (perinatal data) and by vital registration, 1988 to 2005



Source: Customised datasets from Australian Bureau of Statistics (ABS) and NT Department of Health and Families

live birth, albeit in different ways. As Figure 1 shows, however, the NT Midwives' Collection consistently counts fewer births each year than do vital registrations. For the period for which both datasets are available, there are on average 98 more births to Indigenous mothers registered each year than are recorded in the NT Midwives' Collection. Choice of dataset alone will therefore influence the birth rates calculated, with the vital registrations showing higher fertility levels than the perinatal data. Interestingly, in most other states and territories perinatal datasets record higher numbers of births than do vital registrations.[12]

This difference between the two datasets has been reported as incomplete recording of births in the NT Midwives' Collection in the past.[13] The different mechanisms of data capture warrant closer examination to determine if this is actually the case. There are two issues to be explored: firstly, whether the data collection systems capture all births and, secondly, whether the data collection systems record characteristics of the mothers and babies correctly.

The NT Midwives' Collection is a population-based census of all births that take place in the Northern Territory. Government policy in the Northern Territory is for all women to birth in hospital, except for a small homebirth service in Darwin and Alice Springs. For women living outside one of the four centres with a hospital providing maternity services (Darwin, Nhulunbuy, Katherine and Alice Springs), this means transfer into town for 'sit down' at 38 weeks gestation, or earlier, if the pregnancy is deemed high risk.[14] From 1996, most of the information about births has been captured electronically.[15] In the public sector, midwives enter data shortly after the birth of a baby via the hospital information system (CareSys). Births in the Darwin Private Hospital and planned home births are entered via the NT Midwives' Collection intranet site. Births in health centres that do not involve admittance to hospital are submitted in paper form and entered by the perinatal data manager.[16] Most Indigenous women birth in one of the Northern Territory's public hospitals[17] (94 per cent in 2005), thus information about the birth is automatically captured electronically.[18] Extensive checking of health clinic records is also done by the perinatal data manager to ensure data are complete.

It is difficult to imagine that, according to ABS data, up to 200 Indigenous women in a year could be pregnant and give birth without the woman or her baby coming in contact with the public health care system at all and thus not have the birth recorded in the perinatal data collection. This is what is suggested, however, by identifying the perinatal births as an undercount. While mothers who live remotely may avoid the health clinics in order to avoid being transferred to town,[19] the number of identified births taking place in remote communities is small.[20] A 2007 review of maternity services in the Northern Territory did find that the various components of maternity services had different patient information systems, none of which were linked to provide for data sharing.[21] The review focused on information sharing of clinical care outcomes (for example, infection rates and adverse incident rates) and did not identify that different information systems led to births being excluded from the official counts altogether.

It is possible that this difference in the number of births to Indigenous mothers is because of different identification of who is Indigenous. Indigenous status in the vital registrations depends on self identification, whereas health service providers may assume Indigenous status (or not) on behalf of women when information is collected for the NT Midwives' Collection. While different identification of Indigenous status may affect birth numbers to Indigenous mothers, the higher number of births recorded via

vital registrations are evident for all births irrespective of Indigenous status. (In 2005, for example, 3659 births were registered to Northern Territory mothers, and 3555 births were recorded as being born to Northern Territory women in the NT Midwives' Data Collection.)

It is more likely that the systems used affect both the way in which people are identified as Indigenous and the total number of births. The NT Midwives' Data Collection is an epidemiological dataset maintained for the purpose of monitoring pregnancy outcomes and it is the responsibility of health professionals and health bureaucrats. Vital registrations, on the other hand, are the means of proving that a birth has taken place, and provide a child with an official identity recognised by the state. Registering a birth in the Northern Territory is a two-fold responsibility. Firstly, the hospital or health clinic provides a 'Notification of Birth' to the Registrar of Births, Deaths and Marriages within ten days of a birth taking place.[22] Secondly, there is a 'Birth Registration Statement', a form completed for every child by the child's parents, which must be submitted to the Registrar within 60 days of the birth.[23]

A number of processes surround the collection of vital registrations that could explain the different birth counts compared to the perinatal data. The public hospitals in the Northern Territory provide a weekly notification to the Registrar of births that have taken place in the previous week. Information is derived from CareSys and includes information on mother's name, date of birth, place of usual residence and Indigenous status. This is the same information system used to inform the NT Midwives' Data Collection.

Mothers are provided with the Birth Registration Statement form following the birth of their child. This usually takes place in the hospital before the mother is discharged. Forms are also available at community health clinics for women who birth in their community. In the five Northern Territory public hospitals, Aboriginal Health Workers and Social Workers are available to assist mothers who don't understand the form. Often these workers will fill the form in on behalf of mothers, and the mothers then sign it. In the Royal Darwin Hospital (where the largest number of Indigenous births take place every year), Aboriginal Liaison Officers (ALOs) help all Indigenous mothers fill in birth registration forms. ALOs submit registration forms to the Registrar as well as relevant forms to Centrelink (for Medicare, parenting payments, and so forth). At the Alice Springs Hospital, a staff member from the Office of the Registrar of Births, Deaths and Marriages visits twice a week to collect forms, and help women fill them in if required. The Aboriginal Liaison Officers in Alice Springs also work as translators when necessary to help women complete the form.

Once the Birth Registration Statement is received by the Office of the Registrar of Births, Deaths and Marriages, it is checked against the Notification of Birth. If there is any difference between the information about the parents or child from the Notification of Birth and what is recorded on the Birth Registration Statement, it is the information on the Birth Registration Statement that is entered into the vital registrations database (for example, Indigenous status of parent, place of usual residence, and name).

Incomplete registrations occur when the child has no name, or only a partially completed Birth Registration Statement is provided. If no Birth Registration Statement is received within 60 days following the birth, and the Birth Clerk believes it can be obtained, a variety of mechanisms are used to find the mother and ensure a form is completed. If the mother is unable to be found, the birth is registered based on the information from the Notification of Birth.

Statistically, an incomplete registration is the same as a full registration. If the birth is registered at a later date, it is linked to the original Notification of Birth so no duplication occurs. If no Notification of Birth is received, which is a very rare situation, then the birth cannot be registered.

Given that the number of births for the NT Midwives' Data Collection and vital registrations have their genesis in the same information system (CareSys), the different counts that emerge are puzzling. One explanation is the use of different names among Indigenous peoples. Indigenous babies are often given several names and the possibility of one baby being registered under two different names is often raised. Staff at the Office of the Registrar of Births, Deaths and Marriages have said that this is not a problem that they have identified in matching the Birth Registration Statement with hospital Notification of Birth information. Furthermore, the processes in place for registration mean that it is information about the birth such as date, time and place of birth, birthweight and parents' address, that allows matching of records to take place, not the baby's name (Wendy Endenburg and Yvonne Killalea, personal communication). Moreover, a birth would not be able to be registered if a Notification of Birth had not been received, and efforts to obtain such a Notification are likely to identify whether the birth in question has already been recorded under a different name.

Another explanation for the different birth counts between the two systems is a different impact of women's interstate travel to give birth. Both the vital registration and perinatal data systems record place of usual residence for the mother. 'Place of usual residence' has been identified as problematic for a mobile Indigenous population.[24] It is an issue for birth statistics within the Northern Territory boundary. This is because Alice Springs is an important service centre with a hospital for communities across the Australian centre, including communities in South Australia and Western Australia.[25] Each data system deals with interstate births in different ways, which could contribute to the different birth counts.

The NT Midwives' Data Collection includes information on all births that occur in the Northern Territory, and mothers who normally reside interstate are identified separately. Birth rates, and most other measures looked at using the dataset, are based on births to Northern Territory mothers.[26] Similarly, vital registrations are derived from the Birth Registration Statement, which must be submitted in the state or territory where the birth takes place. When vital registrations data are published or purchased based on usual place of residence of mother (in this case, the Northern Territory) births to mothers who usually live in the Territory that took place interstate are also included, but they are not differentially identified.[27] Data from the NT Midwives' Collection are not available in this way.

Interstate travel to give birth could affect the data in two ways. Firstly, women who usually live interstate, but birth in the Northern Territory, could have the birth registered in the NT, particularly if they have come into town for 'sit down' from a remote community. Thus vital registrations could be high because they include NT usual residents who birth in the NT and interstate residents who birth in the NT. While it is not unreasonable to assume some interstate women might be recorded as being NT residents, it seems unlikely that usual place of residence for interstate women would be consistently identified correctly in the Midwives' Collection, but not for births' registrations data. A second effect of interstate travel is that the difference between the two datasets could reflect NT women giving birth interstate, the numbers for which are able to be captured by vital registrations but not the Midwives' Collection. The AIHW National Perinatal Statistics Unit published information on

interstate births for the first time in a report of 2004 data, but not disaggregated by Indigenous status.[28] In 2004, 138 NT women (Indigenous and non-Indigenous) gave birth interstate, yet the difference in Indigenous birth counts between the two data collection systems in that year was 151. Anecdotally, it is well known that many of these interstate births are military wives/partners who travel home to give birth if their husband/partner is posted overseas at the time of the birth.

Alice Springs Hospital is the place where state-based confusion about place of usual residence would be most likely to occur because of its proximity to state boundaries. A 2008 audit of patient demographic data at NT hospitals found that miscoding of usual state of residence was only found for patients incorrectly identified as usually living in Alice Springs Urban or Alice Springs Rural health districts.[29] If the difference in counts between the vital registration and perinatal datasets is because of different counts of interstate births (both in and out of the collections), then it is likely to be concentrated around Alice Springs. This would mean that some of those births recorded to mothers in the Alice Springs Urban and Alice Springs Rural health districts were actually births to interstate mothers. This would have the effect of suppressing the number of births in the NT Midwives' Data Collection even further, thereby exaggerating the difference with the vital registrations data.

A perfect match between the datasets is unlikely because of the way births are reported—by year of occurrence in the NT Midwives' Data Collection and by year of registration for the vital registrations. In the Northern Territory, most births to Indigenous mothers are registered within three months of occurrence, and delays in registration in one year should be balanced by delays from other years. In 2005 and 2006, only 0.3 per cent of births registered to Indigenous mothers usually resident in the Northern Territory were for births that occurred over a year prior to registration.[30] While a perfect match may be unlikely, this relatively quick registration from time of birth indicates that any differences between vital registrations and the perinatal data should be fairly small, but this is clearly not the case.

There is no clear resolution to the question of which dataset is more accurate without much more detailed investigation of both datasets, a matching of records and closer observation of the data collection, data entry and data cleaning processes. More information about interstate births to Indigenous mothers is also needed. Two possibilities remain to explain the different counts—the NT Midwives' Data Collection is missing births, or the vital registrations are counting some births twice. Staff responsible for the respective datasets cannot identify any areas where this might occur. Laws et al.[31] view the perinatal data as more accurate than vital registrations, and the NT Government has based its population projections on fertility levels from the NT Midwives' Data Collection.[32] But at a national level, it is vital registrations that are used for population estimates and projections.[33] Vital registrations are also available in a much more timely fashion. (In the Northern Territory, 2003 to 2005 perinatal data became available in 2009, whereas vital registrations were available for 2007 in October 2008.) In the absence of clear proof one way or the other about which dataset is more accurate, users of either dataset must be clear that their choice of dataset will result in different social facts, namely a higher or lower fertility rate. At a macro level this has implications for predicted population age structures and intergenerational transfers of knowledge and wealth, and at a micro level it can affect planning decisions for fundamentals such as how many houses should be built, how many teachers need to be employed, and how many hospital beds will be needed.

THE DENOMINATOR

Birth rates are not based on births data alone. Births must be related to a population. In Australia, population data are derived from the five-yearly census, with counts of the Indigenous population available from 1961 (although official counts were not published until 1971).[34] A characteristic of Indigenous census counts is the increase in counts from census to census beyond the growth that would be expected from births and deaths alone. An analysis of the increase from 1991 to 1996 concluded that the balance between the explainable increase and the census counts was affected by different undercounts of the Indigenous population at each census, changes in non-response to the Indigenous status question, and changes in the way Indigenous people answer the Indigenous status question.[35] The birth of Indigenous babies to non-Indigenous women is also a contributing factor.[36] This issue of who is counted adds a temporal component to the data that undoubtedly reflects social change in attitudes (both towards Indigenous people, and among Indigenous people themselves), and gives rise to complex reasons why population measures based on these data may change.

While there is a well-documented phenomenon of increased Indigenous counts from census to census, the key issue is that of undercounts. Since 1986, the ABS has had an Indigenous Enumeration Strategy (IES), the aim of which is to improve the enumeration of Indigenous people. Detailed observations of the IES implementation in the Northern Territory for the 2001 and 2006 censuses show that, despite increasing attention and funding to ensure people are counted, many Indigenous people remain excluded from the census count.[37] Taylor and Biddle concluded that: 'in many parts of Australia ... undercounting of the Indigenous population in 2006 has reduced the census to the role of a large sample survey'.[38]

In 2006, for the first time, the Post-Enumeration Survey (PES), carried out one month after census night and used to determine how many people were missed in the census, included remote areas of Australia and discrete Aboriginal communities. It showed that across Australia the Indigenous population had been undercounted by 11.5 per cent. In the Northern Territory this undercount was 19.2 per cent.[39]

In response to this undercount, the ABS creates an Estimated Resident Population (ERP). In addition to the undercount, the ERP takes account of individuals for whom Indigenous status is not known. These individuals include those not counted at all, and individuals who were counted but for whom Indigenous status was not collected.

While technically, the 2006 ERP is, 'probably the best estimate yet of the nation's Indigenous population',[40] its calculation is not straightforward. It requires, 'constructing an 'Indigenous population' … out of 'Indigenous peoples'.[41] This population construction has led to an NT Indigenous ERP that is 24.1 per cent larger than the population counted by the census.[42] It may be overstating the case to claim the Indigenous population is 'made up', but there are data and methodological assumptions used to determine the final ERP that, if changed, could lead to a different outcome.

If the 2006 ERP is Australia's 'best estimate yet' of the Indigenous population, then it raises concerns about what population is used to look at changes over time. The ABS does not attempt to make Indigenous ERPs based on different censuses consistent. Rather, it produces a new ERP, creating a backcast (usually no greater than 10 years) based on an assumption of natural increase. Wilson and Barnes have shown how these backcast Indigenous populations have been higher than census year Indigenous ERPs in every state across Australia.[43] The creation of backcast Indigenous populations for the

NT based on the 2006 ERP show larger Indigenous populations than counted in all censuses prior to 2006. As the NT Department of Health and Families has shown, a larger backcast population demonstrates the need to reassess all historical rates created using census-based population denominators.[44]

This creation of an Indigenous population across time, to increasingly higher levels, while methodologically sound[45] and undoubtedly reflective of reality,[46] has important implications for how we understand birth rates. Figure 2 shows teenage fertility rates calculated in three ways: rates published in the ABS annual *Births Australia* publications, based on ERPs for the year of publication; rates based on vital registrations using a backcast population denominator; and rates based on perinatal data using a backcast population denominator. In addition to the fertility rates being exceptionally high,[47] four things stand out: each of the datasets produce the same general pattern of fertility change, namely overall decline with fluctuations; the higher birth counts for vital registrations than perinatal data are not evident in every year for this age group; published rates are consistently higher than those calculated using a backcast population; and the further back in time the comparison, the greater the difference.

The demographer's access to clean data to create populations for analysis gives him or her the power to influence political decision-making, social commentary and even to determine history. Gray referred to this relationship as 'political demography'[48] and Taylor has claimed the relationship 'is

Figure 2: Northern Territory Indigenous fertility rates, women 15 to 19 years, based on three data sources

Sources: Births Australia, Catalogue no. 3301.0, ABS, various years. Authors' calculations using data from the ABS and the Department of Health and Families.

Note: [1] Rates calculated using a backcast population based on the 2006 NT ERP.

strong and has never been stronger'.[49] This 'political demography' becomes embedded as the trends shown by Indigenous birth rates, particularly the rate of change, are influences that shape the very assumptions about what will happen to birth rates into the future. It is these assumptions that then are used in future population estimates and projections.

CONCLUSIONS

This paper asks whether we are just making up Indigenous birth rates. It has demonstrated that birth rates are based on some best ever estimates in the case of population denominator data, and seemingly rigourous (if different) counting processes in the case of births. While Indigenous birth rates are not made up, in the sense of being invented, they are based on data that cannot be taken at face value and they must be viewed as indicative, rather than precise.

Herein lies a significant problem. Despite evidence of Indigenous population data being undercounted and imprecise, population measures based on Indigenous status continue to feed into government policy settings and programs, and into wider societal views of Indigenous peoples, without caveats on data quality. There is a very real risk that the Kelvin dictum is applied to mean: 'if you can't measure, measure anyway'.[50] Nowhere is this more evident than in the use of birth rates for population projections. The Northern Territory population projections released in 2009 are based on a total fertility rate (TFR) calculated from the NT Midwives' Data Collection that is the average over the period 2001 to 2005, using an ERP derived from the 2001 census. The TFR is thus lower than what would be expected if a TFR based on the vital registrations were used (2.37 birth per woman compared to 2.90 births per woman), which obviously affects population size into the future. Using a basic projection model assuming zero migration, these different TFRs show the Indigenous population growing from 64,000 to 101,000 and 113,000 respectively over 30 years. The difference of 12,000 people is larger than every town in the Northern Territory except Darwin and Alice Springs. The 2001 to 2005 ERPs used in the 2009 NT projections are also smaller than populations backcast from the 2006 ERP. Thus the TFR used in these projections is slightly higher than the one calculated from a 2006-based population (2.37 births per woman compared to 2.26 births per woman). A TFR of 2.26 leads to a projected Indigenous population of 98,000 over 30 years. Not only do different TFRs lead to different projected population sizes, they also lead to different population age structures.

The point, however, is not to quibble about how accurate the projections are.[51] The point is that once entered into the public arena the projections become powerful numbers and are inherently political. The population projections give us our macro-level framework for understanding current and future disadvantage as influenced by age structure, cohort size and intergenerational period. Similarly, backcast populations can cause us to revise history.

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[47] For a point of comparison, the teenage fertility rate for Australia as a whole in 2006 was 15.3 births per 1,000 women aged 15 to19 years, *Births Australia 2006*, op. cit.

[48] A. Gray, 'Some myths in the demography of Aboriginal Australians', *Journal of the Australian Population Association*, vol. 2, no. 2, 1985, pp. 136–149

[49] Taylor, 2009, op. cit.

[50] Lord Kelvin is quoted as saying: 'I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind: it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of science, whatever the matter may be'. From 'Electrical units of measurement', a lecture delivered at the Institution of Civil Engineers, London (3 May 1883), Popular Lectures and Addresses (1889), vol. 1, no. 73. From <www.todayinsci.com/K/Kelvin_Lord/KelvinLord-Quotations.htm>

[51] As the Northern Territory Treasury quite rightly point out: '… the population projections should not be interpreted as accurate forecasts or predictions. They are the result of applying certain assumptions about the future direction and levels of fertility, mortality and migration, to a base population', Northern Territory Treasury, 2009, op. cit.