Atlas of Healthcare Variation Methodology | Cancer incidence

General points:

- Data are not presented where the number of people was less than 10. This is to preserve confidentiality.
- People were assigned to their district health board (DHB) of domicile unless otherwise noted. Where more than one domicile was recorded, the most recent value was selected.
- Ethnicity data presented uses prioritised ethnic group (Māori, Pacific peoples, Asian and European/Other).
- For rate calculations, the number of events per 100,000 population are presented.
- Age-specific rates showing the number of registrations per 100,000 population are presented in the crude incidence rates.
- See Appendix 1 for the method of age-standardisation used.

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- From the Ministry of Health: Chris Lewis and Jenny Hendrix for their assistance in providing the New Zealand Cancer Registry data and explaining the collection processes.

Standard deviation
Data are presented as standard deviation from the mean. Standard deviation is a statistical measure of variation from a mean. Assuming that recorded instances are normally distributed (ie, they are in the usual 'bell-shaped curve'), 68 percent of all recorded instances would be expected to be within one standard deviation either side of the mean and 95 percent within two standard deviations. The two 'middle' shades will be within one standard deviation of the mean.

Confidence intervals
Data for each DHB is presented as either rate per 100,000 population or percentage. Upper and lower confidence intervals were calculated to 95 percent level of confidence.

Indicator #1:	**All cancers, crude incidence rate per 100,000**
Numerator	New cancer diagnoses with the codes C00-C96 and D45-47, by DHB
Denominator	Resident population, Statistics NZ population estimates
Data source	New Zealand Cancer Registry (NZCR), Statistics NZ
Analysis	Subanalyses for : - by year, rolling three year average: (2008 - 2010, 2009 - 2011, 2010 - 2012) - by age groups: 0-24, 25-44, 45-64, 65-74, 75+ - by ethnic groups: Māori, nonMāori - by gender: female, male
Code	Includes all NZCR registrations with ICD-10-AM diagnosis codes C00-C96 and D45-47

Indicator #2:	**Crude female breast cancer incidence rates per 100,000**
Numerator	The number of NZCR registrations between 2008 and 2012 with ICD-10-AM diagnosis codes breast – C50 (female only), by DHB
Denominator	Resident population, Statistics NZ population estimates
Data source	New Zealand Cancer Registry (NZCR), Statistics NZ
Analysis	Subanalyses for : - by year, rolling three year average: (2008 - 2010, 2009 - 2011, 2010 - 2012) - by age groups: 0-24, 25-44, 45-64, 65-74, 75+ - by ethnic groups: Māori, nonMāori
Exclusions	Includes only female breast and the population for all sub-analyses have been aligned with this.

Indicator #3:	**Crude colorectal cancer incidence rates per 100,000**
Numerator	The number of NZCR registrations between 2008 and 2012 with ICD-10-AM diagnosis codes for colorectal cancer (includes colorectum and anus) - C18–C21, by DHB
Denominator	Resident population, Statistics NZ population estimates
Data source	New Zealand Cancer Registry (NZCR), Statistics NZ
Analysis	Subanalysis for : - by year, rolling three year average: (2008 - 2010, 2009 - 2011, 2010 - 2012) - by age groups: 0-24, 25-44, 45-64, 65-74, 75+ - by ethnic groups: Māori, nonMāori - by gender: female, male

Indicator #4:	**Crude lung cancer incidence rates per 100,000**
Numerator	The number of NZCR registrations between 2008 and 2012 with ICD-10-AM diagnosis codes for lung cancer (includes trachea, bronchus and lung) - C33–C34, by DHB
Denominator	Resident population, Statistics NZ population estimates
Data source	New Zealand Cancer Registry (NZCR), Statistics NZ
Analysis	Subanalysis for : - by year, rolling three year average: (2008 - 2010, 2009 - 2011, 2010 - 2012) - by age groups: 0-24, 25-44, 45-64, 65-74, 75+ - by ethnic groups: Māori, nonMāori - gender: female, male

Indicator #5:	**Crude melanoma incidence rates per 100,000**
Numerator	The number of NZCR registrations between 2008 and 2012 with ICD-10-AM diagnosis codes for melanoma - C43, by DHB
Denominator	Resident population, Statistics NZ population estimates
Data source	New Zealand Cancer Registry (NZCR), Statistics NZ
Analysis	Subanalysis for : - by year, rolling three year average: (2008 - 2010, 2009 - 2011, 2010 - 2012) - by age groups: 0-24, 25-44, 45-64, 65-74, 75+ - by ethnic groups: Māori, nonMāori - gender: male, female

Indicator #6:	**Crude prostate cancer incidence rates per 100,000**
Numerator	The number of NZCR registrations between 2008 and 2012 with ICD-10-AM diagnosis code for prostate: C61 (male only), by DHB
Denominator	Resident population, Statistics NZ population estimates
Data source	New Zealand Cancer Registry (NZCR), Statistics NZ
Analysis	Subanalysis for : - by year, rolling three year average: (2008 - 2010, 2009 - 2011, 2010 - 2012) - by age groups: 0-24, 25-44, 45-64, 65-74, 75+ - by ethnic groups: Māori, nonMāori

Indicator #7:	**All cancers, age-standardised rate per 100,000**
Numerator	New cancer diagnoses with the ICD-10-AM codes C00-C96 and D45-47, by DHB
Denominator	Resident population, Statistics NZ population estimates
Data source	New Zealand Cancer Registry (NZCR), Statistics NZ
Analysis	Subanalyses for : - by year, rolling three year average: (2008 - 2010, 2009 - 2011, 2010 - 2012) - by ethnic groups: Māori, nonMāori - by gender: female, male
Code	Includes all NZCR registrations with ICD-10-AM diagnosis codes: C00-C96 and D45-47
Comment	The method of age standardisation is described in Appendix 1.

Indicator #8:	**Age-standardised female breast cancer incidence rates per 100,000**
Numerator	The number of NZCR registrations between 2008 and 2012 with ICD-10-AM diagnosis codes breast – C50 (female only), by DHB
Denominator	Resident population, Statistics NZ population estimates
Data source	New Zealand Cancer Registry (NZCR), Statistics NZ
Analysis	Subanalyses for : - by year, rolling three year average: (2008 - 2010, 2009 - 2011, 2010 - 2012) - by ethnic groups: Māori, nonMāori
Exclusions	Includes only female breast and the population for all sub-analyses have been aligned with this.
Comment	The method of age standardisation is described in Appendix 1.

Indicator #9:	**Age-standardised colorectal cancer incidence rates per 100,000**
Numerator	The number of NZCR registrations between 2008 and 2012 with ICD-10-AM diagnosis codes for colorectal cancer (includes colorectum and anus) - C18–C21, by DHB
Denominator	Resident population, Statistics NZ population estimates
Data source	New Zealand Cancer Registry (NZCR), Statistics NZ
Analysis	Subanalysis for : - by year, rolling three year average: (2008 - 2010, 2009 - 2011, 2010 - 2012) - by ethnic groups: Māori, nonMāori - gender: female, male
Comment	The method of age standardisation is described in Appendix 1.

Indicator #10:	**Age-standardised lung cancer incidence rates per 100,000**
Numerator	The number of NZCR registrations between 2008 and 2012 with ICD-10-AM diagnosis codes for lung cancer (includes trachea, bronchus and lung) - C33–C34, by DHB
Denominator	Resident population, Statistics NZ population estimates
Data source	New Zealand Cancer Registry (NZCR), Statistics NZ
Analysis	Subanalysis for : - by year, rolling three year average: (2008 - 2010, 2009 - 2011, 2010 - 2012) - by ethnic groups: Māori, nonMāori - gender: female, male
Comment	The method of age standardisation is described in Appendix 1.

Indicator #11:	**Age-standardised melanoma incidence rates per 100,000**
Numerator	The number of NZCR registrations between 2008 and 2012 with ICD-10-AM diagnosis codes for melanoma - C43, by DHB
Denominator	Resident population, Statistics NZ population estimates
Data source	New Zealand Cancer Registry (NZCR), Statistics NZ
Analysis	Subanalysis for : - by year, rolling three year average: (2008 - 2010, 2009 - 2011, 2010 - 2012) - by ethnic groups: Māori, nonMāori - gender: female, male
Comment	The method of age standardisation is described in Appendix 1.

Indicator #12:	**Age-standardised prostate cancer incidence rates per 100,000**
Numerator	The number of NZCR registrations between 2008 and 2012 with ICD-10-AM diagnosis codes for prostate: C61 (male only), by DHB
Denominator	Resident population, Statistics NZ population estimates
Data source	New Zealand Cancer Registry (NZCR), Statistics NZ
Analysis	Subanalysis for : - by year, rolling three year average: (2008 - 2010, 2009 - 2011, 2010 - 2012) - by ethnic groups: Māori, nonMāori
Comment	The method of age standardisation is described in Appendix 1.

Appendix One: Age-standardisation method

The method used to calculate age-standardised rates was the same as that used by the Ministry of Health in reporting cancer registrations and deaths:

Ministry of Health. 2014. *Cancer: New registrations and deaths 2011.* Wellington: Ministry of Health.

To quote:

Age-standardised rates adjust for differences in age distribution of the populations being compared. They are calculated by the direct standardisation method, which multiplies the age-specific rates by a standard population. The standard population used in this publication is the WHO world standard population. All rates in this publication are age-standardised unless otherwise stated.

Prior to 2005, publications in the *Cancer: New registrations and deaths* series used Segi's world population, and therefore the rates published are not comparable with those stated in this document. Rates for all years back to 1996 have been recalculated using the WHO world standard population (see Table N-1).

Table N-1: The World Health Organization world standard population

Age group	Population
0–4	8860
5–9	8690
10–14	8600
15–19	8470
20–24	8220
25–29	7930
30–34	7610
35–39	7150
40–44	6590
45–49	6040
50–54	5370
55–59	4550
60–64	3720
65–69	2960
70–74	2210
75–79	1520
80–84	910
85+	635
Total	**100,035**

Source*:* Ahmad et al 2001

The method for calculating the confidence intervals for the age-standardised data also that applied by the Ministry of Health using the methods presented in Keyfitz (1966).

References:

Ahmad O, Boschi-Pinto C, Lopez AD, et al. 2001. *Age Standardization of Rates: A new WHO standard*. GPE Discussion Paper Series No. 31. Geneva: World Health Organization. URL: www.who.int/healthinfo/paper31.pdf (accessed 7 May 2013).

Keyfitz N. 1966. Sampling variance of standardized mortality rates. *Human Biology* 38: 309–17.