

Expected Non Melanoma Skin (Keratinocytic) Cancer incidence in New Zealand for 2018

March 2018

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Report for the New Zealand Health Promotion Agency.

Mary Jane Sneyd (Senior Epidemiologist, Public Health Research and Consulting Services), Andrew Gray (Senior Biostatistician).

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Executive Summary

This project estimated the numbers of diagnoses and the incidence rate of Non-Melanoma Skin (Keratinocytic) Cancer (KC) in New Zealand based on data extracted from a regional collection of pathology records of skin biopsies taken in 2009-2013.

Key findings are:

- It is projected that over 90,400 people will be diagnosed with at least one in situ or invasive KC in 2018.
- In Māori it is projected that in 2018 there will be 388 people diagnosed with KC, 651 presentations to a doctor in which a biopsy will be taken for KC and 758 separate KC diagnoses.
- In non-Māori it is projected that in 2018 there will be 90,077 people diagnosed with KC, 177,855 presentations for KC biopsies, and 229,867 diagnoses of KC.

- The number of diagnoses of KC made each year in New Zealand is currently unknown.
- A previous projection for 2006 suggested that there were at least 67,000 new cases of invasive KC diagnosed in New Zealand that year.
- We were provided with a de-identified dataset of skin biopsy information derived from pathology reports from the Bay of Plenty from 2010-2013.
- The datafile listed visits to a doctor in which a skin biopsy was taken, so individual people could have multiple visits for a biopsy, multiple biopsies at the one visit and multiple diagnoses of skin cancer from the doctor visits.

- Undercounting of KC was estimated from the fraction of independently verified (by the New Zealand Cancer Registry) diagnoses of melanoma.
- Burden of disease was measured in three ways: counts of *people* diagnosed with at least one KC in 2010-2012; for the same people, the number of *presentations* to a doctor in which a biopsy of KC was taken and the total number of KC *lesions* diagnosed.
- It was estimated that 22,190 people were diagnosed with in situ squamous cell carcinomas (SCC), 52,073 with invasive basal cell carcinomas (BCC) and 28,800 with invasive SCC in 2013.
- The age-adjusted incidence rate (for people) for invasive KC was 51.0 per 100,000 in Māori and 786.1 per 100,000 in non-Māori.

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Background

Although it is believed that the diagnosis and treatment of basal cell carcinomas (BCC) and squamous cell carcinomas (SCC), collectively now known as keratinocytic cancers (KC; previously referred to collectively as non-melanoma skin cancer or NMSC), confers a large burden on the NZ health service, currently the number of diagnoses of KC made each year is not known. As new cases of KC are not notified to the New Zealand Cancer Registry (NZCR) primarily because of resource constraints, little is known about the real incidence and burden of KC. However, a previous projection for 2006 suggested that there were at least 67,000 new cases of invasive KC diagnosed in New Zealand that year based on regional data from 1998, and that these cancers cost the New Zealand health-care system \$58million.⁽¹⁾

In fair-skinned populations worldwide, KC has the highest incidence of all cancers⁽²⁾ and it is expected to be the same in New Zealand. A systematic review of the incidence and prevalence of KC in Australia showed that incidence steadily increased from 1985 to 2011, with a higher incidence of BCC than SCC and a higher incidence in men than women.⁽³⁾ A more recent Australian study of Medicare claimants aged 20 years or more found that 6.6% had at least one KC excised during 2011-2014, with incidence in Queensland much higher than elsewhere.⁽⁴⁾ Furthermore, 47% of patients with skin cancer excisions had two or more skin cancers excised during this time. New Zealand shares many features with Australia such as the propensity for an outdoor lifestyle, overlapping latitudes and a predominantly white European population, and there is some evidence that an increase in KC incidence has also occurred in New Zealand.⁽⁵⁾

This project estimated the numbers of diagnoses and the incidence rate of KC in New Zealand and was based on data extracted from a regional collection of pathology records of skin biopsies taken in 2009-2013.

Methods

i) Data sources

In 2013 we were provided with a de-identified dataset of skin biopsy information derived from pathology reports covering one region of New Zealand. The datafile included skin biopsies taken from 2009 to 2013 in the Bay of Plenty (BOP). Each

record in the datafile was of a visit to a doctor in which a biopsy was taken. So individual people could have multiple visits or presentations to a doctor for a biopsy, multiple biopsies at the one visit and multiple diagnoses of skin cancer from the same or multiple doctor visits.

Ethical approval was obtained to match the original datafile to Health Care User (HCU) data, Cancer Registry (CR) data and the mortality datafile from the Ministry of Health (MoH). The matching, carried out by the Ministry of Health, provided additional essential information, for example age, sex, domicile code and ethnicity, for epidemiological analysis. Ethnicity was classified as Māori or non-Māori (everyone else not indicating Māori ethnicity). Domicile codes were mapped to territorial local authority (TLA) regions and to district health board (DHB) regions using the standard MoH mappings.

Preliminary analysis showed that the data were incomplete for the years 2009 and 2013 so all analyses were restricted to 2010-2012.

ii) Calculation of weights for undercounting of KC

For independent verification of completeness of the data for 2010-2012 and for calculation of scaling factors to adjust for potential undercounting of KC diagnoses, from the matched dataset of skin biopsies and additional data (the full dataset) we first extracted diagnoses of in situ and invasive melanoma using the following criteria for text matching across all columns of descriptive data:

Invasive melanoma: contains “melanoma” or “hutchinson” and not “situ”

In situ melanoma: contains “melanoma” or “hutchinson” and “situ”, or contains “lentigo maligna” but not “melanoma.”

Diagnoses of in situ and invasive melanoma were both extracted as they had not been reliably distinguished in the original datafile. The number of individuals diagnosed with in situ or invasive melanoma was counted for each TLA within the BOP DHB. These data were matched to CR data for all registrations of C43 and D03 (ICD10 codes for invasive and in situ melanoma, respectively) in the same TLAs and over the same time period (2010-2012). The CR data were collapsed to produce a single row for each National Health Index (NHI) indicating any melanoma registration during the same three-year period.

The intersection of these data sets was used to identify all patients registered with the CR with one or more melanoma diagnoses who were also captured within the BOP dataset. The proportion of matches between the BOP data and the CR was calculated by age band (under 50, 50 and over), sex (male, female), and ethnicity (Māori, non-Māori). This represented the fraction of CR melanoma registrations at the person level that were captured by the BOP data for each TLA. A proportion of 0.5, for example, would indicate that the BOP data contained a melanoma diagnosis for exactly half the melanoma cases listed in the CR during the same three-year period. This in turn would suggest that doubling the number of diagnoses in the BOP data would provide an estimate of the total number of actual cases. Similarly, a proportion of 0.91 would suggest an approximately 10% undercount in the BOP data. Only the largest TLAs in the BOP with undercounting <30% were included in the calculation of age-sex-ethnicity specific scaling factors.

iii) Population data

TLA total resident population data, as at June 30 of each year, was obtained from Statistics New Zealand (data extracted 18 May 2017) providing age- (5 year groups except the upper group of '85+') and sex-stratified population estimates for each TLA of interest (TLAs 22-27, as above) in 2010, 2011, and 2012. Similarly, Māori population data was obtained (extracted 18 May 2017) for 2006 and 2013. Linear interpolations were used to obtain Māori population estimates for the years of interest, namely 2010, 2011, and 2012. The non-Māori population estimates were obtained by subtracting the Māori estimates from the total population.

iv) Calculation of KC burden in the BOP

From the full dataset we extracted cases of invasive and in situ BCC and SCC using the following criteria for text matching across all columns of descriptive data:

Invasive BCC: contains "basal" but not "situ" nor "metaplasia"

In situ BCC: contains "basal" and "situ"

Invasive SCC: contains "squamous" but none of "situ", "papilloma", "adenoid", or "metaplasia"

In situ SCC: contains "squamous" and either "situ" or "bowen"

Only diagnoses of BCC or SCC made by histology could be included as the original datafile was of biopsies and did not include information on KC treated on a presumptive diagnosis. The burden of skin cancer both to the public and the health service is not fully accounted for by only considering numbers of affected individuals. One skin cancer may require several biopsies or excisions, one visit to the doctor may result in more than one skin cancer diagnosis, and some individuals may have multiple biopsies and multiple skin cancers diagnosed. Therefore burden of disease was measured in three different ways: counts of *people* who were diagnosed with at least one KC in 2010-2012; for the same people, the number of *presentations* to a doctor in which a biopsy was taken; and the total number of KC *lesions* diagnosed in these people.

For each disease group of interest (invasive and in situ BCC and SCC), the total people, presentations, and lesions calculated above by age band, sex, and ethnicity were then scaled by the age-sex-ethnicity scaling factor estimated above.

v) Application of KC incidence rates to DHB regions and New Zealand in total

Census data from 2013 at the DHB level stratified by age (with the usual 5 year age groups along with “85+”), sex, and ethnicity, and 2018 population projections for New Zealand by age, sex, and ethnicity (Māori and non-Māori) (using the medium projections, extracted 25 September 2017) were used to estimate the total numbers for each disease group in terms of people, presentations, and lesions. The 2013 KC incidence rates were applied to the rest of New Zealand on the assumption that the separate Māori and non-Māori incidence rates in BOP applied across all DHB regions. As individual sun exposure varies enormously, the variation in ultra-violet exposure by geographic region (or latitude as a surrogate) was not considered.

The incidence estimations for 2017 by DHB only considered overall change in population size for each separate DHB as these were the only data available and did not consider any possible increase in the underlying incidence rate of KC. Projections of incidence rates to 2018 for the whole of New Zealand only considered projected increases in population from Statistics NZ and not any potential increase in incidence rate of KC over this time as there are no available data for this.

Results and Discussion

We received 82,076 records derived from pathology reports from 2009-2013. Each record included the histology information for one or more skin biopsies and many individuals had multiple records. The protocol whereby we arrived at the final records for analysis is shown in the flowchart (Figure 1). Of the original 82,076 records, 1,909 (2.3%) had obviously incorrect NHI numbers and 99% of correctly formatted NHIs were matched to MoH datasets. After restriction to skin cancer diagnoses made from 2010 to 2012, 56,380 records remained for analysis. The numbers of KC diagnosed in an individual patient from 2010 to 2012 ranged from 1 to 44. For the estimation of undercounting of KC, 956 melanoma diagnoses were made in the time period in the relevant TLAs and 1,153 notifications in the same time and TLA by the NZCR, an underreporting percentage of 17%. In addition, 28 people with a diagnosis of melanoma in the BOP dataset could not be identified in the NZCR.

There was no in situ BCC diagnosed in the original population so in situ BCCs are not included in any tables.

Over the whole of New Zealand it was estimated that 22,190 people of all ethnicities combined were diagnosed with in situ SCC, 52,073 with invasive BCC and 28,800 with invasive SCC in 2013 (Table 1). As many of these were multiple diagnoses in an individual, just over 70,000 people were estimated to have been diagnosed with invasive KC and 79,000 people were estimated to have been diagnosed with at least one in situ or invasive KC in 2013. If we use an approximately similar method as O'Dea we arrive at 80,873 diagnoses of BCC or SCC in people in 2013 but some of these will have occurred in the same people.

Flowchart

File of data derived from pathology reports of skin biopsies from the BOP, 2009-2013.

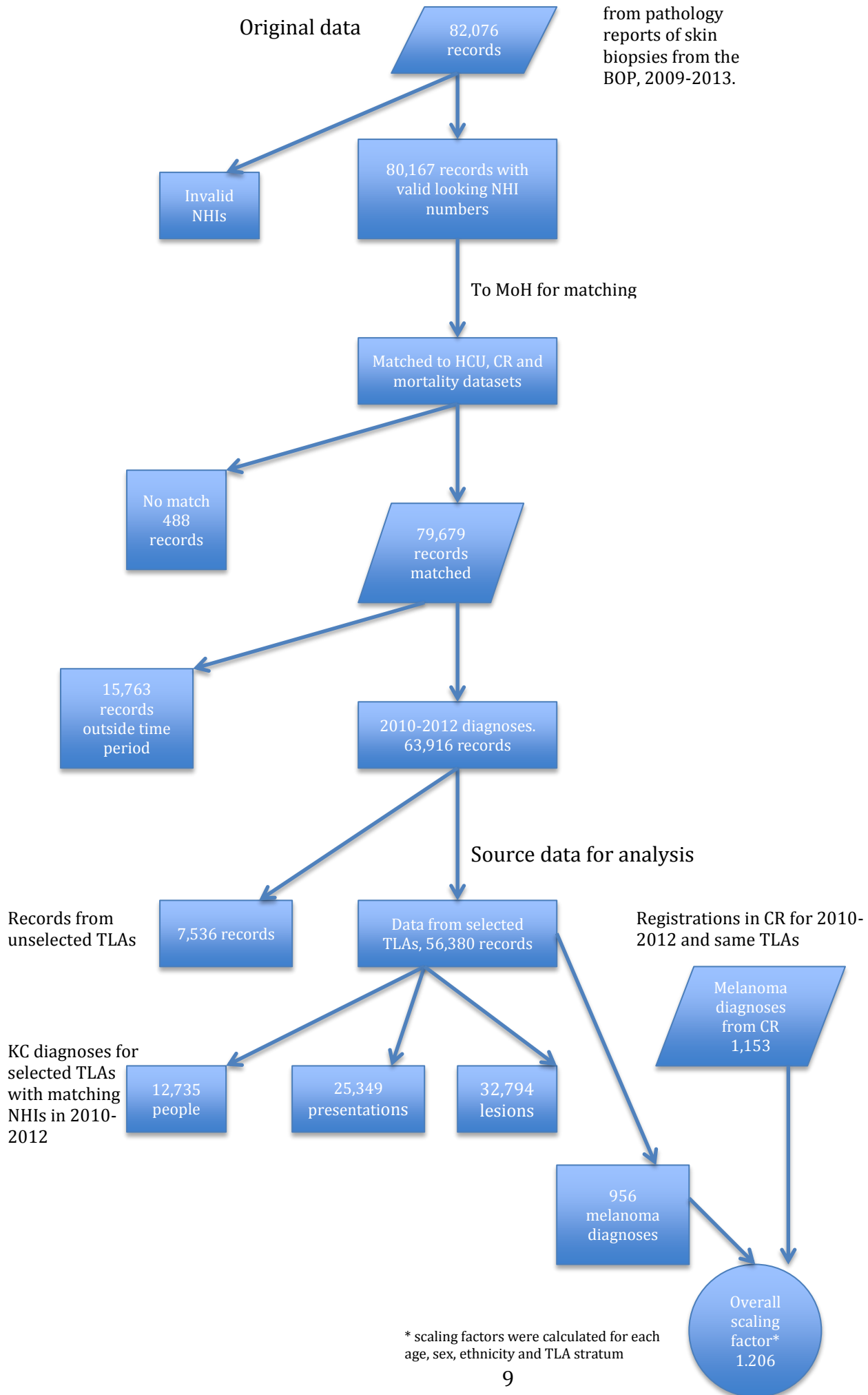


Table 1. Estimated numbers¹ of New Zealanders² diagnosed with in situ or invasive KC in 2013.

	Disease	Female	Male	Total
In situ	SCC	11962	10228	22190
Invasive	BCC	22417	29657	52073
	SCC	12857	15943	28800
Invasive KC Total		31518	38512	70030
			Total (Invasive or In situ KC)	79149

¹As people may have multiple lesions, totals will not be the same as a column addition.

²All ethnicities combined

The rates for 2013 were applied to the New Zealand population projections for 2018. Thus it is projected that over 90,400 people will be diagnosed with at least one in situ or invasive KC in 2018 (Table 2).

Table 2. Projected numbers¹ of New Zealanders² diagnosed with in situ or invasive KC in 2018.

	Disease	Female	Male	Total
In situ	SCC	13694	11756	25449
Invasive	BCC	25423	33986	59410
	SCC	14747	18331	33078
Invasive KC Total		35862	44162	80023
			Total (Invasive + In situ KC)	90464

¹As people may have multiple lesions, totals will not be the same as a column addition.

²All ethnicities combined

However, the burden of skin cancer both to the public and the health service is not fully accounted for by only counting affected individuals. One skin cancer may require several biopsies or excisions, one visit to the doctor may result in more than one skin biopsy and skin cancer diagnosis, and some individuals may have multiple biopsies and multiple skin cancers diagnosed. Each of these contacts with the health system imposes a burden of some sort on the patient and the health service and only counting patients would underestimate this burden.

Tables 3a and 3b show the numbers of people, presentations and lesions diagnosed as KC in New Zealand in 2013 (Table 3a) and 2018 (Table 3b) for Māori. There were 283 Māori in 2013 who had at least one in situ or invasive KC diagnosed but these

people had 476 doctor visits for a skin biopsy and resulted in the diagnosis of 554 individual in situ or invasive KC lesions. These numbers were projected to increase to 388 people, 651 presentations and 758 KC diagnoses in 2018 (Table 3b).

Table 3a. Estimated numbers of people¹, presentations to doctors², and lesions diagnosed as in situ or invasive KC in 2013. For Māori only, by sex.

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	50	17	67	79	17	96	79	20	99
Invasive	BCC	109	69	178	175	116	291	198	128	327
	SCC	46	20	66	74	39	113	84	44	129
Invasive KC Total		150	86	236	243	151	394	283	173	456
Totals (Invasive + In situ KC)		185	99	283	310	165	476	362	193	554

¹As people may have multiple lesions, totals will not be the same as a column addition.

²As multiple diagnoses may be associated with one presentation to a doctor, the total for presentations will not be the same as a column addition.

Table 3b. Projected numbers of people¹, presentations to doctors², and lesions diagnosed as in situ or invasive KC in 2018. For Māori only, by sex.

Disease		2018								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	68	24	92	108	24	132	108	27	136
Invasive	BCC	148	96	244	237	161	398	268	178	446
	SCC	63	27	90	100	55	155	114	62	176
Invasive KC Total		203	120	323	330	209	539	383	240	622
Totals (Invasive + In situ KC)		251	137	388	422	229	651	491	267	758

¹As people may have multiple lesions, totals will not be the same as a column addition.

²As multiple diagnoses may be associated with one presentation to a doctor, the total for presentations will not be the same as a column addition.

The same data for non-Māori are shown in Tables 4a and 4b. In 2013, it was estimated that 78,866 people were diagnosed with a KC resulting in 155,433 presentations to a doctor in which a biopsy was taken, and 200,785 diagnoses of KC

(Table 4a). It was projected that in 2018 there would be 90,077 people diagnosed with KC, 177,855 presentations with biopsy, and 229,867 diagnoses of KC (Table 4b).

Table 4a. Numbers of people¹, presentations to doctors², and lesions diagnosed as in situ or invasive KC in 2013. For Non- Māori only, by sex.

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	11912	10211	22123	17150	14498	31648	19496	16293	35789
Invasive	BCC	22308	29588	51895	36523	55789	92312	43097	71808	114905
	SCC	12811	15923	28734	19085	26716	45801	20324	29767	50091
Invasive KC Total		31368	38426	69794	53955	78383	132337	63422	101575	164997
Totals (Invasive + In situ KC)		37180	41686	78866	67241	88192	155433	82917	117868	200785

¹As people may have multiple lesions, totals will not be the same as a column addition.

²As multiple diagnoses may be associated with one presentation to a doctor, the total for presentations will not be the same as a column addition.

Table 4b. Numbers of people¹, presentations to doctors², and lesions diagnosed as in situ or invasive KC in 2018. For Non- Māori only, by sex.

Disease		2018								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	13626	11732	25358	19618	16661	36279	22308	18727	41035
Invasive	BCC	25275	33890	59166	41433	63967	105400	48899	82361	131260
	SCC	14685	18304	32988	21898	30734	52632	23323	34249	57572
Invasive KC Total		35659	44042	79700	61436	89955	151390	72222	116610	188832
Totals (Invasive + In situ KC)		42299	47778	90077	76630	101225	177855	94530	135338	229867

¹As people may have multiple lesions, totals will not be the same as a column addition.

²As multiple diagnoses may be associated with one presentation to a doctor, the total for presentations will not be the same as a column addition.

Overall, the above data for 2010-2012 gave a lesion (in situ and invasive combined) to person ratio in Māori of 1.96:1 (Table 5). This means that, on average, nearly 2 KCs were diagnosed in each person within 3 years. If restricted to invasive lesions only, Māori had a BCC lesion to person ratio of 1.84:1 and a SCC lesion to person ratio of 1.95:1. In non-Māori the overall lesion (in situ or invasive) to person ratio was

2.55:1 (Table 5) meaning that, on average, 2.5 KC lesions were removed from each person in the 3 years. For invasive BCC in non-Māori the lesion:person ratio was 2.21:1 and for invasive SCC 1.74:1. O’Dea⁽¹⁾ calculated test:person ratios similarly but for data collected over only one year and for all ethnic groups combined, and found ratios of 1.25:1 for invasive BCC and 1.09:1 for invasive SCC - unsurprisingly lower than in our data.

Table 5. Lesion to person ratios of KC for Māori and non-Māori.

	Disease	Lesion:person ratios	
		Māori	non-Māori
In-situ	SCC	1.48:1	1.62:1
Invasive	BCC	1.84:1	2.21:1
	SCC	1.95:1	1.74:1
Invasive KC total		1.93:1	2.36:1
Total invasive and in situ KC		1.96:1	2.55:1

The crude and age-adjusted incidence rates of KC per 100,000 population for Māori in 2013 are shown in Tables 6a and 6b, respectively. The crude and age-adjusted incidence rates of all categories of KC are higher in women than in men. The same pattern is not seen in non-Māori (Tables 7a and 7b for crude and age-adjusted incidence rates, respectively): the crude and age-adjusted incidence rates of in situ SCC were higher in women, but, as has been shown in Australia and elsewhere,^(3, 4) invasive BCC and SCC incidence rates are higher in men than women.

Comparing the age-adjusted rates by person per 100,000 population for non-Māori in these data to those calculated by O’Dea based on data from 1998 (for all ethnic groups), we find that the incidence rates presented here are somewhat lower for invasive BCC and SCC in both men and women. There are two main reasons for this. In the previous work by O’Dea,⁽¹⁾ people who were diagnosed with both BCC and SCC were counted twice whereas we considered people as unique even though some will have had two or more diagnoses of BCC and SCC. Furthermore, in the previous work, the ethnic distribution of the KCs and the source populations were not considered and, as the BOP has a higher proportion of Māori residents than many other regions, we found this to alter the estimates considerably when applying rates derived from the BOP to the rest of New Zealand.

Table 6a. Estimated crude rates of in situ or invasive KC as people¹, presentations² to a doctor, and lesions per 100,000 population in 2013. Māori only, by sex.

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	16.0	6.0	11.2	25.5	6.0	16.1	25.5	6.8	16.5
Invasive	BCC	35.1	24.0	29.7	56.5	40.2	48.7	64.0	44.5	54.6
	SCC	14.9	6.8	11.0	23.8	13.7	18.9	27.2	15.4	21.5
Invasive KC Total		48.2	29.9	39.4	78.5	52.2	65.8	91.2	59.9	76.1
Totals (Invasive + In situ KC)		59.6	34.2	47.3	100.1	57.3	79.5	116.7	66.7	92.6

¹As people may have multiple lesions, total rates will not be the same as a column addition.

²As multiple diagnoses may be associated with one presentation to a doctor, the total for rate of presentations will not be the same as a column addition.

Table 6b. Estimated age-adjusted (WHO standard) rates of in situ or invasive KC as people¹, presentations² to a doctor, and lesions per 100,000 population in 2013. Māori only, by sex.

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	20.4	9.8	15.5	32.5	9.8	22.2	32.5	12.0	23.0
Invasive	BCC	41.5	34.8	37.8	66.9	61.1	62.5	75.2	69.0	70.1
	SCC	17.8	12.8	15.2	29.2	28.2	27.4	32.8	32.5	30.9
Invasive KC Total		57.1	45.4	51.0	93.9	84.9	87.2	108.0	101.5	101.0
Totals (Invasive + In situ KC)		71.6	51.8	62.0	121.5	92.5	105.9	140.6	113.5	124.0

¹As people may have multiple lesions, total rates will not be the same as a column addition.

²As multiple diagnoses may be associated with one presentation to a doctor, the total for rate of presentations will not be the same as a column addition.

Table 7a. Estimated crude rates of in situ or invasive KC as people¹, presentations² to a doctor, and lesions per 100,000 population in 2013. Non- Māori only, by sex.

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	637.7	575.1	607.2	918.1	816.6	868.6	1043.7	917.7	982.3
Invasive	BCC	1194.2	1666.5	1424.4	1955.2	3142.4	2533.7	2307.2	4044.6	3153.8
	SCC	685.8	896.9	788.7	1021.7	1504.8	1257.1	1088.0	1676.6	1374.9
Invasive KC Total		1679.2	2164.3	1915.6	2888.4	4414.9	3632.3	3395.2	5721.3	4528.7
Totals (Invasive + In situ KC)		1990.4	2348.0	2164.6	3599.6	4967.5	4266.2	4438.9	6639.0	5511.0

¹As people may have multiple lesions, total rates will not be the same as a column addition.

²As multiple diagnoses may be associated with one presentation to a doctor, the total for rate of presentations will not be the same as a column addition.

Table 7b. Estimated age-adjusted (WHO standard) rates of in situ or invasive KC as people¹, presentations² to a doctor, and lesions per 100,000 population in 2013. Non- Māori only, by sex.

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	263.4	241.1	252.8	388.8	347.0	368.8	440.3	401.2	421.5
Invasive	BCC	572.5	646.9	607.6	950.4	1263.1	1097.6	1135.3	1644.7	1375.4
	SCC	254.4	328.1	288.6	373.7	565.4	462.8	397.5	631.1	506.2
Invasive KC Total		754.5	822.1	786.1	1292.0	1730.5	1497.3	1532.8	2275.8	1881.7
Totals (Invasive + In situ KC)		885.4	900.7	892.4	1595.0	1966.6	1768.5	1973.1	2677.0	2303.2

¹As people may have multiple lesions, total rates will not be the same as a column addition.

²As multiple diagnoses may be associated with one presentation to a doctor, the total for rate of presentations will not be the same as a column addition.

For ease in estimating the burden of KC at a DHB level, the 2013 rates have been applied to each individual DHB in the appendix (Table A1). These tables provide estimates of the numbers of people diagnosed, presentations to doctors, and lesions biopsied or removed, expected within each DHB region in 2013 and 2017.

Conclusions

Our estimations of incidence rates are likely to be conservative as we have assumed under-reporting of KC to be at the same rate as under-reporting of melanoma whereas KC, because of its lesser effect on mortality, is likely to be more under-reported than melanoma. However, no other independent data were available to assess this.

As we only had data for skin biopsies, any additional burden or cost from treatment of non-histologically proven KC cannot be estimated or included, and it is known that the clinical diagnosis of skin cancer can be very inaccurate.

Now that this more recent baseline of KC numbers and rates has been established, the data can be used to inform updated estimations and projections of the health-care system costs to New Zealanders and the planning of future health-care needs.

In addition, the data can be used to track our progress, or lack of it, in combatting keratinocyte cancer in New Zealanders.

Glossary

Keratinocyte carcinoma (KC): has been used increasingly to refer to Non Melanoma Skin Cancer (NMSC) in academia. HPA have used NMSC in the title and Executive Summary box as a more accessible term.

In situ: early disease in which the tumour cells are still confined to the upper layers of the skin, the epidermis.

Invasive: disease which has invaded beyond the epidermis.

Presentation: presentation to a doctor in which a biopsy was taken.

DHB: District Health Board regions.

TLA: Territorial Local Authority. Convenient boundaries to split geographic areas within DHBs.

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Appendix

Tables A1-A20. Numbers of people¹, presentations to doctors², and lesions diagnosed as in situ or invasive KC in 2013 for each DHB region. For all ethnicities combined, by sex; and total KC projected to be diagnosed in 2017, for ethnicities and sexes combined. As people may have multiple lesions and multiple diagnoses may be associated with one presentation to a doctor, totals for people and presentations will not be the same as a column addition.

A1) Northland

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	447	402	849	644	571	1216	732	643	1375
Invasive	BCC	808	1145	1953	1329	2171	3501	1569	2799	4368
	SCC	484	629	1112	724	1060	1784	772	1182	1954
Invasive KC Total		1151	1493	2644	1991	3067	5058	2340	3981	6322
Totals (Invasive + In situ KC)		1369	1620	2989	2490	3453	5943	3073	4624	7696
Disease		2017								
		People			Presentations			Lesions		
		Total			Total			Total		
Totals (Invasive + In situ KC)		3095			6155			7970		

A2) Waitemata

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	1468	1234	2701	2113	1750	3864	2401	1966	4367
Invasive	BCC	2785	3599	6383	4552	6770	11322	5370	8706	14076
	SCC	1574	1921	3495	2341	3218	5560	2494	3585	6078
Invasive KC Total		3899	4667	8566	6691	9492	16183	7863	12291	20154
Totals (Invasive + In situ KC)		4617	5063	9680	8329	10677	19006	10264	14257	24521
Disease		2017								
		People			Presentations			Lesions		
		Total			Total			Total		
Totals (Invasive + In situ KC)		10463			20544			26505		

A3) Auckland

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	1076	904	1981	1550	1282	2832	1759	1439	3198
Invasive	BCC	2096	2672	4768	3415	5006	8421	4027	6428	10456
	SCC	1147	1405	2552	1702	2347	4048	1812	2612	4424
Invasive KC Total		2909	3456	6365	4970	6992	11961	5839	9040	14879
Totals (Invasive + In situ KC)		3437	3750	7187	6172	7861	14032	7598	10479	18077
Disease		2017								
		People			Presentations			Lesions		
		Total			Total			Total		
Totals (Invasive + In situ KC)		7963			15548			20029		

A4) Counties Manukau

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	1109	952	2061	1597	1349	2947	1813	1515	3328
Invasive	BCC	2144	2799	4943	3496	5251	8747	4123	6746	10869
	SCC	1184	1479	2664	1759	2474	4233	1873	2755	4627
Invasive KC Total		2983	3624	6606	5102	7345	12447	5995	9501	15496
Totals (Invasive + In situ KC)		3528	3932	7459	6342	8259	14600	7809	11015	18824
Disease		2017								
		People			Presentations			Lesions		
		Total			Total			Total		
Totals (Invasive + In situ KC)		8132			15917			20522		

A5) Waikato

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	979	843	1821	1410	1196	2606	1602	1344	2946
Invasive	BCC	1821	2435	4256	2985	4595	7580	3521	5914	9435
	SCC	1053	1314	2367	1571	2207	3778	1674	2460	4133
Invasive KC Total		2567	3164	5731	4419	6461	10881	5195	8374	13569
Totals (Invasive + In situ KC)		3046	3433	6479	5512	7270	12783	6796	9718	16514
Disease		2017								
		People			Presentations			Lesions		
		Total			Total			Total		
Totals (Invasive + In situ KC)		6872			13559			17517		

A6) Lakes

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	247	215	463	357	305	662	405	343	748
Invasive	BCC	455	619	1074	747	1170	1917	881	1506	2387
	SCC	267	336	602	399	565	963	425	630	1055
Invasive KC Total		644	805	1450	1111	1647	2759	1306	2136	3442
Totals (Invasive + In situ KC)		765	874	1639	1388	1854	3242	1711	2479	4190
Disease		2017								
		People			Presentations			Lesions		
		Total			Total			Total		
Totals (Invasive + In situ KC)		1671			3304			4270		

A7) Bay of Plenty

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	637	534	1171	918	759	1676	1043	853	1896
Invasive	BCC	1160	1530	2689	1906	2896	4801	2249	3731	5979
	SCC	688	835	1523	1029	1405	2435	1097	1567	2664
Invasive KC Total		1647	1992	3639	2846	4084	6929	3346	5298	8643
Totals (Invasive + In situ KC)		1957	2161	4118	3557	4597	8153	4389	6151	10540
Disease		2017								
		People			Presentations			Lesions		
		Total			Total			Total		
Totals (Invasive + In situ KC)		4339			8591			11105		

A8) Tairawhiti

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	93	80	173	134	114	248	152	128	280
Invasive	BCC	170	231	401	279	436	715	330	561	890
	SCC	100	125	225	150	211	360	160	235	394
Invasive KC Total		241	300	541	416	614	1030	489	796	1285
Totals (Invasive + In situ KC)		287	326	613	520	691	1211	641	924	1565
Disease		2017								
		People			Presentations			Lesions		
		Total			Total			Total		
Totals (Invasive + In situ KC)		621			1229			1588		

A9) Hawkes Bay

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	455	382	838	656	543	1199	746	610	1356
Invasive	BCC	832	1096	1928	1367	2073	3440	1613	2671	4284
	SCC	492	597	1089	735	1004	1739	784	1119	1903
Invasive KC Total		1181	1426	2607	2039	2922	4961	2397	3790	6187
Totals (Invasive + In situ KC)		1403	1548	2950	2547	3289	5836	3143	4400	7543
Disease		2017								
		People			Presentations			Lesions		
		Total			Total			Total		
Totals (Invasive + In situ KC)		3023			5980			7729		

A10) Taranaki

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	333	285	618	480	404	884	545	454	1000
Invasive	BCC	614	820	1433	1007	1549	2556	1188	1994	3183
	SCC	359	444	804	536	747	1283	571	833	1404
Invasive KC Total		868	1066	1934	1497	2180	3677	1760	2827	4587
Totals (Invasive + In situ KC)		1031	1156	2187	1869	2454	4322	2305	3281	5587
Disease		2017								
		People			Presentations			Lesions		
		Total			Total			Total		
Totals (Invasive + In situ KC)		2270			4486			5798		

A11) Mid Central

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	489	413	901	704	586	1290	800	659	1459
Invasive	BCC	902	1188	2090	1480	2244	3724	1746	2890	4636
	SCC	527	644	1171	787	1083	1869	838	1207	2045
Invasive KC Total		1275	1545	2820	2199	3160	5358	2585	4097	6681
Totals (Invasive + In situ KC)		1514	1676	3190	2744	3556	6300	3385	4755	8140
Disease		2017								
		People			Presentations			Lesions		
		Total			Total			Total		
Totals (Invasive + In situ KC)		3292			6503			8402		

A12) Whanganui

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	186	159	345	269	226	494	305	254	559
Invasive	BCC	338	455	793	556	861	1417	657	1109	1766
	SCC	202	248	450	302	418	720	321	466	788
Invasive KC Total		481	592	1073	832	1214	2046	978	1576	2554
Totals (Invasive + In situ KC)		572	642	1214	1040	1367	2407	1284	1829	3113
Disease		2017								
		People			Presentations			Lesions		
		Total			Total			Total		
Totals (Invasive + In situ KC)		1217			2413			3120		

A13) Capital and Coast

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	740	616	1356	1066	874	1939	1210	981	2191
Invasive	BCC	1420	1806	3226	2318	3392	5710	2734	4360	7093
	SCC	791	958	1750	1176	1604	2780	1252	1786	3038
Invasive KC Total		1980	2340	4320	3392	4749	8141	3986	6146	10132
Totals (Invasive + In situ KC)		2343	2538	4881	4218	5341	9559	5196	7127	12323
Disease		2017								
		People			Presentations			Lesions		
		Total			Total			Total		
Totals (Invasive + In situ KC)		5110			10006			12900		

A14) Hutt

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	379	322	701	546	457	1003	620	513	1134
Invasive	BCC	713	935	1648	1166	1762	2928	1376	2266	3642
	SCC	407	502	909	607	842	1448	646	938	1584
Invasive KC Total		1001	1214	2215	1720	2473	4194	2022	3204	5226
Totals (Invasive + In situ KC)		1186	1317	2503	2144	2783	4926	2642	3717	6360
Disease		2017								
		People			Presentations			Lesions		
		Total			Total			Total		
Totals (Invasive + In situ KC)		2553			5023			6485		

A15) Wairarapa

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	142	123	265	205	175	380	233	196	430
Invasive	BCC	258	351	609	424	665	1089	501	857	1357
	SCC	154	192	346	230	324	554	246	361	607
Invasive KC Total		367	457	824	635	938	1573	746	1218	1964
Totals (Invasive + In situ KC)		436	496	932	793	1056	1850	979	1414	2394
Disease		2017								
		People			Presentations			Lesions		
		Total			Total			Total		
Totals (Invasive + In situ KC)		965			1915			2478		

A16) Nelson Marlborough

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	483	422	905	695	600	1295	791	675	1466
Invasive	BCC	881	1209	2089	1447	2289	3735	1708	2949	4657
	SCC	522	660	1182	780	1111	1891	831	1239	2070
Invasive KC Total		1250	1574	2823	2159	3228	5387	2538	4189	6727
Totals (Invasive + In situ KC)		1485	1707	3192	2697	3634	6331	3329	4864	8193
Disease		2017								
		People			Presentations			Lesions		
		Total			Total			Total		
Totals (Invasive + In situ KC)		3304			6554			8481		

A17) West Coast

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	100	100	200	144	143	287	164	160	324
Invasive	BCC	185	287	472	303	544	847	358	701	1059
	SCC	108	157	265	161	264	425	172	294	466
Invasive KC Total		261	374	635	450	767	1217	529	996	1525
Totals (Invasive + In situ KC)		310	406	716	562	864	1426	693	1156	1849
Disease		2017								
		People			Presentations			Lesions		
		Total			Total			Total		
Totals (Invasive + In situ KC)		720			1434			1860		

A18) Canterbury

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	1473	1261	2733	2121	1790	3910	2410	2011	4421
Invasive	BCC	2748	3654	6402	4501	6889	11391	5312	8866	14178
	SCC	1585	1965	3550	2362	3298	5660	2516	3675	6191
Invasive KC Total		3869	4745	8615	6659	9678	16337	7828	12541	20368
Totals (Invasive + In situ KC)		4588	5148	9736	8302	10889	19191	10238	14552	24790
Disease		2017								
		People			Presentations			Lesions		
		Total			Total			Total		
Totals (Invasive + In situ KC)		10500			20696			26733		

A19) South Canterbury

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	207	178	385	298	253	551	339	285	624
Invasive	BCC	375	510	885	617	965	1582	728	1244	1972
	SCC	224	279	502	335	469	804	356	523	880
Invasive KC Total		533	664	1197	922	1362	2284	1085	1767	2852
Totals (Invasive + In situ KC)		634	720	1354	1153	1533	2686	1423	2052	3475
Disease		2017								
		People			Presentations			Lesions		
		Total			Total			Total		
Totals (Invasive + In situ KC)		1392			2761			3573		

A20) Southern

Disease		2013								
		People			Presentations			Lesions		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
In situ	SCC	918	801	1719	1321	1138	2459	1502	1279	2781
Invasive	BCC	1709	2315	4024	2800	4369	7169	3304	5625	8929
	SCC	988	1250	2238	1473	2100	3572	1569	2340	3909
Invasive KC Total		2408	3008	5416	4145	6145	10290	4873	7965	12838
Totals (Invasive + In situ KC)		2856	3264	6119	5169	6914	12083	6375	9244	15619
Disease		2017								
		People			Presentations			Lesions		
		Total			Total			Total		
Totals (Invasive + In situ KC)		6375			12589			16272		