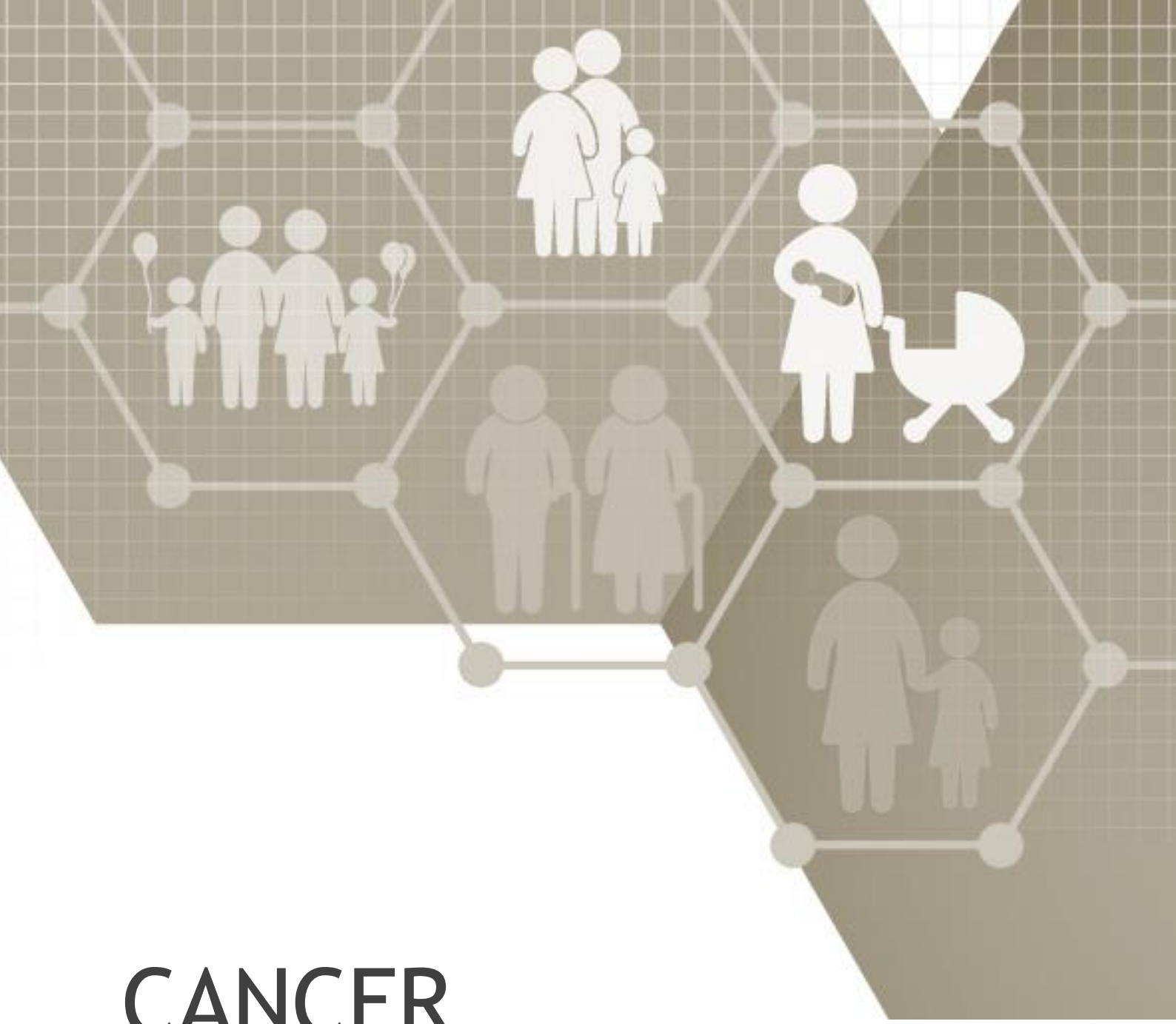

CANCER PROJECTIONS 2017 - 2037

Statistics

Statistics Jersey

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CONTENTS

CANCER INCIDENCE PROJECTIONS

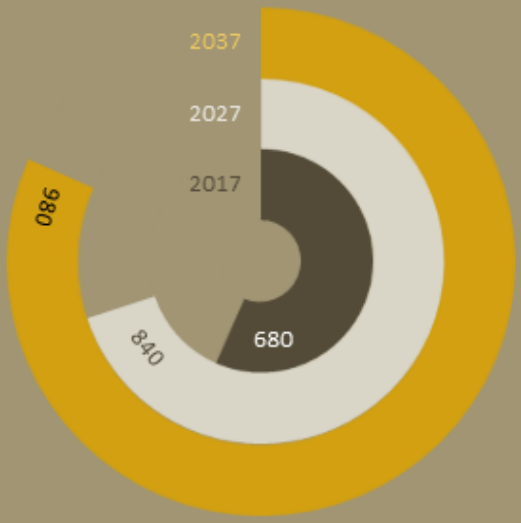
OVERALL POPULATION

End-2017	End-2027	End-2037
10 YEAR CHANGE	+13,100	+12,900

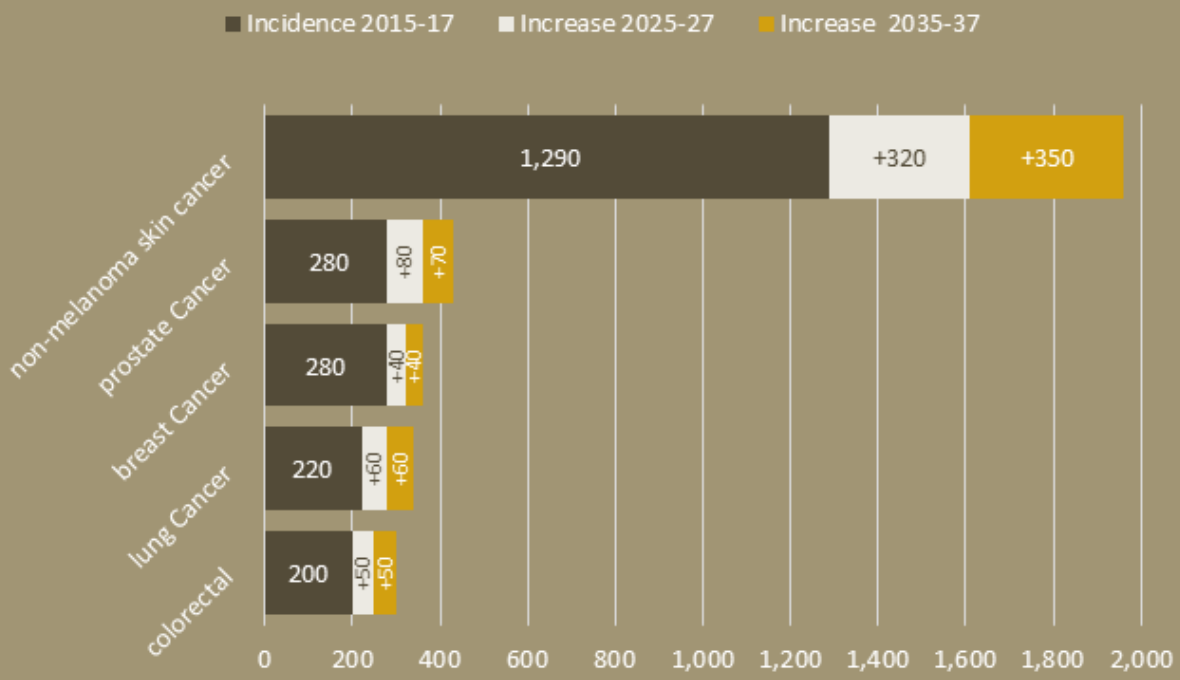
How are these calculated? population increase based on Statistics Jersey projection of +1,000 net per year migration

ALL CANCER INCIDENCE
(except non-melanoma skin cancer)
PER 1 YEAR PERIOD

Newly diagnosed cancer per year



INCIDENCE BY CANCER GROUP – PER 3 YEAR PERIOD



SUMMARY

This report describes the potential future levels of cancer incidence in Jersey, based on the current incidence rates combined with the projected future population. The population projections assume that the recent level of net migration continues. The results of this analysis demonstrate what will happen if the current cancer incidence rates continue while the population continues to age and increase over the next twenty years at current fertility, mortality and migration rates.

For comparison purposes, the analysis was repeated using a 'zero migration' population projection which assumes no migration (in or out). This enables an assessment of the impact of migration on cancer incidence.

INTRODUCTION

This analysis by Statistics Jersey uses details from the 2016 Population Projections[1] and Jersey's most recent cancer incidence rates based on 2014 data[2].

Incidence is the number of **new cases** of cancer diagnosed within a given time period. In this report, when considering 'all cancers' a one year period is used. However, due to smaller numbers, when considering individual types of cancer a three year period is employed.

Incidence rate is the number of new cases within a given time period divided by the total population, expressed as incidence per 100,000 people (or as a percentage). Incidence rate is a measure of the risk of being diagnosed with cancer. Incidence should not be confused with **prevalence** which is the proportion of people within a population that have cancer at a given time.

All cancers diagnosed in Jersey are classified by NCRAS according to the **World Health Organisation's International Classification of Disease (ICD)**. A full list of the ICD-10 cancer codes are given in the background notes.

Over the four years (2012-2016), net migration has averaged +1,000 people per year into the Island. If this migration trend were to continue, it is estimated that Jersey's population would reach more than 131,000 by 2037.

The analysis in this report is based on two primary assumptions:

1. That current patterns of cancer incidence will continue (i.e. no adjustments have been made for improvement or worsening of cancer rates)
2. That net migration will continue at +1,000 people per annum over the next 20 years.

A secondary analysis using a zero migration[3] scenario was also conducted to establish the extent to which the ageing of the population or net inward migration drove the increases in numbers of people with cancer. Results from this analysis showed that, within the timescales of the next 20 years, cancer incidence numbers are similar whether the net +1,000 migration or the zero migration population projection models are used.

[1] States of Jersey Statistics Unit, Jersey Resident Population Estimate 2016, published 23 June 2017 and Jersey Population Projection Report 2016, published 14 October 2016, available from www.gov.je

[2] Compiled by Public Health England's National Cancer Registration and Analysis Service (NCRAS)

[3] This scenario posits that there is no inward or outward migration, no people move away or arrive from outside Jersey to live. The only changes in the population size and structure are through ageing, births and deaths. For more information see the Jersey Population Projection 2016 report, available from www.gov.je

The report projects figures for all cancers together (excluding non-melanoma skin cancers), and the main cancer types seen in Jersey (non-melanoma skin cancer, prostate, breast, lung and colorectal cancers). Non-melanoma skin cancers are not included in the 'all cancer' figures as they have high incidence (and would dominate the 'all cancer' category) and carry a lower mortality risk than other cancer types.

This report firstly considers all cancers together (excluding non-melanoma skin cancer). The most recent (2014) age-and-sex-specific cancer incidence rates are shown, followed by the projected incidence in 2017, 2027 and 2037. Due to the smaller incidences of prostate, breast, lung, and colorectal cancer in Jersey, incidence rates for these cancers are calculated over three year intervals. Incidence rates of non-melanoma skin cancer are also calculated over a three year interval for comparability. Incidence of other cancer types are small and have not been individually projected. The projected numbers are presented as population pyramids for each cancer type.

Throughout this report, all numbers have been independently rounded to the nearest 10.

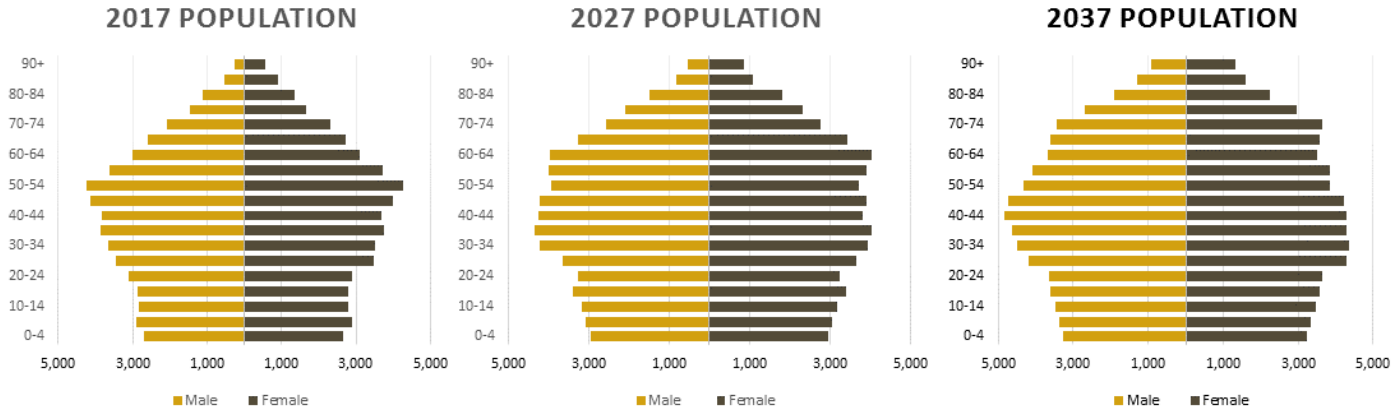
MAIN FINDINGS

- the incidence of **all cancers (excluding non-melanoma skin cancer)** is projected to rise by over 40 per cent by 2037, from an estimated 680 new cases per year in 2017 to 980 new cases per year in 2037.
- consequently, by 2037 Jersey will see approximately **300 more** new cancer diagnoses than the 680 new cases estimated in 2017
- **non-melanoma skin cancer** is considered separately due to its comparatively high incidence rate and low mortality rate
    - incidence of **non-melanoma skin cancer** is projected to rise by over 50 per cent, from almost 1,300 in the three years 2015-2017 to almost 2,000 new cases in the three years 2035-2037
- other than non-melanoma skin cancer, the cancer types with highest incidence are **prostate, breast, lung and colorectal cancer**
    - comparing the three year period 2015-2017 with 2035-2037
        - incidence of **prostate cancer** is projected to rise by over 50 per cent in males, from 280 to 430 new cases over the respective three year periods
        - in females**, breast cancer** is projected to rise by almost 30 per cent, from an incidence of 280 to 360
        - **lung cancer** affects both males and females. Incidence is projected to rise by 55 per cent, from 220 to 340 new cases per three years
        - the incidence of **colorectal cancer**, affecting both males and females, is projected to increase from 200 to 300, a 50 per cent rise
- the projected growth in cancer incidence rate is driven by the **ageing** of the population

POPULATION PROJECTIONS

Population projections, based on the +1,000 net migration scenario, give a starting population of 105,300 in Jersey with a distribution pyramid as shown in Figure 1. The pyramid shows the 50-54 year old range being the largest in 2017.

FIGURE 1: POPULATION PYRAMIDS +1,000 NET IMMIGRATION MODEL



In 2027, the projected population is 118,400, an overall increase of 12 per cent under the +1,000 net migration scenario. The proportion of those aged 65 or over in the population is projected to increase from around 17 per cent in 2017 to 19 per cent in 2027.

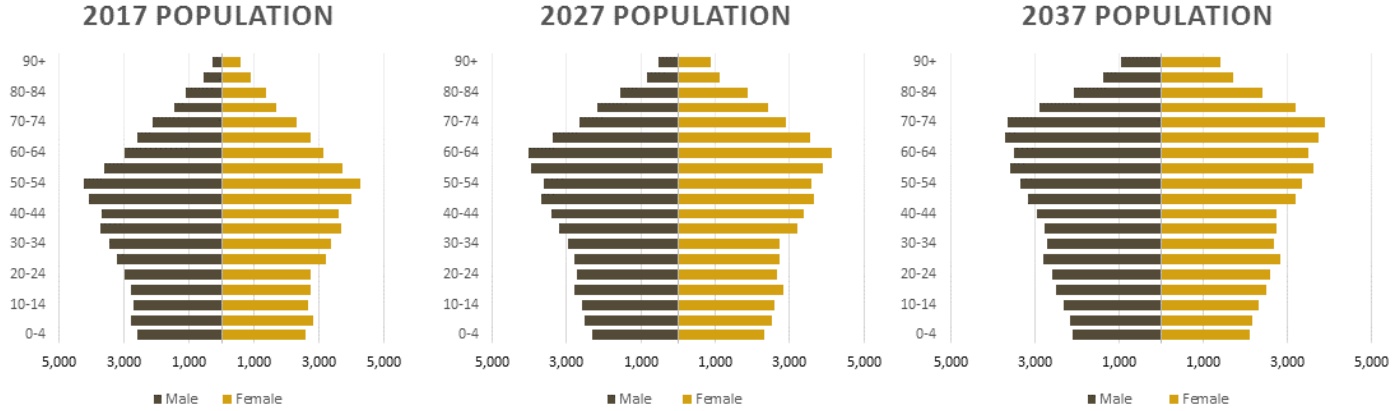
By 2037, the population increases by another 11 per cent, to 131,300, under the +1,000 net migration scenario. Over one in five (22 per cent) of the population would be aged 65 or over.

The larger population of those aged 65 or over has particular implications for cancer incidence on the Island, as incidence rates increase significantly from the age of 60.

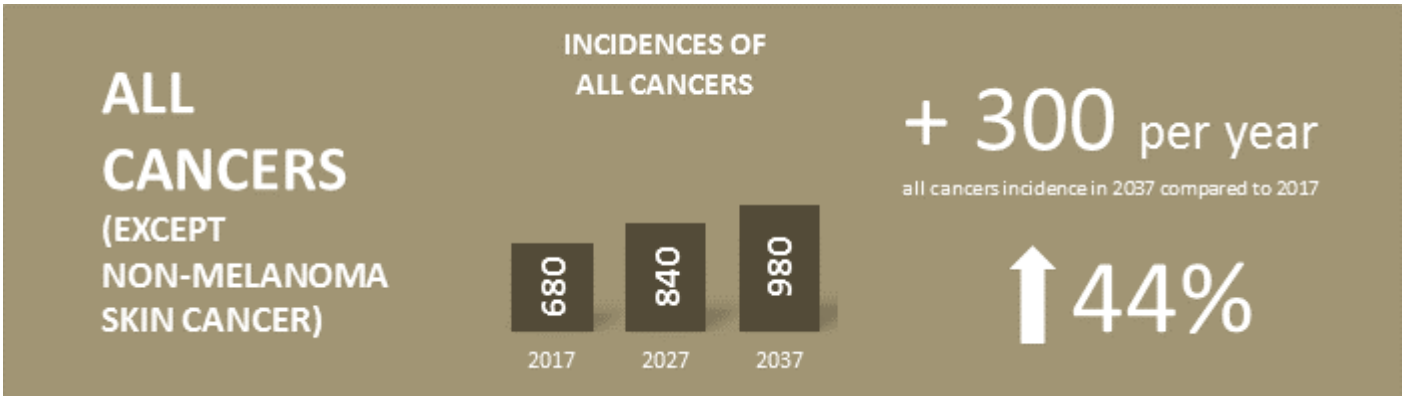
For comparison, Figure 2 shows the projected population pyramids for the zero migration model. These pyramids are slimmer in the younger and middle aged groups as the model projects no inward migrants (who tend to be of working age, some with families).

Ageing is the key driver for cancer incidence; therefore, while the +1,000 net migration model predicts a higher overall population compared to the zero migration model, the two pyramid profiles result in similar cancer incidence.

FIGURE 2: POPULATION PYRAMIDS ZERO MIGRATION MODEL

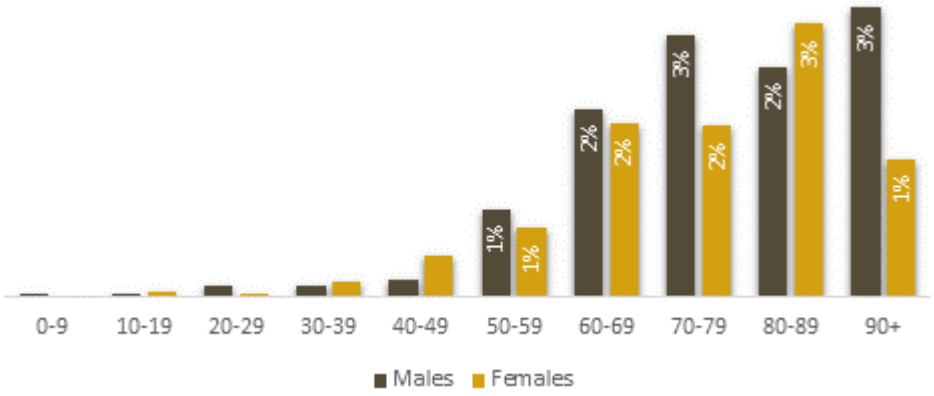


ALL CANCERS



Considering all cancers except non-melanoma skin cancer (ICD-10 C00-97 codes except C44), the age and sex profile of cancer, recorded in 2014, is shown in Figure 3.

FIGURE 3: ALL CANCER INCIDENCE RATE FOR EACH AGE AND SEX 2014[4]



Projecting the overall cancer incidence rates (except non-melanoma skin cancer) for each age group onto the population profiles for 2017, 2027 and 2037, gives corresponding cancer incidence pyramids for these years (Figure 4). The resulting incidence pyramids are then used to produce overall estimates of new cancer diagnoses.

This approach gives a projected increase of 300 new diagnoses per year (an increase of 44 per cent) by 2037.

[4] In all plots, data labels are rounded to the nearest integer

FIGURE 4: PROJECTED NUMBERS OF NEW DIAGNOSES OF ALL CANCERS BY AGE PER YEAR, MALE AND FEMALE

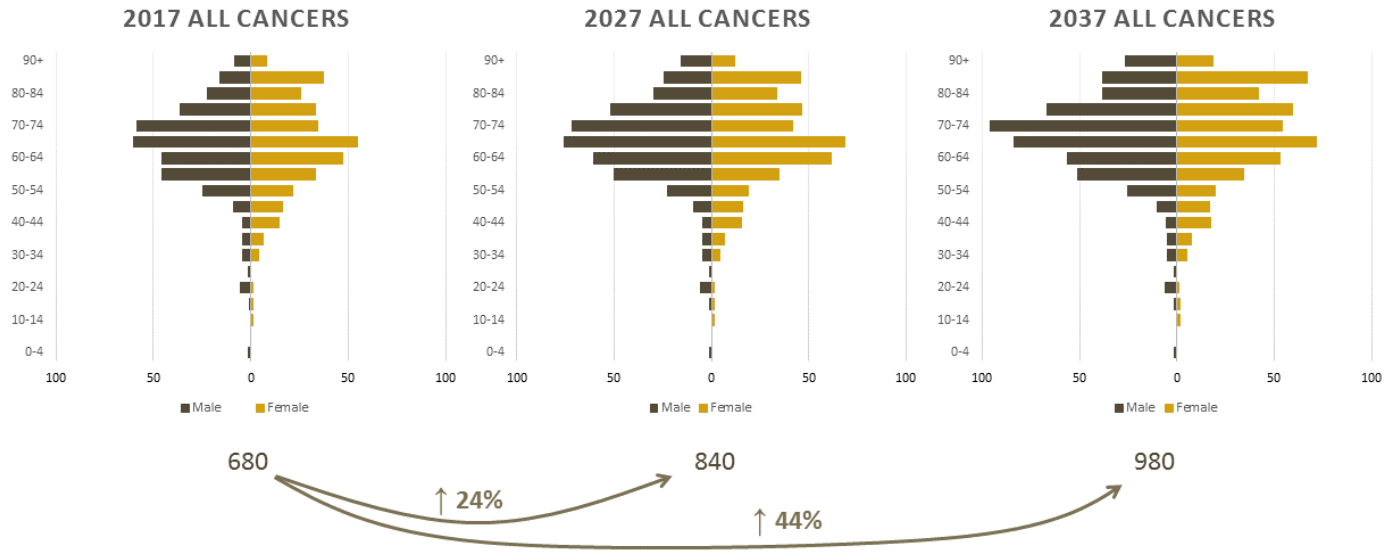
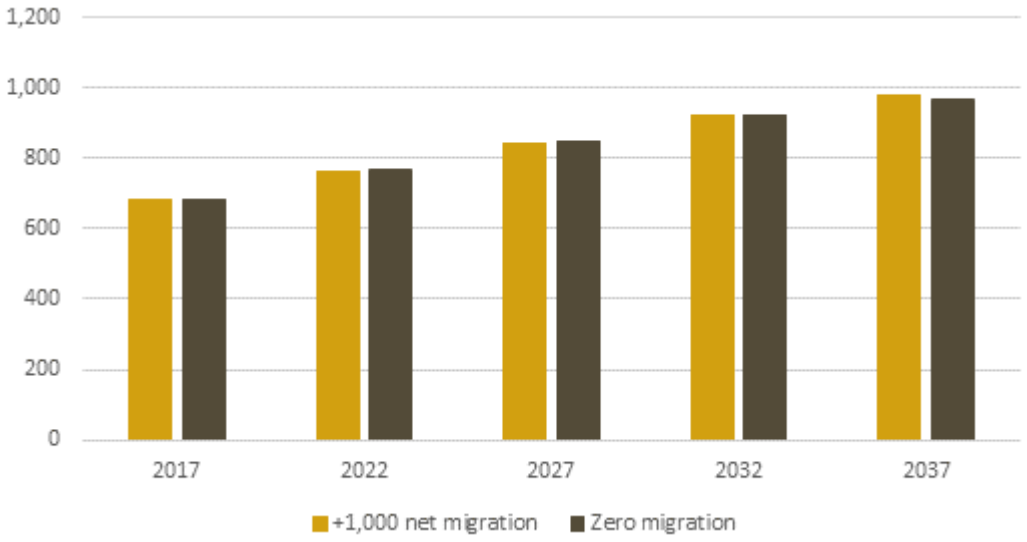
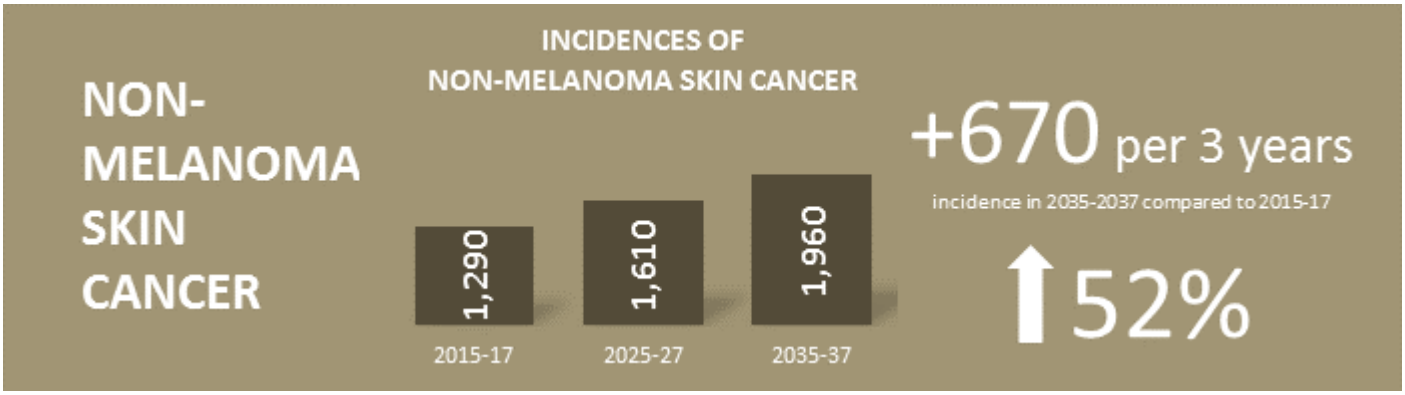


FIGURE 5: PROJECTED NUMBERS OF ALL PERSONS NEWLY DIAGNOSED WITH ALL CANCERS (EXCEPT NON-MELANOMA SKIN CANCER) BASED ON +1,000 NET MIGRATION COMPARED TO ZERO MIGRATION



For comparison, Figure 5 shows the all cancer projections using the zero migration model. Projections using this model are similar to those from the +1,000 net migration model, showing that over the next twenty years current migration rates have little effect on overall projected cancer incidence.

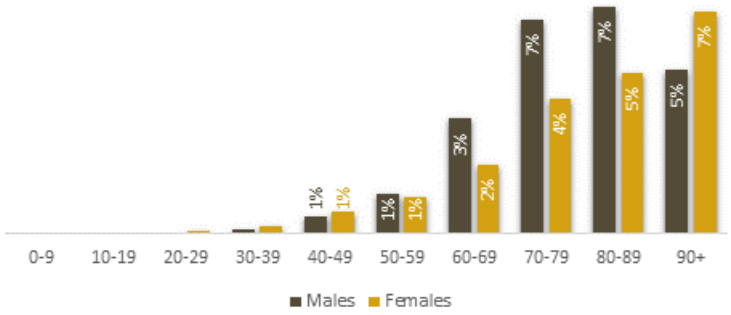
NON-MELANOMA SKIN CANCER



Non-melanoma skin cancer (NMSC) includes all cancers in ICD-10 code C44: 'Other skin (non-melanoma skin cancer)'. These are the more common, less serious type of skin cancer that slowly develop in the upper layers of skin and differ from the more dangerous 'malignant melanoma' (ICD-10 code C43). Incidence of NMSC is considerably higher in Jersey than for any other cancer type[5].

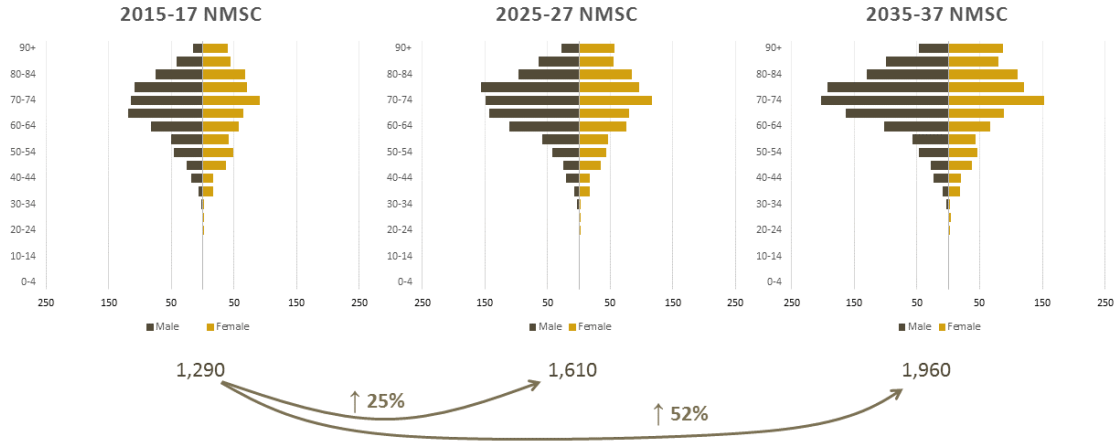
The incidence of non-melanoma skin cancer is calculated over a three year period (Figure 6) to enable comparison with other cancer types of lower incidence.

FIGURE 6: NON-MELANOMA SKIN CANCER INCIDENCE RATE FOR EACH AGE AND SEX 2012-14



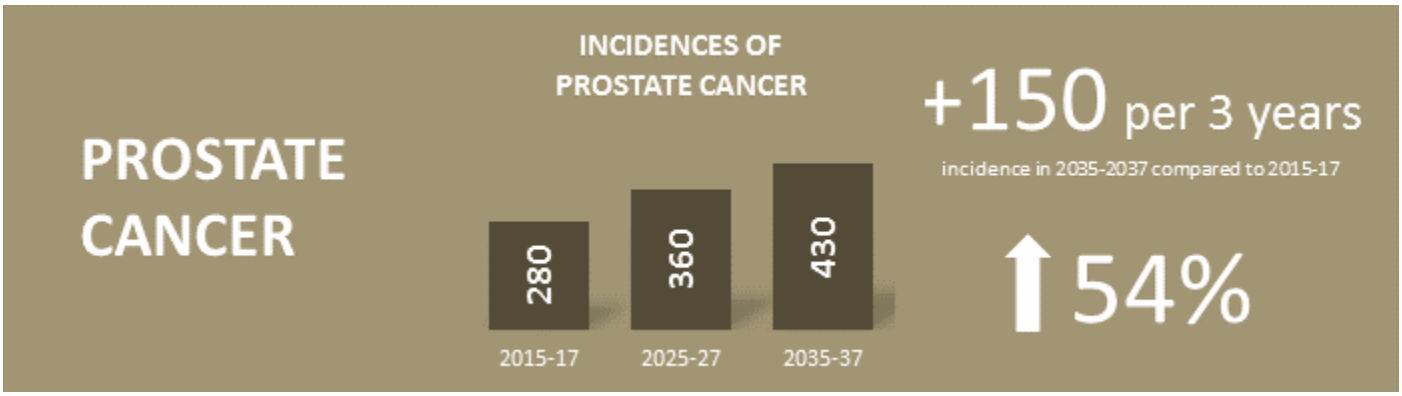
As with most of the cancer types analysed in this report, the incidence of non-melanoma skin cancer increases with age. The projections (Figure 7) show greatest incidence would occur in age groups over 60 years. There is currently a greater incidence in males than females; this difference is projected to continue.

FIGURE 7: PROJECTED NUMBERS OF NEW DIAGNOSES OF NMSC BY AGE PER 3 YEARS, MALE AND FEMALE



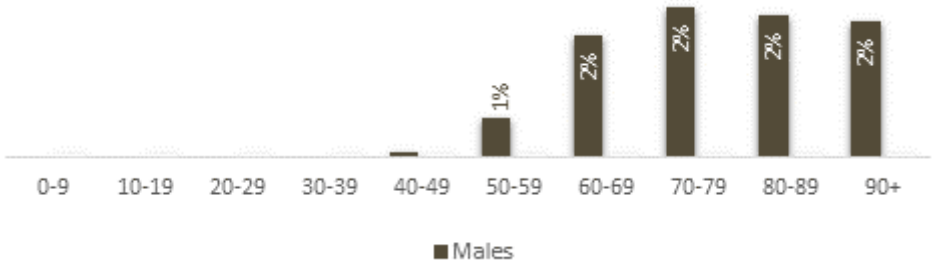
[5] For more information on the high levels of non-melanoma skin cancer on Jersey, see the 'Cancer in Jersey' report of 31st July 2013, available from www.gov.je

PROSTATE CANCER



Prostate cancers are those coded as C61 in the ICD-10: malignant neoplasms of the prostate. Annual numbers are relatively small, requiring analysis over a three year period.

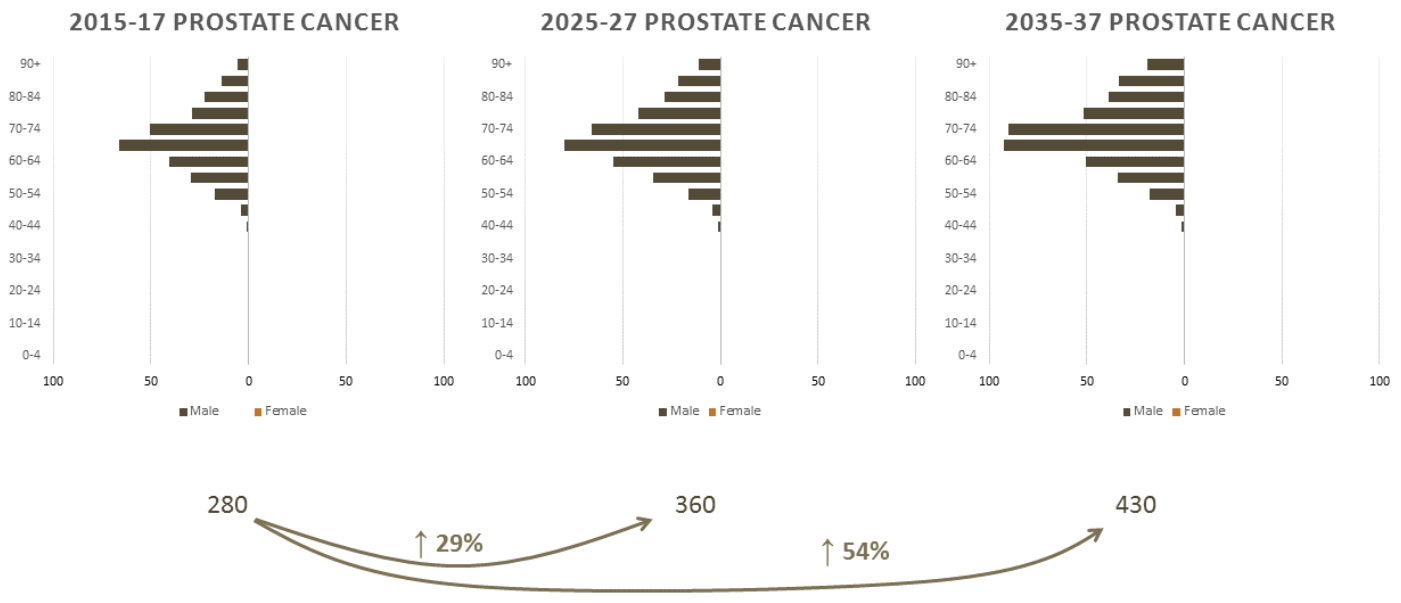
FIGURE 8: PROSTATE CANCER INCIDENCE RATE FOR EACH AGE 2012-14



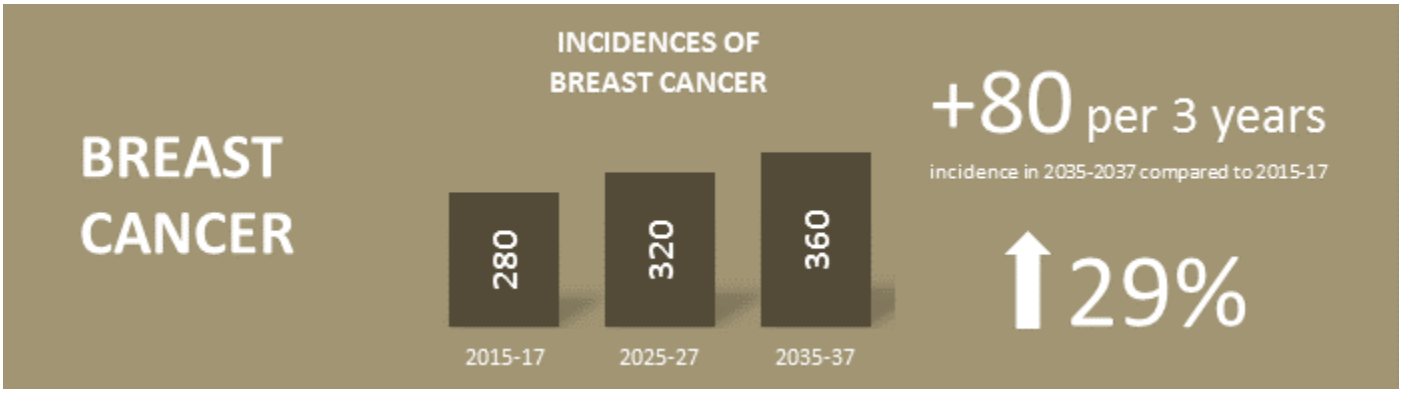
Source: Statistics Unit

Prostate cancer currently has the second highest incidence rate of any cancer sub-group on Jersey after non-melanoma skin cancer (Figure 8). Incidences are predicted to grow by over 50 per cent in the coming twenty years (Figure 9).

FIGURE 9: PROJECTED NUMBERS OF NEW MALE DIAGNOSES OF PROSTATE CANCER BY AGE PER 3 YEARS

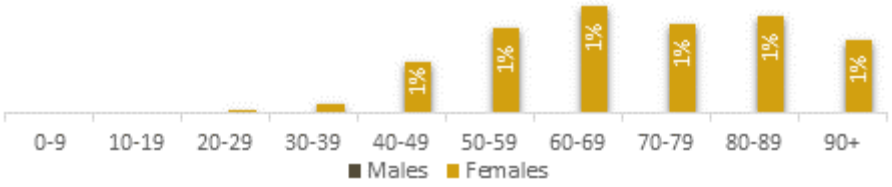


BREAST CANCER



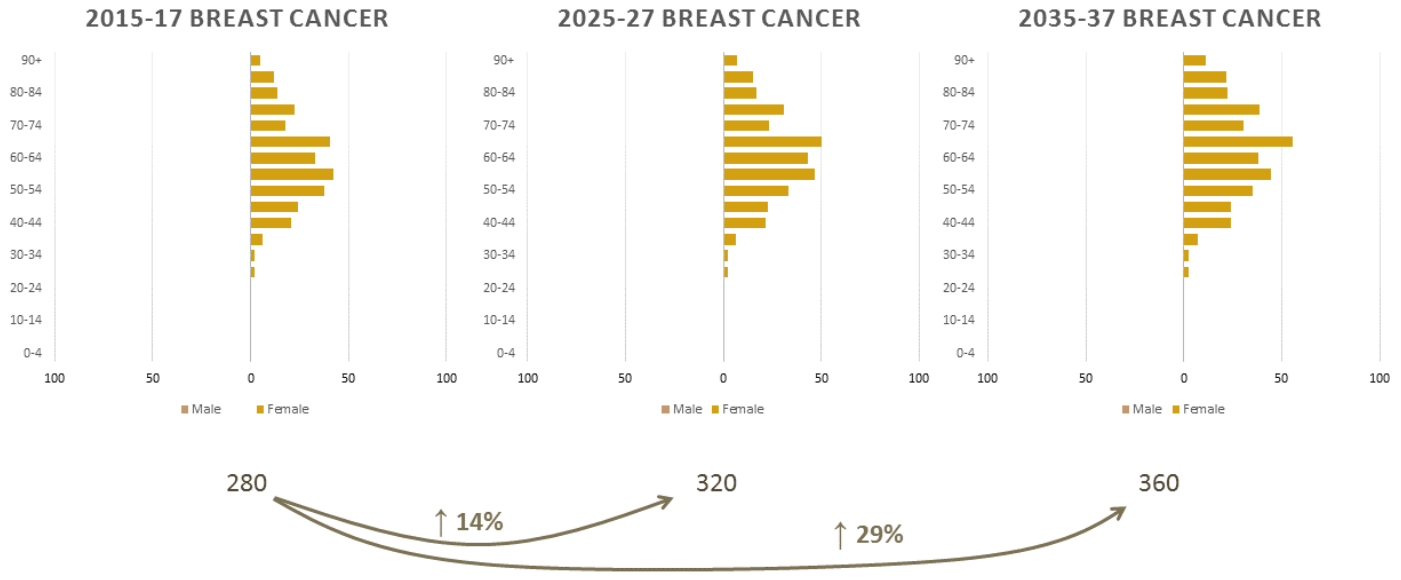
Breast cancer covers all cancers within the C50 category of the ICD-10: malignant neoplasms of the breast.

FIGURE 10: BREAST CANCER INCIDENCE RATE FOR EACH AGE AND SEX 2012-14

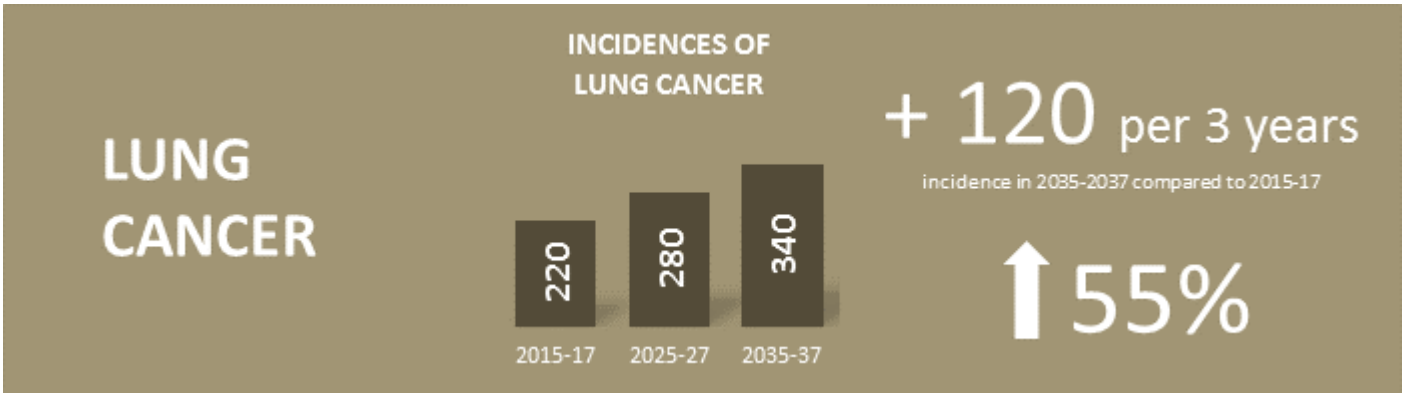


Breast cancer mostly affects the female population. A broader age profile (Figure 10) results in the projections (Figure 11) showing a lower overall increase in the incidence of breast cancer (29 per cent) over the twenty year period than other cancers.

FIGURE 11: PROJECTED NUMBERS OF NEW DIAGNOSES OF BREAST CANCER BY AGE PER 3 YEARS, FEMALE

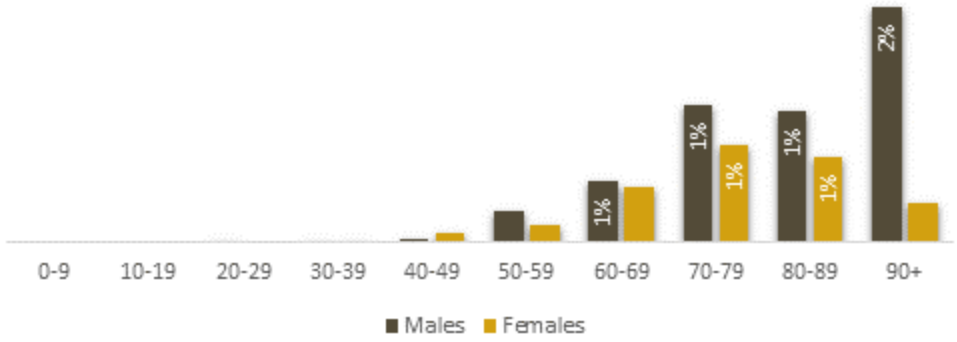


LUNG CANCER



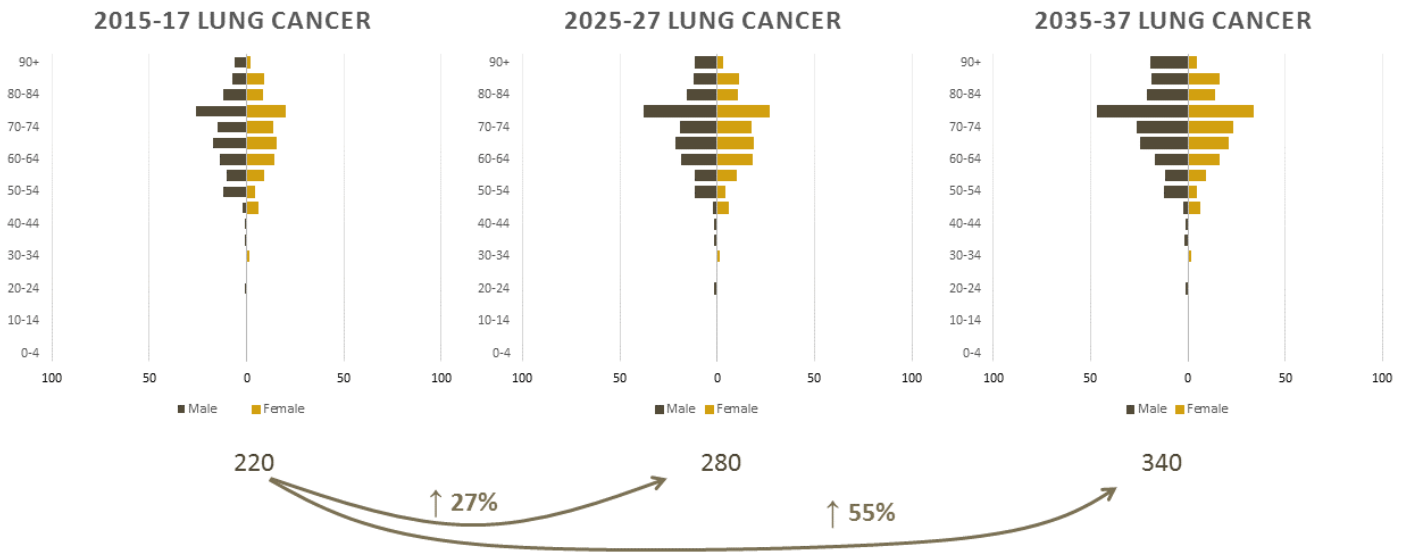
Lung cancer includes all cancers covered by ICD-10 codes C33 and C34: malignant neoplasms of the trachea, bronchus and lung. Analysis is conducted over a three year period due to small numbers.

FIGURE 12: LUNG CANCER INCIDENCE RATE FOR EACH AGE AND SEX 2012-14



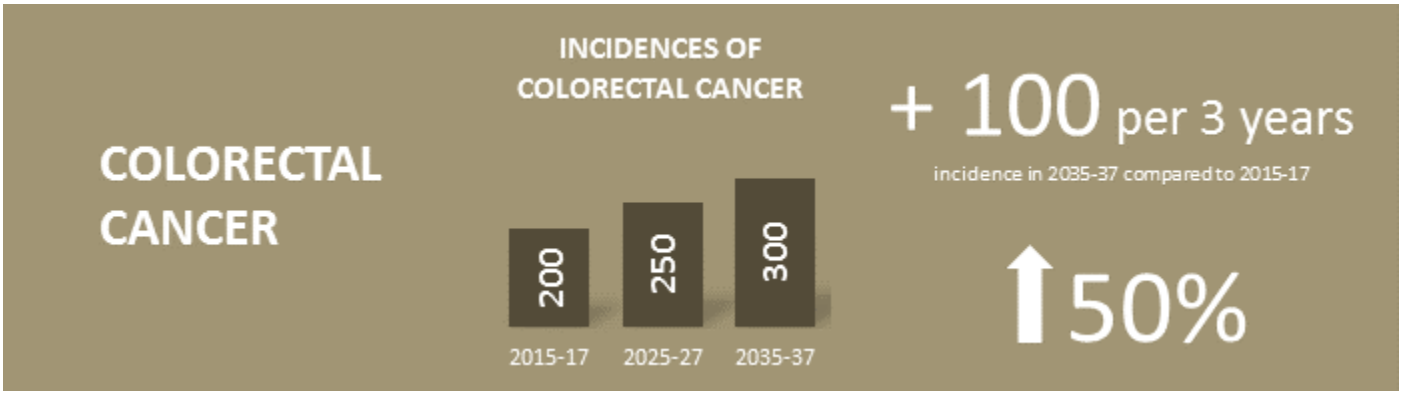
Lung cancer incidence generally increases with age, and males have higher incidence rates than females (Figure 12). Combining this pattern with the ageing population, the projections show a higher growth of lung cancer incidence amongst males than females (Figure 13). [6]

FIGURE 13: PROJECTED NUMBERS OF NEW DIAGNOSES OF LUNG CANCER BY AGE PER 3 YEARS, MALE AND FEMALE



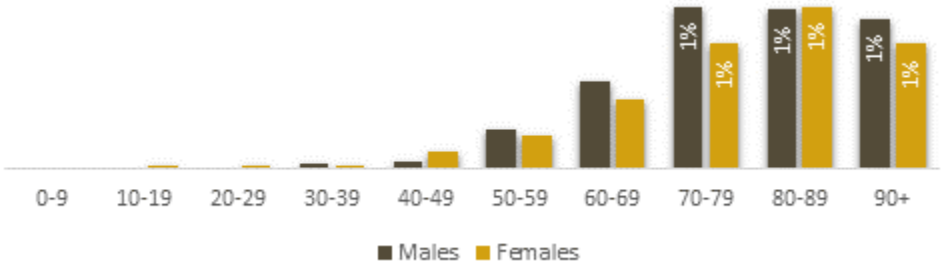
[6] For more information on factors affecting men's health, see "The State of Men's Health in Jersey" report, released on 1st December 2014 on the www.gov.je website

COLORECTAL CANCER



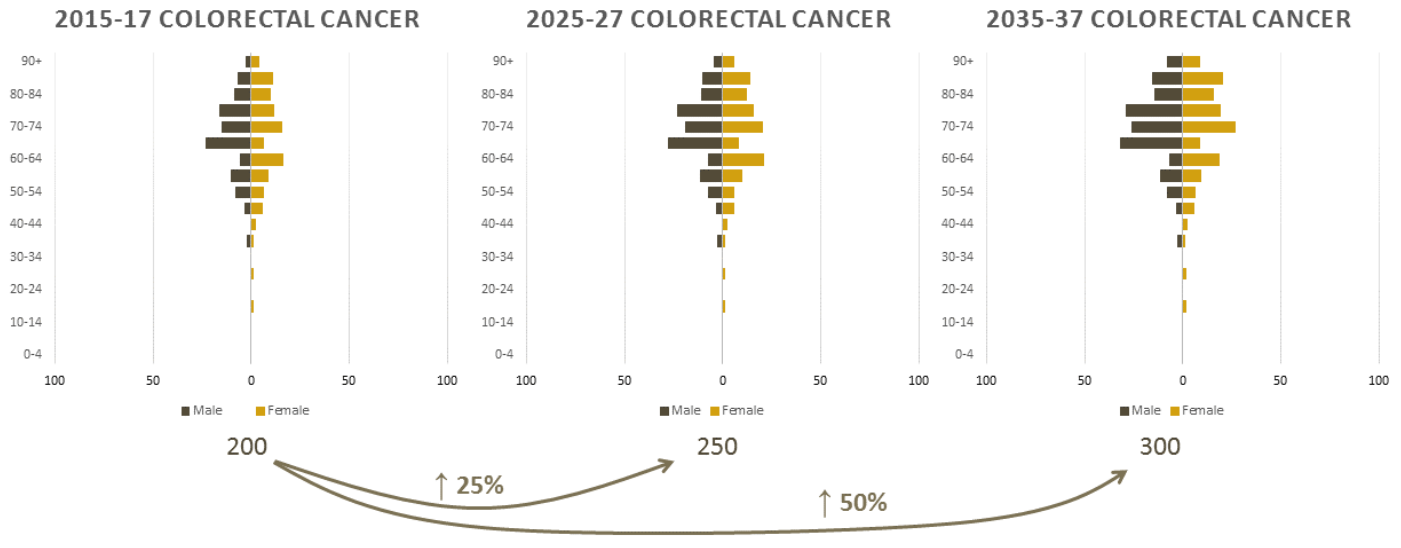
Cancers in this category include all cancers within ICD-10 codes C18-C21, i.e. cancers of the colon, recto-sigmoid junction, rectum, anus and anal canal. Due to the small numbers of colorectal cancer incidence, analysis is conducted over a three year period rather than a single year.

FIGURE 14: COLORECTAL CANCER INCIDENCE RATE FOR EACH AGE AND SEX 2012-14



The colorectal cancer incidence measured 2012-14 (Figure 14) shows increased incidence with age, and similar rates between sexes. As a result, similar numbers of males and females are projected to be newly diagnosed with colorectal cancer by 2037 (Figure 15).

FIGURE 15: PROJECTED NUMBERS OF NEW DIAGNOSES OF COLORECTAL CANCER BY AGE PER 3 YEARS, MALE AND FEMALE



BACKGROUND NOTES

CANCER INCIDENCE DATA SOURCES

The data for this report is supplied by Public Health England's National Cancer Registration and Analysis Service (NCRAS). NCRAS holds data on cancer incidence and cancer mortality for the Channel Islands and England for the period 2001 to 2014.

Jersey Health and Social Services Department supplies NCRAS with data on cancer incidence from hospital and pathology records. NCRAS then code all cancer incidence according to the 10th revision of the International Classification of Diseases (ICD-10) coding system.

Cancer Site ICD-10 codes	
All Cancers excluding non-melanoma skin	C00-C97 excl. C44
Bladder	C67
Brain and central nervous system	C70-C72
Breast	C50
Colorectal	C18-C21
Head & neck	C00-C14, C30-C32, C73
Hepatobiliary	C22-C24
Kidney and ureter	C64-C66
Leukaemia	C91-C95
Lung	C33-C34
Lymphoma	C81-C85, C96
Male urogenital (excl. prostate)	C60-C63 excl. C61
Malignant melanoma	C43
Other skin (non-melanoma skin cancer)	C44
Other cancer	
Other gynaecological	C51-C53, C57-C58
Ovary	C56
Paediatric (0-19 years)	C00-C97 excl. C44
Prostate	C61
Upper gastrointestinal	C15-C16, C25
Uterus	C54-C55

POPULATION DATA SOURCES

The population projections are based on population modelling carried out by Statistics Jersey (formerly the States of Jersey Statistics Unit).

- the 2016 population projections, published October 2016[7] and the population estimate published June 2017[8]

The 2011 Census provided a baseline of the number of known residents in Jersey at March 2011 by age and sex. The population model uses this baseline population, rolled backwards to year-end 2010, and projects the population forwards, year by year, by adding births, subtracting deaths, and modelling for inward and outward migration.

Whilst actual numbers of births and migration levels have been incorporated for 2011 to 2015 inclusive, in 2016 and subsequent years each component in the projections – births, deaths, inward and outward migration – is **an estimate based on recent trends**.

Of the range of net migration scenarios available, the +1,000 per annum net inward migration level is closest to recently observed annual net migration.

TIMELINESS

The latest cancer incidence data available from NCRAS is for the year 2014. This data were used to calculate the 'current' all cancer incidence rates used in the forward projections. Where three year rates were required, the NCRAS data from 2012 to 2014 were used.

METHODS

NCRAS produced a cancer incidence rate for each five-year age band (0-5, 6-10 etc up to the 90+ band) in 2014 using the age-specific cancer incidence from 2014 as numerator, and Jersey age-and-sex-specific population estimates for 2014 as denominator.

These age-and-sex-specific incidence rates for 2014 were then combined with the age-specific population projections from 2017, 2027 and 2037 to produce projected cancer incidence per age band, which were then aggregated to give an overall projection of cancer incidence.

Over the four years 2013-2016, net inward migration averaged 1,000 people into Jersey per annum; hence the +1,000 migration scenario was chosen for this analysis.

A secondary analysis using a zero migration scenario[9] was also conducted to establish the extent to which the ageing of the population or net inward migration drove the increases in numbers of each cancer. Results from this analysis showed that, over the timespan of the next 20 years, incidence of cancer, which affects mainly older age groups, is not sensitive to current levels and profiles of migration.

[7] States of Jersey Statistics Unit, Jersey Resident Population Estimate 2016, published 23 June 2017, available from www.gov.je

[8] States of Jersey Statistics Unit, Jersey Population Projection Report 2016, published 14 October 2016, available from www.gov.je

[9] This scenario posits that there is no inward or outward migration, i.e. no people move away or arrive from outside Jersey to live. Under this hypothetical model the only changes in the population size and structure are through ageing, births and deaths. For more information see the Jersey Population Projection 2016 report, available from www.gov.je

ACCURACY AND RELIABILITY

The quality of cancer registration data in the UK is high, and a substantial amount of time is spent ensuring data are accurate. The introduction of electronic pathology into to the cancer registry has brought a higher level of accuracy in diagnosis to the registration process. However, the unique situation regarding registration of data for the Channel Islands does cause some difficulties.

As the health systems in Jersey and Guernsey do not use NHS number, it is not possible to link patients who have been diagnosed, or had previous cancers when living on the UK mainland, and who have subsequently moved to the Channel Islands, and vice versa. This means that some cancers which are technically recurrences of a previous cancer, cancers diagnosed many years previously and detected at death, or secondary cancers from previously diagnosed primary cancers may be registered as if they were new cases. Such effects are likely to be relatively small, since the recurrence rate of many cancers is low, and better pathology reporting makes it easier to determine if cancers are secondary to another cancer.

The projections presented here are based on a number of assumptions and provide a potential future scenario under which those assumptions hold. Projections are therefore not forecasts, and would require revision if there is evidence of change in the primary assumptions or in other relevant factors, such as behaviour or medical knowledge and treatment.

DATA QUALITY AND COMPLETENESS

The cancer incidence rates provided by the NCRAS are calculated along with 95% confidence intervals to show the potential variation due to natural fluctuations. As numbers of new cancer diagnoses in Jersey are small, the associated cancer incidence rate confidence intervals are approximately plus or minus 8 percentage points on the incidence rate for all cancers (excluding NMSC). This report has not shown the confidence intervals in any of the projections but this additional level of uncertainty should be acknowledged when considering projected cancer incidence.

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