

Statistical bulletin

Cancer survival by stage at diagnosis for England (experimental statistics): Adults diagnosed 2012, 2013 and 2014 and followed up to 2015

Survival for people diagnosed by cancer type, split by stage at diagnosis. Data based on people diagnosed in England in 2012, 2013 and 2014. Produced in collaboration with Public Health England (PHE).

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1. Collaboration

The cancer registration and survival data in this bulletin has been collected and calculated by the National Cancer Registration and Analysis Service (NCRAS); within Public Health England. (PHE), and published in partnership with the Office for National Statistics (ONS).



Public Health
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2. Main points

In general, those people diagnosed with early (stage 1 or 2) cancers have a better 1 year survival than those diagnosed with late (stage 4) cancer.

Apart from lung and ovarian cancer, there is a pattern of similar 1 year survival for patients diagnosed at stages 1 to 3 and a large decrease for those diagnosed at stage 4.

Although stage 4 survival is always the worst for any given cancer, the 1 year survival at stage 4 varies from 15% (men with lung cancer) to 83% (men with prostate cancer).

The difference in 1 year survival between men and women is largest for bladder cancer. 1 year survival for women was 62% (average for 2012 to 2014) whereas 1 year survival for men was 75% (average for 2012 to 2014).

Women diagnosed with breast cancer at stage 1 or 2 have 1 year survival which is very similar to the general population.

Colorectal cancer 1 year survival is similar for men and women at all stages.

The poor overall 1 year survival from lung cancer is partly because so many cancers are diagnosed at stage 4.

1 year survival from malignant melanoma is amongst the highest of all cancer sites reported here, with over half of melanoma cases diagnosed at stage 1.

Ovarian cancer 1 year survival steadily decreases with increasing stage, and so diagnosing at the earliest stage is especially important.

Men diagnosed with prostate cancer at stages 1,2 or 3 have 1 year survival which is the same as the general population.

Uterine cancer has high 1 year survival, because nearly 2 out of 3 cases are diagnosed at the earliest stage.

3. Things you need to know

The main purpose of this statistical release is to show how cancer survival varies at different stages for a variety of cancers. Because of improvements in cancer registration and the completeness of stage data during this 3-year period, we do not recommend looking at the data in this briefing as representing the trends in survival over the 3 years examined (2012, 2013, 2014). Such analyses will be undertaken in the future, when enough comparable data are available. This will bring the stage-specific survival statistics in line with other series that currently publish in 5 year aggregations, such as the National Statistics on Cancer Survival. The main focus of this release is on how survival differs by stage of diagnosis.

Data are presented for the whole of England.

4. Statistician's quote

"The statistics presented in this bulletin show that survival of patients with specific types of cancer, especially lung and ovarian, are substantially lower when diagnosed at a later stage compared to patients diagnosed at an early stage. Therefore, it should be clear that diagnosing cancer as early as possible will help to maximise the survival, of at least 1 year, for patients."

Jamie Jenkins, Head of Health Analysis, ONS

5. Background

This bulletin has been jointly produced by Public Health England (PHE) and the Office for National Statistics (ONS).

This bulletin provides information about the survival of people diagnosed with cancer. The survival is categorised by stage at diagnosis, which is a measure of how advanced the cancer is. Generally speaking, a higher stage number means the cancer is bigger or has spread to other parts of the body (metastasis). This is sometimes referred to as 'later' stage cancer, and often there are fewer treatment options. The staging system used is TNM staging¹. This system puts cancers in a group from 1 to 4 depending on the tumour size (T); whether the lymph nodes have cancer cells (N); or if the cancer has spread to other parts of the body (M). For uterine and ovarian cancer the FIGO system^{2,3} is also used, which matches the TNM system, and allows better data completeness.

The survival measure presented is 1 year survival. This is based on the number of people who die within 1 year from their diagnosis. The years listed (2012, 2013 and 2014) are the years in which people were diagnosed. All people were checked whether they were dead or alive at the end of 2015. The specific method used is net age-standardised survival. This method was used because it takes into account the normal rates of death in the general population and is a measure of the extra deaths caused by the specific cancer. So, for example, if the net survival is 100% those people with cancer have died no more quickly than the general population. If the net survival is 50% the number of deaths is twice that expected from the general population. This method also adjusts for the different ages at which people are diagnosed with different cancers, to allow comparisons to be made between groups of people with cancer. Each person is only counted in each group once. This means that the total of diagnoses from each separate stage group may not be the same at the group of "all stage" cancers.

The analysis in the report includes data on nine different cancer sites: bladder, breast, colorectal, kidney, lung, malignant melanoma, ovarian, prostate, and uterus. These cancers were chosen as they are the cancers included in the Public Health Outcomes Framework (PHOF) measure of cancer stage⁴. However, we have not produced data for Non-Hodgkin Lymphoma (NHL) because this covers a broad group of cancers where the association of stage with treatments and outcomes is very variable.

These statistics are designated as Experimental Statistics, and are based on provisional death data. Experimental Statistics are those which are in the testing phase, are not yet fully developed and have not been

submitted for assessment to the UK Statistics Authority. Experimental Statistics are published in order to involve customers and stakeholders in their development and as a means of building in quality at an early stage. Further information on [Experimental Statistics](#) can be found on our website⁵.

Further [statistics on cancer survival](#) in England are available from our website⁶.

6. Feedback

Comments on this briefing are welcomed. In particular, comments on the following items are sought:

- potential inclusion of an "all-cancers" survival calculation
- how to analyse cancers such as Non-Hodgkin Lymphoma (NHL) as described above
- the separation of cancers by certain morphologies, for example small-cell and non-small-cell lung cancer
- the publication of shorter time intervals for survival, for example at 6 months after diagnosis

Feedback can be sent to cancer.newport@ons.gov.uk

7. Survival by stage

The proportion and number of cases diagnosed at each stage varies between different cancers, and between men and women (Table 1). Generally women are diagnosed earlier. The effect of these differences on survival from a particular cancer is discussed in each section below. Table 2 provides a summary of 1 year survival by stage for each site for 2014.

Table 1: Number of diagnoses and proportion diagnosed at each stage

Adults, England, diagnosed 2012 to 2014 (combined)

Site (ICD code)	Sex	Number of Diagnoses	Stage 1 (%)	Stage 2 (%)	Stage 3 (%)	Stage 4 (%)	Stage not known (%)
Bladder (C97)	Men	18,903	32	18	5	11	35
	Women	6,976	24	18	6	14	38
Breast (C50)	Women	128,772	39	34	8	5	15
Colorectal (C18 to C20)	Men	56,369	16	22	25	22	15
	Women	44,393	14	23	24	22	18
Kidney (C24)	Men	15,511	29	6	13	20	32
	Women	9,233	31	6	12	18	33
Lung (C33 to C34)	Men	58,801	12	8	20	50	11
	Women	49,855	16	7	19	47	11
Melanoma (C43)	Men	18,078	51	17	5	3	24
	Women	18,497	59	13	4	2	22
Ovary (C56 to C57)	Women	18,371	29	5	29	18	19
Prostate (C61)	Men	117,582	30	18	17	17	17
Uterus (C54 to C55)	Women	22,283	64	7	10	6	13

Source: National Cancer Registration and Analysis Service – Public Health England

Notes:

1. People aged 15 to 99 at diagnosis.
2. Stage not known includes all cases with insufficient clinical or pathology information on stage.

Table 2: Summary of age standardised 1 year net survival for selected cancers

Adults, England, 2014 followed up to 2015

Site	Sex	Stage 1 (%)	Stage 2 (%)	Stage 3 (%)	Stage 4 (%)	Stage unknown (%)
Bladder (C97)	Men	95	71	67	35	59
	Women	91	63	56	27	45
Breast (C50)	Women	100	99	95	63	85
Colorectal (C18 to C20)	Men	98	93	89	44	57
	Women	98	91	85	35	50
Kidney (C24)	Men	96	89	95	38	73
	Women	94	91	89	34	68
Lung (C33 to C34)	Men	81	66	42	15	23
	Women	85	69	46	19	28
Melanoma (C43)	Men	101	97	92	47	91
	Women	101	98	96	54	95
Ovary (C56 to C57)	Women	99	94	71	51	46
Prostate (C61)	Men	101	101	100	85	88
Uterus (C54 to C55)	Women	99	94	83	45	53

Source: National Cancer Registration and Analysis Service – Public Health England

Notes:

1. People aged 15 to 99 at diagnosis.

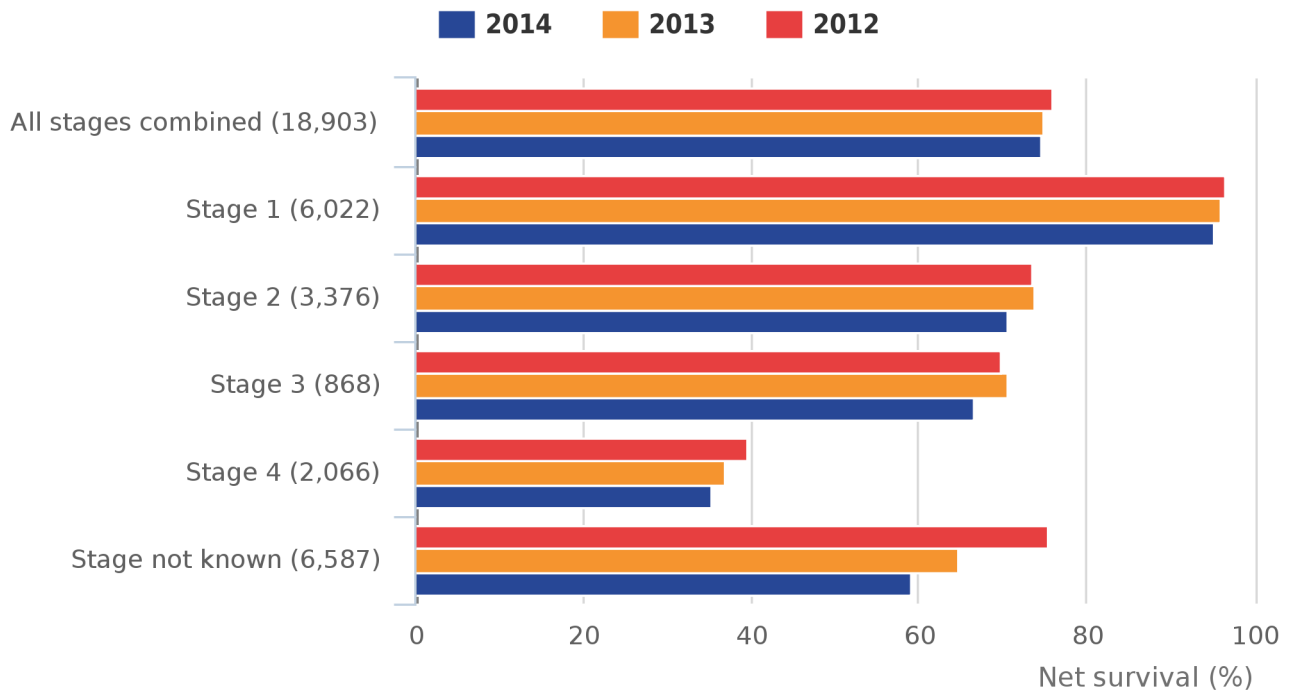
2. Survival estimates take into account the normal rates of death in the general population and net survival is a measure of the extra deaths caused by the specific cancer. For some stage 1 & 2 cancer patients their net survival is greater than 100% which means there are fewer deaths among this cohort compared to the general population. This may be explained by people after diagnosis reducing risk factors associated with poor health, for example stopping smoking. Also because they now see a doctor more often, other health issues may be dealt with. The effect of these changes might be larger than the death rate for that cancer, especially for low-mortality cancers like prostate or melanoma. People diagnosed with early-stage cancer tend to be less deprived, and this might also contribute to lower than average mortality.

Bladder cancer

Bladder cancer is unusual compared with the other cancers studied because women have much lower survival (62% average for 2012 to 2014) than men (75% average for 2012 to 2014). This is likely to be due to a complex mix of reasons⁷. Women with a given stage of bladder cancer have worse survival compared with men with the same disease stage (Figures 2 to 3, and Table 2). This suggests that there are some gender differences in bladder cancer survival, because of differences in biology. Women with bladder cancer also tend to be diagnosed at a later stage (Table 1) which contributes to the overall differences in survival. Longer waits for diagnosis and higher proportions of emergency diagnoses in women with bladder cancer may also contribute^{8,9}.

Figure 1: One-year net cancer survival for men diagnosed with bladder cancer, by stage at diagnosis

England, 2012 to 2014, followed up to 2015



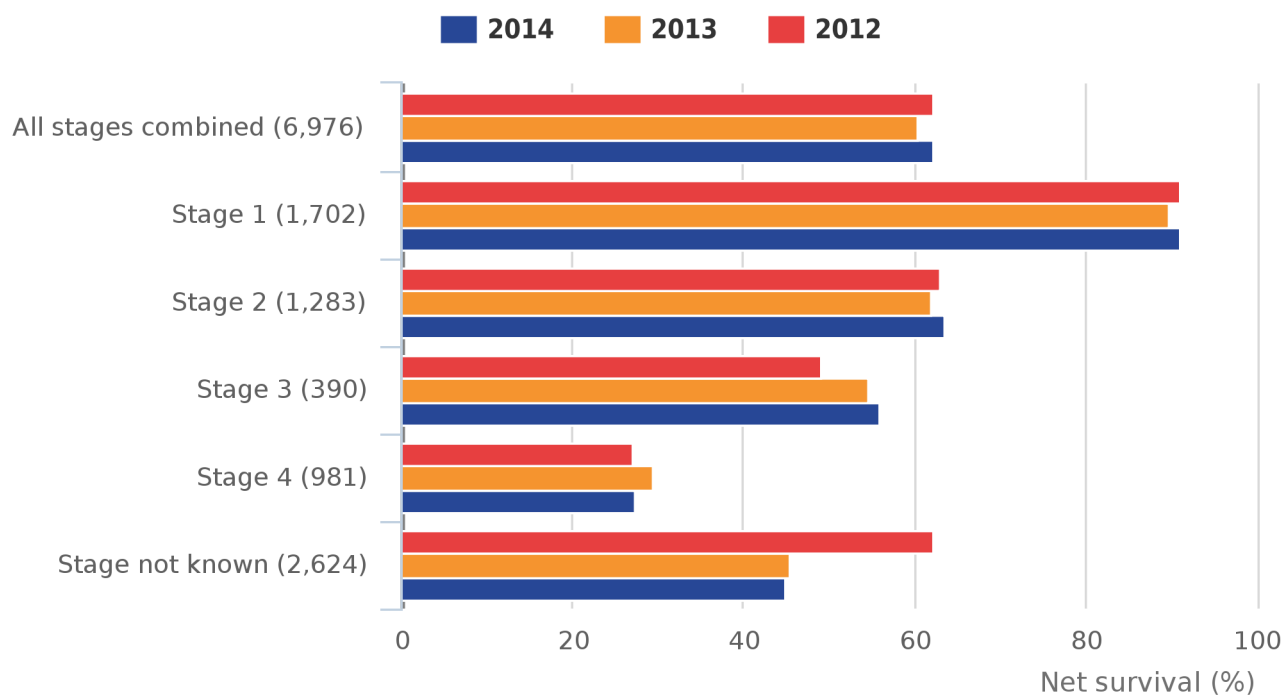
Source: National Cancer Registration and Analysis Service – Public Health England

Notes:

1. Men aged 15 to 99 at diagnosis.
2. Age standardised net cancer survival.
3. Information on cohort sizes can be found in the Excel download table.
4. Stage not known includes all cases with insufficient clinical or pathology information on stage.
5. Numbers in brackets are total cases diagnosed at that stage, for all years combined.

Figure 2: One-year net cancer survival for women diagnosed with bladder cancer, by stage at diagnosis

England, 2012 to 2014, followed up to 2015



Source: National Cancer Registration and Analysis Service – Public Health England

Notes:

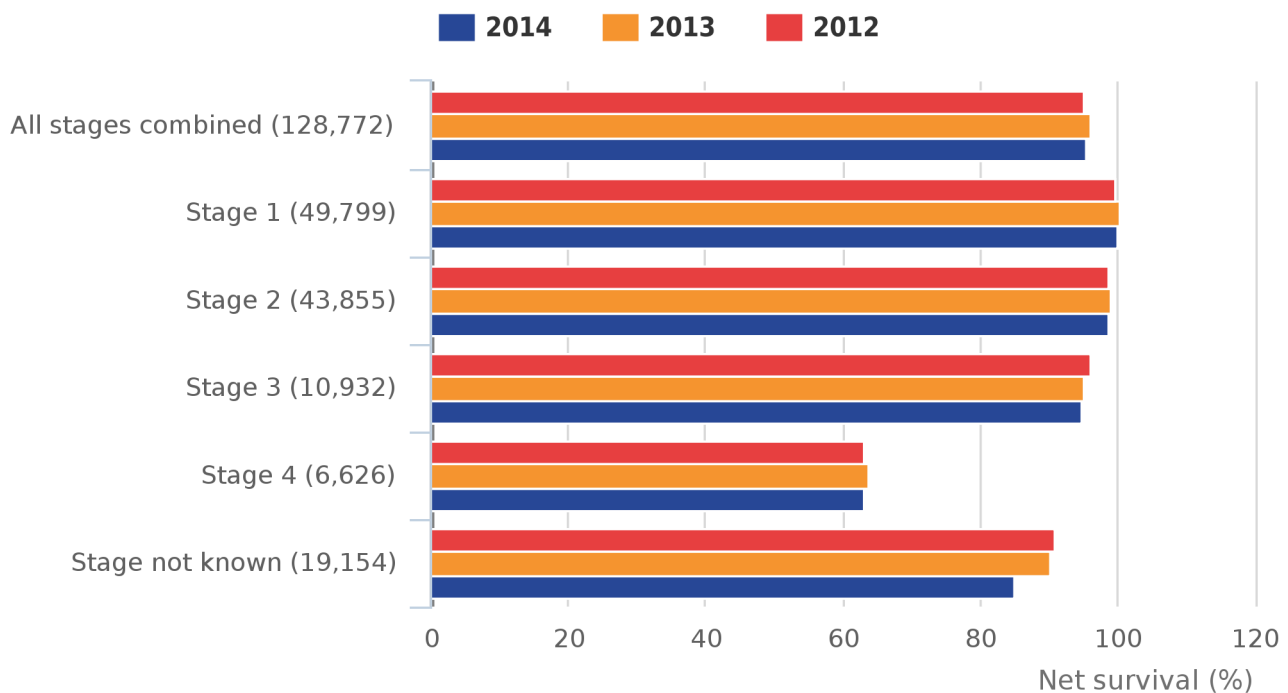
1. Women aged 15 to 99 at diagnosis.
2. Age standardised net cancer survival.
3. Information on cohort sizes can be found in the Excel download table.
4. Stage not known includes all cases with insufficient clinical or pathology information on stage.
5. Numbers in brackets are total cases diagnosed at that stage, for all years combined.

Breast cancer (women only)

Survival from breast cancer is amongst the highest of all cancers (96% average across all years for all stages combined). This is probably due to a combination of factors including a higher number of cancers detected through screening (1 in 3), well-understood symptoms, and the increasing availability of effective treatments for most cases. For those diagnosed at stage 1 or stage 2 there were very few excess deaths from breast cancer, compared with the general population, in the first year after diagnosis. For those diagnosed at stage 4 there was a much lower survival of 63% (average for 2012 to 2014).

Figure 3: One-year net cancer survival for women diagnosed with breast cancer, by stage at diagnosis

England, 2012 to 2014, followed up to 2015



Source: National Cancer Registration and Analysis Service – Public Health England

Notes:

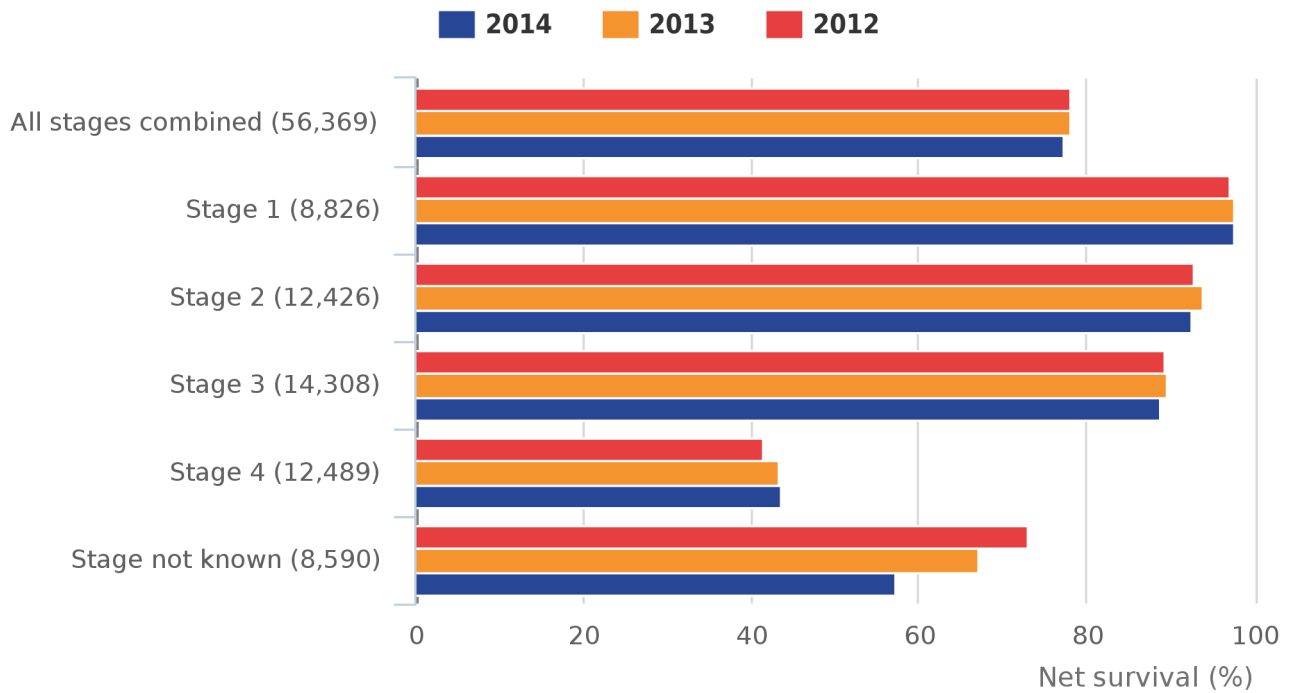
1. Women aged 15 to 99 at diagnosis.
2. Age standardised net cancer survival.
3. Information on cohort sizes can be found in the Excel download table.
4. Stage not known includes all cases with insufficient clinical or pathology information on stage.
5. Numbers in brackets are total cases diagnosed at that stage, for all years combined.

Colorectal cancer

Colorectal cancer survival is slightly higher in men (78% average for 2012 to 2014) than women (73% average for 2012 to 2014). There is a gradual decrease in survival from stage 1 to 3, with a larger step down between stages 3 and 4. The survival at stage 4 is around 40% (average for 2012 to 2014), which shows that people diagnosed at this stage die at more than twice the rate of the general population. There is a national screening programme for colorectal cancer but only about 1 in 10 cases are currently diagnosed via this route⁹.

Figure 4: One-year net cancer survival for men diagnosed with colorectal cancer, by stage at diagnosis

England, 2012 to 2014, followed up to 2015



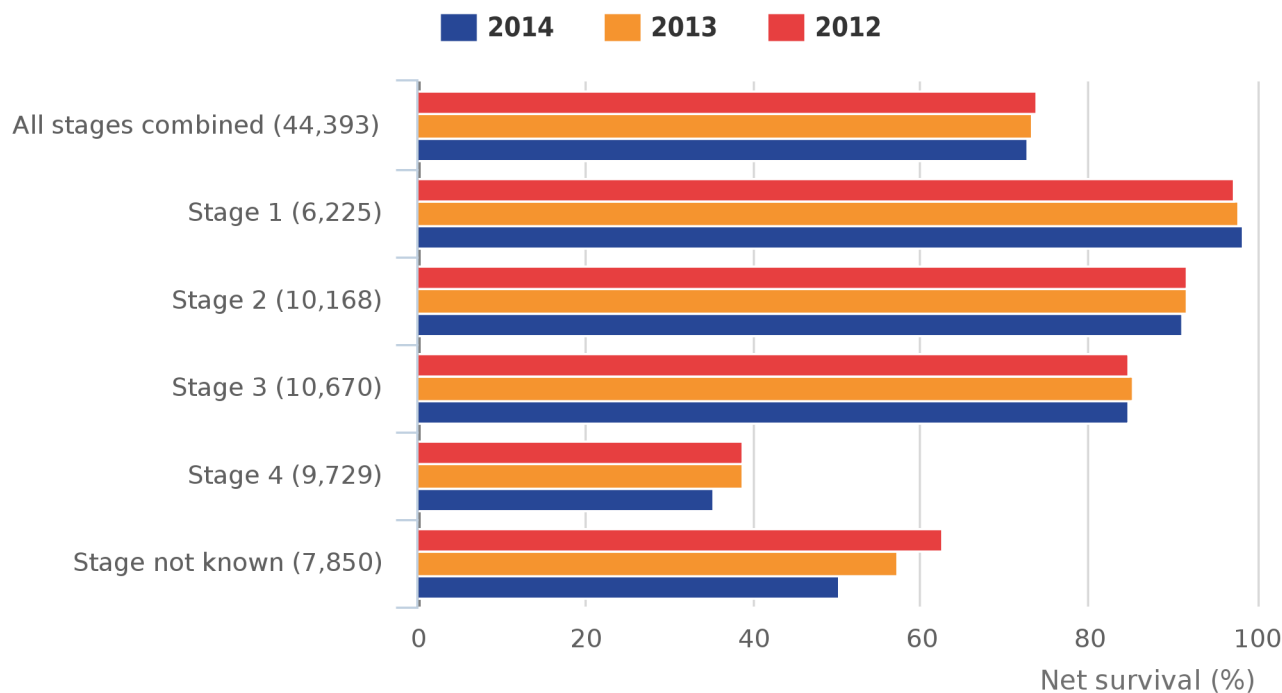
Source: National Cancer Registration and Analysis Service – Public Health England

Notes:

1. Men aged 15 to 99 at diagnosis.
2. Age standardised net cancer survival.
3. Information on cohort sizes can be found in the Excel download table.
4. Stage not known includes all cases with insufficient clinical or pathology information on stage.
5. Numbers in brackets are total cases diagnosed at that stage, for all years combined.

Figure 5: One-year net cancer survival for women diagnosed with colorectal cancer, by stage at diagnosis

England, 2012 to 2014, followed up to 2015



Source: National Cancer Registration and Analysis Service – Public Health England

Notes:

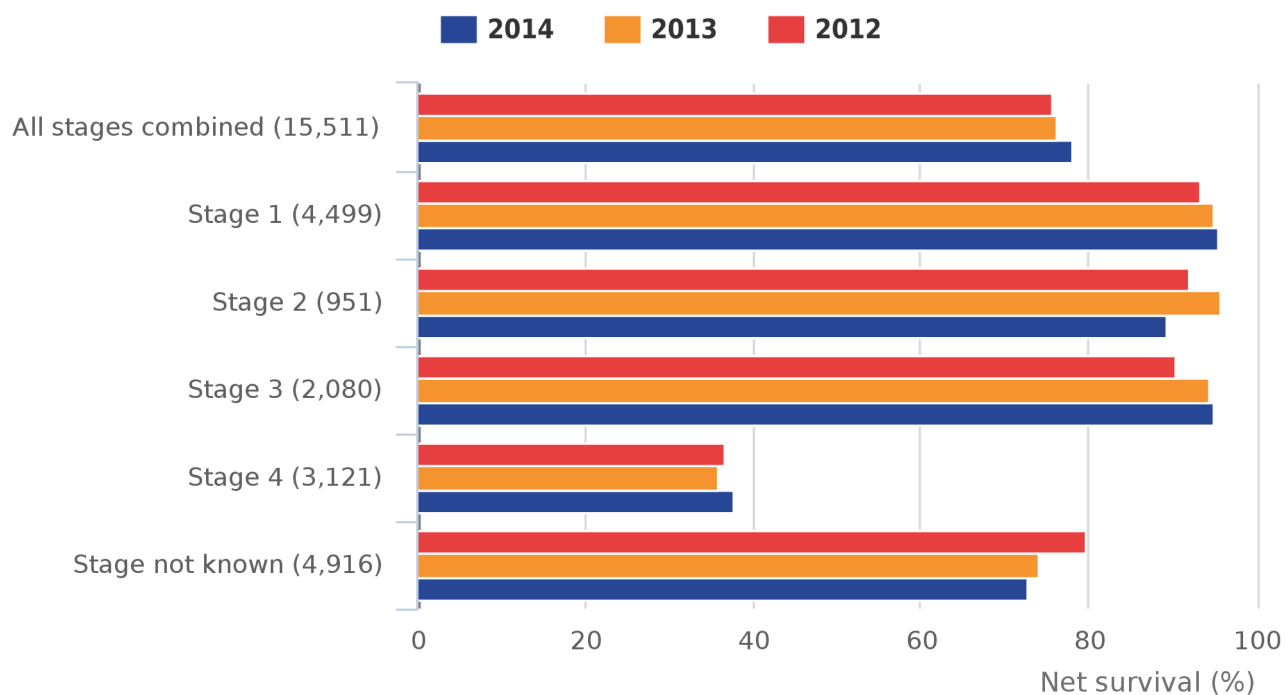
1. Women aged 15 to 99 at diagnosis.
2. Age standardised net cancer survival.
3. Information on cohort sizes can be found in the Excel download table.
4. Stage not known includes all cases with insufficient clinical or pathology information on stage.
5. Numbers in brackets are total cases diagnosed at that stage, for all years combined.

Kidney cancer

The proportion of men and women diagnosed with kidney cancer at each stage is similar. The overall survival is nearly the same (77% for men and 75% for women, 2012 to 2014 average). There is not much difference in survival between stages 1 to 3, but much worse survival for those diagnosed at stage 4. The numbers of new kidney cancers have been rising, which may be because they are picked up when people have scans for other illnesses. These cancers are often small and can be effectively treated, so the overall survival has been rising steadily over time.

Figure 6: One-year net cancer survival for men diagnosed with kidney cancer, by stage at diagnosis

England, 2012 to 2014, followed up to 2015



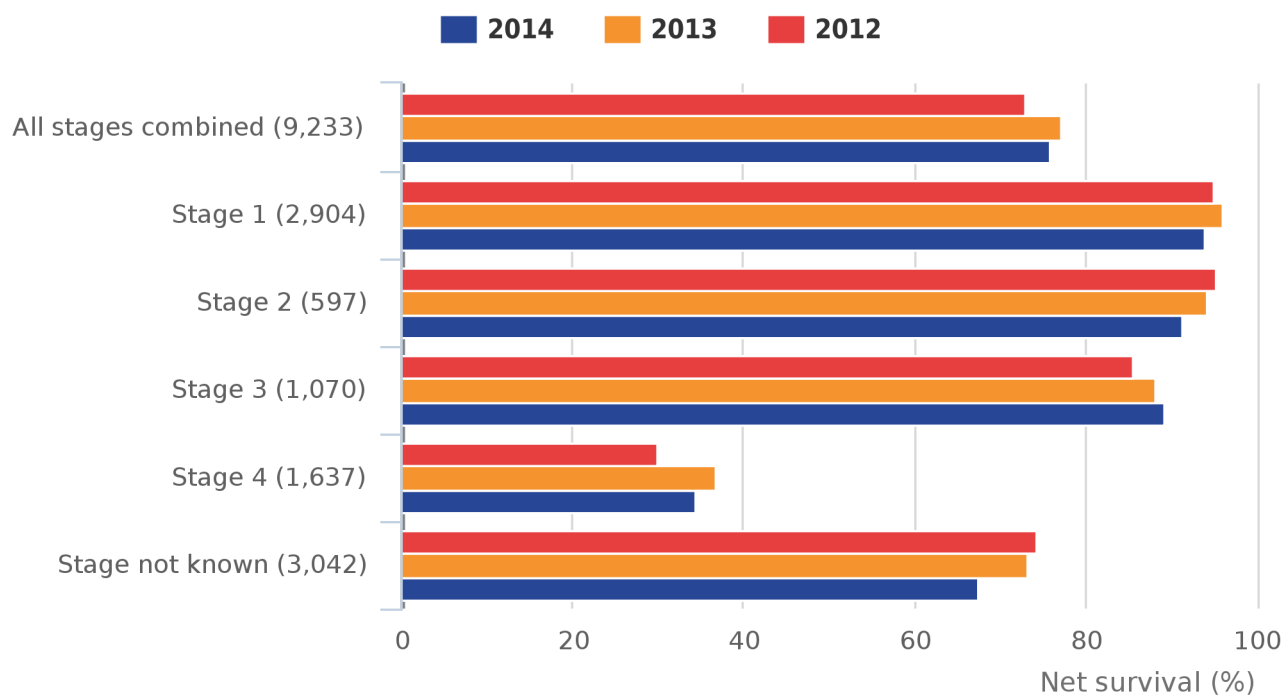
Source: National Cancer Registration and Analysis Service – Public Health England

Notes:

1. Men aged 15 to 99 at diagnosis.
2. Age standardised net cancer survival.
3. Information on cohort sizes can be found in the Excel download table.
4. Stage not known includes all cases with insufficient clinical or pathology information on stage.
5. Numbers in brackets are total cases diagnosed at that stage, for all years combined.

Figure 7: One-year net cancer survival for women diagnosed with kidney cancer, by stage at diagnosis

England, 2012 to 2014, followed up to 2015



Source: National Cancer Registration and Analysis Service – Public Health England

Notes:

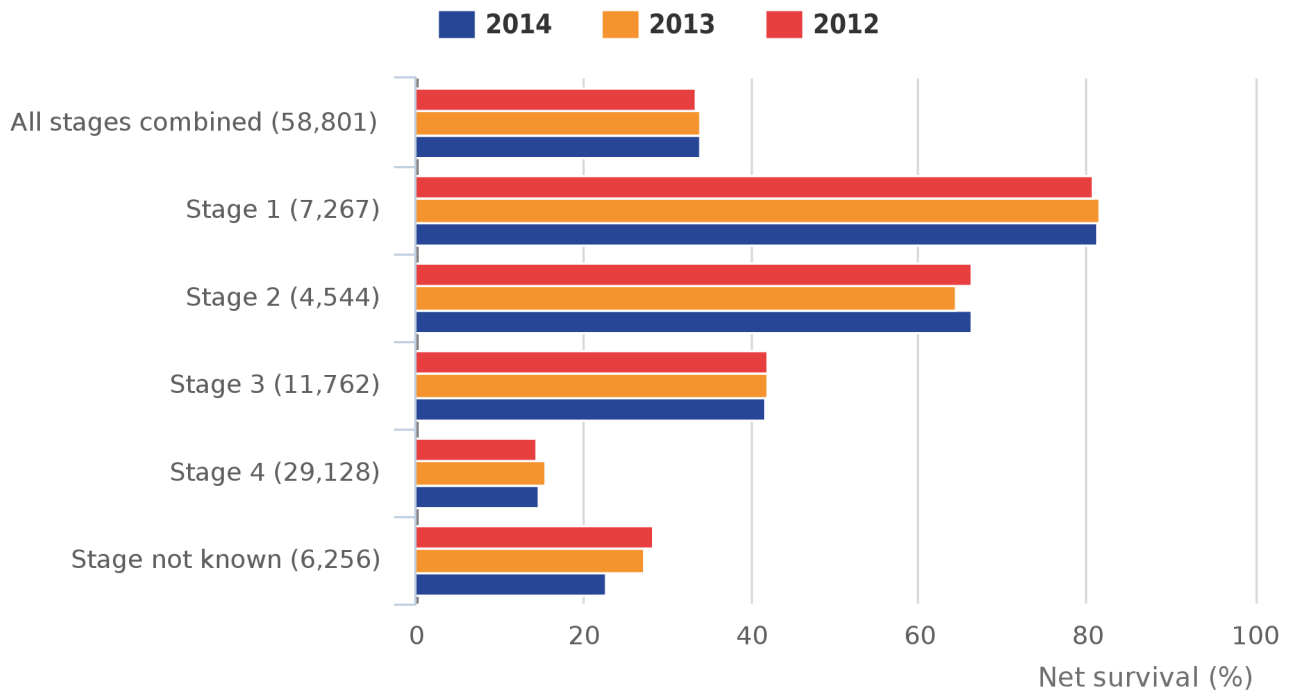
1. Women aged 15 to 99 at diagnosis.
2. Age standardised net cancer survival.
3. Information on cohort sizes can be found in the Excel download table.
4. Stage not known includes all cases with insufficient clinical or pathology information on stage.
5. Numbers in brackets are total cases diagnosed at that stage, for all years combined.

Lung cancer

Overall, survival from lung cancer is low (34% for men and 39% for women, average for 2012 to 2014), and this reflects the larger proportion of cases which are diagnosed at late stage. Many patients with lung cancer have symptoms that are similar to other illnesses so it can be difficult to diagnose. Survival at stage 1 is 81% for men (average for 2012 to 2014) and 85% for women (average for 2012 to 2014), but fewer than 1 in 6 lung cancers are diagnosed at this stage. About half of lung cancers are diagnosed at stage 4. There is a steadily decreasing survival with increasingly advanced stage. At all stages (except stage 2) women have higher survival than men.

Figure 8: One-year net cancer survival for men diagnosed with lung cancer, by stage at diagnosis

England, 2012 to 2014, followed up to 2015



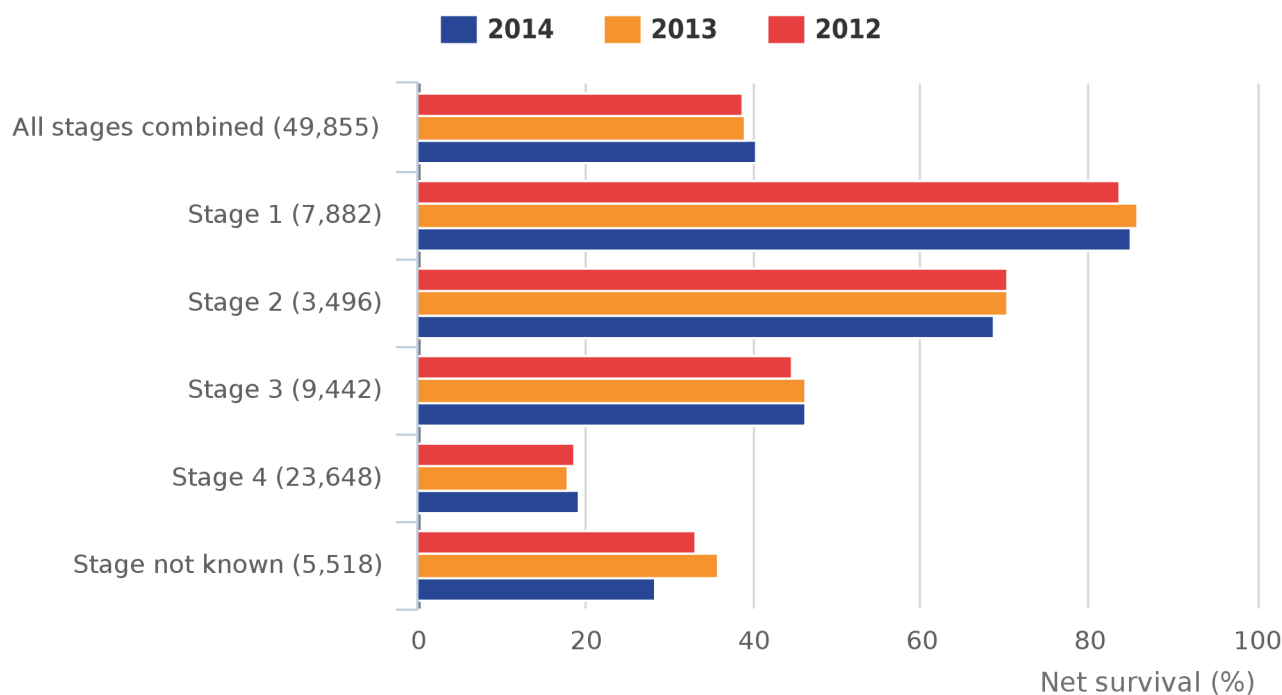
Source: National Cancer Registration and Analysis Service – Public Health England

Notes:

1. Men aged 15 to 99 at diagnosis.
2. Age standardised net cancer survival. Descriptions of what confidence intervals are can be found in the background notes.
3. Stage not known includes all cases with insufficient clinical or pathology information on stage.
4. Numbers in brackets are total cases diagnosed at that stage, for all years combined.

Figure 9: One-year net cancer survival for women diagnosed with lung cancer, by stage at diagnosis

England, 2012 to 2014, followed up to 2015



Source: National Cancer Registration and Analysis Service – Public Health England

Notes:

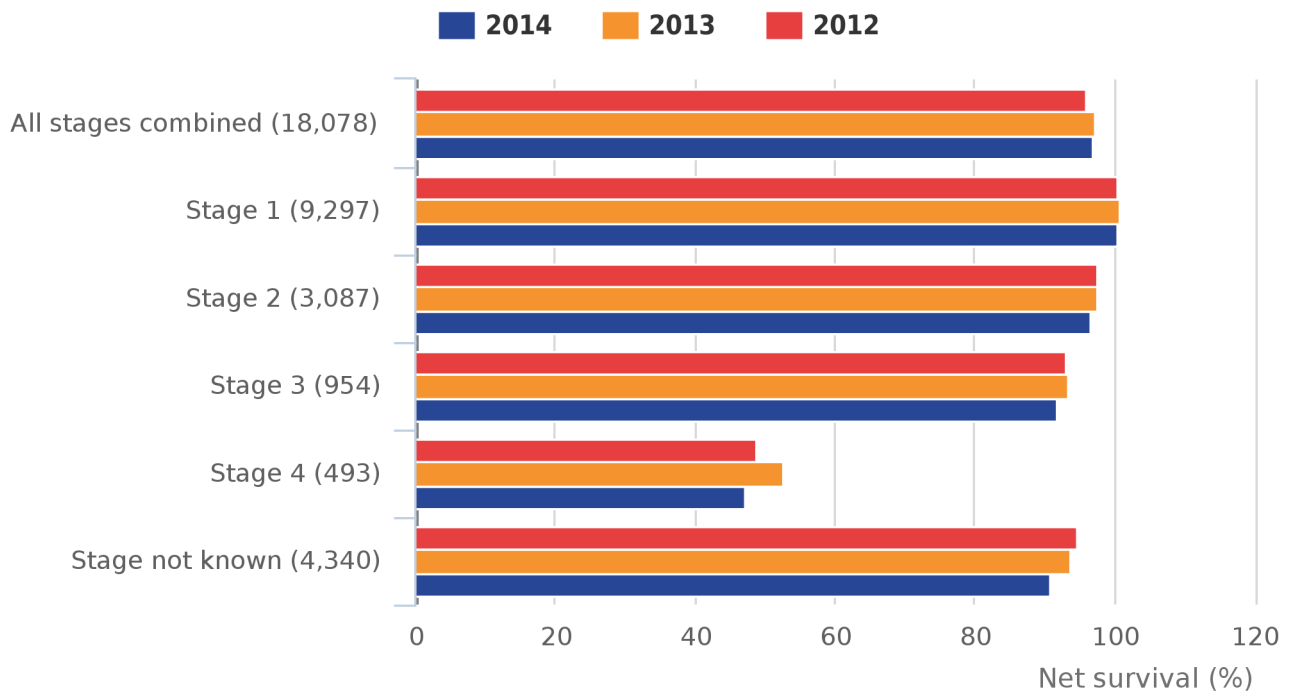
1. Women aged 15 to 99 at diagnosis
2. Age standardised net survival
3. Information on cohort sizes can be found in the Excel download table.
4. Stage not known includes all cases with insufficient clinical or pathology information on stage.
5. Numbers in brackets are total cases diagnosed at that stage, for all years combined.

Malignant melanoma

Malignant melanoma is a type of skin cancer which is more likely to cause death than other types. It affects all ages, but is one of the more common cancers in people aged under 40. Survival is very high, and slightly higher in women (99% average for 2012 to 2014) than in men (97% average for 2012 to 2014). More than half of malignant melanomas are diagnosed at stage 1, where the survival is 100% (average for 2012 to 2014). This means that no more people with melanoma diagnosed at stage 1 die than would be expected in the general population. This high stage 1 proportion (see Table 1) may be due to increased awareness, or because of the fact the cancer is on the skin and easier to detect.

Figure 10: One-year net cancer survival for men diagnosed with malignant melanoma, by stage at diagnosis

England, 2012 to 2014, followed up to 2015



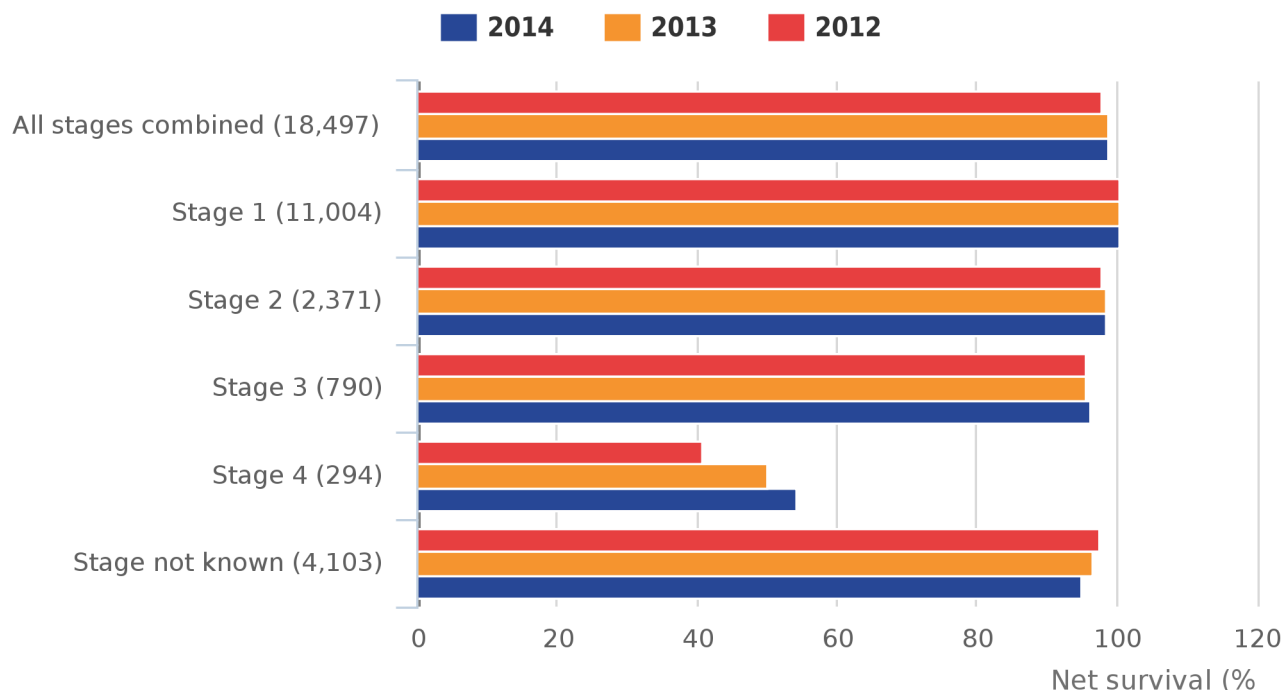
Source: National Cancer Registration and Analysis Service – Public Health England

Notes:

1. Men aged 15 to 99 at diagnosis.
2. Age standardised net cancer survival.
3. Information on cohort sizes can be found in the Excel download table.
4. Stage not known includes all cases with insufficient clinical or pathology information on stage.
5. Numbers in brackets are total cases diagnosed at that stage, for all years combined.

Figure 11: One-year net cancer survival for women diagnosed with malignant melanoma, by stage at diagnosis

England, 2012 to 2014, followed up to 2015



Source: National Cancer Registration and Analysis Service – Public Health England

Notes:

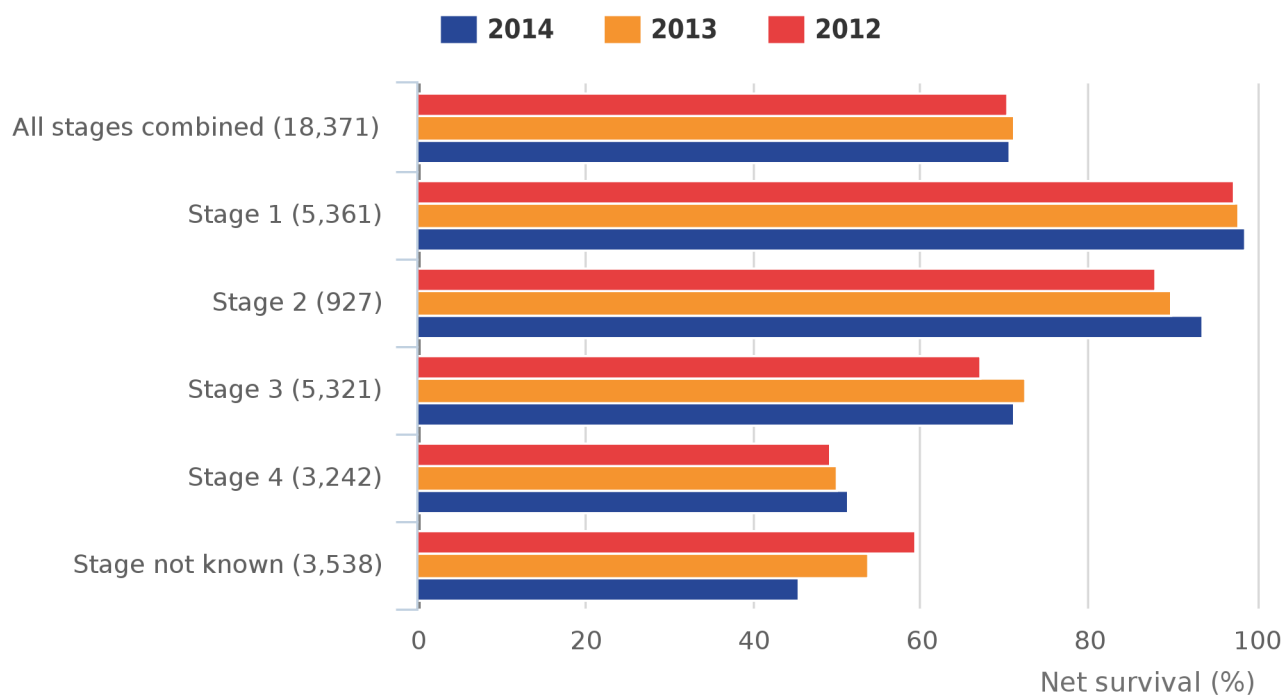
1. Women aged 15 to 99 at diagnosis.
2. Age standardised net survival.
3. Information on cohort sizes can be found in the Excel download table.
4. Stage not known includes all cases with insufficient clinical or pathology information on stage.
5. Numbers in brackets are total cases diagnosed at that stage, for all years combined.

Ovarian cancer

Overall survival for women diagnosed with ovarian cancer is 71% (average for 2012 to 2014). This is the second lowest overall survival for women for the cancers in this bulletin, with lung being worse. Nearly half of women diagnosed with ovarian cancer are diagnosed at stages 3 and 4. Like lung cancer, the symptoms of ovarian cancer can be similar to lots of other illnesses, which makes it difficult to diagnose. There is a steadily decreasing survival with increasing stage, but survival for those diagnosed at stage 1 is high (98% average for 2012 to 2014).

Figure 12: One-year net cancer survival for women diagnosed with ovarian cancer, by stage at diagnosis

England, 2012 to 2014, followed up to 2015



Source: National Cancer Registration and Analysis Service – Public Health England

Notes:

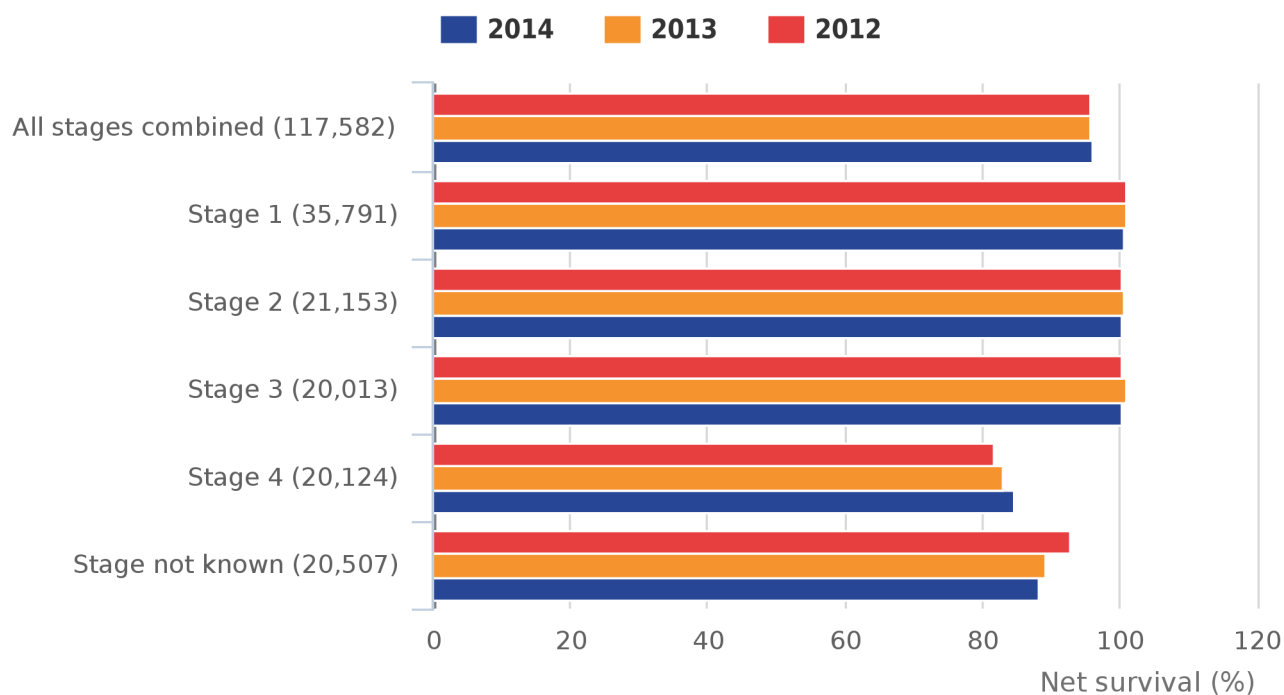
1. Women aged 15 to 99 at diagnosis.
2. Age standardised net cancer survival.
3. Information on cohort sizes can be found in the Excel download table.
4. Stage not known includes all cases with insufficient clinical or pathology information on stage.
5. Numbers in brackets are total cases diagnosed at that stage, for all years combined.

Prostate cancer

Survival from prostate cancer is also very high (96% for all stages combined in 2012 to 2014). There is no national screening programme for prostate cancer but some men have a PSA (Prostate Specific Antigen) tests at their GP's. There are no differences in 1 year survival between stages 1, 2 and 3 (over 100% average for 2012 to 2014); the survival greater than 100% means that less men died than expected. A lower survival is seen for stage 4 cancers (83% average for 2012 to 2014), but this is still higher than many other cancers diagnosed at earlier stages.

Figure 13: One-year net cancer survival for men diagnosed with prostate cancer, by stage at diagnosis

England, 2012 to 2014, followed up to 2015



Source: National Cancer Registration and Analysis Service – Public Health England

Notes:

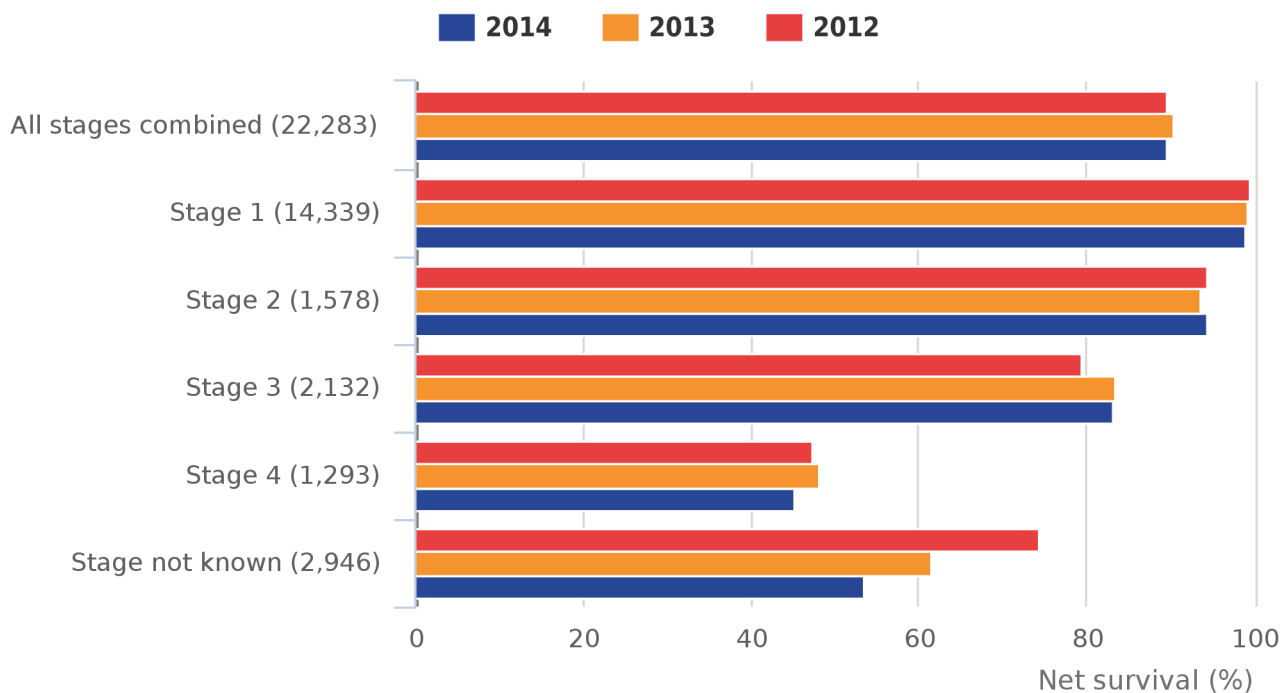
1. Men aged 15 to 99 at diagnosis.
2. Age standardised net cancer survival.
3. Information on cohort sizes can be found in the Excel download table.
4. Stage not known includes all cases with insufficient clinical or pathology information on stage.
5. Numbers in brackets are total cases diagnosed at that stage, for all years combined.

Uterine cancer

Survival for women diagnosed with cancer of the uterus is amongst the highest of cancers reported in this bulletin (90% overall average for 2012 to 2014). This is related to the very high proportion of cases diagnosed at stage 1; nearly 2 out of 3 cases. For those diagnosed at stage 4, the proportion dying is still twice as high as the general population.

Figure 14: One-year net cancer survival for women diagnosed with uterine cancer, by stage at diagnosis

England, 2012 to 2014, followed up to 2015



Source: National Cancer Registration and Analysis Service – Public Health England

Notes:

1. Women aged 15 to 99 at diagnosis.
2. Age standardised net cancer survival.
3. Information on cohort sizes can be found in the Excel download table.
4. Stage not known includes all cases with insufficient clinical or pathology information on stage.
5. Numbers in brackets are total cases diagnosed at that stage, for all years combined.

8. International comparisons

Previous work carried out by the International Cancer Benchmarking Partnership (ICBP)¹⁰ and by the Eurocare project¹¹ showed that cancer survival in England was not as good as similar countries in Europe and around the world. Survival by stage was compared for some cancers (breast¹², lung¹³, colorectal¹⁴ and ovarian¹⁵). The differences in survival were thought to be caused by a number of things; including differences in how many cases were diagnosed early, and survival for those diagnosed with stage 4 disease. These results were for people diagnosed 10 to 20 years ago, when there was less data about stage at diagnosis. This bulletin represents an update to the figures for England, with more complete data.

9. Policy context and use

The policy area which is most likely to be influenced by these results is early diagnosis. The National Awareness and Early Diagnosis Initiative (NAEDI)¹⁶ aims to improve cancer survival by getting cancers diagnosed earlier.

The data from this bulletin can help show the improvement in survival which could be made if more cancers were diagnosed earlier. It also shows the pattern of survival and stage, which may help show where most improvement can be made, for example when the survival from a certain cancer is much worse at stage 4.

10. Methodology

This bulletin presents net cancer survival. This is the probability of surviving cancer compared with a matched cohort from the general population. Matching is based on age, sex, year of diagnosis, region and deprivation. This allows comparisons to be made between different years, population groups etc.

The survival calculations are age-standardised. This means that differences in the age-structure of the population in different years are taken into account.

Full details of the methodology are contained in the [Cancer Survival Quality and Methodology Information](#).

11. References

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13. Acknowledgements

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ONS: Jamie Jenkins; Rhian Murphy; Stephen Rowlands

14. Background notes

1. Cancer registration in England is run by the National Cancer Registration and Analysis Service within Public Health England. Details of all cancers diagnosed in people living in England are collected and securely held by PHE.
2. Details of the policy governing the release of new data are available from the UK Statistics Authority website.
3. Confidence intervals are used to define the degree of variation in rates that can be considered normal. In this briefing, we used 95% confidence intervals. Generally speaking, when the confidence intervals of two survival rates overlap, there is no statistically significant difference between them. That is, the difference between them is just a chance finding. The smaller the population and the smaller the number of cases, the larger the confidence interval.