Cervical Cancer Surgery:

| Basic Information | |
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| **1. What is being measured?** | The proportion of cervical cancer patients who received surgery. |
| **2. Why is it being measured?** | Surgery is the treatment that has the greatest impact on long term survival in most types of cancer. It can also serve the purpose of significantly improving symptoms, even in situations where long term survival is unrealistic. A more detailed understanding of the patterns of surgical treatments in cancer is therefore vital to efforts to improve outcomes for cancer patients. |
| **3. How is the indicator defined?** | Cervical cancer patients are defined as women who have had a cancer diagnosis coded C53, according to the International Classification of Diseases, Edition 10 (ICD10).<br>Patients were extracted from the national cancer data repository (NCDR) where diagnosis was not notified by death certificate only (DCO).<br>A major resection is defined as a procedure which is carried out with the aim of removing the entire tumour. The list of the OPCS4 codes can be found in the Major Surgical Resections, England, 2004-2006 report. Relevant surgery was defined as occurring 30 days before and up to one year post diagnosis.<br>Each patient was assigned to a cancer network according to postcode of residence. |
| **4. Who does it measure?** | It measures all females diagnosed with cervical cancer in 2004-2006 who were not DCO registrations, resident in each of the cancer networks in England and who could be matched to at least one HES record. As data is only available for patients treated in NHS hospitals, any patients who could not be matched to at least one hospital episode were also excluded from the analysis as they could have received private treatment for their cancer. |
| **5. When does it measure it?** | Cancer Network level – patients diagnosed 2004-2006 and followed up to 2007. |
| **6. Does it measure absolute numbers, proportions or rates?** | It is a proportion – numerator - number of cervical cancer patients receiving a major resection. Denominator – total number of none DCO cervical cancer patients. |
| **7. Where does the data come from?** | The data is taken from the NCDR, linked with the HES records for 2003-2007. |
| **8. How accurate and complete are the data?** | The eight regional registries collect, on a voluntary basis, data on cancers registered to residents of their areas. These data are loaded onto the |

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| | new person-based database and validated. The extensive checks include the comparability of the cancer site and associated histology, consistency of dates, for example to check that the surgery date is not after the date of death. These checks are closely based on those promulgated by the International Agency for Research on Cancer (IARC). Once all the expected records for any one surgery year have been received and validated at ONS, detailed tables are published on the numbers and rates of all types of cancer by age and sex, and by region of residence, as presented in the annual ONS publication MB1. Please visit http://www.ons.gov.uk to view MB1 reports for further details of the completion of registration each year.<br><br>HES data is collated and submitted by each trust in England. Quality and completeness reports are produced each year. Please visit HES online for more details on the collection of HES http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937 |
| **9. Are there any caveats/ problems/ weaknesses?** | Problems with HES data: There may be differences in the way that trusts code procedures. HES was not established with the direct intention of analysing details of surgical operations.<br>Stage of Disease: There are some procedures which it is not possible to assign as 'major' resections without knowledge of the stage of disease at diagnosis. Stage of disease has not been considered in this version of the report. For cervical cancer, there are some procedures coded as biopsies, which for late stage disease are carried out for diagnostic purposes; however, for very early stage of disease this procedure would aim to remove the whole tumour. For this reason, surgical rates may be lower than expected.<br>Co morbidities: These analyses have also not taken into account co-morbidities of patients which will affect the decision to treat and which could vary in their impact at regional level. |
| **10. What methods are used to test the meaning of the data and variation?** | **Count:**<br>The 'count' is the number of patients that received surgery.<br><br>**Lower and Upper Confidence Limits (LCL and UCL):**<br>For the percentages, 95% confidence intervals are given calculated using the Wilson Score Method.<br>These are a measure of variability in the percentages calculated using the sample size. The upper and lower limits of the confidence interval show how big a contribution chance may have made to a particular statistic. The 95% confidence intervals quoted give the range in which the rate in question would fall 19 times out of 20, were it possible to repeat the analyses.<br>When comparing the rates of different groups, the CIs can be compared to determine if the range of values overlap. If the CIs do not overlap then the difference between the rates is said to be statistically significant. |

**Area Profile:**

Spine Chart:

The area profile presents a spine chart which allows a comparison of the local value (represented by a circle) against the national average (represented by a red line in the middle of the chart) and regional average (where available, represented by a diamond), but also where the local area lies in relation to the range of values for all the other local areas. The darker grey shading of the bar represents the 25th to 75th percentile of the range of values.

Map:

The map is coloured according to whether the rate is statistically significantly higher or lower than the England average, higher/lower than the national average but not significantly so and the same as the national average. The statistical significance tested by the CIs is different to the method described below for funnel plots and may present the same area differently in terms of statistical significance when compared to the national average.

Example of interpretation:

The symbol in the spine chart is green (better) when rate of cervical cancer resections is statistically significantly higher than the England average; or red (worse) when the rate is statistically significantly lower than the England average. Statistical significance is to the 95% confidence level. The symbol is orange when the incidence of cervical cancer is not statistically significantly different to the national average.

**Funnel Plot:**

Funnel plots have become a preferred method of presenting comparisons between geographical areas or institutions in public health. This is opposed to the more conventional use of 'caterpillar' plots which visually imply a ranking of areas based on good or bad performance. In any process or system, variation is to be expected; the funnel plot approach makes it easier to identify which data points indicate areas that may be worthy of further investigation.

Simple statistical methods are used to define limits of expected variation known as control limits. The group average is used as the estimate of expected 'performance' and the best estimate of expected variation around this average is both/either ± 2 standard deviations (SDs), equivalent to 95% confidence intervals, and/or ± 3 SDs, equivalent to 99.8% confidence intervals. Those areas that fall outside of these control limits are deemed to be statistically significantly different from the group average. More information on funnel plot methodology can be found in the following references:

Spiegelhalter DJ, 2005. Funnel plots for comparing institutional performance. Statistics in Medicine, 24: 1185-1202.

Association of Public Health Observatories (APHO), 2009. Statistical

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| | Process Control Methods in Public Health Intelligence, Technical Briefing no. 2, Available at http://www.apho.org.uk/resource/item.aspx?RID=39445<br><br>The number along the x-axis of the funnel plot is the number of HES linked patients.<br><br>Map:<br>The map is coloured according to where the areas fall relative to the 2 and 3 standard deviation funnels.<br><br>Example of interpretation:<br>Areas where cervical cancer resection rates are statistically significantly lower (worse) than the England average fall below the horizontal green line (national average) and outside of the funnels. Those areas where cervical cancer resection rate is statistically significantly higher (better) than the national average fall outside of the funnels above the horizontal line. Areas where the resection rate for cervical cancer is not statistically significant fall inside the inner funnel around the horizontal line.<br><br>Those areas that fall outside of the funnels in the funnel plots may require further investigation into the reasons for the statistically significantly low or high resection rates. Particular attention should be paid to those areas falling outside both funnels.<br><br>**Double map:**<br>Scatter Plot:<br>The double map option displays a scatter plot of the association between the two chosen rates e.g. cervical cancer resection rates and survival. The correlation coefficient (r) statistic displayed at the top of the scatter plot is Pearson's correlation coefficient, often called the correlation. It measures the degree of 'straight-line' association between the two indicators and can take any value between -1 (perfect negative correlation) and 1 (perfect positive correlation). A value of zero indicates no correlation.<br>Map:<br>In the map, the range of values for mortality is split into five groups (quintiles), and not according to statistical significance.<br><br>Interpretation:<br>If all the points lie very close to the straight line on a slope indicating, that as one variable increases (or decreases) the other increases (or decreases), then it can be said that there is a strong association between the two indicators. If the points are more scattered, but still in a straight line, would indicate that there is a weaker relationship. |

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| | Interpretation of the relationship between two indicators should be made carefully; it does not mean there is a 'causal' relationship between the two indicators.<br><br>**Single map:**<br>Map:<br>The map is coloured according to whether the rate is statistically significantly higher or lower than the England average, higher/lower than the national average but not significantly so and the same as the national average<br>Time Series:<br>The time series animation allows the user to view how the map changes for each indicator that has time series data, according to whether the rates are statistically significantly different or not. |
| **11. Geography provided in this toolkit** | Since April 2013 the NHS health boundaries for Primary Care Trusts, Cancer Networks and Strategic Health Authorities have been become non-operational and have been replaced by other organisational structures responsible for the commissioning and performance management of cancer services, namely Clinical Commissioning Groups, Local Area Teams and Strategic Clinical Networks. However, in the absence of established boundaries and available data for these new organisations we have only been able to present sub-national data for the old organisations. The old organisations still retain some currency and relevance to the commissioning and public health structures as redefined and this is explained below:<br><br>PCTs<br>Many PCTs are coterminous with the Clinical Commissioning Groups and therefore statistics at PCT level for these CCGs will still be largely relevant.<br><br>Cancer Networks<br>Cancer Networks were formed in order to oversee and organise the local implementation of the Cancer Plan and Cancer Reform Strategy for the areas within their jurisdiction. There were 28 Cancer Networks in England which have now been replaced by 12 Strategic Clinical Networks which will provide support to cancer networks 'nesting' within their boundary.<br>In consultation with the Gynaecological Site Specific Reference Group (SSCRG) it was decided that cancer network levels figures would be carried forward in the absence of any other relevant boundary, particularly as this will provide data for on-going peer review and whether improvements are being made over time.<br><br>NHS Strategic Health Authorities (SHA)<br>Strategic Health Authority data is available for the mortality, mortality and survival data. However, these organisation no longer exist and the |

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| | figures serve to provide a regional comparison in the absence of any other available data at present. The values for the SHAs can be seen by toggling the map and comparison button on each map. In the health profile, the regional value is shown as a grey diamond. Some cancer networks cross over more than one SHA boundary, the regional average is used for each cancer network and PCT where the majority of the area resides. However, when filtering in the, single, double and health profile map, the cancer networks that have a significant area falling within the boundary of the SHA are shown. The SHAs can be highlighted on the map by ticking the box in the legend. The borders will then be highlight in red. |
| **12. Further data availability** | See the report Major Surgical Resections, England, 2004-2006 |
| **13. Frequency/ timeliness of data updates** | It is not known when the report may be repeated. |
| **14. Disclosure control** | No rates have been suppressed as the smallest geography at which cervical cancer surgery rates are available is PCT level. |
| **15. Rationale for inclusion** | The rationale for including the findings from this report is to allow an initial understanding of the geographical variation in surgical rates. |