Geographic Patterns of Cancer Survival in England: Adults diagnosed 2004 to 2008 and followed up to 2013

Main findings

- For 8 of the most common cancers, there was an upward trend in 1-year and 5-year survival for adults diagnosed in England between 2004 and 2008.

- Among the 25 Area Teams in England, the largest annual change from 2004 to 2008 in 1-year survival was for oesophageal cancer (increasing 5.5% per year) for both men in 'Durham, Darlington and Tees' and for women in 'North Yorkshire and Humber'.

- Wide geographic differences in survival were observed. The range in 1-year survival between the 25 Area Teams was greater than 10% for cancers of the oesophagus and stomach in men, and for cancers of the oesophagus, stomach, colon and bladder in women.

Summary

Estimates for 1-year and 5-year net survival are presented for adults diagnosed with a cancer of the oesophagus, stomach, colon, lung, breast (women), cervix, prostate or bladder (Background notes 1 and 2) in England between 2004 and 2008. These cancers represent a large proportion of all cancer diagnoses for adults, and they reflect a variety of diagnostic and treatment pathways and trends in survival.

Results are presented for England as a whole, and for three geographic levels of organisation of the NHS in England – 4 NHS Regions, 12 Clinical Senates and 25 Area Teams (Background note 5).

Age-standardised survival estimates are presented for adults diagnosed between 2006 and 2008 and followed up to 2013. Estimates are age-standardised to adjust for changes in the age profile of cancer patients over time (Background note 3). To show trends over time, unstandardised survival

estimates for each year of the period 2004 to 2008 are also presented, together with the annual change (Background note 4).

Collaboration

The cancer registration data in this publication have been collected by the National Cancer Registration Service in Public Health England. This publication is produced in partnership with the Cancer Research UK Cancer Survival Group at the London School of Hygiene and Tropical Medicine.
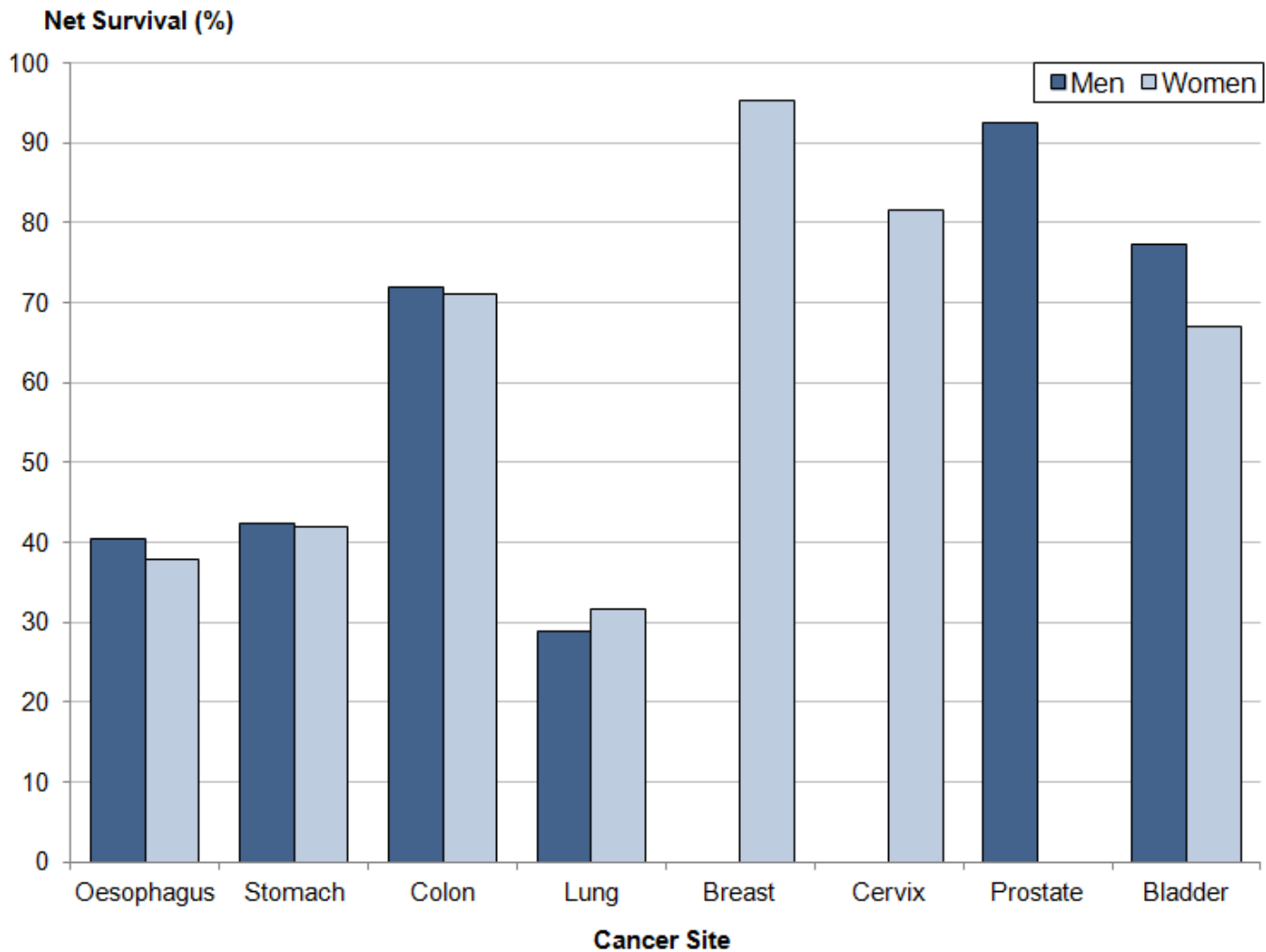
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Results

At a national level, 1-year survival was above 70% and 5-year survival above 45% for cancers of the colon, breast (women), cervix, prostate and bladder (Figures 1 and 2). It should be noted that changes in the coding and classification of bladder cancer in England from 2000 onwards has contributed to a reduction in the overall estimate of survival from bladder cancer (Background note 6). For cancers of the oesophagus, stomach and lung, survival remained very low, with 1-year survival less than 45% and 5-year survival less than 20%. Figures 1 and 2 show that 1-year survival is generally higher in men, except for lung cancer, while 5-year survival is higher in women, except for bladder cancer.

Figure 1: 1-year age-standardised net survival (per cent) for adults diagnosed between 2006 and 2008 and followed up to 2013: England, 8 common cancers, by sex

Source: Office for National Statistics, London School of Hygiene and Tropical Medicine

Notes:
1. Survival estimates are age-standardised (Background note 3)
2. Adults aged 15 to 99 years

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Figure 2: 5-year age-standardised net survival (per cent) for adults diagnosed between 2006 and 2008 and followed up to 2013: England, 8 common cancers, by sex

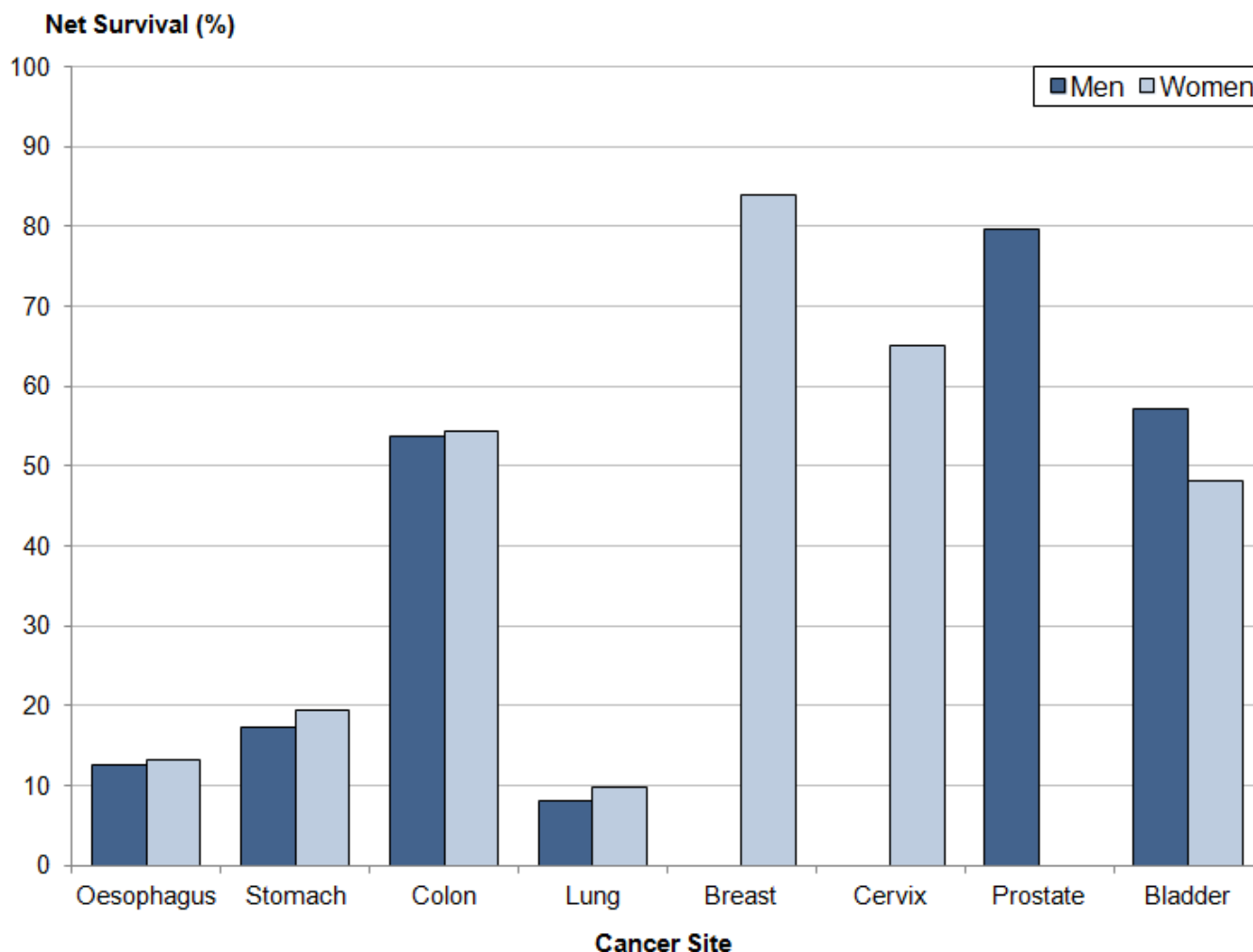Source: Office for National Statistics, London School of Hygiene and Tropical Medicine

Notes:

1.   Survival estimates are age-standardised (Background note 3)
2.   Adults aged 15 to 99 years

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The annual change in net survival presented in the reference tables describes the trend in cancer survival over a 5-year period as an absolute difference from one year to the next (Background note 4). For all the cancers presented, the annual change in 1- and 5-year survival at national level showed improvement between 2004 and 2008. The largest annual improvements in 1-year survival at national level were for cancer of the oesophagus (1.7% per year for men, 1.0% per year for women), stomach (1.5% per year for both men and women) and cervix (1.2% per year for women). The largest annual improvement for 5-year survival was for colon cancer (1.3% per year for men and 1.5% per year for women). For all other cancers, the annual increase for 1-year and 5-year

survival was less than 1% per year. At Area Team level, the largest annual improvements were for 1-year survival for oesophageal cancer (increasing 5.5% per year) for men in 'Durham, Darlington and Tees' and women in 'North Yorkshire and Humber'.

Wide and persistent differences in survival between the 25 Area Teams in England were seen for all cancers diagnosed between 2006 and 2008 (Tables 1 and 2). For women with a cancer of the oesophagus, stomach, colon or bladder, the absolute difference between the highest and lowest estimates in Area Teams was more than 10% for 1-year survival, and wide differences persisted at 5 years. Also, 5-year survival from cervical cancer differed widely between Area Teams (absolute difference around 17% between the highest and lowest estimates). For men, the largest absolute differences between the highest and lowest estimates were more than 12% for 1-year survival (oesophagus and stomach cancers) and more than 15% for 5-year net survival (prostate cancer). It should be noted that some sub-national variation in bladder cancer can be attributed to the progressive completion of changes in coding and classification by the regional cancer registries in England during this period (Background note 6).

Table 1: Range in 1-year net survival (per cent) between the 25 Area Teams in England: adults diagnosed between 2006 and 2008 and followed up to 2013, 8 common cancers, by sex

Age-standardised net survival (%)

ICD-10 code[2]	Site description	Men			Women			Persons		
		Min	Max	Range	Min	Max	Range	Min	Max	Range
C15	Oesophagus	34.2	46.5	12.3	30.2	44.0	13.7	33.2	43.1	9.9
C16	Stomach	35.2	47.5	12.3	35.5	49.4	13.9	35.9	47.6	11.7
C18	Colon	67.7	74.8	7.1	62.6	74.0	11.4	66.7	73.6	7.0
C33-34	Lung	23.7	33.2	9.5	26.3	34.7	8.4	25.5	32.0	6.5
C50	Breast	:	:	:	93.7	96.5	2.7	:	:	:
C53	Cervix	z	z	z	76.7	85.7	8.9	z	z	z
C61	Prostate	88.1	95.7	7.6	z	z	z	z	z	z
C67	Bladder	71.2	80.3	9.1	55.6	73.3	17.7	69.6	77.5	7.9

Table source: Office for National Statistics

Table notes:
1. Adults aged 15 to 99 years.
2. International Classification of Diseases, 10th edition.
3. The symbol (:) means not available. Breast cancer in males is rare, and survival estimates are not available.
4. The symbol (z) means not applicable.
5. Area Teams for which it was not possible to calculate an age-standardised estimate have been excluded.

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Table 2: Range in 5-year net survival (per cent) between the 25 Area Teams in England: adults diagnosed between 2006 and 2008 and followed up to 2013, 8 common cancers, by sex

Age-standardised net survivial (%)

ICD-10 code[2]	Site description	Men			Women			Persons		
		Min	Max	Range	Min	Max	Range	Min	Max	Range
C15	Oesophagus	7.8	16.1	8.3	7.3	17.8	10.5	8.9	16.1	7.2
C16	Stomach	12.7	20.8	8.1	13.5	23.2	9.8	13.5	22.1	8.6
C18	Colon	49.0	58.5	9.5	44.5	60.7	16.2	48.7	57.9	9.2
C33-34	Lung	5.8	9.6	3.9	7.2	12.1	4.8	6.8	10.5	3.7
C50	Breast	:	:	:	81.4	85.5	4.1	:	:	:
C53	Cervix	z	z	z	54.5	71.4	16.9	z	z	z
C61	Prostate	70.9	86.3	15.4	z	z	z	z	z	z
C67	Bladder	51.5	61.8	10.3	36.9	54.5	17.6	48.0	59.0	11.1

Table source: Office for National Statistics

Table notes:
1. Adults aged 15 to 99 years.
2. International Classification of Diseases, 10th edition.
3. The symbol (:) means not available. Breast cancer in males is rare, and survival estimates are not available.
4. The symbol (z) means not applicable.
5. Area Teams for which it was not possible to calculate an age-standardised estimate have been excluded.

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Additional information

Further information about cancer survival estimates that we publish can be found in the Cancer Survival Quality and Methodology Information paper. These are overview notes containing key qualitative information on the quality of statistics and a summary of the methods used to compile the output.

Statistics on cancer are produced:

- in Scotland by the Scottish Cancer Registry
- in Wales by the Welsh Cancer Intelligence and Surveillance Unit
- in Northern Ireland by the Northern Ireland Cancer Registry

Users and uses

Main users of cancer survival estimates include the Department of Health, academics and researchers, cancer charities, cancer registries, other government organisations and our researchers, the media, and the general public. The Department of Health uses cancer survival figures to brief government ministers, and as part of the evidence base to inform cancer policy and programmes, for example in drives to improve survival.

Cancer survival estimates that we publish are also included as indicators in the NHS Outcomes Framework 2013 to 2014 and the Clinical Commissioning Group indicator set, which are used to hold the NHS and commissioners to account. Academics and researchers use the figures to inform their research. Similarly Public Health England and other government organisations use the figures to carry out individual and collaborative projects. Charities use the data to provide reliable and accessible information about cancer to a wide range of groups, including patients and health professionals via health awareness campaigns and cancer information leaflets and web pages. Our researchers use the data to support further research and to publish alongside other National Statistics.

Policy context

In Improving Outcomes: A Strategy for Cancer (January 2011), the Department of Health stated that although improvements have been made in the quality of cancer services in England, a significant gap remains in survival compared with the European average. Survival estimates for cervical, colorectal and breast cancer are some of the lowest among member states of the Organisation for Economic Co-operation and Development (OECD). The strategy document sets out how the Department of Health aims to improve outcomes for all cancer patients and improve cancer survival, with the aim of saving an additional 5,000 lives every year by the financial year ending 2015.

Outcomes strategies set out how the NHS, public health and social care services will contribute to the ambitions for progress agreed with the Secretary of State in each of the high-level outcomes frameworks. The indicator set for the NHS Outcomes Framework 2013 to 2014 focuses on measuring health outcomes includes 1- and 5-year cancer survival indicators for all cancers combined, and for colorectal, breast and lung cancers combined.

References

1. Coleman MP, Rachet B, Woods LM, Mitry E, Riga M, Cooper N, Quinn MJ, Brenner H and

Estève J (2004). Trends and socio-economic inequalities in cancer survival in England and Wales up to 2001. British Journal of Cancer 90, 1367-1373.

2. Pohar Perme M, Stare J and Estève J (2012). On estimation in relative survival. Biometrics 68, 113-120.

3. Coleman MP, Babb P, Damiecki P, Grosclaude P, Honjo S, Jones J, Knerer G, Pitard A, Quinn MJ, Sloggett A and De Stavola BL (1999). Cancer survival trends in England and Wales 1971-1995: deprivation and NHS Region. Studies in Medical and Population Subjects no. 61. London: The Stationery Office.

4. Coleman MP et al. (2011). Cancer survival in Australia, Canada, Denmark, Norway, Sweden and the UK, 1995-2007 (the International Cancer Benchmarking Partnership): an analysis of population-based cancer registry data. The Lancet 377 (9760), 127-138.

5. Previous editions of the bulletin Geographic patterns of cancer survival are available on our website.

6. Clerc-Urmès I, Grzebyk M, Hédelin G (2014). Net survival estimation with stns. Stata Journal 14, 87-102.

7. Danieli C, Remontet L, Bossard N, Roche L and Belot A (2012). Estimating net survival: the importance of allowing for informative censoring. Statistics in Medicine 31, 775-786.

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Acknowledgements

Background notes

1. The cancer registration data in this publication have been collected by the National Cancer Registration Service in Public Health England. Patients were included in the analyses if they were diagnosed between the ages of 15 and 99 years with a primary, invasive, malignant neoplasm at one of the 8 specified sites, as defined in the 10th edition of the International Classification of Diseases: oesophagus (C15), stomach (C16), colon (C18), lung (C33-34), breast (C50), cervix (C53), prostate (C61), bladder (C67). Records of patients registered only from a death certificate, or who were diagnosed with a benign or "in situ" tumour, or a tumour that could not be classified as definitely malignant, were excluded. For further details of the exclusion criteria see Coleman et al. (2004).

2. Net survival is the survival that we would observe if cancer were the only cause of death. It is estimated by assuming the all-cause mortality to be the sum of the expected (background) mortality and the excess mortality due to cancer. Expected mortality is derived from general population life tables of all-cause mortality rates by age, sex, calendar year, deprivation and geographic region. Patients who were known to have died on the same day as they were diagnosed were included in the analyses with a survival time of one day. Estimation of net survival was carried out with the non-parametric Pohar-Perme estimator (Pohar Perme et al., 2012) as implemented in Stata within the stns command (Clerc-Urmès et al., 2014). This method adjusts for the informative censoring that arises when, for example, the death from cancer of elderly patients is less likely to be observed because of a higher competing risk of death from other causes (Danieli et al., 2012). For convenience, net survival is expressed as a percentage in the range 0 to 100%.

3. Net survival varies with age at diagnosis, and the age profile of patients can vary with time and between geographical areas. To enable comparison of survival for all ages combined over long periods of time or between geographical areas, age-standardised estimates are calculated as a weighted sum of the age-specific survival estimates using a standard age distribution. Here, we used the weights from the age distribution of cancer patients diagnosed during 1986 to 1990 in England and Wales (Coleman et al. 1999). This enables direct comparison with survival figures over the last 20 years. Age standardisation requires an estimate of survival to be available for each age group. Age-specific estimates may not be obtained if there are too few events (deaths) in a given age group. That can happen because survival is very high (there are very few deaths) or because it is very low (most of the patients die early in the 5-year period of follow-up). Where it was not possible to age-standardise, the unstandardised estimate has been presented, and this is clearly marked in the tables.

4. Net survival was estimated for each year from 2004 to 2008 (these results are not age-standardised). The annual trend in survival is the slope estimated by the variance-weighted least squares regression of the annual survival estimates. In some cases, it was not possible to calculate the unstandardised estimate for adults diagnosed with a particular cancer in a particular geography in a particular year because the numbers are too small. This has been clearly marked in the tables. The trend is reported only if at least 3 annual survival estimates are available and the absolute difference in survival between 2 consecutive years is not higher than 20%. The p-value indicates whether or not the annual change reported is statistically significant. A p-value lower than 0.05 indicates that we can be more than 95% confident that the observations represent a real change and have not just occurred by chance.

5. Previous editions of this bulletin (published prior to 2014) present results by Government Office Region, Strategic Health Authority and Cancer Network. The latter 2 geographies were abolished in April 2013 by changes in the core structure of the NHS. Clinical Senates were established across England in April 2013 to provide strategic clinical advice and leadership to Clinical Commissioning Groups (CCGs) and the NHS Commissioning Board. There are 12 Clinical Senates: assigned to fixed geographies, Clinical Senates comprise a range of professionals and take an overview of health and healthcare for local populations by providing advice and leadership on how services should be designed to provide the best overall care and outcomes for patients.

6. Transitional-cell papillomas of the bladder diagnosed from 2000 onwards were reclassified from malignant to non-malignant. Non-malignant tumours are excluded from these analyses. Survival from transitional-cell papillomas is high. Excluding them from the analysis therefore reduces the overall estimate of survival from bladder cancer. Geographic variation in the speed with which the changes in pathological classification were applied affects the geographic pattern of survival.

7. The introduction of the Prostate-Specific Antigen (PSA) test during the 1990s increased the diagnosis of asymptomatic prostate cancers. Men with these tumours have higher survival.

8. Previous editions of this bulletin are available on our website.

9. A list of the names of those given pre-publication access to the statistics and written commentary is available in Pre-release Access List: Geographical patterns of cancer survival, adults followed up to 2013 . The rules and principles which govern pre-release access are featured within the Pre-release Access to Official Statistics Order 2008.

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11. Details of the policy governing the release of new data are available by visiting www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html or from the Media Relations Office email: media.relations@ons.gsi.gov.uk

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