Institution: London School of Hygiene & Tropical Medicine (LSHTM)

Unit of Assessment: UoA2 – Public Health, Health Services & Primary Care

Title of case study: Cancer survival: impact on cancer control policy in England

1. Summary of the impact

The core target in the government's national strategy for cancer control in England is to 'save 5,000 lives a year by 2015'. This target was taken directly from research done by LSHTM showing that 10,000 cancer-related deaths per annum would be avoidable if five-year relative survival were as high as the highest levels observed in Europe. Current government strategy is entirely focused around 'halving the gap' in avoidable premature cancer deaths identified in this research, which also forms the basis for England's National Awareness and Early Diagnosis Initiative.

2. Underpinning research

In August 2003, EUROCARE-3, an EU-funded study, published data confirming that cancer survival five years after diagnosis in the UK was below the European average for most cancers. LSHTM's Cancer Survival Group (CSG), led by Michel Coleman (Professor of Epidemiology and Vital Statistics at LSHTM since 1995) and Bernard Rachet (Clinical Reader in Cancer Epidemiology, at LSHTM since 2002, then Clinical Lecturer), and employing three Research Fellows, was formed in 2005 (grants 1, 2, 4). Its goal has been to identify, quantify and explain inequalities in survival, specifically to inform health policy for improved cancer control. The Cancer Survival Group now has more than 20 scientific staff, with worldwide collaborations in cancer survival research and methodological development.

Early work involved the evaluation of the effectiveness of the NHS Cancer Plan (2000) in improving one-year survival in England, by explicitly seeking acceleration in the underlying trends before (1995–1999), during (2000–2003) and after (2004–2006) implementation of the Plan. The Group took advantage of a natural experiment in that, despite NHS similarities in England and Wales, Wales did not have a formal cancer plan until 2006. They found that survival increased more quickly during 2004–2006 in England than in Wales for about half the cancers examined. [3.1]

The research underpinning the core target in the current national cancer strategy in England (*Improving Outcomes: A Strategy for Cancer, 2011*) was initiated by the Group in 2008, in collaboration with Professor Timo Hakulinen (University of Helsinki) and Dr Manar Abdel-Rahman (University of Khartoum). The Group developed a method to estimate the annual number of cancer-related deaths within five years of diagnosis in Britain that would not be expected to occur if relative survival were as high as the highest levels observed in Europe.[3.2] International comparisons of survival from the EUROCARE programme were used to estimate trends in 'avoidable premature mortality' over the previous 15 years. This was done as the product of the number of five-year survivors expected from life tables and the difference in relative survival between each country in Britain and the highest survival in Europe, summed across age group, sex, type of cancer and country.

In August 2010, in a *BMJ* editorial, two eminent cancer specialists, Valerie Beral and Richard Peto, dismissed international comparisons of cancer survival involving the UK as 'unreliable', on the basis of two proposed errors in national cancer registry data. In response, the Cancer Survival Group rapidly performed a full-scale simulation of the proposed errors. This provided firm evidence to refute the critique.[3.3]

In 2010, the Department of Health (DH) commissioned the Group to perform a major international comparison of cancer survival involving six high-income countries as part of the International Cancer Benchmarking Partnership (ICBP). It showed that UK survival up to 2007 improved faster than comparator countries for breast cancer, but not for cancers of the bowel, lung or ovary.[3.4] Subsequent analyses indicated that the UK survival deficits are partly explained by later diagnosis and partly by lower stage-specific survival.[3.5, 3.6]

3. References to the research

3.1 Rachet, B, Maringe, C, Nur, U, Quaresma, M, Shah, A, Woods, LM, Ellis, L, Walters, S, Forman, D, Steward, JA and Coleman, MP (2009) Population-based cancer survival trends in England and Wales up to 2007: an assessment of the NHS cancer plan for England, *Lancet Oncology*, 10(4): 351–369, doi: 10.1016/S1470-2045(09)70028-2. Citation count: 59.

3.2 Abdel-Rahman, MA, Stockton, DL, Rachet, B, Hakulinen T and Coleman, MP (2009) What if cancer survival in Britain were the same as in Europe: how many deaths are avoidable?, *British Journal of Cancer*, 101(Suppl. 2): s115–124, doi: 10.1038/sj.bjc.6605401. Citation count: 39.

3.3 Woods, LM, Coleman, MP, Lawrence, G, Rashbass, J, Berrino, F and Rachet, B (2011) Evidence against the proposition that 'UK cancer survival statistics are misleading': simulation study with National Cancer Registry data', *BMJ*, 324(d3399), doi: 10.1136/bmj.d3399. Citation count: 9.

3.4 Coleman, MP, Forman, D, Bryant, H, Butler, J, Rachet, B, Maringe, C, Nur, U, Tracey, E, Coory, M, Hatcher, J, McGahan, CE, Turner D, Marrett, L, Gjerstorff, ML, Johannesen, TB, Adolfsson, J, Lambe, M, Lawrence, G, Meechan, D, Morris, EJ, Middleton, R, Steward, J, Richards MA and ICBP Module 1 Working Group (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, *Lancet*, 377(9760): 127–138, doi: 10.1016/S0140-6736(10)62231-3. Citation count: 149.

3.5 Walters, S, Maringe, C, Butler, J, Rachet, B, Barrett-Lee, P, Bergh, J, Boyages, J, Christiansen, P, Lee, M, Wärnberg, F, Allemani, C, Engholm, G, Fornander, T, Gjerstorff, ML, Johannesen, TB, Lawrence, G, McGahan, CE, Middleton, R, Steward, J, Tracey, E, Turner, D, Richards, MA, Coleman, MP and ICBP Module 1 Working Group (2013) Breast cancer survival and stage at diagnosis in Australia, Canada, Denmark, Norway, Sweden and the UK, 2000–2007: a population-based study, *British Journal of Cancer*, 108(5): 1195–1208, doi: 10.1038/bjc.2013.6. Citation count: 2.

3.6 Maringe, C, Walters, S, Rachet, B, Butler, J, Fields, T, Finan, PJ, Maxwell, R, Nedrebø, B, Påhlman, L, Sjövall, A, Spigelman, A, Engholm, G, Gavin, A, Gjerstorff, ML, Hatcher, J, Johannesen, TB, Morris, EJ, McGahan, CE, Tracey, E, Turner, D, Richards, MA, Coleman, MP and ICBP Module 1 Working Group (2013) Stage at diagnosis and colorectal cancer survival in six high-income countries: a population-based study of patients diagnosed during 2000–2007, *Acta Oncologica*, 52(5): 919–932, doi: 10.3109/0284186X.2013.764008. Citation count: 3.

Key grants (all to Coleman)

1. Cancer survival programme, Cancer Research UK, 4/2005–3/2010, £1,984,261.
2. Post-doc fellowship for Laura Woods (part-time), Cancer Research UK, 10/2006–6/2017, £239,159.
3. International Cancer Benchmarking Partnership, DH via McKinsey Consultants, 1/2010–12/2011, £162,583.
4. Cancer Survival Programme, Cancer Research UK, 4/2010–3/2015, £1,185,330.

4. Details of the impact

CSG research has been central to how UK government and the NHS have targeted investment in cancer services and devised strategies to improve cancer survival and reduce inequalities.

In the period since 2008, CSG members have frequently and on an ongoing basis been called upon to advise the DH on cancer policy. This included working closely with Professor Sir Mike Richards, the government's first National Cancer Director, mainly through policy-influencing initiatives such as the National Cancer Action Team (2008–2013), the National Cancer Policy Team, the Cancer Reform Strategy Advisory Board (April 2010) and the National Cancer Intelligence Network (Scientific Advisory Panel 2010–2013).[5.1]

The CSG has also been responsible for producing the UK's annual official **national statistics** on cancer survival since 1999, both nationally, for various NHS geographies,[5.2] and for the UK.[5.3] Since 2008, this has included close collaboration with the Office for National Statistics (ONS) analysing and publishing trends and sociodemographic patterns in cancer survival for major cancers by age, sex and socioeconomic status in England. These statistics and research are used by policy-makers and key stakeholders at national and local levels to evaluate and update cancer policy.

CSG research estimating the number of avoidable premature deaths arising from the UK cancer survival deficit relative to Europe featured heavily in the evidence underpinning the DH's **National Awareness and Early Diagnosis Initiative** (NAEDI), launched in November 2008. Established as part of the government's strategy to improve cancer outcomes, NAEDI draws on CSG findings to support its key hypothesis that delays in cancer diagnosis are linked to poor survival and avoidable deaths in the UK. As a result, the government has focused its entire cancer strategy around 'halving the gap' in avoidable premature cancer deaths identified in LSHTM research.[5.4] In its 2011 assessment of NAEDI's impact on NHS costs and public benefits, the DH found that 'earlier diagnosis is generally cost-effective, but not cost-saving. If people are diagnosed earlier … the benefit is a substantial improvement in health outcomes'.

Building on NAEDI, in 2010, the DH commissioned the CSG to design and execute survival comparisons for the **International Cancer Benchmarking Partnership**, a global partnership aimed at improving cancer survival outcomes by optimising cancer polices and services, intended to feed directly into England's national cancer strategy for 2011. The results of CSG research were considered so important by the DH that publication of the government's plans to reform health and care services, ***Improving Outcomes: a Strategy for Cancer***[5.5] was delayed until the LSHTM-authored article in *The Lancet*[3.4] was accepted for publication and could be cited in the new strategy. This article is the first one listed under 'New evidence supporting the development of this strategy', where it is described thus: 'We now have internationally comparable data which is more robust and up-to-date than has been possible before'.

The 2010 Beral/Peto criticism of the international survival comparisons, upon which the government's cancer strategy is based, threatened to undermine both official and public confidence. The CSG's independently initiated research, published in rebuttal in 2011, provided policy-makers with evidence of the robustness of comparisons derived from the national cancer registration data for England.[3.3] The DH initiated its own review of the cancer registration scheme, but considered the CSG's peer-reviewed research as the strongest plank of evidence for the strategic utility of cancer registration in cancer control policy.[5.1]

In January 2013, the CSG was commissioned by the DH to develop interim metrics to evaluate progress toward the central target in national cancer control policy (i.e. to 'save 5,000 lives' a year by 2014–2015.) CSG researchers developed several such metrics, and wrote Annex C of the second annual report of the DH's 2012 report, ***Improving Outcomes: A Strategy for Cancer***.[5.6] The DH then commissioned the CSG to update these estimates with the results of the EUROCARE-5 study in 2013, to assess progress in reducing the survival deficit.

Additional commissions from the DH during the REF's impact period include the production of the indicators of cancer survival specified for the NHS Outcomes Framework[5.7] and the indicators of cancer survival for the Clinical Commissioning Groups Outcome Indicator Set;[5.8] both in January 2013.

Such has been the relevance of CSG's cancer survival research that during the REF's impact period, Coleman has delivered invited presentations or keynote lectures at more than 50 major national and international conferences and meetings for policy-makers and stakeholders at the highest levels.[5.9] He has also been regularly called upon by national and international media to provide expert information based on the CSG's research.[5.10]

5. Sources to corroborate the impact

5.1 National Cancer Director, England (until March 2013), DH, to corroborate the impact of the CSG's research on cancer control policy in England.

5.2 Quaresma, M, Whitehead, S, Coleman, MP and Rachet B (2012) *Combined Cancer Survival by Primary Care Trusts, Patients Diagnosed 1996–2010, Followed Up to 2011*. London: ONS, http://www.ons.gov.uk/ons/rel/cancer-unit/combined-cancer-survival-by-primary-care-trusts/patients-diagnosed-1996-2010--followed-up-to-2011/index.html (accessed 14 November 2013).

5.3 OECD (2011) *Health At a Glance 2011: OECD Indicators*. Paris: OECD Publishing, doi: 10.1787/health_glance-2011-en.

5.4 Richards, MA (2009) The National Awareness and Early Diagnosis Initiative in England: assembling the evidence, *British Journal of Cancer*, 101(Suppl. 2): s1–4, doi: 10.1038/sj.bjc.6605382.

5.5 DH (2011) *Improving Outcomes: A Strategy for Cancer – January 2011*. London: DH, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/213785/dh_123394.pdf (accessed 14 November 2014).

5.6 DH (2012) *Improving Outcomes: A Strategy for Cancer – Second Annual Report 2012*. London: DH, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/136551/Improving_outcomes_second_annual_report.pdf (accessed 14 November 2014).

5.7 DH (2011) *The NHS Outcomes Framework 2012/13: Technical Appendix*. London: DH, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/213713/dh_131721.pdf (accessed 14 November 2014).

5.8 Health and Social Care Information Centre (2013) *CCG OIS (Clinical Commissioning Groups Outcome Indicator Set) Planned Publication Schedule*. London: Health and Social Care Information Centre, http://www.hscic.gov.uk/media/11813/Clinical-Commissioning-Groups-OIS-Publication-Schedule/pdf/CCG_OIS_publication_schedule_14_Jun.pdf (accessed 14 November 2013).

5.9 List of conferences, seminars and other events for policy-makers, practitioners and/or stakeholders featuring invited presentations or keynote lectures delivered by Professor Michel Coleman between 1 January 2008 and 31 July 2013 is available upon request.

5.10 Michel Coleman's many media engagements include a two-part cancer documentary series, *Catching Up With Cancer*, broadcast on BBC Radio 4, February–April 2008, http://www.bbc.co.uk/programmes/b008vt6c http://www.bbc.co.uk/programmes/b008vzdq (accessed 14 November 2013). International media coverage includes Canada TV News 16 July 2008, http://www.ctvnews.ca/canada-gets-high-ranking-for-cancer-survival-rates-1.309105 (accessed 14 November 2013). A full list of media engagements 1 January 2008–31 July 2013 available here: http://www.lshtm.ac.uk/eph/ncde/cancersurvival/research/media_engagements_since_2008.pdf (accessed 15 November 2013).