

Director of Public Health

**Trends in cancer incidence, prevalence and survival: implications for public health.**

**Recommendations:**

**The Board is asked to note:**

- **Numbers of new cancers will continue to increase in the foreseeable future and that an aging population is a major reason for this.**
- **The persisting importance of smoking on cancer incidence**
- **The increasing importance of obesity, alcohol consumption and diet on common cancers.**
- **HEAT targets on child healthy weight initiatives, alcohol brief interventions and smoking cessation interventions have been met or exceeded in 2009-11 and these will contribute to reducing cancer incidence and improving survival.**
- **The incidence of malignant melanoma has increased more than any other cancer and is the fourth commonest malignancy in women.**
- **New HEAT targets on increasing detection and treatment of colorectal, lung and breast cancers by 25% are being introduced.**
- **Interpretation of clinical audit and survival data to identify variations in survival and components of best quality care will contribute to quality improvement of cancer services.**

**1. Introduction.**

Cancers are the second most common cause of death in NHSGGC residents, responsible for 3644 deaths in 2009. Over the past 10 years, cancer incidence has risen in women and fallen in men. Beneath these total figures, however, are important differences between cancer types that reflect changes in risk factors and in the population at risk. Survival from most cancers has also increased, so larger numbers of

people are living with a diagnosis of cancer. This has implications for determining when to discharge patients from follow-up and for helping to prevent new cancers in survivors.

The purpose of this paper is to highlight important patterns of cancer incidence, prevalence and survival and to indicate their implications for public health in NHSGGC. We highlight aspects of 5 of the 7 priorities set out in *Better Cancer Care, An Action Plan*: prevention, early detection, treatment, living with cancer and improving quality of cancer care for patients.

## 2. Incidence of the commonest cancers

The number of new cases of cancer is likely to continue to increase by about 1.4% per year until at least 2020.<sup>1,2</sup> This will place increasing demands on diagnostic and treatment services in NHSGGC. The increasing number of cancer cases is largely due to an increase in the at-risk population – most cancers occur in the increasingly large elderly population – but there have also been increases in some risk factors. Some cancers are becoming less common, notably cancers of the stomach, lung and cervix. Trends in cancer incidence need to be revised regularly, because it can be difficult accurately to predict future cancer incidence. In Scotland, rises in male rectal cancers, melanoma in women, and prostate cancer were underestimated by over 20%.<sup>1</sup>

In men, prostate cancer is the commonest incident cancer and rose by 17% in the past decade; lung cancer is second commonest and fell by about 18% in the past decade; and colorectal cancers are third commonest with little change in incidence. In women, the commonest cancers are breast cancer, which rose by 8% in the past decade; lung cancer, which rose by 16% in the past decade; and colorectal cancer, which, as in men, has changed little in the past decade. The fourth commonest cancer in women is malignant melanoma, which rose by 70% over the past decade.

### ***Socio-economic patterns of cancer incidence***

There is a small excess of breast and prostate cancers in more affluent populations. The reasons for the excess in female breast cancers can be explained by some known risk factors (see below) and more broadly because longer life expectancy is associated with higher risks of most cancers. The higher risk of lung cancers in more deprived areas can be explained by higher prevalence of smoking. The West of Scotland Cancer Surveillance Unit has identified a recent socio-economic gap between colorectal cancer incidence among men from affluent and deprived areas,<sup>3</sup> such that if all men experienced the same risks of bowel cancer as those in the most affluent areas, there would be 75 fewer new cases of bowel cancer per year in the West of Scotland. In Scotland, over the last few decades, smoking, obesity and poor diet (higher consumption of non-diet drinks, crisps, savoury snacks, chips and meat products; lower consumption of fruit and vegetables) have been more prevalent among the most deprived.<sup>4,5</sup>

### ***Public health implications:***

Smoking remains the single largest preventable cause of cancers. It causes about 90% of lung cancer and is also a causal factor for oesophageal, laryngeal, oral, pancreatic, bladder, stomach, bowel and other malignancies. Smoking is responsible for over a

quarter of all cancer deaths and about a quarter of all deaths.<sup>6</sup> Although the prevalence of smoking continues to fall slowly in all socio-economic groups, it remains much more common (39-44% of adults) in the most deprived areas compared to the most affluent (16-18%) areas.<sup>7</sup>

The causes of prostate cancer and the steep rise in incidence are not well understood but are the subject of ongoing research in Glasgow. There is evidence that high cholesterol – which is associated with obesity and liver disease – may increase the risk of more aggressive prostate cancer.<sup>8</sup> Greater detection of prostate cancer is also likely to explain some of the increase in incidence, but it seems probable that a true increase has also occurred.

Reducing risk factors for breast cancer is complex because it is partly a disease of affluence and desirable social outcomes - such as delaying starting a family to complete full-time education - are risk factors. Larger birth weight, earlier menarche, and later menopause are also associated with good general health but increased breast cancer risk. However, obesity, alcohol consumption and poor diet are all modifiable risk factors for breast cancer and 42% of cases might be avoided through modification of these three factors.<sup>9</sup> There was widespread media coverage of a report in the British Journal of Cancer in July 2011 in which obesity was identified as the leading driver of breast cancer.<sup>10,11</sup>

The main known risk factors for colorectal cancer are poor diet (the characteristic Western diet high in red meat and saturated fat, low in vegetables); obesity; alcohol and lack of exercise. Colorectal cancer incidence increased by about 30% between 1970s and early 1990s, indicating that it is strongly influenced by behavioural factors. Red meat increases the risk of colorectal cancer by 15% for every 50g/day consumed; every unit of alcohol increases the risk by about 9%, with a greater effect in men than women; and each extra inch of waist circumference increases risk by 5%.<sup>9</sup>

Malignant melanoma is caused by ultraviolet light exposure – principally from sunlight and sunbeds. Childhood sun exposure is a particular risk factor. The recent increase in malignant melanoma in Scotland is attributable to the fashion for having a suntan and from the effects of short high-intensity sun exposures on un-acclimatised Caucasian skin, particularly the trunk, from sunny foreign holidays. There is evidence that national campaigns can reduce risks of malignant melanoma in Australia<sup>12</sup>.

The Board has been successful in meeting or exceeding relevant 2009-11 HEAT targets that reduce risk factors for cancers and other chronic diseases. These include child healthy weight initiatives (which have just exceeded the target of 850); alcohol brief interventions (which exceeded the target of 34,902); and smoking cessation interventions (which were delivered on the target of 21,240).

NHSGGC continues to work with its associated local authorities to deliver school health and wellbeing programmes as part of the Curriculum for Excellence. Both primary and secondary school tobacco prevention and education programmes are designed to extend children's learning on the topic across all curriculum areas as well having clear links to Curriculum for Excellence Experiences and Outcomes. In addition to school programmes, the W-WEST Youth Advocacy & Peer Education programme provides young people with the opportunity to develop their learning outwith the formal school setting through engagement in community settings and innovative approaches such as social networking, web site development, and social marketing.

The incidence of most cancers increases steeply with age, particularly beyond middle age. Successes in reducing deaths from other causes, such as cardiovascular diseases,

as well as cancers, have led to increasing numbers of adults surviving into older age and therefore being at risk of developing cancers. Age itself is not a risk factor that we would want to change but we need to consider how best to reduce known risk factors throughout adult life. There may be scope for targeting cancer survivors for preventive interventions (see *Living with cancer*, below).

Skin cancer awareness is being raised through a range of ongoing projects including events with staff and patients in Victoria and Stobhill ACHs and Yorkhill Hospital, which include a drop in "mole check" session piloted last year. NHSGGC conducts a regular campaign of sun safety information events with primary schools and under-5's establishments.

### **3. Stage at diagnosis and early detection**

The *Detect Cancer Early Initiative* was launched by the Scottish Government in August 2011.<sup>13</sup> It requires all Health Boards to increase the proportion of patients diagnosed and treated when their cancer is at the earliest stages by 25%. This will be part of a HEAT target and apply to colorectal, breast and lung cancers. It is based on the observation that poorer survival from most cancers in the UK compared with the rest of Europe, presented in the EURO CARE studies,<sup>14</sup> is largely due to excess early deaths and that this is because of later stage at presentation. However, there is currently much debate about whether this is true (see below for current debate on *Why is cancer survival poorer in the UK than Europe?*). It should be noted that a systematic review on interventions to promote earlier presentation of cancers<sup>15</sup> found that most had limited impact and the effects were short-lived.

Patients who present with cancers at an earlier stage are more likely to live longer or be cured. It is less clear, however, whether some patients present with less advanced disease because it is slower-growing and would be less likely to affect their survival, while those with more advanced disease have more aggressive cancers. Thus, there is an ongoing debate about the effectiveness of early detection and screening programmes on reducing cancer mortality. An analysis of breast cancer screening widely publicised in July 2011 concluded that it did not "play a direct part in reductions on breast cancer mortality" and that improvements in treatment were responsible.<sup>16</sup> Any benefits of screening also need to be weighed against over-diagnosis, where asymptomatic cancers are detected in patients who would not otherwise have had symptoms of the disease for the rest of their lives. The evidence in favour of faecal occult blood test screening for bowel cancer, currently used in NHSGGC, suggests that about 1 in 6 bowel cancer deaths can be avoided, partly because precancerous adenomas can be removed (which prevents cancer occurring in the first place) and partly because earlier detection of cancers leads to a higher cure rate.<sup>17</sup> In the first few years of the bowel cancer screening programme, we expect to see an increase in new cancers, particularly those at an earlier stage, followed by a decline to previous, or lower than previous, levels.

The natural history of many common cancers is still not well understood. This is particularly the case for prostate cancer, where there is considerable clinical uncertainty about how to manage men with lower-grade disease which may not progress to become clinically important. We are therefore studying prognostic factors for prostate cancers to try to help clinicians better manage the increasing number of cases.

### **Public health implications:**

Health Improvement and the public health screening unit will contribute to achieving the HEAT target to improve early detection and treatment of colorectal, breast and lung cancers. Initiatives are likely to include public and professional awareness campaigns based on evidence of the most effective approaches, and collaboration with clinicians to review referral and diagnostic pathways.

The West of Scotland Cancer Surveillance Unit will continue to collaborate with cancer Managed Clinical Networks to determine the roles of early detection, compared with other factors (such as co-morbidities, biological measures of inflammation, and treatment) on survival for cancer in NHS GGC area.

## **4. Treatment and quality of care.**

Survival is a useful proxy measure of quality of care for cancer, although survival also depends on stage of cancer at diagnosis, cancer type, general health of the patient and in some cases, age, as well as treatment. Some broad observations for the most common cancers can be made. Five-year relative survival for the commonest cancers are shown in Table 1. These show what percentage of patients are still alive after 5 years compared to individuals of the same age and sex in the Scottish population. Survival has improved only a small amount for lung cancer, making primary prevention by far the most effective way of reducing deaths from the disease. Large improvements in 5-year survival occurred for prostate cancer, increasing from 47% to 86% between 1983 and 2007. There have also been significant improvements in survival for cancers of the female breast, colorectal cancers and malignant melanomas.

**Table 1. 5-year relative survival (%) for patients diagnosed between 1983 and 2007 (patients aged 15-99 years) in Scotland.**

	Calendar period				
	1983-1987	1988-1992	1993-1997	1998-2002	2003-2007
<b>Lung, trachea, bronchus (all)</b>	6	7	7	7	8
<b>Prostate</b>	47	54	66	78	86
<b>Breast (female)</b>	65	72	78	83	86
<b>Colorectal (all )</b>	37	44	48	54	55
<b>Malignant melanoma (all)</b>	80	88	89	91	93

### ***Why is cancer survival poorer in the UK than in Europe?***

The EURO CARE-4 analysis found that cancer survival in all UK countries was poorer than the European average for most types of cancer.<sup>14</sup> Malignant melanoma was the only malignancy identified by EURO CARE-4 in which survival in Scotland compared favourably with other European countries. These results have led to concerns that cancer treatment is poorer in the UK than the rest of Europe. However, it remains unclear whether this is true.

There are three main explanations for the poorer survival of cancer patients in the UK compared with the European average. These comprise: artefacts due to international differences in calculating cancer survival;<sup>18,19,20</sup> later stage at diagnosis and poorer general patient health; and differences in the quality of treatment. There is evidence that surgery for non-small cell lung cancer, for example, is about half that of other European countries. Later diagnosis and differences in treatment are most likely to explain international variations in cancer survival<sup>21</sup> and the International Cancer Benchmarking Partnership (ICBP) aims to identify which has the largest effect.<sup>22</sup> Irrespective of the conclusions of the ICBP, efforts to both improve early detection and the quality of cancer care are required.

### ***Understanding determinants of cancer survival in the West of Scotland***

Co-morbidities (in particular those due to smoking, alcohol, poor diet, obesity and socio-economic deprivation) are likely both to influence patients' survival directly and also their fitness to receive optimal cancer treatment. The West of Scotland Cancer Surveillance Unit (WoSCSU) recently presented evidence<sup>23</sup> that the gap in survival from colorectal cancer between deprived and affluent populations becomes larger with more advanced stage at presentation. That is, earlier detection alone would not remove the socio-economic differential in mortality from bowel cancer. The National Awareness and Early Diagnosis Initiative also found that early detection alone did not fully explain geographic survival variations for lung, colorectal and prostate cancers and differences in treatment might also have been important. However, geographic differences in survival for breast cancer largely occurred soon after diagnosis, suggesting that earlier detection was the most important factor.<sup>24</sup> The WoSCSU is also working with colleagues at the University of Glasgow department of surgery to evaluate how measures of inflammation, in addition to conventional prognostic measures, might predict cancer survival. Such information may lead to treatments to reduce inflammatory factors and thereby improve prognoses in cancer patients.

### ***Effectiveness of treatment for advanced cancer***

Relatively little is known about the effectiveness of treatment of advanced cancer, particularly after several attempts at treatment have been tried. The WoSCSU is evaluating survival and other outcomes (including inpatient hospital stays) of treatment of advanced breast cancer to give clinicians and patients more information on what might be expected from treatment of advanced breast cancer.

### ***Public health implications:***

Poor general health can reduce patients' capacity to receive optimal cancer treatment. Thus, effective health improvement interventions are important not just in preventing cancer but in improving survival. Success in achieving HEAT targets for health improvement (see page 3) will contribute to improving cancer outcomes in NHSGGC area.

Local evaluation of the effectiveness of cancer services is complex as reasons are multifactorial and require individuals who are skilled in data management and cancer statistics. The West of Scotland Cancer Surveillance Unit works with cancer Managed

Clinical Networks within NHSGGC and across the region to identify variations in cancer survival and to indicate how services should respond. This work forms part of a cycle of quality improvement. Current themes include an evaluation of the effects of introducing the breast cancer Managed Clinical Network in Glasgow, and identification of which patients benefit most from referral to regional specialist ovarian cancer services.

## **5. Living with cancer**

We estimate that about 33,000 individuals in Glasgow are living after a diagnosis of cancer (not including non-melanoma skin cancers). They largely comprise common cancers with a good prognosis. Thus there are just under 9000 female breast cancer survivors, 4700 bowel cancer survivors, 3700 prostate cancer survivors but only 1400 lung cancer survivors. There are also about 1400 female survivors of malignant melanoma in NHSGGC.

### ***Public health implications:***

Cancer survivors continue to be at risk of developing new cancers. There is also some evidence that health improvement (particularly stopping smoking and exercise) improve survival. The WoSCSU is collaborating with Stirling University on a national study of patients undergoing investigation for colorectal cancer (Cancer as a Catalyst for Change project). The aims are to determine whether investigation and diagnosis of colorectal cancer are useful events at which to provide enhanced health improvement interventions.

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