Guidance on Commissioning Cancer Services

Improving Outcomes in Lung Cancer

The Manual
Purpose of this document

This booklet is intended to help those planning and commissioning cancer services, in partnership with local hospitals and the community to improve the quality of care for people with lung cancer or those at higher risk of developing the disease. It is intended to support the ongoing implementation of the recommendations within the report ‘A Policy Framework for Commissioning Cancer Services’.

Other relevant publications

A Policy Framework for Commissioning Cancer Services NHSE 1995
Guidance for Purchasers: Improving Outcomes in Breast Cancer NHSE 1996
Guidance on Commissioning Cancer Services: Improving Outcomes in Colorectal Cancer NHSE 1997
# Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreword</td>
<td>3</td>
</tr>
<tr>
<td>Introduction</td>
<td>5</td>
</tr>
<tr>
<td>Key Recommendations</td>
<td>8</td>
</tr>
<tr>
<td>Background</td>
<td>10</td>
</tr>
</tbody>
</table>

## The Topic Areas

1. Prevention .......................... 15
2. Access, Diagnosis and Staging .......... 23
3. Multiprofessional Teams ............... 28
4. Communication, Information and Support 32
5. Radical Treatment for Non-small Cell Lung Cancer (NSCLC) 35
6. Radical Treatment for Small Cell Lung Cancer (SCLC) 42
7. Palliative Interventions and Care ........ 46

## Appendices

1. Developing the Guidance: the Process .................. 51
2. People and Organisations Involved in Production of the Guidance ........ 53
3. Glossary of Terms .................................. 67
This, the third report in the guidance series, deals with the leading cause of cancer death in the United Kingdom. The preponderance of male deaths from lung cancer reflects higher rates of smoking amongst men than women for most of this century. The link between smoking and lung cancer became widely accepted in the 1960s and rates of smoking in males have dropped considerably since that time. Mortality trends clearly show the resulting steady decline in male deaths, together with an increasing female death rate due to the rise in smoking amongst women during the post war years. As rates of smoking amongst men and women in the population approach parity, lung cancer is taking over from breast cancer as the leading cause of cancer death amongst women.

It has been apparent to those preparing this report on lung cancer that prevailing attitudes towards this disease and its treatment are characterised by a sense of pessimism, at the extreme by a degree of nihilism, amongst some professionals. To put this view crudely, it doesn't matter what you do for patients with lung cancer because they all die relatively quickly. Where, then, is the incentive to provide good care? Whilst lung cancer does carry a poor prognosis for many patients, there is ample evidence to support the view that better organisation and delivery of treatment and care can make a worthwhile difference. Health professionals, including those responsible for commissioning and managing services, need to be encouraged to adopt a more positive view of the improvements in health that can be achieved for large numbers of patients with lung cancer. In this context, Macmillan Cancer Relief are to be congratulated on their campaign, begun in autumn 1997, to raise the profile of lung cancer amongst the public, patients, and professionals.

This is the first of the guidance reports in which the theme of primary prevention has real importance. The natural history of smoking behaviour is that smokers are recruited to the habit when young, most in their teens. This typically leads to continuing dependency over many years, eventually resulting for many smokers in ill health, principally respiratory and cardiovascular diseases, from which as many as one in two smokers will ultimately die. Although the decision to start smoking regularly, or to continue the habit, might be construed as an issue of individual choice, this is over simplistic. The ‘dice’ are loaded by peer group and societal pressures, both smoking and related death rates show a persistent association with socio-economic disadvantage.

Preventive activity is possible on a number of levels. Practical strategies necessitate partnerships between the NHS and other agencies at a local level. These need to be directed towards reducing the take-up of smoking amongst the young, and providing support to enable smokers to quit at all ages. These measures take place against a background promotion of tobacco smoking through advertising (including sponsorship). In this context the 1997 European Community agreement to address tobacco advertising in all its forms is to be welcomed.
In the long term, prevention is the only foreseeable means by which the impact of this disease on the population can be radically reduced. However, the development of lung cancer occurs slowly over many decades, resulting in a peak incidence in the age group 65 to 74. Therefore most of the cases of lung cancer which will manifest themselves over the next couple of decades will follow damage from smoking patterns which are already established.

Strategies for dealing with lung cancer must therefore combine effective preventive measures, with their long term potential to reduce the human and financial costs of this disease, with improved services for those with the disease today, or whose lung cancer is already ‘programmed’. Sir Douglas Black advised against the tendency to polarise treatment and prevention as if they are opposed choices in his Rock Carling Fellowship Lecture: “I see no fundamental antithesis between treatment and prevention. Both must be based on goodwill and on sound scientific knowledge; each can complement the other; and both are necessary.”

The challenge of treating lung cancer has much in common with our preceding reports on breast and colorectal cancers. Access to expert specialist assessment is as important for lung cancer patients as in other cancers. Patients can pass through a bewildering variety of different routes to obtain the care they require. A current audit in Yorkshire, for example, reveals three broad categories of referral to hospital (those with a working diagnosis of lung cancer, with other symptomatology, or as acute admissions). All these patients need to be “captured” early on for assessment by the specialist lung cancer team to determine their optimal management, yet this audit revealed no less than 58 different combinations of consultant involvement.

One of the roles of specialist assessment is to identify the relatively small numbers for whom potentially curative treatments (surgery or radical radiotherapy) offer real benefit, and to organise that treatment promptly. In this context the high quality of research into the role of CHART (continuous hyperfractionated accelerated radiation therapy) for lung cancer has led us to recommend that CHART should be generally available for the delivery of radical radiotherapy to suitable patients. A view will need to be taken as to the optimum configuration for the efficient delivery of this service. For those patients in whom a significant prolongation of life is unlikely, there is still a great deal that can be achieved through expert palliation, not least because large numbers of patients are implicated. Improved quality of life represents an important therapeutic gain which should not be subsumed by a sense of nihilism or clinical failure, since it is possible to provide good care in these circumstances.

The elderly age distribution, and the fact that relatively few patients survive long term with this disease, makes it difficult to create the same effective advocacy for the interests of these patients that has been so influential for women with breast cancer. The large numbers of lung cancer patients nonetheless deserve equivalent concern for their needs.

Professor Robert Haward
Chairman of the Cancer Guidance Group

Introduction

This manual is intended to guide commissioning, planning and development of lung cancer services. It follows on from the Calman and Hine Report, *A Policy Framework for Commissioning Cancer Services* and forms part of the Department of Health strategy as set out in Executive Letter EL(96)15, paragraph 8 and Annex C.

The guidance concentrates on those aspects of services which are likely to have significant impact on health outcomes. The recommendations represent a set of priorities in areas most likely to make a difference to patients, not a “shopping list” of all relevant health care activities or everything to be commissioned. Both the resource implications and the anticipated benefits of implementing the recommendations are considered.

This is neither a set of mandatory instructions nor clinical practice guidelines. Many of the recommendations made here may have already been implemented in some places; the guidance can be used to identify gaps in local provision and to check on the appropriateness of existing services.

It is not anticipated that all the proposals described will be achieved in all areas. Some may be easy to implement, while others will be goals at which to aim. Health authorities and primary care groups will need to identify which of these to prioritise, taking into account the quality and configuration of existing local services and the resources available. It might seem reasonable to prioritise on the basis of the likely impact of change - as far as this may be judged from the evidence - but this too depends on the degree to which the current service differs from that which is recommended.

The topic areas covered vary widely and the evidence suggests that change in some areas will have more impact than in others. The amount and strength of supporting evidence available also varies, partly reflecting the fact that research has tended to focus on some issues more than others. Unanswered questions and areas of uncertainty remain. Some of these are being studied in well designed and co-ordinated clinical trials, in which all commissioners, units and centres should be encouraged to participate, to contribute to improvements in knowledge about the best way to prevent and treat lung cancer. It is anticipated that this guidance will be updated when significant new evidence becomes available.

Local circumstances will necessitate modifications in the way this guidance is implemented. For example, services suitable for sparsely populated areas, where access can be difficult, may be different from those provided in cities. Cultural and ethnic differences may also affect appropriate provision. Local people and GPs should be involved in discussions about the configuration of local services and the nature of the care to be provided.
How the guidance was produced

The guidance is a result of an extensive, explicit and rigorous multi-stage process developed by the Chief Medical Officer's Cancer Guidance Group, chaired by Professor Haward of Leeds University (Appendix 1). A wide range of individuals from professional, policy and patient groups was involved in generating proposals for recommendations which were then critically appraised in the light of research evidence (Appendix 2). Finally, the material was synthesised and refined, taking account of the resource implications.

The first stage of the production process for lung cancer guidance took place at a two-day event at which a large group of relevant health care professionals, people with personal experience of lung cancer, health care commissioners and academics from around the country, met to put forward structured proposals based on their experience and knowledge of the research. These proposals were then sent to referees, including clinicians, academics, representatives of health authorities, the Department of Health, patient organisations, and relevant charities, many of whom made detailed comments and suggestions. Systematic reviews of the research literature were then carried out or commissioned by the NHS Centre for Reviews and Dissemination (CRD) at the University of York.

This process culminated in the production of two large sources of information, one with a practical or operational focus and the other containing detailed research evidence on effectiveness. The guidance draws on both these sources, with added input from commissioners, patients, and experts in the particular fields who gave advice. It was written by the NHS Centre for Reviews and Dissemination with editorial input from the Cancer Guidance Editorial Group, and informed by focus groups of commissioners. The final seven topic areas represent a refinement of material which had originally been presented in fourteen proposals.

The production of this guidance was funded by the NHS Executive.

The organisation of the guidance material

The guidance material is divided into two documents, in which the seven topic areas are discussed in the same order for ease of cross-reference. This order is intended to be a logical sequence of issues and does not reflect priorities.

The first document (The Manual) is based on all the available sources of information. Each topic area includes five sections which summarise: (A) the recommendations, (B) potential benefits of implementing them, (C) the strength of the supporting evidence, (D) how implementation may be measured, and (E) the resource implications of implementing the recommendations. The only references included in this manual are to guidelines and other sources of information which are not reports of research.

The second document (The Research Evidence) is a condensed version of systematic reviews of research which was used to inform the guidance. It includes tables with information about individual studies and is fully referenced.

The recommendations are also available as a four page summary which will be widely distributed, particularly in primary care.
The Topic Areas
1. Prevention
2. Access, Diagnosis and Staging
3. Multiprofessional* Teams
4. Communication, Information and Support
5. Radical Treatment for Non-small Cell Lung Cancer (NSCLC)
6. Radical Treatment for Small Cell Lung Cancer (SCLC)
7. Palliative Interventions and Care

The Research Evidence
In order to ensure that the guidance is anchored in the research evidence, the research literature was reviewed and critically appraised. The reliability and quality of evidence which supports the recommendations is graded throughout the document. These grades refer to the nature of the evidence, not the strength of the recommendations. The grades are as follows:

A. Evidence derived from randomised controlled trials or systematic reviews of randomised trials.
B. Evidence from non-randomised controlled trials or observational studies.
C. Professional consensus.

It should be recognised that the quality of research evidence forms a continuum. It is categorised here for convenience but there is overlap between categories. Most of the published research on lung cancer focuses on clinical evaluations of treatment; relatively little direct research has been carried out on the organisation and delivery of services. In addition, for many service delivery issues, randomised controlled trials (categorised here as the highest quality evidence) may not be feasible. Therefore, research designs which might be regarded as of relatively poor quality for evaluating a clinical intervention may be the most reliable available for assessing the effectiveness of service delivery.

References

* In the breast and colorectal cancer guidance the term multidisciplinary has been used. In this guidance we have chosen the term multiprofessional. Although the two terms are similar, we have chosen multiprofessional to emphasise the inclusion of people from a number of professions, not only disciplines within a profession.
Key Recommendations

The guidance puts forward recommendations in a number of areas. Since it is unlikely that all of these can be implemented in the short term, we have identified six key recommendations which, if implemented, would make a major contribution to improving outcomes. Each is discussed more fully in the relevant topic section.

Prevention (Topic 1)
Action against smoking should be the primary focus of efforts to improve outcomes in lung cancer. A range of co-ordinated interventions to reduce the uptake of smoking and promote quitting should be provided at local and national levels. Health professionals should be trained in the use of effective interventions and encouraged to offer them.

Access to a Lung Cancer Team (Topics 2 & 3)
The management of patients with lung cancer should be the responsibility of specialist multiprofessional teams. Systems need to be established to ensure that all patients suspected of having lung cancer are assessed by the local lung cancer team, which may work in more than one hospital. Patients should have quick access to appropriate team members throughout the course of their illness.

The palliative approach (Topics 3 & 7)
Palliative care should be an integral part of patient management from the outset. It should be the responsibility of a multiprofessional team which has close links with the lung cancer team, sharing at least one member in common.

Selection of patients for radical treatment (Topics 2, 5 & 6)
Radical treatment - notably surgery - offers the chance of long term survival for a minority of lung cancer patients and every effort should be made to identify those who might benefit. Detailed information on cancer type and stage must be obtained promptly for all patients being considered for radical treatment.
**Radiotherapy using CHART (Topic 5)**

Systems should be established to allow CHART (continuous hyperfractionated accelerated radiation therapy) to be offered to patients with inoperable early-stage non-small cell lung cancer. This will require that radiotherapy is available at weekends, on an in-patient or hotel basis.

**Chemotherapy (Topics 5, 6 & 7)**

Chemotherapy using established drugs should be considered for all patients with small cell lung cancer. New drugs should be used in the context of multicentre randomised controlled trials until their comparative cost-effectiveness has been demonstrated. Chemotherapy for patients with non-small cell lung cancer requires further evaluation. Participation in multicentre randomised controlled trials which evaluate costs of treatment and effects on survival and quality of life should be strongly encouraged.
Cancer of the lung\(^*\) is the third most common cause of death in the UK. It is responsible for almost a quarter of all cancer mortality, with 30,803 deaths in England and Wales in 1996, 4,237 in Scotland, and 768 in Northern Ireland (1995). The 1996 death rate per 100,000 population was 77.7 for men and 41.8 for women.\(^1\) The age-standardised 5-year survival rate for England is 5.5%.\(^2\)

**Figure 1: Lung cancer deaths - crude rates per 100,000 population England and Wales\(^*\)**

Cigarette smoking is by far the most important cause of lung cancer, accounting for over 80% of cases.\(^3\) Other contributing factors include exposure to radon gas, occupational hazards, particularly exposure to asbestos, a diet low in fruit and vegetables, and air pollution. The higher prevalence of these risk factors in poorer populations is reflected in a lung cancer death-rate for men of Social Class V which is over five times that of Social Class I (1991-3 standardised mortality ratios: 206 and 45, respectively).\(^4\)

Reduced cigarette smoking since the late 1970s has led to a fall in the overall prevalence of lung cancer, particularly among men and people of higher social class, but lung cancer mortality is still rising in women over 55.\(^5\) Although smoking was falling steadily among adults until 1994, this trend appears to have reversed since then, with a significant increase among younger women.\(^6\) The proportion of teenagers who smoke has been rising since 1988.\(^7\)

\(^*\) Source: Office for National Statistics\(^3\)

\(^*\) Cancer of the lung includes cancer of the bronchi or trachea (ICD-10 code C34, ICD-9 code 162).
The majority of people with lung cancer are elderly; the median age at death is 72 years. Because smoking is a risk factor for other diseases, many suffer from a range of other illnesses, notably cardiovascular disease and chronic obstructive lung disease, and are therefore less fit than their contemporaries.

The disease
Lung cancer usually progresses rapidly. The median survival time after diagnosis is less than four months and about 80% of patients die within one year.8

The most common symptoms are cough (which may bring up blood), breathlessness, tiredness, loss of appetite, weight loss, chest pain and anxiety. Less common symptoms, such as swelling of the head and neck, depend on the location, size and stage of the cancer. Metastatic disease is most likely to affect the brain, liver and bones.

There are two broad types of tumour, usually classified as small cell lung cancer (SCLC), which accounts for about 20% of cases, and non-small cell lung cancer (NSCLC). Non-small cell lung cancer includes a range of pathological cell types (e.g. squamous, adenocarcinoma, large cell) which respond to treatment in broadly similar ways. The distinction between SCLC and NSCLC can be important to appropriate management.

Less common cancers which affect the lungs include mesothelioma and lymphomas. The lung is also an important site for secondary cancers (e.g. breast, colorectum and prostate). The present document is concerned only with primary carcinoma of the lung and the subsequent effects of the disease.

Interventions
Prevention is the only form of intervention that can be expected to have a substantial effect on lung cancer incidence and mortality. Interventions to prevent people from taking up smoking and to help smokers to quit range from mass media campaigns to individual advice and treatment. Many such interventions have been shown to be highly cost-effective. Other strategies include increasing the price of cigarettes through taxation, reducing advertising and controlling sales.

The Government’s new health strategy, Our Healthier Nation, aims to reduce cancer deaths. The Health of the Nation strategy aimed to reduce the lung cancer death rate by at least 30% in men and 15% in women under 75 years of age by 2010. Targets included reduction of cigarette consumption from 98 billion in 1990 to 59 billion by the year 2000, and reduction of the prevalence of cigarette smoking in people over the age of 16 to no more than 20%. In the two decades up to 1994, there was a gradual reduction in the prevalence of cigarette smoking, but this has been followed by an upward trend. The 1996 prevalence rates were 29% for men and 28% for women.9
Despite the generally poor prognosis for patients with NSCLC, treatment can usually increase life-expectancy and may lead to long-term survival in the minority who have localised disease. 10-15% of patients with NSCLC are suitable for surgery to remove the tumour and a further 10% may be suitable for radical radiotherapy. Radical treatment is not appropriate for the majority, either because the disease is too far advanced at the time of diagnosis or because the patients are not fit enough to tolerate such treatment. Chemotherapy can produce modest improvements in survival and symptom control.

In patients with SCLC, chemotherapy can extend life-expectancy and produce dramatic improvements in quality of life. However, duration of remission is usually measured in months and there are few long-term survivors.

By the time it is diagnosed, lung cancer is often quite far advanced and so most patients require active palliation from the beginning of their treatment to control their symptoms and improve the quality of their remaining life. Palliative radiotherapy and a variety of other interventions for symptom relief are used for patients with both types of lung cancer. These can often be given on an out-patient basis.

**Delivery of services**

There are wide variations in clinical practice and in service provision for the prevention and management of lung cancer. Prevention has the potential for the greatest impact on lung cancer, yet attention is frequently focused on treatment.

Patients with lung cancer may follow a variety of routes within the health care system. Delays are common, and some patients with the capacity to benefit from active treatment are never referred to a lung cancer specialist and so may not get effective care or may receive inappropriate treatment. Because of the generally poor prognosis for this disease, clinicians can become rather nihilistic about managing lung cancer. Services are often poorly co-ordinated and fragmented and access to treatment inequitable. These problems are compounded by low rates of histopathological diagnosis and inadequate assessment of some patients, which increases the probability of inappropriate management and poor outcomes. One of the aims of this guidance is to help the NHS provide more co-ordinated care and improved access to effective management by people who work together in a team.
A diagrammatic representation of services required for lung cancer is given in Figure 2 below.

**Figure 2: Services for lung cancer**

**Costs**

Provision of palliative care accounts for the greatest part of the cost of services for lung cancer. It has been estimated that the average cost of treatment for each patient with lung cancer is £4,730 (1990 prices).\(^{10}\) This estimate is based on the following assumptions: 15% of patients would undergo surgery at £2,600 each; 15% of patients would have radical radiotherapy at a cost per case of £2,500; 5% would have chemotherapy, at £2,000; 33% would have palliative radiotherapy, at £600 each; and 90% would have palliative care costing, on average, £4,066.

These figures will vary with differences in local provision, and where new chemotherapy drugs are used, costs are likely to be higher. A Glasgow audit found much lower rates of both surgery and radical radiotherapy (5% and 2.5% respectively) and greater use of chemotherapy (10%).\(^{11}\) Nevertheless, the overall picture of high costs generated by hospitalisation, particularly in the later stages of the illness, is consistent with information from other sources.\(^{12}\)

Preventing lung cancer, by contrast, can be very cheap, with estimated costs per life year gained ranging from £2-11 for media promotion of cessation kits, to £141-£1062 for advice from GPs.\(^{13}\)
References


Prevention

Cigarette smoking is the primary cause of over 90% of lung cancers. The main thrust of lung cancer prevention must therefore be to reduce the prevalence of smoking by reducing the uptake of smoking and promoting quitting.

In 1996, 29% of men and 28% of women in Great Britain were smokers. Smoking is increasing among young people and especially among women aged 25-34. A wide variety of approaches, ranging from face-to-face interventions and community anti-smoking campaigns to national action on pricing and advertising, can be used effectively in a co-ordinated way to prevent people from starting to smoke and to help smokers give up.

There has been considerable research evaluating the effectiveness of specific interventions to reduce smoking in different settings (see Research Evidence). Some are effective in particular settings and others are not. Care should be taken to distinguish amongst the large number of prevention programmes and support those which are likely to have a significant impact. Prevention programmes may focus on populations or individuals and use a range of interventions. These are discussed separately below for clarity, but they should be integrated in a co-ordinated and balanced strategy to maximise their effectiveness (Figure 3).

A. Recommendations

(i) Smoking

(i.1) Action at the local level

Prevention: Schools-based interventions

Schools-based programmes should be established to help young people resist the social pressures to smoke. These programmes should use social reinforcement techniques, not simply education or information approaches that concentrate on long-term health issues. They should focus on children below the age at which smoking is likely to begin in that locality. While the peak age for taking up smoking is 15 years, this varies between communities.
Cessation: Interventions for individuals

General practitioners, practice nurses, and other health care professionals should identify all patients who are current smokers. They should use every opportunity to emphasise the importance of quitting smoking, and offer advice, encouragement and structured support for smokers who wish to give up.

Formal training should be offered to health care professionals, both to encourage them to actively promote smoking cessation, and to improve the effectiveness of their advice to patients.
Smokers who need additional support, particularly heavy smokers, should be advised to try substituting other sources of nicotine (patches or chewing gum) for cigarettes. Explicit information should be provided on use of these devices. Nicotine replacement is a useful adjunct to, but should not replace, structured counselling, advice or support, since it has only been shown to be effective when used in conjunction with these interventions. It can help prevent weight gain after stopping smoking. Nicotine replacement is currently not available on prescription; if it were, the quit rate might be increased through greater use of replacement therapy.

Pregnant women who smoke should be identified and offered individual pre-natal counselling on smoking cessation as part of routine ante-natal care. They should also be given non-judgmental written information tailored to their specific situation.

**Community campaigns**
Health authorities, in collaboration with local groups, should consider organising community activities with incentives and/or competitions designed to encourage people to give up smoking.

**Workplace interventions**
Employers should be encouraged to implement smoking cessation programmes within the workplace. As one of the country’s largest employers, the NHS (including primary health care settings) should run smoking cessation programmes for its work-force.

**No-smoking environments**
The establishment of no-smoking environments in public places should be considered, in conjunction with smoking cessation and prevention programmes.

(i.2) **Action at the national level**

**Anti-smoking campaigns**
Anti-smoking campaigns should be supported as part of a co-ordinated approach. National level campaigns reach large numbers and so can be cost-effective even when the proportion of people who are influenced is small.

**Price**
The real price of tobacco products should be raised by increasing taxation.

**Advertising**
Bans on tobacco advertising and sponsorship should be supported as part of a co-ordinated anti-smoking programme.

(i.3) **Co-ordinated approach**
Smoking cessation and prevention activities at local and national levels are more likely to be effective if individual support is available for those who wish to stop smoking. Different approaches should be co-ordinated to maximise the overall effect. Health authorities, primary care teams and local authorities should co-operate across sectors under clear and identified leadership to achieve co-ordinated action.
(ii) **Asbestos and other occupational carcinogens**

Health authorities should work with the Health and Safety Executive and occupational health services to reduce exposure to asbestos and other carcinogens. Educational interventions should emphasise the particular importance of giving up smoking among people who may be, or may have been, exposed to occupational carcinogens.

(iii) **Radon**

In areas where levels of naturally-occurring radon gas tend to be high (notably Cornwall, Devon, Somerset, Northamptonshire and Derbyshire), residents should be encouraged to have radon concentrations measured in their homes. Health authorities should co-operate with the National Radiological Protection Board and local authorities to inform people of the link between radon and lung cancer, to persuade owners of affected homes to have remedial work undertaken and to make local authority grants available.

(iv) **Nutrition**

Increased consumption of fruit and vegetables should be encouraged.

### B. Anticipated Benefits

(i) **Smoking**

Because smoking is the major cause of lung cancer and the prognosis for most patients diagnosed with lung cancer is poor, effective smoking prevention will lead to a larger reduction in deaths from lung cancer than any other measure. Interventions which reduce smoking rates produce many other benefits, notably reduced deaths and illness due to heart, blood-vessel and respiratory disease and reduced levels of employee sickness and absence. Since smoking acts synergistically with other causes of lung cancer such as radon and asbestos exposure, smoking reduction would reduce the risks posed by other carcinogens.

Once smokers quit, the additional risk of lung cancer due to smoking diminishes over time. For younger smokers who give up, the risk approaches that of a lifetime non-smoker over the course of around 20 years.

Effective smoking cessation programmes aimed at pregnant women will both benefit women’s health directly and reduce the incidence of low birth weight babies. This will conserve resources by reducing the number of babies who need special care.

(ii) **Asbestos**

Adherence to health and safety precautionary measures against asbestos and occupational carcinogens may be expected to reduce the risk of lung cancer in those who are exposed to these substances.

(iii) **Radon**

Remedial work on homes and workplaces to reduce high levels of indoor radon is likely to produce small long-term reductions in the risk of developing lung cancer in affected areas of the country.
(iv) Nutrition
If everyone’s consumption of fruit and vegetables were as high as that of the quarter of the population with the highest consumption, over 10% of cases of lung cancer might be prevented. Increased consumption of vegetables and fruit is also associated with reductions in other cancers and other health benefits.

C. Evidence

(i) Smoking

(i.1) Action at the local level
There is convincing evidence, notably from a 40 year study of British male doctors, that smokers are almost twenty times more likely to develop lung cancer than lifetime non-smokers. Those who give up smoking are less likely to develop lung cancer than those who continue to smoke. The level of risk of lung cancer for ex-smokers falls to around 10% of that for smokers of similar age over two decades.(B)

Exposure to cigarette smoke also harms non-smokers. Living with a smoker increases the risk of lung cancer in lifelong non-smokers by around 26%.(B)

Prevention: Schools-based interventions
Most smokers start young; the peak age at which smoking begins is 15 years.(B)

Preventive programmes which simply provide factual information are not particularly effective. However, interventions which focus on the social influences which encourage smoking can prevent young people from taking it up. These interventions strengthen ability to recognise social pressures to use cigarettes, develop skills in resisting such pressures, and identify immediate social and physical consequences of smoking. School-based programmes based on these principles can lead to reductions in tobacco use in young people.(A)

Cessation: Interventions for individuals
Brief advice and encouragement given by health professionals during routine consultations has been shown to lead around 2% of smokers to give up for at least one year.(A)

Individual and group counselling and/or behaviour modification can be effective for helping smokers to quit.(A) These interventions should provide social skills training, aim to help smokers to recognise and cope with problems with quitting, and include advice on relapse prevention.(A)

Proactive telephone counselling has been shown to be effective; however, the effect is smaller than that achieved by face-to-face interventions.(A)

The use of nicotine replacement therapy can double the effectiveness of advice from health professionals.(A) In studies where nicotine replacement therapy is used in addition to counselling/support in smoking cessation clinics, about 10% of participants give up smoking cigarettes. Over a range of contexts, the use of nicotine replacement therapy nearly doubles the odds of abstinence (OR = 1.7, 95% CI: 1.6 to 1.9), compared with no nicotine. Inhalers and patches appear to be slightly more effective than chewing gum.(A) Since nicotine replacement therapy is
not available on prescription, the main part of the cost is currently borne by the nicotine user. For average smokers, these products cost about the same as cigarettes.

Pregnant women are more likely to give up when they receive information tailored to their situation together with advice from health professionals. Programmes to encourage pregnant women to give up smoking may reduce health services costs overall by reducing the number of low birth weight babies and hence the need for neonatal intensive care.

Only 1 in 4 UK smokers report receiving advice from their doctors. Formal training of health professionals in smoking cessation methods increases the probability that they will offer appropriate interventions.

Self-help materials (such as books, manuals, audiotapes, videotapes, or a combination of these) used on their own, have been shown to have little effect. There is insufficient evidence of effectiveness for other interventions including acupuncture, hypnosis, antidepressants, anxiolytics, aversive therapy and nicotine antagonists.

Workplace interventions
Workplace smoking cessation programmes have been shown to be effective, with a long term quit rate averaging 13%. Most programmes were multi-component and included one or more of the following: self-help written materials, advice, cessation groups, incentives. The effects of restrictive smoking policies on reductions in smoking prevalence are not clear.

No-smoking environments
Smoke-free environments protect non-smokers from tobacco smoke. Although the level of lung cancer risk attributable to passive smoking in public places or at work may be relatively small, many people are affected. Smoke-free environments may have more impact by helping people who are trying to quit and reducing pressure to start smoking, but no formal evaluations have addressed these issues.

(i.2) Action at the national level

Anti-smoking campaigns
Media campaigns (both national and local) which target smokers can result in small (0.05% to 0.5%) reductions in the proportion of smokers in the population. Even small changes in large populations can produce worthwhile absolute reductions in the total number of smokers. Campaigns designed to prevent the uptake of smoking in young people can be effective.

Price
Every 1% increase in the real price of cigarettes leads to a fall in consumption of about 0.5% (price elasticity of demand), provided that income remains constant. Demand for tobacco products among women and young people is particularly sensitive to price. A study based on US college students suggests that the impact of price increases may be almost three times as great in this group as in the general population. However this relationship does not appear to hold amongst the poorest groups in Britain, where increasing the price of cigarettes does not reduce consumption but increases hardship.
Advertising
Links have been demonstrated between brand awareness in children generated by advertising and later smoking behaviour. A review of before-and-after studies of the effects of policy changes from Australasia, Scandinavia and Canada suggests that banning cigarette and tobacco advertising can decrease consumption. The effects of such bans are wide-ranging, altering cultural views of smoking as well as reducing reminders of brand-names.

(i.3) Co-ordinated approach
When a free telephone quit line is provided as part of an anti-smoking campaign, the success rate may rise to over 1%. The cost of a recent Scottish campaign of this sort was estimated at £100 per person who gave up smoking.

(ii) Asbestos and other occupational carcinogens
Asbestos is the most common occupation-related cause of lung cancer. It also causes pleural cancer (mesothelioma), usually after a long latent period. Smoking acts synergistically with asbestos exposure to greatly increase the risk of lung cancer. Deaths due to asbestos-related cancers are expected to rise until about the year 2020. Occupational carcinogens, including asbestos, are likely to be responsible for fewer than 10% of all lung cancers.

(iii) Radon
Evidence from epidemiological studies demonstrates a small but significant association between lung cancer and exposure to radon in the home. Lifetime exposure to radon at the UK action level of 200 Bq m\(^{-3}\) increases the chance of developing lung cancer by about 50%. The risk for smokers is particularly high. Radon levels vary substantially by geographical area and from house to house within affected areas. Indoor radon levels can usually be reduced by relatively minor alterations to buildings.

(iv) Nutrition
There have been a number of reviews of epidemiological studies examining the associations between lung cancer and the consumption of fruit and vegetables. These studies, most of which control to some extent for smoking, consistently show that people who eat a wide range of fruits and vegetables are significantly less likely to develop lung cancer. The reasons for this apparent protective effect of fruit and vegetable consumption are not known.

There is no convincing evidence that specific anti-oxidant micronutrients (vitamins C and E and selenium) offer similar benefits, nor is there evidence that supplementation with any specific nutrient offers protection from lung cancer. Supplementation with beta-carotene has not been shown to prevent lung cancer and may increase its incidence in male smokers.
D. Measurement

Collection of information will need to be co-ordinated across relevant health and local authority sectors.

Structure
- Mechanisms in primary care to identify patients who smoke.
- Staff in primary care and other settings trained to provide smoking cessation advice.
- Existence of cross-sectoral smoking prevention and cessation programmes.
- Existence of programmes to facilitate smoking cessation in NHS facilities and other workplaces.

Process
- Number of people participating in structured smoking cessation programmes in primary care or workplaces.

Outcome
- Quit rates amongst smokers participating in cessation programmes at 6 months and 1 year.
- Changes in prevalence of smoking over time in cohorts of individuals, including young people.

E. Resource Implications

- Interventions to prevent and stop smoking will require extra resources but are, in general, very cost-effective.
- Effective smoking cessation interventions in pregnancy lead to rapid cost savings due to the reduced incidence of low birth weight babies.
- Training health professionals and auditing to ensure high levels of provision of support will require extra resources.
- If nicotine replacement products were to be made available on prescription, additional resources would be required.
- Resources will be required for systematic measurement to monitor the degree to which appropriate anti-smoking interventions are in place, and their impact on smoking rates.
Access, Diagnosis and Staging

A. Recommendations

Asymptomatic people should not be offered screening for lung cancer.

Access: Each district should establish a clear documented local clinical policy which describes the pathway of care for the diagnosis and management of lung cancer. This policy should be based on evidence and drawn up by the lung cancer team (see Topic 3) in collaboration with general practitioners, radiologists, physicians who specialise in care of the elderly, public health physicians, and accident and emergency staff. All patients who may have lung cancer, whatever their age, should be managed in accordance with documented clinical policy.

The policy should make clear what action should be taken if x-ray findings suggest a patient has a low or high suspicion of lung cancer.

There should be clear routes of access to this pathway for patients coming from any point in the health care system, including primary care, chest clinics, medicine for the elderly, emergency departments and general medicine. Arrangements should be made to facilitate rapid referral to the lung cancer team for patients who are being treated for other conditions and have, or are thought to have, lung cancer. Radiologists should notify the lung cancer team whenever they see a chest x-ray which shows possible lung cancer.

General practitioners need prompt access to good diagnostic services and reporting. High quality further diagnosis and clinical assessment should be readily available if malignancy is suspected.

Every effort should be made to complete the process of diagnosis, staging and development of a management plan as quickly as possible.

Because of the complexity of access, the implementation of local policies should be carefully audited.

Diagnosis: The aim of local clinical policy should be to ensure efficient and accurate diagnosis. A full range of diagnostic tests should be available; those most frequently used are given in Box 1 (individual patients are not likely to require all of these). Invasive investigations should only be used when the results are likely to determine management decisions and when consequent interventions are expected to produce improvements in life expectancy or quality of life.
When initial investigations support a working diagnosis of lung cancer, responsibility for further diagnostic procedures should shift to the lung cancer team. A multiprofessional approach should be adopted and delays kept to a minimum.

**Box 1. Diagnostic tests for lung cancer**

<table>
<thead>
<tr>
<th>Question</th>
<th>Diagnostic procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Is there a suspicion that the patient has lung cancer?</td>
<td>History, clinical examination, chest x-ray.</td>
</tr>
<tr>
<td>2. Does the patient have lung cancer, and if so, what is the histological type?</td>
<td>Bronchoscopy and pathological assessment of specimens, sputum cytology (when invasive investigation is not acceptable), fine needle biopsy of tumours which cannot be accessed by bronchoscopy.</td>
</tr>
<tr>
<td>3. What is the stage of the cancer and what treatment is appropriate?</td>
<td>Blood tests (including tests for liver function and alkaline phosphatase), lung function tests, assessment of performance status. CT scan if surgery or radical radiotherapy is being considered. Mediastinal biopsy if CT scan shows enlarged nodes in NSCLC but surgery seems feasible.</td>
</tr>
</tbody>
</table>

The diagnosis should include cytological typing except where this will not influence management. This requires assessment by a pathologist of adequate samples obtained through sputum collection, bronchoscopy or transthoracic needle biopsy.

Defined standards should be adopted for bronchoscopy. These should cover the following: who carries out the procedure, histocytological confirmation rates when the tumour is visible, the procedures used to obtain cytological specimens, detailed and accurate reporting of bronchoscopy findings, the rate of definitive diagnosis, complication rates, and patient acceptability. Bronchoscopy should be undertaken by, or under close supervision by, people with sufficient training; a figure of at least 100 procedures has been proposed. Biopsy should be combined with brushings (smears) and washings even when bronchoscopic appearances are considered normal. The same pathologist should examine both biopsy and cytology specimens. Bronchoscopy should be carried out as a day case procedure where possible.

**Staging**: Every patient should be adequately staged so that the best management policy for that individual can be adopted. This is particularly crucial for patients with non-small cell lung cancer who are being considered for surgery; they should not proceed to thoracotomy or radical radiotherapy without full staging information. Patients for whom surgery may be appropriate should have a CT scan of the chest, followed by mediastinoscopy (biopsy of mediastinal lymph nodes) if CT findings are unclear.
B. Anticipated Benefits

Implementing these recommendations would overcome one of the major problems of contemporary lung cancer care: poor access to adequate diagnosis. The use of documented local clinical policies, audit standards and clearly defined diagnostic pathways will provide more comprehensive and accurate diagnostic information and improve access to effective management. This will permit earlier symptom control, increase the probability that those patients who stand to benefit from each form of treatment will be identified, and reduce the risk of under- or over-treatment. It will also allow more accurate information to be given to patients.

A co-ordinated approach will reduce duplication of testing, minimise delay in diagnosis, and lead to greater efficiency. Delay may cause unnecessary anxiety and therefore implementing this recommendation is likely to reduce uncertainty and anxiety among patients and their carers.

Collection and reporting of full diagnostic and staging data for all patients will provide better information for audit and routine monitoring by cancer registries.

C. Evidence

There is no evidence to show that population screening for lung cancer is effective. Even amongst high risk groups (male cigarette smokers, over 60 years old), randomised controlled trials have failed to demonstrate that screening, by a combination of x-ray and sputum cytology, reduces death rates.(A)

Unless the disease is far advanced, the choice of treatment depends largely on whether patients have small cell or non-small cell lung cancer, and the stage of the disease (See Topics 4 and 5). Pathological and staging data are therefore crucial to decision-making about treatment.

Studies in Yorkshire and Merseyside in the mid-1980s found that no information was recorded on histological diagnosis for half of the patients who had lung cancer. This low rate appears to be associated with inadequate investigation, especially among older patients, and poor outcomes. Histological confirmation was recorded for two thirds of patients under 65, but for fewer than one quarter of patients over 75.(B) A similar study in Southend in the early 1990s found that histological information was recorded for 93% of patients under 65, but for only 66% of patients over 75.(B)

A questionnaire study carried out in 1989 revealed that over 40% of patients who underwent surgery for lung cancer were not adequately staged pre-operatively.(B) Without effective staging, it is inevitable that some patients will undergo avoidable “open and close” thoracotomy (where the patient’s chest is opened but the tumour cannot be removed), which can be associated with serious morbidity (see Surgery section of Topic 5, Radical Treatment for Non-small Cell Lung Cancer).

In view of the rapid progression of most forms of lung cancer, prompt diagnosis and treatment is clearly desirable.
There is no direct evidence to demonstrate that prompt diagnosis reduces mortality, but delay can unnecessarily prolong patient distress. Data from Papworth Hospital before and after the establishment of a co-ordinated regional approach to the diagnosis and treatment of lung cancer shows significant reductions in delay at every stage.

More information about the nature of the tumour is gained when bronchoscopy is carried out by people with more experience (e.g. >100 bronchoscopies) and when brushings (smears) and washings are used. Bronchoscopy is associated with some morbidity, particularly among older patients and those with cardiac disease. There is considerable variability in skill among bronchoscopists in carrying out this procedure, with resulting variability in patient satisfaction and diagnostic yield.

Pathological information may also be obtained by sputum cytology. Although this method has a high false negative rate, it has high positive predictive value in high-risk individuals and is less invasive than bronchoscopy.

Clinical examination plus simple biochemical tests using predefined criteria has been shown to be as useful for excluding metastatic disease as CT and bone scan. If the history and clinical findings suggest that the patient is free from metastatic disease, CT scanning can provide information on the stage and extent of the tumour.

Mediastinoscopy is not necessary for patients with NSCLC if CT scans do not show enlarged nodes, and clinical examination and biochemical tests suggest that the disease is operable. However, mediastinoscopy can provide valuable information for the selection of patients for surgery when the mediastinal lymph nodes appear to be enlarged on CT scan.

A systematic review and subsequent update concluded that there is no reliable evidence that PET scanning offers any advantage over a combination of other diagnostic methods. PET scans may have a limited role in decision-making about thoracotomy.

**D. Measurement**

**Structure**

- There should be documented local clinical policies which provide co-ordinated systems for diagnosis and referral of patients with suspected lung cancer.

- There should be documented local clinical policies for all diagnostic techniques.

- Evidence of accreditation of pathology laboratories and the use of agreed pro-formas for histology and cytology reporting.

- Audit structures in place to measure adherence to local clinical policy.
Process

• Audit to check what happens to patients with x-rays showing possible lung cancer.

• Audit of time from referral with suspicion of lung cancer to definitive diagnosis and time from diagnosis to implementation of the management plan.

• Proportion of bronchoscopies meeting local audit standards.

• Proportion of bronchoscopies carried out or supervised by someone who has done at least 100 under supervision.

• Histological confirmation in at least 70% of all cases; this minimum target level should be regularly reviewed.

• Proportion of lung cancer patients for whom histological information and full staging data are recorded.

Outcome

• The proportion of all thoracotomies for lung cancer which are “open and close”.

• Audit of patient satisfaction with diagnostic process and time of delay.

• Bronchoscopy complication rates.

E. Resource Implications

• Increased resources will be required for diagnosis because a greater number of patients will be assessed in some areas. However, there may be a reduction in unnecessary duplication of diagnostic tests.

• Reduction in inappropriate surgery as a result of adequate staging.

• Increase in appropriate surgery and consequent reduction in some treatments for advanced disease.

• The net effect on resources is unclear and will vary locally depending on current practice.
Multiprofessional Teams

A. Recommendations

The management of lung cancer involves three cross-linked teams: the Primary Health Care Team, the Lung Cancer Team, and the Palliative Care Team. Good co-ordination and communication between these teams is important at every stage. Because of the poor prognosis for most patients with lung cancer, it is especially important that a member of the Palliative Care Team should be incorporated in the Lung Cancer Team.

The Lung Cancer Team should aim to review all cases of lung cancer, and take overall responsibility for the management of these patients.

All teams should ensure that individual patient needs are met by facilitating quick access to appropriate team members.

Members of the teams

The Lung Cancer Team should include medical and nursing staff with specialised knowledge of diagnosis and treatment, both curative and palliative, of lung cancer. A lead clinician - normally a respiratory physician - should take managerial responsibility for the service as a whole. The multiprofessional treatment team work in more than one hospital, and should include the following:

- Respiratory physician with a special interest in lung cancer.
- Radiologist with thoracic expertise. The radiologist has a local co-ordinating role, ensuring that patients whose chest x-rays show possible lung cancer are referred to the Lung Cancer Team.
- Pathologist ± cytologist.
- Nurse specialist. A nominated individual with specialised knowledge of lung disease and cancer should be available to provide patient support and advocacy, to facilitate communication and the flow of information, and to liaise with other services.
- Oncologist, preferably with a special interest in lung cancer: either a clinical oncologist who can offer both radio- and chemotherapy, or a medical oncologist working closely with a clinical oncologist from the centre to which patients are referred for radiotherapy.
- Palliative care specialist. Because of the nature of the disease, close links with the Palliative Care Team are essential.
• Thoracic surgeon. The surgeon may be a core member of one or more teams and should be involved in developing local clinical policy and audit. She/he may not attend all meetings but should be readily available to liaise with the Lung Cancer Team when required and to ensure that patients who may benefit from surgery are assessed promptly. The surgeon will co-ordinate local surgical policy.

The Palliative Care Team should also be multiprofessional and should, as a minimum, include the following members:

• Palliative care physician
• Palliative care nurse specialists

In addition, the team should include, or have close links with, the following:

• Psychologist/psychiatrist
• Social worker
• Chaplain/pastoral care worker
• Bereavement care worker
• The Primary Health Care Team

The team’s role includes both direct care for patients and families with complex problems and the provision of advice, support and education for other health professionals who are involved in patient care.

At any one time, there should be a named clinician to whom the patient principally relates, e.g. the respiratory physician in the early stages of the disease and the palliative care physician at later stages. Such arrangements should be explicit and clearly understood by patients, who should be given information about the members of the teams involved in their management.

**How the teams function**

Close co-ordination is required between the Primary Health Care Team, the Lung Cancer Team and Palliative Care Team, and patients, their families and carers. The overall clinical lead will vary, depending on the patient’s needs.

All cases should be reviewed prospectively by the Lung Cancer Team. There should be regular team meetings (for example, weekly or fortnightly) where members discuss the management of individual patients (both new patients and those receiving treatment) before management plans are finalised. The precise mode of functioning of the team is a matter for local decision. It is important that the team takes a broad and careful look at patients’ needs to avoid both over- and under-treatment and ensure that palliative care needs are being met.

The Lung Cancer Team should develop and document local clinical policies based on the best evidence, and the treatment of individual patients should be discussed in relation to these policies. All members of the team should be involved in policy decisions and audit.
All decisions should be recorded and communicated to patients and all those outside the Lung Cancer Team - for example, GPs and other professionals - who require, or may benefit from, information about decisions made by the team about the care of particular patients.

The Lung Cancer Team should be responsible for data collection, adoption of and adherence to local clinical policies, and participation in well-designed, national or internationally co-ordinated clinical trials. Audit of outcomes and action which may be stimulated by audit findings (such as training) should be discussed in team meetings.

**B. Anticipated Benefits**

The most important potential benefit of team working is that it facilitates co-ordinated care and improves communication between the individuals involved. Patients managed by a team are more likely to be offered a range of effective interventions at appropriate times and to receive seamless care through all stages of the disease. Having a well co-ordinated lung cancer management pathway is a precondition for optimal diagnosis, treatment and palliation.

Dedicated nurses with specialised knowledge of lung disease and cancer are likely to improve information flow to patients, increase satisfaction, improve pain control and symptom management, and reduce patients' distress during later stages of the illness.

**C. Evidence**

**Members of the teams**

There is little research evidence on potential benefits of care provided by specialists or specialist units. One observational study suggests that patients are more likely to survive if they undergo surgery in hospitals where more than 24 lung resections a year are carried out. There is some evidence that patients referred to a respiratory physician may receive more appropriate care than those referred to other specialists.

Audit data from the Papworth hospital shows that a co-ordinated team approach to the diagnosis and treatment of lung cancer achieves higher rates of potentially curative resection, although information on patient outcomes is not yet available.

There is good evidence that specialist nurses working as part of a multiprofessional palliative care team can improve patient outcomes in terms of relief of symptoms and time spent at home. There is evidence from two randomised controlled trials that nurse-led clinics can be effective in the management of symptoms of lung cancer, in particular breathlessness.

**How the teams function**

There is strong general evidence that the use of clinical guidelines can improve the process and outcome of care. Local adoption of good quality guidelines, incorporating the best up-to-date evidence and addressing relevant aspects of care, can lead to better outcomes for patients.
Problems in interprofessional communication have been reported, resulting in poor outcomes for patients.(B)

D. Measurement

Structure
- Existence of a Lung Cancer Team with appropriate membership.
- Development and adoption of clinical practice protocols for key aspects of decision making.

Process
- Evidence that the Lung Cancer Team functions in a regular and co-ordinated way.
- Evidence of prompt and effective communication between the Lung Cancer Team, Primary Health Care Teams and Palliative Care Teams.
- Proportion of lung cancer patients managed by the Lung Cancer Team.
- Audit of outcomes of treatment, including detailed information on case-mix.

Outcome
- 1-year and 3-year relative survival, adjusted for age, type and stage of cancer.
- GP/patient/carer satisfaction with the organisation of care.

E. Resource Implications
- More specialists are likely to be required in many areas; this will require additional resources.
- Resources will be required for audit and data collection.
Communication,
Information and Support

A. Recommendations

Lung cancer usually progresses rapidly. The time between events is often short, so communication needs to be rapid, with efficient links between primary and secondary care teams. Many patients and their carers are elderly, and because lung cancer is more common in people who are poorer, they may lack resources and social support.

At every stage, patients and their relatives should be offered clear, full and prompt information in both verbal and written form. This should include information about the disease, diagnostic procedures, and aims and likely effects of treatment (including potential adverse effects). Patients should be given a clear indication of the expected start date and duration of every procedure or course of treatment.

All health professionals involved in each patient’s care should know what the patient has been told. A record of this, along with the patient’s preferences for information and involvement in decision making, should be included in the notes to aid interprofessional communication. This information should be given to the patient’s GP, together with a comprehensive summary of the management plan.

The amount and timing of information, and the degree to which patients are actively involved in treatment choices, should take each patient’s preferences into account. Patient preferences should take precedence over the views of relatives or carers, but relatives and carers should be involved in decision making when patients wish. Patients should be given individual support and guidance from a member of the specialist Lung Cancer Team when required, and be provided with well-produced information leaflets.

Patients should also be given information about sources of social and practical help, such as local support groups and disability and benefits helplines, both verbally and in written form. Information should be provided in appropriate languages and media.

Providers must be sensitive to potential problems with communication. Those who provide direct patient care should have training in communication and counselling skills. They need to be aware that patients often find it difficult to take in information given during the consultation, especially just after receiving bad news. Patients should be given adequate time to reflect before decisions about treatment are made.
From the time of diagnosis, each patient should have access to a named nurse who has enhanced communication skills and knowledge of lung cancer, and who can offer continuity of care. The lung cancer and palliative care nurse specialists must be in close communication.

Psychosocial support is also necessary for carers looking after patients with advanced lung cancer at home. The primary and palliative care teams have particularly important roles in ensuring that the needs of both patients and carers are identified and met.

Patients under continuing management require rapid access to the health care system via an open door policy. The route by which specialist care can be accessed must be clear and explicit.

B. Anticipated Benefits

Information is valued for its own sake; people with cancer want to understand what is happening to them and most want to know about their prognosis. Well informed patients are also likely to suffer less anxiety.

Good communication reduces ignorance and fear, and can reduce anxiety and anger and improve patients’ confidence. Health care workers may come to treat patients in detached or even dehumanised ways to reduce their own emotional stress; training in counselling and communication skills may help professionals to recognise and overcome this problem. Supportive team working may also help staff to cope with the emotional pressure of dealing with distressed patients.

Psychosocial support can reduce levels of psychological morbidity and reduce symptoms. Some patients may develop significant depression; if this is recognised, appropriate treatment can be offered.

C. Evidence

Although some patients do not wish to take an active part in decision making, there is strong evidence that they value accurate information, and that many feel they are not given sufficient information.(B)

There is considerable evidence of problems with communication between both doctors and patients, and doctors and nurses, which can cause unintended distress.(B) A taped or written record of the consultation can be helpful for those whose prognosis is good. However, patients with poor prognosis, which will include the majority of those with lung cancer, do not appear to benefit from a detailed reminder of the consultation.(A)

There is fairly strong evidence that currently doctors and nurses have a limited ability to detect patients’ needs.(B)

Generally, patients with cancer can benefit from a variety of cognitive and behavioural interventions, including relaxation training, guided imagery, desensitisation, biofeedback, and standard information accompanied by counselling.(A) Interventions of these types can reduce side effects of therapy and
alleviate psychological and functional disturbances. Some forms of psychological and psychosocial counselling may improve a range of psychological, quality of life and other functional outcomes in patients with cancer. However, few of these studies included patients with lung cancer, and some of the benefits may be limited because life-expectancy tends to be short.

D. Measurement

Structure
- Providers should be able to demonstrate that appropriate and adequate verbal and written information about lung cancer in general and the patient’s own situation and options is given to every patient.
- Providers should demonstrate provision of services designed to meet the psychosocial needs of patients.
- Providers should demonstrate provision of training courses in communication skills.

Process
- There should be evidence that patients receive information and support from suitably trained staff.
- Proportion of staff involved in direct patient care who have had specific training in communication and counselling skills.

Outcome
- Surveys of patients can be carried out by providers to assess the adequacy of each component of patient-centred care, for example patient knowledge about available resources, and patient satisfaction with the quantity of information and the manner in which it was given.

E. Resource Implications
- Resources will have to be made available for the provision of information and educational material for patients with lung cancer. Much of this information is available from existing organisations.
- Resources will be required to allow sufficient staff time for provision of psychosocial and educational support for patients.
- Additional training in communication skills for nurses and other clinical staff will require additional resources.
Radical Treatment for Non-small Cell Lung Cancer (NSCLC)

A. Recommendations

Surgery is a highly effective treatment for some patients with non-small cell lung cancer (NSCLC). As many as 20% of patients may be suitable for surgery and every effort should be made to identify these individuals. The surgeon should be involved in team decisions about all patients with potentially operable tumours. Patients with early stage NSCLC who do not undergo surgery may benefit from radical radiotherapy. Chemotherapy is unproven as first-line treatment for patients with NSCLC; those for whom it is considered should be encouraged to participate in well-designed clinical trials (see below).

Surgery

Patients with early (stage I or IIa) NSCLC should be considered for surgery (lobectomy or pneumonectomy). Surgery is not recommended for patients with advanced disease (stage IIIb or IV), and expert clinical judgement is required for patients with stage IIb or IIIa disease.

Elective surgery should only be undertaken after adequate diagnosis and staging, in order to minimise the number of inappropriate thoracotomies (see Topic 2, Access, Diagnosis and Staging). Surgery other than with curative intent should not generally be carried out (but see Topic 7, Palliative Interventions and Care). Surgeons should aim to achieve a rate of open-and-close thoracotomy (where the patient’s chest is opened but the tumour cannot be removed) of below 5%.

Because of the morbidity and mortality associated with surgery, it is important that patients should be given realistic information about both risks and benefits (see Topic 4, Communication, Information and Support).

Radiotherapy

Radical radiotherapy should be offered to suitable patients with early stage NSCLC who do not undergo surgery. This group includes patients who decline surgery, are medically unfit for surgery, or otherwise not eligible for surgery but still have regionally localised disease. Potential benefits of radical radiotherapy must be balanced against the risk of adverse effects; these issues should be discussed with patients (see Topic 4, Communication, Information and Support).
Health care commissioners should work together and with providers to make the 
option of CHART - continuous hyperfractionated accelerated radiation therapy - 
available for these patients. Since CHART involves thrice daily therapy for 12 
consecutive days, hostel facilities and weekend use of equipment will become 
necessary.

Adjuvant radiotherapy, either pre- or post-operative, should not generally be used.

Palliative radiotherapy is discussed in Topic 7 (Palliative Interventions and Care).

Chemotherapy
The use of chemotherapy tends to be associated with improved survival in NSCLC 
but there is continuing controversy about the overall balance of benefits and costs, 
both for individual patients and for the health service. A number of new drugs have 
recently been introduced, but despite promising results in early studies, there is as 
yet insufficient reliable evidence to suggest that such agents should become standard 
therapy. Before new chemotherapeutic agents are introduced into routine clinical 
practice, there should be good evidence from randomised controlled trials that they 
offer greater benefits than established treatments, or that they are more cost-effective.

Appropriate patients should be encouraged to participate in ongoing multi-centre 
trials (see Box 2), and collaborating cancer centres and units should be supported.

Box 2: National multi-centre clinical trials of chemotherapy for non-small 
cell lung cancer in the early stages of recruitment.

- The Big Lung Trial (BLT), designed to assess the effects on survival, 
  quality of life, and costs of adding cisplatin-based chemotherapy to 
  standard therapies for NSCLC.
- MRC LU20, which aims to assess the effects of neo-adjuvant 
  chemotherapy before radiotherapy or resection in patients with stage 
  IIIa NSCLC.
- MRC LU22, which aims to assess the effects of neo-adjuvant 
  chemotherapy before resection in patients with early stage NSCLC.

Patients should be given realistic information about expected benefits and adverse 
effects of chemotherapy and should be encouraged to contribute to decision-
making when they wish to be involved.

Induction (neo-adjuvant) chemotherapy: The value of chemotherapy given 
before surgery or radiotherapy (induction therapy) is unclear. Participation in well 
designed randomised controlled trials (in particular MRC LU20 and LU22) should be 
strongly encouraged.

Adjuvant chemotherapy: Platinum-based combination chemotherapy may be 
offered to selected patients after surgery or radiotherapy (adjuvant chemotherapy). 
This option should be discussed with oncologists in the context of lung cancer team 
meetings.
**Advanced disease:** The use of potentially toxic chemotherapy in patients with advanced NSCLC needs careful consideration on a patient by patient basis. Patients should be evaluated after two cycles of treatment to assess their response. Chemotherapy can reduce symptoms and may improve quality of life in patients with advanced disease (see Topic 7) but offers only modest improvements in survival. Because of continuing uncertainty about optimum regimens in different circumstances, entry into multi-centre clinical trials should be encouraged.

Chemotherapeutic agents require special care in delivery and dealing with adverse effects. There should be written protocols on administration of chemotherapy and on the management of complications and toxicities. Chemotherapy should be given in a designated daycase area in units or centres where close supervision by oncologists and chemotherapy nurse specialists is available, in accordance with Joint Council for Clinical Oncology (JCCO) guidelines.* There should be expert pharmacy and 24 hour laboratory support.

Patients receiving chemotherapy should have access to emergency care, information and advice from oncology trained staff on a 24 hour basis. They should be given written information on appropriate action for dealing with side-effects of chemotherapy and should be specifically warned, both verbally and in writing, of the particular risk of infection about 10 days after beginning chemotherapy. Any patients with signs or symptoms that could be due to infection must be admitted for treatment without delay.

**B. Anticipated Benefits**

**Surgery**

Surgery offers the best chance of long term survival for suitable patients. Increasing the rate of appropriate surgery is likely to maximise the potential benefits and reduce avoidable morbidity and mortality.

**Radiotherapy**

CHART has been shown to produce 2-year survival rates of 29%, an absolute improvement of 9% over conventional radical radiotherapy, in a randomised controlled trial. An additional advantage of CHART is that treatment is completed in 12 days, compared with 6 weeks for conventional radiotherapy. Weekend working, necessary for the delivery of CHART, may also permit quicker access to palliative radiotherapy.

**Chemotherapy**

Chemotherapy may offer modest improvement in survival in patients with early disease. However, a statistically significant improvement in survival (4% at 2 years and 2% at 5 years) has only been demonstrated in patients with locally advanced disease treated with both chemotherapy and radical radiotherapy. In patients with advanced non-small cell lung cancer, chemotherapy increases median life expectancy by about 6 weeks (reported median survival for patients who receive best supportive care ranges from 9 to 20 weeks). In patients who respond, chemotherapy reduces symptom severity and improves quality of life.

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C. Evidence

Surgery
There are no randomised controlled trials comparing surgery with no surgery, and therefore there are no reliable estimates of the effect of surgery on survival. Observational studies of patients with stage I NSCLC, suggested 5-year survival probability was 70% for those undergoing surgery compared with 10% who did not.(B)

Audit data from Yorkshire show that 28% (95% CI: 26% to 30%) of all patients who have undergone surgery for lung cancer survive for 5 years.(B)

Although surgery appears to offer a marked increase in life-expectancy, observational studies are difficult to interpret because of potential biases. For example, patients who undergo surgery are likely to be in better general health and therefore have better prognosis within a given stage, than those who do not receive surgery. There is a strong body of clinical opinion supporting the use of surgery.

In patients with T₁N₀M₀ NSCLC (localised stage I) lobectomy is associated with lower mortality and recurrence rates than limited resection (wedge or segment).(A)

Surgery for lung cancer carries a 5% overall operative mortality risk and causes significant morbidity. 10% of patients have major life-threatening complications and may suffer persistent incisional pain for 1-4 years after thoracotomy.(B) Quality of life deteriorates in the first 3 months after thoracotomy, but returns to the preoperative baseline after about 6 months.(B)

Annual returns of the Society of Cardiothoracic Surgeons of Great Britain and Ireland show that 11% of thoracotomies were “open and close”, where the disease is found to be too extensive to be treated by surgery.(B) Inappropriate thoracotomies lead to avoidable morbidity and wasted resources. Under trial conditions, a Canadian study of diagnostic techniques reported an “open and close” rate of 4%. (A)

Radiotherapy
In patients with stage I - III NSCLC who are considered unsuitable for surgery, radical radiotherapy appears to lead to improvements in survival. 5-year survival rates in retrospective studies range from 10% to 42%; however equivalent rates in registry series are below 5%. (B) There have been no recent comparisons with other forms of treatment; the only RCT comparing radiotherapy with surgery was carried out over 30 years ago and may not be relevant to current practice. Higher survival rates have been reported with higher radiotherapy doses, but around 20% of patients suffer severe long-term adverse effects after treatment with 60 Gy or more.(B)

29% of patients with cancer limited to the thorax (stages I to III) treated with CHART survived for 2 years, compared with 20% of those randomised to conventional radiotherapy. CHART requires that patients be accommodated in hospital and that they receive treatment outside normal working hours; it therefore leads to greater hospital costs than conventional radiotherapy.(A) The incremental cost per disease-free life year of CHART compared to conventional radiotherapy is estimated at just under £2,500.
Adjuvant radiotherapy does not improve survival. Two RCTs of pre-operative radiotherapy did not find any survival benefit. A meta-analysis of post-operative radiotherapy found a detrimental effect.

**Chemotherapy**

A meta-analysis, published in 1995, based on results for 9387 patients in 52 randomised controlled trials suggests that platinum-based chemotherapy leads to small improvements in survival, when compared with no chemotherapy. In patients with locally advanced disease treated with radical radiotherapy, platinum-based adjuvant chemotherapy results in an absolute increase of 4% of people surviving at 2 years (95% CI: 1% to 7%), and 2% (95% CI: 1% to 4%) at 5 years. Suggested benefits of adjuvant chemotherapy with surgery or surgery and radiotherapy are not statistically significant. In advanced disease, platinum-based chemotherapy gives an absolute improvement in survival of 10% (95% CI: 5% to 15%) at one year when compared with supportive care and an increase of 6 weeks median survival time.

There is no firm evidence that regimens containing vinca alkaloids, etoposide or other, newer drugs produce better results than platinum-based chemotherapy. Older long-term alkylating agents increase the risk of death.

A meta-analysis comparing single agent versus combination chemotherapy in advanced NSCLC found a modest survival advantage but significantly greater toxicity for combination chemotherapy. This survival advantage was no longer significant when combination therapy was compared with more active single agents (platinum analogues or vinorelbine).

Two trials suggest that neo-adjuvant chemotherapy is beneficial for patients with stage IIIa disease, but both have methodological problems. Further research is required.

A number of new chemotherapeutic agents have recently been introduced (for example, gemcitabine, taxanes and navelbine). The results of several RCTs assessing effectiveness of new drugs are likely to be published in the near future. Although early results appear promising, information is required from large randomised controlled trials before these drugs can be properly assessed. An update of the meta-analysis of chemotherapy (see above) with the possible addition of neo-adjuvant chemotherapy is planned, but results are unlikely to be available before the end of 1999.

There is very little reliable data on the cost-effectiveness (e.g. costs per life year) of chemotherapy for lung cancer.
D. Measurement

Structure
- Documented local clinical policy to guide treatment for specified patient groups.
- Documented local clinical policy to guide patient selection for surgery.
- Availability of facilities for the delivery of CHART, including hostel accommodation.
- The ability to offer chemotherapy under supervised conditions.

Process
- Proportion of surgical procedures where tumour histology was known before thoracotomy.
- Proportion of ‘open and close’ thoracotomies.
- Audit to monitor the rate of surgery.
- Weekend working in radiotherapy departments which offer CHART.
- Audit of the delivery of chemotherapy against JCCO guidelines.

Outcome
- Reduction in unnecessary surgery as shown by an increase in the ratio of curative surgical interventions to total thoracotomies for lung cancer.
- Adverse effects of radiotherapy.
- Chemotherapy-related deaths.
E. Resource Implications

- It is believed that many patients with lung cancer in Britain are undertreated. Increased use of radical treatment is likely to increase resource requirements.

- Resource implications of implementing the recommendations for surgery are unknown, because it is not clear whether the overall surgical volume would decrease or increase with more appropriate use of surgery. The reduction in inappropriate thoracotomies could be partially or totally offset by an increase in appropriate surgery due to accurate diagnosis and staging of patients who would currently not undergo surgery. However, the absolute numbers of patients involved is small.

- Economic analysis of the CHART trial shows that the cost of continuous hyperfractionated accelerated radiation therapy is higher than that of conventional radiotherapy. Average costs (including hospital, community, and patient costs) up to 3 months from the beginning of treatment were £2484 for CHART and £1786 for conventional radiotherapy, a differential of £698 (95% CI: £392 - £1003; p<0.001). Costs varied widely between the 10 participating centres, with average costs for conventional therapy greater than for CHART in one of the centres.

- Provision of CHART would require some re-organisation of radiotherapy services. If hostel facilities are available and weekday radiotherapy provision is extended, the cost differential between the two types of treatment could be reduced to approximately £250.

- Staff costs are likely to rise with the provision of radiotherapy at times when it has not previously been available.
Radical Treatment for Small Cell Lung Cancer (SCLC)

A. Recommendations

Small cell lung cancer (SCLC) is a disease that progresses and spreads rapidly. By the time of diagnosis, about 70% of patients have extensive disease. The remaining 30% have limited disease, with no sign of cancer beyond one side of the chest.

This type of cancer usually responds well to chemotherapy, which is the main first line treatment. Chemotherapy can offer relief from symptoms but leads to complete cure in fewer than 5% of patients. The addition of radiotherapy can improve survival in selected patients, but the role of surgery is very limited.

**Surgery**

Surgery should only be considered if there is strong reason to believe that the cancer is sufficiently localised to allow its complete removal.

**Radiotherapy**

Radiotherapy of the primary tumour and mediastinum should normally be offered to patients with good performance status and limited disease who respond to chemotherapy (probably fewer than a quarter of all patients with SCLC). Problems of frailty and bone marrow reserve must be considered.

Prophylactic cranial irradiation (PCI) to prevent brain metastases should be offered to patients in complete remission. It should not be given concurrently with chemotherapy.

Palliative radiotherapy is discussed under Topic 7, *Palliative Interventions and Care*.

**Chemotherapy**

Small cell lung cancer usually responds to chemotherapy and all patients should be considered for this treatment. Those who are sufficiently fit to tolerate it should be offered up to 6 cycles of standard-dose combination chemotherapy; 3-4 cycles should be offered to less fit patients. Response to therapy should be assessed in all patients after 2 cycles, before additional chemotherapy is given.

Before new chemotherapeutic agents are introduced into routine clinical practice, there should be good evidence from randomised controlled trials that they offer greater benefits or are more cost-effective than established treatments.
Patients should be given realistic information about expected benefits and adverse effects of chemotherapy and, when appropriate, should be encouraged to contribute to decision-making.

Chemotherapeutic agents require special care in delivery and dealing with adverse effects. There should be documented local clinical policies for administration of chemotherapy and for the management of complications and toxicities. Effective anti-emetic treatment, normally using 5-HT₃ receptor antagonists, should be available throughout the period of chemotherapy. Chemotherapy should be given in a designated daycase or inpatient area in units or centres where close supervision by oncologists and chemotherapy nurse specialists is available, in accordance with Joint Council for Clinical Oncology (JCCO) guidelines. There should be expert pharmacy and 24 hour laboratory support.

Patients receiving chemotherapy should have access to emergency care, information and advice from oncology trained staff on a 24 hour basis. They should be given written information on appropriate action for dealing with side-effects of chemotherapy and should be specifically warned, both verbally and in writing, of the particular risk of infection about 10 days after beginning chemotherapy. Any patients with signs or symptoms that could be due to infection must be admitted for treatment without delay.

Palliative chemotherapy is discussed under Topic 7, Palliative Interventions and Care.

B. Anticipated Benefits

Radiotherapy
Thoracic radiotherapy used in conjunction with chemotherapy can reduce local recurrence and increases 3-year survival for patients with limited disease. Prophylactic cranial irradiation can reduce the risk of brain metastases (from which most patients eventually suffer), and may improve survival.

Chemotherapy
Around three quarters of patients with small cell lung cancer respond to combination chemotherapy, which appears to increase life-expectancy by about 9 months. However, 2-year survival rates are low, less than 10%. A minority of those who achieve complete remission become long-term survivors - about 3% of treated patients. Chemotherapy is also effective for symptom relief.

C. Evidence

Surgery
A randomised trial comparing surgery after chemotherapy with chemotherapy alone demonstrated slightly poorer (but not statistically significantly different) survival rates among patients who had surgery. (A)

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Radiotherapy
A meta-analysis of radiotherapy in addition to chemotherapy for patients with limited small cell lung cancer (tumour on one side of the thorax only and no evidence of metastases) found that 3-year survival increased from 9 to 14%.(A)

A systematic review found that radiotherapy can halve rates of local recurrence after chemotherapy for patients with limited disease. Long-term survivors may experience late complications such as lung fibrosis. In patients with extensive disease, radiotherapy does not improve survival and may be toxic.(A)

Prophylactic cranial irradiation given after chemotherapy-induced remission can significantly reduce the lifetime risk of brain metastasis.(A) After 2 years, 40% of surviving patients treated with PCI have brain metastases, compared with 67% of patients treated with chemotherapy alone (relative risk 0.35).(A)

PCI given at the same time as chemotherapy may be associated with serious complications including intellectual impairment, mental disorders, dementia and cerebral atrophy. These adverse effects, which may appear up to 10 years after treatment, are irreversible and progressive.(B) Long-term adverse reactions to PCI appear to be rare when concurrent administration of chemotherapy and radiotherapy is avoided,(A) but the optimal dose and timing of PCI requires further investigation in prospective randomised trials.

Chemotherapy
Objective response rates between 65 and 100% have been reported in randomised controlled trials of combination chemotherapy.(A)

Untreated patients with small cell lung cancer have a median survival of 2-4 months.(B) Trials of combination chemotherapy report median survival times ranging between 47-65 months for limited disease and 26-43 months for extensive disease.(B)

Average 2-year survival for patients with small cell lung cancer treated in British chemotherapy trials (1978-1986) was 6%. A minority of those who achieve complete remission become long-term survivors - about 3% of all patients.(B)

Combination chemotherapy is more effective than any single drug.(A) No regimen has been shown to be clearly superior to a variety of combinations (usually between two and four) of the following drugs: cyclophosphamide [C], doxorubicin (Adriamycin) [A], vincristine [V], etoposide [E], cisplatin/carboplatin [P], ifosfamide [I].(A) There have been no published reports of randomised trials comparing newer agents such as gemcitabine, vinorelbine, taxanes or topoisomerase inhibitors with established regimens such as CAV/EP for first-line treatment of SCLC.

Chemotherapy extended beyond 6 cycles may increase the length of time before disease progression, but it is associated with increased toxicity and a poorer quality of life.(A) Symptom relief normally occurs after 1 or 2 cycles; 3-4 cycles are likely to be appropriate for less fit patients.(B)
There is no reliable evidence that high-dose chemotherapy produces better results overall than standard doses, nor that there is any advantage in increasing dose intensity by reducing the period between chemotherapy cycles to less than three weeks.\(^{(A)}\)

Patients whose general condition is particularly poor, who suffer from severe breathlessness, have extensive disease, abnormal blood biochemistry and/or enlarged liver, are at greater risk of treatment-related death.\(^{(B)}\) This is most likely to occur during the second week of the first cycle of chemotherapy, when immunity to infection reaches a minimum.

### D. Measurement

**Structure**
- Availability of documented local clinical policies to guide treatment for specified patient groups.
- The ability to offer chemotherapy under supervised conditions.

**Process**
- Percentage of patients offered chemotherapy.
- Audit of the delivery of chemotherapy according to JCCO guidelines.

**Outcome**
- Adverse effects of radiotherapy.
- Case-mix adjusted survival of patients undergoing chemotherapy.
- Deaths within 21 days of initiating chemotherapy.

### E. Resource Implications
- The therapeutic approach described here does not represent a change in established clinical practice. It is therefore unlikely to have significant resource implications.
Palliative Interventions and Care

The majority of lung cancer patients present with relatively advanced disease. For these patients, symptom control and palliation are central to any management plan.

The major symptoms fall into four groups: symptoms due to the presence of tumour in the chest (e.g. breathlessness, cough, haemoptysis (coughing blood), chest pain, voice problems, difficulty in swallowing (dysphagia), superior vena cava obstruction); symptoms related to metastases (e.g. bone pain, spinal cord compression, neurological symptoms such as fits); general systemic symptoms (e.g. fatigue, weakness, malaise, anorexia, weight loss); and psychological symptoms (e.g. anxiety, depression).

A. Recommendations

A system should be established to ensure that patients receive optimal symptom control, together with psychological, social and spiritual care throughout the course of their illness. Such support should also be available for carers, both during the patient’s lifetime and after bereavement. There should be documented local clinical policies to guide referral to the Palliative Care Team and close liaison between the Lung Cancer, Primary Care and Palliative Care Teams to ensure co-ordinated delivery of appropriate interventions.

Symptom management

While patients with lung cancer may require a variety of interventions to manage symptoms and improve quality of life, radiotherapy and/or chemotherapy can help to control several different symptoms simultaneously. Chemotherapy should normally be considered as a first-line treatment for symptom control in patients with small cell lung cancer (SCLC) and radiotherapy in patients with non-small cell lung cancer (NSCLC). The toxicity of such interventions must, be carefully weighed against potential benefits and the choice of treatment discussed with individual patients.

Chest/local symptoms: Short courses of palliative radiotherapy (usually not more than 1 or 2 fractions) should be available without delay for patients with cough, haemoptysis, superior vena cava obstruction (SVCO), or chest pain due to cancer. Longer courses of radiotherapy may be appropriate for patients with NSCLC and better performance status.

These symptoms often respond to chemotherapy, particularly in patients with SCLC (see below, also Topics 5 and 6, Radical Treatment).

For breathlessness caused by pleural effusion, drainage may be appropriate. Non-medical interventions for breathlessness, including counselling and breathing training, may be beneficial, possibly in nurse-led clinics.
Effective pain relief should be available promptly for all patients. This should follow World Health Organisation guidelines and use the 3-step analgesic ladder. The adequacy of pain control should be assessed regularly.

A range of invasive interventions should be available when required for the minority of patients who suffer severe symptoms that cannot readily be controlled. These include palliative surgical interventions such as stenting for superior vena cava obstruction, and interventions such as endobronchial brachytherapy, stenting and laser treatment to open up the airways or oesophagus. Such procedures should be carried out by specialists at designated regional centres.

**Symptoms related to metastases:** Palliative radiotherapy (see above) should be available without delay for patients with bone or brain metastases. Spinal cord compression needs urgent treatment, usually with radiotherapy. Radio- or chemotherapy should be available for patients with symptoms due to brain metastases.

**General systemic symptoms:** Palliative chemotherapy, normally using 3-6 cycles of a combination of drugs, should be discussed with selected patients, particularly those who have relatively good performance status and who have not previously received chemotherapy. Any improvements are likely to be apparent after 2 treatment cycles, at which point patients should be assessed and the use of further treatment discussed with them. New generation products should not be used outside the context of clinical trials unless they have been demonstrated to be cost-effective in this group of patients.

**Psychological symptoms:** Effective management of physical symptoms (see above), combined with good communication, information and support (see Topic 4) can reduce patient distress. Specialist mental health services should be available for the assessment and management of more severe and persistent psychological symptoms.

**The organisation of palliative care**

A large number of patients with lung cancer have advanced disease at diagnosis and palliation will be the main focus of care. Lung cancer services should be organised to ensure that palliative care is an integral part. Specialist palliative care should be available for all patients, both within the hospital and in the community.

A multiprofessional palliative care team should be available to provide both optimal relief from symptoms and social and psychological support for patients and their carers. The team should also have access to other skills including counselling for patients with advanced incurable illness, spiritual guidance, dietary advice, and practical support (see Topic 3, **Multiprofessional Teams**). Members of the team should be trained in communication and in understanding the needs of patients with advanced incurable illness (see Topic 4, **Communication, Information and Support**).

Patients and carers should have access to the advice and expertise of palliative care specialists, and should have continuity of contact with a named member of the team. Patients should be helped to remain in the place they prefer, whether this is their home, hospital, or hospice, and should, whenever possible, be allowed to choose where they wish to die. Health professionals (e.g. GPs and hospital staff) should have access to palliative care specialists at any time.
**B. Anticipated Benefits**

**Symptom management**
Prompt treatment of symptoms is likely to reduce distress and disability, and may diminish strain on carers.

Short courses of radiotherapy can provide effective palliation for common symptoms of lung cancer. Single-fraction treatment is likely to be convenient for patients. Chemotherapy can reduce symptoms and improve life-expectancy.

**The organisation of palliative care**
Provision of effective palliative treatments and adequate pain control, combined with high quality co-ordinated care services, can improve quality of life for people with advanced lung cancer. Effective palliative care by home care teams allows patients to stay at home longer, if this is their preference. This is preferred by most patients and is the least expensive option for the NHS.

**C. Evidence**

**Symptom management**

**Generalised and local symptoms:** Palliative chemotherapy can reduce the severity of a wide range of lung cancer symptoms and offers small increases in life expectancy (median 6 weeks in trials of platinum-based chemotherapy for advanced NSCLC).(A)

**Chest symptoms:** Radiotherapy can palliate cough, shortness of breath, chest pain, haemoptysis and superior vena cava syndrome.(B) Short courses of radiotherapy (1 or 2 fractions) are as effective as longer courses for symptom control in patients with NSCLC.(A) Single-fraction (10 by 10) treatment has not been linked with any lasting adverse effects. (A). There appears to be considerable variation in doses used in practice.(B)

In patients with NSCLC who are less ill, there is a trade-off between short-term advantages of lower dose radiotherapy and the possibility of delaying the onset of metastatic disease with higher doses given over a longer period. 17 Gy in 2 fractions gives better and more rapid palliative effects than 39 Gy in 13 fractions; however, the higher dose delays metastatic disease for longer and is associated with marginally improved survival (9% and 12% of patients alive at 2 years after 17 Gy and 39 Gy respectively; hazard ratio 0.82, 95% CI 0.69 to 0.99).(A)

There is survey evidence that common symptoms of lung cancer, particularly breathlessness and pain, are currently poorly controlled.(B) These are progressive problems with advancing disease. Behavioural/psychoeducational treatment provided in a nurse led clinic was found to be more effective than standard care for reducing breathlessness and anxiety.(A)

There is also evidence of a lack of recognition of the severity of pain experienced by patients and an under-use of appropriate drugs leading to poor pain relief.(B) Cancer pain can generally be well controlled in 80-90% of patients treated following World Health Organisation guidelines for cancer pain using the three-step analgesic ladder.(A)
The insertion of a stent can relieve airway obstruction in patients with recurrent tumour but there is no clear evidence on the indications for the use of stents. (B) Removal of tumour tissue by laser or cryotherapy can also relieve airway obstruction. (B)

The proportion of patients likely to benefit from intraluminal interventions is small. Intraluminal brachytherapy may have a role in the management of patients whose symptoms recur after conventional radiotherapy but it does not appear to be superior to conventional radiotherapy for routine use. (A) Brachytherapy can cause severe adverse effects including fatal haemorrhage, particularly when given in combination with other treatments. (B)

**Symptoms related to metastases:** Radiotherapy is effective for alleviating symptoms of spinal cord compression and bone and brain metastases. There is considerable variability in the doses used, with little evidence of any advantage for any specific regimen. (A) For bone pain, 8 Gy in a single fraction is as effective as higher doses. (A)

**The organisation of palliative care**
There is considerable evidence of problems with communication between professionals in the management of patients with advanced cancer. These can reduce patients’ quality of life and lead to inadequate treatment of symptoms. (B) Care may be fragmented and poorly co-ordinated, with many different paid carers visiting patients’ homes during the last months of life. (B) One trial has shown that the use of nurse co-ordinators to ensure that patients have access to appropriate services can lead to significant reductions in inpatient days, home visits and costs, without reducing satisfaction. (A) No other studies have looked at this method of service co-ordination.

Adding a multiprofessional support team to conventional care can result in a higher quality service. (A) Referral to specialist palliative care services leads to improvements in pain control and reductions in the severity of other symptoms. (B)

The majority of patients wish to die at home, and home care is usually the lowest cost option for the health service. Poor symptom control is the most common reason for referral to hospital. (B)

**D. Measurement**

**Structure**
- Documented local clinical policies to guide referral and treatment.
- Availability of suitably trained staff and facilities for the provision of symptom management, co-ordination of supportive care, and education.
- Evidence that adequately resourced and staffed palliative care services are available in hospitals, hospices and the community.
- Arrangements to ensure access to intraluminal therapies at cancer centres.
**Process**
- Waiting times for palliative radiotherapy.
- Use of the World Health Organisation 3-step analgesic ladder for pain control.

**Outcome**
- Patients’ quality of life and reduction in symptoms.
- Results of symptom control audits.
- Surveys of satisfaction with care.

**E. Resource Implications**
- The majority of patients with lung cancer are currently given radiotherapy at some point in their illness. Increased use of a single-fraction regime is likely to conserve resources without compromising outcomes. However, resources may be required to restructure radiotherapy services so that treatment can be given promptly.

- Increasing the number of palliative care specialists will require additional resources in some areas.

- Increased resources will be required in some areas to create effective multiprofessional palliative care teams and to monitor outcomes.

- Care at home, managed by suitably resourced teams, costs considerably less than hospice or hospital care and may reduce the need for hospice/hospital admission.

- Improved co-ordination of care may lead to substantial reductions in costs per patient.
Appendix 1

Developing the Guidance: the Process

The methodology used for the production of this guidance document is the same as that developed for the production of the guidance documents on breast and colorectal cancers. Both the process and the identities of those involved (lists in appendix 2), need to be open to scrutiny. The methodology, which was developed specifically for this work, is summarised in the figure which identifies the four main stages. The process is sequential, with each of the first three stages contributing a body of material from which the final document is then drawn. A particular feature is the openness of the process to external views allowing proposals to be challenged and fresh evidence introduced.

The initial stage is a residential event at which people from a range of disciplines and organisations identify what they believe to be the most important attributes of a cancer service necessary to deliver good outcomes. These are set out in a common format and constitute a set of proposals. Each proposal includes key elements such as the evidence on which it is based, implications for the NHS, and relationships to outcome.

These proposals are then subject to refereeing, involving a spectrum of clinical opinion, those likely to use the eventual guidance, and organisations representing the concerns of cancer patients. The comments of referees are collated for use in committee, but the full comments, together with the original proposals, go into the evidence review stage.

Evidence reviews are commissioned through the NHS Centre for Reviews and Dissemination at the University of York and separately funded by the Research and Development Directorate. The task of the reviewers is to prepare a systematic assessment of the nature and strength of the evidence underlying the proposals and arising from comments by referees. This work is summarised in the Research Evidence which supports this manual.

The synthesis of the three strands of work into a coherent report is overseen by the whole Cancer Guidance Group, most of whom are not involved in the earlier stages of any one site-specific report. The shaping of the document is assisted by feedback from Commissioners on issues of style and content.
Cancer Guidance Methodology
What did we do?

Proposal Generating Event

Draft Proposals

External Referees

Comments on Proposals

Independent Review of Evidence

Evidence Commentary

Cancer Guidance Group

Guidance Report

Generate Proposals

Referee Proposals

Review Evidence

Write Guidance
Appendix 2

People and Organisations Involved in Production of the Guidance

2.1. Cancer Guidance Group

2.2 Members of the proposal generating group

2.3 People/organisations invited to comment on original proposals

2.4 Researchers carrying out literature reviews

2.5 Members of commissioners focus groups

Guidance synthesis and writing
Dr A Melville, Research Fellow
Ms A Eastwood, Senior Research Fellow
Professor T A Sheldon, Director
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Dr M D Peake, Consultant Physician, Pontefract General Infirmary
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Middlesex Hospital, London

People/organisations invited to comment on drafts of the guidance
Members of COG
Cancer Guidance Group
Various professional organisations
Department of Health

Project support
The Northern and Yorkshire Cancer Registry and Information Service
Appendix 2.1

Membership of the Cancer Guidance Group

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Vice Chairman
Professor M Richards  Sainsbury Professor of Palliative Medicine, St Thomas’s Hospital, London

Members
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Professor C C Bailey  Regional Director of R&D, NHS Executive - Northern & Yorkshire
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Mrs R Miles  Regional Cancer Adviser, NHS Executive - West Midlands and Chairman of National Cancer Alliance
Dame G Oliver  Director of Patient Services, Clatterbridge Centre for Oncology
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Mr H Ross  Chief Executive, United Bristol Healthcare Trust
Served on the Group until June 1997
Professor T A Sheldon  Director, NHS Centre for Reviews and Dissemination, University of York
Served on the Group until June 1997
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Served on the Group until June 1997
Professor I Williams  Professor of General Practice, University of Nottingham
Dr E Wilson  Senior Medical Officer, Department of Health, Wellington House
### Appendix 2.2

**Participants in the Lung Cancer Proposal Generating Event**

<table>
<thead>
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<th>Position and Institution</th>
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Facilitated by:
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Professor M A Richards  Sainsbury Professor of Palliative Medicine, St Thomas’ Hospital, London
Appendix 2.3

Referees of the Lung Cancer Proposals

Invited to comment:
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Appendix 3

Glossary of Terms

**Adjuvant treatment**
Treatment (e.g. chemotherapy) given in addition to the main primary treatment (e.g. surgery or radiotherapy). Adjuvant treatment is given with the aim of eliminating any microscopic residual disease, thereby decreasing the risk of subsequent relapse.

**Anti-emetic**
A drug which prevents nausea or vomiting.

**Aorta**
The main artery which carries blood from the heart to the body.

**Audit**
A method for assessing the quality of care. Results of a process or intervention are assessed, compared with a pre-existing standard, changed where necessary, then reassessed.

**Biopsy**
Removal of a sample of tissue or cells from the body to assist in diagnosis of a disease.

**Brachytherapy**
Treatment using radioactive material placed close to, or in the tumour.

**Bronchi**
The tubes leading into the lung from windpipe (or trachea), though which we breathe. The main bronchus serves a lung, and then divides into smaller bronchi serving lobes. About three-quarters of all lung cancers develop from the bronchi, most often from the inner surface.

**Bronchoscopist**
Someone, usually a respiratory physician or surgeon, who undertakes bronchoscopies.

**Bronchoscopy**
The insertion of a tubular instrument down the windpipe (or trachea) into the bronchi to look for a tumour and take samples of tissue. It is usually done using a flexible fibre optic instrument under local anaesthetic and sometimes light sedation.

**Brushings**
Samples of tissue collected on brushes inserted via a bronchoscope into areas of lung where cancer is seen or suspected.

**Carcinogen**
A cancer producing substance.
Carcinoma
A type of cancerous growth.

Chemotherapy
The use of drugs that kill cancer cells, or prevent or slow their growth.

Clinical Oncologist
A doctor who specialises in the treatment of cancer who is specially trained in the use of radiotherapy but who may also use chemotherapy.

Combination Chemotherapy
Chemotherapy using more than one drug to kill cancer cells.

Computed tomography (CT)
An x-ray imaging technique.

Continuous Hyperfractionated Accelerated Radiation Therapy (CHART)
A form of radiotherapy in which treatment is given in smaller doses, more frequently, and over a shorter period than normal (three times daily on each of 12 consecutive days).

Cryotherapy
The use of low temperatures for the treatment of disease.

Curative Resection
An operation in which the surgeon believes that all cancer-containing tissue has been removed.

Cytology
The study of the appearance of individual cells under a microscope. Cytology may be performed on samples of sputum, brushings taken at bronchoscopy or samples obtained by needle biopsy.

Dysphagia
Difficulty in swallowing.

Extensive disease
Lung cancer which has spread beyond one side of the chest.

Fibre optic bronchoscopy
See Bronchoscopy.

Fine needle biopsy
Biopsy taken by inserting a fine needle into tissue to withdraw cells. When lung cancer is suspected, diagnosis may involve piercing the skin and chest wall (percutaneous or transthoracic needle biopsy).

Fraction
Radiotherapy is usually given over an extended period. The dose delivered each day is known as a fraction.

Haemoptysis
Coughing up blood or blood stained sputum.
Heterogeneous
Of differing origins, or different types.

Hilum
The root of the lung; the point at which the main vessels and nerves enter the lung, around which lymphatic glands are situated.

Histological type
The classification of the tumour by type of cancer cell, for example small cell lung cancer.

Histology
Examination of the microscopic structure of tissue by a pathologist.

Intercostal
Between the ribs.

Intraluminal
Within a tube. In lung cancer, this is likely to refer to interventions such as brachytherapy, cryotherapy or laser treatment, which are delivered from the inside of the airway.

Larynx
The voice organ situated at the top of the trachea.

Limited disease
Small cell lung cancer which is confined to one side of the chest (one lung).

Limited resection
An operation where part of a lung is removed.

Lobectomy
The surgical removal of a lobe of a lung. Lobectomy is the operation most often used with the intention of curing patients with lung cancer.

Localised disease
Tumour confined to a small area (e.g. a part of the lung, possibly including any lymph nodes in the immediate vicinity).

Lumen
The space inside a tube such as an airway.

Lung fibrosis
The formation of fibrous (scar) tissue in the lung.

Lymph nodes
Lymph nodes are small organs which act as filters in the lymphatic system. Lymph nodes close to the site of the primary tumour are usually the first sites to which cancer spreads.

Lymphadenopathy
Disease of the lymph nodes.
Lymphoma
Malignant tumour originating in the lymph nodes.

Mediastinal biopsy
Biopsy of the lymph nodes situated in the mediastinum.

Mediastinoscopy
Inserting an instrument (mediastinoscope) into the mediastinum to see the mediastinal lymph nodes and possibly take a biopsy. It is usually done under anaesthetic by thoracic surgeons, to check how far lung cancer has spread.

Mediastinum
The space in the chest between the lungs.

Medical Oncologist
A doctor who specialises in the treatment of cancer and particularly in the use of chemotherapy.

Mesothelioma
A malignant tumour of the pleura caused by asbestos.

Meta-analysis
The statistical analysis of the results of a collection of individual studies to synthesise their findings.

Metastases
Spread of cancer away from the primary site, leading to secondary tumours. In lung cancer, this implies a poor prognosis. About three-quarters of patients with metastases will die within 6 months and almost all within a year.

Nicotine replacement therapy
The use of patches, gum or sprays containing nicotine to prevent symptoms of nicotine withdrawal in ex-smokers.

Nodes
See Lymph nodes.

Non-small cell lung cancer (NSCLC)
All types of cancer that originate in the lung or lower airways other than small cell lung cancer, including squamous cell (the most common type), large cell and adeno-carcinoma. These types of cancer show similar patterns of response to treatment.

Oncologist
A doctor who specialises in treating cancer.

Oncology
The study of the biology and physical and chemical features of cancers. Also the study of the cause and treatment of cancers.

Open and close thoracotomy
An operation in which the patient’s chest is opened but the tumour cannot be removed.
Palliative
Anything which serves to alleviate symptoms due to the underlying cancer, without the prospect of cure. Hence palliative care, palliative radiotherapy.

Pancoast tumour
A cancer which arises in the apex of the lung close to the collar bone, and spreads to the area of the armpit through which nerves pass to the arm (brachial plexus).

Percutaneous
Through the skin.

Placebo
Fake or inactive interventions received by participants allocated to control groups in clinical trials, used to allow investigators to quantify any specific effect of treatment.

Pleura
The membrane covering the surface of the lung, diaphragm, mediastinum, and chest wall.

Pleural
Relating to the pleura.

Pleural aspiration
Removal of fluid (pleural effusion) from the pleural space for therapeutic or diagnostic purposes.

Pleural effusion
Collection of fluid in the pleural space.

Pneumonectomy
The surgical removal of an entire lung. In lung cancer, pneumonectomy is done with the intention of curing the patient.

Pneumothorax
A collection of air in the thoracic cavity (i.e. between the lung and the chest wall), leading to collapse of the lung.

Positron emission tomography (PET)
An imaging technique that can provide information about tissue function.

Prophylactic antibiotic cover
Antibiotics given to prevent infection, for example to protect patients whose resistance is reduced by chemotherapy.

Prophylactic cranial irradiation (PCI)
Radiotherapy of the brain, given to reduce the risk of cancer recurrence when there are no detectable brain metastases.

Prophylaxis
Intervention to prevent an unwanted outcome.

Quality of life
The individual's overall appraisal of his/her situation and subjective sense of well-being.
Radical radiotherapy
High doses of radiotherapy given with curative rather than palliative intent.

Radiotherapy
The use of radiation, usually x-rays or gamma rays, to kill tumour cells.

Radon
A radioactive gas which occurs naturally in certain areas of the country (notably Cornwall, Devon, Somerset, Northamptonshire and Derbyshire). Exposure to high levels of radon can cause lung cancer.

Remission
A period when cancer volume and/or symptoms are reduced, usually in response to treatment. In complete remission, there are no signs or symptoms of tumour; partial remission is usually defined as a reduction in tumour bulk of 50% or more.

Resection
The removal of an organ or part of an organ.

Small cell lung cancer (SCLC)
An aggressive variety of lung cancer which often spreads rapidly. SCLC includes oat cell carcinoma.

Sputum
Matter coughed up from the lungs or airways.

Sputum cytology
Examination of a sample of sputum under the microscope for cancer cells. A relatively straightforward test, but one which has a high false negative rate (i.e. it may miss cases of lung cancer).

Squamous cell carcinoma
This is the most common type of lung cancer, classified as non-small cell lung cancer; it grows relatively slowly and may be treatable by surgery.

Staging
Refers to the allocation of categories (Stage I, II, IIIa, IIIb, IV) to groupings of tumours defined by internationally agreed criteria. Staging helps determine treatment and indicates prognosis. It is also expressed in terms of local tumour characteristics (T), spread to local lymph nodes (N) and more distant spread (M).

Standardised mortality ratio
The ratio of the number of deaths observed in a study group or population to the number expected if the study population had the same specific rates as the standard population, multiplied by 100.

Stent
A tubular metal or plastic device used to hold a tube open. In lung cancer, stents may be used to keep airways or major blood vessels open.

Stenting
The insertion of a stent.
Superior vena cava syndrome
The superior vena cava carries blood to the heart from the head, neck and upper limbs. Superior vena cava syndrome or superior vena caval obstruction occurs when tumour obstructs this vein, causing the head and neck to swell.

Thoracoscopy
Inserting a telescope like instrument through the chest into the pleural cavity in order to see the pleural surfaces and possibly take a biopsy.

Thoracotomy
An operation in which the chest is opened to expose the lungs. It requires general anaesthetic.

Trachea
The windpipe.

Transbronchial biopsy
A biopsy which may be done at the time of bronchoscopy. It involves piercing the bronchus to obtain lung tissue.

Transthoracic needle biopsy
A biopsy taken by inserting a needle through the chest wall.

Washings
The use of saline, delivered via a bronchoscope, to wash areas of the lung where cancer is seen or suspected. Cancer cells may be identified in washings by pathological examination.