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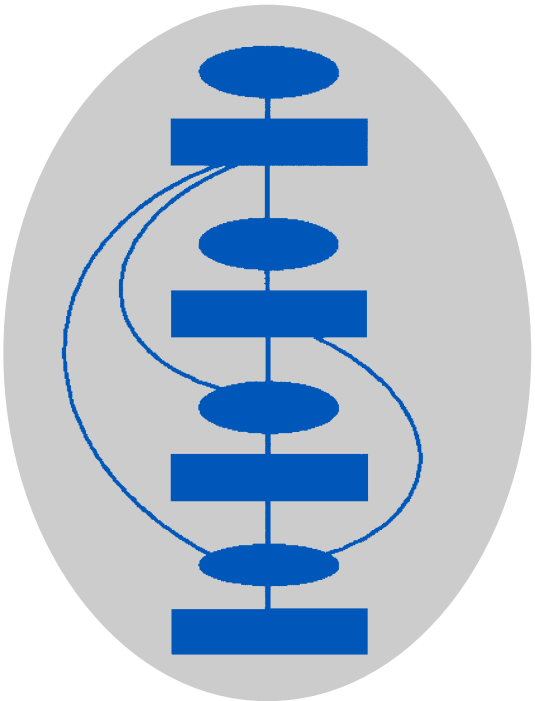
Guidance on Cancer Services

Improving Outcomes for People with Brain and Other CNS Tumours

Analysis of the Potential Economic Impact of the Guidance



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Analysis of the Potential Economic Impact of the Guidance: 'Improving Outcomes for People with Brain and Other CNS Tumours'

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Executive summary

The economic consequences of the recommendations of the *"Guidance on Cancer Services: Improving Outcomes for Brain and Other CNS Tumours"* in England and Wales are set out in this document. The analysis focuses on those aspects of the key recommendations that are likely to be of greatest consequence in terms of costs.

The summary of economic implications is outlined in Table 1.

There is uncertainty concerning the estimates presented and there will be variation at the neuroscience centre and cancer network level. Sensitivity analyses were conducted where appropriate in the estimated costs. Further assessments will be needed at cancer network level and/or NHS trust level to determine the exact cost implications. The calculations for employment costs are based on pay levels at 2005/06, any future pay awards will also need to be taken into consideration. Work is currently being carried out in the NHS in England, in connection with 'Payment by Results', to develop a better understanding of costs of treatment and care. This may help these assessments in the future.

Table 1 Summary of estimated annual economic implications

	Costs per year (£)	
	Lower range	**Upper range**
Staffing costs of weekly neuroscience MDT meetings (per centre)	73,320	188,084
Staffing costs of monthly cancer network MDT meetings (per network)	7,266	18,336
Site specific MDTs [1]		
Staffing costs of monthly pituitary MDT meetings (per MDT)	5,994	15,768
Staffing costs of monthly spinal cord MDT meetings (per MDT)	5,172	12,924
Staffing costs of monthly skull base MDT meetings (per MDT)	7,044	18,912
Staffing costs for each MRI scanner [2]	267,071	
Molecular pathology costs (staffing and test costs for MGMT assay)	1,283,090	
Core employment costs of neuroscience centre	1,308,005	2,180,008
Total employment costs of additional clinical nurse specialists	1,932,346	
Total employment costs of additional neuropathologists	1,474,208	
Employment costs per centre of additional allied health professionals	48,726	97,453
Total employment costs of additional palliative care specialists	223,848	
Cost of producing information leaflets (for all patients with brain and other CNS tumours in England and Wales)	14,620 (yr1) 10,400 (subsequent yrs)	

1 It is uncertain how many site specific MDTs will be required.

2 There is overlap between these figures for employment cost of radiologist and radiographer

Neuroscience and cancer network multidisciplinary teams (MDTs)

The Guidance recommends that attendance at MDT meetings should form part of the timetabled activities for core MDT members. It is assumed that extra resources will need to be made available to enable staff to attend MDT meetings. Meeting costs are derived by estimating the time spent attending meetings by different staff, multiplied by their hourly rate (salary and on-costs), in addition to preparation time.

It is anticipated that for those cancer networks with no neuroscience brain and other CNS tumours MDT in place, there will be an annual opportunity cost of between £73,320 for minimum attendance of a weekly two hour neuroscience MDT and up to £188,084 for full attendance at weekly three hour neuroscience MDT meetings.

All cancer networks will have an additional opportunity cost for establishing a cancer network brain and other CNS tumours MDT. This is estimated to be between £7,266 per year for minimum attendance at monthly one hour MDT meetings, and £18,336 for full attendance at monthly two hour MDT meetings.

Site specific MDTs

For each pituitary MDT in place, there will be annual opportunity costs of between £5,994 for minimum attendance at monthly one hour MDT meetings, and £15,768 for full attendance at monthly two hour MDT meetings.

For each spinal cord MDT in place, there will be annual opportunity costs of between £5,172 for minimum attendance at monthly one hour MDT meetings, and £12,924 for full attendance at monthly two hour MDT meetings.

For each skull base MDT in place, there will be annual opportunity costs of between £7,044 for minimum attendance at monthly one hour MDT meetings, and £18,912 for full attendance at monthly two hour MDT meetings.

Diagnosis – Radiology

Government initiatives are underway to improve access to CT and MRI facilities. There is a need for imaging facilities to have dedicated time available for patients with brain and CNS tumours. Existing scanners need to be adequately staffed to ensure that they are able to operate throughout the working day. Based on staffing estimates for a dedicated brain and CNS patient scanner, the staffing level required to run an MRI scanner during normal working hours would be 1.3 FTE consultant neuroradiologists, 3.0 FTE neuroradiographers plus additional administrative support. The annual cost of this level of staffing is £267,071 per MRI scanner.

Diagnosis – Pathology

Molecular diagnosis is a fast developing area of clinical practice, and cancer networks will need to plan for expansion over the next 10-20 years. At present, existing services for molecular diagnosis are adequate for the numbers of patients who require testing. If a specific molecular diagnostic test such as the MGMT assay becomes available, then it is anticipated that an additional 30 biomedical scientists would be required in England and Wales. The total additional annual cost for the anticipated 2,500 MGMT tests in England and Wales, including consumables, and staffing to perform them is estimated to be £1,283,090. If two more similar molecular tests were to be adopted for brain and other CNS tumours over a period of ten years, then the total costs may double.

Minimum staffing costs at neuroscience centres

The annual employment costs of the core staffing components of a neuroscience centre treating 100 new patients per year is estimated to be around £1,744,006 (± 25% range, £1,308,005 to £2,180,008). There will be economies of scale for neuroscience centres that have all facilities on site. As a result of uncertainty in this estimate a sensitivity analysis of ± 25% has been applied. It needs to be emphasised that the costs represent opportunity costs, as most of the staff involved in the treatment centres will already be contracted to the NHS.

Clinical Nurse Specialists

The needs assessment conducted to inform the guidance development indicated that there was a variation in the numbers of clinical nurse specialists for neuro-oncology across England and Wales. Although 3 (of 27) neurosurgical units and 4 (of 45) oncology/radiotherapy units had more than the recommended minimum staffing for clinical nurse specialists in neuro-oncology, the remainder had less. To ensure that there are a minimum of 1.5 specialist nurses at each unit, a further 39.2 FTE would need to be recruited at oncology/radiotherapy units and a further 11.5 FTE at neurosurgical units. Therefore, an additional 50.7 FTE clinical nurse specialists are required in England and Wales at an estimated annual employment cost of £1,932,346.

Neuropathologists

A report for the Royal College of Pathologists from the British Neuropathological Society has recommended that there should be one FTE neuropathologist per 1,000,000 patients. In order to achieve this level, a further 15 FTE posts are required across England and Wales with an estimated employment cost of around £1,474,208. There are currently seven single-handed neuropathologists in England and Wales, and these would need to be supported to ensure continual cover of the adult neuro-oncology service in these centres.

Allied Health Professionals

It has been estimated by GDG members that it is likely that an additional 0.5 - 1 FTE speech and language therapist, occupational therapist and physiotherapist may be required at each neuroscience centre as a result of the Guidance. The employment cost estimate for the three additional AHPs is between £48,726 (1.5 FTE) and £97,453 (3 FTE) per centre. This estimate is uncertain, as it may be that some centres would recruit additional junior staff to enable more experienced staff to concentrate on specialist work.

Palliative care specialists

To ensure that there are a minimum of 0.4 FTE palliative care specialists available at all neuroscience centres additional staff will need to be recruited. The estimated additional cost for the nine neurosurgical centres without palliative care support is estimated to be around £223,848 (£24,872*9). This estimate is based on a split between palliative care specialist nurses and consultants (60/40). Further investigation will be required at a local level to establish whether palliative care consultants, nurse specialists or a mixture of both are required. In addition, those centres that stated that palliative care was available may require additional funding to increase current level of staffing. As with the other staff discussed in this section it is possible that the staffing situation has improved since this survey was conducted.

Patient Information

The Guidance suggests that patients with brain and other CNS tumours have specific information needs, particularly when there is some degree of cognitive impairment and require information to be provided in different formats such as spoken, written and audio visual. The total cost of producing and distributing generic and centre specific information leaflets would be £14,620 in the first year for all patients with brain and other CNS tumours in England and Wales. In subsequent years the costs would be £10,400.

A wide range of high quality information is available from a variety of sources on the internet. These mainly include charitable foundation web pages. Set-up costs of having information available are therefore unlikely to be significant.

1. Introduction

The Guidance has been developed to improve the provision of services for patients with brain and other CNS tumours. This economic analysis serves to inform commissioners, trusts and cancer networks of the resource and cost implications of implementing the recommendations in the Manual. The Centre for Economics and Policy in Health at the University of Wales, Bangor has been commissioned to support this process by analysing the potential cost implications.

1.1 Scope

The objectives of this economic analysis are to:

- Identify possible models of implementation which will vary depending both on the baseline position and on the chosen means of achieving the targets set out in the Guidance
- Identify the key economic issues and cost drivers of Guidance implementation
- Estimate the costs of implementing the Guidance according to the different models identified and, in so doing, provide a structure and methodology that commissioners may use to do their own analysis
- Estimate the cost implications of implementing the Guidance at the neuroscience centre or cancer network level.

The analysis does not aim to:

- Provide a definitive answer to the cost implications of the Guidance for specific oncology/radiotherapy centres or cancer networks but to produce an indication of the scale of costs involved for different models
- Analyse the health outcome consequences of implementing the Guidance
- Estimate the cost-effectiveness of implementing the Guidance recommendations.

2. Process and Methods

2.1 Integration of economic analysis with the cancer service guidance

The research into the cost implications of the Guidance was developed in parallel with the production of the document on *Improving Outcomes in Brain and other CNS Tumours*. One or more of the authors attended the GDG meetings to gain a full understanding of the Guidance as it developed.

2.2 Literature and data searching

Literature searches were carried out by the NCC-C information specialists and the health economics team at Bangor. Searches were conducted in order to identify any existing costing exercises, audits of cancer activity, cost of illness studies or models of treatment pathways. Literature was screened for economic content and any emerging economic literature was referred to the health economists for appraisal.

In addition to the specific research questions raised by the GDG, searches were conducted of the published economic literature relating to:

- the care of patients with brain and other CNS tumours
- specific issues on the key recommendations of the guidance.

The databases searched were MEDLINE, CINAHL, NHS EED, HTA and DARE. No filters were used to restrict the searches, however limitations to the searches included:

- studies in English
- publicly funded health services, i.e. similar systems to the NHS
- publications after 1990.

Unpublished data were obtained as a result of direct contact with members of the GDG, other expert clinicians, finance directors from oncology/radiotherapy centres and trusts, as well as private healthcare providers and voluntary agencies.

2.3 Cost data

Procedural cost data were obtained using Healthcare Resource Group (HRG) costs from Payment by Results[1]. HRG costs are produced by every trust in the country, using a very detailed method which costs all elements of patients' care including theatre time, laboratory tests, pathology tests, minutes of nursing time, minutes of consultant time, physiotherapy, X-rays, ultrasound, pharmacy and overheads (administration, heating etc)[1]. Data were available for inpatient elective and non-elective cases, as well as day cases. Where HRG costs were not available, financial managers at NHS trusts or PCT/LHBs were consulted.

Staff salaries were based on Agenda for Change banding for 2005/06[2]. For each professional grade, either a spine point or mid-point was chosen, upon which 20% employment on-costs plus a London weighting were added as appropriate. The consultant salary is based on a mid-point in the range for consultants of more than 7 years experience, except where stated in the text. Where calculations were based on hourly rates, salary and on-costs, leave and sickness were taken into account by assuming a 42 week year[3]. Further advice on calculating staffing costs was provided by the payroll managers of three NHS trusts.

The impact of the Working Time Directive is not clear at this time and has not been taken into account. However it will need to be considered by commissioners, as will Agenda for Change as it becomes fully implemented across England and Wales[4].

2.4 Discussions with clinicians and other healthcare professionals

Advice from members of the GDG was sought to ensure that appropriate assumptions were made for future activity, to identify data sources and to assist in the interpretation of data. In addition, doctors and/or finance managers from individual trusts were contacted to discuss resource implications of various aspects of the Guidance. Further details are included in the relevant sections of this report. Information and advice was sought from the Department of Health (DH), cancer networks and Royal Colleges.

2.5 Identification of key cost issues

The guidance development process, GDG discussions and a formal survey of GDG members identified and prioritised the key cost issues according to their potential budgetary impact. A proforma was produced to collate information on the key economic issues to be included, and the extent to which literature was available for key questions relating to this Guidance.

2.6 Cost analysis

For each of the key issues identified, an estimate of the national, cancer network or neuroscience centre level resource implications has been made wherever possible. The approach adopted for each issue is detailed in the relevant section.

The costs for each cancer network will vary depending on population base, health service facilities, staffing levels and local patient activity. Estimates were based on broad working assumptions concerning future staffing configurations. Commissioners and trusts will need to make further considerations based on their local situation.

2.7 Sensitivity analysis

When estimating costs, where appropriate, we chose a range of ± 25% to reflect uncertainty in the estimate, in line with other cancer service guidance documents. There is uncertainty in our estimates, for example, in existing configurations, frequency of MDT meetings and in current and future staffing levels. In addition there may be cost savings as a result of the Guidance that are not possible to quantify at this time.

3. Multidisciplinary teams (MDTs)

The Guidance recommends that:

> *"The care of all patients with CNS tumours should be coordinated through a specific model of multidisciplinary assessment and care:*
>
> - *a designated lead in every acute trust*
> - *a neuroscience brain and other CNS tumours multidisciplinary team (MDT), usually based at a neuroscience centre*
> - *a cancer network brain and other CNS tumours multidisciplinary team (MDT)*
> - *a key worker".*
>
> Key recommendation and MDT section

The main economic implication of this recommendation will be in connection with MDTs. The Guidance recommends that attendance at MDT meetings should form part of the timetabled activities for MDT core members. It is acknowledged that the professionals in the MDTs will already be employed by the NHS, therefore it is the opportunity cost that will be discussed. The opportunity cost represents the value of opportunities lost i.e. funds for healthcare professionals' time, no longer available to be invested in the next best alternative. The recommended model of multidisciplinary assessment and care will involve a change in existing working practices in many cancer networks.

3.1 Cost of MDT meetings

It is assumed that extra resources will need to be made available to enable staff to attend MDT meetings. Meeting costs are derived by estimating the time spent attending meetings by different staff multiplied by their hourly rate (salary and on-costs, see Section 2.3), in addition to preparation time. Although the precedence has been to conduct MDTs outside of normal working hours[5] the costs calculated here are based on MDTs being conducted during paid hours of work. The Guidance formally places MDT work within programmed activities.

The cost estimates do not include the cost of time spent by extended team members in MDT meetings. The cost of travelling and parking has not been taken into account. There will be variation between cancer networks concerning the precise salary point paid to individuals and the numbers of MDT members attending each meeting.

The costs relating to the neuroscience brain and other CNS tumours MDT will be considered first, followed by the cancer network brain and other CNS tumours MDT and the specialist site-specific MDTs (pituitary, spinal cord and skull base).

3.2 Neuroscience brain and other CNS tumours MDT

The Guidance recommends that:

> *"The neuroscience MDT should meet at weekly intervals to review all new patients and advise on the initial management of their disease in accordance with national cancer waiting times standards. …… Patients reviewed and discussed previously should be referred back to the neuroscience MDT by the cancer network MDT for advice on further surgery or specialist interventions on relapse, according to agreed protocols".*
>
> Multidisciplinary team section

For the purpose of this cost analysis, we assume that the neuroscience brain and other CNS tumour MDT, hereafter referred to as the neuroscience MDT, would usually be based around one of the existing 27 neuroscience centres, although not all clinicians would necessarily be based in one location.

The resource implications for the neuroscience MDT are based on the membership as described in Table 8 of the Manual. The membership includes neurosurgeons, neuroradiologists, neuropathologists, neurologists, oncologists, clinical nurse specialists, palliative care specialists, neuro-psychologists, allied health professionals (AHPs) and MDT coordinator.

3.2.1 Staff cost of neuroscience MDT meetings

The main costs of MDT meetings are the employment costs of the staff attending the meetings. The calculation assumes that dedicated time is allocated for neuroscience MDT meetings as recommended in the Guidance and that it would involve all members of the team for a meeting lasting two or three hours and include some preparation time for most members. Advice was sought from the GDG concerning the preparation time required by members of the MDT. A calculation has been included for minimum attendance (50%) and optimal attendance (75%) at meetings for all MDT members, apart from a coordinator who would be present at 100% of the meetings. The employment costs are outlined in Table 3.1.

Table 3.1 Estimated employment cost of weekly neuroscience MDT meetings

Professional	Hourly employment cost (£)	Preparation time (hr)	Cost of 2 hour meeting including preparation[a]	Cost of 3 hour meeting including preparation[a]
1 Lead clinician (usually a neurosurgeon)	62.40	3	312	374
1 Neurosurgeon	62.40	1	187	250
2 Neuroradiologists	62.40	2	499	624
2 Neuropathologists	62.40	1 hour per hour of meeting	499	749
1 Neurologist	62.40	1	187	250
2 Oncologists	62.40	0.5	312	437
2 Clinical Nurse Specialists (Band 7 Pt 32)	24.86		199	249
1 Palliative care specialist[b]	39.88	0	80	120
1 Neuropsychologist	45.57	0	91	137
3 Specialist AHPs (Senior 1, Band 7 Pt 32)	24.86	1	224	298
1 MDT Coordinator (Band 4 Pt 16)	14.34	6	115	129
Staff cost per meeting			**2,705**	**3,617**
Annual centre cost of a weekly MDT meeting per neuroscience centre (100% attendance)			**140,660**	**188,084**
Annual centre cost of minimum 50% attendance at weekly MDT meetings (excluding MDT coordinator who would attend 100% of meetings)			**73,320**	**97,370**
Annual centre cost of optimal 75% attendance at weekly MDT meetings (excluding MDT coordinator who would attend 100% of meetings)			**106,990**	**142,701**

[a] All calculations rounded to the nearest £
[b] Employment cost based on 40/60 split between consultant and clinical nurse specialist

The estimated employment cost for each neuroscience MDT meeting, including preparation time is £2,705 for a two hour meeting and £3,617 for a three hour meeting. The estimated annual cost for weekly meetings with full attendance is £140,660 for two hour meetings and £188,084 for three hour

meetings. However, with the exception of a MDT coordinator (who attends 100% of the MDT meetings), if other MDT members only attend the minimum of 50% of the MDT meetings the annual employment cost would be between £73,320 and £97,370 for a two and three hour meeting respectively.

There will be variation between networks in line with population size and referral practices which will require further investigation at a local level. It is likely that larger units will involve more than two clinicians for each speciality.

3.2.2 Current neuroscience MDT activity

The needs assessment[6] conducted to inform the Guidance surveyed all neurosurgical and radiotherapy units in England and Wales. The results indicated that there are currently 22 MDTs based at neurosurgical units and 24 at radiotherapy units. One of the five neurosurgical units without an MDT stated that the MDT had not been established due to lack of resources. Not all meet at the frequency recommended in the Guidance. For example, sixteen of the 22 (73%) meet weekly, three meet fortnightly / twice per month, and three meet monthly. Using current meeting frequency, it is estimated that around 64% of the recommended number of MDT meetings currently take place.

At the time the survey was conducted, just one of the 22 established neurosurgical MDTs had a full complement of members, as recommended by the Guidance. Less than 20% of the neurosurgical units reported having key AHPs in attendance; this was also the case at the radiological units. The employment costs of AHPs are about 8% of the total meeting costs.

The needs assessment[6] indicated that MDTs in existence may deal with much fewer patients than recommended by the Guidance, for example in neurosurgery; only 27% of the existing MDTs discussed all patients referred.

The needs assessment was based on information from the existing units rather the neurosurgical centres as proposed in the Guidance. It is yet to be determined how many centres there will eventually be. It is not possible to

estimate with any certainty the change in existing resource use required for MDTs as a result of the Guidance. The needs assessment has shown that there is a shortfall in meeting frequency and in the membership of MDTs. Estimates have been made using the data from the neurosurgical units, Table 3.2. However the resource requirement will vary between centres and it is likely that meeting frequency has changed since the survey was conducted. Commissioners will need to investigate further at a local level.

Table 3.2 Opportunity cost estimates for additional annual neuroscience MDTs activity (based on data from the needs assessment[6])

Additional annual MDT activity required	**No of units affected**	**Annual additional costs / centre if 2 hour mtgs weekly[a]**	**Annual additional costs / centre if 3 hour mtgs weekly[a]**
52 meetings required where no MDT meetings currently take place	5	140,660	188,084
40 meetings required where monthly MDT meetings currently take place	4	108,200	144,680
26 meetings required where fortnightly meetings currently take place	3	70,330	94,042
Additional staff for 52 MDT meetings annually [b]			
3 AHP members required [c]	14	11,648	15,496
2 Nurse Specialists required	5	10,348	12,948
1 consultant required [d]	3	13,000	16,224
1 palliative care specialist required [e]	9	4,160	6,240

[a] All calculations rounded to the nearest £
[b] Costing data from Table 3.1
[c] Needs assessment showed 14 units declared no OT, physio or SALT attend the MDT and 4 did not state.
[d] Needs assessment showed two units without an imaging consultant and one without a neuropathologist attending the MDT.

3.3 Cancer network brain and other CNS tumours MDT

The Guidance recommends that:

> *"The cancer network MDT should meet at least monthly to coordinate care for 5 to 15 new patients monthly and monitor the ongoing care of approximately 50-100 follow-up patients."*
>
> Multidisciplinary team section

The cancer network brain and other CNS tumours MDT, hereafter referred to as the cancer network MDT, is the coordinating team for the non-surgical management of most adult patients with CNS tumours. The need for the cancer network MDT arises as a result of disparity between populations served by neuroscience centres and cancer networks. In areas of the country where there is disparity, very clear arrangements for referral and continuing management are essential to ensure that patients get the most appropriate care. This will require collaboration between networks and some pooling of resources to ensure that all patients have access to a full range of services.

The assumptions to be used for the costing are based on the MDT membership as described in Table 10 of the Manual. The membership includes neurologists, radiologists, radiographers, oncologists, clinical nurse specialists, palliative care specialists, AHPs and MDT coordinator.

3.3.1 Staff cost of cancer network MDT meetings

As with the neuroscience MDT the main costs of the cancer network MDTs will be in staff employment costs. The calculations assume that dedicated time is allocated for cancer network MDT meetings as recommended in the Guidance and that it would involve all members of the team for a meeting lasting one or two hours and include some preparation time for most members. Advice was sought from the guidance development group concerning the preparation time required by members of the MDT. A calculation has been included for minimum attendance (50%) and optimal attendance (75%) at meetings for all MDT members, apart from the coordinator who would be present at 100% of the meetings. The employment costs are outlined in Table 3.3.

Table 3.3 Estimated employment cost of monthly cancer network brain and other CNS tumours MDT meetings

Professional	Hourly rate (£)	Preparation time (hr)	Cost of 1 hr. meeting including preparation[a]	Cost of 2 hr. meeting including preparation[a]
1 Lead clinician, probably oncologist	62.40	4	312	374
1 Neurologist	62.40	1	125	187
1 Radiologist	62.40	2	187	250
2 Radiographers (Senior 1, Band 7)	24.86	1	99	149
2 Clinical Nurse Specialist (Band 7, Pt 32)	24.86	1	99	149
1 Palliative care specialist [b]	39.88	0	40	80
3 Specialist AHPs (Senior 1 Band 7, Pt 32)	24.86	1	149	224
1 MDT Coordinator (Band 4, Pt 16)	14.34	6	100	115
Staff cost per MDT meeting			**1,111**	**1,528**
Annual cost of monthly MDT meetings per network			**13,332**	**18,336**
Annual cancer network cost of minimum 50% attendance at monthly MDT meetings (excluding MDT coordinator who would attend 100% of meetings)			**7,266**	**9,858**
Annual cancer network cost of optimal 75% attendance at monthly MDT meetings (excluding MDT coordinator who would attend 100% of meetings)			**10,299**	**14,097**

[a] Calculations rounded to the nearest £
[b] Employment cost based on 40/60 split between consultant and clinical nurse specialist

The estimated employment cost for each cancer network MDT, including preparation time, is between £1,111 for a one hour meeting and £1,528 for a two hour meeting. The estimated annual cost for monthly meetings with full attendance is between £13,332 and £18,336. However, with the exception of the MDT coordinator (who attends 100% of MDT meetings), if other MDT members only attend a minimum of 50% of MDT meetings the annual employment cost would be between £7,266 and £9,858 for one and two hour meetings respectively.

3.3.2 Current cancer network MDT activity

It is assumed that there are no cancer network MDTs currently in existence, therefore this will be an additional opportunity cost for each network. In practice, some networks may choose to work together and combine services, for example where neuro-oncology patients are referred into a neighbouring cancer network for treatment. It may well be that in some locations, neuroscience and cancer network MDTs co-locate and membership overlaps, in which case the estimated costs may be less than the combined total estimate.

3.4 Electronic image transfer

The Guidance recommends that:

> *"An electronic image transfer system should be in place to ensure timely image transfer between the local hospital and neuroscience MDT (see section on Presentation and Referral). A function of the MDT meeting should be to determine whether or not further imaging is necessary prior to surgery."*
>
> Diagnosis: radiology and pathology section

Electronic transfer of images, together with video conferencing, can assist MDTs particularly in centres where there are split sites or where there is limited access to specialist radiology and pathology clinicians.

National initiatives[7,8] are in place to ensure that electronic patient recording systems, such as Picture Archiving Communication System (PACS), are installed throughout England and Wales. This will facilitate transfer of diagnostic images such as x-rays, CT, and MRI, either from digital-ready diagnostic imaging equipment or images produced in the traditional manner which have been converted to a digital format by scanning. Where this is not yet in place, additional IT equipment may be required. Local commissioners will need to take such issues into account, as well as costs relating to line rentals which vary considerably between NHS trusts.

The cost of equipment to enable electronic transfer of images for each centre will vary according to the type of system specified and the number of sites involved. The cost of a video conferencing system with high-quality image transfer capability would be around £15,000 (£18,000 inclusive of VAT and delivery) per centre inclusive of installation, software and a three year maintenance contract.[9]

Recurrent annual costs will vary considerably between networks depending on the number and duration of meetings, the number of sites involved in each meeting and the line packages negotiated with suppliers.

Any travel expenses would be reduced if teleconferencing facilities were used. Separate calculations would need to be undertaken at a local level to ascertain costs as they are dependent upon distances travelled and local agreements with the telecom supplier.

3.5 Pituitary, spinal cord and skull base MDTs

In addition to the MDTs discussed above, the Guidance recommends that:

> *"Patients with pituitary, spinal or skull base tumours should have their management plan decided by a dedicated specialist MDT."*
>
> Treatment and follow up chapter

The resource implications for the pituitary, spinal cord and skull base MDT meetings are based on monthly meetings with the MDT membership as described in Tables 13, 14 and 15 of the Manual.

3.5.1 Staff cost of pituitary, spinal cord and skull base MDT meetings

The main cost of MDT meetings are the employment costs of the staff attending the meetings which represent opportunity costs. The calculations assume that dedicated time is allocated for MDT meetings as recommended in the Guidance and that it would involve all members of each team for a meeting lasting one or two hours and include some preparation time for most members. Advice was sought from the guidance development group concerning the preparation time required by members of the MDT. A calculation has been included for minimum attendance (50%) and optimal

attendance (75%) at meetings for all MDT members, apart from the coordinator who would be present at 100% of the meetings.

In some centres there may be a need for the site specific MDTs to meet more frequently than monthly. The employment costs relating to pituitary MDT meetings are outlined in Table 3.4, spinal cord MDT meetings in Table 3.5 and skull base MDT meetings in Table 3.6.

Table 3.4 Estimated employment cost of monthly pituitary MDT meetings

Professional	Hourly employment cost (£)	Preparation time (hr)	Cost of 1 hour meeting including preparation[a]	Cost of 2 hour meeting including preparation[a]
1 Specialist pituitary surgeon	62.4	1	125	187
1 Endocrinologist	62.4	3	250	312
1 Neuroradiologist	62.4	2	187	250
1 Neuropathologist	62.4	1 hour per hour of meeting	125	250
1 Clinical oncologist	62.4	0	62	125
1 Clinical Nurse Specialist (Band 7 Pt 32)	24.86	1	50	75
1 MDT Coordinator (Band 4 Pt 16)	14.34	6	100	115
Staff cost per pituitary MDT meeting			**899**	**1,314**
Annual cost of monthly MDT meetings per centre			**10,788**	**15,768**
Annual centre cost of minimum 50% attendance at monthly MDT meetings (excluding MDT coordinator who would attend 100% of meetings)			**5,994**	**8,574**
Annual centre cost of optimal 75% attendance at monthly MDT meetings (excluding MDT coordinator who would attend 100% of meetings)			**8,391**	**12,171**

[a] All calculations rounded to the nearest £

The estimated employment cost for each pituitary MDT meeting, including preparation time is £899 for a one hour meeting and £1,314 for a two hour meeting. The estimated annual cost for monthly meetings with full attendance is £10,788 for a one hour meeting and £15,768 for a two hour meeting. However, with the exception of the MDT coordinator (who attends 100% of the MDT meetings), if other MDT members only attend the minimum of 50% of the MDT meetings the annual employment cost would be between £5,994 and £8,574 for a one and two hour meeting respectively.

Table 3.5 Estimated employment cost of monthly spinal cord MDT meetings

Professional	Hourly employment cost (£)	Preparation time (hr)	Cost of 1 hour meeting including preparation[a]	Cost of 2 hour meeting including preparation[a]
1 Spinal surgeon	62.4	3	250	312
1 Neuroradiologist	62.4	2	187	250
1 Neuropathologist	62.4	1 hour per hour of meeting	125	250
1 Clinical Nurse Specialist (Band 7 Pt 32)	24.86	1	50	75
1 Specialist AHP (Senior 1, Band 7 Pt 32)	24.86	1	50	75
1 MDT Coordinator (Band 4 Pt 16)	14.34	6	100	115
Staff cost per spinal cord MDT meeting			**762**	**1,077**
Annual cost of monthly MDT meetings per centre			**9,144**	**12,924**
Annual centre cost of minimum 50% attendance at monthly MDT meetings (excluding MDT coordinator who would attend 100% of meetings)			**5,172**	**7,152**
Annual centre cost of optimal 75% attendance at monthly MDT meetings (excluding MDT coordinator who would attend 100% of meetings)			**7,158**	**10,038**

[a] All calculations rounded to the nearest £

The estimated employment cost for each spinal cord MDT meeting, including preparation time is £762 for a one hour meeting and £1,077 for a two hour meeting. The estimated annual cost for monthly meetings with full attendance is £9,144 for a one hour meeting and £12,924 for a two hour meeting. However, with the exception of the MDT coordinator (who attends 100% of the MDT meetings), if other MDT members only attend the minimum of 50% of the MDT meetings the annual employment cost would be between £5,172 and £7,152 for a one and two hour meeting respectively.

Table 3.6 Estimated employment cost of monthly skull base MDT meetings

Professional	Hourly employment cost (£)	Preparation time (hr)	Cost of 1 hour meeting including preparation[a]	Cost of 2 hour meeting including preparation[a]
1 Lead Clinician	62.4	3	250	312
2 Specialist Surgeons (Neurosurgical, ENT, maxillofacial, ophthalmic or plastic surgeons)	62.4	1	250	374
1 Neuroradiologist	62.4	2	187	250
1 Neuropathologist	62.4	1 hour per hour of meeting	125	250
1 Oncologist	62.4	0	62	125
1 Clinical Nurse Specialist (Band 7 Pt 32)	24.86	1	50	75
1 Specialist AHP (Senior 1 Band 7 Pt 32)	24.86	1	50	75
1 MDT Coordinator (Band 4 Pt 16)	14.34	6	100	115
Staff cost per skull base MDT meeting			**1,074**	**1,576**
Annual cost of monthly MDT meetings per centre			**12,888**	**18,912**
Annual centre cost of minimum 50% attendance at monthly MDT meetings (excluding MDT coordinator who would attend 100% of meetings)			**7,044**	**10,146**
Annual centre cost of optimal 75% attendance at monthly MDT meetings (excluding MDT coordinator who would attend 100% of meetings)			**9,966**	**14,529**

[a] All calculations rounded to the nearest £

The estimated employment cost for each skull base MDT meeting, including preparation time is £1,074 for a one hour meeting and £1,576 for a two hour meeting. The estimated annual cost for monthly meetings with full attendance is £12,888 for a one hour meeting and £18,912 for a two hour meeting. However, with the exception of a MDT coordinator (who attends 100% of the MDT meetings), if other MDT members only attend the minimum of 50% of the MDT meetings the annual employment cost would be between £7,044 and £10,146 for a one and two hour meeting respectively.

3.5.2 Current site specific MDT activity

The needs assessment[6] conducted to inform this Guidance indicated that currently just under half of the neuroscience centres (13 of 27) have established MDTs for pituitary tumours. In addition there are MDTs in place for both spinal cord and base of skull in some neuroscience centres. There are six centres with base of skull MDTs and two centres with spinal MDTs.

Opportunity costs relating to specialist MDTs have been included for completeness. At present it is uncertain as to whether current activity will change.

3.6 Additional staffing requirements

Staffing issues may be significant in some centres. In particular, the needs assessment[6] conducted to inform the Guidance indicated that not all units have clinical nurse specialists, AHPs or palliative care specialists. There is also a staffing shortfall for neuropathologists. This is discussed in section 5.

3.6.1 MDT Coordinators

The Guidance recommends that each MDT for patients with brain and other CNS tumours has a MDT coordinator. Their role has been defined in the Manual. Evidence from GDG members and the needs assessment[6] would indicate that there are few designated coordinators currently in post. Furthermore where they are in post, funding for approximately 25-30% of coordinators is on 'soft' money[10]. It is often the case that the role is taken by a clinician, nurse or secretary.

It is anticipated that each neuroscience MDT will require a full time coordinator (n = 27) and each cancer network (n = 37) and site specific MDT will require 0.5 FTE post.

At present, the annual costs of employing a MDT coordinator/data manager post is £22,582 (Band 4, Point 16). The total number of additional MDT coordinator posts required are uncertain. If each of the 37 cancer networks in England and Wales required 0.5 FTE post for a cancer network MDT, the maximum estimated additional annual employment cost for MDT coordinators is estimated to be £417,767. In practice, some networks may choose to work together and combine services, for example where neuro-oncology patients are referred into a neighbouring network, so the actual costs of additional MDT coordinator posts for cancer network MDTs may differ from this estimate.

3.7 Discussion

The organisation of brain and other CNS tumour cancer services into MDTs may have significant resource implications in some cancer networks where there is no current MDT activity. The cost of service re-configuration for an individual cancer network will vary according to the existing MDT configuration and staffing levels. This will require further investigation by local commissioners.

The increased time commitment for MDT meetings will have an opportunity cost for all staff members, particularly where there is an existing shortfall. Methods may need to be considered to share neighbouring expertise when there is a shortage of personnel, while additional staff are being trained.

Teleconferencing offers the advantage that travel time is eliminated, making more efficient use of scarce specialist staff.

The cost analysis has explored a limited number of potential variations. Costs would obviously change if teams served a larger or smaller population or were combined in line with local need. The analysis does not take into account the

costs of providing facilities, parking or transport costs, and is intended as a guide rather than being definitive.

Additional staff may need to be recruited to allow existing staff the time to attend meetings. Minimum staffing levels will be considered in section 6.

3.8 Conclusion

It is anticipated that for those cancer networks with no neuroscience MDTs in place, there will be an annual opportunity cost of between £73,320 for minimum attendance at weekly two hour neuroscience MDT meetings and up to £188,084 for full attendance at weekly three hour MDT meetings.

All cancer networks will have an additional opportunity cost for establishing cancer network MDTs. This is estimated to be between £7,266 per year for minimum attendance at monthly one hour MDT meetings and £18,336 for full attendance at monthly two hour MDT meetings.

Site specific monthly MDTs are recommended for patients with pituitary, spinal cord and skull base tumours. The estimated annual opportunity cost of pituitary MDTs ranges from between £5,994 for minimum attendance at monthly one hour pituitary MDT meetings to £15,768 for full attendance at monthly two hour MDT meetings.

The estimated annual opportunity cost of spinal cord MDTs ranges from between £5,172 for minimum attendance at monthly one hour spinal cord MDT meetings to £12,924 for full attendance at monthly two hour MDT meetings.

The estimated annual opportunity cost of skull base MDTs ranges from between £7,044 for minimum attendance at monthly one hour skull base MDT meetings to £18,912 for full attendance at monthly two hour MDT meetings.

There will be an element of uncertainty in the estimates reflecting variation in staffing levels and actual salaries paid to individuals. Local commissioners will

need to consider this further according to their existing patterns of work. Due to existing staff shortages increasing the number of MDTs may not be immediately possible.

4. Diagnosis: radiology and pathology

4.1 Diagnosis - Radiology

The Guidance recommends that:

> *"All acute trusts should have adequate CT and MR imaging facilities so that investigations of patients with suspected CNS tumours meet cancer waiting time national targets"*
>
> Diagnosis: radiology and pathology section

There are currently 223 MRI scanners and between 200 and 230 CT scanners in the UK; the capital costs per scanner are £0.75 million and £0.45 million respectively. Government initiatives are underway to upgrade all CT and MRI facilities[11]. Despite this increase in equipment there is still unmet need, partly due to difficulties in funding and recruiting staff. Dedicated time may need to be allocated for brain and CNS patients in cancer networks without a dedicated CNS scanner.

There is a need for the existing scanners to be adequately staffed to ensure that they are able to operate throughout the working day. It has been estimated that the staffing level to run a dedicated brain and CNS patient MRI scanner during normal working hours would be 1.3 FTE consultant neuroradiologists, 3.0 FTE neuroradiographers plus additional administrative support[12]. The costs for this level of staffing have been estimated in Table 4.1. Details of employment cost calculations are given in section 2.3. There may be some overlap between this estimate and that for the minimum staffing discussed in section 5. Local commissioners will need to investigate current staffing levels and increase staffing where necessary.

Table 4.1 Estimated annual employment costs for each MRI scanner

	FTE	Employment costs[a]
Neuroradiologist	1.3	127,764
Neuroradiographers	3.0	114,341
Administrative support (Band 3/4, pt 12)	1.3	24,966
Total		**267,071**

[a] See Section 2.3 and Table 5.1 for rates used in calculation

4.2 Diagnosis - Pathology

The Guidance states that:

> *"Molecular diagnostic tests will become increasingly important as supplementary investigations to the neuropathological assessment of CNS tumours, informing diagnosis, prognosis and therapeutic decisions. The evaluation, development and implementation of these tests should be supported"*
>
> Diagnosis: radiology and pathology section

Molecular diagnosis is a fast developing area of clinical practice, and cancer networks will need to plan for expansion over the next 10-20 years. Existing services in the UK are adequate for approximately 200 patients per year with gliomas who require molecular cytogenetic 1p/19q testing. If the MGMT assay becomes available, then this would rise to about 2,500 patient tests which would require an additional biomedical scientist per testing laboratory[13]. The current annual employment costs of a biomedical scientist (band 5 spine 21) is around £26,103. The total number of extra staff across the UK would probably be 30 at maximum, giving a total additional staffing cost of £783,090. The costs of consumables (including infrastructure costs) would probably be in the region of £200 per test. Total additional annual cost for 2,500 MGMT tests including consumables for the tests and staffing to perform them is £1,283,090.

If two more similar molecular tests were to be adopted for brain and other CNS tumours over a period of ten years, then the total costs may double[13]. However, it is not possible to predict the implications of this recommendation; it will be for cancer networks to consider in line with their local requirements.

The cost implications for the shortfall in neuropathologists in England and Wales is detailed in section 5.4.

5. Core staffing components for brain and other CNS tumour patients at neuroscience centres

In order to estimate the costs of providing a safe and sustainable service for the care and treatment for patients with brain and other CNS tumours, minimum staffing levels have been estimated and are discussed below. The healthcare professionals will in the main already be employed by the NHS. The objective in undertaking this exercise is to enable commissioners to consider infrastructure and staffing to patient ratios in their local neuroscience centre. It is acknowledged that there will be differences between centres in line with case mix, the complexity of disease and stage of treatment, and the age of the patients.

5.1 Methods

A consultation process took place with members of the GDG and other key professionals, both in person and by email or phone. Staffing levels to provide a safe and sustainable service for a minimum activity level have been estimated for tumour patients at a neuroscience centre, managing at least 100 new patients with brain and other CNS tumours per year (100 patients is used as a common denominator for comparison purposes).

Neuroscience centres are often on split sites for neurosurgery, oncology and radiotherapy. The staffing estimates are therefore estimated for two separate units, one for neurosurgery and one unit for oncology and radiotherapy which in combination would be a neuroscience centre. NHS staff salary pay-scales 2005/06, obtained from the DH[2] were used to calculate the current staffing cost (see Section 2 for further information).

5.2 Cost of staffing at neuroscience centres

The full time equivalent (FTE) staffing levels, together with an estimated annual employment cost, for staff dedicated to the care of patients with brain and other CNS tumours are outlined in Table 5.1. It is anticipated that clinical and other specialist posts would be undertaken by two or more individuals to ensure adequate leave and sickness cover.

Table 5.1 Minimum staffing levels to assure a safe and sustainable service for 100 new patients with brain and other CNS tumours per year.

Staff requirement	Minimum FTE[a]	Employment-costs (£)[b]
Neurosurgical unit		
Consultant neurosurgeons	2	196,561
Neuroradiologist	2	196,561
Neuropathologist	2	196,561
Neurologist[c]	1.5	147,421
Clinical oncologist	1	98,280
Clinical Nurse Specialists (Band 7 Pt 32)	1.5	57,170
Palliative care specialist (consultant/nurse 40/60 split)	0.40	24,872
Consultant neuropsychologist	0.5	35,886
Physiotherapist (Senior I / Band 7)	1	32,484
Occupational therapist (Senior I / Band 7)	1	32,484
Speech and Language therapist (Senior I/Band7)	1	32,484
Neuropsychiatrist	0.3	29,484
Neuroscience MDT coordinator (Band 4, Pt 16)	1	22,582
Unit administrative support (Band 4 Pt, 16)	0.5	11,291
Total employment cost per neurosurgical unit		**1,114,121**
Oncology/Radiotherapy units		
Neurologist	0.6	58,968
Radiologist	1.5	147,421
Radiographer	1	38,114
Clinical oncologist	1	98,280
Clinical Nurse Specialists (Band 7 Pt 32)	1.5	57,170
Palliative care specialist (consultant/nurse 40/60 split)	0.4	24,872
Physiotherapist (Senior I / Band 7)	1	32,484
Occupational therapist (Senior I / Band 7)	1	32,484
Speech and Language therapist (Senior I/Band7)	1	32,484
Consultant neuropsychologist	0.5	35,886
Neuropsychiatrist	0.5	49,140
Cancer network brain/CNS MDT coordinator [d]	0.5	11,291
Unit administrative support (Band 4, Pt, 16)	0.5	11,291
Total employment cost per oncology/radiotherapy unit		**629,885**
Combined cost estimate [e]		**1,744,006**
Sensitivity analysis ± 25%		**1,308,005 to 2,180,008**

[a] One FTE not necessarily 1 individual
[b] All costs are rounded to the nearest £
[c] Neurologist would be available to both units
[d] Not required at all oncology/radiotherapy units
[e] In centres where both units are on the same site the costs would be lower

It is likely that the staffing levels will exceed the minimum in some settings depending on activity levels, case mix, intensity of treatment and types of referrals to the centres.

The annual employment costs of the core staffing components of a neuroscience centre treating 100 new patients per year is estimated to be around £1,744,006 (± 25% range, £1,308,005 to £2,180,008). There may be economies of scale for neuroscience centres that have all facilities on site.

The cost calculations above are for the core components of the staff that will be caring for patients with brain and other CNS tumours, however it is not inclusive of all staff who would be involved with the patients' care. For example, ward nurses, community palliative nurses, psychology/psychiatry staff and epilepsy nurse specialists are members of the extended neuroscience MDT and also the extended cancer network MDT. However it is likely that patients may receive this care at their local hospital rather than the neuroscience centre.

In addition, there are the specialists involved in the treatment of pituitary, spinal cord and skull base tumours for example: endocrinologists, neurosurgeons, pituitary, spinal, ENT, maxillofacial, ophthalmic and plastic surgeons that should be available for this group of patients. In view of the low incidence for these tumours (see background chapter of the Manual) it has not been practicable to estimate the FTE for these specialists. At this time, we have not included an estimate for ward and clinic nurses. Ancillary, catering or administration workforce would be an additional cost. These factors would need to be considered by commissioners.

It needs to be emphasised that these costs represent opportunity costs as the staff involved in the treatment centres will already be contracted to the NHS. Local commissioners will need to consider the opportunity costs of any increase in existing staffing levels. However, data collected for the needs assessment[6] would indicate that it is likely that additional staff will need to be recruited in some centres.

5.3 Clinical Nurse Specialists

A recent report into the progress of cancer services[14] since the NHS Cancer Plan[5] has indicated that the numbers of cancer clinical nurse specialists has increased, however, no precise estimate of numbers was made because the information was not held centrally.

The minimum staffing for clinical nurse specialists for CNS tumour patients is estimated to be 1.5 FTE at each neurosurgical unit and oncology/radiotherapy unit, as detailed in Table 5.1. It is anticipated that some of the clinical nurse specialist posts will be peripatetic in that the same clinical nurse specialist may be attending the neurosurgical unit and oncology/radiotherapy unit.

The needs assessment[6] conducted to inform the guidance development indicated that four of the oncology/radiotherapy units had at least two clinical nurse specialists in neuro-oncology. There was a maximum of one FTE specialist nurses at the remaining units (n = 41). To ensure that there are a minimum of 1.5 specialist nurses at each of the 45 units where brain and other CNS patients are treated a further 39.2 FTE would need to be recruited. Three neurosurgical units stated that they had two or more clinical nurse specialists in neuro-oncology. To ensure that the remaining 24 centres had a minimum of 1.5 FTE nurse specialists then as a minimum, a further 11.5 FTE would need to be recruited. Therefore for each centre to have a minimum of 1.5 clinical nurse specialists in neuro-oncology an additional 50.7 are needed; the estimated total annual employment cost would be £1,932,346 based on Band 7 Pt. 32. It is possible that the staffing situation has improved since this survey was conducted, it will require further investigation at a local level.

Clinical nurse specialist training courses are available throughout England and Wales. Courses can be first degree or masters level and examples of services they provide include contemporary practice in neurosciences or neurological care. Some courses are available as distance learning modules. The costs of specialist modules range between £250 - £350 per module. A part-time masters level cancer care course is around £2,300 per year[15,16,17]. For

existing staff these costs would be met through funding for annual continual professional development (CPD).

5.4 Neuropathologists

The increase in MDT working would increase the workload of neuropathologists. A report for the Royal College of Pathologists from the British Neuropathological Society has recommended that there should be one FTE neuropathologist per 1,000,000 patients[13]. In order to achieve this level, a further 15 FTE posts are required across England and Wales with an estimated employment cost of around £1,474,208. There are currently seven single-handed neuropathologists in England and Wales, and these would need to be supported to ensure continual cover of the adult neuro-oncology service in these centres.

5.5 Allied Health Professionals

The needs assessment[6] requested information about services available at existing units. From this survey we know that one oncology/radiotherapy unit was without services available for occupational therapy (OT), three had no speech and language therapy (SALT) services and 18 had no neuropsychology services on site. All had physiotherapy services available. All neuroscience centres had services from SALT, OTs and physiotherapy, and all bar two had neuropsychology services available. This data would indicate that there is a shortfall in existing staffing, however it is not possible to extrapolate any accurate numbers because there is no information at this time concerning the existing number of dedicated staff at the sites where there are services.

It has been estimated by GDG members that it is likely that an additional 0.5 - 1 FTE speech and language therapist, occupational therapist and physiotherapist may be required at each neuroscience centre as a result of the Guidance. The employment cost estimate for the three additional AHPs is between £48,726 (1.5 FTE) and £97,453 (3 FTE) per centre. This estimate is uncertain, as it may be that some centres would recruit additional junior staff to enable more experienced staff to concentrate on specialist work.

5.6 Palliative care specialists

The minimum staffing for palliative care specialists for CNS tumour patients is estimated to be 0.4 FTE at each neuroscience centre and oncology/radiotherapy centre, as detailed in Table 5.1. For the purposes of the economic analysis it is assumed that the specialist in palliative care would be a 40/60 split between consultant and specialist nurse. In practice this will vary with local requirements.

The needs assessment[6] conducted to inform the guidance development indicated that all oncology/radiotherapy centres had palliative care representation on site, whereas nine neurosurgical units had neither palliative care consultant nor palliative care nurse representation. To ensure that there are a minimum of 0.4 FTE palliative care specialists available at all neuroscience centres additional staff will need to be recruited. The estimated costs for the nine neurosurgical centres without palliative care support is estimated to be around £223,848 (£24,872*9). Further investigation will be required at a local level to establish whether palliative care consultants, nurse specialists or a mixture of both are required. In addition, those centres that stated that palliative care was available may require additional funding to increase current level of staffing. As with the other staff discussed in this section it is possible that the staffing situation has improved since this survey was conducted.

5.7 Neuropsychiatrists

In general, patients in the neuroscience centre will be seen by a neuropsychiatrist for acute psychiatric states such as an acute organic confusional or psychotic state or an acute adjustment reaction. The psychiatric input may be intensive but relatively short-lived.

The patients under the care of oncology/ radiotherapy units, as well as the above conditions, tend particularly to manifest more chronic affective disturbances that require ongoing and regular input from the neuropsychiatrist for longer, often in an outpatient setting.

The FTEs quoted represent a minimum level of input tailored to the levels of psychopathology generally reported in the literature. If more time were available then the neuropsychiatrist would be able to contribute to the prevention of the development of psychiatric disturbances as well as to the detection of unreported psychopathology and management of less severe emotional symptoms and states [18].

6 Supportive Care - Information for patients with brain and other CNS tumours

Evidence collected for the Guidance suggests that patients with brain and other CNS tumours have specific information needs. Primarily, due to some degree of cognitive impairment, patients with brain and other CNS tumours, require information to be provided in different formats such as spoken, written and audio visual. The Guidance recommends that:

> *"Information materials containing clear, accurate and relevant information about each CNS tumour type should be made available to patients, their relatives and carers by all healthcare professionals. This material should explain what patients can expect to happen to them at each stage of their pathway, and when and where each event will occur, with an explanation of the terminology."*
>
> Patient Information section

In order to estimate costs for producing the information required by the Guidance, we contacted the following charitable organisations: CancerBACUP, Brian and Spine Foundation and the Pituitary Foundation.

The charity CancerBACUP is one of the main providers of high quality generic and specific booklets about all aspects of cancer and brain tumour. In particular, CancerBACUP produces a specific, in-depth booklet for those affected with brain and other CNS tumours. Annual costs of development, production and distribution of this booklet are estimated at £9,750[19]. In addition, CancerBACUP produces 13 factsheets on brain and other CNS tumours with an annual cost of £1,950. The information provided in these factsheets relates to brain tumours, CNS lymphoma, pituitary and secondary brain tumours. This information is revised and updated every 12-18 months. The costs of production of booklets and factsheets for subsequent years are £9,750 and £1,950 respectively. The booklets are free to cancer patients and £1.95 each to others. In addition, the Pituitary Foundation produced seven patient information booklets and recorded outgoings of £10,376 for production and distribution in 2004[20].

In order to estimate costs for producing the information recommended in the Manual, the Brain and Spine Foundation were contacted for cost estimates of generic leaflets for brain and other CNS tumours, the results are outlined below.

6.1 The costs of generic leaflets on brain and other CNS tumours

This cost is based on producing new generic introductory leaflets on specific types of brain and other CNS tumours that guide the patient to other sources of information. The costs of producing a leaflet are around £3,800 in the first year and around £3,300 annually thereafter[21]. The set up and consequent costs are presented in Table 6.1. It is anticipated that there would be up to three different generic leaflets produced giving a total set-up cost of £11,400 and £9,900 annual costs in subsequent years.

Table 6.1 Set up and annual cost estimates for producing generic brain and other CNS tumours leaflets for patients in England and Wales[21]

	(£)
Design and development	500
Printing (first 1000)	3,000
Distribution	300
First year total for 1 generic leaflet	**3,800**
Annual cost in subsequent years	**3,300**

All diagnosed patients should have the opportunity to receive a leaflet. Nearly 6,500 primary tumours of the central nervous system are registered annually in England and Wales, of which 58% are malignant.

6.2 Neuroscience centre-specific leaflets

The cost calculations for the neuroscience centre specific leaflets are based on information collected for costing similar leaflets relating to sarcoma treatment centres in the economic review of the NICE service guidance on *Improving Outcomes in Patients with Sarcoma*[22].

A simple one page black and white information leaflet on a specific brain and other CNS tumours sub-type could be developed and distributed to the CNS tumour clinical nurse specialists and consultants. The format could be standardised for all centres with specific information appropriate to each centre in England and Wales. The leaflet could be printed from a CDROM or the internet as required. This would obviate the need for storage space for the leaflets.

The design would require input from CNS consultants and clinical nurse specialists. The costs have been estimated to be around £3,220, with annual costs of £500, again assuming a 3-year redesign and re-pressing of the CDROM. These costs are presented in Table 6.2.

Table 6.2 Set up and annual cost estimates for producing neuroscience centre-specific leaflets (on CDROM) for patients in England and Wales

	(£)
Design and development of leaflet	2000
CDROMS (including index)	850
Distribution of CDROMS	120
Web space (approx)	250
Total for year 1	**3,220**
Annual cost in subsequent years	**500**

6.2.1 Total costs for the production of information leaflets for patients

The total annual costs of designing, producing and distributing generic and neuroscience centre-specific patient information leaflets are summarised in Table 6.3. The quality and the consistency of the content would be ensured by having centrally produced material. Nationally produced materials would also minimise duplication.

Table 6.3 Total costs for the production of information leaflets for patients in England and Wales

	(£)
Set-up for three generic leaflets (3,800*3)	11,400
Set-up for one neuroscience centre-specific leaflet (on CDROM)	3,220
Total for year 1	**14,620**
Annual cost in subsequent years for 3 generic leaflets (3,300*3)	9,900
Annual cost in subsequent years for one neuroscience centre-specific leaflet	500
Total for subsequent years	**10,400**

6.3 Access to alternative information formats (e.g. web-based materials)

A wide range of high quality information is available from a variety of sources on the internet. These mainly include charitable foundation web pages. Set-up costs of having information available are therefore unlikely to be significant. The economic review of the NICE guidance on *Improving Outcomes in Palliative and Supportive Care* estimates the costs updating website containing patient information booklets and leaflets are £57,000 per annum[23].

Cognitive impairment of patients with brain and other CNS tumours require these patients to have information in audio and visual formats. At the moment, the Brain and Spine Foundation are in the process of developing these products, the costs of which are not yet available.

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