

**The organisation and delivery of
non-surgical oncology services in the
Merseyside and Cheshire Cancer
Network**

**A feasibility study into the potential for the
relocation of non-surgical oncology services
from Clatterbridge to Liverpool**

**Professor Mark R Baker
Mr. Roger C Cannon**

**Report to the Cancer Taskforce
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Contents

1	Background	3
2	Case for Change	4
3	Process and Methodology	9
4	Findings	10
5	Interim measures	23
6	Benefits for patients	24
7	Summary of Key Recommendations And interim proposals	26
8	Appendices	28
	1. Scope of Study	
	2. List of contributing organisations	
	3. Interim presentations	
	4. Support from NHS stakeholders	
	5. Option appraisal/matrix	
	6. Capital and revenue costs	
	7. Equipment schedule and costs	
	8. Outline plan for Oncology Centre at RLH	

1 Background

- 1.1 The potential for the establishment of a CRUK Cancer Research Centre in Liverpool led to a joint meeting between the University of Liverpool and the Merseyside and Cheshire Cancer Network (MCCN) Cancer Taskforce in November 2007. Following the submission of a briefing paper, it was agreed by the Taskforce in January 2008 to take forward a feasibility study into the potential for relocation of key non-surgical oncology services from their current location at Clatterbridge to Liverpool. The Scope of the Study is attached under Appendix 1.
- 1.2 We were appointed to lead the feasibility study project in March 2008 and we have reported to a Project Steering Group and the Cancer Taskforce at three monthly intervals.
- 1.3 By this time, agreement had already been reached within the network, and supported by commissioners, to develop satellite radiotherapy units at Aintree University Hospital/Walton Neurosciences Centre and at the Royal Liverpool Hospital (RLH) to promote better accessibility to radiotherapy and to increase overall radiotherapy capacity in line with national policy (see below). Our review took place against this background and with the expectation that we would support the general theme of these decisions.
- 1.4 This report examines the feasibility of a transfer of oncology facilities from Clatterbridge to Liverpool, identifies suitable options for achieving this and makes recommendations for NHS Commissioners. It also considers the need to improve the safety, quality and sustainability of services by investing further in the Clatterbridge site. The material contained within this report is suitable for the content of a Strategic Outline Case for a major capital scheme contributing towards the implementation of our recommendations. Following discussions with NHS Northwest and the Department of Health we understand that there is no prospect of the availability of significant capital funding in the current strategic timeframe. We have therefore included proposals to develop and improve services in the intervening period to 2020, with an assumption that any major capital scheme will not be achievable before 2020.

2 The Case for Change

2.1 There are a number of factors driving changes in the way in which radiotherapy and chemotherapy are being delivered. Many of these are consistent throughout the country; others are specific to Merseyside and Cheshire and/or the North West of England. They can be considered in four constituencies:

- National policy drivers
- Regional/network service organisation
- Regional/network population needs
- Research drivers

2.2 National policy drivers

In chronological order, there are three major policy drivers which influence the future organisation of non-surgical oncology. These are:

- The report of the National Radiotherapy Advisory Group (NRAG)
- The Cancer Reform Strategy (CRS)
- High Quality Care for All (The Darzi Report)

There is strong synergy between all three policies; the NRAG conclusions being enshrined within the CRS and the CRS and Darzi reports sharing core values and principles.

It is also understood that a further major policy paper on chemotherapy is in preparation by DH.

The key features of these reports, insofar as they are relevant to this review, are as follows:

- Radiotherapy facilities should be expanded substantially to reflect increased incidence of cancer (mostly consequent upon the ageing of the population), increased penetration of cancer patients' pathways with radiotherapy treatments and higher fractionation regimes. Population-based targets for fractions of treatment are set (in both NRAG and CRS) which would equate to approximately 15 (fifteen) LINACs for the population of Merseyside and Cheshire (plus existing inflow from Isle of Man and Flintshire) by 2016 (current provision is 9).
- This expansion of radiotherapy should be achieved by developing satellite radiotherapy units, working in close association with established oncology centres for the purposes of treatment planning, clinical and scientific supervision and participation in carefully mapped patient pathways.
- As a result, cancer centres should not aim to exceed the 'optimum' size of 8 (eight) LINACs and satellite unit developments should be sited to improve patient access to treatment.
- Chemotherapy delivery is expected to increase at a rate similar to the historical norm of 7% per annum. Whilst some of this is facilitated by the development of oral therapies, the demand for intravenous treatment will

continue to rise and this should be managed by moving the place of chemotherapy administration closer to home (but not necessarily in the home). This will involve the greater use of chemotherapy facilities based in local general hospitals but may also include delivery of chemotherapy in smaller hospitals and primary care facilities if the demand is sufficient.

- All these moves to make services more accessible should be managed in a way which preserves and enhances the technical quality of care. That is, services should be localised where possible but centralised where necessary. In most (though definitely not all) cases, it is possible to deliver services locally with the same technical quality and better patient experience, albeit sometimes at some additional cost and dependent on the creation of reliable electronic communication systems between service delivery points.
- Forthcoming reports from DH and CEPOD on chemotherapy and the management of cancer patients in general hospitals emphasise the need for a stronger oncology presence in cancer units.

2.3 Service organisation in the Merseyside and Cheshire Cancer Network

Merseyside and Cheshire Cancer Network (MCCN) has succeeded in reconfiguring most of its specialist surgical oncology services in line with the recommendations of NICE Improving Outcomes Guidance and overseen by the Cancer Action Team at the Department of Health.

Some of these teams are exemplary, e.g. head and neck cancer; others have undergone radical reorganisation to deliver centralised complex surgery, e.g. gynaecological oncology. In all cases there has been a noticeably high level of Chief Executive leadership for these changes and strong commissioner commitment to ensure full implementation of national guidance. The cancer peer review programme 2004-2007 was generally complimentary about the organisation of services and teams

All these achievements are set against a background of hospital Trust organisation which no longer exists in any other part of England except Central London, and then not as pronounced as in Merseyside. The retention of small, single specialty hospital Trusts, now mostly Foundation Trusts, has contributed positively to the high quality of operational management and leadership for these services and impacts effectively on the patient experience. However, this is at the expense of not always achieving integrated, multi-modality care which is, increasingly, the norm for cancer patients. As a result, highly specialised surgery for people with cancer takes place at five separate Trusts within Liverpool, whereas this is contained within one or two organisations in many cities. In addition, the oncology services are provided by a small and separate Foundation Trust, now one of only three in the country and by far the smallest and the only one without on-site surgery and critical care. We believe that the role of the cancer network in Merseyside and Cheshire is to ensure that organisational boundaries do not interfere with the smooth delivery of patient care and that corporate interests do not conflict with the sensible management of patients where a degree of pooled risk or

sovereignty is required and brokered agreements will be required to implement service change..

The consequence of this configuration is that patient pathways are exceptionally dependent on the 'glue' provided by oncologists working between different organisations. Given the relatively low number of oncologists employed in MCCN, the 'glue' is softening and more investment is required to strengthen multi-disciplinary team working and the security of patient pathways. This will facilitate the delivery of more chemotherapy closer to the patients' homes, and especially in local hospitals (including making better use of charitably funded, high quality facilities such as the Marina Dalglish Centre at Aintree), and the delivery of radiotherapy services more accessibly and, if possible, in closer alignment with surgical oncology services in order to make MDT working more effective.

2.4 Population needs

Some areas in Merseyside have some of the highest rates of cancer in the country. This is related mostly to lifestyle factors, and especially cigarette smoking. As a result more people in MCCN are likely to develop cancer and to do so at an earlier age. The survival rates/results of treatment from cancer are not especially worse than those for other urban centres but below the national average which is, in turn, disappointing compared with international comparators. With higher levels of specialisation facilitated by more investment in oncology services, these results can improve.

People tend to present relatively late with cancer with poorer prospects for cure than in some parts of the country. This is typical of the North West of England and several other urban centres in the North and Midlands. Access to, or use of, non-surgical treatments for cancer tends to be lower in the North than the South. Generally, the availability of LINACs is significantly lower in the North (though MCCN has been less compromised than other networks in this regard) and this gap may well persist unless patients can be persuaded to seek medical help earlier in the course of their illness combined with more investment in clinical oncology.

These issues are addressed in the CRS and in the North West Cancer Plan which was adopted by the MCCN earlier this year. Additionally MCCN was the first network to appoint a dedicated Health Inequalities Manager and have already developed a Cancer Early Detection and Prevention Strategy published in January 2008 which aims to address cancer inequalities. Members of the network team are closely linked to the National Awareness and Early Detection Initiative (NAEDI) which will be formally launched in November 2008

2.5 Research and Development

Prior to this feasibility study being initiated, a peer review was conducted in 2007 of the Merseyside and Cheshire Cancer Research Network, part of the National Cancer Research Network which maps onto the MCCN area and

services. The general conclusion of the review was that despite excellent research management and clinical leadership, the achievements of the research network had hit a “glass ceiling” because of the absence of academic leadership in oncology. This deficiency is widely recognised and has been the subject of several unsuccessful attempts to recruit a Professor of Oncology to develop and lead an Academic Department of Oncology.

More recently, the CRUK has launched an initiative to identify a number of Cancer Research Centres in the UK with which it would intend to conduct research over the coming years. This process will take into account the inherent cancer research strengths of the centres and not just address the current CRUK funding of research in these centres. It is not primarily an investment programme but there is no doubt that designation as a CRUK Research Centre would strengthen the position of the centre with regards to future funding. In this context, the CRUK has shown significant interest in Liverpool as it has major research strengths in fields of cancer research which are not well represented nationally, including head and neck cancers, pancreatic cancer and leukaemias. Again, the lack of academic leadership in oncology has arisen as a major limiting factor in the progress which Liverpool can make in developing its cancer research.

It is widely suggested that the physical isolation of the oncology service base (at Clatterbridge) from the research base at the RLH/University campus is one of the obstacles to the successful development of academic oncology. This may well be a factor though we would suggest that the isolation from the other treatment modalities is as much of a problem. In either event, academic oncology needs, for optimum impact on patient care as well as research, to be colocated with basic and translational research and the other treatment modalities. In the context of Merseyside and Cheshire’s dispersed specialist surgical oncology model, this will be challenging enough.

Although research (needs and potential) was originally seen as the principal driver for the proposed reconfiguration of service, whilst undoubtedly important we consider it to be secondary to the need to improve the safety, quality and sustainability of cancer services. Furthermore, we see the development of academic oncology as a necessary step in increasing the specialisation in oncology service delivery, enhancing the opportunities for patients to participate in clinical trials and in raising the expectations and ambitions of cancer services throughout the network.

2.6 Summary

To sum up the reasons for considering a change in the service model, location and delivery of non-surgical oncology in MCCN:

- National policy drivers encourage the major expansion of radiotherapy through the development of satellite radiotherapy units closer to the populations served and limiting the size of major centres to a maximum of eight LINACs.

- The concomitant decentralisation of chemotherapy requires a larger clinical workforce with a greater local presence than is currently available.
- More flexible service delivery models are required which are less dependent on a single centre and more served through networks of care.
- The increasing use of multi-modality treatment regimes suggests that, in the longer term, isolated oncology centres are no longer appropriate.
- The organisation of hospital services in MCCN means that integrated cancer care is dependent on oncologists to secure the integrity of patient pathways. It is more difficult to achieve this from a remote centre and with low levels of staffing.
- The needs of the network population are high in terms of cancer care but the results are likely to be inhibited by poor accessibility of oncology services as well as by late presentation. Closer alignment of oncologists to local providers will shift the balance of leadership in cancer care and provide a nidus for improving the overall organisation and delivery of care.
- Developing cancer research in Liverpool, an essential component of all cancer care and of medical research, is severely compromised by the absence of academic oncology leadership. The isolation of the current cancer centre and its distance from surgical oncology and MDTs are factors in the difficulty in addressing this deficiency.

3 Process and Methodology

- 3.1 The feasibility study has been progressed using the agreed methodology presented to the initial Steering group meeting on 10 April 2008.

The process was one of involvement of a number of key stakeholders from the NHS and Liverpool University and numerous discussions and meetings have taken place to identify individual thoughts and aspirations (and fears). On a number of occasions, detailed formal meetings were held with groups of senior staff and/or Boards. A list of contributing organisations is given at Appendix 2.

In addition to ascertaining the views of local stakeholders and leaders, the views of national 'experts' on the objectives of the feasibility study were obtained with special reference to the research aspirations. Discussions also took place with CRUK on this and on their Cancer Research Centre programme.

- 3.2 A Staged Approach

The three stage approach which was adopted was designed to identify early options, discuss them with stakeholders and build on the initial thinking; at the end of each stage seeking the approval of the Steering Group and Taskforce. The stages were as follows:

- Stage 1 - Project Plan - Steering Group 10/4/08; Taskforce 16/4/08
- Stage 2 - Interim findings - Steering Group 10/7/08; Taskforce 16/7/08
- Stage 3 - Progress feasibility study to evaluate agreed options and make recommendations - Steering Group 16/9/08; Taskforce 15/10/08

Details of the presentations given to the Steering Group/Taskforce meetings are attached at Appendix 3.

- 3.3 Support from Key NHS Stakeholders

As a part of the study, and after the presentation of our initial findings, some key questions were asked of a number of key NHS stakeholders. The questions, and their replies, from the Royal Liverpool and Broadgreen University Hospitals Trust, Clatterbridge Centre for Oncology Foundation Trust and the Aintree University Hospitals Foundation Trust are shown at Appendix 4.

They show a high level of support for the direction of change and the suggested outcome of the study.

4 Findings

4.1 Observations

4.1.1 Research and Development

There is a good deal of high quality research in Liverpool which is about, or relevant to, cancer but there is no overarching cancer research strategy or a multi-disciplinary cancer research centre. Although the leadership of the School of Cancer Studies is committed and passionate, there doesn't appear to be a higher level commitment to any particular cancer research strategy. Consequently, the University of Liverpool has not been able to provide a strategic context for the recent discussions about CRUK Research Centre status or the relevance for research of the possible relocation of the clinical services.

The obvious lack of leadership in academic oncology is a remarkable omission for such a large and longstanding centre for cancer service delivery. Unusually, the large and growing number of medical oncologists are largely clinical service-based rather than research-based. Efforts to fill a chair in medical oncology have proved irritatingly futile, though work continues, and would be assisted if the research facilities and clinical services were more closely aligned.

The CRUK Cancer Research Centre initiative has encouraged the University to develop its thinking about future organisation of cancer research in Liverpool. The CRUK process is not primarily about funding but about defining the Centres which it recognises as providing suitable infrastructure and added value in terms of cancer research in the round. Thus, the major strengths in haematology and head and neck cancers, which are not at all CRUK funded, contribute to the demonstration of excellence.

Whilst the CRUK process encourages the presentation of strengths, it glosses over the areas of relative weakness. Furthermore, the University sees future success in building on existing strengths, principally, pancreatic disease, head and neck cancer and haemato-oncology together with recent CRUK investment in Early Cancer Medicine development (formally NTRAC) and the Cancer Trials Unit. These are areas which are not especially strong in other major centres. However, together they account for barely 6% of all cancers. Academic oncology departments will inevitably want to engage with research on the common cancers, including lung, breast, colorectal and prostate, which together account for 60% of cancers, not least because they are easier to trial and where the product chain is relatively strong. The NHS's clinical service needs resonate more strongly with an approach targeted at the common cancers than with strengthening an already leading position in relatively rare cancers. Some tension between the University's interests in strength in depth (e.g. for RAE returns) and the NHS's requirement for strength and innovation in breadth may well exist.

Recognition of the University's strengths and potential in cancer research (by CRUK) is an important step in developing the quality of cancer services in the future. Academic leadership in oncology brings with it a focus on cancer site specialisation and access to the newest treatments. Survival rates tend to be better in such settings, taking into account the underlying characteristics of the population. Academic leadership in one modality however also impacts upon the behaviours in other modalities of care. Just as the surgical leadership and excellence in pancreatic disease and head and neck cancer has galvanised practice in these areas, so one can expect academic leadership in oncology to have the same impact on some other cancers. Over-focussing on the existing strengths, whilst supporting the research assessment exercise, will do little for clinical service improvement in other cancers.

4.1.2 Clinical Safety, Quality and Sustainability

The Clatterbridge Centre for Oncology (CCO) is a large and distinguished provider of non-surgical oncology services. For many years it has provided a peripatetic service for the people of Merseyside and Cheshire. However, the current service is, in our view, not sustainable or appropriate in the longer term for a number of reasons.

When it was first established, the Clatterbridge campus provided a wide range of medical and surgical services; this is no longer the case and the oncology facilities are now isolated from modern medical and surgical practice. During this time, the complexity of cancer treatments has increased dramatically, patients are older and sicker and the treatments have more side effects. In most cancer centres, most of the beds are used for patients who are seriously ill because of their underlying cancer or because of the side effects of treatment. The management of these conditions requires ready access to both critical care facilities and the on-site access to the full range of general medical and surgical expertise. This is no longer possible at CCO. Although it may be feasible, albeit at considerable cost, to provide a Level 2 critical care facility on site (equivalent to high dependency care), the absence of the general hospital expertise is also an important omission and is not achievable in the current location.

The oncologists from CCO provide a level of support to locally-based multi-disciplinary teams in a number of District General Hospitals. Where possible, this has been developed along site-specialised lines - mostly in medical oncology - but, in practice, the service is so stretched that site-specialisation is sometimes in name only and the distribution of oncologists is more geographical than cancer site-based. Although research-involvement is good, particularly in medical physics, with a couple of notable exceptions research leadership is limited with only a few examples of National Trial Principle Investigators based at CCO. In this regard, CCO differs from the remaining specialist cancer centres in England (Christie and the Royal Marsden) which continue to be separate from general hospital sites. They both have a wide range of surgical provision on-site as well as extensive critical care facilities and extensive research programmes although they too suffer from the lack of medical specialty expertise.

4.1.3 Capacity and Access for radiotherapy and chemotherapy

By 2000 standards, radiotherapy capacity in MCCN was acceptable and above the levels available in most other centres in the North and Midlands. However, these levels fall some way short of the access levels anticipated to become the norm in the NRAG Report/CRS by 2011 and considerably below what is expected for 2016. Furthermore, the radiotherapy capacity is centralised and away from the main centres of population with extensive anecdotal evidence of access reduced by the distance patients have to travel, in line with universal findings to this effect nationally and regionally.

In general, fractionation regimes are believed to be close to proposed national norms whilst capacity is well below the target proposed. We therefore estimate that utilisation of radiotherapy is around 30% below the expected national norms in 2016. Some of this gap is related to rising incidence over the coming years though some must be presumed to be partly due to limited penetrance of the cancer community for radiotherapy treatment; i.e. many patients who could benefit from radiotherapy - especially for palliative radiotherapy - are not receiving it. It may also be the case that the future demand has been over-estimated given the current stage of presentation of many patients in the North of England and that these requirements will only materialise if significant progress is made in achieving earlier detection and presentation.

The additional requirement for radiotherapy, according to NRAG, equates to approximately 6 LINACs by 2016 and policy assumes that this additional capacity will be achieved through locally-placed satellite units closely linked to existing cancer centres. We challenge the upper limit of these capacity assumptions below though not their distribution.

There is no convincing evidence that chemotherapy access in MCCN is below the national norm. There is no evidence that specific drugs are less accessible in MCCN than elsewhere but there is evidence of wide variation in expenditure between PCTs. We do know that there has been limited site specialisation in oncology, though there has been progress in this area, and patient access difficulties created by the preference of some oncologists to administer chemotherapy at the centralised but isolated CCO campus. It is clear that whilst many local hospitals have the facilities to deliver chemotherapy, these are underused by oncologists for reasons which are not related to the patients' clinical needs and may be influenced by low consultant staffing levels in clinical oncology in particular.

The centralised commissioning and delivery model for chemotherapy creates a monopoly and monopsony scenario which does not necessarily support flexibility and innovation in patient care. Commissioner drive for the location of treatment will be needed to alter the shape of cancer care delivery, both for radiotherapy and for chemotherapy. We understand that a separate and detailed review is in progress and we share the ambition to further decentralise chemotherapy, through a networked delivery model which better utilises the assets available throughout the network and provides for increased oncologist input to the care of cancer patients in general hospitals.

4.1.4 Clinical Service Synergy

The diaspora of specialist surgical oncology across Merseyside and Cheshire provides a highly complex setting for the coordination of cancer care. Six organisations are delivering the cancer services which are provided in a single Trust in Leeds, Nottingham and Newcastle and in a pair of organisations in Sheffield and Birmingham. Although there are some significant benefits for the managerial leadership and focus on specialist care, there are losses in terms of overall pathway management. With most cancer patient pathways crossing both diagnostic and treatment modalities, the imposition of organisational boundaries as well adds a further level of complexity. It is clear that cancer patients receiving specialist cancer surgery in single specialty Trusts and non-surgical oncology via CCO, having been diagnosed and perhaps received some treatment locally, have very complex pathways of care. The isolation of both non-surgical and sometimes surgical providers creates an overall lack of synergy in clinical cancer services.

The potential to improve the service synergy through moving the oncology services is too good an opportunity to miss. We regard it as impractical, and frankly too difficult and too late, to radically reorganise specialist surgery in Merseyside. Consequently, realigning the non-surgical oncology with the surgery offers the best chance of improving the organisation of specialist cancer care.

4.2 Analysis

We have made certain observations above which require more detailed analysis to justify the conclusions and recommendation which follow. These are especially in the areas of workforce, the target requirement for radiotherapy - and its distribution, the number of inpatient beds required and the model of chemotherapy delivery. We also explore the options for developing an academic unit in oncology.

4.2.1 Workforce

Currently the specialist cancer workforce for solid tumours is based wholly at CCO. It therefore has a monopsonic control over the numbers and distribution of staff and recruitment policy. In oncology, most appointments are made from people trained locally and the same is true in other professional disciplines. Whilst this is not necessarily a problem, it results in the perseveration of intrinsic weaknesses, such as the lack of a research base.

The overall numbers of oncologists (approximately 16 clinical oncologists and 12 medical oncologists) are low compared with major centres in Manchester and Leeds. The number of clinical oncologists is especially low in comparison and militates against the development of cancer site specialisation in radiotherapy and also explains the resistance of the oncologists to the possibility of supporting more than one inpatient unit.

Given the surgical diaspora, the importance of oncologists in building coherence in cancer patient pathways cannot be over-emphasised. This is not possible with current consultant numbers. At the current pace of growth, about 2-3 per year, the medical workforce can keep pace with demand but cannot do as much as is desirable in terms of specialisation and team strengthening. We estimate that it would be a decade before the workforce was sufficient to be able to support specialist teams with specialist oncologists across the network. At this stage, and based on current recommended ratios, there would be approximately 40 clinical oncologists and 20 medical oncologists. However, with a heavily front-loaded investment in additional consultants and support staff, especially in clinical oncology, this might be achievable in a third of the time. Recruitment is not especially easy however and the current dependence on locally trained staff could not, on its own, sustain such a recruitment programme. The development of a credible academic unit in oncology would, however, provide a much wider field from which to recruit to new posts in both clinical and medical oncology.

Concomitant growth and specialisation will similarly be required in medical physics, radiotherapy radiography and in onco-pharmacology although we have not performed any detailed analyses of needs. The continued growth of specialist cancer services provision will also require increases in ward, chemotherapy and clinical specialist nurses. Prior to and during the course of this review this has been recognised as a key priority for early investment.

4.2.2 The overall capacity requirement for radiotherapy

The factors which influence the demand for radiotherapy are multiple and complex. They include some easily tangible elements such as population served, target efficiency and number of cancers. Some of the variables are less precise however such as case-mix, stage at presentation, ability to access and/or benefit from treatment, and potential use for research. Our analysis attempts to estimate the likely demand for radiotherapy treatments in an oncology centre based in Liverpool in about ten years from now, utilising standards and norms proposed in the NRAG report and made policy in the CRS.

We estimate that the population served (in 2017) will be almost 2.4 million made up of 2.16 m. resident in the network, 80,000 from the Isle of Man and 150,000 resident in Flintshire. This represents the current catchment of CCO updated for predicted population change. It is subject to a low level of risk from competing centres.

The NRAG/CRS expectation is that the demand will reach 54,000 fractions per million population by 2016 and that each LINAC will be used for 9 hours per day and deliver 8,700 fractions per year (equivalent to 6.2 LINACs per million). These are not upper limits and some centres are already achieving higher treatment turnovers per LINAC. However, the application of these assumptions to the population produces a LINAC capacity of 14.9.

This estimate makes no adjustment for late presentation, which tends to have the effect of reducing the demand for (high fraction) radical treatment whilst increasing the need for (low fraction) palliative treatment. It also excludes the use of LINACs for research. If one adjusts down the demand for capacity to take account of the current presentation profile and then partially compensates for a potential research use, we believe that a total capacity of 14 LINACs (13 for exclusive NHS use) will be sufficient for MCCN and those areas which look to the network to provide their specialist treatment. If we prove to have underestimated the demand, a higher turnover per machine can be achieved which would equate to an additional LINAC. Some NHS work and cover during machine downtime can be provided from the proposed research LINAC.

4.2.3 Oncology beds

At the present time, all non-surgical oncology inpatient beds are at Clatterbridge. Current provision is 88 beds which experience 71% occupancy. This probably underestimates the actual use as some day patients may be treated in ward beds though they could be managed in day units elsewhere in most cases.

A number of changes are envisaged resulting from clinical, research and other drivers which we analyse below.

- We believe that, with more flexible and appropriate use of day care facilities at general hospital sites, an occupancy level of 80% is achievable for inpatient oncology beds. As most of the admissions are elective, an even higher figure might be achievable.
- Recent guidance on the provision of cancer services for teenagers and young adults requires the development of a specialist inpatient facility which is designed to meet the needs of 16-24 year old patients. Such units require access to specialists responsible for treating childhood cancers and also the full range of adult cancers. Almost half of the patients in this group have haematological cancers. The facilities have to be provided in the same city as designated principal treatment centres for children. They must therefore be in Liverpool and logically at the RLH site. Approximately eight beds will be required of which half will be for haematological disease. Some financial support from Teenage Cancer Trust may be available to support the development of facilities and a suitable environment for these beds.
- With the development of an academic unit of oncology, a clinical trials facility will be required for patients close to the experimental cancer medicine centre and the clinical trials unit, i.e. at the RLH. This facility will form an integral part of mature oncology services. The requirement for beds will depend on the nature of the translational research being performed and developing relationships with key manufacturers. Based on the estimates used in other major oncology schemes, a minimum of eight trial beds will ultimately be required. Given that oncologists cannot be reasonably expected to treat patients only if they have consented to participate in trials, some NHS non-trial

patients will also be treated alongside the trial beds. We propose a minimum configuration of 14 beds (including the trial beds) rising to 20 when the academic unit is fully staffed.

- Providing oncology facilities on a large general hospital campus will engender a workload not currently managed at Clatterbridge. Patients attending A&E, for example, will be (more) appropriately admitted to specialist oncology beds rather than to general medical or surgical beds and the opportunity to transfer appropriate patients from other specialties will also become available. Experience in other such moves suggests an increased use of the order of 10-15%.
- In addition, the planned expansion of radiotherapy and the continuing growth in chemotherapy will create their own demand for additional inpatient facilities. Furthermore, the better location of facilities in the future will improve access to non-surgical treatments.
- Demographic drivers, especially ageing, influence upwards the number of patients seeking treatment and account for some of the required expansion in facilities.

Our estimate of the overall impact of these dynamics is shown in the Table below.

Table 1 Changes in bed requirement

Baseline provision	88 beds @ 71% occupancy	88
Increase occupancy level	To 80% (-10)	78
TYA unit	8 beds incl. existing 4 for haematology (+4)	82
Cancer Trials unit	8 beds (+8)	90
Improved access from A&E and localising services	12 beds (+12)	102
Growth in demand from expansion and demography	8 beds (+8)	110
Total change		+22

These numbers do not include critical care requirements. At present, little use is made of critical care by non-surgical oncology patients. In future, with more experimental treatments and with better located facilities, this might well be expected to rise. However, demand will still be low and unlikely to exceed 1 Level 3 bed and 2 Level 2 beds and we assume that these will be provided in existing facilities.

4.2.4 Chemotherapy delivery

There is a general trend upwards in chemotherapy treatments driven by increases in the incidence of cancer, increased use of adjuvant therapy in pursuit of higher cure rates, more ambitious and aggressive management of advanced disease and greater use of combined modality treatments such as chemo-radiation. Further, the development of an Academic Unit in Oncology will create additional treatments outwith current practice. Current national

trends, which have been maintained over many years, are of the order of a 7% per annum increase.

We anticipate that some of this growth will be handled through the increasing use of oral therapies which require less use of infrastructure but do still require close monitoring. We propose that the remaining growth should be managed by the more extensive use of locally-based facilities for chemotherapy administration supported by the increase in the number of oncologists. Consequently, we have assumed no growth, and actually a small reduction, in the chemotherapy facilities required in the major oncology centre when it transfers.

4.2.5 Developing an Academic Unit of Oncology

Irrespective of the timescales, the source of capital funding or the eventual Option implemented, the development of an academic unit of oncology must be central to the achievement of the goals of improving the care and outcomes for people with cancer in Merseyside and Cheshire. Given the current and future location of the key research and clinical facilities, it is imperative that this academic unit is based at the Royal Liverpool campus from the outset. If the proposed major relocation of oncology services is delayed, the academic should still be established at the RLH site, within existing facilities prior to the redevelopment of the Royal Liverpool Hospital. We envisage that the unit would operate within the context of a comprehensive regional service for oncology, led by CCO, but closely aligned to university research facilities and to clinical and academic haematology within the RLH.

Throughout this review, one of the underlying principles has been that the CCO Foundation Trust would remain as the monopoly NHS provider of non-surgical oncology services for solid tumours. Whilst we continue to make that assumption in the longer term, the early development of an academic oncology unit entrenched within clinical services in the RLH could also be managed by the RLBUH Trust. Indeed, our assumption is, in the event that a major relocation is delayed, that the academic unit would be provided with clinical accommodation adjacent to haematology and integral to the existing practices and procedures of the RLH.

In order to maintain coherence for oncology services across the network, close alliance with CCO will be essential and senior clinical staff, who we envisage would be University of Liverpool employees, should have honorary contracts with both RLBUH and CCO. We also suggest that the emerging team at the RLH might benefit from being joined by some CCO-based staff, providing that there is contemporaneous investment by commissioners in additional oncologists at CCO to facilitate this.

Assuming that the academic oncology unit and clinical team is established well in advance of a major relocation scheme, we propose that no additional building is provided for the associated university (teaching and research facilities) but that existing space is utilised to provide office and teaching facilities for the team.

We suggest that the early recruitment of three senior (professor and two senior lecturers) clinical academic staff is required to establish an academic unit, together with appropriate junior medical and scientific staff. As mentioned above, a unit of up to 14 beds could be maintained by such a team with support from haematology colleagues. We also suggest that a further expansion to five senior staff, supporting up to 20 beds in total should be pursued as a second phase within two years.

4.3 Formulation of options

As the study progressed, various options emerged which showed that combinations of services and locations were possible. A number of these options were identified at Stage 2 of the study and capital costs were identified for two of the options.

Following discussions with all the stakeholders, a list of nine options has been drawn up which give varying benefits to a reorganised service (See Appendix 5, Table.1)

Although all these options are potentially feasible, some offer little benefit for patient care and/or research. An Option Appraisal was carried out to identify the best options. A range of non-financial criteria was used to enable weightings to be applied to illustrate the degree of benefit for each option (See Appendix 5, Table.2).

The resulting matrix (Appendix 5, Table.3) clearly shows the ranking of these options. The top two are as follows:

Rank 1: Option 4

Main oncology facility moves to RLH site with a link oncology centre at Aintree and a satellite radiotherapy unit at CCO

Rank 2: Option 5

Main oncology facility moves to RLH with satellite radiotherapy units at Aintree and CCO

The differences between these two options are not huge though they are well differentiated from all the others. The differences between Options 4 and 5 are largely explained by there being better clinical and MDT synergy at Aintree but much better research and academic links at the RLH site.

We understand that the majority view at CCO is strongly opposed to splitting the inpatient provision at this stage which would tend to suggest that Option 5 would be their preferred solution. However, with the longer term timeframe envisaged for a major capital development, and with an early increase in clinical oncology posts to support site specialisation, the linked centre at Aintree option may receive more support than is currently anticipated and would, in our view, provide significant

advantages in strengthening the overall management of people with head and neck and brain cancers as well as offering comprehensive local management for a wide range of people with other, common, cancers. Given the current strategic capital position, this issue could be revisited nearer the time when a major development is feasible in the light of the implementation of our interim proposals (see below) and the clinical and research circumstances at the time.

4.4 Proposals

- 4.4.1 The conclusion of our discussions is that the current provision of oncology services at Clatterbridge, even with the development of satellite radiotherapy units at Aintree and the RLH site, will not be fit for purpose in the longer term and development of the available facilities on the existing site will not compensate for the deficiencies in the long run. We conclude therefore that a transfer of the major oncology facilities to the RLH site and/or Aintree is required by 2020.

The desire of the oncologists now to maintain a single inpatient facility for all solid tumour oncology services is recognised and, to some extent, understandable. We do not necessarily believe it to be wholly justified, given the fact that the majority of large networks have more than one radiotherapy centre, and we believe that there are real benefits in this growing service having permanent inpatient bases in more than one location. We do, however, acknowledge that substantial increases in oncology staffing will be required to deliver a split-site cancer centre without compromising service quality. This has been signalled to commissioners as they develop their Strategic Commissioning Plans and the investment profile to support this over time and as detailed in Section 5, will be shared with commissioners in the near future.

However, clinical support for such a major shift in service location and style is essential and we therefore propose that Option 5 be adopted as the default strategic position for the foreseeable future if capital becomes available with the development of a major oncology centre at the Royal Liverpool Hospital site with satellite radiotherapy units at Aintree (to include facilities for stereotactic radiosurgery) and on the Wirral (initially - at least - on the existing Clatterbridge estate).

- 4.4.2 Following extensive discussions with clinical leaders, we consider that Option 5 is the most feasible option to relocate non-surgical oncology services to Liverpool in the shorter term, provided that public dividend capital is going to be made available. In the expectation that a major capital scheme is deferred until the end of the next decade, we suggest that demand and oncology staffing would justify creating the linked centres with the main base at the Royal Liverpool site and a linked cancer centre at Aintree.

We have worked up in some detail the capital and revenue consequences of Option 5 and these are included at Appendix 6 and details of equipment capital costs are shown at Appendix 7.

The service profile and facilities for the schemes associated with Option 5 would be as follows:

4.4.2.1 New Centre for Clinical Oncology

Based at the Royal Liverpool Hospital site and planned to be adjacent to the proposed redevelopment of the RLH, the building would include:

- 110 inpatient beds (including any academic clinical facilities which predate the scheme); under Option 4, 84 of these beds would be at RLH and 26 beds at Aintree.
- 8 Linear Accelerators (7 for NHS use, 1 for research)
- 26 Chemotherapy treatment stations
- 12 Treatment rooms/consultant rooms
- 8 outpatient department rooms
- 1 outpatient theatre

A full range of other supporting facilities for NHS and academic use will also be provided and these are listed in full in Appendix 6.

The detailed content would be finalised at Strategic Outline Case/OBC stages.

4.4.4.2 Satellite unit – Aintree Centre

The existing plans for a 3 LINAC satellite unit should be expanded to a 4 LINAC solution to include stereotactic radiosurgery treatments in partnership with the Walton Centre for Neurosciences. The proposed service profile for the treatments given by this satellite unit should be extended to include radical treatment for breast, lung and prostate cancers and palliative radiotherapy. If possible, and with the use of patient hotel facilities, some head and neck radiotherapy may also be given.

The consolidation of oncology outpatient clinics within the satellite unit should be seriously considered and for the purpose of this study they have been included in the schedule of requirements, transferring demand from elsewhere at Aintree. The use of the Marina Dalgleish Centre (for chemotherapy) should be substantially expanded to improve local access to treatments and to complement the radiotherapy facilities. Under Option 4, 26 beds would be required and these could be available in the same block as the Dalgleish Centre with some upgrading and possible physical links to the satellite radiotherapy centre.

4.4.2.3 Satellite unit – CCO/Wirral

With the above developments taking place, we suggest that a local (satellite) radiotherapy service should be maintained on the Wirral peninsular either at the existing CCO site or elsewhere. For the purposes of this study, we have assumed that a 2 LINAC unit will be retained at CCO in Clatterbridge.

4.5 Affordability - capital and revenue costs

The relocation of non-surgical oncology from Clatterbridge to Liverpool will inevitably require substantial funding, not only in Capital to fund the infrastructure but also in revenue funding to pay for the consequences of the capital funding, the improved standard of accommodation and the concurrent substantial expansion of services which is proposed.

4.5.1 Capital costs

A set of capital costs have been developed for Option 5 but the headline costs provide a ballpark estimate for either of the preferred options.

The overall capital cost of the proposed developments is of the order of £160m. These will vary according to the location(s) and distribution of facilities and will need to be reviewed at OBC stage.

For the proposed interim measures (see below), we understand that the capital costs for the provision of an academic oncology unit with 14 inpatient beds and support accommodation will be of the order of £1.5m; we are awaiting a cost estimate for a two bunker temporary satellite radiotherapy unit at the RLH but we would expect it to be of the order of £5m including equipment. These are in addition to the costs of the agreed satellite radiotherapy unit at Aintree which are of the order of £30m.

4.5.2 Revenue costs

Additional revenue costs will be incurred for three reasons:

- Revenue costs arising from the capital cost of relocation of services
- Funding the expansion of services and associated activity
 - Additional LINACs and radiotherapy activity
 - Additional beds
 - Increased chemotherapy activity
- Funding improvements in the quality of care including more consultant appointments to enable site-specialisation, critical care etc.

The overall revenue costs of the relocation and expansion of oncology services will be approximately £19.555m of which roughly £13m is the cost of capital and infrastructure support to the buildings. (See Appendix 6)

4.6 Timetable and deliverability

4.6.1 The key issue in the delivery of a viable scheme of oncology relocation is its relationship to, and location, on the Royal Liverpool Campus. Initial discussions have taken place with the (RLBUH) Trust to ascertain if the proposals are viable and sustainable without interfering in the progress of their own site-development plans.

The Trust has confirmed that it is feasible to locate the proposed new oncology hospital on the site adjacent to their proposed PFI redevelopment scheme and have completed an Outline Plan to show how it can be achieved.

- 4.6.2 Whilst the actual dates for the proposals are subject to change, the timescales envisaged show that the elapsed time from agreement to plan to the first patient treated is approximately four years. Project teams will have to be established to progress the schemes (RLH and Aintree sites) regardless of the means of capital finance, i.e. PFI or public dividend capital.
- 4.6.3 The integration of the major oncology scheme at the RLH will have to be closely aligned with the RLH main site development in order to ensure that key supporting clinical facilities, such as critical care, are horizontally accessible and that other potential synergies, e.g. haematology, are taken advantage of. Other key issues which will need to be coordinated with the PFI scheme are energy supply, car parking, location of imaging equipment and pharmacy manufacturing, supply and dispensing.

The project team at the RLH has produced an Outline Plan which is attached at Appendix 8.

5 Interim measures

As it will not prove possible to effect a major relocation scheme before 2020 as currently indicated by the SHA, we take the view that this is too long a time to allow to pass without significant improvements in oncology in Merseyside and Cheshire. We therefore propose the following interim measures in the shorter term.

- 5.1 Clinical safety for patients cared for by CCO at Clatterbridge should be improved by instituting specially nursed beds, equivalent to HDU, with continuous support from a critical care outreach team from Arrowe Park (because of its proximity). There will be additional costs for the enhanced nursing and fees for the outreach service which should be supported by videoconference facilities. Agreement must be reached at the outset between the parties over the location of clinical responsibility and clinical governance for patients cared for in this way and processes need to be developed for the rapid transfer of patients requiring more advanced critical care facilities without delay. CCO is currently undertaking a review of acute care.
- 5.2 The satellite radiotherapy unit at Aintree should be developed by CCO as described in 4.4.2 above. The unit should include 4 LINACs including a SRS facility, outpatients and should be used extensively for radical radiotherapy for breast, lung and prostate cancers and palliative treatments and hopefully for outpatient head and neck treatments too. We favour the retention of the option to develop this unit into a linked centre in due course with the use of inpatient beds in the Women's Hospital wing and the provision of head and neck and intracerebral radiotherapy at that time.
- 5.3 We support the further development by CCO of a temporary satellite radiotherapy unit at the RLH, preferably in temporary accommodation and adjacent to the Linda McCartney Centre. We suggest that the capacity of this satellite should be limited to 2 LINACs with simulation and planning carried out at CCO.
- 5.4 An academic oncology unit should be developed as soon as possible with an initial recruitment of a professor, two senior lecturers and at least three junior medical staff. Up to 14 beds should be provided, including up to 8 beds for trials and some for treatment, within the existing estate of the RLH and linked as closely as possible to the haemato-oncology facilities. A further expansion to five senior clinical academic staff with appropriate support and an increase in bed complement to 20 should be achieved within two years. The academic unit staff should be employed by the University with honorary contracts at both RLBUH and CCO and the clinical service could be 'governed' by either Trust.
- 5.5 We believe that front-loaded investment in NHS oncology posts should be made to facilitate site-specialisation in radiotherapy and to increase the oncology presence at Cancer Units and local MDTs to improve the clinical care of patients presenting to local hospitals with the complications of cancer and/or treatment.

6 Benefits for patients

There are key areas where the full implementation of our proposals will improve both the experience and the outcomes for patients. Described in more detail below are some of the more prominent areas which we have tried to address in developing our proposals.

6.1 Service Quality

Most treatments for cancer carry significant risks and/or unpleasant side-effects. Treatment decisions always take into account the effect of the treatment on quality of life and the overall balance of risks and benefits. A large proportion of oncology beds are occupied because of the underlying disease process or because of the effects of treatment. In making decisions about treatment of patients who are unwell, judgements have to be made about the suitability of the facilities available to treat the patient. Although, in theory, all the expertise of modern medicine is available to CCO, it is mostly off-site and there is almost certainly sub-conscious conservatism in the selection or availability of treatments which will not be the case when the service moves to a general teaching hospital site.

Furthermore, wherever patients are treated, they often present to their local emergency department with the complications of their cancer or its treatment. These hospitals do not have appropriate specialist nursing or medical facilities to care for these patients. Moving the oncology base(s) to the major general hospitals will improve the overall care of these patients.

The demand for critical care in oncology is relatively low. However, the non-availability of critical care and the associated specialty support at CCO is an obstacle to optimum care which will be addressed by transferring the services to the Royal Liverpool Hospital Campus.

6.2 Specialisation

In general terms, specialisation increases experience and expertise. There is evidence in oncology that it also increases ambition in patient treatment and leads to a willingness to support more local care and to offer newer products and/or access to clinical trials. This applies to both radiotherapy and chemotherapy.

Our proposals include both the academic focus in medical oncology and the development of more site-specialisation in clinical oncology through an early investment in consultant numbers.

6.3 Research and Development

In cancer, research is not optional; it is not feasible to deliver high quality cancer care without a major interest in conducting research, involvement in clinical trials or awareness of the results of research. Such engagement is

facilitated by specialisation and by academic leadership, both of which require attention and are addressed in our proposals.

It is widely reported that patients in trials do better than patients not in trials and that this is due to the closeness of monitoring and attention that trial patients receive. It is not entirely clear that these are consistent findings, though and it is safer to say that teams which are research-active provide better and more modern overall care than teams which are research-naïve.

It is certainly true that academic leadership in oncology leads to higher standards of practice in the fields of special interest and that it is therefore important that the academic team has some interest in the common cancers as well as in some less common fields.

6.4 Local access to treatment

At a national and regional level, there is a consistent association between proximity to a cancer treatment centre and the level of access to treatment. It is less clear whether this relationship consistently exists at a more local level though it is safest to conclude that this is the case in MCCN. National policy is that patient travel times for radiotherapy should be reduced to a maximum of 45 minutes wherever possible. Thus, developing satellite radiotherapy and making better use of local chemotherapy facilities will be expected to increase the overall utilisation of oncology treatments with consequential improvements in outcomes.

6.5 Multidisciplinary team working

Since 1995, the concept of multidisciplinary team decision-making in cancer has become firmly established and, since the NHS Cancer Plan and subsequent guidance, has become mandatory. There is extensive evidence that MDTs result in different and better treatment decisions than individuals and that clinical approaches to care are more consistent.

The wide distribution of surgical oncology and the low levels of oncology staffing compromise the extent to which specialist oncology support can be given to all MDTs. Our proposals therefore encompass the investment in oncology staff to increase specialisation and the preference for moving oncology services to sit alongside specialist surgical teams where feasible.

7 Summary of Key Recommendations

- We propose that most oncology facilities should be relocated from Clatterbridge to Liverpool.
- If an early (pre 2015) major scheme can be delivered, we propose that all the inpatient beds should relocate to the Royal Liverpool hospital Campus. If no early scheme is feasible, we recommend that the majority of the facilities should relocate to the RLH with a linked centre at Aintree
- Assuming that the major relocation of services is delayed until 2020, satellite radiotherapy facilities should be developed at Aintree and at RLH. A satellite radiotherapy facility should be retained at CCO on the Wirral after relocation.
- An academic oncology unit should be developed at the RLH as soon as practicable with at least 14 inpatient beds including capacity for clinical trials.
- Commissioners should support early investment in additional clinical oncology posts to facilitate further site-specialisation.
- Additional investment in medical oncology should also be supported to enhance the oncology presence at Cancer Units.
- Interim measures should be taken to support very sick patients at Clatterbridge.

Interim proposals, including priority investment plan

2009-2011

- Develop the satellite radiotherapy unit at Aintree with the transfer of 2 LINACs plus 2 additional LINACs including SRS facility (c. £5m revenue; c£30m capital))
- Appoint additional 6 oncologists (clinical and/or medical) (£0.75m)
- Appoint 3 senior academic oncology staff (£0.375m)
- Appoint support clinical and research staff for academic unit (£0.35m.)
- Open academic clinical unit at RLH (£1.0m; c.£1.5m capital))
- Create HDU facility at Clatterbridge with supporting outreach arrangement (£0.25m)

Overall costs are:

Capital (est)*	£31.5m
Revenue	£7.725m

*part funded by CCO - existing proposal

2012-2014

- Complete the satellite radiotherapy unit at RLH with 2 additional LINACs (£2m; c.£5m capital))
- Appoint additional 7 oncologists (clinical and/or medical) (£0.875m)
- Appoint additional 2 academic oncologists (£0.25m)
- Appoint further clinical and research support staff (£0.15m)
- Extend academic clinical unit to 20 beds (£0.3m)

Overall costs are:

Capital	£5m
Revenue	£3.575m

c.2020

- Complete relocation of oncology facilities to Liverpool

Overall additional costs are approximately

Capital	£130m
Revenue	£11m

8 Appendices

Appendix 1 Final Scope

Scoping Document for the Feasibility Study into the Relocation of Non-Surgical Oncology Services from Clatterbridge to Liverpool

A feasibility study on the relocation of key non-surgical oncology services from Clatterbridge to Liverpool has been commissioned by the Network Taskforce as it is thought this would greatly enhance the development of the Cancer Research Centre. This bid is currently being developed led by Professor Neoptolemos, Head of Cancer Studies at the University and supported by Peter Clark, Medical Oncologist at Clatterbridge Centre for Oncology to meet the requirements of the Cancer Research UK. Although the main driver of this bid is to achieve the research aspirations, the real impact will be on service delivery models and ultimately patients. A meeting of senior NHS and University partners took place on 1/11/07 resulting in a briefing paper for the Cancer Taskforce meeting in January 2008. It was agreed to take forward this project with network and external support. Whilst the overall project sponsor is the MCCN Taskforce, a Project Steering group (which is a sub set of the Taskforce merged with the 1/11 group) is now being formed as described below to oversee the study. Approaches were made by the network team to suitable candidates to undertake this study and subsequently the Project Team has now been confirmed as:

Professor Mark Baker – Lead
Roger Cannon, Independent Healthcare Consultant
Project Steering Group membership
Kathy Doran, Chair
Tony Bell, CEO, RLBUHT
James Birrell, CEO, AHT
Derek Campbell, CEO Liverpool PCT
Andrew Cannell, DOF, CCO
Peter Clark Medical Oncologist and Research Lead, CCO
Ged Corcoran, Network Lead Clinician
Pat Higgins, Network Director
Darren Hurrell, CEO, CCO
Professor John Neoptolemos, University of Liverpool

The Project will be supported by Leah Curphey, PA and Business Support Coordinator, MCCN who will coordinate diary dates, telephone meetings and other administrative support to the Project Team and the Project Steering Group.

Expert Reference Group

It was agreed that Professor Baker would use a range of cancer experts as a reference group. These will include the following (though not exclusively)

David Cameron, NCRN
Prof Sir Alex Markham, University of Leeds
Mike Richards, National Clinical Director for Cancer
Professor Peter Selby, Joint Director, UKCRN and University of Leeds

Given the timescales it is unlikely that such a panel can be convened to discuss this but to ensure that the ideas for strengthening the Liverpool cancer centre are

consistent with current thinking, Professor Baker will consult with each separately. Others may be consulted at his discretion.

Sources of Information to be provided for the study

Interviews with a range senior University and NHS colleagues
Annual Reports of partner organisations
CancerTaskforce minutes and relevant papers e.g. satellite radiotherapy
University Cancer Research reports
Research income
CRUK bid (even if in draft)

Scope of the study

This is to explore the potential benefits to patients as well as to research of a relocation of some (or indeed all services) as follows:

- . inpatient chemotherapy*, radiotherapy** and chemoradiotherapy
- . daycase chemotherapy, radiotherapy and chemoradiotherapy
- . medical physics and mould room
- . Mechanical and electrics workshop
- . radiotherapy planning
- . cancer imaging
- . chemotherapy pharmacy
- . palliative care
- . oncology liaison psychiatry
- . R & D including the Merseyside & Cheshire Cancer Research Network
- . specialist nursing services
- . finance and administration.

* existing satellite chemotherapy will remain as is

** the provision of 6 linacs in Liverpool is now a given – 3 at Aintree and 3 at the Royal Liverpool site

The feasibility study should take account of the broad costs of any shift in services. The real challenge for will be whether relocation could be achieved at an acceptable cost and whether any thing less than a full relocation would achieve the optimum clinical and research benefit.

Timescales and reporting arrangements

The timescale of the study remains flexible but the intention would be to conclude this by the end of the summer with interim reports to the Project Steering Group in early April (dates being sought). Taskforce meetings will be useful interim reporting milestones, as follows:

- April's Taskforce (16/04/08 2.00pm): Well defined project plan and relevant 'doors' opened
 - July's Taskforce (16/07/08 2.00pm): Interim findings – Potential closure of project if findings are definitive
 - October's Taskforce (15/10/08 2.00pm): Final report
- It is envisaged that a progress report in the form of a presentation will be made to the Project Steering Group on 10th April and Taskforce meetings thereafter. At the end of

the Project, a draft report with recommendations for action will then be circulated in for all parties to comment on which can then be signed off by the Project Steering Group on behalf of the Taskforce.

On a day to day basis the Project Team will report to the Network Director. The Network will provide secretarial support to arrange meetings and manage diaries. The Cancer Network has also funded Dr Peter Clark to dedicate time to work with the Project Team. Andrew Cannell, Director of Finance at Clatterbridge, will co-ordinate the provision of any financial information and analysis that may be required.

Pat Higgins
Network Director
6th March 2008

Appendix 2 Contributing organisations

A wide range of organisations and individuals have contributed to this feasibility study; the detailed list is as follows:

- Clatterbridge Centre for Oncology NHS Foundation Trust
 - i. The Board
 - ii. The Executive Team
 - iii. Departmental heads
 - iv. Clinical Directors and clinicians
- The Royal Liverpool and Broadgreen University Hospitals NHS Trust
 - i. The Chair
 - ii. The Executive Team
 - iii. Departmental heads
 - iv. Clinical Directors and clinicians
- Aintree University Hospitals NHS Foundation Trust
 - i. The Executive Team
 - ii. Clinical Directors
- The Walton Centre for Neurosciences
 - i. The Chief Executive
- The University of Liverpool
 - i. The Vice Chancellor
 - ii. Pro-Vice Chancellor and Dean of the Medical School
 - iii. The Head of the School of Cancer Studies
 - iv. The Director of Estates
- The Merseyside and Cheshire Cancer Network
 - i. Chair of the Board
 - ii. The Lead Team
- Members of the Merseyside and Cheshire Cancer Takforce
- North West SHA
 - i. The Chief Executive
 - ii. The Director of Public Health
- Members of a proposed Expert Panel for research
 - i. Professor Sir Alex Markham
 - ii. Professor Peter Selby
 - iii. Professor David Cameron
 - iv. Professor Mike Richards
- Cancer Research UK
 - i. Senior members of staff in the Centres programme



FEASIBILITY STUDY by Mark Baker and Roger Cannon

RELOCATION OF NSO SERVICES FROM
CLATTERBRIDGE TO LIVERPOOL
10 April 2008
Presentation to the Project Steering Group



PROJECT PLAN

TASK FORCE
MILESTONE
DATES

- **STAGE 1** 10th April 2008
 - Collect background information
 - Visit sites (ongoing)
 - Interview range of senior University and NHS colleagues
 - Consult "Expert Reference Group"
 - Consider content of draft CRUK bid
 - Report initial findings to Project Steering Group



Initial issues emerging

- Significant but not universal agreement on a transfer of NSO
- Access to services is limited by location of the centre
- Centre lacks ICU
- Lack of academic leadership in NSO compromises research performance, site specialisation and overall quality of care



Further issues

- Opportunities for integrated solutions with the University are emerging
- Advanced thinking about implementation of NRAG
- Strong feelings about retaining a single inpatient facility
- Strong support for research proposals from independent experts



Key drivers for change (1)

- The desire to strengthen the research effort and enhance the acquisition of knowledge for the benefit of local patients
- Improving access to treatment and to clinical trials
- Increase site-specialisation in oncology
- Safety and outcomes of care



Drivers for change (2)

- Meet new cancer treatment targets (31 days for all treatments)
- Implement NRAG capacity proposals
- Improve alignment of the key treatment modalities for many cancers
- The need to reduce inequalities in access and outcomes



Building a comprehensive cancer research centre

- Vertical integration of the key components
 - Colocated basic sciences
 - Leading edge application in diagnostics
 - Translational research capability
 - Close links with industry, City fathers and other key stakeholders
 - Clinical trials unit
 - Site-specialised service delivery model
 - All located together



An expert reference panel

- Initial views sought from Mike Richards, Alex Markham, Peter Selby and David Cameron
- Further views to be sought from CRUK (X2)
- CRN performance is as good as the limitations allow but progress requires academic oncology leadership and a radical reorganisation of cancer research and services in the area



How comprehensive?

- Some experts consider that Liverpool provides a unique opportunity for natural laboratory research into prevention, reducing inequalities and health services research including pathway development and reducing bed utilisation.



PROJECT PLAN

TASK FORCE
MILESTONE
DATES

STAGE 2

- Firm up thinking
- Quantify future demand
- Explore benefits to patients
- Impact on Research
- Identify possible Options/ Model to review
- Work up range of Options
 - Financial/ Viable/ Affordable
- Consider impact on current schemes
 - Satellite provision
 - PFI proposals/ timescales
- Link to CRUK bid content
- Produce Interim findings
 - Report to July task force
- Fit with Cancer Reform Strategy & NRAG guidance

16th July 2008



Preliminary views: vision of cancer services in Merseyside 2020

- All the beds and most of the LINACs should relocate to the RLH/University campus
- RT satellite at Aintree has extended long term potential for specialist use as well as providing basic locally accessible OP treatment
- A small residual satellite retained in the Wirral
- Various options for distribution of LINACs, simulators and physics between the sites



RLH/University campus development

- Not part of RLBUH PFI scheme
- Earlier development possible in whole or preceded by satellite
- Retain CCO brand
- Provide RT, outpatient and inpatient facilities with research and service labs, physics and suggest up to 8 bunkers (1 providing a platform for radiation R&D)
- Potential to link to University 5 year capital plan
- Future footprint for proton therapy development will be available on site



The Aintree satellite

- Need to assess the potential capacity utilisation for routine outpatient RT
- SRS should be included at the outset
- Outpatient oncology for head and neck should also be offered but complex chemoradiation would require inpatient care



Long term demand and response issues

- Incidence likely to rise from 11,000 to 14,000 by 2020
- Use of RT and CT to rise from 40% and 30% respectively to 50% and 50% with total NSO input rising from 50% to 70%
- Oncologist workload likely to drop
- Oncologist numbers will rise from <30 to >50; 60 with academics



PROJECT PLAN

TASK FORCE
MILESTONE
DATES

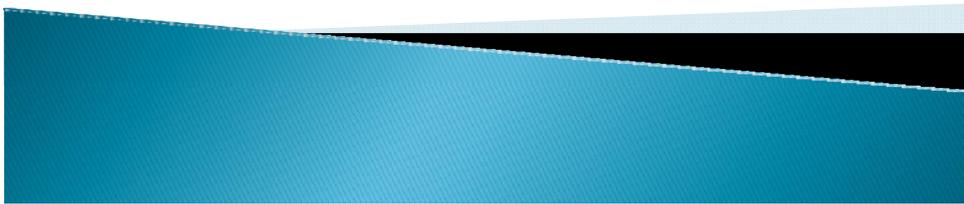
○ STAGE 3

- **Progress Feasibility Study to evaluate agreed Options (max 3) CRUK links/ University strategy including Strategic fit, Clinical and Research benefits, Patient benefits, broad financial costs of shift in saving**

15th October
2008

Report to the Cancer Taskforce 16th July 2008

Mark Baker and Roger Cannon



Firmed up thinking

- ▶ Have met executive teams from the three Trusts (RLHBUH, AUH, CCO) and the University
- ▶ Further discussions with CRUK
- ▶ Specific focused questions posed and replied
- ▶ Broad agreement on principles and shape
- ▶ Further work required to refine options and timing
- ▶ Lack of clarity over university intentions



Clinical care models

- ▶ Clinical pathways are mainly dependent on oncologists
- ▶ Patient pathways are not well defined
- ▶ Service model appears robust
- ▶ Oncology site specialisation driven by medical oncology but lacks academic leadership
- ▶ Specialist surgical oncology is fragmented
- ▶ Organisational framework is an obstacle to integrated cancer care



An activity model for the future

- ▶ Population needs
- ▶ Facilities required to meet those needs
- ▶ Clinical care workload arising from those needs
- ▶ Workforce implications
- ▶ Current efficiency and utilisation of fixed facilities (beds and LINACs) is quite good



Quantified future RT demand for 2017

- ▶ Population served will be approx. 2.4 m.
 - MCCN 2.16
 - IoM 0.08
 - Flintshire 0.15
- ▶ Treatments per million in 2016 (NRAG) 54K
- ▶ Treatments per LINAC (NRAG) 8.7K
 - =LINACs per million = 6.2
- ▶ NRAG compliant capacity 14.9
- ▶ Adjusted capacity required (@85%) 12.7
 - Total, incl. Research, 13.7 = 14



Suggested location of LINACs

- ▶ RLH 7 + 1 research
- ▶ Aintree/Walton 4 incl. SRS
- ▶ CCO/Wirral 2

based on a linked centre at Aintree/Walton campus and basic satellite service on the Wirral

Further work is required to define the scope and likely volumes for SRS treatments as an integral part of the new linked centre.

Inpatient beds (total)

- ▶ Current provision is 88 at 71% occupancy
 - Increase occupancy to 80% (-10)
 - TYA unit (+4)
 - Trials unit (+8)
 - Improved access (+12)
 - Growth in demand (+8)

- ▶ Overall requirement is 110
- ▶ Proposed 86 at RLH; 24 at Aintree/Walton

Excludes demand for critical care at RLH and reduced demand for medical admissions



Options and Models

- ▶ 8 options evaluated including high level schedules of accommodation
- ▶ Options included various combinations of RLH, Aintree/Walton and the Wirral
- ▶ 2 options have been capital costed



2 worked up potential options

- ▶ RLH (110 beds, 26 DC stations, 20 OPD rooms, 8 LINACs)
 - 25,170 sq. mtrs.
 - £110m – £135.8m
 - Excludes major equipment (c.£15m) and car parking

- ▶ Aintree/Walton (4 LINACs and OPD only)
 - 4,334 sq. mtrs.
 - £20.3 – £27.7m
 - Excludes major equipment (c.£6m) and car parking



Impact on current schemes

- ▶ Aintree “satellite” to be developed into a new linked centre role at Aintree/Walton providing main base for SRS, CNS and head and neck oncology together with outpatient work for lung, breast and prostate and palliation; beds integrated with haemato-oncology
- ▶ Main base for oncology to move to RLH; Scale, source of funding and timing determine the need for an interim Satellite at RLH
- ▶ Separate from the RLH PFI scheme
- ▶ Capability to sustain scale of programme is questioned
- ▶ Compatibility with Monitor rules is also an issue
- ▶ Location of oncology units on the sites is uncertain



Further work required

- ▶ Service model and capacity for the link centre at Aintree/Walton
 - ▶ Chemotherapy DC and OP activity and capacity requirements
 - ▶ Workforce implications of activity and service model
 - ▶ Revenue impact of service model and activity changes (estimated order of cost c. £25m), timed to match capital developments incl. additional oncologists
 - ▶ Refine capital options incl. LU requirements if any
- 

Benefits for patients

- ▶ Improved access to more specialised NSO treatments
 - ▶ Better treatment decisions with critical care requirement
 - ▶ Improved clinical management of patients with multiple needs
 - ▶ Improved synergy with other treatment modalities
 - ▶ More patients being offered treatment
 - ▶ Improved access to clinical trials
 - ▶ All leading to improved outcomes
- 

Impact on research capability

- ▶ Research and treatment are closely interlinked for cancer patients
- ▶ Strengthens clinical research potential
- ▶ Provides ideal environment for academic leadership in oncology
- ▶ Strengthening specialised cancer care and early access to new therapies
- ▶ Enables Cancer Research Centre to operate at the clinical interface



CRUK proposal

- ▶ Focused on existing strengths
- ▶ Very likely to succeed eventually
- ▶ Requires greater university engagement on public health research, compatibility with five year plan and organisation of basic sciences
- ▶ NHS commitment (to targets) is implausible and they are a hostage to fortune
- ▶ NHS need is for broadly based academic strength and leadership in oncology



Interim findings

- ▶ Centre at RLH; Linked Centre at Aintree/Walton; Satellite at Wirral
- ▶ Service change is crucial to promote research and improved quality and safety of care and access
- ▶ Delivers national targets and expectations
- ▶ Relocation is essential to deliver NW Cancer Strategy



Risks

- ▶ Corporate behaviour
- ▶ Monitor rules/special arrangements required for CCO ownership
- ▶ Affordability – capital and revenue
- ▶ Competition for preferred sites for developments
- ▶ Uncertain procurement path
- ▶ Consequential delay
- ▶ University engagement (beyond School of Cancer Studies)



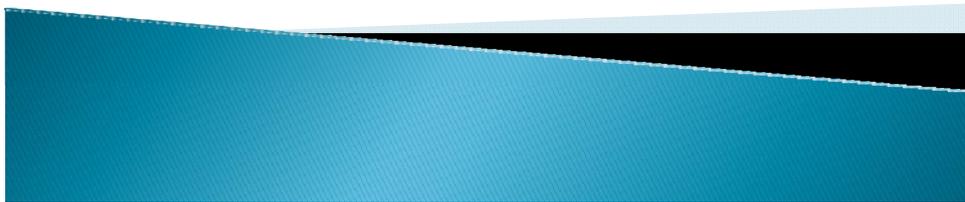
Outcomes from Taskforce meeting

- ▶ Agreement with the interim findings
- ▶ Agreement to proceed with Stage 3
 - Evaluation of (3) agreed options
 - Strategic research developments and their location
 - Exposition of benefits for patients, services and research
 - Detailed financial summary of the proposals
- ▶ Produce final report for Taskforce on 15th October 2008



Feasibility study

Report to stakeholders
16 September 2008



Main conclusions

- Clatterbridge site is inappropriate setting for oncology centre in the longer term
- Current configuration is compromising service delivery now
- Research interests require an inpatient setting at the RLH/University site
- Surgical configuration is an insurmountable obstacle but oncology can relocate to improve synergy and team development
- Twin site centre provides the best fit but is not supported by current oncology leadership



Option appraisal

- ▶ Of nine options, the best three were:
 - Main base at RLH with linked centre at AUH and satellite at CCO
 - All inpatient beds at RLH with satellites at AUH and CCO
 - Inpatient radiotherapy at AUH with academic oncology at RLH and satellite at CCO
- ▶ For a short term scheme, all beds at RLH seems the only deliverable option



Contingency plans

- ▶ If an early scheme is not feasible:
 - Need to develop Level 2 critical care at CCO with support from an outreach team for Level 3 care
 - Propose the development of radiotherapy satellites as previously planned
 - Support the development of an academic unit of medical oncology at RLH
- ▶ Retain live plans for major scheme in case economic circumstances offer opportunity for major public capital investment



Critical care at CCO

- ▶ Not feasible to have medically led facility
- ▶ Nursed HDU beds (2) with professional support and outreach service from the critical care unit at either Arrowe Park or RLH
- ▶ Require agreement on clinical governance and responsibility for these patients



Satellite radiotherapy

- ▶ Proceed with the Aintree satellite with SRS facility.
- ▶ Favour a 4 LINAC solution as it will drive greater localisation of care
- ▶ Prefer to retain option for developing into a linked centre in due course
- ▶ Suggest use of a temporary building for satellite at RLH, adjacent to LMC, and may limit to 2 LINACs



Academic oncology

- ▶ Must have inpatient beds and be based at RLH
- ▶ Could be provided by RLBUH or by CCO
- ▶ Should be provided in existing estate and linked with haematology if possible
- ▶ Offices and teaching facilities may require temporary buildings or use of LMC block
- ▶ Requires at least three senior staff for minimum 14 beds; preferably four to five senior staff for 20 beds – could be developed in phases
- ▶ Consultants should be university employed and have honorary contracts with both RLH and CCO



Major scheme

- ▶ If scheme follows interim arrangements, preference is for linked centre
- ▶ Main base must move to RLH campus first
- ▶ Site adjacent to RLH PFI scheme seems the best option
- ▶ Location of academic and teaching offices remains unresolved



Development of academic department

- ▶ Needs both synergistic research focus and breadth of coverage
- ▶ Senior academic interests in the common cancers is vital to realising NHS benefits
- ▶ For best results, needs joint approach from University, RLH and CCO (and potentially LWH and LCHH)
- ▶ Might consider role in TYA
 - Should be at RLH alongside haematology
 - Should be in the city of Liverpool with paed. onc.



Appendix 4 Support from NHS Stakeholders

A key part of the study has been securing the commitment of NHS stakeholders and as part of the exercise we specifically asked the three main Trusts a series of questions during May 2008 to determine their support for the likely changes. The questions and the replies obtained are detailed below.

The Clatterbridge Centre for Oncology NHS Foundation Trust

Question	Answer
Is there agreement from the CCO Board to the vision outlined in this presentation (equivalent to 10 April (Appendix 3)?	Yes as presented
Is the Board prepared to promote the vision and its consequences to key political interests?	Yes as presented
What is the minimum requirement for radiotherapy capacity by 2011? I am assuming that we are looking for 12 LINACs achieved through a satellite at Aintree and possibly some partial relocation from CCO to RLH	This required further detailed work to ensure that there was not under or over capacity. Recommendation that this work happens before the July Taskforce meeting. That said, 12+ LINACs seemed a good starting point. LINACs for Wirral patients would need to continue to be provided on the Wirral.
What is the realistic demand for radiotherapy and how does this translate into LINAC requirement? My view is that a conservative approach beyond 2011 is worth considering given the potential for efficiency and uncertainty over the translation of NRAG assumptions to the North West.	Again more work required for the July Taskforce meeting. Agree with a conservative approach being taken as the starting point.
What. In terms of oncology service shifts, is most pressing in order to strengthen research?	Again more work required to determine chemotherapy focus. However drug research should not prevent consideration of other research opportunities such as radiotherapy and social sciences (early presentation/lifestyle influences on cancer)
If a satellite radiotherapy unit is developed at the RLH site, is it best to use a conventional satellite model adjacent to the Linda McCartney Centre, a more temporary building or should it be treated as Phase 1 of a major scheme?	CCOs preferred option is to see the relocation of the cancer centre to Liverpool without an interim step which would see the creation of a stand alone LINAC service on the Royal/University campus.
Is there a view from Monitor on the current proposals? Is there a contact we could discuss our ideas with?	CCO will contact Monitor to look at how a business model could be approached- this would be required given the size of the capital investment required and the need to find a way to inject purchaser

	capital. There was a view that Procure21 would be a preferred route if this proved possible.
Is the Board willing to work with us in developing and testing the feasibility of options for relocation?	Yes as presented

The Royal Liverpool and Broadgreen University Hospitals NHS Trust

Question	Answer
Does the Executive team of the RLBUH support the vision of a CCO-run Cancer Centre described in this presentation, separate from the RLH PFI scheme?	<p>Yes. The clinical staff at the Royal have tremendous enthusiasm for and expertise in the diagnosis and treatment of cancer and cancer is very much part of the ‘core business’ of the Trust.</p> <p>There have been enormous changes within the Trust over the last 12 months or so with a new Chairman, Chief Executive, Cancer Manager, Cancer Lead and Executive Lead for cancer. All see cancer as central to the business of the Trust as it goes forward for Foundation status. The Trust also sees the current review as an opportunity to work collaboratively with CCO to provide a world class cancer centre in Liverpool for the population of Merseyside and Cheshire.</p> <p>The Trust sees both the PFI build and a new cancer centre as affording tremendous opportunities which should be grasped. We look forward to working with CCO in delivering a new cancer centre on the site.</p>
Are you happy with the solution to oncology location on or close to your site?	<p>Yes, indeed we would see it as absolutely central to the provision of really good quality cancer facilities that the oncology services are located in close proximity both to the Royal and the University.</p> <p>The benefits and opportunities which the review potentially affords are also dependent upon any new oncology location being not only close to the Royal but having a physical connection with the hospital. We have the opportunity for improving the care for cancer patients and this must include real and effective access to critical care beds as well as being in closer proximity and having access to both Phase 2 and Phase 3</p>

	clinical trials and close collaboration with the translational researchers of the University.
Are you happy with the evolving research interfaces?	<p>Research has to be at the heart of any cancer centre and the advantage of the RLUH site for a cancer centre is the opportunities that this affords for research in collaboration with the University. This research must be multi faceted taking in basic science, translational research and Phase 2 and 3 trials.</p> <p>The recognition of the importance of cancer research by the university and the creation of the School of Cancer Studies is an important first step in this process. There have been a number of successes already in that Liverpool has been designated as an Experimental Cancer Medicines Unit by CRUK, haematology has traditionally been an area of strength for research by the University and, the Trust and the recent CRUK bid, if successful, will further improve the research base and collaboration. In the last month, the Trust has been designated as a Pancreatic Digestive Biomedical Research Unit.</p> <p>We feel that there has been a good start and with progress over the last 3 or 4 years which provides a good basis on which to build going forward.</p>
How crucial is the total integration of radiotherapy and chemotherapy on a given site? For example, is there a future for day case chemotherapy in the Linda McCartney Centre if the main base moves to the RLH/University campus?	<p>In the development of modern cancer services there is a key balance to be struck between services close to home or even in the community or at home versus the centralisation of services. This balance is key to the development of a new cancer centre.</p> <p>One of the benefits of a cancer centre development would be to deliver a critical mass of radiation oncologists, surgical oncologists, clinical triallists, basic researchers and scientists in one place. Our expectation therefore would be that the activity that currently takes place in the Linda McCartney Centre would transfer to the new cancer centre and become part of this critical mass of interacting clinicians and researchers.</p>
Is there a solution for the reprovision of	All the facilities in the Duncan Building

<p>facilities in the Duncan Building?</p>	<p>are planned to be reprovided in either the new hospital or in a new University research building planned for their site on West Derby Street.</p>
<p>What, in terms of oncology shifts, is most pressing in order to strengthen the research agenda?</p>	<p>There has been a change in the relationship between the clinicians at Clatterbridge and the University and the Royal in the last six months. The relationship and appetite for collaboration and working together to improve cancer care in Merseyside and Cheshire has made a significant move forward. This spirit of collaboration is fundamental. Recruitment of a high profile individual to the Chair of Oncology is the most pressing issue. This will require agreement across organisational boundaries on the way forward including on the service model for patient cancer services and the location of the cancer centre and its satellites. There needs to be increasing clinical and research collaboration and discussion to mould and shape this agenda based on the results of your recommendations and report.</p>
<p>If a satellite radiotherapy unit is developed at the RLH site, is it best to use a conventional satellite model adjacent to the Linda McCartney Centre, a more temporary building or should it be treated as Phase 1 of a major scheme?</p>	<p>This is not an easy question to answer and is in part dependent on the recommendations of your report. Fundamentally this question should be answered on the basis of the aspirations by Clatterbridge and the Royal to build a world class cancer centre and the principles that therefore follow from this collaboration and aspiration. It is more important to get this right rather than necessarily to do this quickly. Given the collaboration of the Royal and CCO this is entirely possible. A number of options are being examined in some detail. Some of the key issues being considered in the option appraisal include: size of facility (3 or more LINACs), whether the location is suitable in the short or long-term or both, physical link to the hospital, timing to construction start on site, site constraints for either the radiotherapy facility, a new cancer hospital or the Royal PFI scheme, the capital cost and revenue consequences,</p>

	<p>the implications of business case requirements, the procurement route. The option appraisal is due to be completed shortly.</p> <p>It is worth mentioning at this point the huge potential of the hospital site and its immediate surroundings, as an important area within the knowledge quarter, to contribute significantly to the knowledge economy of the City. This is recognised by NWDA and Liverpool Vision.</p>
<p>Has any consideration been given to service realignments in the event of a cancer centre development on the campus, e.g. involving haematology, intrathecal chemotherapy or surgical oncology?</p>	<p>Not yet. The focus has been on maintaining the momentum in planning a replacement for the existing Royal. For this departmental relationships have been key though almost equally important has been ensuring the adaptability of the building to inevitable service development and reconfigurations. Once again the answer to this question is dependent upon real collaboration between the Royal and Clatterbridge and the timing of the decisions around the siting of the new cancer centre. It is envisaged that a Clinical Steering Group would be formed to look at service re-alignment and service reconfiguration around the provision of cancer services. This would involve discussions around diagnostic imaging, surgical oncology and haematology and intrathecal chemotherapy.</p>

Aintree University Hospitals NHS Foundation Trust

Question	Answer
<p>Does AUHFT support the proposed radiotherapy satellite unit development to be built and run by CCO?</p>	<p>This Trust fully supports the establishment of a CCO-run satellite radiotherapy unit on the University Hospital Aintree campus.</p>
<p>Does AUHFT support the extended use of a satellite radiotherapy unit on the site to provide stereotactic radiosurgery (for the Walton Centre) and potentially inpatient care including chemoradiation for head and neck cancer?</p>	<p>We would be happy for the service to provide SRS and potentially inpatient care, including chemoradiation for head and neck cancer.</p>
<p>Will there be support for such a development from haematology?</p>	<p>The suggestion that the service could be supported by haematology is one that we would welcome and would want to progress.</p>

<p>If so, what are the implications for the location of the satellite unit on the campus?</p>	<p>The site implications of locating a satellite facility at Aintree are still being investigated but a good deal of work has already been undertaken and our Director of Estates is confident that all the requisite services can be provided as part of the project.</p>
<p>Has agreement been reached with CCO on the timing of the satellite and service level agreement arrangements?</p>	<p>Discussions are taking place with CCO regarding the SLA but we do not envisage any significant difficulties. Effectively this is a service we already provide to other healthcare providers on the campus.</p>

Appendix 5 Option Appraisal

Table 1; The options

Option reference number	Description of option
1	Do nothing
2	Current provision at CCO plus planned satellite radiotherapy units at Aintree and RLH
3	Current provision at CCO plus a link oncology centre at Aintree and a satellite radiotherapy unit at RLH
4	Main oncology facility moves to RLH site with a link oncology centre at Aintree and a satellite radiotherapy unit at CCO
5	Main oncology facility moves to RLH with satellite radiotherapy units at Aintree and CCO
6	Main oncology facility moves to Aintree with satellite radiotherapy units at RLH and CCO
7	Main oncology facility moves to Aintree with a link centre for chemotherapy (academic unit) and a satellite radiotherapy unit at RLH and a radiotherapy satellite unit at CCO
8	Development of CCO provision to include high dependency care with a link centre at Aintree and a satellite radiotherapy unit at RLH
9	Development of CCO provision to include high dependency care with a link centre for chemotherapy (academic unit) and a satellite radiotherapy unit at RLH and a satellite radiotherapy unit at Aintree

Table 2; The criteria and their weighting

Criterion number	Non-financial criterion	Weighting applied
1	Patient access - public transport, car parking etc.	10
2	Clinical safety - access to acute services including critical care	20
3	Recruitment and retention of staff	5
4	Compatibility with strategic drivers	10
5	Local environment	5
6	Research and academic links	15
7	Future site development	5
8	Colocation of clinical and medical oncology and improved MDT arrangements	5
9	Reduced patient travel times	10
10	Clinical synergy with other treatment modalities and specialist teams	15

Table 3; Options table matrix

Option no.		Criterion 1	Cr 2	Cr 3	Cr 4	Cr 5	Cr 6	Cr 7	Cr 8	Cr 9	Cr 10	Weighted score	Rank
	Weighting	10	20	5	10	5	15	5	5	10	15		
1	Score	2	1	5	2	6	2	3	3	2	1		
	Weighted score	20	20	25	20	30	30	15	15	20	15	210	9
2	Score	4	1	5	4	6	2	3	3	4	2		
	Weighted score	40	20	25	40	30	30	15	15	40	30	285	8
3	Score	4	2	5	4	6	3	3	4	4	4		
	Weighted score	40	40	25	40	30	45	15	20	40	60	355	7
4	Score	6	6	5	5	4	5	5	5	6	6		
	Weighted score	60	120	25	50	20	75	25	25	60	90	550	1
5	Score	6	6	5	5	4	6	5	4	5	4		
	Weighted score	60	120	25	50	20	90	25	20	50	60	520	2
6	Score	6	6	5	4	5	2	5	4	5	4		
	Weighted score	60	120	25	40	25	30	25	20	50	60	455	4
7	Score	6	6	5	4	5	5	5	3	5	5		
	Weighted score	60	120	25	40	25	75	25	15	50	75	505	3
8	Score	4	3	5	4	6	2	3	4	4	4		
	Weighted score	40	60	25	40	30	30	15	20	40	60	360	6
9	Score	4	5	5	5	5	4	4	3	4	5		
	Weighted score	40	100	25	50	25	60	20	15	40	75	450	5

Appendix 6 Capital and revenue costs

The service profile and facilities for the schemes associated with Option 5 would be as follows:

New Centre for Clinical Oncology

Based at the Royal Liverpool Hospital site and planned to be adjacent to the proposed redevelopment of the RLH, the building would include:

- 110 inpatient beds (including any academic clinical facilities which predate the scheme)
- 8 Linear Accelerators (7 for NHS use, 1 for research)
- 26 Chemotherapy treatment stations
- 12 Treatment rooms/consultant rooms
- 8 outpatient department rooms
- 1 outpatient theatre

A full range of other supporting facilities for NHS and academic use will also be provided and these are listed in full in Appendix 6.

The detailed content will be finalised at Strategic Outline Case stage.

Satellite unit – Aintree Centre

The existing plans for a 3 LINAC satellite unit should be expanded to a 4 LINAC solution to include stereotactic radiosurgery treatments in partnership with the Walton Centre for Neurosciences. The proposed service profile for the treatments given by this satellite unit should be extended to include radical treatment for breast, lung and prostate cancers and palliative radiotherapy. If possible, and with the use of patient hotel facilities, some head and neck radiotherapy may also be given.

The consolidation of oncology outpatient clinics within the satellite unit should be seriously considered and for the purpose of this study they have been included in the schedule of requirements, transferring demand from elsewhere at Aintree. The use of the Marina Dalglish Centre (for chemotherapy) should be substantially expanded to improve local access to treatments and to complement the radiotherapy facilities.

Satellite unit – CCO/Wirral

With the above developments taking place, we suggest that a local (satellite) radiotherapy service should be maintained on the Wirral peninsular either at the existing CCO site or elsewhere. For the purposes of this study, we have assumed that a 2 LINAC unit will be retained at CCO in Clatterbridge.

Affordability - capital and revenue costs

The relocation of non-surgical oncology from Clatterbridge to Liverpool will inevitably require substantial funding, not only in Capital to fund the infrastructure but also in revenue funding to pay for the consequences of the capital funding, the improved standard of accommodation and the substantial expansion of services which is proposed.

Capital costs

A set of capital costs have been developed for Option 5, i.e. Main oncology facilities move to RLH with satellite radiotherapy units at Aintree (4 LINACs) and Clatterbridge (2 LINACs).

In calculating the capital costs, assumptions have been made in the contents of each scheme and the additional cost of equipment etc. A range of capital costs have been derived using standard NHS formula i.e. H3N areas in sq.m. plus notional cost allowances. An alternative methodology has also been used to provide a range of costs given that all new buildings would be subject to efficiency gains - see Appendices 5 and 6. The estimated capital costs of retrenchment at CCO are based on their estimates.

The resultant capital costs can be summarised as follows:

Table: High Level Capital Costs (£m)

	Royal Liverpool Hospital		Aintree University Hospital		Clatterbridge Centre for Oncology
	High	Low	High	Low	
Construction	118.1	107.0	27.7	20.3	4.5
Car parking	2.5	2.5			
Major equipment	17.0	17.0	5.5	5.5	
Total	137.6	126.4	33.2	25.8	4.5

Note 1: Priced @ FP MIPS 530

Note 2: The figures assume that reductions in space requirements can be achieved through the maximum use of locally owned facilities for chemotherapy delivery.

Note 3: The included university requirements for education (200 sq m) and research (750 sq m) are subject to review.

Note 4: The equipment costs assume that the fourth LINAC at Aintree is a Novalis TX system to provide a stereotactic radiosurgery service and that some existing equipment is transferred from CCO to either new site.

Note 5: An OB1 has been provided by CCO costed at £4.5m but this is based on demolition of many existing buildings which we consider to be an unlikely outcome.

We believe that these costs could therefore be considerably reduced through the re-use of existing facilities for other purposes.

Revenue costs

Additional revenue costs will be incurred for three reasons:

- Revenue costs arising from the capital cost of relocation of services
- Funding the expansion of services and associated activity
 - Additional LINACs and radiotherapy activity
 - Additional beds
 - Increased chemotherapy activity
- Funding improvements in the quality of care including more consultant appointments to enable site-specialisation, critical care etc.

The costs identified are a combination of staff and non-staff and are based on information submitted by the statutory organisations; we estimate the additional revenue costs to be:

▪ Additional clinical oncologists		
○ 6 @ £125K each		£0.75m
▪ Academic medical oncology team		
○ Initially 3 @ £125K		£0.375m
Rising to 5	(£0.625m)	
▪ NHS medical oncologists		
○ 2 @ £125K		£0.25m
▪ Academic support staff	(est)	£0.5m
▪ Expansion of LINAC capacity (to 13 for NHS use)		£3.8m
▪ Additional non-staff costs of new facilities, e.g. energy, rates etc		£2.6m
Less existing costs at Clatterbridge, say		-£1.0m
▪ Expansion of beds to 110		£0.9m
▪ Cost of capital		£11.38m
 Total additional revenue required		 £19.555m

These costs will need to be funded through PbR (for additional activity) - approximately £10m - together with enhanced cost arrangements which will have to be agreed with commissioners. Growth in drug costs will be additional.

Royal Liverpool Hospital site for the major Oncology Centre

Area / Function	Basis of Calculation / Assumption	Departmental m2
Ward Block - 110 beds approx	2 no. 24-bed wards plus 2 no. 32-bed wards @ 100% single rooms per HBN04. Includes teenage / young adult unit, "acute" transfers and 6-8no. research beds	4,540
Chemotherapy Unit - 14 additional treatment stations	26 treatment stations in total, but only 14 additional to allow for full utilisation of existing Linda McCartney and Marina Dalglish unit (potential issue regarding expansion physical capacity of Linda McCartney unit to 26 in total or provision of 2 Chemo day units not being co-located on the Royal site) based on areas from HBN54 - compare with existing CCO provision 960m2	450
Outpatient Accommodation - On-Treatment Review - 12 consulting rooms	12 consult / exam room suite per HBN12	955
Outpatient Accommodation - Other - 4 additional consulting rooms	4 consult / exam room suite per HBN12 pro-rata. Reduced from 8 rooms on the assumption that fuller usage could be made of existing OP facilities at Royal Liverpool and Aintree	320
Radiotherapy Facilities - Linear Accelerators 8 no. including 7 no. NHS and 1no. research linacc	8 linaccs @ 1,040m2 for suite of four per Leeds drawings inclusive of reception, wait, change and support accommodation	2080
Radiotherapy Facilities - HVX / MVX - 2no.	2 orthovoltage suites @ 100m2 per suite as per Leeds drawings	200
Radiotherapy Facilities - Physics (Workshops etc)	640m2 based on current CCO provision	640
Operating Theatre Facilities	1no. Theatre plus HDR, floor area assumed to be equivalent to current CCO i.e. 185m2 as no HBN measure available for 1no. theatre.	185
Diagnostic Imaging - MR	1no MR suite as per HBN6	244
Diagnostic Imaging - CT	1no CT suite as per HBN6	168

Diagnostic Imaging - Ultrasound	1no Ultrasound suite as per HBN6	53
Diagnostic Imaging - Nuclear Med	1no Nuclear Med suite as per HBN6	165
Diagnostic Imaging - Plain Film	2no. rooms pro-rata from HBN6 - seems very excessive?	421
Diagnostic Imaging - PET-CT	1no PET-CT - no relevant HBN so assumed worst case scenario - same area and costs as MR scanner suite from HBN6	244
Therapy Support	Assumed same floor area as CREST @ CCO = 670m2	670
Pharmacy	Assumed inpatient dispensing pharmacy from HBN29 - 494m2 (current CCO area 462m2)	494
Trust HQ	Assumed 250m2 office accommodation	250
Corporate Services (HR/Finance/IM&T/Estates)	Assumed 700m2 as per current CCO accommodation	700
Medical Records - Library	Assumed 435m2 per HBN47 (note: current CCO med recs accommodation 650m2 including library and offices)	435
Medical Records - Office / Workstations	Assume 25 workstations as per HBN47	315
Main Entrance / Reception	Assume approx 200m2 as per satellite (current CCO 170m2)	200
Education / Academic Unit	200m2 of offices rooms per HBN42	200
Research Facilities	Offices and seminar rooms - assume 750m2 (CCO existing = 670m2)	750
Staff Change / Rest Facilities	Assume 275m2 per HBN41 - allows for 300 staff change, plus say 125m2 for staff rest rooms x4no.	400
Office / Meeting / IT Hub Rooms etc	General office and meeting room accommodation not allowed for in the above areas - say 250m2	250
		15,329

Total Departmental Area		15,329
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Planning Allowance (from HBN54)	5%	16,095
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Engineering Allowance (from	3%	483
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HBN54)		
Circulation Allowance	33%	5,311
Total Area		21,890

<i>Total cost estimate for the above, based on 2008/09 price base (MIPS 530):</i>	118,117,545
<i>Add:</i>	
<i>Car parking (350 spaces @ £7k each)</i>	2,500,000
<i>New additional equipment (6 linacs, Planning, 2x CT-Sim, PET:CT, Misc imaging)</i>	16,600,000
<i>Capitalise cost of transferring existing equipment</i>	350,000
<i>Land (assume provided with long-lease @ peppercorn rent)</i>	0
<i>Total</i>	137,567,545

ALTERNATIVE CALCULATION

Take existing estate at CCO (+ some additional m2 to recognise current accommodation pressures) and add/subtract major incremental changes

Once new area derived cost up at Rider Hunt average cost per m2 (excluding future inflation) of £5,395.

The existing estate to be re-provided at Royal Liverpool under this option = 19,000 m2 (approx)

The extra space required as a result of this option can be defined as: (areas shown include allowances for planning and circulation)

	<i>m2</i>
<i>Research</i>	80
<i>22 beds</i>	1,000
<i>Offices</i>	100

6 cons/ exam	200	
2 linacs now included at Aintree	-1,000	
1 simulator now included at Aintree	-200	
1 PET CT	250	
Increase main entrance	200	
Education / Academic Unit	200	
Total extra area	830	
Total revised area =	19,000 m² + 830 m² = 19,830 m²	
Total rate £/m² as Rider Hunt cost forms (excluding inflation)	£135.8m / 25,170 m² = £5,395/ m²	
Indicative cost for new option =	19,830 m² @ £5,395/m² =	106,982,850
	Add:	
	Car parking (350 spaces @ £7k each)	2,500,000
	New additional equipment (6 linacs, Planning, 2x CT-Sim, PET:CT, Misc imaging)	16,600,000
	Capitalise cost of transferring existing equipment	350,000
	Land (assume provided with long-lease @ peppercorn rent)	0
	Total	126,432,850
Range of cost for the option: (excluding inflation and disposal of existing CCO site)	Upper limit (including equipment & carparking)	£137.6 m
	Lower limit (including equipment & carparking)	£126.4 m

Aintree Satellite

Area / Function	Basis of Calculation / Assumption	Departmental m2
Ward Block	Not Included	0
Chemotherapy Unit	Not included - already provided within Marina Dalglish Centre at Aintree	0
Outpatient Accommodation - On-Treatment Review - 6 consulting rooms	6no. consult / exam room suite per HBN12	543
Outpatient Accommodation - Other	6 consult / exam room suite per HBN12	543
Radiotherapy Facilities - Linear Accelerators 4 no.	4 linaccs @ 1,040m2 for a suite of four per Leeds drawings inclusive of reception, wait, change and support accommodation	1,040
Radiotherapy Facilities - HVX / MVX	Not included	0
Radiotherapy Facilities - Physics	Minimal allowance for office and technical area say 50m2	50
Operating Theatre Facilities	Not Included	0
Diagnostic Imaging - MR	Not Included	0
Diagnostic Imaging - CT	Not Included - assumed in CT-Sim above if required	0
Diagnostic Imaging - Ultrasound	Not Included	0
Diagnostic Imaging - Nuclear Med	Not Included	0
Diagnostic Imaging - Plain Film	Not Included	0
Diagnostic Imaging - PET-CT	Not Included	0
Therapy Support	Assumed sessional use of OPD rooms so not included separately	0
Pharmacy	Not Included	0
Trust HQ	Not Included	0
Corporate Services (HR/Finance/IM&T/Estates)	Not Included	0
Medical Records - Library	Not Included	0
Medical Records - Office / Workstations	Not Included	0
Main Entrance / Reception	Assume approx 200m2 as per satellite (current CCO 170m2)	200
Education / Academic Unit	Not Included	0
Research Facilities	Not Included	0

Staff Change / Rest Facilities	Say 150m2 maximum similar to Aintree satellite - M/F staff change plus seminar / staff rest room	150
Office / Meeting / IT Hub Rooms etc	Minimal allowance for consultant, resident doctor, junior doctors and centre manager / head radiographer - say 100m2	100
		2,626

Total Departmental Area		2,626
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Planning Allowance (from HBN54)	5%	2,757
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Engineering Allowance (from HBN54)	3%	83
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Circulation Allowance	33%	910
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Total Area		3,750
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Total cost estimate for the above, based on 2008/09 price base (MIPS 530): **27,711,056**

Add:

Car parking (assume provided by host) 0

New additional equipment (1 linacs + 1 SRS, 2x CT-Sim) 5,500,000

Land (assume provided with long-lease @ peppercorn rent) 0

Revised total: 33,211,056

ALTERNATIVE CALCULATION

Take existing satellite plan and add major incremental changes

Once new area derived cost up at Rider Hunt average cost per m2 (excluding future inflation) of £6,520.

The present scheme at Aintree is based on 1,800m2 with a capital cost of £12.2m

The extra space required as a result of this option can be defined as:

Area for 1 extra linac	500 m ²	
Area for 16 extra consult/ exam rooms	200 m ²	
Area for extra CT scanner	200 m ²	
Sub total	900 m ²	
Add 5% planning	45 m ²	
Add 33% circulation	297 m ²	
Total extra area	1,242 m², say 1250 m²	
Total revised area =	1,871 m ² + 1,250 m ² = 3,121 m ²	
Total rate £/m ² as latest scheme =	£12.2m / 1,871 m ² = £6,520/ m ²	
Indicative cost for new option =	3,121 m ² @ £6,520 /m ² =	20,348,920
Add:		
Car parking (assume provided by host)		0
New additional equipment (1 linacs + 1 SRS, 2x CT-Sim)		5,500,000
Land (assume provided with long-lease @ peppercorn rent)		0
Revised total:		25,848,920
Range of cost for the option:	Upper limit (including equipment & carparking)	£33.2 m
	Lower limit (including equipment & carparking)	£25.8 m

Royal Liverpool University Hospital site - Cancer Centre development - Assumptions

- 1 To be constructed at Royal Liverpool University Hospital site adjacent to the Linda MacCartney Centre
- 2 No allowance for demolitions, decanting, relocation of car parking etc - to be borne by host NHS trust

Aintree University Hospitals / Walton Centre site - Cancer Centre development - Assumptions

- 1 To be constructed on Walton Centre car park at University Hospital Aintree with bridge / corridor link to Walton Centre building

- Assume programme to be as per current proposed Aintree satellite centre development
- 2

- No allowance for costs of reproviding car parking etc - to be borne by host NHS trusts
- 3

General Assumptions - both projects

- 1 No land costs to CCO - assume land transferred at nil premium or long lease at peppercorn rent from host NHS trust
- 2 Assume 15% for professional fees
- 3 Assume 10% planning contingency
- 4 Assume 22% optimism bias for both projects
- 5 Assume 10% for equipment costs - excludes major equipment e.g. linacs, CT-sim, MR/CT scanners etc

- 6 Rider Hunt to advise on appropriate on-cost allowance for each scheme
- 7 Assume both projects publicly-funded and delivered via ProCure21 route
- 8 All costs shown at 2008/09 price base

Appendix 7 Equipment

RELOCATION OF CCO

MAJOR MEDICAL EQUIPMENT - ADDITIONAL EQUIPMENT ONLY

	Unit Cost £m	ROYAL		AINTREE		TO
		Units	Total Cost £m	Units	Total Cost £m	Units
<u>Treatment Machines</u>						
Linear accelerators with OBI	1.44	6	8.6	1	1.4	7
Stereotactic Radiotherapy	3.10	0	0.0	1	3.1	1
Treatment & Planning System	1.80	1	1.8	0	0.0	1
CT Simulators	0.50	2	1.0	2	1.0	4
			<u>11.4</u>		<u>5.5</u>	
<u>Diagnostic Equipment</u>						
MRI	1.00	1	1.0		0.0	1
CT	0.50	1	0.5		0.0	1
PET:CT	3.20	1	3.2		0.0	1
Other imaging	0.50	1	0.5		0.0	1
			<u>5.2</u>		<u>0.0</u>	
			<u>16.6</u>		<u>5.5</u>	

AC
11th September 2008

Appendix O4 – CCO Mitigation Plan

Review of Non Surgical Oncology Services in Merseyside & Cheshire

Outline Plan to Accommodate a CCO Development on the Royal Site

Introduction

This plan has been developed consequent to the interim report of the Review of Non Surgical Oncology Services.

Although the recommendations in the interim report include the transfer of a significant proportion of Clatterbridge Centre for Oncology (CCO) to the Royal site the final report is not due until October 2008. At this stage therefore, the eventual outcome, timescale and procurement route cannot be stated with certainty.

This plan provides a route to enable the Royal Redevelopment to proceed to its existing timetable without jeopardizing an appropriate site and configuration for CCO on the Royal site.

The Plan

The Royal Redevelopment is to be undertaken through PFI using Competitive Dialogue (CD). The project approach is to minimize any change to specification from OJEU through to financial close. OJEU is planned for April 2009 and procurement documentation will need to be completed by December 2008 to enable time for DH approval.

The proposed approach outlined below does not require an immediate decision on the procurement route for the CCO development whether this is ProCure21, traditional tendering, separate PFI or linked PFI. However, if a linked PFI approach is adopted this will also need to be identified in the OJEU and procurement documentation.

In outline:

a) Procurement documentation for the Royal would be supplemented by an outline brief for CCO to enable bidders to take account of this in developing detailed plans for the Royal. This outline brief would include:

1. The content of the hospital and schedule of accommodation
2. Environmental and technical requirements
3. Energy requirements
4. Equipment requirements
5. Clinical and non clinical relationships
6. Car parking requirements.

This would be provided in sufficient detail to allow the bidders to identify appropriate site and infrastructure to allow a future CCO development.

b) The CCO requirements to be worked up from September to late November 2008. Much of this work would be prior to the outcome of the review.

c) Bidders for the Royal redevelopment to be required to take the above CCO specification into account when preparing their proposals for the Royal, to identify an appropriate location on the site for a CCO development and potential points for physical links between the two buildings.

DH and Private Sector View

The plan will need to be tested with both DH and with potential consortia leads and may require subsequent adjustment.

Economies of Scale

The plan assumes that the specification for the Royal would not change, apart from at the margins to enable some economies of scale on the CCO development to be achieved.

Clinical and non clinical support departments where economies of scale could be achieved include laboratories, pharmacy, receipt and distribution, facilities management, restaurant facilities.

Governance Arrangements

Appropriate and strong governance arrangements will need to be established.

Conclusion

This outline plan provides a route to enable the Royal Redevelopment to proceed to timetable without jeopardizing an appropriate site and configuration for CCO on the Royal site.

Its success will be dependent on appropriate governance arrangements and good collaboration across organizational boundaries.

Potential Relocation of Non Surgical Oncology Services to the Royal Optimistic Timetable

Deliverable	Tasks	From	To	PFI
Interim review outcome	Completed	n/a	07/08	
Mobilise Project	Structure and Governance Project Systems Appoint interim advisors Appoint project resources Project plan	08/08	10/08	Complete OBC OBC review SHA/PCT Develop PQQ/MOI ITPD PA
Prepare SOC/OBC	Service Model (Royal, Aintree, CCO Site) Departmental relationships (interface with Royal) Agree shared departments (e.g. R&D/Catering, Labs, FM) Stakeholder involvement/consultation Clinical Buy In Assess equipment and transfers – scope who will procure Activity Content Option Appraisal Capital Revenue (inc workforce) Masterplanning Engage with Liverpool City Council LTFM	10/08	04/09	Procurement Review SHA/DH/PFU Approvals in place OJEU
Prepare Consultation Documents	Documents Process Briefing Packs Presentation	02/09	05/09	PQQ Stage Evaluation of Responses
Approval to Consult	SHA/PCT/Monitor	04/09	05/09	Board Approvals
Gateway	Gateway 0	04/09	05/09	Identification of Bidders (3)
Appoint P21 Partner	Brief as developed for SOC/OBC At risk – consultation process not completed		05/09	

Consultation Process	Presentations by Directors/PCTs	05/09	07/09	
Design Development	Project team, user groups engage with P21 designers – to develop and sign off requirements Develop equipment specifications Validate equipment requirements and transfers Engagement with Liverpool City Prep and submission of planning app Stakeholder involvement/consultation	06/09	12/09	ITPD Issued CD Commences Receive Interim Proposals
FBC	FBC Planning Approval (? JR) Gateway Approval	01/10	06/10	Evaluate 3 to 2 CD Continues Submission of Drafts
Construction	Build Period Operational Policies Move plans Tenders for removals Procure equipment	06/10	05/12	Evaluate Draft Bids Issue ITFB (08/10) Receipt FB (10/10) Select PB (11/10) ABC PB Letter (12/10) Planning (04/11) FC (07/11) Start on Site (08/11)
Service Move	Equip new facilities (new) Linac commissioning Training and familiarisation Equipment transfers Service move	05/12	11/12	Building handover (4/15)

Issues to Consider:

CCO/Royal/Aintree Board Approvals
 Shared FM/TUPE
 Staff Consultation
 Haematology
 Linda McCartney
 Research

Assumptions

Mobilise Project on the basis of the interim review report
 SOC/OBC hybrid required in order to gain SHA/PCT/Monitor approval to consult
 SOC/OBC will include option appraisal, service model, activity, SoA and operational policies, capital costs, revenue costs including workforce (split site implications), LTFM
 P21, exchequer funded

Work at risk re mobilisation of project structure, interim advisors, engagement of P21 partner
Planning approval prior to completion of FBC
Gateway approvals to proceed as required
A lot of work carried out at risk
Development of sustainability approach, regeneration, corporate citizen, EIA - not factored into timescales.