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Where to next for cancer centre design?

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ABSTRACT

The design of cancer centres must not only address the clinical requirements of diagnosis, treatment and care, but also consider ways in which patient wellbeing can be optimised through the design and layout of the space in order to maximise positive outcomes.

Operationally, cancer centres must be flexible enough to adapt to new approaches to care and treatment and new technologies. They must also be able to integrate the treatment of patients with the research value of a live cancer care environment by providing an interdisciplinary setting.

This article discusses the drivers for innovation in cancer centre design and the role of consultation in developing a design aligned to key clinical, patient and operational requirements. It also highlights best practice examples to illustrate the points raised.

KEYWORDS: Best practice, cancer centres, design

Introduction

Cancer is one of the biggest challenges that the medical fraternity faces but also one that is rapidly evolving, especially with the advent of biologically targeted treatments and personalised cancer treatments based on genomic sequencing. It is clear that an interdisciplinary approach to integrating research, treatment and care will help address those challenges with improved outcomes, increased patient wellbeing and more effective prevention and treatments in the future. Because of the complex and lengthy treatment methods that are often required, cancer treatment is not a one-stop experience but part of a journey, involving both the patient and clinicians, potentially over several years.

Research successes, more effective treatment pathways and a focus on patient-centred care have all helped to improve outcomes for cancer sufferers. From an architectural perspective, we now need to share global best practice and integrate design expertise and technologies with stakeholder insights to build on our ability to support positive outcomes in purpose-built cancer care environments.

A move towards specialist cancer centres to support the work carried out in treating and caring for patients in hospital oncology departments is creating scope for specialist expertise in the design of cancer care environments. A 'hub and spoke' model for patient care with comprehensive cancer centres at its core, feeding into major urban cancer units and provincial hospital provision, enables appropriate treatment and care to be delivered at varying stages in the patient's treatment journey, supporting both optimisation of resources and patient wellbeing.

It is in the design of these comprehensive cancer centres that we are seeing pioneering approaches to integrating clinical trial components in the building, along with highly complex treatment and care. This design innovation future-proofs investment in the building while optimising operational efficiency, addressing clinical priorities and supporting patient wellbeing. The benefits of this approach have been well-documented in a number of research projects, including 'Patients' experience of important factors in the healthcare environment in oncology care'[1] and 'Patient-centred cancer treatment planning: improving the quality of oncology care: workshop summary',[2] prompting an evidence-based approach to further innovation in intelligent cancer centre design.

The role of consultation

Early engagement of an architectural practice experienced in developing both concept designs and detailed plans for cancer centres is critical to ensuring that the facility truly answers as many clinical, patient, research and operational requirements as possible. It allows stakeholder engagement to be integrated into the design process from the outset.

Ideally, the architectural team should also have international experience or be drawn from an international practice to ensure that they are fully conversant with global best practice and that the scheme can benefit from knowledge sharing.

The typical delivery period for a cancer centre is around 5 years, with the design period taking up to 2 years and a further 2–3 years required for construction, fit out and commissioning. Part of the reason for the lengthy design period is the level of consultation required. The architectural team must begin by interrogating the brief to fully understand the services that will be offered, patient profiles and demographics, treatment pathways, specialist layout requirements and any space, weight and building services considerations that treatment and diagnostic equipment will demand. Defining this can be difficult as treatment methods, approaches to patient care and new technologies can change; for this reason, the consultation process must also involve an understanding of the drivers for change and consideration of future scenarios.

For example, in response to patient and clinician feedback and specific site challenges, such as a scheduled archaeological

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Fig 1. Varian TrueBeam™ precision radiotherapy system at Guy's Cancer Centre. Photographer: Morley von Sternberg.

monument located under the foundations, the new cancer centre at Guy's Hospital in London, designed by Rogers Stirk Harbour and Partners and Stantec, has linear accelerator (Linac) radiotherapy machines located on the second floor to enhance patient wellbeing by taking the treatment from a dark basement environment and placing it on the same floor as consultation and waiting areas in a light and bright space (Fig 1). Among the technical challenges involved in this decision were the need to build the requisite amount of shielding into the construction and the imperative to develop plans for installing the Linac machines within the designated space.

The consultation process highlighted the fact that the hospital would want to reassign this space if, at a future date, treatment pathways no longer required the use of the Linac machines. As a result, the shielding was not built into the fabric of the building as structural concrete but was installed as prefabricated, demountable and stackable concrete and lead blocks. The need to ensure easy passage during initial installation and any future upgrades to the machines also resulted in the addition of removable panels in the façade through which the 10-tonne machines can be lifted into – or out of – the building in pieces. A similar approach to easy replacement was taken for other diagnostic equipment, such as the cancer centre's magnetic resonance imaging and computerised tomography machines.

This example demonstrates that the consultation process must not only elicit a true understanding of current requirements but also build future proofing and exit strategies into the design process. In this way, the project team can maximise the service life of the building and ensure that it continues to answer the needs of stakeholder groups in the future.

Consultation should also be a continuous process, with post-completion feedback playing an important role in assessing the design success of cancer centres and informing the design process and principles of future schemes. Following the opening of Guy's Cancer Centre in September 2016, research is being conducted into whether the design has improved the patient experience and/or provided operational benefits for staff. The outcomes of this research will be presented by Stantec and Guy's and St Thomas' NHS Foundation Trust in June 2017 at the European Health Care Design Conference, entitled 'Visioning the future: Designing for change in people-centred health systems'.

Wellbeing

There is an increasing design emphasis on how cancer centre environments affect patients' anxiety levels and wellbeing, which, ultimately, influence outcomes.

Patient feedback is essential at every stage, from concept through to spatial planning and finishes. Often patient groups are involved in key stages of the design so that their feedback can be incorporated into the design process. During the design process of Guy's Cancer Centre, patients' group representatives were embedded into each of the clinical focus groups. Their contribution ranged from the initial briefings to the layout of the departments, the best placement of equipment in the room, interior design strategies and art selection. For example, patients requested easy access to outside landscaped spaces and waiting areas with outside views (Fig 2). This became a key driver for the radiotherapy and outpatient waiting areas, which have access to landscaped terraces. Patients also requested that the design should minimise long, institutional corridors, so the design team laid out the public areas in a way that minimises corridors and ensures they are light filled.

It is clear from this experience that patient voices can drive innovation in both the way the patient journey is managed within the space to reduce the need to move between floors and departments and in the way the cancer centre looks; connecting the indoor environment with a feeling of light and space from outside and creating more of a wellness space than traditional hospital sterility.

This approach to a nurturing environment must be multisensory, in terms of both space planning and finishes. An approach to finishes for waiting and reception areas that is more akin to a hotel lobby than a traditional hospital will not only help with noise absorption but will also offer a choice of seating

Fig 2. Above ground radiotherapy waiting area at Guy's Cancer Centre. Photographer: Morley von Sternberg.

Fig 3. Patient self-check in at Guy's Cancer Centre. Photographer: Morley von Sternberg.

and quiet or social spaces within a comfortable setting. Where practical, consideration should also be made to ensure that any landscaping opportunities are maximised, taking patients as far away from traditional 'hospital' and 'treatment' environments as possible to enable them to feel more relaxed.

Reducing the number of steps to treatment is another key element in improving the patient journey. This starts with quick and easy registration/check out, using pre-sent letters with bar coding similar to that now widely used in airports (Fig 3). Patient tracking systems that allow caregivers to know the patient's location at any time provide valuable data to ensure better responses and reduce frustration for patients, carers and clinicians. This approach also allows patients to move more freely around the building and arrive just in time at their consultation or treatment space, reducing the anxiety that can result from extended wait times. A more mobile patient can access education and therapeutic facilities while they are waiting for treatment or consultation, ensuring better integration of all aspects of care through the patient journey.

While all of these elements can be controlled and designed into concept planning for new build facilities, cancer centre design that involves repurposing existing buildings also needs to implement intelligent design to work with existing environments and implement best practice in these areas wherever possible. For example, the re-positioning of care givers' bases with improved line of sight to patients can improve patient safety and signal staff availability, creating a culture of transparency. Often, it is not the physical state of the building that limits the effectiveness of care but the way in which the patient is processed through the space that inhibits an improved patient experience. This can be improved by re-assessing processes with resultant improvement in organising flows and reducing the number of steps in the patient journey.

Workflows and the patient journey

The move to ambulatory models without inpatient provision not only increases the emphasis on a homely environment throughout the cancer care facility but also provides an opportunity for greater design flexibility. The ambulatory care facility still has to address the flow of the patients in trolleys coming from either nearby inpatient accommodation or directly from the community via ambulance. The preferred design option is to create separate inpatient entry points into the facility. This can enable direct access to discrete pathways that do not cross the patient waiting areas. Consequently, patients can be taken to dedicated individual patient trolley bays located near to staff bases for ease of supervision while waiting for their treatment or collection by transfer staff.

The challenge is aligning clinical pathways with spatial design, rather than allowing spatial planning to be determined on a silo departmental basis. Practical operational considerations, such as building services engineering, weight loading and access, must be factored into this approach, but the treatment pathways must be the starting point. Furthermore, the facility's research objectives must be built into the patient journey to ensure that diagnostics, research and treatment are seamlessly integrated. Making research visible to patients reassures them that their treatment is up to date and of the highest quality, encouraging higher rates of participation in clinical trials.

This has been achieved at the Guy's Cancer Centre thanks to a 'treatment villages' concept based on design experience at Maggie's Centre at Charing Cross Hospital; a homely place of comfort and refuge for cancer patients during all stages of their treatment. Laid out across 14 storeys at the Guy's Cancer Centre, this treatment village model maximises the accommodation, making circulation more manageable for patients and giving the building a human-scale. There are radiotherapy, outpatients and chemotherapy (with the embedded Innovation Hub) treatment villages along with a welcome village with communal spaces located on the ground floor.

Throughout the facility, the floors are organised into two zones, with high technology 'Science of Treatment' zones at the rear and low technology 'Art of Care' zones, which include naturally-lit waiting areas and landscaped balconies, at the front apex. This design concept has been delivered to facilitate workflow efficiency for clinical teams while also making the building more functional and less intimidating for patients. It also provides a very practical building services strategy with separation between the most and least heavily serviced areas.

An alternative but equally successful approach has been taken at the Cleveland Clinic Cancer Centre, a private cancer facility designed by Stantec in Ohio with involvement from the UK team. This facility has also been planned in three distinct bands: the south facing exam clinics zone, the north facing infusion zone and the central staff support zone located in between, which provides opportunities for interdisciplinary collaboration between the team of professionals. This spatial organisation also creates an opportunity for patients to have more unplanned access to their clinicians throughout the patient journey, supporting a more holistic approach to integrated care and treatment.

The design detail

While the concept design of a cancer centre must support treatment pathway delivery and multidisciplinary integration, the practical realities of day-to-day services (clinical and operational), patient wellbeing and comfort and the culture of the care environment must also be embedded in the detailed design.

Fig 4. At the London Clinic Cancer Centre, patients are given control of blinds, entertainment, temperature and lights from their beds. Photographer: Ed Sumner.

The use of BIM (building information management), a design and project delivery approach that has 3D modelling of the design at its core, is now helping to nurture the process of embedding patient and clinician feedback into the detailed design in real time. Designers can use the modelling software as a visualisation tool to consult with stakeholders in exacting detail about the size and location of furniture, windows, doors and even plug sockets! As a result, there is an opportunity for conceptual and theoretical design to learn from stakeholders' genuine input. Moreover, that detailed specification and layout data is then held within the model for reference during any future remodelling or repurposing works.

For facilities that include patient bedrooms, detailed design is particularly important both from a clinical perspective in ensuring that the facilities meet the needs of the patient and treatment pathway, and from a patient wellbeing point of view. Operationally, the design will also impact on cleaning and infection regimens, workflows and practicalities for managing visiting hours or family support.

Just like the waiting and reception areas, progressive patient bedroom design is now taking its cue from the hotel sector, giving control back to the patient by allowing them to adapt their environment (blinds, entertainment, temperature and lights) to their personal preferences (Fig 4), ideally with the ability to do so from their bedside. Given the nature of the illness, ample family space should also be integrated into the room to allow family members to play a key role in the treatment and recovery process.

While inpatient stays are avoided wherever possible, treatment pathways for some cancers can require prolonged hospital stays, sometimes in isolation. Radical treatments, such as stem cell transplantation or immunotherapies, often require a heightened emphasis on infection control. This requires an integrated approach to mechanical ventilation systems and choice of material finishes within the room. Hard finishes are required to enable effective cleaning regimens, but designers must find ways of making them appear less harsh and this means considering the acoustic impact of the design and specification as well as the colour scheme and tactile elements. Acoustic abatement methods must, therefore, form part of the design strategy, along with specification of noise absorbing hard finishes.

While contemporary healthcare design is moving away from communal ward models in favour of private rooms to support dignity for patients and assist in infection control, some research has also been done into the benefits of offering cancer centre inpatients the option of social space. Integration of rehabilitation within the nursing unit is also driving design innovation for inpatient care environments, to avoid the need for patients to travel outside their unit.

Where patients are infectious or immunocompromised, these activities need to take place at the bedside and will, therefore, require increased room sizes. In addition, cancer inpatients often need dialysis during part of their stay, so the room layout, size and environmental provision have to account for the equipment and services involved.

Bringing the broader healthcare team to the patient, whether in the outpatient or inpatient areas, is key to an integrated, multidisciplinary care approach and often necessitates enhanced accommodation for staff touchdown spaces and meeting rooms, as outlined by Fennell *et al.*[3]

Conclusion

Ultimately, the purpose of designing specialist cancer care units is to support patient wellbeing and improve outcomes. This can only be done with an approach that puts consultation at the centre of achieving a bespoke design that meets the needs of specific professionals and patients. However, it is clear that there is a wealth of global best practice in the progressive design of cancer centres and, by sharing this knowledge, we can continue to improve the patient experience. ■

Conflicts of interest

The author has no conflicts of interest to declare.

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