Children's Hospice Gardens:

Using Nature to Enhance Well-Being

By Elizabeth Read

Children’s Hospice Gardens:
Using Nature to Enhance Well-Being

Elizabeth Read is passionate about both children’s hospices and gardens. She was an executive director for six years at Tŷ Hafan, a children’s hospice in South Wales. She holds a postgraduate diploma in garden and landscape history from the University of London, a master’s degree in business administration from the University of Hull and the Chartered Institute of Marketing postgraduate diploma. Before joining Tŷ Hafan, she worked in financial services and was a Fellow of the Chartered Institute of Securities and Investment.

Copyright © 2019 by Elizabeth Read

All rights reserved. This book or any portion thereof may not be reproduced or used in any manner whatsoever without the express written permission of the publisher except for the use of brief quotations in a book review or scholarly journal.

First Printing: 2019

ISBN 978-1-9993002-1-0

Elizabeth Read
Llangibby, Usk, United Kingdom, NP15 1NZ

Cover Image: Released free of copyrights under Creative Commons CCO.
https://pxhere.com/en/photo/802451 [accessed 18 November 2018].

Children’s Hospice Gardens:
Using Nature to Enhance Well-Being

Elizabeth Read, MBA, Dip.M, PgD

This paper sets out the evidence that supports the use of children’s hospice gardens in the delivery of palliation and, based on this, presents guidelines for the design and on-going management of such gardens. A sample of children’s hospice gardens was analysed to assess to what extent they included evidence-based design criteria and could be judged to have therapeutic value.

For the benefit of those outside the sector, the paper covers the conditions and symptoms experienced by children receiving hospice care, the needs of such children and their families, and the support required by staff. It chronicles the historical evidence that shows a connection between well-being, nature, and gardens and leads on to the impact that a move away from nature has had on physical and mental health. It provides evidence that accessible green space, sunlight and outdoor activities can improve well-being, support strategies to manage pain and enhance the outcomes of palliation. Design frameworks that flow from the evidence are contextualised for children’s hospices and the author shows how they can be put into practice. The paper also discusses some of the management issues that may have a detrimental effect on the therapeutic value extracted from a garden and proposes methods for evaluation. The results of an analysis of seven children’s hospice gardens identify that they are not always designed or used to their full potential and in some cases could be detrimental to the well-being of their users. The author concludes with thoughts on how children’s hospices may approach the design and management of gardens in the future.

Acknowledgements

Sally Jenkins and Greenfingers (a national charity creating gardens for children and families who spend time in hospices) have been supportive throughout the writing of this work. Thank you to them and to the hospices that generously gave their time: Chestnut Tree, Helen House, Keech, Little Havens, Naomi House, Richard House and Tŷ Hafan. Thank you also to Dee Montagu-Pollock of Horatio's, Salisbury and Lucy Aubrey of Maggie's, Swansea, and to Tracy Jones, Ben Pritchett, Robert Sheehan and Louise Tucker-Harvey.

Contents

Preface 6

1: Introduction 7

2: Children’s Hospice Care 9

3: A History of Therapeutic Gardens 13

4: Nature and Well-Being 16

5: Theory and Evidence 22

6: Design in Practice 28

7: Management Concerns 38

8: Research 44

9: The Way Forward 48

Bibliography 51

Table of Figures 61

Preface

A garden is a place to reflect, feel restored, play, laugh, make friends, grieve and much more. With children's hospices focusing on quality of care, how much attention is paid to the environment in which that care is delivered and does it really matter? Evidence suggests that nature can enhance well-being, reduce the need for analgesics and alleviate stress; and nature is therapeutic physically, emotionally, socially and spiritually. This paper will show that a hospice landscape can make a difference to children, parents and staff – and it does matter.

Copyright © 2019 Elizabeth Read

1: Introduction

This paper will set out the evidence that supports the use of children's hospice gardens in the delivery of palliation and, based on this, will present evidence-based guidelines for the design and on-going management of such gardens. It is written for anyone in a responsible position within a children's hospice (for example trustees, directors and managers), and is relevant to those covering a range of disciplines including care, fundraising, volunteering, administration, finance and human resources. It is also intended for designers who have not yet worked with a children's hospice and anyone who has an interest in either the children's hospice sector or therapeutic gardens.

Children's hospices provide care and support to children expected to die in childhood (termed "life-limited"), as well as their families. There is no expectation of a cure for these children but evidence will show that they and their families (and the staff caring for them) can benefit from a restorative environment, such as a garden; it can enhance well-being, support strategies to manage pain and enhance the outcomes of palliation. Gardens designed to enhance well-being are termed "healing" or "therapeutic".

The term "healing" is not limited to a cure but echoes the World Health Organisation's definition of health (which has not changed since being agreed in 1946) as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (World Health Organisation, 1946). Horowitz (2012, p. 78) uses the term "therapeutic" and defines a therapeutic garden as an outdoor space "that has been specifically designed to meet the physical, psychological, social and spiritual needs of the people using the garden as well as their caregivers, family members, and friends". The term "therapeutic" will be used throughout this paper, reflecting Horowitz's 2012 definition. Quoted references will also include various analogous terms such as "landscapes for health", "therapeutic landscapes", "restorative landscapes", "restorative gardens", "wellness gardens" and "rehabilitation gardens".

The children's hospice movement started in 1982 and, in Spring 2018, there are 54 children's hospices in the UK. This number is unlikely to remain constant given the current trends for new young adult units to emerge and some adult hospices to bring younger individuals into their remit. Some hospices (and their gardens) may serve adults (including young adults) as well as children and babies but, as section 2 will clarify, there are marked differences between children's hospice care and adult provision, and there is a risk of an inadequate "one cap fits all" approach to garden design if the special needs of children and their families are not considered separately. This paper deliberately focuses on the relationship between gardens and the children and families receiving care at hospices for children.

Gardening therapy is increasingly provided for those with physical and mental illness, and at adult end-of-life[1]. Thrive, a national charity which aims to use gardening to bring about positive changes in the lives of people living with disabilities or ill health, or who are isolated, disadvantaged or vulnerable (Thrive, 2017), is already providing leadership in this area. In conducting a literature review, the author found no work on the benefits of gardening therapy in children's hospices and, whilst it would be useful to research that topic, the main focus of this paper is *gardens*, rather than gardening therapy.

[1] "End-of-life" is a term used to refer to the days and weeks immediately before death.

Copyright © 2019 Elizabeth Read

This paper explains children's hospice care for those who may have a limited understanding of the subject, setting out the conditions and symptoms experienced by the children, and the needs of the children, their families and the staff caring for them. It chronicles the historical evidence that shows a connection between well-being, green space and gardens before it reviews current evidence that shows accessible green space, sunlight and outdoor activities can provide a reconnection with nature that can improve well-being. From Roger Ulrich's seminal work, "View through a Window May Influence Recovery from Surgery" published in *Science* in 1984 to the theories and evidence that followed, experts in the field have developed frameworks for evidence-based design that, for the most part, have proven germane to therapeutic gardens. The subsequent sections of this paper offer strategies for applying their work in the creation of therapeutic gardens at children's hospices and discusses the on-going management that is critical for success.

Two charities (Maggie's, which creates gardens near NHS oncology units, and Horatio's, which specialises in gardens for spinal patients) have been studied by the author and used to illustrate the theory and practice. References to these two charities will be made throughout the text. In addition, seven children's hospices were visited by the author in July 2018 to assess the therapeutic value of their gardens and to discuss usage with key members of staff. The results were analysed by the author and an assessment is presented in section 8. The author concludes with comments that suggest how children's hospices might manage their gardens in the future.

Many reading this paper will be familiar with the King's Fund report, "Gardens and Health: Implications for Policy and Practice" (The King's Fund, 2016). They will be aware that the National Gardens Scheme commissioned The King's Fund to present an independent report on the benefits of gardens and gardening to health. The report had a wide distribution and raised public awareness of the therapeutic value of green space. It provides useful insights (particularly on the relationships between green space, levels of activity and health), but neither its analysis nor its recommendations are specific to children's palliative care. The present paper has some common ground with the report but, in contrast, it deliberately focuses on children's hospices and goes further to develop the evidence-based design frameworks in a practical direction, addresses management issues and adds a current analysis of gardens within the children's hospice sector.

By the end of this paper, readers will have had an opportunity to consider recent evidence that proves what our ancestors historically took for granted, and to think about drawing upon both historical and recent sources of knowledge to develop garden designs that will help vulnerable families. Those in responsible positions within children's hospices should be better able to make informed decisions about managing a garden as both an asset and a resource; garden designers might use this paper as a springboard for their own ideas and creativity. This is an opportunity for children's hospices to augment existing services to children and families and look after staff.

Copyright © 2019 Elizabeth Read

2: Children's Hospice Care

Whilst those working in a children's hospice will have specialist knowledge of this field of care, garden designers and those with a general interest in therapeutic gardens may have only a limited understanding of the subject. This section sets out conditions and symptoms experienced by children receiving hospice care, the needs of such children and their families, and the support required by staff working in challenging circumstances. It aims to provide a backdrop for greater understanding of the relevance of gardens in the delivery of children's hospice care.

"Paediatric palliative care" and "children's hospice care" can be described as synonymous; hospice care is not necessarily delivered within a hospice building: it can be delivered at home, in a hospital, or in a garden. Throughout this document, the term "children" is used to describe babies, children, and young people up to their 19th birthday (although children's hospices vary the upper age at which their services are withdrawn). Children's hospices provide care and physical, emotional, social and spiritual support to the families of children expected to die in childhood (termed "life-limited"). It starts with diagnosis, includes the management of distressing symptoms, continues through to the end of the child's life and into bereavement. Disease progression can have psychological implications resulting in anxiety, distress, depression, fear, uncertainty and anger. Children may experience helplessness, hopelessness and sense loss of control and dignity; close relationships may also be affected. Hospices make an holistic assessment of need, and respond with holistic care and support, involving the whole family. Whilst the needs for physical, emotional, social and spiritual support are all individually recognised, relief and support can be delivered simultaneously; for example, a child may find that using a hydrotherapy pool provides physical, social and spiritual relief.

Families may use a hospice for day care, planned short breaks, emergencies and/or end-of-life. A hospice is a homely environment, where parents may stay with their child and his or her siblings. Unlike an adult hospice that provides care only at end-of-life and for days or weeks, or a hospital that focuses on the physical needs of a child, a children's hospice offers an holistic approach for the whole family (the child, mother, father, and siblings) and support may last for many years. Whilst a cure is not expected, children's hospices endeavour to help children develop to their full potential; the focus is on quality of life rather than end-of-life.

"Life-limiting or life-shortening conditions are those for which there is no reasonable hope of cure and from which children or young people will die. Life-threatening conditions are those for which curative treatment may be feasible but can fail" (Association for Children's Palliative Care, 2009). Together for Short Lives[2] goes further to delineate these into four categories: life-threatening conditions (for which curative treatment may be feasible but can fail); conditions where premature death is inevitable; progressive conditions without curative treatment options and, irreversible but non-progressive conditions causing severe disability, leading to susceptibility to health complications and the likelihood of premature death (Together for Short Lives, 2013a). The impact and trajectory of life-limiting conditions vary with mental capacity and physical ability sometimes at odds; for example, the cognitive ability of a child with Duchenne Muscular Dystrophy (DMD) will progress normally whilst physical deterioration will render the child increasingly dependent on parents and carers over a number of years (Together for Short Lives, 2013a).

[2] Together for Short Lives is an umbrella charity for hospices and professionals working in children's palliative care.

Work by Fraser et al. (2011) sought to make sense of the data on life-limiting conditions, which previously were largely based on death certificates and therefore considered unreliable; in contrast, this work used in-patient hospital data. It estimated that there were at least 49,000 children living with life-limiting or life-threatening conditions in the UK. Not all of them, by any means, received the support of children's hospices although many would have been eligible. The study showed that the national prevalence of life-limiting conditions in children (0-19 years) per 10,000 population in the years 2000/1 to 2009/10 rose in Scotland, Wales and Northern Ireland, and more than doubled the previous prevalence estimates in England. In all four countries, the prevalence of life-limiting conditions in children and young people was associated with deprivation with the highest prevalence in areas of highest deprivation. In England, prevalence of life-limiting conditions was significantly higher in the South Asian, Black and Other ethnic minority groups compared with the white population. No comparable data was available for Northern Ireland, Scotland or Wales.

Because the data for each country were recorded and collected differently, it is not possible to combine the figures to produce UK statistics. For illustrative purposes, the percentages per diagnostic category *for England only* are shown in Figure 1 (Fraser et al., 2011).

Figure 1: Life-limiting conditions (England only): percentages per diagnostic category

Diagnostic Category	% of children
Congenital anomalies	30.7
Oncology	13.7
Neurological	12.0
Haematology	9.8
Respiratory	8.8
Genitourinary	6.2
Perinatal	7.7
Metabolic	3.8
Circulatory	3.8
Gastrointestinal	2.4
Other	1.1

Medical advances have led to a decrease in infant mortality which has increased the chances of survival for children with disabilities. Although the mortality rate increased slightly from 4.3 deaths per thousand in 2010 to 4.4 per thousand in 2016, longer term the rate has fallen by 60% over the past 30 years, according to *Deaths registered in England and Wales* (Office for National Statistics, 2016). According to Moore et al. (2012), the number of babies born before 27 weeks' gestation who survived and left hospital increased between 1995 and 2006, but the proportion that experienced serious health problems into childhood remained largely unchanged.

Copyright © 2019 Elizabeth Read

According to Together for Short Lives (2013a), the main goal for a family living with a life-limited child is simply to "lead a normal family life". A family's ability to do this is compromised by the need to support their child 24/7; the need to provide care is financially and emotionally draining, and can be isolating. For some parents the situation is overwhelming and they lose their sense of identity, in their minds becoming simply "the carers". Life-limited children, parents, and siblings can be supported through interaction with other families in similar situations to their own and children's hospices provide a valuable service by bringing these groups together in formal and informal settings to share experiences and make friends.

Children's hospices also provide support to siblings who may suffer in silence despite feelings of resentment, jealousy, isolation, fear, guilt, anger and despair. Unexpressed emotion may manifest as school failure, behavioural problems, and physical symptoms; these children may try to protect their parents from added distress by not burdening them with their own worries. How each sibling will react will differ depending on their own character and circumstance, what stage the life-limited child is at in the journey to end-of-life and the sibling's relationship with the child. Children's hospices support siblings directly, bring them together with other children experiencing similar issues and help parents provide support. (The Royal Children's Hospital, Melbourne, 2018)

Play is important for every child's physical, emotional, intellectual and educational development, for acquiring social and behavioural skills and for learning. When parents are focused on caring (and day-to-day activities can take longer than normal), finding time to play with their children can be challenging. The right to "rest and leisure, and to engage in play and recreational activities", for all children and young people up to 18 years of age, is codified in Article 31 of the UN Convention on the Rights of the Child, ratified by the UK Government in 1991 (Child, 2018). The Charter for Children's Play sets out that "all children and young people … need time and space to play … indoors and outdoors" (Play England, 2009a). Children's hospices have a role in facilitating play both indoors and outdoors. Living life to the full, having fun and making memories are important throughout the palliation journey and laughter (although seemingly incongruous) is valuable even if it is sometimes hard to recognise (a blink of an eye or small body movement may amount to the equivalent of laughter or be a means of communication for certain children). For those children who are unable to communicate in the normal way, members of the care staff learn the individual reactions or movements that constitute communication.

Communication skills are vital as they enable staff to approach difficult subjects with sensitivity. Difficult conversations are necessary when conditions change or deteriorate, towards end-of-life or when transitioning to adult provision. Care staff do not necessarily create opportunities to have difficult conversations but act on opportunities when they arise. Good communication and sensitivity enable care staff to identify the grieving process which may begin well before a child's death; for example, parents grieve for "the normal child they no longer have" (The Royal Children's Hospital, Melbourne, 2018). Parents may feel anger, fear, a realisation of mortality, self-doubt, guilt, a questioning of faith, apathy, frustration, a sense of failure and more. Medical advances over recent decades have increased life expectancy and few parents with life-limited children will have first-hand experience of being in close proximity to someone who is dying; children's hospices provide support to families both before and after a child's death.

Copyright © 2019 Elizabeth Read

Spiritual care is important at these times and helps individuals make sense of the world around them and their meaning and place within it. How this is achieved will be very personal and might vary according to an individual's age, culture, and state of health. Some common themes are: a sense of purpose, a sense of 'connectedness to self' (to others, nature, God or Other), a quest for wholeness, a search for hope or harmony, a belief in a higher being or beings, some level of transcendence (or the sense that there is more to life than the material or practical), and the taking part in activities that give meaning and value to life (Cornah, 2006). Spiritual care is also about developing self-knowledge, self-esteem and self-confidence, and addressing questions like: "Why me?" and "How do I have hope?" Members of the care staff provide spiritual support with these difficult, very personal, issues that may affect any member of the family, particularly when anticipating end-of-life.

Parents will be given the opportunity to plan how they will approach the end of their child's life and staff will provide support and advice throughout (Together for Short Lives, 2013a, p. 36). "Bereavement should be seen as a 'normal process', but different groups of parents may have different needs depending on the nature of their child's death" (The Royal Children's Hospital, Melbourne, 2018); for example, it may be decided to remove the endotracheal tube providing life-support (this process is known as "extubation"). These are difficult circumstances for the staff as well as the families.

Employers will acknowledge "the emotional labour" of caring for a child at end-of-life and recognise that staff members need support and supervision (Together for Short Lives, 2013a, p. 32). Huy (1999, pp. 32-34) suggested: "Individuals obliged continually to enact a narrow range of prescribed emotions are likely to experience emotional dissonance. This reflects the internal conflict generated between genuinely felt emotions and those required to be displayed. This can result in emotional exhaustion and burnout". In addition to the professional process of supervision, time (and a place) for quiet reflection can be beneficial.

In summary, children's hospices provide holistic care and support (physical, emotional, social and spiritual) to children with complex conditions, and to their families. The delivery of palliation is, therefore, an enduring challenge for care staff and management. Hospice care is not necessarily delivered at a hospice, but nonetheless, the design of a hospice and its immediate environment can make a profound difference to those receiving or delivering palliation. Recently, evidence has been systematically gathered which indicates that accessible green space improves well-being but gardens and nature have been associated with health for longer than that; healing and therapeutic gardens have a rich history going back many centuries. The next section outlines that history much of which is still relevant today.

Copyright © 2019 Elizabeth Read

3: A History of Therapeutic Gardens

Anecdotal evidence is plentiful throughout garden history suggesting that the creators and users of gardens were aware, or believed, that gardens enhanced well-being. From the early monastic gardens to the new hospital gardens now being created, there is an almost unbroken thread in the understanding, and indeed the assumption, that gardens have therapeutic value that precedes the evidence base, created largely from 1970 onwards. The aim of this section is to chronicle the historical evidence that shows a connection between well-being, nature, and gardens.

From the evolution of the genus Homo in Africa 2.5 million years ago to the Agricultural Revolution which brought about permanent settlements and the domestication of plants and animals 12,000 years ago, humans were simply hunter-gatherers. Humans, then, have been hunter-gatherers for almost all of their existence and any change in them and our landscape is recent (Harari, 2014). The change has, however, been gaining pace and landscapes have evolved from wild forbidding forests or deserts into largely tamed and progressively urban settings in the past 500-1000 years.

It is difficult to pinpoint when the raising of food crops segued into the origin of gardens but the earliest English gardens (as we now understand the term) were rustic enclosures in what would otherwise be an unmanaged landscape; the purpose of the enclosure was to keep animals out and protect food crops. But, early gardens created by religious orders were not just enclosures for food production. According to Souter-Brown (2015), monastic gardens contained a kitchen garden, orchard (which doubled as a graveyard), physic garden (to grow herbs for medicinal purposes) and cloister garden; thus, these were not only places to produce food, but also places to work, to be social, to bury and mourn the dead, and for contemplation. The therapeutic act of gardening has its roots in the monastic tradition; the religious orders considered labouring to be both physically and spiritually beneficial. In the Middle Ages, the nobility also had gardens for food production, but in addition they created pleasure grounds, which were private spaces frequented mostly by the ladies for quiet reflection. As the size of these gardens expanded, high walkways were designed for both exercise and admiring the garden below.

In medieval times, nature was regarded as the wild and unkempt landscape outside the garden. According to Horace Walpole, it was William Kent (1685 – 1748) who “leaped the fence and saw that all nature was a garden” (Dixon-Hunt, 1986, p. 91) and Kent has been attributed with the English garden style that embraces nature within a borrowed landscape[3]. From the 18th century onwards, the naturalistic landscape designs of Lancelot (Capability) Brown and others were embraced, and gardens and nature were considered as one.

In the 19th century, industrialisation brought about a migration to towns and cities and the 1851 census recorded the urban outstripping the rural population. There was a rise in pollution and sanitation was poor or non-existent; there were outbreaks of cholera and tuberculosis was commonplace. This was a golden age for public parks, which were considered good for social cohesion as well as public health, and provided “green lungs” in otherwise unhealthy environments. The gardens too suffered from pollution, hence the rise in the use of evergreens, and both bedding[4] and potted plants in Victorian gardens.

[3] A “borrowed landscape” is the landscape surrounding a garden and this view is included in the garden design.
[4] A plant set into a garden bed or container when it is about to bloom, typically an annual used for display and discarded at the end of the season.

Copyright © 2019 Elizabeth Read

Hickman (2013) has chronicled the history of gardens in hospitals and healing institutions since 1800 and provides details of both hospital and hospital garden designs. In the 19th century, the curative potential of hygiene, light, and air, the importance of views and the value of a rural location all came to be recognised. Then, hospitals were built either in the country or on the outskirts of towns because the countryside was considered more salubrious than the town. New purpose-built hospitals often had separate pavilions with each pavilion cross-ventilated by opposing windows, and colonnades for exercise. These designs afforded an opportunity to create gardens between the pavilions. Florence Nightingale (1863, p. 19) recognised the importance of both a view and light on mental and physical well-being: “Among kindred effects of light I may mention, from experience, as quite perceptible in promoting recovery, the being able to see out of a window; instead of looking against a dead wall; the bright colours of flowers; the being able to read in bed by the light of a window close to the bed-head. It is generally said that the effect is upon the mind. Perhaps so; but it is no less so upon the body on that account”.

During the early part of the 20th century, open-air institutions became popular and in 1907 there were 96 institutions providing open-air treatment in England and Wales. As the role of the hospital changed to deal with acute patients, convalescent homes provided longer-term recuperation. Gardens in hospitals were mainly for staff and in convalescent homes they were for patients and visitors. In 1948, concern about a connection between sickness and poverty led to the National Health Service (NHS) and the creation of District General Hospitals. Other hospitals and convalescent homes were closed, with the inevitable loss of the gardens. Many new hospitals were located in city or urban environments and, from the 1950s onwards, high-rise buildings took patients skywards and away from verdant nature. Much of what the Victorians had promoted was abandoned but, since the end of the 20th century, there has been a notable increase in gardens in healing environments (for example, Maggie’s, Horatio’s, and at Evelina London Children’s Hospital and Great Ormond Street Hospital).

Hickman (2013) also gives insights into the landscapes associated with psychiatric institutions (asylums), tracing their history from the nineteenth century through to the present day. Her study provides evidence, from annual reports, brochures, patient accounts and maps, that the landscapes around these institutions were considered beneficial to the well-being of their users and those responsible for the purchase and design of these asylums operated under this premise. The prevalent belief of the time was that nature had curative powers. Edginton (1997, p. 94): “The focus of the treatment was not the patient but the attachment of the patient to the healing ability of natural and social environments”. Asylums tended to be located in the country, and patients were encouraged to walk in the “airing courts”; these were originally paved but later developed into gardens. “In each county, but with a few exceptions, will now be found an asylum, well-built and well-appointed, cheerfully situate, and surrounded by extensive well-planned grounds and gardens for the use and recreation of the inmates. The old, dreary, walled in airing courts, in which in former times the patients were accustomed to tramp to and fro like so many felons in a goal, are now transformed into cheerful parterres, the flowers affording pleasing objects of contemplation” (Prichard, 2013, p. 90). The trustees and management of these establishments went out of their way to provide patients with gardens and access to nature believing them to be beneficial to their well-being; they did this based only on anecdotal evidence and what was generally considered to be true at the time.

Copyright © 2019 Elizabeth Read

In addition to using gardens for physical and emotional benefit, there is a history of gardens being used as a social space; for example, during Elizabeth I's reign, gardens were used to entertaining dignitaries (including the queen) and the gardens of Versailles were used for promenades, shows, concerts, operas, comedies, fireworks and light displays. After the English Civil War (1642-51), houses no longer needed to be fortified: house and garden were designed as one and a terrace was a natural extension of the house for social activities. At the end of the 19th century, al fresco dining became popular, as became evident in the art of the period (for example, *Le dejeuner sur l'herbe* (1863) by Manet). In the 20th century, houses were connected to the garden through sliding glass doors and today, domestic outdoor space is variously used as a garden or for storage, parking, play, or socialising and eating. According to Coton (2015), now more than half of users use gardens to "barbecue and socialise". Historically, gardens have also provided privacy for intimate conversations or personal reflection. The enclosed gardens of medieval times gave the ladies privacy from the common spaces and Henry VIII had a privy garden at Hampton Court Palace. Even the large landscape gardens of the 18th century offered resting places, generally with a view, for personal reflection. In the 20th century, outside rooms within gardens were popularised and these created intimate spaces.

There is also a history of gardens being used to support spiritual well-being. Spiritual support is not necessarily religious but nonetheless, all major religions have connections with gardens and nature. In the Christian faith, the Bible not only begins with a garden (Eden) but ends with one (the Garden of New Jerusalem), and many important biblical events took place in gardens. The Islamic garden represents paradise on earth and is a place for physical and spiritual refreshment, and there are many references to gardens in the Qur'an. There are also connections to nature in Hinduism and Sikhism. Churchyards and graveyards are natural, spiritual environments designed for reflection, prayer, and solace, but gardens (with or without religious symbolism) can be places of sanctity, contemplation, restoration, and remembrance. Gardens have always provided a sense of connectedness to nature through the plant cycle of life, the seasons and the elements but they can also provide some level of transcendence. This was the aim of the late 18th century picturesque gardens which were said to be "sublime", evoking a combination of beauty and awe (even fear or a suspension of belief). Some gardens were like cinematic sets with perilous paths, waterfalls, imposing rock faces and tunnels; the relief that followed the anxiety they generated was considered spiritually uplifting. Philosophers of the time discussed beauty and transcendence over the limits and suffering of mortal life.

Gardens have been places for play, entertainment and fun throughout history. Grottoes, elaborate water automata designed to soak unsuspecting visitors, mazes, caged birds, animals, and other "curiosities" were all designed to amuse and engage the garden visitor. The first public-access playground was opened in Manchester in 1859 and most public parks today include a playground.

History shows how gardens have long been assumed to support physical, emotional, social and spiritual well-being. Although there was only anecdotal evidence to support this assumption, the buildings and landscapes around healing institutions (and written sources of the time) show these assumptions were translated into common practice. During the latter part of the 20th century, evidence was found to prove what our ancestors had taken for granted. The next section will considers the impact of the move away from nature that led academics to seek evidence to reverse the trend.

Copyright © 2019 Elizabeth Read

4: Nature and Well-Being

This section looks at the evidence that shows accessible green space, sunlight and outdoor activities can provide a reconnection with nature that improves both physical and mental well-being. Today, access to green space is poor and nature deprivation on the increase. The health implications are challenging for the population in general but particularly so for the families of life-limited children because statistically they are more likely to be nature deprived.

According to *Population Estimates* (Office for National Statistics, 2016), the UK population is projected to increase by 3.6 million (5.5%) over 10 years from 65.6 million in mid-2016 to 69.2 million in mid-2026. The rise in population has led to a rise in urbanisation at the expense of green space. The *Consultation Paper on a new Planning Policy Statement: Planning for a Natural and Healthy Environment* (The Department for Communities and Local Government, 2010) has defined eleven categories and more than 40 sub-categories of green space suggesting an abundance of green space in the UK. Accessibility, however, is critical, and poor maintenance, inadequate facilities and fears over safety are all reasons why some population groups are less likely to visit green spaces than the national average (Natural England, 2011). There is anecdotal evidence that schools, for instance, whilst having green space often do not make it available because it is too far away from the main school buildings for teachers to monitor the children. Signs saying, “No Ball Games” and “Keep Off the Grass” are commonplace at community sites.

Access to green space is unevenly distributed with the most affluent population having greater access than the most deprived. According to Balfour and Allen (2014, p. 4), “Access to green space is not equal across the population of England. People living in the most deprived areas are less likely to live in the greenest areas, and will therefore have less opportunity to gain the health benefits of green space compared with people living in the least deprived areas”. Data from the *Monitor of Engagement with the Natural Environment* (Natural England, 2011), which surveys around 45,000 people from across England each year, show that minority ethnic groups, urban deprived populations, more disadvantaged social groups, those over the age of 65 and disabled people are all less likely to visit green spaces than the national average.

This inequality is troubling given that evidence suggests that good access to green space has health benefits, whilst poor access is associated with poor health outcomes. Mitchell and Popham (2008) found an association between greenspace exposure and lower premature mortality from circulatory disease. Takano et al. (2002) found that urban areas with walkable green space were associated with increased survival of senior citizens. De Vries et al. (2003) combined land use data with the self-reported health of 10,000 individuals and found that living in a green environment was positively related to health indicators with somewhat stronger results for housewives, the elderly and less educated people. Maas et al. (2009) found a lower prevalence of diseases, including coronary heart disease and diabetes, in areas with more green space. Berg et al. (2016) concluded that living in greener environments was associated with better mental health and lower (all-cause) mortality. Villeneuve et al. (2012) conducted a cohort study of the associations between green space and death and concluded green space was inversely associated with mortality, particularly for non-malignant respiratory disease. Gascon et al. (2016) concur that living in areas with higher amounts of green space reduces mortality, mainly from cardiovascular disease. Hu et al. (2008) observed high levels of stroke mortality

Copyright © 2019 Elizabeth Read

in areas with lower levels of exposure to green space. It would appear that "blue space" (for example, water) is also beneficial. White et al. (2013) discovered that individuals reported significantly better health when they lived nearer to the coast; the effects were present for both general and mental health.

The apparent causal link between access to green space and health outcomes has come to the attention of the Government. Public Health England (2014) suggests there is growing evidence that access to green spaces has health benefits (including better self-rated health, lower body mass index, overweight and obesity levels, improved mental health and well-being, and increased longevity). Parliamentary Office of Science and Technology (2016) reports evidence linking green space to physical activity and health although the quality of green space (e.g. its perceived safety, accessibility and how it is used) is important in mediating any effect.

If, as the evidence suggests, health outcomes can be influenced by access to green space, then there are opportunities to benefit from increasing accessible green space, and people can also benefit from moving near to that which already exists. Alcock et al. (2014) found that moving to greener urban areas was associated with sustained mental health improvements, suggesting that environmental policies to increase urban green space may have sustainable public health benefits too. Mitchell and Popham (2008) suggested that physical environments that promote good health might reduce socioeconomic health inequalities and concluded that populations that are exposed to the greenest environments also have the lowest levels of health inequality related to income deprivation. However, parallels between poor access to green space and deprivation (low incomes, low quality housing and poor diet) make it difficult to determine if poor health outcomes are related to poor access to green space, deprivation or a combination of the two.

Evidence also suggests that those living near green space are more likely to engage in physical activity. In the UK, people who live within 500 metres of accessible green space are 24% more likely to achieve 30 minutes of physical activity a day than those living further away (Natural England, 2011). Thompson Coon et al. (2011) found that compared with exercising indoors, exercising in natural environments was associated with greater feelings of revitalisation and positive engagement, decreases in tension, confusion, anger and depression, and increased energy. Participants also reported greater enjoyment and satisfaction with outdoor activity and declared a greater intent to repeat the activity at a later date.

Notwithstanding the benefits of outdoor activity and exercise, the population today has a sedentary life-style and one that is largely spent indoors. Long commutes to work (and school) have resulted in less time spent walking outdoors and more time confined in trains, buses and cars. Fast food, high in carbohydrates, consumed at all times of the day is convenient, but unhealthy. As a result of poor diet and increasingly sedentary lifestyles, obesity is on the increase. People who are overweight or obese are at much greater risk of heart disease, type 2 diabetes and bone/joint disease. According to *Statistics on Obesity, Physical Activity and Diet, England 2017* (NHS Digital, 2017), in 2015, 58% of women and 68% of men were overweight or obese; obesity prevalence increased from 15% in 1993 to 27% in 2015; in 2015/16, over 1 in 5 children in Reception, and over 1 in 3 children in Year 6 were measured as obese or overweight and there were 525,000 admissions to NHS hospitals where obesity was a factor.

Copyright © 2019 Elizabeth Read

It is unsurprising therefore that those who are advocating for green space have emphasised the links between access to green space, physical activity and a reduction in weight. "Green prescriptions" are on the increase. Ip et al. (2017), in a study including 208,280 students (6-18 years of age) from 438 schools, concluded that a physical activity-friendly school environment is associated with lower risk of obesity. Liu et al. (2007) linked green space with reduced levels of obesity in children and young people in America.

There is also evidence that green space improves mental well-being. Hartig et al. (2003) and Barton & Pretty (2010) reported a beneficial change in emotional and physiological markers of stress measured during visits to natural areas. Stigsdotter et al. (2010) concluded that greater use of green space was associated with less reported stress and closer proximity to green space was also associated with better self-reported health. Barton and Pretty's multi-study (2010) assessed the exposure to exercise in green space required to improve self-esteem and mood (indicators of mental health) and concluded that whilst every green environment improved both, the presence of water generated greater effects. The greatest change in self-esteem brought about by green exercise was in the youngest and the mentally ill.

Exposure to natural light has health benefits, as shown in a study by Malenbaum et al. (2008). Eighty-nine patients who had undergone spine surgery were randomly assigned to a bright or dim room in hospital; those assigned the bright rooms required 22% less opioid-equivalent analgesic medications, which resulted in a 21% decrease in medication costs. This study also found that individuals in bright rooms had significantly shorter hospital stays: women spent only 2.3 days in hospital when in bright rooms, compared with 3.3 days when in dull rooms.

Sunlight deprivation leads to health problems. The beneficial effect of sunlight varies as the seasons change, with least benefit in winter and autumn and most in spring and summer; this has led to connections between low levels of sunlight and several forms of depression - clinical, manic, dysthymic and season affective disorder (SAD). When exposure to day-light is inadequate, melatonin levels increase causing drowsiness and depression. Golden et al. (2005) concluded that light therapy is as effective as medication in treating not just SAD, but also major depression. SAD can also lead to a craving for carbohydrates and thence to other medical issues such as obesity (Wurtman & Wurtman, 1995). The circadian or body clock manages the sleep-wake cycles not just in the brain but in the liver, lungs, stomach, skeletal muscles, and so on. According to Hobday (2006), disruption of the clock (for instance by shift work) can cause mood swings, depression and other health issues. Morning sun is said to be more beneficial to well-being than afternoon sun; consequently, buildings are sometimes orientated northeast-southwest ensuring the building faces the morning and afternoon sun.

Fears of cancer and premature aging of the skin are driving the population indoors and away from the benefits of natural sunlight. According to Cancer Research UK (2017), too much ultraviolet radiation from the sun or sunbeds is the main cause of skin cancer (it causes 8 out of 10 cases of melanoma in the UK). The cosmetics industry contends that sunlight ages the skin. However, recent evidence suggests that vitamin D deficiency is becoming a problem and some related conditions, such as rickets, are returning. Vitamin D is produced when bare skin is exposed to sunlight; it increases serotonin levels in the brain and improves our sense of well-

Copyright © 2019 Elizabeth Read

being and vitality (Hobday, 2006). Vitamin D is important for the development of a healthy musculoskeletal system, preventing rickets and osteoporosis, maintaining muscle strength and preventing diseases such as type 1 diabetes and rheumatoid arthritis (Horlick, 2005). But, despite the concerns mentioned above, managed exposure to sunlight can be beneficial to health. Babies too can benefit from being outside for "healthy eye development, to build immunity, to build strong bones, to strengthen young lungs and to protect against asthma and allergies; regular time outdoors with varied-length focal points, sunlight on their skin and fresh, clean air is vital" (Souter-Brown, 2015, p. 111).

Increasingly children suffer from stress and anxiety. This can be related to family dynamics, pushy parenting and what Louv (2010) refers to as "nature deficit disorder". Changes in family formation, household structure and work-life balance are said to affect child well-being. Families come in all shapes and sizes. Parents may be single, married, civil partners, cohabiting or divorced; they may be step or foster parents. According to *Families and Households* (Office for National Statistics, 2017), there were 19.0 million families in the UK in 2017, a 15% increase from 16.6 million in 1996. The married or civil partner couple family remains the most common type (representing 12.9 million families in 2017), with the cohabiting couple family growing the fastest. The estimated percentage of marriages ending in divorce (assuming 2010 divorce and mortality rates throughout the duration of marriage) is 42% and around half of these divorces are expected to occur in the first 10 years of marriage (Office for National Statistics, 2017). Children experience stress and anxiety from the changes and challenges brought about by separation, divorce and remarriage.

Amy Chua's *Battle Hymn of the Tiger Mother* (2011) describes a home environment where some children are put under pressure to succeed; "Tiger Mother" has since become shorthand for pushy parenting. The need to ensure children are safe has resulted in structured timetables, packed schedules, constant monitoring, little privacy or freedom for them, and a generation of children who rarely walk or cycle to school and, when not at school, stay at home more than previous generations finding entertainment through electronic games and technology. According to Louv (2010, p. 10), "we see the emergence of what I have come to call nature-deficit disorder. This term is by no means a medical diagnosis, but it does offer a way to think about the problem and the possibilities – for children, and for the rest of us as well". He describes nature-deficit disorder as "the human costs of alienation from nature, among them: diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses" (Louv, 2010, p. 36).

Could it be that the reduction in playtime or the "wrong kind of play" is responsible for the rise in children's mental health problems, evidenced in increasing rates of depression, anti-social behaviours and teenage suicide? "Childhood is a time of discovery, of exploration, learning and growing. It is the time we make neural connections, and social connections" (Landry, 2005, cited in Souter-Brown, 2015, p. 99). Children learn through play, imitation and experience (Souter-Brown, 2015, p. 99). The list of green spaces in the *Consultation Paper on a new Planning Policy Statement: Planning for a Natural and Healthy Environment* (The Department for Communities and Local Government, 2010) specifically includes provision for children and teenagers ("including play areas, adventure playgrounds, skate parks, basketball

Copyright © 2019 Elizabeth Read

courts and other informal areas"); however, evidence suggests that "traditional play-grounds do not compare favourably with the natural environment and fixed equipment leaves little room for children to play creatively, since there is generally a finite number of ways to use each piece of equipment" (Brown & Berger, 1984, pp. 599-626). According to Frost et al. (2008), children become bored by fixed equipment and either go to non-equipment forms of play or use equipment in unintentional ways increasing the likelihood of accidents. Barbour (1999) found that children's engagement with materials and equipment in the physical environment affected their motor skill development and their physical competence. She also found that traditional playgrounds - consisting of fixed equipment (such as slides and swings) - promote competition rather than cooperation and that playground design influences elementary school children's physical skill development by facilitating or constraining the strategies they use to manage their play with peers.

Opportunities to reconnect with nature through natural outdoor play areas promote healthy, whole child development: Herrington and Studtmann (1998) found that installing natural materials and other landscape elements in children's outdoor play areas led to changes in children's spatial cognitive awareness, and challenged and increased children's physical competence and skills. They also observed improvement in children's socialisation and fantasy play, which lasted for longer durations. Shim et al. (2001) reported that preschool children were likely to engage in more complex forms of peer play outdoors rather than indoors. Hartle (1996) found that outdoor play environments can stimulate as much or even more social play compared to indoor ones. Henniger (1985) found differences in social play between indoors and outdoors: more solitary activity was observed indoors while more parallel play was observed outdoors. According to Ryan et al. (2010), being outside is associated with greater vitality, such as levels of physical activity and social interaction. Maller et al. (2008, cited in Souter-Brown, 2015 p. 121) observe that outdoor play affords direct contact with the weather and seasons, and suggest that it supports a healthy lifestyle, physical activity, imagination, resourcefulness, and the development of aptitudes for risk management, negotiation, turn-taking, co-operation and problem-solving.

As well as the social engagement of play, children value privacy, which is important for them, particularly those children who are rushed from one group activity to another. Greenman (1988) suggests that opportunities for solitary pursuits and experiences of privacy are necessary for young children, and that private space available outdoors leads to fewer constraints on children's behaviours and enables them to find solitude away from other children and adults, or to be in small, intimate groups. Jacobs (1980) suggests that privacy helps in the development of personal autonomy as it gives a child the opportunity to come to terms with his or her own thoughts and feelings.

In summary, there is evidence that green space is beneficial to the health and well-being of both adults and children; however, with increased urbanisation, changes in family dynamics, changing habits and more sedentary life-styles, there is less access to green space, even as there is greater need for it. There is a risk that deprivation may affect the families of life-limited children disproportionately. According to Fraser et al. (2011), life-limited children are more likely to reside in the most deprived areas, which tend to be furthest away from green spaces.

Copyright © 2019 Elizabeth Read

Their parents may be time-poor, with little opportunity for exercise and may not have a garden at home, or be unable to manage one that they do have. Siblings may fall into the trap of a technology-driven, sedentary life-style, largely spent indoors, deprived of natural sunlight and at risk of obesity and other health issues. Because of the pressures associated with caring, children may encounter conflict in the home or family breakdown. "To counter the stressors that young children today are exposed to – blended families; both parents working outside the home; increased exposure to violence, both real and on the screen; excessive screen time; feeling pressured to perform or behave beyond their ability [Witkin, 1999] – we can design environments to attract young people back to their childhoods and away from excessive screen time, away from dysfunction or disharmony in their home" (Souter-Brown, 2015, p. 110).

In this section, evidence has been shown to suggest that access to green space can significantly enhance well-being and counter some negative aspects of the contemporary environment. Green space around a children's hospice building is therefore highly likely to be beneficial. The next section investigates theories and evidence that connect nature and well-being.

Copyright © 2019 Elizabeth Read

5: Theory and Evidence

Since the very first monastic gardens, anecdotal evidence attests that gardens were created, used and deemed to be beneficial for physical, emotional, social and spiritual well-being. In the 1970s, Roger Ulrich, environmental psychologist, started to research the physical and emotional effects of the environment on hospital patients. In 1984, *Science* published his ground-breaking article, "View through a Window May Influence Recovery from Surgery", triggering further research into the connection between nature and well-being.

Ulrich studied cholecystectomy patients recovering from surgery in hospital and found that they recovered more quickly with a view of trees and nature from their window. Twenty-three surgical patients assigned to rooms with windows looking out on a natural scene had shorter postoperative hospital stays, received fewer negative evaluative comments in nurses' notes and took fewer potent analgesics than 23 matched patients in similar rooms with windows facing a brick building wall (Ulrich, 1984). Importantly, he used the standards of modern medical research (strict experimental controls and quantified health outcomes) and thereby proved the point that Florence Nightingale had made a century earlier (Nightingale, 1863, p. 19).

Other academics went on to prove the beneficial effects of artificial nature in the form of a film, and in pictures. Katcher et al. (1984) found that nature other than green space, viewed within a building (rather than through a window), had positive results: patients waiting to undergo dental surgery had lower anxiety and higher scores for patient compliance having been in a waiting room with (rather than without) an aquarium. Frederickson and Levenson (1998) identified that viewing artificial nature reduced stress. They did this by first exposing participants to a fear-eliciting film and then randomly assigning some to view a nature film afterwards. Those who viewed the nature film exhibited significant recovery from cardiovascular stress in only 20 seconds. Ulrich, working with Gilpin (2003), found that nature depicted in art through various media has the same beneficial outcomes for patients as does nature itself.

Ulrich's work provided the seminal argument in favour of the benefits to patients of access to nature. In the context of evidence-based design, he not only gave reasons why there should be natural landscapes around medical institutions, but he also showed that patients would benefit when those landscapes are made clearly visible from within the buildings, including from the bedrooms. His pioneering work sparked an interest in bringing together the theory and research to guide decisions about the design of health care settings and their surroundings.

Design strategies for therapeutic gardens emanate from theoretical and philosophical foundations laid in the last quarter of the 20th century. Academics have been attracted to both prove and challenge those hypotheses and theories, and thus a wealth of evidence both for and against has evolved. Some features of evidence-based design are proven; those that have created debate are still nevertheless enthusiastically adopted by a growing cohort of experts in therapeutic design while the work of providing the evidence to support the theories continues. In scholarly terms, it must be noted that at present some aspects of so-called evidenced-based design are universally accepted rather than proven. For example, the biophilia hypothesis (see below) continues to be debated and yet has already led to a genre of architecture with a global following.

Copyright © 2019 Elizabeth Read

The foundations for therapeutic garden design strategies are the biophilia hypothesis (leading to Appleton's habitat and prospect-refuge theories), the stress reduction theory and the attention restoration theory. They are widely quoted in works such as the King's Fund report, *Gardens and Health: Implications for Policy and Practice* (The King's Fund, 2016), Dr William Bird's report, *Natural Thinking* (2007), *Therapeutic Landscapes: An Evidenced-Based Approach to Designing Healing Gardens and Restorative Outdoor Spaces* (Marcus and Sachs, 2014), *Healing Gardens: Therapeutic Benefits and Design Recommendations* (Marcus & Barnes, 1999), *Therapeutic Gardens, Design for Healing Spaces* (Winterbottom & Wagenfeld, 2015) and *Landscape and Urban Design for Health and Well-Being* (Souter-Brown, 2015).

The Biophilia Hypothesis

The word "biophilia" derives from the Latin *bio* (life) and *philia* (attraction) and is generally attributed to biologist Edward O. Wilson. Wilson identified that human beings desire natural settings and this desire is fundamental to being human. He introduced his biophilia hypothesis in his book, *Biophilia* (Wilson, 1984). He stated, "Biophilia, if it exists, and I believe it exists, is the innately emotional affiliation of human beings to other living organisms. Innate means hereditary and hence part of ultimate human nature" (Wilson E., 1997, p. 31).

Habitat and Prospect-Refuge Theories

Appleton (1975) also argues that our preferences are derived from our evolutionary origins and proposes his habitat and prospect-refuge theories. He suggests humans prefer savannah-like landscapes with occasional trees similar to the environment in which our ancestors prospered. This reflects our need for survival and harks back to before the Agricultural Revolution (10,000 BCE), when we were hunter-gatherers. Orians and Heerwagen (1992) asked study participants from three countries to state their preferences for different types of trees; the most popular were the type generally found in savannah-like environments, with large canopies and short trunks. A clear prospect, perhaps from a vantage point or refuge, provides the opportunity to see without being in danger. Heerwagen and Gregory (2008) identified that people who are ill or fatigued prefer more refuge, teenagers prefer more prospect than refuge, and women prefer more refuge than men.

Browning et al. (2014) identify fourteen patterns of biophilic design for improving health and well-being in the built environment which are organised into three categories: "Nature in Space" (including plant life, water and animals, as well as breezes, sounds, scents and other natural elements), "Nature Analogues" (such as objects, materials, shapes or patterns similar to nature) and "Nature of the Space" (identifying not only prospect and refuge, as did Appleton (1975), but also mystery and risk or peril, described as an identifiable threat coupled with a reliable safeguard) - discussed further in the next section.

Copyright © 2019 Elizabeth Read

Psycho-Physiological Stress Reduction Theory

Stress reduction is the focus of much research relating to health care facilities. Ulrich (1991) presented study participants with a stress-inducing film and then collected data on heart period, muscle tension, skin conductance and pulse transit time to measure stress recovery during environmental presentations of six different natural and urban settings; he found that recovery was faster and more complete when subjects were exposed to natural rather than urban environments. The foundation for Ulrich's work on stress is Professor Walter Cannon's concept of "fight or flight" (Cannon, 1932), also called "acute stress response". The body reacts to threats with the release of epinephrine (adrenalin) and norepinephrine, triggering increases in heart rate and breathing, constricting blood vessels and tightening muscles. In the past, "fight or flight" stress would have been commonplace and the situations causing it life-threatening; in contemporary times, people experience stress, for example, from work or conflict and, whilst such situations are not generally life-threatening, stress can be damaging.

Undoubtedly, caring staff and the families of life-limited children will experience stress on a regular basis with short-term consequences, such as disrupted sleep, increased feelings of isolation and depression, elevated heart rate and blood pressure, a reduced ability to make antibodies, weakened immune systems and prolonged wound-healing. Longer term, stress can contribute to heart disease, cancer, type 2 diabetes and depression (Marcus and Sachs, 2014). According to Ulrich (1991, pp. 201-230), stress will be reduced if a hospital environment fosters perceptions of control, social support and positive distraction, to which he later added physical movement and exercise (Ulrich, 1999, p. 48) - explored further below.

Control and Privacy

Life-limited children can lose their sense of control for various reasons: being in a hospital environment, depending on others for their basic needs, experiencing long waiting times, following a regime for medication and having their choices limited. Dependency can also lead to a lack of privacy. Loss of either control or privacy can result in stress. Parents too may lose their sense of control, feeling that they are being swept along by events or that their child is being taken away from them; there may be very few private moments in a hospital for them too. Ulrich (2014) refers to two sources of stress: illnesses (possibly resulting in chronic pain, reduced physical capabilities and restricted diets) and physical-social environments (ones that are noisy, confusing in terms of wayfinding, and where people lose privacy and control, for example, over lighting and temperature). A sense of helplessness, anxiety and depression can manifest itself in increased blood pressure, muscle tension and high levels of circulating stress hormones. Kennedy et al. (1990) found that stress suppressed the immune system functioning of Alzheimer patients' carers; Pardres (1982) and Schumaker and Pequegnat (1989) found job-related stress widespread amongst health care staff with outcomes such as absenteeism, high turnover and "burn out".

Copyright © 2019 Elizabeth Read

Research has shown that a sense of control is an important factor influencing stress levels and wellness (Steptoe & Appels, 1989). Proshansky et al. (1970), in studying the health benefits of different hospital designs, identified the need for freedom of choice. Research by Glass and Singer (1972) and Evans and Cohen (1987) shows that where there is a sense of control, the impact of stressors is reduced or eliminated; for example, music from a neighbour's house can cause stress, whilst the same music played (and therefore controlled) by an individual is positively perceived.

Social Support

Ulrich (1999, p. 42) wrote: "People who receive higher levels of social support are usually less stressed and have better health status than persons who are more socially isolated. … Low social support may be as great a risk factor in mortality as is cigarette smoking". Ulrich defines social support as emotional, material and/or physical aid and caring. "It can manifest in many ways, including expressing to someone that he or she is cared about; encouraging a person to express feelings or beliefs; giving someone a sense of belonging to a social group or network; and providing tangible assistance" (Marcus and Sachs, 2014, p. 26). The need for social support is recognised in the care provided at children's hospices.

Positive distractions

An appropriate level of stimulation (not so high as to be stressful, nor so low as to create boredom) has a positive effect on well-being. Low stimulation or sensory deprivation (for instance a lack of windows) is associated with high levels of anxiety. Natural distractions are positive distractions through contact with nature. Ulrich (1999, p. 49) writes: "A positive distraction is an environmental feature or situation that promotes an improved emotional state in the perceiver, may block or reduce worrisome thought, and fosters beneficial changes in physiological systems such as lowered blood pressure and stress hormones". The top four positive distractions that can improve health and well-being are: nature, laughter, companionable animals and music (Winterbottom and Wagenfeld, 2015, p.33).

Opportunity for movement and exercise

The benefits of exercise include improved cardiovascular health and reduced levels of depression among adults and children (Brannon and Feist, 2000). Instances of movement and exercise might range from a child sitting upright to look at a view, to a group of siblings letting off steam; from a bereaved parent taking a gentle walk around a memorial garden to teenagers with DMD competing on a wheelchair racing track.

In addition to control, social support, positive distractions and opportunities for movement and exercise, Marcus (2007) includes five more: visibility, accessibility, familiarity, quiet, comfort and unambiguously positive art, all discussed further in the next section.

Copyright © 2019 Elizabeth Read

Attention Restoration Theory

Environmental psychologists, Rachel and Stephen Kaplan, developed the attention restoration theory which contends that people can concentrate better after either spending time in natural environments or just looking at representations of nature (pictures or videos) (Kaplan & Kaplan, 1989). The theory distinguishes four responses: direct attention, direct attention fatigue, effortless attention and restored attention. Direct attention ("hard fascination") involves concentrating on a task, which necessitates blocking out distractions. Over time, this causes direct attention fatigue (both mental and physical) and can lead to poor judgement, irritability, unhappiness and even hostility. Kaplan and Kaplan's theory is that recovery comes from effortless attention ("soft fascination"), such as is engaged when listening to bird song and looking at plants and natural features. Soft fascination leads to restored attention. Families of life-limited children will have long periods of direct attention and are likely to suffer from direct attention fatigue, even though they may perhaps consider this to be the norm. Hospice staff carry the burden of emotional labour, which can also lead to direct attention fatigue.

Being Away

Marcus and Barnes (1995) contend that "soft fascination" comes from "being away" from the source of stress. It could be argued that coming to a hospice on short breaks gives respite from stress, but it is also helpful to be away at the hospice; a garden, or specific parts thereof, can facilitate this. The extent to which a place makes an individual feel in a different world from the source of their stress improves the outcome; the environment should hold the individual's attention, enabling them to think different thoughts.

Gardens do make a difference. A post-occupancy evaluation study of hospital gardens took place in the San Francisco Bay Area (Marcus and Barnes, 1995) – see Figure 2.

Copyright © 2019 Elizabeth Read

Figure 2: Responses from 143 garden users at four San Francisco Bay Area hospitals (Marcus and Barnes, 1995)

How do you feel after spending time in the garden?	
More relaxed, calmer	79%
Refreshed, stronger	25%
Able to think/cope	22%
Feel better, more positive	19%
Religious or spiritual connection	6%
No change of mood	5%

According to Marcus (2007, p. 4), of those responding to the question, "Do you feel any different after spending time in the garden?", ninety-five percent reported a positive change of mood. In an audit carried out for Horatio's Garden (Salisbury, UK), 100% of patients said the garden gave them "an improved sense of well-being" and 94% said it "improved happiness" (Chapple, 2017).

Academics are in broad agreement on what elements constitute a therapeutic garden, much of which echoes historical evidence. Whilst a garden cannot provide a cure for a life-limited child, it can create a sense of control, facilitate stress reduction and help a child summon inner resources. It can also provide staff with a retreat from work-related stress, a relaxed setting for family interaction, an environment totally different from hospital, a place for new experiences and memories, a place to interact with siblings and make friends, and a refuge for privacy and quiet reflection. The next section puts theory into practice, developing frameworks into ideas that illustrate what could be included in a therapeutic garden. The list is not exhaustive, nor is it compulsory. It is not meant to be definitive, but rather to start discussions between designers and stakeholders to trigger ideas and highlight opportunities that can be developed into unique solutions for each hospice.

Copyright © 2019 Elizabeth Read

6: Design in Practice

Most children's hospices have accessible gardens that can be designed to optimise their therapeutic value. This section presents design frameworks that flow from the evidence, contextualises them for children's hospices and shows how they can be put into practice. Because children's hospice gardens are intended not only for life-limited children, but also for their siblings, parents and care staff, all features that may have therapeutic benefit to any of these groups have been included even though it is recognised that not all life-limited children will be able to participate fully.

A good starting point is Appleton's (1975) prospect-refuge theory, which proposes an unimpeded view over a distance (prospect) and a place for withdrawal (refuge). Designs incorporating a prospect will include a place, feature or topography that provides a view. Borrowed landscape beyond the garden, an eyecatcher[5] in the distance, a view out to sea, a focal length created by planting hedges or trees to guide the eye into the distance, seats to contemplate the view, ha-has,[6] infinity structures[7], terraces, high ground, mounds, arches, gateways and openings in walls, fences and hedges all provide prospects. A prospect can be separate from a refuge or combined with one.

A refuge is a place for withdrawal from the main flow of activity. It is a place of security for those that are grieving or suffering stress. This sits well with Marcus and Barnes' theory (1995) of being away to achieve relief and restoration. A place of refuge might provide protection from the elements or be a place where people cannot be seen (shielded by hedges, planting or walls, or in a loggia, gazebo or pod); it might also be a place where conversations cannot be overheard, perhaps masked by other sounds, such as those of water. Seating may be against a wall creating a feeling of security. Solitary refuge recalls Ulrich's theory (Ulrich, 1991, pp. 201-230) that stress will be reduced if the environment fosters perceptions of control, especially control over privacy. According to Berg and Medrich (1980, p. 340), children choose their own place of refuge, thereby achieving both control and privacy. "This is not surprising as it reflects children's desire to have something that is theirs, at a time when virtually everything else […] is built for or 'belongs to grown-ups'".

Browning et al. (2014) add mystery and risk or peril to Appleton's prospect and refuge. Mystery is created by promising more information through partially obscured views or other sensory devices that entice an individual to travel deeper into an environment. Sounds and vibrations from an unknown source, scent, curved walls, meandering or disappearing paths, hidden views, perspective and illusion, and light and shadow can all create mystery. A risk or peril is an identifiable threat coupled with a reliable safeguard; for example, bridges, walking close to a waterfall with the risk of getting wet, high paths, infinity edges, passing under a bridge or tunnel, passing through water, or standing under a tree or ledge all create risk or peril. A combination of fear and reverence can engender an appreciation for powers greater than ourselves (Kellert, 2008, p. 14). These two attributes (mystery and risk or peril) are reminiscent of 18th century picturesque gardens which inspired awe and were said to be spiritually uplifting.

[5] An "eyecatcher" is a feature drawing the eye into the distance; for example, it might be a statue.

[6] A "ha-ha" is a recessed landscape design element that creates a vertical barrier while preserving an uninterrupted view of the landscape beyond.

[7] An infinity structure gives the impression that the garden merges seamlessly into the surrounding landscape or sky.

Copyright © 2019 Elizabeth Read

According to Ulrich (1991, pp. 201-230), stress will be reduced if an environment fosters perceptions of control, social support and positive distraction. A perception of control can be introduced into a hospice garden by making the access and navigation easy; for example, by ensuring good signage and no barriers. It can also be introduced by providing choices, for example, a choice of places to go, routes to take or places to sit. Children feel empowered by pushing, turning and touching interactive features. Moveable furniture enables groups to congregate and spend time together, and a variety of spaces suitable for different users, groups and activities can all foster social interaction. Places to eat outside make a garden a natural social space and give it a domestic feel. Gardening activities can be used to create social engagement, and parties or events held in a garden can extend participation to include those outside the hospice and family circle.

According to Winterbottom and Wagenfeld (2015, p. 33), the top four positive distractions that can improve health and well-being are: nature, laughter, companionable animals and music. Green nature is evidenced in the verdure of a garden; Marcus and Barnes (1999) recommend a minimum of 70% vegetation to 30% hard landscaping in a healing garden. Whitehouse et al. (2001) found that users of a children's hospital garden disliked and avoided areas having a high percentage of concrete ground or starkly built features and consistently recommended that the garden should have "more greenery and flowers". The minimalist approach of the design at Maggie's, Dundee (grass and gravel parterre in geometric or symbolic designs) leaves nature somewhat threadbare. The 70:30 ratio can be difficult to achieve on a small site; Horatio's Garden, Salisbury has overcome this problem by including height in the form of trees, whilst others include living green walls.[8] Nature is also evidenced in natural shapes and materials. Marcus & Barnes (1995) recommend using natural materials and various organic shapes rather than straight lines in garden design. Similarly, advocates of biophilic design recommend including natural shapes and forms (for example, shells and spirals, eggs, ovals and tubular forms), simulating natural features (for example, wood or the different characteristics of natural light and shadow) and emphasising a garden's relationship to the place where it is sited (for example, by using local stone and indigenous planting) (Kellert, 2008).

Kaplan and Kaplan (2002, cited in Bird, 2007, p. 11) identified that the relationship teenagers have with nature is different from either that of children or of adults: "Teenage years are a time when children develop an identity of their own. During this brief time there appears to be a reduced affinity with nature in preference to time spent with their peers. Nature can be used to increase social opportunities and provide the location for adventure activities for teenagers. However, research has found that in all societies there is a return to a relationship with nature from the age of 19yrs, making the teenage interlude a brief break to a lifelong relationship". As children's hospices include teenagers as well as younger children within their remit, consideration could be given to including an area outside for teenagers that encourages peer group social interaction.

Laughter is a natural distraction and, notwithstanding the need for a quiet, reflective space for some hospice users, it is generally uplifting. Natural water features can be used in gardens to stimulate laughter; for example, Little Harbour (part of Children's Hospice South West) has

[8] Living green walls are panels of plants, grown vertically using hydroponics, on structures that can be either free-standing or attached to walls.

Copyright © 2019 Elizabeth Read

several water automata which spray passers-by to amuse the children (and their parents). As well as providing a natural distraction, these water features provide the risk or peril referred to by Browning et al (2014). Other sources of laughter might be features that react to touch or movement. Laughter creates stories and memories thereby fostering a sense of place.

Companionable animals were used in the 19th century asylums for patient therapy. In Tuke's description of the York Retreat (Hickman, 2013, p. 40) he writes, "These creatures are generally very familiar with the patients, and it is believed that they are not only the means of innocent pleasure, but that the intercourse with them sometimes tends to awaken the social and benevolent feelings". Animals (for example, dogs and rabbits) can be introduced through agencies and volunteers; wildlife (birds, bees and butterflies) can be encouraged into the garden with suitable planting. Bird tables and video links to nests provide engaging natural distractions.

Many children's hospices will provide music therapy with the active involvement of a music therapist. There is also therapeutic value in being stimulated by music while engaging in other activities or by simply focusing on the music. It can be mood changing, making the listener either happy or sad. This positive distraction can give the feeling of being away in a different world, absorbed by the music. The music can be live, recorded, re-active to the visitor (created on demand by the visitor through an interactive mechanism), re-active to nature (e.g. wind chimes) or natural (e.g. bird song, rustling grass or trees). Constant music, or constant repetitive sound, which the visitor has no choice but to hear, can be stressful and should be avoided.

Movement and exercise provide benefits such as improved cardio-vascular health and reduced levels of depression and stress among adults and children (Brannon & Feist, 2000; Koniak-Griffin, 1994). Many of the 19th century asylums included extensive walks and today rural children's hospices may have the opportunity to create a woodland path or accessible track through a wild flower meadow. A variety of destination points, routes and opportunities for play encourage exercise and provide choice. Paths that meander allow visitors to stroll in a garden to discover different areas and features, or reach a specific destination, which might be a view, a statue or a special place.

Playgrounds are often included in children's hospice gardens; they are an opportunity for movement and exercise and a place for both life-limited children and their siblings to enjoy with their parents. These playgrounds might have a polymeric, synthetic or rubber surface and fixed equipment made of artificial materials. The sterile environment created by a uniformly flat surface made from impact-attenuating play carpet, whilst comparatively safe and low maintenance, all too often lacks the stimulation for creative play and social engagement.

Brown and Berger (1984) suggest that traditional play-grounds and fixed equipment have their limitations. Alternatives are natural play (creative play in a natural environment, such as a wood) and natural playgrounds (designated areas for play consisting of natural elements, such as water, sand, boulders and logs). "To be effective, natural play areas need to stimulate the biophilic senses. Natural play is about examining, exploring, dreaming and pretending, taking risks and developing confidence to try something new" (Souter-Brown, 2015, p. 237). Natural play provides a sensory experience and an opportunity for self-expression and imagination.

Copyright © 2019 Elizabeth Read

Play England, part of the National Children's Bureau, has produced *Design for Play: A Guide to Creating Successful Play Spaces* (2008) and *Nature Play: Maintenance Guide* (2009b), which are aimed at those responsible for developing, delivering and maintaining innovative natural play space. *Design for Play* suggests that successful play spaces should offer opportunities for movement and physical activity, stimulate the five senses, be good places for social interaction, allow children to manipulate natural and fabricated materials, and provide children with challenges. It also suggests that successful play spaces are the result of inclusive design: suitable for all ages to play together, for the able-bodied and those with disabilities. Importantly, these are places that children seek out, enjoy and return to. In a speech at the "Places to Play Seminar" organised by Play England, Packard (2007) said, "If we are to really improve the quality of play opportunities, we also need to provide children with access to more natural and creative play settings that help stimulate the senses and encourage greater use of the imagination".

Kaplan and Kaplan's sources of "soft fascination" (1989) includes natural features, plants and birdsong. Broadly these match Winterbottom and Wagenfeld's positive distractions (2015) – see above. Marcus and Barnes (1995) suggest that "soft fascination" is achieved by being away, for instance, by being in an environment different from the source of stress. The extent to which a garden provides an environment or experience that makes an individual feel in a different world from the source of their stress improves the therapeutic outcome. The domestic feel of a hospice is the antithesis of the clinical, institutional feel of a hospital. There is a strong case for creating and sustaining a homely environment at a children's hospice which supports families doing "normal family things". One of the challenges is to maintain the homely, domestic feel whilst ensuring that the charity responsible for the hospice benefits from the synergies of proximity. For instance, it is convenient for fundraisers and others to be on site, but housing them there can soon turn the domestic environment into something more akin to a campus. The homely atmosphere of a children's hospices can be felt as much in the garden as in the building. Turning a large space into smaller, discrete areas with different characteristics or focal points allows individuals and families to find their own space. Planting styles can change the "feel" of a garden from institutional to domestic or vice versa.

A children's hospice garden will cater to different ages and abilities and some organisations in seeking an inclusive design may look to sensory gardens for the solution. They may also be responding to the need to support children who suffer from sensory loss (touch, taste, smell, sight or hearing) and whose remaining senses have become increasingly important for stimulating interest and for communication. Rarely, other sensory systems (kinaesthetic, proprioceptive, vestibular and tactile) may be compromised. Kinaesthesia and proprioception are senses concerned with body/spatial relationships, the vestibular sense is important for balance and tactile defensiveness creates an adverse reaction to touch. Many life-limited children have over- or under-responsive sensory systems and sensory enrichment for one child might be unpleasant for another; for example, birdsong may be a nourishing experience for one child, but another might cover his or her ears (Winterbottom & Wagenfeld, 2015, pp. 224-259). Designing a sensory garden is challenging for this reason and because it is difficult to make it effective all year round. Fragrances can trigger memories, the sounds of leaves or grass moving can capture soft attention, plants can be pleasant to touch, the colour and shape of different plants juxtaposed can be visually appealing and edible plants can arouse the taste buds. Children may be allowed

Copyright © 2019 Elizabeth Read

to pick flowers and collect leaves, both as a pastime and an opportunity to make gifts (Barnes, 2014). Sensory experience does not depend on garden design but may be achieved simply by being out in the garden to feel the elements (gentle rain, snow and wind, the warmth of sun and the cool of shade). For hospitalised children who spend their time indoors with controlled air and temperatures, the opportunity to feel atmospheric variations by being outdoors can be an enlightening and distracting experience.

According to Marcus and Barnes (1995), privacy is part of being away; this echoes Ulrich's theory (1991, pp. 201-230) that stress will be reduced if an environment fosters perceptions of control. There are obvious parallels here with Appleton's refuge proposal where a refuge can also be a place of privacy (Appleton, 1975). Life-limited children rarely have privacy and are likely to be constantly monitored at a hospice. Facilitating their privacy in a garden safely can provide a unique benefit to them. Private space can be created sheltered by walls, fences or planting; seats or benches under a tree or a secluded place in the garden can provide privacy for a family or small group. Individual seats recessed into the border are effective private spaces as demonstrated at Penny Brohn, Bristol. Horatio's, Salisbury, has a recess within the planting large enough for a bed. Staff will need privacy in the garden away from families and places of activity.

Marcus and Barnes (1995) also suggest that a sense of being away can be achieved by emphasising the ongoing cycle of life versus evoking thoughts of anxiety, illness and death. The human life cycle emulates the botanical life cycle and the natural journey from propagation, through growth, flowering, fruiting and decay to regeneration. Similarly, the pattern of the seasons provides a sense of inevitability, predictability and of being part of something greater than oneself. Consideration of self in this context can facilitate spiritual contemplation and where better than in a garden surrounded by the evidence of nature?

Marcus (2007) includes further design recommendations: visibility, accessibility, familiarity, quiet, comfort and unambiguously positive art. Visitors to a hospice may not necessarily be aware that there is a garden if it is not visible either from the entrance or the rooms being accessed by the family. Good signage is important, as is a legible layout for easy navigation. It should be possible to access a garden easily whether or not an individual has a disability. Ideally, a garden should be accessible all year round, all day and even after dark. Lighting can be both functional and ornamental, transforming the garden and creating a secondary design at night. The borrowed landscape too can be totally different at night and the stars a source of wonder and spiritual contemplation. Consideration might be given to making a garden accessible to babies, who may benefit from fresh air and natural daylight. This should have shade and some protection from the elements; however, there are still hazards to being outside, such as wildlife, UV rays, pollution and allergens.

For some, the transition from indoors to outside will be complicated by changes in temperature and differences in light intensity. Many therapeutic gardens include spaces that can be defined as half-way between indoors and outdoors, for instance, garden rooms and colonnades. As history recounts, and Worpole suggests (2009a, p. 83), "canopies, pergolas, balcony overhangs, loggias and other elements help break down the strict boundaries between indoors and outside". Places where families and staff can enjoy fresh air, sunlight and view the garden, but also

Copyright © 2019 Elizabeth Read

be protected from the sun, wind or rain are popular in many hospices. These areas extend the use of the garden as well as providing additional semi-indoor space. Horatio's Gardens at Stoke Mandeville, London and Oswestry all include garden rooms (designed by architect Andrew Wells) to provide a place for patients to enjoy the garden even when the weather is poor. Rotating pods are sometimes used both to capture the sun and provide an intimate space. These hark back to the rotating chalets of the beginning of the 20th century and to George Bernard Shaw's rotating shed where he wrote many of his literary works.

For many regular visitors, a garden will become familiar and they will have a sense of place or belonging; however, those visiting for the first time (which may be for an end-of-life situation) will benefit from aspects of the garden with which they can quickly connect, for example, its domestic scale. Water is universally appealing to people from different cultures. The English Garden style (lawns, flowers, trees and winding paths) incorporates all the elements of Ulrich's Theory of Supportive Design (Ulrich, 1999) and is familiar to Western cultures. Children make their own associations from their experiences; they remember a garden in terms of what they did there rather than by its physical features, for example, they may remember a place where they played pirates.

According to Marcus (2007), hospice visitors must feel comfortable. A number of the points already discussed can be reconsidered as matters of comfort. For example, a hospice garden can provide quiet places, away from unwanted noise, parking, traffic and so on. To be comfortable, some users may need places to sit or walk that are suitable for all weathers and seasons, sheltered from the elements. They may want to feel secure without feeling they are in "a fishbowl", which can be the unintentional effect of a courtyard garden. A place of comfort may be a place for release, for example, to cry privately.

Another of Marcus's recommendations (2007) is unambiguously positive art. Ulrich (1991) found mental health patients in Scandinavia reported positive emotional responses to nature paintings and prints, but consistently negative, stressful reactions to abstract works of art. Malenbaum et al. (2008) made a further study by randomly assigning patients to rooms with either images of nature, abstract art, a blank panel or nothing at all. Patients exposed to nature images were more likely to require weaker painkillers and reported significantly less anxiety than other patients. Patients viewing abstract art had the highest level of anxiety. Ulrich and Gilpin (2003, pp. 134-136) recommend art subjects such as waterscapes, landscapes with visual depth, nature settings in warmer seasons, scenes with barns or older houses, garden scenes and people at leisure in nature and sunny conditions. Nanda et al. (2008) found that art preferences varied significantly between hospital patients and people with art or design backgrounds. Paintings, prints and photographs inside a hospice should have unambiguously positive content.

Art installations outside and in gardens, if depicting nature, can be positive distractions. At Horatio's, Salisbury, there is an apple sculpture by Simon Gudgeon, reflecting Horatio Chapple's love of apples: the natural representation is pleasing. The statue of Peter Pan in Kensington Gardens (featuring squirrels, mice, rabbits and fairies as well as Peter Pan himself) is a "talking statue" that can be brought to life with a smart phone. A classic case of the "wrong" kind of art occurred in a US hospital where abstract figures of birds in a courtyard were viewed with dislike and fear by cancer patients in adjacent wards, and eventually had to be removed. (Ulrich, 1999, pp. 70 – 71)

Copyright © 2019 Elizabeth Read

Appleton's habitat theory suggests we prefer environments akin to the kind in which our ancestors prospered: prairie or savannah-like landscapes. The trees in a savannah landscape are sufficiently widely spaced to allow gaps in the canopy, not unlike English parkland. Marcus and Barnes's 70:30 verdure to hard landscaping rule (1999) presupposes that therapeutic gardens will have a preponderance of verdure and many institutions seek to achieve this by creating repetitive blocks of low-to-medium height, evergreen shrub planting, which is low maintenance. This is particularly popular in car parks and business parks and generally excludes lawns, which are high maintenance. This type of planting lacks interest and engagement, changing little with the seasons. It is the institutional association that makes it particularly unattractive in the context of children's hospices. Souter-Brown (2015, p. 113) contends that "school grounds with the natural shade of tall trees, bio-diverse planting to attract wildlife, edible planting, views of the sky or distant views, create a calming connection for the children".

Plants in a therapeutic garden will be chosen to provide colour, texture and movement, and reflect the need for year-round interest. Marcus and Sachs (2014, pp. 80-83) suggest planting to provide a rich, multisensory experience, mounded or sloped beds to increase visibility, different plant heights and the use of trees to make the buildings look smaller by comparison and provide views of greenery from the upper floors. Ulrich (2008, p. 90) recommends "verdant vegetation, flowers, savanna-like or parklike properties (scattered trees, grassy understory), and unthreatening wildlife such as birds". Gwenn Fried, horticultural therapist at New York University Langone Medical Centre (cited in Marcus and Sachs, 2014, pp. 277 -278) recommends selecting plants on the basis that they offer at least three qualities; these might include sensory attributes (colour, fragrance, texture or sound), flowers, interesting foliage or bark, usefulness for crafts, hardiness and reliability, interest over multiple seasons, attractiveness to wildlife, non-invasiveness, little/moderate need for maintenance, a long-blooming or night-blooming nature, educational benefits, or edible flowers or fruit (they should always be non-toxic).

Along with flowers, water is prevalent in therapeutic gardens. It is also ubiquitous to landscape more generally, and indeed to human existence. It is essential for life, it covers 97% of the earth, it appears as rain, clouds, humidity and snow, and it can produce rainbows. It is not surprising, therefore, that designers include water in their gardens. Whilst water is partly characterised by its lack of certain sensory qualities (pure water is unscented, transparent and tasteless), its boundaries can define a landscape; edges waver and rivers meander. Water features can be transformed with the addition of stones, flora and fauna. When water is still it has mirror-like qualities; when disturbed it is animated. It is transformed by light: sombre in dim light and sparkling in sunshine. It can collect in pools, or flow in waterfalls, cascades and fountains. It can enhance a sculpture or even move one. Water can provide sound (for instance, with rain chains) and low-pressure fountains can be a place for play. Bridges can create intrigue and a sense of awe. Moving water provides soft fascination and connects with the cycle of life. In Greek mythology, the River Styx was the boundary between life and death (Mador, 2008).

Water is significant in nearly all religions and its inclusion can provide harmony in a non- or multi-denominational environment. Immersion in water is important in Christianity (baptism), Hinduism (immersion in the Ganges; pilgrimages to the river Narmada), Judaism (the ritual bath – mikvah), Islam (the well of Zemzem at Mecca is sacred water, and Muslims perform a foot cleansing ritual in water before entering the mosque) and Shinto (water is used for purification

Copyright © 2019 Elizabeth Read

in every shrine). Because of its significance in different religions and its physical attributes, water often features in memorial gardens.

The purpose of a memorial garden is to offer an outdoor space for reflection. Its situation and design should provide a sense of being away whilst not being so distracting that it hampers quiet contemplation and the generation of personal thoughts or prayers. A memorial garden should be protected from invasive noise by being placed at a distance from the main garden and activities in the garden and, if necessary, further protected by hedges or planting. Because parents may visit the memorial garden at will, easy access directly from a car park can be helpful. Planting might be used to create a peaceful environment, but not to distract from personal thoughts. Shakespeare and the Victorians famously gave meaning to plants (for instance, rosemary for remembrance); however, the hidden meaning may be lost on the visitors or searching for one be too distracting. Memorial gardens are often minimalist or simple without the Marcus and Barnes's (1999) recommended 70:30 verdure to hard landscaping; instead nature is found in the surrounding landscape, sky and water (if it is included). The Japanese style lends itself to the design of a year-round quiet space with what Worpole (2009b, p. 55) describes as "the adroit assembly of water features, rocks, stones, raked gravel and occasional outbreaks of shrubbery" and thus "reflection not immersion or exploration". This style can work effectively in a memorial garden, but would not be appropriate for the main garden at a children's hospice.

Memorial gardens might include a borrowed landscape, perhaps with a distant view, to give a sense of being part of something bigger, a journey and a mystery. In the same way, a channel of water drawing the eye into the distance with minimal distraction can be powerfully evocative. Fountains provide focus, a religious connection and exemplify the cycle of life. Simple geometric shapes can be significant and effective: Islamic gardens use the square to represent earth and the circle for heaven; memorial gardens (irrespective of religion) can include a rectangular upright water feature entirely in contrast to nature's curves, thereby drawing attention. This can be combined with a pool (or garden footprint) which is square, circular or oval. To be restorative, the garden will feel peaceful and serene; it will focus on living and hope. Still water in a sunny spot creates reflections of the sky, and moving water, perhaps animated by wind or mechanical means, can scatter dancing light onto surrounding structures. Silvered water features exaggerate water's own reflective qualities and the combination of sky and water can be beautiful. A place to rest with shade provides an opportunity to linger. A memorial garden reflects a hospice's ongoing commitment to care for the bereaved, and whilst the bereaved are likely to outnumber the families of living life-limited children, the latter are the hospice's priority. As has been demonstrated by the different design approaches, it would be difficult for a memorial garden to double as a place of refuge.

It is common practice to exclude personal memorials, such as plaques and benches, from hospice gardens, which are seen as places for the living. "What the hospice cannot be, I was told time and time again, is a memorial garden. It has to be imbued with a sense of life, change and hope for the future and 'the journey ahead'" (Worpole, 2009a, p. 88). The scattering of ashes is also usually discouraged. Increasingly children are being taken into hospice gardens to die, the specific locations being entirely the parents' personal choice. Wherever parents choose, a sense of place is created for the bereaved without leaving a trace that might affect future users of the space.

Copyright © 2019 Elizabeth Read

Moore (1999, pp. 370-382) suggests some practical design recommendations: make sure the garden is secure from intruders, ensure accessibility for those using IV equipment, provide a mix of challenge and rest, as much diversity of nature as possible and hands-on activity with nature, and finally, consider the maintenance and storage requirements. Other relevant considerations are drinking fountains and electricity.

Roger Ulrich's (1984) ground-breaking work, "View through a Window May Influence Recovery from Surgery" published in *Science* in 1984, contends that benefit is gained simply from viewing a garden from inside a building. To make the most of the therapeutic value of nature, consideration should be given to ensuring that as many windows as possible have a good view. This might mean re-siting car parking away from a building or out of sight altogether. Looking out on tarmac or even a playground will not provide the benefits available from natural outlooks. Playgrounds can be unattractive when viewed from inside the building and often totally obscure any potential view of nature, thus diminishing nature's benefits from inside a building as well as the benefits children might enjoy if the playground were a destination.

Many children's hospices have a main community room or living room, usually attractively situated with good sunlight and views. Unlike an adult hospice, where privacy is of prime importance, a children's hospice is an altogether more social place (families and staff often gather together informally throughout the day). Rather than putting chairs (and wheelchairs) around a room facing inwards (waiting room style), they can be grouped in an arc to face the windows affording an opportunity for the children, families and staff to engage both with each other and with nature outside. If a garden is easily visible and accessible, hospice users will be encouraged to socialise or eat outside. A level surface and wide (unlocked) doors will ease the physical transition to the garden.

Besides the communal areas, therapy rooms and family rooms, there will be individual rooms for life-limited children. In most hospices these have attractive views and sometimes a private space outside. Some children will spend much of their time in their rooms and may even end their lives there. The spaces outside the children's rooms can be designed as individual gardens; ideally, they will be large enough to fit chairs for parents to sit outside and for a child's bed. Such a space is a refuge, a place in which to be away from the bedroom. The room itself should enjoy a verdant view and the designated outside area would benefit from being planted with as much verdure as possible (not just paved). Some hospices ensure that outside every bedroom there is a bird-table bringing nature close to the children despite the constraints of confinement.

The entrance to a hospice is the first and most important transition from outside. Here a visitor might already be in the garden and experience its effect when getting out of a car, ambulance or taxi. The entrance garden can allay anxieties for first-time visitors and later come to signal relief. An entrance can be made more welcoming and calming by the garden leading up to it. Families may spend a long time disembarking if they have considerable quantities of paraphernalia to offload. Entrances are sometimes placed on the north side of buildings to ensure that the living areas, on the opposite side, get the best of the sunlight, and for this reason, they are often neglected in terms of garden design, with the porch or shelter area left bare – such omission should be avoided, if possible.

Copyright © 2019 Elizabeth Read

It will not be possible for all hospices to include all the design ideas that have been set out in this section, nor would it necessarily be appropriate for them to do so, even assuming they had the resources and a suitable site; however, it became clear during the research phase of this project (see Section 8) that despite limitations, some hospices have been able to design creative and original therapeutic gardens. In view of the complexities of designing a garden and the specific knowledge required, trustees are advised to seek professional help when doing so. That said, a designer will need the support and engagement of stakeholders not only in the design phase, but also long after the design is complete, to ensure that the garden meets its full potential in the future. In the next section, a number of the issues relating to the development and on-going management of children's hospice gardens will be discussed. The successful accomplishment of related tasks will prove as important as the design itself.

Copyright © 2019 Elizabeth Read

7: Management Concerns

The history and evidence presented here support the concept that green spaces are beneficial to physical and mental health, social engagement and spiritual well-being. If the trustees and management of children's hospices accept this and are willing to use evidence-based design to create a therapeutic garden, then the issue for many will be how best to manage this resource. The management remit will include planning a garden and its maintenance, engaging effective volunteers, deciding how the garden is used for fundraising and public relations, ensuring the health and safety of users, making sure that the culture and working practices encourage garden use and, finally, evaluating the impact of the garden. This section addresses these issues and whilst the list is not exhaustive, these are the matters most likely to impact on the quality and potential of the garden.

There are design guidelines relating to healthcare settings that are a helpful starting point for any hospice planning a therapeutic garden; however, many are more concerned with the building rather than the garden, refer largely to provision for adults rather than children and are specific to each country within the United Kingdom. The Principles of Hospice Design (from The King's Fund and The Prince's Trust) discusses the importance of non-clinical and homely surroundings with a relaxed and informal atmosphere, the need for contact with nature, the importance of natural light, the need for "domestic" rather than institutional scale and feel, the configuration of furniture (for example, chairs in small clusters), the importance of quiet spaces for consultations with medical and nursing staff and a range of therapy rooms (The King's Fund, 2012).

Choosing an ideal location for a new hospice is not always possible as the site can be dictated by financial considerations, a donation or proximity to a sister organisation. The Victorians preferred a rural location for their medical institutions, but Worpole (2009a, p. 47) reports that Cicely Saunders (founder of the hospice movement) chose to locate St. Christopher's in suburban Sydenham and she later wrote: "We wanted to be somewhere where there were stations at each end of the road and buses going up and down. Patients wanted to see that, not lovely green fields". History does not recount whether this view was based on any evidence. Clearly, there is a myriad of advantages and disadvantages of both rural and inner-city locations that will be pertinent to, for example, recruitment of staff and volunteers, access to services, travel, car parking and cost. The current cohort of children's hospices has a broad range of locations from the coast to the city centre. Good design does not necessarily follow from a good location (however interpreted) and many would suggest that a difficult site can foster more creative designs.

A new hospice build is an ideal opportunity to incorporate design features flowing from evidence; for example, views from the windows and easy access to the garden. Marcus and Barnes (1995) suggest some issues identified in their research would have been mitigated or avoided had a landscape architect been involved when the hospice building was first planned. Garden projects can be a refurbishment of the whole or part of a garden and Marcus and Sachs (2014) urge designers to consider the entire site as a healing environment; projects relating to only one part of a garden should start with a review in the context of the whole site. "A beautiful garden can, like an elegant building, be easily compromised or spoiled by inappropriate additions, changes, or modifications" (Worpole, 2009a, p. 89). It would also be helpful to engage a garden designer with appropriate skills and an ability to work with stakeholders.

Copyright © 2019 Elizabeth Read

At a conference, “The Art of Gardens”, organised by Horatio’s and held on 31 January 2018, five garden designers were asked if their designs were evidence based. Only one designer articulated any knowledge of evidenced-based, therapeutic garden design; this may have been an omission or it could be indicative of a trend to engage designers for their celebrity status and (more general) garden design reputation. Evidence-based design is important not least because without it there is a risk that designers can do harm. “Some designers may unwittingly create gardens containing negative distractions if they focus exclusively on design qualities that please their personal or aesthetic tastes … Further, the types and styles of environmental design and art that many designers and artists personally prefer can be those that elicit distinctly negative reactions from the public” (Ulrich, 1999, p. 65). Hospice management should not presume that all garden designers are either knowledgeable about therapeutic garden design or are prepared to subjugate their own styles to accommodate it. Whether or not garden designers have knowledge or experience of therapeutic garden design, they will have expertise in garden design generally. This paper is not a substitute for engaging a professional designer, rather a preamble.

The Royal Horticultural Society Encyclopedia of Garden Design (2013) sets out guidelines on the creative process asking basic questions such as: What do you want to do in the garden (to be active or relax)? How do you want to feel (from upbeat to restored)? How do you want the garden to look (traditional or contemporary)? How much maintenance is sustainable? Do you have a particular style, perhaps to match the hospice building design or the location? Do you want to use the view or lose the view? What levels, structures, textures, colours and lighting do you want in the garden? How do you want to access the garden – paths and walkways, terraces and resting places? Do you want the garden to be environmentally friendly? Should the garden to be a sensory experience? Is the garden to be used all year round, all day including after dark? Are there any specific constraints, such as listed or mature trees, drainage problems or public footpaths? Do you want the garden to attract wildlife? The topography, soil, climate, wind direction, sunlight and shade, and open or enclosed aspect will also be assessed. Your garden designer will be considering all these aspects of garden design (and more) before proposing a design. This would be normal practice to create any garden design and to be expected in addition to specific recommendations relating to the therapeutic nature of the garden.

A starting point for any garden design will be to clarify the aim. There is evidence that some health-related gardens are designed to promote a cause rather than for therapeutic benefit. For example, Katie Crome’s *The Embroidered Minds Epilepsy Garden* at the 2018 Chelsea Flower Show represented different stages of a seizure. This promoted awareness and understanding of the condition rather than creating a therapeutic environment for those suffering from epilepsy. Some designers combine both: for example, there is a low wall representing a spine in Horatio’s therapeutic garden, Salisbury (for those with spinal injuries). The author suggests that here the sense of being away is compromised. The aim of the garden should be very clear at the outset.

Design is a collaborative process and designers will appreciate that if their designs are to be successful they need early buy-in from users. Human-centred design (HCD) allows designers “to get away from ego and self-expression” to focus on the users (Souter-Brown, 2015, p. 202). Ulrich (1999) makes it clear that regardless of whether a garden might garner praise in

Copyright © 2019 Elizabeth Read

professional design journals as “good” design, it will fail as good design in healthcare terms if it produces negative reactions. He contends that in the context of healthcare gardens, designers are obligated to subordinate or align their personal tastes to create a user-centred, supportive environment. At the “The Art of Gardens” conference (see above), all five designers agreed that they struggled with collaboration. Trustees should be aware that collaboration with users and staff could result in a myriad of conflicting suggestions.

Focus groups or workshops are likely to be the most productive forums for collaboration in terms of short-term outcome and long-term engagement. Staff and users are best able to describe the different users and their needs; creating profiles of different family members as they journey from first arriving at the hospice through to end-of-life and beyond would be invaluable to a designer aiming to deal with the emotions and needs of all users. Consultation is essential to ensure that the garden is accessible, user-friendly and designed to be equitable (Human Centered Design, 2018).

If consultation is rushed there is a risk that plans will have to be adapted, budgets stretched, deadlines missed and contractors upset; those who conceived the original plan will feel cheated and those who were not properly consulted will be angered. Consultation is the first stage of a change management process to ensure that staff have a sense of ownership and will engage with the garden when it is completed. It is often the case that a project team is created out of enthusiasts leaving the perception that enthusiasm is universal. A deliberate effort is required to engage staff across the board if the garden is to be utilised to its optimum potential. That effort will involve communicating to both the heads and hearts, disseminating not just the evidence, plans, budgets and completion dates, but also stories and case studies. Poor collaboration and lack of evidence-based design mean there is a risk that the hospice will end up with a garden that is either an expensively-designed amenity area or one that reflects only the designer’s self-expression. Both compromise the therapeutic value.

There is anecdotal evidence to suggest that over time trustees find that the design of their hospice garden can become tired, uninspiring and unused with calls for a total or partial redesign. This begs three questions: Has the maintenance programme (or lack of it) damaged the original design concept? Does the culture within the hospice work against effective use of the garden? Was the design appropriate in the first place? This leads on to a discussion about maintenance, culture and evaluation.

The quality of garden maintenance has a bearing not just on garden users but also on the reputation of the hospice. Whether a garden is encountered for the first time during a hospice visit or virtually through a website, families, staff, and supporters will immediately form an image of a hospice and its level of care. “An attractive, well-designed, and well-maintained healing environment reassures a person that she or he will be given an equally high level of attention and care” (Marcus and Sachs, 2014, p. 31). An unkempt garden, unmown lawns and broken furniture indicate an uncaring attitude that adversely impacts on the image of the care provided and can increase family stress. The garden is therefore an important part of the brand and is as relevant to supporters as it is to families and staff.

Copyright © 2019 Elizabeth Read

Maintaining a garden can be time-consuming and requires knowledge, experience and commitment. Trustees must expect that the level of maintenance afforded to a garden is likely to be reflected in the value they can extract. For example, a low-maintenance garden with evergreen block planting creates a sterile, unchanging environment without any sensory benefit and it adds little therapeutic content; the engagement value is poor and (as seen in car parks) this type of low maintenance design is best utilised as an environment to pass through. Hard landscaping is clinical and largely unsuitable for children. Ideally, maintenance will be discussed during the design phase and the designer will provide a maintenance programme. At Horatio's garden, Salisbury, the designer, makes regular visits and continues to advise on the garden design. There is a gardener who works with the designer and volunteers, ensuring that the garden is not just well-maintained but continues to perform as it was intended. Unfortunately, it is often the case that when the garden is left to volunteers without design knowledge or direction the garden quickly loses its integrity.

Ideally, a garden designer will provide a maintenance programme that both meets the objectives of the garden and matches the hospice's ability to provide maintenance, in all likelihood using volunteers. The charity responsible for running the hospice may already have a bank of community volunteers or may consider recruiting those with gardening experience; current and bereaved parents may also find gardening activities therapeutic. Many hospices use volunteers in the garden drawn from local businesses. Eager to satisfy their corporate social responsibility (CSR) targets, businesses choose their charitable associations both on what resonates with their staff and their customer base, and the level of engagement the charity is able to provide. The therapeutic value of gardening will directly benefit the office workers, can have training potential and provides traction for traditional and social media communications. CSR activities may also lead to financial benefit for the hospice. A knowledgeable leader will be required to create long- and short-term plans for the maintenance of the garden and the management of the garden volunteers.

Good maintenance will retain the therapeutic value and ensure that the garden reflects the high standards of care prevalent at the hospice generally. When the number of visitors to a well-maintained garden falls, design is often blamed; rarely will trustees turn their attention to analysing other reasons. Research has been undertaken by Debbie Carroll and Mark Rendell and presented in "The Care Culture Handbook and Map" which suggests that "these answers do not lie in the outside space but are hidden deep within the cultural practices of the care setting itself" (Carroll & Rendell, 2016, p. 3). They make three observations: they found a direct correlation between what they term "relationship-centred care" (the optimum care culture position) and active engagement with an outside space; a fearful approach to Health and Safety can limit the use of outside space and, finally, there is a risk that money will be wasted on garden design unless that design matches the current care culture position of the organisation. Trustees have a legal responsibility for the health and safety of staff, volunteers and those attending the hospice and it is inevitable that garden usage and design decisions will be made to reflect Health and Safety and other policies within the organisation; however, there is a risk that too prescriptive a response will lead to another kind of risk: that a garden is no longer used or fails to fulfil its therapeutic potential. It becomes a management issue to balance risk with quality of service.

Copyright © 2019 Elizabeth Read

Carroll and Rendell report an observation from their research when a dandelion (a weed to most gardeners) is used by care staff to connect with a patient in ways that make an elaborate and expensively designed garden superfluous for that particular "touch point" to be valuable (Carroll & Rendell, 2016, p. 4). Therapeutic value lies in members of staff using the garden to engage with the children, not just by being in the garden but by connecting the children to the natural setting (physically and mentally). Simply looking out of the window to observe the weather, the wildlife, the sunset or the flowers can connect a child with the outside space but mostly it needs staff members to be actively involved, initiating and leading engagement. A study by Schein (2014) identified that when nature is explored with a caregiver or with other young children, a social bond is formed and spirituality is strengthened and deepened when repeated interactions with nature occur. Carroll and Rendell contend that with the right culture, care staff will use the garden in a way that is beneficial to the residents; without the right culture, the garden (no matter how well it is designed) will not be used and might ultimately become a burden rather than a benefit.

Whether the hospice considers its garden a success or not, it is reasonable that from time to time success is evaluated. "Success of restorative gardens is critical for many reasons. First, a well-designed, well-constructed and well-maintained garden promotes the best health outcomes. Second, such a garden will bring a positive image to the facility and all of the stakeholders involved. Third, every successful restorative garden is a powerful testimony to restorative gardens, and access to nature as a whole" (Marcus and Sachs, 2013, p. 79). Trustees will seek assurances that expenditure is justified, whether this is for a capital project (such as the design of a new garden) or the annual cost of maintenance. Evaluation of a capital project might be in the form of a post-occupancy evaluation (POE), which aims to identify how well the original objectives were met, the needs of the users were understood and their expectations were satisfied. The goal of evaluation is "to determine whether we have created a garden that realises our original intent" (Tyson, 1998, p. 201). Marcus and Sachs (2013) suggest behaviour-mapping to provide objective information about usage and interviews to provide subjective information about motivation and feeling.

Many children's hospices use case studies to illustrate the benefits of their service. This is standard practice when promoting a service which is intangible and therefore difficult to quantify. Anecdotal evidence to illustrate the difference made by the garden to a child, family or care staff, either through observation by staff or by documenting comments or photographs can support case studies. This evidence can be garnered through focus groups, therapy sessions, diaries or visitors' books. The benefit of this approach is that it will generate a greater understanding of the value of a garden and that in turn will encourage use. Tyson comments: "informal observations and anecdotes provide a real-life perspective of direct benefits of contact with the natural world" (Tyson, 1998, p. 193).

Research might also be through satisfaction surveys or audits. Most children's hospices carry out service satisfaction surveys from time to time and questions might be included on the impact a garden may have on issues such as stress and mood change. If it is just an attractive garden, but one that makes no difference, then it fails as a therapeutic garden. Marcus and Sachs (2013), as part of a certification process for therapeutic gardens in the USA, have created an audit tool, the aim of which is to recognise the inclusion (and quality) of essential (or desirable) evidence-based design features. The research process scores therapeutic gardens on their potential therapeutic value; certification is based on the scores.

Copyright © 2019 Elizabeth Read

Designing a therapeutic garden and then making sure that the value is extracted from it is a challenge for trustees and hospice management. Without the determination of senior managers, there is a risk that not only money but also a valuable resource will be wasted. Recognising the benefits, accumulating evidence directly from the users and sharing that broadly with all stakeholders is likely to lead to greater appreciation of the garden. Evaluation is key and as part of this work a research project has been constructed involving a sample selection of children's hospices to demonstrate to what extent children's hospice gardens can be termed "therapeutic". The next section outlines this research project.

Copyright © 2019 Elizabeth Read

8: Research

To date little primary research has been conducted into children's hospice gardens (other than pre-development research in advance of individual garden projects); yet, it would be helpful to understand how gardens are currently designed and used. To arrive at a research proposal, consideration was given to various research concepts that could add value to this paper. It was decided not to add further medical evidence as this type of research requires consents and clinical knowledge; rather it was concluded to allow the existing medical evidence presented in the paper to speak for itself. Any research involving direct contact with families is known to be a protracted process; therefore, it was decided not to carry out this type of research as it is best managed by individual hospices.

It was concluded instead to undertake an audit that would create a snapshot of children's hospice gardens in 2018. An audit was designed specifically for this project, based on an audit tool developed by Marcus and Sachs (2013) as part of a certification process for therapeutic gardens (proposed in the US), recognising the inclusion and quality of essential (or desirable), evidence-based design features. Inevitably, what Marcus and Sachs deemed to be essential reflects their own findings and does not take account of the work of a number of other specialists in the field, for example, Browning, Ryan and Clancy (2014) and Ulrich (1999). An audit tool was therefore conceived based on that developed by Marcus and Sachs, but including other evidence-based design features. The audit identified negative as well as positive features reflecting evidence that the inclusion of some features can adversely affect the therapeutic value of a garden. It should be noted that the audit identified the inclusion of evidence-based design features, not what stakeholders would like or expect to see. This observational research was carried out by the author and, whilst it was a subjective assessment, all participating hospices were audited by her within a three-week period providing consistency across the sample. In addition, there was a semi-scripted interview with a director or staff member. Together the observational research and interview took approximately two hours.

Seven hospices participated representing 13% of all UK children's hospices and reflecting different sites (urban/rural; small/large): Chestnut Tree, Helen House, Keech, Little Havens, Naomi House, Richard House and Tŷ Hafan. The visits took place in July 2018, which was a hot, dry month with temperatures over 30℃; the gardens were not looking their best but it was possible to make an assessment nonetheless. Those taking part in the research were varied in seniority from the chief executive down, occasionally involved more than one person and sometimes included the (volunteer) gardener; the opinions and views represented here reflect this limited contact with each hospice. An analysis of the audit and the interviews has led to some notable strengths and weaknesses, expanded below.

The entrances or driveways created a first and lasting impression. The majority of hospice entrances supported the homely environment evident in the architecture of the buildings. A potential weakness was car parking close to the entrance and planting made up mostly of greenery both of which detracted from the homely or domestic feel. The main garden was not usually visible from the entrance or reception but led out from the internal activity rooms. In all cases, the area immediately outside the activity rooms was used for play and social activities. Three hospices had grass close to the building and four led out onto hard or rubberised surfaces.

Copyright © 2019 Elizabeth Read

Social areas fit well with the domestic feel and were usually close to the dining area facilitating al fresco dining; however, where the social space was extensive, had fixed furniture and lacked greenery/planting, it created many of the characteristics of a public rather than a domestic space. One hospice introduced colourful bedding plants, which only served to exaggerate the non-domestic feel. Perhaps breaking up the area with structures or potted trees would have created intimate spaces, shade and a more congenial environment. Where a social area segued into a playground, parents' sense of being away was potentially diluted.

In the cases of five out of seven hospices, the main access from the building led to an area which was predominantly a playground. Discussions indicated that this provided easy access and a natural extension from indoor to outdoor play, which was embraced by the staff and children; however, this artificial landscape lacked the therapeutic value inherent in nature. Those hospices with a playground further away provided an opportunity for some children to choose it as a destination and demonstrate control and independence. Other than providing an opportunity for movement and exercise, a playground cannot be described as a garden, and the siting of playgrounds in the immediate vicinity of the main rooms pushes the garden away from the hospice building and reduces the natural views from within.

Fundamental to good therapeutic garden design are signage, accessibility and comfort. Signage was generally poor, particularly where there were distinct garden areas that might not be readily apparent. Accessibility to and around the gardens was good; all the hospices indicated that their gardens were accessible all year round, in all weathers (except icy), but not often at night. Comfort was created by the inclusion of shade and resting places. Shade was an issue for some hospices, particularly in the playgrounds. Whilst all hospices had seating, there was a preponderance of benches or table and bench combinations that were difficult to move or reconfigure. Some hospices had special wheelchair accessible tables at different heights.

Using the descriptions provided by the hospices surveyed, the most used areas were the playground, prospect viewing platform, pirate ship, kaleidoscope seating area (with filtered, coloured light), tree house, swing seat, woodland walk, patio/seating area, under a large tree, sensory area and "beach" area. The areas immediately outside the common rooms had high usage, and it was inevitable that playgrounds were well used because they were mostly close to the building and used with care staff. Of the three hospices with large wooded areas, one is used extensively while another is hardly used at all. Three hospices mentioned teenage spaces in the garden, but two of these were no longer used.

The activities that took place in the garden were varied, engaging and imaginative, including eating outside, picnics, play, treasure hunts, woodland trails, sensory experiences, arts and crafts, water play, clubs, role play, story time, bikes, music, messy and wheelchair painting, wheelchair "racing", farm visits, Mad Hatter's Tea Party, Mum's Pamper Day, Music Fest, Tots and Toys, Sparklers' Group and scouts. All hospices held events in their gardens (variously for the bereaved, the community, volunteers and major donors). There was an impression that the staff relied more on organised activities outdoors than nature to provide distraction or engagement.

Copyright © 2019 Elizabeth Read

Privacy, rarely enjoyed by life-limited children, was one area which could be given further consideration. To facilitate this at a hospice would be a valuable gift providing a sense of being away. Parents sought out their own privacy in the gardens and some gardens had several refuge places; others provided little privacy for parents who found quiet places behind slopes or in the woods. Three hospices had attractive refuge areas away from the main activity areas, but these were not always well signed.

Four out of the seven hospices visited had dedicated areas outside the children's rooms, which were variously paved or planted and afforded some privacy for children and their families. In two cases the individual rooms led on to the main activity area or playground. One of those interviewed suggested that the children preferred to be closely connected with what was going on. Some hospices had bereavement suites and where these had gardens they were thoughtfully designed.

In terms of designing "distraction", "mystery" and "risk or peril" in the garden, one hospice had captured these aspects well. The garden included a grotto with a mysterious door and window, a fairy garden, caterpillar topiary, tunnels, winding paths that obscured the destination, bridges over a (dry) stream, destination points including artworks, interactive and sensory features, a playground, dungeon and a waterfall, a prospect and a summer house (with borrowed landscape). This design used the space and topography well, making it accessible while taking advantage of the different levels. Nearly all hospices had places that provided prospect (an opportunity to look out from a position of advantage). Many of the rural hospices could look out to fields or woods.

Memorials and memorial gardens proved to be subjective issues. All hospices were averse to personal memorials in the garden although two had memory trees/benches. Four hospices had memorial gardens; two were away from the main garden. One was sombre even in good weather; in contrast, another was uplifting and hopeful. Not having a memorial garden was a deliberate choice, in some cases recognising the conflict between a place for the living and a place for remembrance. Two had Paths of Life where the paving stones focussed on commemorating associations other than deceased children. All except two hospices had experience of children being taken into the garden to die.

It was difficult to make a detailed assessment of the planting and natural elements in the garden during the prevailing drought; however, it was possible to identify the trees, shrubs and plants and the broad mix of planting schemes. Sensory planting, whether in boxes or borders, was the frequent choice; mixed planting (shrubs and perennials[9]), defined colour schemes and seasonal interest were evident in some gardens, but sadly lacking elsewhere. The minimum 70:30 verdure to hard landscaping maxim was evident in many gardens but failed where playgrounds dominated. Water features were included in some gardens, and one hospice had installed a metal frame under the surface of the pond to make it safe.

Other than nature, positive distractions include laughter, animals and music. Whilst there was laughter resulting from activities (for example, water fights), there was only a limited number of design features to generate laughter. Other than natural wildlife in the garden, none of the

[9] A perennial is a plant that lives more than two years.

Copyright © 2019 Elizabeth Read

hospices had resident, domestic animals but visiting animals were popular. Bird tables proved impractical because they attracted rats and other vermin. Many gardens included interactive musical instruments and wind chimes. The art was predominantly natural rather than abstract.

Across the seven hospices, the main users of the gardens were reportedly life-limited children (with carers), siblings, parents, and staff (in that order overall). At one hospice, the staff (in a personal capacity) did not use the garden at all. In most cases, parents used the garden with their children more than on their own account. All except one hospice would put babies out into the garden. Current designs may determine current usage; some garden designs focussed on children (particularly young children) with little for teenagers, parents or staff. Only one hospice had an area of the garden dedicated for staff use.

All except one hospice reported that members of staff were proactive in engaging the children with nature; inevitably the opportunity is limited in the case of those hospices with outdoor spaces that are predominantly playgrounds unless there are facilities for natural play. If there were any culture issues that limited garden use, these were not reported by the individuals interviewed and the prevailing impression was that the staff were enthusiastic about being outdoors (although not specifically in contact with nature). It is difficult to make a robust assessment without further research.

Good maintenance is not only important to create therapeutic value but also to support the brand. Volunteers were both individual and corporate and one hospice had a gardening club. Another had a paid gardener (four days a week), who directed volunteers and contributed to long-term planning. The standard of garden management and maintenance that emanated from this professionalism appeared higher. Poor maintenance and poor volunteer management were evident in some cases.

Fundraising staff at all seven hospices included the gardens as part of their promotional tour and most of the hospices included photographs of the garden on their website; however, there were no garden-related endorsements or case studies on the websites at the time of the review. All hospices held fundraising or community events in their gardens.

An assumption was made that the hospices that took part in this research wanted to use their outdoor space to perform as a therapeutic garden and the audit sought out the inclusion and quality of essential (or desirable) evidence-based design features. This methodology has its limitations: users were not consulted directly and the sample was relatively small; nonetheless, this snapshot has identified strengths and weaknesses in garden design, usage and management, which together with the evidence presented earlier, leads on to consideration of the future of therapeutic gardens in children’s hospices.

Copyright © 2019 Elizabeth Read

9: The Way Forward

This paper has set out the evidence that supports the use of children's hospice gardens in the delivery of palliation and, based on this, it has presented guidelines for the design and on-going management of such gardens. All those reading this paper will recognise that the delivery of care and support to life-limited children, their parents and their siblings is a complex undertaking, particularly because of the varying ages of the children, their different physical and mental abilities, the inclusion of the children's siblings and parents within the remit of a hospice, the range of service users' needs and their cultural differences. All this is a challenge for hospice staff, whose work is both stressful and emotional. This paper has demonstrated how gardens have historically provided a healthy environment in which to feel restored and that since the 1970s there has been a steady drive to recapture the value of green space, make it accessible and use it to enhance well-being. Evidence has been set out here to support the design of hospice outdoor spaces as therapeutic environments. The paper has also discussed some of the management issues that might have a detrimental effect on the therapeutic value extracted from a garden and has proposed methods for evaluation. An analysis of seven children's hospice gardens visited by the author in July 2018 illustrated their design and usage and, whilst this represented only a sample of the total cohort, the analysis identified strengths and weaknesses with respect to evidence-based criteria. Consideration of the above and the author's journey to date have naturally led to thoughts on how the children's hospice sector might approach the design and management of gardens in the future.

Stakeholders with an interest in children's hospice gardens include trustees, senior managers, life-limited children and their families, staff, referring medical professionals, donors, volunteers and garden designers. Staff and volunteers will need encouragement from trustees and senior management to support the therapeutic intent of the garden. Without them there is a risk that a garden will have little or no therapeutic value; it will fall into disuse and disrepair, money will be wasted, a valuable resource will be squandered and the reputation of the hospice will be damaged.

Trustees might consider setting out their support for evidence-based design, together with what they expect a garden to deliver and to whom; their ongoing interest could lead to a regular report and evaluation. Research has shown that a garden is often regarded as a burdensome cost rather than as an integral part of service delivery and both costs and management are sometimes dispersed across administrative departments. To mitigate this, senior managers might consider appointing a leader to manage garden plans, budgets and implementation, communication and training, and the recruitment and management of volunteers essential for delivering a garden's maintenance programme. A leader might also consider building a knowledge bank through regular research projects, providing health and safety guidelines to encourage safe garden use and fostering a culture that connects users and staff with nature. A communications strategy might be used to underpin a supportive culture.

All stakeholders will benefit from communications that set out the evidence supporting a therapeutic garden and the benefits accruing from it: a garden is an asset that enhances the overall value of a hospice; it is also a resource extending the space available for palliation and, if designed for therapeutic value, can enhance the delivery of palliation. A garden can provide support that is not necessarily available to children and families elsewhere; for example, it can provide privacy, a social space, a sense of control and independence, a homely environment, an

Copyright © 2019 Elizabeth Read

antithesis to the inside of a hospital or hospice, a sense of being away, a myriad of distractions and an opportunity for new experiences and learning. Some therapeutic benefit comes from a garden with or without direct palliative intervention. Gardens are restorative environments for staff, supporting them mentally and physically to meet the challenges of caring for life-limited children, and potentially reducing staff sickness and absenteeism. A communications strategy might be delivered through newsletters and other printed matter, websites and social media, and events such as workshops, tours and illustrated talks. It might be supported by the publication of research, stories and case studies that demonstrate the benefits of garden usage. Fundraising staff could use such evidence to attract donations.

There is always a concern that a new development within an existing garden will compromise the original garden's objectives. When preparing a business case, the appointed project manager should consider the impact of the new project on the effectiveness of the whole garden, including driveways, the entrance area and views from inside the hospice. It is particularly important that a new development focusing on one user group does not unintentionally exclude others, for example, children to the exclusion of staff. The project manager will lead collaboration between stakeholders and a garden designer.

The involvement of a garden designer will be pivotal to the success of any therapeutic garden. This paper has identified that specialist knowledge is required to create a therapeutic garden, in addition to the professional knowledge for which a garden designer may already be recognised as an expert. A hospice will benefit from a designer who is willing to collaborate and use human-centred design processes. Equally important will be the designer's ability to ensure that his or her design is durable; this may be achieved either through the designer's ongoing involvement or through the delivery of clear instructions for maintenance. A garden designer's creativity will be essential to reflect the uniqueness of each hospice site and to push the boundaries in terms of therapeutic design.

Children's hospices are committed to providing care and physical, emotional, social and spiritual support to life-limited children and their families and that care and support can be delivered in the home, in hospital, at school or in a hospice itself. Evidence has been presented here that gardens are not only effective places for care and support, but they are also in some respects better than other places, such as hospital or hospice interiors. In some instances, the mere presence of a garden can supplement active staff intervention; for example, for a parent simply to be alone in a garden can improve his or her emotional state and well-being.

Most children's hospices in the UK have outdoor spaces, which may or may not be designed as therapeutic gardens. Trustees who choose not to have gardens designed for therapeutic benefit may be denying a benefit to children and families and neglecting a responsibility to their staff. Moreover, a poorly designed garden can be detrimental to well-being (stress-inducing rather than restorative) and a poorly maintained garden can damage the charity's brand. Some trustees may consider that cost is an issue preventing them from creating a therapeutic garden; others may be concerned about committing management time. The author recognises the pressures that some hospices are under, but there is overwhelming evidence that children's hospices can benefit from therapeutic gardens and this presents trustees with an opportunity. Care staff will

Copyright © 2019 Elizabeth Read

be better able to deliver hospice services if they are refreshed by a restorative environment and feel that their contribution is rewarded. Children and families will benefit from the resultant increase in service quality as well as directly benefitting from the garden itself. The garden might offer a rare opportunity for siblings to enjoy green space. Parents will benefit from the restorative nature of the garden and will return from their short break better able to cope with the challenges they face. Let's make the most of children's hospice gardens.

Copyright © 2019 Elizabeth Read

Bibliography

Alcock, I., White, M., Wheeler, B., Fleming, L., & Depledge, M. (2014). Longitudinal Effects on Mental Health of Moving to Greener and Less Green Urban Areas. *Environment Science and Technology, 48*(2), 1247-1255.

Appleton, J. (1975). *The Experience of Landscape.* London: John Wiley and Sons.

Association for Children's Palliative Care. (2009). *A Guide to the Development of Children's Palliative Care Services.* Retrieved Feburary 9, 2017, from www.togetherforshortlives.org.uk

Balfour, R., & Allen, J. (2014). *Improving Access to Green Spaces.* London: Public Health England. Health Equity Briefing 8.

Balling, J., & Falk, J. (1982). Development of Visual Preference for Natural Environments. *Environment and Behavior, 14*(1), 15-28.

Barbour, A. (1999). The Impact of Playground Design on the Play Behaviors of Children with Differing Levels of Physical Competence. *Early Childhood Research Quarterly, 16*(5), 599-626.

Barnes, M. (2014). Planting and Maintaining Therapeutic Gardens. In C. Marcus, & N. Sachs, *Therapeutic Landscapes. An Evidence-Based Approach to Designing Healing Gardens and Restorative Outdoor Spaces.* New York: John Wiley and Sons.

Barton, J., & Pretty, J. (2010). What is the Best Dose of Nature and Green Exercise for Improving Mental Health? A Multi-Study Analysis. *Environmental Science and Technology, 44*(10), 3947-3955.

Becker, F., Sweeney, B., & Parsons, K. (2008). Ambulatory Facility Design and Patients' Perceptions of Healthcare Quality. *Herd, 1*, 35-54.

Berg, M., & Medrich, E. (1980). Children in Four Neighbourhoods: The Physical Environment and its Effect on Play and Play Patterns. *Environment and Behavior, 12*(3), 320-348.

Berg, M., Wendel-Vos, W., van Poppel, M., Kemper, H., van Mechelen, W., & Maas, J. (2016). Health benefits of green spaces in the living environment: A systematic review of epidemiological studies. *Urban Forestry Urban Greening 2015, 14*(4), 806-816.

Berson, D., Dunn, F., & Takao, M. (2002). Phototransduction by retinal ganglion cells that set the circadian clock. *Science, 295*, 1070-1073.

Bird, W. (2007). *Natural Thinking.* Bedford: RSPB.

Bloomer, K. (2008). The Picture Window: The Problem of Viewing Nature Through Glass. In S. Kellert, J. Heerwagen, & M. Mador, *Biophilic Design* (pp. 253-261). Hoboken, New Jersey: John Wiley and Sons.

Brannon, L., & Feist, J. (2000). *Health psychology: An introduction to behavior and health.* Australia: Brooks/Cole.

Copyright © 2019 Elizabeth Read

Brown, J., & Berger, C. (1984). Playground designs and preschool children's behaviors. *Environment and Behavior, 16*(5), 599-626.

Browning, W., Ryan, C., & Clancy, J. (2014). *14 Patterns of Biophilic Design. Improving Health and Well-being in the Built Environment.* Retrieved November 6, 2017, from Terrapin Bright Green: https://www.terrapinbrightgreen.com/reports/14-patterns/

Cancer Research UK. (2017). *How the sun and UV cause skin cancer*. Retrieved January 11, 2018, from Cancer Research UK: http://www.cancerresearchuk.org/about-cancer/causes-of-cancer/sun-uv-and-cancer/how-the-sun-and-uv-cause-cancer

Cannon, W. (1932). *Wisdom and the Body.* United States: W. W. Norton and Company.

Carroll, D., & Rendell, M. (2016). *The Care Culture Map and Handbook.* Southampton: Step Change Design Ltd.

Chapple, O. (2017). Horatio's Gardens – the benefits of beautiful garden projects in the NHS. *Landscape, Gardens and Health Network Conference 2017.*

Child, U. C. (2018). *What makes the UNCRC so special?* Retrieved April 4, 2018, from Unicef: https://www.unicef.org.uk/what-we-do/un-convention-child-rights/

Chua, A. (2011). *Battle Hymn of the Tiger Mother.* London: Bloomsbury.

Cornah, D. (2006). *The impact of spirituality on mental health.* London: Mental Health Foundation.

Coton, D. (2015, July 9). *Horticultural Facts and Figures*. Retrieved July 4, 2018, from The Gardener: A Blog by Gardensite: https://www.gardensite.co.uk/blog/news/horticultural-facts-and-figues

de Vries, S., Verheij, R., Groenewegen, P., & Spreeuwenberg, P. (2003). Natural environments - healthy environments? An exploratory analysis of the relationship between greenspace and health. *Journal of Environmental Planning and Management, 35*, 1717-1731.

Department for Communities and Local Government. (2010). *Consultation Paper on a new Planning Policy Statement: Planning for a Natural and Healthy Environment.* London: Department for Communities and Local Government.

Dixon-Hunt, J. (1986). *Garden and Grove. The Italian Renaissance Gardens in the English Imagination: 1600-1750.* London: J.M. Dent and Sons Ltd.

Edginton, B. (1997). Moral Architecture: the influence of the York Retreat on Asylum Design. *Health and Place, 3*(2), 94.

Evans, G., & Cohen, S. (1987). Environmental Stress. In D. Stokios, & I. Altman, *Handbook of Environmental Psychology (2 volumes)* (pp. 571-610). New York: John Wiley and Sons.

Copyright © 2019 Elizabeth Read

Farris, S., Stigsdotter, U., & Nilsson, K. (2012, 12 01). A Review of Design Concerns for Outdoor Areas at Health Care Facilities. *Journal of Therapeutic Horticulture, XXII*, 32-47.

Fraser et al., University of Leeds/Children's Hospices UK. (2011, October). *Life-Limiting Conditions in Children and the UK: national and regional prevalence in relation to socioeconomic status and ethnicity.* Retrieved February 11, 2018, from www.togetherforshortlives.org.uk/

Fredrickson, B., & Levenson, R. (1998). Positive Emotions Speed Recovery from the Cardiovascular Sequelae of Negative Emotions. *Cognition and Emotion, 12*(2), 191-220.

Frost, J., Clark Wortham, S., & Stuart Reifel, R. (2008). *Play and Child Development.* Austin, Texas: Pearson/Merrill Prentice Hall.

Gascon, M., Triguero, M., Martinez, D., Dadvand, P., Rojas-Rueda, D., Plasencia, A., & Nieuwenhuijsen, M. (2016). *Residential green spaces and mortality: A systematic review* (Vol. 86). Environment International.

Glass, D., & Singer, J. (1972, December 22). Urban Stress. Experiments on Noise and Social Stressors. *Science, 178*(4067), pp. 1275A-1275B.

Golden, R., Gaynes, B., Ekstrom, R., Hamer, R., Jacobsen, F., Suppes, P., . . . Nemeroff, C. (2005). The efficacy of light therapy in the treatment of mood disorders: a review and meta-analysis of the evidence. *American Journal of Psychiatry, 1*(62), 656-662.

Gome, B. N. (2012, Month). Reversal of the British trends in place of death: Time series analysis 2004-2010. *Palliative Medicine, 26*(2), 102-7.

Greenman, J. (1988). *Caring spaces, learning places: children's environments that work.* Redmond, WA: Exchange Press.

Harari, Y. (2014). *Sapiens. A Brief History of Humankind.* London: Penguin Random House.

Hartig, T., Evans, G., Jamner, L., Davis, D., & Garling, T. (2003). Tracking restoration in natural and urban field settings. *Journal of Environmental Psychology, 23*, 109-23.

Hartle, L. (1996). Effects of additional materials on preschool children's outdoor play behaviors. *Journal of Research in Childhood Education, 11*(1), 68-81.

Heerwagen, J., & Gregory, B. (2008). Biophilia and Sensory Aesthetics. In J. Kellert, J. Heerwagen, & J. Mador, *Biophilic Design* (pp. 227-241). Hoboken, N.J.: John Wiley and Sons.

Henniger, M. (1985). Preschool chldren's play behaviors in an indoor and outdoor environment. In J. Frost, & S. Sunderlin, *When Children Play* (pp. 145-149).

Copyright © 2019 Elizabeth Read

Herrington, S., & Studtmann, K. (1998). Landscape interventions, new directions for the design of children's outdoor play environments. *Landscape and Urban Planning, 42*(2-4), 191-205.

Hickman, C. (2013). *Therapeutic Landscapes. A history of English hospital gardens since 1800.* Manchester: Manchester University Press.

Hobday, R. (2006). *The Light Revolution. Health Architecture and the Sun.* Forres, Scotland: Findhorn Press.

Hooper, R. (2013). Lexicon Medicum (or Medical Dictionary). In C. Hickman, *Therpeutic Landscapes. A history of English hospital gardens since 1800* (p. 1). Manchester: Manchester University Press.

Horlick, M. (2005). The Vitamin D deficiency epidemic and its health consequences. *Journal of Nutrition, 135*(11), 2739-2748.

Horowitz, S. (2012). Therapeutic Gardens and Horticultural Therapy: Growing Roles in Health Care. *Alternative and Complementary Therapies, 18*(2), 78-83.

Horsfield, T. (2013). A History, Antiquities and Topography of the County of Sussex (two volumes). In C. Hickman, *Therapeutic Landscapes. A history of English hospital gardens since 1800* (p. 58). Manchester: Manchester University Press.

Hoskin, S., & Haggard, L. (1999). *Healing the Hospice Environment - Design, management and maintenance of healthcare premises.* New York: Taylor and Francis.

Hu, Z., Liebens, J., & Ranga Roa, K. (2008). Linking Stroke Mortality with Air Pollution, Income and Greenness in Northwest Florida: an ecological geographical study. *International Journal of Health Geographics, 7*, 20.

Human Centered Design. (2018, March 19). *Principles of Universal Design*. Retrieved from Institute for Human Centered Design: https://humancentereddesign.org

Huy, Q. (1999). Emotional capability and corporate change. *Mastering Strategy, 6*, 32-34.

Ip, P., Ka-Wing Ho, F., & Hung-Tak Louie, L. (2017). Childhood Obesity and Physical Activity-Friendly School Environments. *Journal of Paediatrics, 191*, 110-116.

Jacobs, E. (1980). The Privacy Behaviour of Pre-school children: Mechanisms and Functions in the Day-care Environment. In P. Wilkinson, *In Celebration of Play* (pp. 119-134). London: Croom Helm.

Kaplan, R., & Kaplan, S. (1989). *The Experience of Nature: A Psychological Perspective.* New York: Cambridge University Press.

Kaplan, R., & Kaplan, S. (2002). Adolescents and the Natural Environment: Time out? . In P. Kahn, & S. Kellert, *Children and Nature.* Cambridge: The MIT Press.

Copyright © 2019 Elizabeth Read

Katcher, A., Segal, H., & Beck, A. (1984). Comparison of contemplation and hypnosis for the reduction of anxiety and discomfort during dental surgery. *American Journal of Clinical Hypnosis, 27*, 14-21.

Kellert, S. (2008). Dimensions, Elements, and Attributes of Biophilic Design. In S. Kellert, J. Heerwagen, & M. Mador, *Biophilic Design* (pp. 3-19). Hoboken, N.J.: John Wiley and Sons.

Kellert, S., & Wilson, E. (1993). *The Biophilia Hypothesis.* Washington D.C.: Island Press.

Kennedy, S., Glaser, R., & Keicolt-Glaser, J. (1990). Psychoneuroimmunology. In J. Cacioppo, & L. Tassinary, *Principles of Psychophysiology: Physical, Social and Inferential Elements.* (pp. 177-190). New York: Cambridge University Press.

Koniak-Griffin, D. (1994). Aerobic Exercise, Psychological Well Being, and Physical Discomforts. *Research in Nursing and Health, 17*, 253-268.

Landry, S. (2005). *Effective early childhood programmes: turning knowledge into action.* Houston: University of Texas Press.

Lee, A., & Maheswaran, R. (2011). The health benefits of urban green spaces: a review of the evidence. *Journal of Public Health, 33*(2), 212-222.

Liu, G., Wilson, J., Qi, R., & Ying, J. (2007). Green Neighborhoods, food retail and childhood overweight: differences by poplation density. *American Journal of Health Promotion, 21*(4), 317-325.

Louv, R. (2010). *Last child in the woods: saving our children from nature-deficit disorder.* London: Atlantic Books.

Maas, J., Verheij, R., de Vries, S., Spreeuwenberg, P., Schellevis, F., & Groenewegen, P. (2009). Morbidity is related to a green living environment. *Journal of Epidemiology Community Health, 63*, 967-973.

Mador, M. (2008). Water, Biophilic Design, and the Built Environment. In S. Kellert, J. Heerwagen, & M. Mador, *Biophhilic Design. The Theory, Science, and Practice of Bring Buildings to Life* (pp. 43-58). Hoboken, N.J.: John Wiley and Sons.

Malenbaum, S., Keefe, F., Williams, A., Ulrich, R., & Somers, T. (2008). Pain in its environmental context; implications for designing environments to enhance pain control. *Pain, 134*, 241-244.

Maller, C., Townsend, M., St. Leger, L., Henderson-Wilson, C., Pryor, A., Prosser, L., & Moore, M. (2008a). *The health benefits of contact with nature in a park context: a review of relevant literature.* Melbourne: Deakin University and Parks, Victoria.

Marcus, C. (2007). Healing Gardens in Hospitals. *Design and Health, 1*(1). Retrieved November 21, 2017, from http://www.idrp.wsu.edu/

Copyright © 2019 Elizabeth Read

Marcus, C., & Barnes, M. (1995). *Gardens in Healthcare Facilities: uses, therapeutic benefits and design recommendations.* Martinez, Calif.: Centre for Health Design.

Marcus, C., & Barnes, M. (1999). Acute care hospitals: case studies an design guidelines. In C. Marcus, & M. Barnes, *Healing Gardens: Therapeutic Benefits and Design Recommendations* (pp. 157-234). New York: John Wiley and Sons.

Marcus, C., & Barnes, M. (1999). *Healing Gardens: Therapeutic Benefits and Design Recommendations.* New York: John Wiley and Sons.

Marcus, C., & Sachs, N. (2013). Gardens in Healthcare Facilities: Steps toward evaluation and certification. *World Health Design, 6*, 76-83.

Marcus, C., & Sachs, N. (2014). *Therapeutic Landscapes : An Evidence-Based Approach to Designing Healing Gardens and Restorative Outdoor Spaces.* Hoboken, New Jersey: John Wiley and Sons.

McGowan, C. (2016). *A Strategy for children's palliative and end-of-life care.* Belfast: Department of Health NI.

Michell, R., & Popham, F. (2008). Effect of exposure to natural environment on health inequalities: an observational population study. *Lancet, 372*(9650), 1655-1660.

Moore, R. (1999). Healing Gardens for Children. In C. Marcus, & M. Barnes, *Healing Gardens. Therapeutic Benefits and Design Recommendations* (pp. 323-384). New York: John Wiley and Sons.

Moore, R., Hennessy, E., Myles, J., Johnson, S., Draper, E., Costeloe, K., & Marlow, N. (2012). Neurological and developental outcome in extremely pre-term children born in England in 1995 and 2006: the EPICure studies. *British Medical Journal, 345:e*, 7961.

Morena Marcheso, E. (1989, April). The Many Uses of Post-occupancy Evaluation. *Architecture*, 119-121.

Morgan Stanley. (2018). The Morgan Stanley Garden for the NSPCC. *Chelsea Flower Show.* London: Morgan Stanley.

Nanda, U., Eisen, S., & Baladandayuthapani, V. (2008). Undertaking an art survey to compare patient versus student art preferences. *Environment and Behavior, 40*(2), 269-301.

Natural England. (2011). *Green Space Access, Green Space Use, Physical Activity and Overweight.* NECR067: Natural England.

NHS Digital. (2017). *Statistics on Obesity, Physical Activity and Diet, England 2017*. Retrieved November 6, 2017, from NHS Digital: http://digital.nhs.uk/catalogue/PUB23742

NHS Estates Design Brief Working group. (2005). *A place to die with dignity: Creating a supportive environment.* England: NHS Estates.

Copyright © 2019 Elizabeth Read

Nightingale, F. (1863). *Notes on Hospitals* (Third Edition ed.). London: Longman, Roberts and Green.

Office for National Statistics. (2011). *2011 Census*. Retrieved January 20, 2018, from https://www.ons.gov.uk/census/2011census

Office for National Statistics. (2016). *Deaths registered in England and Wales*. Retrieved January 12, 2018, from Office for National Statistics: https://www.ons.gov.uk

Office for National Statistics. (2016). *Population Estimates*. Retrieved February 14, 2018, from https://www.ons.gov.uk

Office for National Statistics. (2017). *Families and Households.* London: ONS. Retrieved January 12, 2018, from ONS; People, Population and Community; Births, Deaths and Marriages: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/families

Orians, G. (1980). Habitat Selection: General Theory and Applications to Human Behavior. In J. Lockhard, *The Evolution of Human Social Behavior* (pp. 49-63). New York: Elsevier.

Orians, G., & Heerwagen, J. (1992). Evolved responses to landscape. In J. Barkow, L. Cosmides, & J. Tooby, *The Adapted Mind: Evolutionary Psychology and the Generation of Culture* (pp. 111-123). New York, NY: Oxford University Press.

Packard, S. (2007). Places to Play Seminar. *Play England.*

Pardes, J. (1982). Occupational Stress Among Student Nurses: A National Experiment. *Journal of Applied Psychology, 67*, 784-796.

Parliamentary Office of Science and Technology. (2016). *Green Space and Health.* POSTnote 538: Houses of Parliament.

Play England. (2008). *Design for Play: A Guide to Creating Successful Play Spaces.* Retrieved March 20, 2018, from Play England: http://playengland.org.uk/media/70684/design-for-play.pdf

Play England. (2009a). *Charter for Children's Play.* Retrieved February 10, 2017, from www.playengland.org.uk

Play England. (2009b). *Nature Play: Maintenance Guide.* Retrieved March 20, 2018, from Play England: http://playengland.org.uk/media/120468/nature-play-maintenance-guide.pdf

Prichard, T. (2013). Report on Cases of Insanity Treated at Abington Abbey, Northampton 1862-67. In C. Hickman, *Therapeutic Landscapes. A history of English hospital gardens since 1800* (p. 90). Manchester: Manchester University Press.

Copyright © 2019 Elizabeth Read

Proshansky, H., Ittelson, W., & Rivlin, L. (1970). Freedom of Choice and Behavior in a physical setting. In H. Proshansky, W. Ittelson, & L. Rivlin, *Environmental Psychology: People and their physical settings.* New York: Holt, Rinhart & Wilson.

Public Health England. (2014). Local Action on Health Inequalities: Improving Access to Green Spaces. *Health Equity Briefing, 8*.

Ryan, R., Weinstein, N., Bertstein, J., Warren, K., Mistretta, L., & Gagne, M. (2010). Vitalizing effects of being outdoors and in nature. *Journal of Environmental Psychology, 30*(2), 159-168.

Sachs, N., & Cooper Marcus, C. (2013). Gardens in Healthcare Facilities: Steps Towards Evaluaton and Certification. *World Health Design, 6*, 76-83.

Schein, D. (2014). Nature's role in children's spiritual development. *Children, Youth and Environments, 24*(2), 78-101.

Schmaker, S., & Pequegnat, W. (1989). Hospital Design, Health Providers, and the Delivery of Effective Healthcare. In E. Zube, & G. Moore, *Advances in Environment, Behavior, and Design* (Vol. 2). New York: Plenum.

Sherman, S., Varnie, J., Ulrich, R., & Malcarne, V. (2005). Post-occupancy evaluation of healing gardens in a pediatric cancer centre. *Landscape and Urban Planning, 73*(2/3), 167-183.

Shim, S.-Y., Herwig, J., & Shelly, M. (2001, June). Pre-schoolers' Play Behaviors with Peers in Classroom and Playground Settings. *Journal of Research in Childhood Education, 15*(2), 149-163.

Sook-Young, S., Herwig, J., & Shelley, M. (2001). Pre-schoolers' Play Behaviors with Peers in Classroom and Playgound Settings. *Journal of Research in Childhood Education, 15*, 149-163.

Souter-Brown, G. (2015). *Landscape and Urban Design for Health and Well-being.* London: Routledge.

Steptoe, A., & Appels, A. (1989). *Stress, Personal Control, and Health.* Chichester: John Wiley and Sons.

Sternberg, E. (2010). *Healing spaces - the science of place and well-being.* Cambridge, M.A.: Havard University Press. Retrieved July 21, 2018, from https://www.youtube.com/watch?v=7zBOPRs1yRE

Stewart-Brown, S. (2016, January 6). *Five steps to mental well-being*. Retrieved from NHS Choices: https://www.nhs.uk/conditions/stress-anxiety-depression/improve-mental-wellbeing/

Copyright © 2019 Elizabeth Read

Stigsdotter, U., Ekholm, E., & Schipperijn, J. (2010). Health promoting outdoor environments - associations between green space and health, health-related quality of life and stress based on a Danish national representative survey. *Scandinavian Journal of Public Health, 38*(4), 411-417.

Takano, T., Nakamura, K., & Watanabe, M. (2002). Urban residential environments and senior citizens' longevity in mega-city areas: the importance of walkable green spaces. *Journal of Epidemiology and Community Health, 56*, 913-918.

The King's Fund. (2012). *Principles of Hospice Design.* London: The King's Fund.

The King's Fund. (2016). *Gardens and Health: Implications for Policy and Practice.* London: The King's Fund.

The Royal Children's Hospital, Melbourne. (2018). *Palliative Care: Psychosocial Support*. Retrieved February 10, 2018, from https://www.rch.org.au/rch_palliative/for_health_professionals/Psychosocial_support

The Royal Horticultural Society. (2013). *The Royal Horticultural Society Encyclopedia of Garden Design.* (C. Young, Ed.) London: Dorling Kindersley Limited.

Thompson Coon, J., Boddy, K., Stein, K., Whear, R., Barton, J., & Depledge, M. (2011). Does Participating in Physical Activity in Outdoor Natural Environments have a Greater Effect on Physical and Mental Well-being than Physical Activity Indoors? A Systematic Review. *Environmental Science and Technology, 45*(5), 1761-1772.

Thrive. (2017). *Home page*. Retrieved February 9, 2017, from https://www.thrive.org.uk/

Together for Short Lives. (2013a, February). *A Core Pathway for Children with Life-limiting and Life-threatening Conditions, Third Edition.* Retrieved February 10, 2018, from www.togetherforshortlives.org.uk

Together for Short Lives. (2013b, June). *The Big Study for Life-limited Children and their Families.* Retrieved February 10, 2018, from www.togetherforshortlives.org.uk

Triguero-Mas, M., Dadvand, P., Cirach, M., & Martinez, D. (2015). Natural Outdor Environments and Mental and Physical Health: Relationships and Mechanisms. *Environment International, 77*, 35-41.

Tyson, M. (1998). *The Healing Landscape. Therapeutic Outdoor Environments.* New York: McGraw-Hill.

Ulrich, R. (1984). View through a window may influence recovery from surgery. *Science, 224*, 420-421.

Ulrich, R. (1991). Effects of health facility interior design on wellness: Theory and recent scientific research. *Journal of Health Care Design, 3*, 97-109.

Copyright © 2019 Elizabeth Read

Ulrich, R. (1993). Biophilia, Biophobia and Natural Landscapes. In S. Kellert, & E. Wilson, *The Biophilia Hypothesis* (pp. 74-137). Washington D.C.: Island Press.

Ulrich, R. (1997). A Theory of Supportive Design for Healthcare Facilities. *Journal of Healthcare Design, 9*(3-7), 97-109.

Ulrich, R. (1999). Effects of gardens on health outcomes: Theory and Research. In C. Marcus, & M. Barnes, *Healing Gardens: Therapeutic Benefits and Design Recommendations.* New York: John Wiley & Sons.

Ulrich, R. (2008). Biophilic Theory and Research for Healthcare Design. In S. Kellert, J. Heerwagen, & M. Mador, *Biophilic Design. The Theory, Science, and Practice of Bringing Buildings to Life* (pp. 87-106). Hoboken, N.J.: John Wiley and Sons.

Ulrich, R. (2014). Effects of Interior Design on Wellness: Theory and Recent Scientific Research. *Journal of Healthcare and Interior Design, 3*, 97-109.

Ulrich, R., & Gilpin, L. (2003). Healing Arts: Nutrition for the Soul. In S. Frampton, L. Gilpin, & P. Charmel, *Putting patients first: designing and practising patient-centred care* (pp. 117-146). San Francisco, CA.: John Wiley and Sons.

Ulrich, R., Luden, O., & Eltinge, J. (1993). Effects of exposure to nature and abstract pictures on patients recovering from heart surgery. *33 Meeting of the Society for Psychophysiological Research.* Rottach-Egern, Germany: Abstract published in Psychophysiology 30 (Supplement 1, 1993): 7.

Veitch, R., & Arkkelin, D. (1995). *Environmental Psychology: An interdisciplinary Perspective.* London: Prentice-Hall.

Villeneuve, P., Jerrett, M., Su, J., Burnett, R., Chen, H., Wheeler, A., & Goldberg, M. (2012). A cohort study relating urban green space with mortality in Ontario, Canada. *Environmental Research, 115*(May 2012), 51-58.

Wasserman, J. (1998). To trace the shifting sands: community, ritual and the memorial landscape. *Landscape, 1*, 42-61.

Wells, N., & Jones, G. (2003). Nearby Nature. A Buffer of Life Stress among Rural Children. *Environment and Behavior, 35*(3), 311-330.

White, M., Alcock, A., Wheeler, B., & Depledge, M. (2013). Coastal proximity, health and well-being: Results from a longitudinal panal survey. *Health and Place, 23*, 97-103.

Whitehouse, S., Varni, J., Seid, M., Marcus, C., Ensberg, M., Jacobs, J., & Mehlenbeck, R. (2001). Evaluating a children's hospital garden environment: Utilization and Consumer Satisfaction. *Journal of Environmental Psychology, 21*, 301-314.

Wilson, E. (1984). *Biophilia.* Cambridge: Havard University Press.

Copyright © 2019 Elizabeth Read

Wilson, E. (1997). Biophilia and the Conservation Ethic. In S. Kellert, & E. Wilson, *The Biophilia Hypothesis* (p. 31). Washington, D.C.: Island Press.

Wilson, L. (1972). Intensive Care Delirium: the effect of outside deprivation in a windowless unit. *Archives of Internal Medicine, 130*, 225-226.

Winterbottom, D., & Wagenfeld, A. (2015). *Therapeutic Gardens. Design for Healing Spaces.* London: Timber Press.

Witkin, G. (2015). Kid Stress. In G. Souter-Brown, *Landscape and Urban Design for Health and Well-Being* (p. 110). Abingdon: Routledge.

World Health Organisation. (1946, July 22). *What is the WHO definition of health?* Retrieved February 10, 2017, from http://www.who.int/suggestions/faq/en/

Worpole, K. (2009a). *Modern Hospice Design.* Abingdon: Routledge.

Worpole, K. (2009b). The Journey Ahead - finding nature in hospice gardens. *Ecos - British Association of Nature Coservationists, 29*(2), 52-57.

Wurtman, R., & Wurtman, J. (1995). Brain serotonin, carbohydrate-craving, obesity and depression. *Obesity Research, 3*, 477S-480S.

Table of Figures

Figure 1: Life-limiting conditions (England only): percentages per diagnostic category 10

Figure 2: Responses from 143 garden users at four San Francisco Bay Area hospitals (Marcus and Barnes, 1995) 27

Copyright © 2019 Elizabeth Read