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Perspective

# Bringing Fronts Back: A Research Agenda to Investigate the Health and Well-Being Impacts of Front Gardens

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**Abstract:** This perspective article proposes an agenda to investigate the impacts of front gardens (yards) on health and well-being. As front gardens are increasingly being paved over, significant ecological benefits will be lost. In addition, urban green infrastructure has a measurable role to play in addressing major public health issues related to mental health, chronic stress, inflammatory, and cardiovascular diseases. The social value of front gardens remains un-quantified. Future research can contribute to assessing the psycho-socio-cultural value of front gardens, and fostering healthy environments for people to live, work, and play in. A better understanding of the health impacts of front gardens can provide a relatable argument to protect permeable surfaces and spaces for nature, as well as to discourage the general public from paving over their front gardens. We propose eight central research questions to be addressed in future work, and elaborate on further variables, lines of inquiry, and suggested intervention trials and observational studies. Potential research findings will have implications for decision-making in fields of horticulture, landscape architecture, urban planning, and public health.

**Keywords:** well-being; domestic gardens; front gardens; cultural ecosystem services; urban landscapes

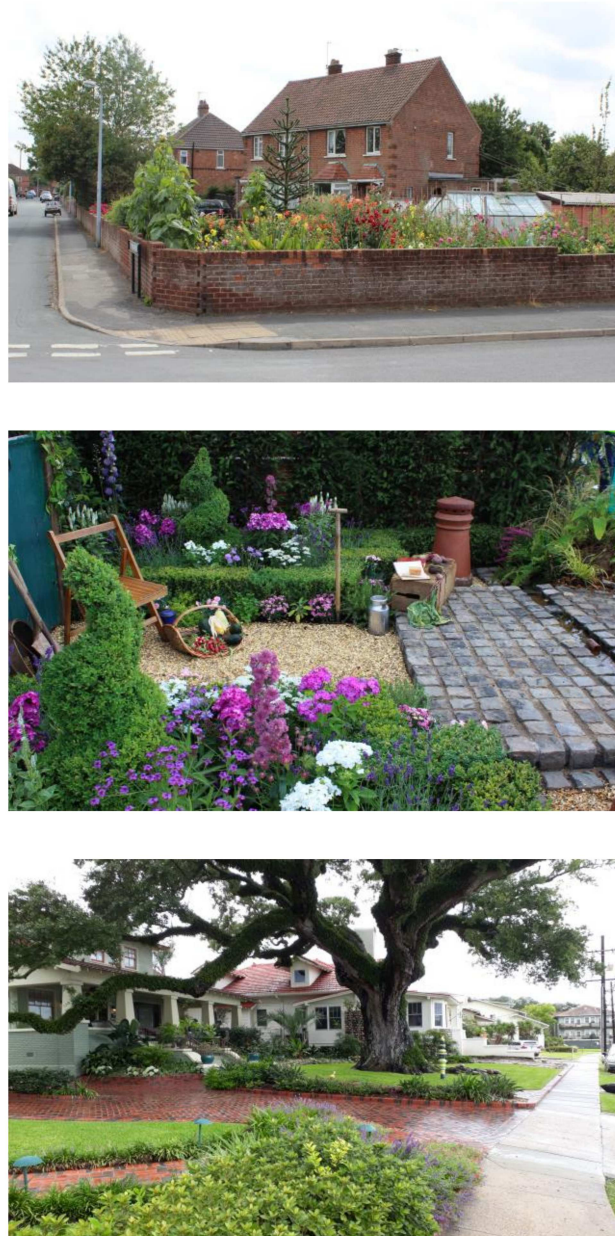
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## 1. Introduction

Over five million front gardens (front yards) in the United Kingdom (UK) now have no plants growing in them (one in three), and four and a half million front gardens (one in four) are completely paved over [1]. This is three times less plant cover in front gardens than ten years ago [1]. In part, this is due to increasing fees and regulations for road parking, a desire for lower maintenance requirements, and a lack of time or skills to look after green space [2]. In 2013, over one million homeowners paved over a portion of their garden [3]. Reasons cited were to create a driveway for off-road parking, and to minimise garden maintenance. Domestic gardens currently have no protected status in UK planning law other than as part of private amenity space, and are not classified as a type of land-use in their own right [4]. The health consequences of land-use changes (such as paving over a front garden) are also largely unknown. Moreover, in contrast to the increasing evidence for the ecological processes taking place in front garden landscapes, the physical, social, and cultural contributions of front gardens are less well evaluated [5,6]. The Royal Horticultural Society, the main gardening charity in the UK, has been leading campaigns and funding research to protect front gardens [1,7].

Front gardens here refer to the piece of land between the street and the front of a residential home. In most cases, this is private land belonging to the homeowner. Front gardens vary in size,

shape, aspect, and vegetation type. There may be a hedge or fence delimiting the front garden from the pavement or public area. Although there may be generic features to many front gardens, such as access pathways and drives, considerable heterogeneity can exist in terms of vegetational composition and planting style (Figure 1). Common features including lawns, shrubs, annual bedding plants, herbaceous plants, rose borders, ponds, and rockeries. The front garden is typically visible from the street and pavement, as well as from any windows at the front of the home.



**Figure 1.** Contrasting styles/vegetational components of front gardens (Cameron).

We propose the importance of investigating how green spaces in the immediate vicinity of the house influence health and well-being. This is in the dual context of the recognised impact of nature and green spaces on physical and mental health, and the growing trend in the UK to pave over front gardens for off-road parking and ease of maintenance. This perspective article reviews current evidence and sets out a future agenda for guiding this field of research.

## 2. The Significance of Front Gardens

Although small in size, residential gardens make up a combined area of 5300 square kilometres in Great Britain, the equivalent of 30% of the total urban built-up area in the country [8]. In any one city, gardens can make up over 25% of urban land area [9,10], and are the most readily accessible green spaces for residents. Davies et al. estimated that 87% of homes in the UK have access to a garden [11]. There are currently 27 million adult gardeners and 24 million domestic gardens [12,13]. While domestic gardens are a valuable component of green infrastructure, their relative contribution remains largely un-quantified [14].

The main difference between front and back gardens is the role frontages play as unique buffer zones that connect the home to the outside world, providing services both to residents and passers-by, while simultaneously separating the private from the public realms [15]. Cultural geographers would classify front gardens as an ordinary urban landscape that reveals the everyday lives of ordinary people. The social and aesthetic function of front gardens has been explored to this effect [16–18]. As well as gardening, front gardens are used to carry out mundane tasks such as arriving and departing the home, taking out the rubbish, or answering the door [19]. The front garden is a front-facing and exterior manifestation of the house. Via local ordinances and housing policies, front gardens have been used as a vehicle for social exclusion and discrimination in neighbourhood politics [20]. These places are our “unwitting autobiography, reflecting our tastes, values, aspirations and even our fears in tangible, visible form” [21]. Staats calls for research on restorative environments in specific spatial, behavioural, and temporal circumstances within the home [22]. Filling this need, we suggest looking at the front garden, the first part of the home that one sees when arriving, and the most public-facing part of the home that provides public good.

## 3. The Ecological Context

If the loss of vegetated surface area in front gardens continues, significant ecological and environmental benefits will be lost. Environmental ecosystem services provided by garden plants and permeable surfaces include slowing run-off and minimising the risk of localised flash-flooding by reducing the pressure on urban drainage systems [23,24]. For example, in Leeds (Yorkshire, UK) over a 33-year period, there was a 13% increase in impervious surfaces, 75% of which was due to paving of residential front gardens [25]. This was linked to higher frequency and magnitude of flooding in the area. A similar situation in Southampton (Hampshire, UK), where impermeable cover in domestic front gardens increased by 22% between 1991 and 2011, and required a 26% increase in attenuation storage volumes [26]. Furthermore, gardens can be a source of food and a habitat for wildlife, and provide pollination resources. Plants and trees can mitigate temperature extremes by cooling urban heat waves and providing shelter and insulation in winter [14]. This ecological role will potentially become even more important in the future as our climate changes [27].

## 4. The Health Context

In 2011, 82.4% of the English population lived in urban areas [28], so there is potential to impact the health outcomes of many lives by improving the quality of urban green spaces. Urban green infrastructure has a measurable role to play in addressing major public health issues related to mental illness, obesity, and cardiovascular diseases. These non-communicable diseases are becoming increasing burdens on health care and workforce productivity [29].

The World Health Organisation (WHO) has emphasised the negative impacts of stress to address the role of public policy in creating better health outcomes [30]. Long-term stress, chronic anxiety, insecurity, low self-esteem, and social isolation all have detrimental effects on both mental and physical health [31]. Furthermore, as these burdens accumulate over the life course, the risk of poorer quality of life, morbidity, and premature death increases [32]. Mental health is a growing public health concern [33,34]. The WHO issued a key policy recommendation to improve the quality of the social

environment people live, study, and work in [30]. In the same vein, Beute and De Kort [35] explain that existing therapies for mental health issues should be complemented by everyday interventions, such as exposure to restorative environments.

There is now a strong body of evidence to indicate that access to green space, streetscape greenery, and nature can provide a range of benefits including improvements in mental health, physical health, and social cohesion [29,36,37]. The ever-growing body of literature shows outdoor activities in green spaces have a positive effect on stress alleviation [38,39]. Positive effects include improved cognitive function [40,41], improved relaxation [42–44], coping with trauma [45,46], and the alleviation of attention deficit disorder symptoms in children [47–49]. Swanwick and colleagues [50] provided an overview of the sociocultural contributions of public urban green space to agendas of social inclusion, health, sustainability, and urban renewal. Conversely, a shortage of green space in local environments has been linked to feelings of loneliness and lack of social support [51,52]. Having said this, benefits from exposure to green spaces is not linear but modulated by the quality and quantity of nature elements, as well as frequency, duration, and patterns of exposure [53]. The quality of nature elements can be assessed using several metrics such as safety, cleanliness, accessibility, maintenance, vegetation structure, species richness, number of different habitats, and birdsong [54]. In all cases, preferences and perceptions will influence the extent to which these measures of nature are relevant or effective for different people [55]. As opposed to public green spaces, there are few studies about the contribution private gardens add to the health and well-being agenda [56–59].

Kaplan and Kaplan have considerably developed our understanding of the psychology of human-nature relations in ‘nearby nature’ (green spaces within walking distance of the home including domestic gardens) and identified four roles that these places play [60]. These include (1) recovery from stress and anxiety that cannot be found elsewhere by providing a soft fascination for plants and flowers to restore directed attention, (2) a context for daydreaming and restfulness, (3) the feeling of being in a completely different world, and (4) compatibility between humans and nature. More recently, Hartig’s seminal work on the processes and mechanisms in restorative environments has further informed the health values of nature experiences [55,61–63]. Moreover, physical activity in natural settings has been shown to be more advantageous in terms of restoration, mood, and self-esteem when compared to physical activity in non-natural indoor and highly urban settings [64]. This is true for adults with both good and poor mental health.

The health and well-being benefits of gardening as physical activity are well-documented. A meta-analysis assessing the consistency of the positive effects of gardening on health (while controlling for publication bias) shows that the reported health benefits of regular gardening are robust [65]. Previous research has focused on the restorative, rehabilitative, and nutritional aspects of gardening activities for many different groups, such as convalescing patients [66], children with attention deficit disorder [47], homeless women [67], older people [68,69], and adults with clinical depression [70]. Furthermore, gardening has been shown to be beneficial in a variety of settings: allotments [71,72], other communal gardening settings [73–76], hospitals [66], nursing homes [77], and schools [78,79]. A recent report by the King’s Fund demonstrates how gardening interventions play an important role in the UK’s National Health Service and the wider health system [58]. The report places gardens within the national strategic health policy context, particularly with regards to the integration of health services, social care, and illness prevention. The report concludes that gardening interventions are an important mechanism for reaching national and local health policy goals.

Despite the current enthusiasm for, and recognition of, the importance of this research area, studies into the distinct benefits of domestic green space towards health and well-being are currently lacking. For example, Mitchell et al. conclude that larger areas of green space were most salutogenic without taking into account the inherent smaller size of domestic gardens [80]. Similarly, Stott et al. promote larger parks and reserves as being crucial for ecosystem service provision, without making a distinction between differential benefits from public and private landscapes and gardens [81]. Addressing exactly this, a recent study quantified the mitigation of local health deprivation by green space and domestic

gardens, rather than relying on a simple measure of land cover [82]. The latter found that domestic gardens provided the most convincing mitigating effect on health deprivation. Another exception, Brindley et al. looked exclusively at residential gardens and found that the largest residential gardens were associated with reduced socioeconomic health inequalities in England [83]. This gives strong support to the idea that domestic gardens, through the provision of different socio-cultural opportunities, are at least just as important to human health as larger public green spaces.

## 5. Gaps in Knowledge

The World Health Organisation has urgently called for robust evaluations of urban green space interventions to be conducted [29]. While the health and social effects of greening vacant lots have been studied through randomised trials [84–86], to our knowledge, there have been no studies that have evaluated a front garden greening intervention at either household or street scale.

A remaining difficulty is to assess the size and duration of the effects of (residential) nature on health and well-being [55]. Jiang et al. have described a dose-response curve for a laboratory-based experiment on tree cover and stress recovery [87], and Shanahan et al. have attempted to sketch dose-response curves to provide information on how small changes in the environment or exposure to nature could influence different health outcomes [53]. More recently, White et al. showed that visiting natural environments for more than 120 min a week was associated with higher self-reported good health in England [88]. There is no existing dose-response curve concerning gardening in domestic gardens. The potential presence of gardening intensity, frequency, or duration thresholds can be used to guide national or neighbourhood scale public health guidelines. In all cases, preferences and perceptions will influence the extent to which these measures of nature are relevant or effective for different people [55].

## 6. A Research Agenda for Health and Well-Being

We propose using both quantitative and qualitative methods to evaluate how front garden landscapes influence health and well-being. Findings can contribute to assessing the psycho-socio-cultural value of gardens. A better understanding of the health impacts of front gardens can provide a relatable argument to protect permeable surfaces and spaces for nature, as well as to discourage the general public from paving over their front gardens. A case built on the need for healthy living conditions rather than gardening in and of itself [89–93] will be more compelling for urban planners, policy-makers, developers, the horticulture and landscape industry, homeowners, and social housing associations.

In order to evaluate how front garden landscapes might be understood as private therapeutic landscapes, research needs to draw on literature from landscape studies, geography, environmental psychology, public health, horticultural therapy, and planetary health. The socio-environmental determinants of health highlight the interrelations between people and their environment, and are the settings of the causal mechanisms for nature's impact on health and well-being [94–97].

Proposed research questions for an agenda on front gardens and health:

1. For residents and passers-by, what are the health benefits of (a) the presence of green front gardens? (b) Gardening in front gardens? Are there any dose-response effects?
2. How do residents relate to their front gardens? What types of interactions occur in front gardens? How are these relationships created and maintained?
3. Are certain front garden features and plantings more conducive to positive emotions or better health outcomes than others? Are favourite parts of a front garden more restorative?
4. Does introducing plants to front gardens that are currently paved over improve well-being and other cultural ecosystem services (such as social cohesion, cognitive development, spiritual and creative enrichment, tranquility, and recreation) for residents and the public?

5. Are there any negative effects caused by increased vegetation in front gardens? How might these be managed?
6. How do front gardens contribute to the walkability of a neighbourhood?
7. How does a sense of community and social cohesion emerge from (a) the presence of green front gardens? (b) Gardening in front gardens? Do front gardens have a role to play in bringing different cultures together and forming societies that are more resilient to socio-technological and environmental risks and challenges?
8. Do front gardens have a role to play in issues of health and social equity, and are their well-being effects mediated by socio-economic status?

Answering the research questions above will require exploring which health outcomes and indicators are likely to be affected by the presence of front gardens and the mechanisms of this effect. Evaluations of front garden landscapes could measure personal well-being, including positive and negative emotions, and psychological functioning (such as feeling competent and having a sense of purpose). Measures should carry individual meaning, statistical relevance, comparability to existing greenspace and health research, and applicability to the medical, public policy, and business worlds. Appropriate examples include the Warwick-Edinburgh Mental Well-Being Scale [98], the Perceived Stress Scale [99], and concentrations of salivary cortisol as biomarkers of stress [52]. Social resilience can be measured by modelling risk and evaluating community preparedness, coping and adaptive capacities in response to natural and health crises [100–102].

Important lines of inquiry could consider different types of plants, colours, scents, planting structures, and other garden features. Given the psychological impacts of colour, aesthetic preferences, and the links between higher biodiversity and well-being, there are numerous factors to be explored for their health and well-being impacts. Whether this is based on observational or intervention studies, there is a large scope for further research on the typologies of front gardens that lead to improved environmental and well-being outcomes. Taking such research forward would depend on engaging sufficient numbers of participants to allow for randomised trials.

A deeper understanding of the impacts of front gardens on health and well-being can be furthered by distinguishing impacts for people who are in good health—as a preventative mechanism—from those in poor mental or physical health. Results could inform horticultural therapists, as well as other frontline health and social care providers, on best practice and effective investments.

There should be a consideration to examine factors that lead to varying extents of community cohesion in different communities. Both in the UK and internationally, the range of streetscape typologies and resident demographics means that front gardens can take on greater significance in certain areas than in others. Research conducted in different neighbourhoods, cities, and countries would have their own specificities and be embedded in unique socio-political contexts. If replicating a greening intervention, programs led by local authorities, the horticultural and landscape industries, grassroots initiatives, schools, gardening clubs, private businesses, or utilities companies could have an effect on engagement levels, perceptions of the scheme, and funding availability.

Related lines of inquiry could prioritise investigations into reducing social isolation and improving social equity and cultural cohesion, or other specific high priority socio-medical concerns. Further considerations include how (front) gardens can impact health and well-being for people at different ages through the life course. Longer-term longitudinal research can be poised to capture the dynamic relationship between people and their (front) gardens across childhood, adolescence, adulthood, and older age, as well as through times of change and transition.

As the societal and health issues of our time, it is important that any research agenda address the health equity debate. People with lower socio-economic status, people living in deprived urban communities, and people with disabilities are likely to have poorer access to a front garden, let alone the resources to plant and maintain one. Ethnicity and other cultural relationships can also be explored through the front garden, for example how gardening can facilitate place-belonging for migrants and displaced people.

## 7. Conclusions

*The garden is the smallest parcel of the world and then it is the totality of the world.*

–Michel Foucault [103]

Michel Foucault encapsulates how small spaces that are part of our everyday lives can also carry much deeper significance than might be assumed based on their size and ordinariness. To date, front gardens have largely been overlooked in the assessment of public health, environmental, and planning outcomes. We propose a research agenda to evaluate how front garden landscapes influence health and well-being. There is merit in valuing front gardens not only for the ecological ecosystem services, but also for their multiple positive psycho-socio-cultural impacts. Potential research findings will have implications for fields of horticulture, landscape architecture, urban planning, and public health. These should be articulated in ways relevant to policy-makers, decision-makers, and funding bodies to empower them to integrate the value of front gardens in their work, particularly when dealing with front garden paving regulations, future housing developments, and streetscape greenery, amongst others.

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