'Those little connections':
Community-led housing and loneliness

A report for the Ministry of Housing, Communities and Local Government

ANNEXES

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Annex A: Literature review

Introduction

This review (drafted in December 2019, with minor revisions March 2021) provides an overall assessment of the impact on loneliness of housing interventions abroad and in the UK, with particular emphasis on cohousing, as well as other models and definitions that fall under the wider umbrella of community-led housing (CLH) such as community land trusts and housing co-operatives. It builds on the systematic reviews developed by the 'What Works Centre for Wellbeing' (Daykin et al 2019; Victor et al, 2018) to identify and assess which policy interventions best help reduce social, emotional and existential loneliness across all ages nationally and internationally.

Both for resource reasons but also because the understanding of the mechanisms by which housing interventions affect loneliness are still poorly understood, this document is not a systematic review. Rather, it summarises what is known so far and identifies areas where research might be best focussed. As with the What Works review, the literature selected encompassed published qualitative and mixed-methods articles and book chapters, and includes grey literature. Literature searches were conducted through scientific databases that included Scopus, the Social Science Citation Index (Web of Science), the Arts and Humanities Citation Index (Web of Science) and the Science Citation Index. The review also draws on recent literature searches for reviews and studies of CLH carried out by members of the research team, and more broadly on the knowledge and literature collated by colleagues in our national and international networks on CLH including UrbaMonde, Cohousing Association of the United States, European Network of Housing Research [ENHR], Australian Housing and Urban Research Institute [AHURI] and France's National Network of Participatory Housing [RNHP]).

The review is divided into three main sections: first a brief review (drawing on Daykin et al. 2019) of how loneliness has been conceptualised or defined, highlighting particular risk groups or aspects of loneliness that are potentially relevant to community-led housing interventions; a second section that reviews the efficacy of selected interventions reported in the literature; and third a consideration of the extent to which the literature specifically on community-led housing has addressed the issues of loneliness and wellbeing.

1 Conceptualising loneliness

While the focus of research into loneliness in the UK and North America has been largely on old age, there is increasing recognition that loneliness is a phenomenon that can occur across the adult life course and is not just – or even mainly – a risk associated with later life (for example Qualter et al., 2015; Victor and Yang, 2012). Further, while it is likely that everyone will experience loneliness at some point in their lives, the phenomenon is increasingly understood as an outcome not just of household makeup or life stage (e.g. working or retired) but also as related to social class, gender, ethnicity, sexual orientation, physical environment, physical environment, and is thus unlikely to respond to simplistic or single-approach interventions (Daykin et al., 2019; Kantar Public, 2016; Victor and Pikhartova, 2020; Victor and Yang, 2012). Because the experience of loneliness has a large cultural element, definitions of loneliness may also vary between different countries.

In their systematic conceptual review of the literature on loneliness, Daykin et al. (2019) note that loneliness is a subjective state, not automatically arising from physical or social isolation, but from a perceived deficit in comparison with an individual's expectations. As such – and although a number of different methods of measuring loneliness are noted across the wide range of research the authors assess – loneliness is generally accepted as being self-reported. The UK Government's Community Life Survey 2017-2018 for instance, which focussed on loneliness, was based on self-completed online and

paper questionnaires from over 10,000 individuals (Department for Digital, Culture, Media & Sport, 2019).

Daykin et al. (2019) identify three broad concepts or types of loneliness, which, while not strict divisions, can be regarded as useful 'framings' to better understand the phenomenon. These are:

Social loneliness – arising from social isolation or a deficit of social connections, sometimes explained as a dissatisfaction with the quality or quantity of a person's social network.

Emotional loneliness – arising from a perceived absence of meaningful relationships or a lack of a sense of 'belonging', for instance to a social group, family or loved one.

Existential loneliness – a condition whereby a person feels completely separate and isolated from others, felt most commonly by those experiencing isolating trauma such as a life-threatening illness.

Daykin et al. (2019) have drawn on a very wide range of examples reported across the literature in order to establish these three aspects. The following discussion draws primarily on their report, but also on other literature to identify those themes that might directly or indirectly relate to interventions through CLH.

Loneliness and social capital

Social capital is a term widely used within the field of sociology but also in the wider public sphere, and is also widely and differently understood. Putnam (2001) popularised the concept, calling it a resource created by individuals but also a collective shared understanding and endeavour; it has also been conceived as one of the many forms of capital that are developed and used by the individual (Bourdieu, 1986; Schuller et al., 2000). Nyqvist et al. (2016) say there is general agreement that social capital can be described as a social resource, but point out that while studies of social capital have previously focussed on issues of physical and mental health, there has been much less examination of the relationship with mental wellbeing or with loneliness specifically. Nonetheless they note that as the concept of social capital has become increasingly important in public health research, the '… *growing interest in social capital […] reflects a renewed interest in socio-environmental factors as determinants of health and denotes a shift in focus from micro level risk factors to broader contextual factors on neighbourhood or societal levels*.' (Nyqvist et al., 2016: 1).

The concept is not often found in the loneliness literature reviewed, but has been used as a lens for examining the social dynamics and benefits derived through membership of intentional housing communities, (see for instance Jones, 2017; Ruiu, 2016) and will be returned to later in that context.

The following sections discuss the various categories of groups in society who have been found to be at most risk of loneliness, and the situations that can bring it about.

Spatial, geographic and place-based factors

The socially isolating effects of living in a certain place are not limited to a single age group. Corcoran and Marshall (2017) argue from a case study that emotional loneliness can be an outcome of insecurity or a lack of attachment to place, whether rural or urban. And in a study of social connection between people living in a high-rise block in the UK (Chile et al., 2014), the authors find while living alone does not in itself imply social isolation, there is a risk that such designs – as opposed to lower-rise

construction where there is greater chance of serendipitous social encounters – might create psychological distance between residents.

But the spatial aspect of emotional loneliness affects older people most strongly (or at least the literature has focussed more on this phenomenon). The literature suggests this might be not only because later life brings changes such as retirement, which in turn brings reduced social networks, but that places and spaces that support social interaction might change or disappear – or that a social connection such as a spouse might be lost (Costello, 2002; Davies et al., 2016; Huijbers, 2019; Muir & McGrath, 2018; Theeke at al., 2015).

Huijbers (2019) notes, in a UK study of mental health service users, how perception of a place is important to a sense of belonging, and conversely that a lack of identification with – and feeling secure in – a locality leads to feelings of disconnection and loneliness for older people. The need for safe, familiar space is connected with other factors including the quality of local amenities and services, the limiting effects of physical and mental illness; a personal preference for social connection or solitude; a subjective sense of aloneness (including fear of dying alone, loss of family and friends and lack of daily human contact);and – perhaps most importantly in the context of this review – a sense of community, in terms of connection in shared public spaces, connections through intergenerational living and housing characteristics. The importance of feeling safe and at home in a place suggest that moving away from familiar locations in later life (such as downsizing or moving to a retirement area) may present challenges for some.

Three recent studies examine social isolation among older people in rural communities, all in Ireland (Bantry-White et al., 2018; McHugh Power et al., 2017; Power et al., 2017). Although some of the findings might be specific to geographical-demographic changes in that country, there was evidence that older people experienced social isolation through a lack of both people and opportunity around them, and mourned the loss of an 'idealised community' (Bantry-White et al., 2018). . They also could feel vulnerable because of living alone (McHugh Power et al., 2017; Power et al., 2017), a finding that reinforces the importance of feeling secure.

One German study reported a comparable sense of a lost idealised community but in an urban setting (Schirmer & Michailakis, 2015). The older people studied felt that urban life was responsible for their loss of community, and that face-to-face social contact across family connections and between generations had been reduced or devalued through societal changes that included use of technology and younger generations prioritising work over family and friends.

Victor and Pikhartova (2020) however found that the rural / urban split (for older people at least) was of far less importance in terms of loneliness when compared to the degree of deprivation for a given location; poverty, and the complex problems associated with it, are closely tied to the extent to which an individual experiences loneliness.

Loneliness among older people

By far the largest number of studies referenced by Daykin et al. (2019) addressed older populations (generally defined as over 55 but in some literature as young as 50), and included issues of health and illness as a source of isolation. Studies have looked at those living in the community but especially at older people in residential care settings, where much of the research on loneliness interventions has been directed. Social loneliness was portrayed as stemming from disruptions to social networks and meaningful engagement in later life (Mackowicz & Wnek-Gozdek, 2018; Smith, 2012; Taube et al., 2016), and a lack of opportunity for continued social participation (Goll et al., 2015; Hauge & Kirkevold, 2012),

in turn related to the physical restrictions of illness and disability, loss of a loved one, or a sense of lost community (Smith, 2012; Taube et al., 2016). The loss of a partner or other intimate relationship was also often a catalyst for *emotional* loneliness in several studies (Bennett & Victor, 2012; Costello, 2002; Davies et al., 2016; Merz & de Jong Gierveld, 2016) as well as fears of becoming stigmatised as lonely and old; notably many older people hid feelings of loneliness for fear of becoming a burden on family (Barg et al., 2006; Dong et al., 2011; McInnis & White, 2001; Muir & McGrath, 2018).

Perhaps unsurprisingly, changes in life culture such as retirement were triggers for the onset of loneliness, as well as a disparity between lifestyles such as the prioritisation of work among younger generations, or raising young families; one German study (Schirmer & Michailakis, 2015) cited these factors as instrumental in feelings of isolation and loneliness among older people.

Loneliness among younger people and across the life course

Despite increasing evidence that loneliness among younger adults is a significant problem (Victor and Yang, 2012), there is very little social research that responds to this. While studies have examined social loneliness among university students struggling with new and unfamiliar environments (McLaughlin & Sillence, 2018; Sawir, 2008; Vasileiou et al., 2019a), there is less that addresses loneliness among young people more broadly, although there is evidence that social loneliness among young people experienced as they face changes through adolescence is compounded by issues that included navigating social media, difficult living situations, weak social networks, cuts in services, and poverty (Batsleer et al., 2019; The Mental Health Foundation, 2018).

Work roles, paid and unpaid work, caregiving

Social loneliness has been identified as a significant risk in certain socially isolating paid and also unpaid work, with informal caregivers being especially vulnerable (Hislop et al., 2015; Vasileiou et al., 2017b). A major reason for loneliness among domestically-based caregivers was their sense of powerlessness and the impossibility of sharing the care burden with others (Vasileiou et al., 2017b).

Physical and mental health issues

While chronic illness, physical conditions and long hospital stays can be socially isolating, there are examples of isolating illnesses – most notably cancer – where individuals experience *existential* loneliness through a lack of contact with others able to understand them, even if surrounded by friends and family (Nystrom, 2006). Nilsson (2008) describes, in a Norwegian study the existential loneliness experienced through mental illness, of being excluded from a 'normal' life.

Gender

There is significant evidence that men and women experience loneliness differently, predominantly in later life (see below) but also through earlier life periods. Women are more likely to experience social loneliness during periods of being at home with young children, children leaving home, or bereavement, and this is often exacerbated by poverty and lack of access to local amenities, job opportunities and personal social activities (Bates & Machin, 2015). Winterstein and Eisikovits (2005) examine the social isolation of women who had survived domestic violence. Two studies focus on the experience of social isolation of women in immigrant communities (Houston, 2016; Hurtado-de-Mendoza, 2014); in one case of women isolated in widowhood exacerbated by cultural exclusion from family and community events (Houston, 2016).

Less attention has been paid to loneliness among men, at least prior to old age: Smith (1998) writes of cases of the social isolation felt by men going against social norms as househusbands.

Migration and later life

Looking at relocation through a different lens – that of migration – several studies report significant social loneliness among older migrants living in North America and Western Europe (for instance Canham, 2015; Cela & Fokkema, 2017; Hislop et al., 2015; Park et al., 2018; Pirhonen et al., 2018). Pirhonen et al. (2018) describe migration as a life changing event that contributes to social loneliness in later life, and which disproportionately affects older women especially in widowhood. Park et al. (2018) consider the experience of Asian older women living in New Zealand; a study by Cela & Fokkema (2017) a lack of meaningful relationships with 'co-ethnic' peers (people of the same ethnic background) was identified as a contributory factor in social loneliness of older carers and the people they cared for.Both studies highlight the importance of having communities of like-minded people able to share experiences and backgrounds.

2 Responses and interventions

A dearth of rigorous evaluation

In their overview of reviews into the efficacy of loneliness interventions (Victor et al., 2018), the authors find that evidence from the published literature is very limited; only 40 studies were identified as having useful results, and all of these addressed loneliness among older people (albeit this was generally defined as 55, in some studies as young as 50). Other deficits are noted in the studies, two key aspects being firstly that more complex issues of inequality and diversity were little addressed; and secondly that there were no longer-term or longitudinal studies.

It is also apparent in reading the various reviews referenced, that many in turn refer to research on interventions that could be described as somewhat instrumental or reductive – robotic pets feature in several, for instance, amid other more socially connective technologies – and tended to be based on studies of interventions in care homes or residential accommodation where older people were more physically isolated, through poorer physical and mental health. The authors comment that the complex underlying mechanisms of loneliness were rarely investigated, and take the diverse range of approaches to suggest there is no single effective approach, proposing that more tailored or targeted programmes might be more effective (they also question the ethical aspects of some of the more medically-led studies).

Given these limitations, the rest of this section also considers a number of additional published and grey literature reports on potential interventions, as well as drawing on those from Victor et al. (2018) and Daykin et al. (2019).

The importance of meaningful social contact

The sociological literature that addresses interventions into loneliness experienced by those in formal healthcare, or with physical or mental health issues, recognises that these are complex issues. Ans while interventions aimed at combating loneliness focus primarily on the need for good professional care and also mutual support from those with similar experiences (Hollenbeck & Patrick, 2017; Sagan, 2017), also noted is the need for supportive relationships and for societal attitudes to be overcome – especially around the need for psychological support (Cherry & Smith, 1993; Howard et al., 2014). In addressing the connections between loneliness and mental health, the importance of wider environment is also stressed, such as housing and employment (Topor et al., 2016), and which includes provision of supported housing for young people with mental health problems (Pettigrew & Roberts, 2008).

The importance of meaningful social contact as a way of alleviating social and other aspects of loneliness is emphasized in a number of studies. Vasileiou et al. (2017) note how, in the case of informal carers, practical support and *meaningful* opportunities for social connection are found to be a way of addressing loneliness (they also note that social contact that is not meaningful to the carer, such as those who are not able to share or empathise with their experiences may even be unhelpful).

As noted above, Victor et al.'s (2018) overview of reviews, in strictly filtering for rigorous reviews was left only with literature that addressed loneliness in the context of old age. Within these, there *are* a number of papers that review loneliness interventions beyond what we might call the 'robot dog' approach noted above, and that report some success from more socially-directed themes such as the efficacy of a life-long positive approach to wellbeing and an active lifestyle (Mackowicz & Wnek-Gozdek, 2018; Smith, 2012), or intergenerational approaches such as a programme whereby younger adults supported older people in the use of technology (Breck et al., 2018). Other research highlights a more community-led but similar approach in developing peer-led mentor schemes and befriending programmes for older women, resulted both in increased independence but also significantly reduced loneliness (Walkner et al., 2018).

And while the published literature in Victor et al.'s overview report presents no clear efficacy for many of the interventions specifically for the *older* population – most notably the more 'technological' responses – the authors do note that there is significant support from the unpublished grey literature in particular for the role of supporting social bonds within communities, saying:

> … *a potential mechanism for successful loneliness interventions may be in 'reconnecting' those who are experiencing loneliness with their community (however defined) via the development of meaningful relationships*.'
>
> (Victor et al., 2018: 50).

Interventions on loneliness among older people

On one hand, there is significant literature from sociology and social gerontology that might support a policy approach directed to interventions that support making meaningful social connections (for instance Hemingway & Jack, 2013; Quinn & Blandon, 2014). Macmillan et al. (2018), suggest significant benefits in tackling isolation for older people from a 'Homeshare' project, whereby younger people on low incomes provide companionship and low-level support in exchange for affordable accommodation. Similarly, Labit (2016) notes that social policy in France has been supportive of models that challenge older people's isolation through support of student-senior home-sharing. Further, there is evidence that older participants might respond more positively (and therefore might engage more fully) in social activities they perceive as having a purpose other than combatting social isolation, i.e. social interaction that is less stigmatised as being 'for older people' (Kharicha et al., 2017; Smith, 2012).

In addition, there is a range of evidence that suggests more attention should be given to interventions that encourage group socialising, especially where this was based around activities that encouraged unsupported friendships to be made. In a much publicised recent Swedish housing project that mixes those over 70 with young locals and refugees, Arroyo et al. (2020) found that following initial positive signs, the Covid-19 pandemic in fact further encouraged the agency of the residents, who continued to develop social bonds but also social bridging bonds across the different groups. In the UK, a grey literature report by Leicester Ageing Together (2017) found that while one-to-one interventions had no significant effect, group interventions – such as walking groups, gardening projects and so on – had greater impact. Similarly, a study in Finland also suggested the potential for group-based activities, such as group exercise and discussions (Routasalo et al., 2009).

Hemingway & Jack (2013) assessed the work of a charity programme that launched a series of friendship clubs across two counties in the south of England. The authors identified significant success in terms of reducing feelings of social loneliness and a (self-reported) improvement in health and wellbeing. A key aspect was that the members of the clubs learned to provide meaningful friendship and support for each other, made possible by the organisers providing transport and suitable venues. Quinn & Blandon (2014) conducted research with Plymouth's 'Keep Singing, Keepsake' Project, that worked with older people in residential and community settings through weekly group singing sessions. The authors report significant success in preventing social isolation and loneliness through the creation of shared knowledge and social networks formed between participants, as well as associated health benefits; the authors also note that the benefits appeared to last well beyond the duration of the project.

Also notable was the Care Connect programme at the University of Sheffield, whose '*More Than a Mealtime*' project used shared meals as a way of bringing together single older people at different local venues (Care Connect, 2017). It is quoted here at length, given the extent to which it chimes with shared meals as one of the central tenets of cohousing (as described later):

> *Many said that getting involved in Shared Tables had led to the development of new friendships. The intimate nature of sitting together in a small group of six to eight people was identified as much more rewarding than large coffee mornings (which some found daunting). As a result of making friends through 'Shared Tables', small groups have shared unfacilitated meals or coffee together and gone out to the cinema. The key mechanism for reducing social isolation and potentially loneliness was the development of meaningful relationships.*
>
> (Care Connect, 2017: 2)

A key point also made here is the aspect of self-determinism – *unfacilitated* arrangements made between peers which emphasise the earlier point that paternalistic approaches might tend to stigmatise old age and loneliness. One evaluation of a peer-led support programme known as 'The Silver Line' emphasises the importance of personal histories and socio-cultural circumstances; the project brought like-minded individuals together under a common purpose (Moore & Preston, 2015).

Place-based approaches

While many of the examples cited so far could by their nature be regarded as based in a particular place or locality, in the context of this report – i.e. exploring the potential of community-led housing as intentional neighbourhood – it is important to survey the literature that specifically addresses the role of place, neighbourhood and proximate community in tackling loneliness.

Jose & Lim (2014) found evidence of social connectedness – quality of social connections rather than size of network – to be an important predictor of lower levels of loneliness among adolescents. More specifically, in a study of loneliness among young people in New Zealand Smith (2015) emphasizes the importance of proximity in making and maintaining these social connections, the '*ready availability of family and friends for regular face-to-face contact, as well as the ability to easily access and contribute to the local community*.' (2015: ii). Batsleer et al. (2018) highlight a range of factors relevant to loneliness among younger people, stressing the negative role of poverty, poor environments and physical isolation, but also emphasise the importance of place-based and community-supporting measures such as youth clubs, cafes and other spaces where young people can make and maintain friendships with the support of the wider community. Similarly, Sital-Singh et al. (2018) explore the role of youth organisations in tackling loneliness among young people, finding that even where such a goal is

not made explicit, the work done is successful in part through interventions that include providing safe spaces for young people, fostering a sense of belonging, and positive relationships with other young people and trusted adults; in short those actions we might view as building strong communities.

Several studies found the importance of place-based approaches to combatting loneliness, that included place-based programmes such as friendship groups and other activities that facilitated social support and encouraged social connection (for instance Chile et al., 2014; Huijbers, 2018; Bess & Doykos 2014).

With a focus specifically on ageing, an evaluation by Ageing Well Torbay (2017) found that reconnecting isolated older people at a local level was key, and that loneliness was reduced through involvement in a variety of neighbourhood projects. Collins & Wrigley (2014) emphasise the importance on drawing on localised solutions through a study of programmes in four neighbourhoods in the north-east of England, supported by the Joseph Rowntree Foundation. The programmes used local people recruited as action-researchers to explore sources of loneliness in their communities and seek community-led solutions, which were then implemented. The authors note their evaluation as demonstrating

> *…that the community activism this programme fostered can contribute to the well-being of people at risk of or experiencing loneliness. Local people can play a central role in such activity and this involvement in turn enhances community well-being. … The highlight of the programme … was its participatory approach, which placed local people at the heart of everything. It allowed them to fail or succeed, learn as they go and, eventually, form small teams of residents dedicated to creating change for themselves and their neighbours.*
> (Collins & Wrigley, 2014: 51)

Price (2015) makes an extensive UK-based study of what he describes as 'platforms', for individuals making better – and deeper – local social connections, and which are rarely intentional or explicitly regarded as a means of social connection. Giving the example of social interaction among parents at the school gate, the author views such informal social nodes as creating and sustaining a range of relationships of different kinds and strengths, that were little talked about but '… *largely seen as an implicit, win-win exchange in which people invested time and effort to create a sense of the "good community"'* (2015: 5). The study looks at a range of initiatives that include: *The Big Lunch* (neighbourhoods eating together); shared allotment and community garden projects, *The U* and also *Streetbank* (two programmes that connects local skills, building social capital on 'weak' ties of those not already close friends); a 'Casserole Club' (an initiative that brings together those who cannot cook for themselves and those who want to cook for others) and a number of children's clubs, based around sharing school runs and other school support activities. The overall aim of the report is to explore the question of how we might encourage such platforms to flourish while preserving their incidental nature: in doing so he supports other work noted above that suggests such 'indirect' interventions avoid the stigma of programmes explicitly aimed at tackling loneliness; they are paternalistic in the sense of being enabled through policy support, but achieve a range of positive outcomes that draw on the untapped potential of existing communities, to become self-directing.

The importance of approaches that are sustainable in the long-term

Bess & Doykos (2014) however, in a UK study of a programme aimed at reducing social isolation through place-based parent education in deprived communities, sound a note of warning that contrasts with the singing project investigated by Quinn & Blandon (2014, see earlier): that support for programs that provide opportunities for building social connection might need to extend beyond the duration of any

single program. They further note that successful interventions to combat loneliness may need to address wider structural issues of poverty, as an underlying contributor to social loneliness.

3 The community-led housing literature

As previously noted, 'community-led housing' has been defined in the context of this report as an umbrella term that encompasses cohousing, community land trusts, housing co-operatives and self-build projects (and with individual schemes that may be more than one of these things). This section includes the literature on all of these forms where relevant, and also other models that approximate to these in key ways, but in particular on cohousing as both the field of research with the greatest body of literature that potentially relates to combatting loneliness, but also as the only one of these housing forms whose definition is rooted *explicitly* in social interaction.

The relatively small – but fast growing – literature focussed on CLH and cohousing in particular has addressed a range of issues, that include the physical design of projects, their legal structures and development decision-making processes (key work includes Bamford, 2001; Brenton, 2008; Field, 2004; Fromm, 1991; Lietaert, 2007; McCamant and Durett, 1998; Meltzer, 2005; Sargisson, 2010; Scotthanson and Scotthanson, 2005; and Williams, 2005).

But while models such as community land trusts and co-operatives have been predominantly framed as a response to housing market failure, or to lack of access to decent housing by certain social groups (Moore, 2014), advocates of *cohousing* and closely-comparable models have long positioned it as rooted in a response to a perceived lack of social interaction at a local level, and that such communities may support greater mental and physical wellbeing through mutual sociability (Choi, 2004; Choi & Paulsson, 2011; Field, 2004; Fromm, 1991; Heath et al., 2018; McCamant & Durett, 1998; Taylor, 2018; Fernández-Arrigoitia and West, forthcoming). Meadows (1997) refers to cohousing's beginnings in Denmark as being '*a reaction to the loneliness and expense of unintentional communities*.'

Thus, while there are a number of definitions of cohousing, essential in this context are that residents have private homes but also share common facilities (such as a kitchen and dining room, a laundry and other shared spaces), participate in the physical design process, collectively manage the site and shared elements, and meet regularly as a way to ensure an *intentional* community is maintained, i.e. that members are more than simply good neighbours.

Yet, especially given that the defining feature of cohousing is said to be its 'social architecture', there remains a lack of empirical studies or data about the social dimensions of cohousing and community-led housing more broadly in terms of sociability and social capital both within groups and in their connection with the communities in which they are based. There are case studies that indicate that when a 'proximate' community of close neighbours share a space (and that notably is distinct from individual private homes) there is a common sense of ownership, and that the facilitation of regular social interaction reduces social isolation (Bay, 2004; Carstens, 1993; Chile et al., 2014).

Further, there is evidence that the (often lengthy) process of forming CLH groups and developing projects in itself has a positive impact in terms of making social connections and bringing together groups of like-minded people (for instance Hudson et al., 2019; Jones, 2017).

And while there is minimal research that addresses issues of loneliness other than later life (for which see below), there are studies that explore the related concepts of 'wellbeing' through mutually supportive behaviour in housing communities. Two social studies that are rare in collecting quantitative data about cohousing – Choi (2004) and Choi & Paulsson (2011) – who surveyed and/or interviewed more than 700 members of groups in Denmark and Sweden, conclude that in comparison with the wider

population, there is a greater degree of socialising and time shared with neighbours, and that members enjoy good or at least better health into old age. In addition, members reported feeling that there was greater mutual support generally than in conventional housing (although this was not empirically measured). Similar results were found by research on a smaller scale through a case study research in California (Williams, 2005) and also in Austria (Millonig et al., 2010).
Markle et al. (2015) however, in a study of members of multiple cohousing groups across the USA, did compare experiences of social support between 60 members of groups and 65 individuals who expressed an interest but had not joined a group, finding '*significantly more socially supportive behaviors than their non-cohousing peers*' (2015: 616).

There is also literature that examines cohousing and other forms of CLH making use of the concept of social capital in describing the levels of social interaction and the supportive bonds that are formed within groups (for example Bouma and Voorbij, 2009; Bramanti, 2012; Brenton, 2008; Jarvis, 2015a; Lang & Novy, 2014; Markle et al., 2015; Poley, 2007; Poley & Stephenson, 2007; Ruiu, 2016; Sargisson, 2010; and Williams, 2005, 2008). One of these (Lang & Novy, 2014) specifically finds greater levels of social capital in community-led co-operatives, in comparison with that found in housing developments created and managed by others.

Finally, it is worth noting that what is often missed in much of the literature on CLH – perhaps because it is so intrinsic to the concept – is that it represents a local or *place*-based response by a community to a particular problem; in the context of loneliness interventions we might therefore regard different forms of CLH as place-based responses comparable to some of the community-based interventions noted in the previous section.

Reaching beyond closed groups to a wider community

Thus far the focus has been largely on the benefits in terms of social connection for those within groups, but it is also important in the context of loneliness interventions to consider how CLH projects draw from and interact with the wider community. Of course, almost by definition community-led housing is instigated and driven by some form of community. But more specifically, studies have examined the social connections and networks that projects create.

In a study of newly created collaborative housing neighbourhoods in Germany, Hamiduddin and Gallent (2016) note the capacity of the self-build process itself to create wider community benefits; Fromm (2012) draws on collaborative housing projects from around the world to examine how such schemes are able to rebuild social connections and mutual support to repair the social fabric of communities. Ruiu (2016), in a study of cohousing groups in England and Italy, considers the different dimensions of social capital to explore how it is created and employed not just through the internal social dynamics of the group, and finds that

> *… the bridging social capital depends on the willingness to be open to the outside, and on creating friendly relationships with the wider neighbourhood; the linking social capital is built in relation to cohousers' ability to create partnerships with external actors (institutions or external organizations), which may help groups to reduce the length of the development process and promote a higher degree of heterogeneity within communities (in terms of economic, cultural and social capital).*
> (Ruiu, 2016: 409)

Chiodelli (2015) and Ruiu (2016), in the study noted above) both find residents of cohousing groups to be keen to involve the wider neighbourhood in common activities, and that they participate actively in

wider neighbourhood life. Often this is as an explicit aim of the group (Hudson, 2019). Poley (2007) and Berggren (2011) both find residents of cohousing groups to be more engaged in civic society and politics at different levels than others, with Poley drawing on Putnam's understanding of the importance of social capital as a collaborative resource (Putnam, 1998).

Inclusion and diversity

For cohousing advocates in a number of countries, expanding the principles of inclusion and diversity in community-led housing remains a strong focus, with the aim of further widening access in terms of gender and sexual orientation, disability, migration experiences, religious practices, relationships, family forms, and more (Droste & Komorek 2017; LaFond & Tsvetkova, 2017). There is arguably a tension here that is not often addressed in the cohousing literature: between the need for diversity and the need for groups to comprise like-minded people in order to be able to function socially. It could equally be argued however that rather than attempt to enforce a diversity on individual groups, a better policy to be adopted by advocates might be to stress the importance of social contact beyond individual groups as noted earlier.

One strong theme that emerges from the literature that traces the utopic and communitarian roots and practices regarding gender equality, cohousing and other closely-related collective forms of living can be less patriarchal than other more mainstream residential and domestic choices, with women in particular less isolated by individualised domestic workloads (Horelli & Vepsä 1994; Sargisson 2012; 2014; Sangregorio 1995; 2010; Toker 2010; Williams 2005; Vestbro 1997; 2010; Vestbro & Horelli 2012; Fernández-Arrigoitia and West, forthcoming). Graber and Wolfe (2004) describe a rare but successful example of how cohousing has been used as a supportive environment for women vulnerable because of domestic violence to live collectively with their children, and creating a mutually supportive community in doing so.

Similarly, parents or carers might be less isolated through membership of groups (Sullivan-Catlin, 2014; Toker, 2010). Hudson et al. (2019) note for instance that in one group in development stage, a carer for her severely disabled son described how the group had been of great support even before moving in. Pederson (2015), in a survey of senior cohousing in Sweden, notes that members had often provided significant support to members experiencing conditions that included depression, and – while acknowledging that there is often a need for such groups to set limits on the level of practical support – in one case support for a member with dementia.

Lager et al. (2012) explored the experience of a group of older Antillean migrants in the Netherlands, finding that living in cohousing together gave its members not only a feeling of wellbeing and of being 'in place', but also a secure social base from which it was possible to make new attachments within the wider community that members felt might have otherwise have seemed an insurmountable barrier. Fromm (2012), in a study that includes a cohousing project by older immigrants from Southeast Asia, emphasizes the fact that through a long history of state support in the role of enabler, cohousing projects have long been established as accessible by a far wider demographic than perhaps has been the case so far in the US or the UK.

Indeed, while cohousing – as distinct from co-operative housing or community land trusts that focus primarily on affordability (Moore, 2014) has sometimes been criticised as being largely restricted to those with substantial economic capital (and especially in the US, where a private – arguably a neoliberal – model dominates, see for instance Jarvis, 2018), it can be argued that other community-led models, namely community land trusts and co-operatives, arise fundamentally as collective and community-based response to inequality and lack of affordability (Jarvis, 2015b). In fact, the perception

of cohousing as an exclusive endeavour has been challenged, for example in cases where projects are supported by state funding such as historically in the Netherlands (Brenton, 1998) or indeed in some English examples such as OWCH (Fernández-Arrigoitia and West, 2020). In Sweden, where there is a similarly a long-established tradition of cohousing, Jakobsen et al. (2018) find that, although unsurprisingly owner-occupier cohousing residents are wealthier, in rental and co-operative iterations of the model, residents socio-economic status is much more reflective of a wider demographic. Further, Boyer and Leland (2018) argue that in the US, an attraction to the cohousing ideal is not limited by wealth or social class, rather that '*the slow diffusion of cohousing is likely the consequence of inaccessibility rather than low appeal*' (2018: 653), and that government policy has a role to play in opening up the social benefits of cohousing to a wider population.

Finally, while there may be a lack of empirical work addressing diversity in projects that are formally defined as cohousing or community land trusts, studies of some other long-established collective housing projects that meet the definitions of cohousing in all but name suggest there might be benefits of casting the academic net wider. Fernández-Arrigoitia (2015) describes a financially and socially self-managed housing community that has successfully challenged the social isolation of multiple vulnerable groups, that include:

> … *cancer survivors, previous victims of domestic abuse, ex-prisoners, those with mental health issues in need of housing, adults with special needs who grew up in care and others with difficult beginnings or stories that make them particularly vulnerable*.
> (Fernández-Arrigoitia, 2015: 6)

Forrest (2013) reports on a co-operative housing scheme in Brixton, south London in which he is a member, that while having its roots in an LGBT squatter group who took up residence in the project's two streets in the late 1970s, have become a highly stable community in terms of resident turnover and have begun to consider the challenges of growing older together as a community that certainly in old age remains marginalised by wider society.

Cohousing and older people

While other demographics and groups have been addressed in the literature noted thus far, it is only the literature on cohousing and especially that on (so-called) senior cohousing that directly addresses the issue of loneliness and its connection to social and emotional isolation.

Labit (2016) notes that intergenerational collaborative housing projects (often cohousing) based on solidarity between seniors and families are gaining ground in Germany. Kehl & Then (2013) have found significant measurable benefits in terms of mutual support and reciprocity for both older and younger people living in multi-generational intentional neighbourhoods[1]. Jones (2017) however notes that from a qualitative study of older people living in intergenerational cohousing groups in England, many participants have been ambivalent about the social benefits for older members – even for those who have lived in such communities since much earlier periods in their lives.

Others make a case for the benefits of greater social connection and the prevention of loneliness through specifically *senior* cohousing, and it is in this area that potential social isolation, loneliness and its consequences in terms of the wider social costs are most strongly emphasized. Advocates for senior cohousing promote the model as supporting for its members an enhanced sense of wellbeing, reduction

[1] While the projects are described in their research as 'cohousing', the neighbourhoods are fundamentally created and maintained by independent or semi-public organisations; while they are cohousing in physical form, they do not meet the requirements of 'true' cohousing in the important sense of being self-managed.

of loneliness and isolation, as well as the potential to stay healthier for longer (for instance Brenton, 2008, 2011; Durrett, 2009; Fromm, 2006; Glass and Vender Plaats, 2013; Jolanki & Vikko, 2015, etc.). Pederson (2015) describes how members of groups provide mutual support that, while boundaries are often set to prevent this crossing into informal care, the psychological and social support given has been greater than anticipated, with members in some cases continuing to give support in a case severe depression, and even to a dementia sufferer (2015: 141). Brenton (1999) has noted how various co-operative living arrangements among older women, while not meeting the full definition of 'cohousing' – transitory mobile home communities in the US for instance – nonetheless provide mutually supportive communities for socially marginalised groups.

Often, members of senior groups describe their motivations as a response to actual or potential social isolation by a geographical change in their social networks (for instance Hudson, 2017); Jolanki and Vikko (2015) note how for many members of a Finnish group, geography played a significant role, with one resident as describing how

> *[…] if I had a motive to move here, I mean, come here, then definitely this sense of community was an important thing for me. And the fact that, planning my retirement, I thought about how I would have so many fewer everyday contacts. I mean, I have friends around the town, but the more they and myself get aches and minor illnesses with age, the fewer contacts there are. And my relatives live far away. There is not one relative of mine [in the city]. So the significance of the community was really important to me.*
> (Jolanki and Vikko, 2015: 118)

Several authors note how for many people in industrialised societies, family is no longer of overriding social importance, with family members often far away or unprepared to offer support (Baars and Thomése, 1994; Glass, 2009; Brenton, 2011, 2013; Kang et al., 2012). Further, older people themselves may not wish to impose on their own children, given their Own experiences of having to support their parents in later life (Kang et al., 2012; Fernández-Arrigoitia and West, forthcoming) – and which thinking chimes strongly with some of the data noted for older people in the previous section.

But while there is a growing literature that emphasizes the potential benefits of senior cohousing, there remains thus far a very limited number of empirical studies that explore the lived experience of the mutual social support within such groups and its potential for scaling up. The first proper study of the UK's pioneering senior cohousing community, carried out by members of the research team, found strong evidence of the benefits of mutual support when members of a senior cohousing community were experiencing health difficulties, but also noted that the limits of mutual support were yet to be tested and, indeed, the subject something that the members themselves were grappling with (Fernández-Arrigoitia and West, forthcoming).

4 Conclusions

This review has drawn on existing key overviews of the literature on loneliness and also on reviews of loneliness interventions to examine particular dimensions of loneliness and social isolation to which community led housing – and in particular cohousing – might represent a potentially effective response.

While it is clear that loneliness is a complex social problem with many contributory causes, and which to some degree affects every age group as well as multiple social groups, research on loneliness in the UK and elsewhere has thus far been largely concentrated on loneliness and social isolation among older

people. The literature that addresses loneliness interventions is even more limited to an older demographic, and as such there is a gap in our knowledge about what interventions might best address, or reflect a better understanding of different stages of the life course, especially loneliness among younger people; how loneliness and its underlying causes are affected by poverty, gender, ethnicity, sexual orientation; and the longer-term effectiveness of short-term interventions—as these interventions (at least for older people living in care or sheltered accommodation settings) are often quite instrumental or simplistic in approach.

Yet while the published literature is unclear overall about what approaches might be most effective in alleviating loneliness, the unpublished / grey literature does offer a number of 'pointers' toward the greater effectiveness of interventions that take a longer-term, more meaningful approach (and in part as summarised by Victor et al., 2018):

- Tailoring interventions to the needs of people for whom they are designed
- Developing approaches which avoid stigma or reinforce isolation
- Supporting meaningful social relationships that are built through collaborative projects sustainable in the longer term

Although there is an increasing literature on CLH and its social dimensions, and much of this affirms the intention to create more socially connected and supportive lives as groups, there are significant gaps. As with the literature on loneliness interventions, the CLH and cohousing literature that does directly address loneliness is focussed almost entirely as a response to loneliness among older people. There is also a lack of studies, especially in the UK, of CLH developments created by and for a diversity of communities – indeed studies that address motivations for forming or joining such groups rarely mention the issue.

Perhaps more fundamentally, there remains a lack of empirical research that examines this sociability as a response to loneliness – research has come almost entirely from self-reported studies; there has been very little research that takes a comparative approach with the wider population. Having said this, research does need to acknowledge that CLH, and cohousing in particular, is largely a preventative response to combatting loneliness; that individuals might have been lonely but for joining a project, and that this may be difficult to measure, especially in terms of direct value for money.

Community led housing – and cohousing especially, with its focus on building mutually supportive, neighbourhood-based social connections – seems to have the potential to address many of the issues raised by the broader literature on loneliness interventions, and in the case of cohousing to reach a wider demographic than it has done thus far in the UK in its (largely) self-funded form. Specifically, the various forms of CLH chime closely with findings from the loneliness interventions literature previously discussed, drawing on existing- or creating new neighbourhoods that support greater social interaction, meaningful relationships and social capital, both in their 'completed' form but also through the process of development, and forging links with the wider community surrounding them. In doing so, CLH also represents a form of project that is intrinsically self-determined, in contrast to some of the interventions reviewed in the literature, thus avoiding the stigma of more paternalistic responses aimed explicitly at combatting loneliness. Further, CLH represents an opportunity for building communities that are self-sustaining in the longer term, beyond interventions in terms of initial social policy support.

Annex B: Qualitative survey methodology and case study selection

Qualitative elements of the online survey

The survey included open-ended free text questions about the impact of involvement in CLH for loneliness, which aimed to gain in-depth, qualitative understandings of a) individual experiences and perceptions of loneliness, motivations for participating in CLH and cohousing and strategies for mitigating loneliness; and b) the specific mechanisms by which different kinds of CLH and cohousing impact upon loneliness. There were two general questions in the original questionnaire, and a further three Covid-specific questions were added on 24th March 2020 (Table 4). Both were addressed to CLH residents as well as to CLH non-resident participants and all answers were anonymous, which may have contributed to more honest responses than face-to-face interviews.

The first set of questions asked whether CLH had helped the respondent face loneliness, and whether CLH might be appropriate for the wider population. These generated a wide range of responses, from negative to highly positive. The Covid-specific questions tried to capture the effect of the pandemic on the lives of communities and groups. We analysed the responses qualitatively through thematic analysis undertaken by team members separately and together, to ensure analytical rigour and coding alignment. We looked for recurring textual themes and categorised responses as positive, negative or neutral in tone.

Table B1: Open-ended questions from online survey

	Numbers of responses from CLH participants		
From original survey	**Residents**	**Non-residents**	**Total**
Q5.31 We would be very grateful if you could share any thoughts on whether and how your involvement with community-led housing has helped you in facing loneliness	77	79	156
Q5.32 Would living in CLH be a good option for more people? Why or why not?	82	83	165
COVID-19 Questions (from 24 March)			
How has the Covid-19 situation affected your household's day-to-day life?	16	23	39
Qts. 89 & 90 How has your CLH community/group responded/taken measures to the Covid-19 situation?	16	22	38
Qts. 91 & 92 Thinking of yourself and your own household, how has living in a CLH community/involvement with a CLH group affected your ability to cope with the situation?	16	21	37

Case study selection

The brief required us to conduct in-depth case studies of five CLH communities, of which at least two were to be cohousing. Community-led housing is a small though diverse sector, and our aim was to study communities with a range of operational models, demographic profiles and organisational models. Working with secondary data, and in cooperation with sector experts, we refined our selection criteria to focus on the community characteristics most likely to affect loneliness.

The following criteria were included in the initial selection framework but subsequently removed:

- **addressing loneliness an aim/addressing loneliness not an aim** We were unable to identify from secondary sources any CLH schemes where addressing loneliness was an explicit aim, although some do have mission or vision statements that mention neighbourliness and sociability
- **origin in local groups/origin in common-interest groups** In practice this seemed like a false distinction for many schemes, and does not take account of other types of origin (e.g., recruitment to an existing or planned scheme). In any case it was difficult to find information from secondary sources.

The final selection matrix appears below (Table B2), and Table B3 sets the five case studies against the selection criteria.

Table B2: Case study selection matrix

1 Demographics		2 Location	3 Design and construction		4 Stage of development
Residents' age	**Gender**		**Degree of participatory design**	**Construction type**	
Intergenerational	Single-sex	Urban	Strong	New build	Occupied < 5 years
		Suburban/town	Weak or none	Retrofit	Occupied 5 - 10 years
Senior	Mixed	Rural		Self-build	Occupied > 10 years

Other elements to cover							
Range of household sizes	At least two cohousing schemes	Tenure mix	Financial & allocation arrangements	Ethnic diversity, LGBT	Group values & social attitudes	Degree of resident participation in management	Design typology

Table B3: Case schemes against selection criteria

	1 LANCASTER COHOUSING	2 OWCH COHOUSING	3 TANGRAM CO-OP	4 Bristol CLT (325 Fishponds Road)	5 ASHLEY VALE SELF-BUILD
Number of households	35	26	41	12	41
RESIDENT AGE					
Intergenerational	X		X	X	X
Senior		X			
GENDER					
Single-sex		X			
Mixed	X		X	X	X
LOCATION	LANCASTER	LONDON	LEEDS	BRISTOL	BRISTOL
Urban		X	X	X	X
Suburban/town					
Rural	X				
PARTICIPATORY DESIGN					
Strong	X	X		X	X
Weak or none			X		
CONSTRUCTION TYPE					
New-build	X	X		X	
Self-build					X
Retrofit/refurbishment			X		
LENGTH OF OCCUPATION					
Occupied <5 years		X		X	
Occupied 5-10 years	X				
Occupied >10 years			X		X

Annex C: Text of online survey

The survey was administered using Qualtrics software.

Q1.1
Thank you for responding to this survey, which should take about 20 minutes to complete.

This is the first time systematic data on community-led housing in the UK is being collected in this way. The results will give us a much better understanding of the sector, and we hope they will have real impacts on policy as well. The survey is part of a research project funded by the Ministry of Housing, Communities and Local Government, who want to understand whether residents of and participants in community-led housing (CLH) schemes experience less loneliness than people living in conventional housing, and if so why. The findings will help guide decisions about government support for community-led housing.

The survey has five sections and needs to be completed in one sitting. Your responses are anonymous. The survey analysis will be more robust if you respond to all the questions.

By taking the time to complete the survey you are contributing to improve the future of community-led housing.

Note: The survey is open to individuals aged 16 or over, and we would welcome responses from all eligible persons in the household.

End of Block: Introduction

Start of Block: Your involvement in community-led housing

Q2.1 This survey aims to capture the experience of people who have been involved in community-led housing, which includes cohousing, community land trusts, co-ops, self-help housing, community self-build, and tenant management organisations.

The next set of questions is about your own involvement in community-led housing.

Q2.2
What is the nature of your involvement in CLH? (choose one)

- ○ Currently live in CLH (1)
- ○ Lived in CLH in the past but no longer do (2)
- ○ Current/former member of active CLH group(s) and working towards living in CLH (4)
- ○ Current/former supporter of CLH group(s) but do not intend to live there (5)
- ○ None--have never been personally involved in CLH (6)

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = None--have never been personally involved in CLH

Q2.3 Thank you for taking part in the survey. Your response has been recorded.

Skip To: End of Survey If Thank you for taking part in the survey. Your response has been recorded. Is Displayed

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Current/former member of active CLH group(s) and working towards living in CLH

Q2.4 You said you are or have been involved with active CLH group(s). How many groups are you currently involved with?

▼ 1 (1) ... 5 (5)

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Current/former supporter of CLH group(s) but do not intend to live there

Q2.5 How many are you currently a supporter of?
How many did you previously support but are no longer involved with?

Currently (1)	▼ 0 (1) ... 7 (8)
Previously (2)	▼ 0 (1) ... 7 (8)

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH
Or What is the nature of your involvement in CLH? (choose one) = Lived in CLH in the past but no longer do
Or What is the nature of your involvement in CLH? (choose one) = Current/former member of active CLH group(s) and working towards living in CLH
Or What is the nature of your involvement in CLH? (choose one) = Current/former supporter of CLH group(s) but do not intend to live there

Q2.6 What is the name of the CLH community or group that you are or were involved with (or most involved with, if more than one)?

_____

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH
Or What is the nature of your involvement in CLH? (choose one) = Lived in CLH in the past but no longer do
Or What is the nature of your involvement in CLH? (choose one) = Current/former member of active CLH group(s) and working towards living in CLH
Or What is the nature of your involvement in CLH? (choose one) = Current/former supporter of CLH group(s) but do not intend to live there

Q2.7 Just to check, does that group have

- ○ a completed, occupied scheme (1)
- ○ a site but is not yet occupied (2)
- ○ no site yet, just a group (3)

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH

*

Q2.8 In what year did you start living in your current CLH community?

_____

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Lived in CLH in the past but no longer do

*

Q2.9 You said you lived in CLH in the past but no longer do. In what year did you stop living in CLH?

_____

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Lived in CLH in the past but no longer do

Q2.10 How many years had you been living in that community when you stopped living there?

_____

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Current/former member of active CLH group(s) and working towards living in CLH
Or What is the nature of your involvement in CLH? (choose one) = Current/former supporter of CLH group(s) but do not intend to live there

Q2.11 In what year did you become a member or supporter of the group you are most involved with?

_____

Q2.12 Thinking of the community-led housing you are or were most involved in, what type is/was it? (choose all the categories that apply to that CLH scheme)

- ☐ Cohousing (1)
- ☐ Community land trust (2)
- ☐ Co-op (3)
- ☐ Self-build (4)
- ☐ Self-help housing (9)
- ☐ Tenant management organisation (8)
- ☐ Other (please specify) (6)

_____

End of Block: Your involvement in community-led housing

Start of Block: Demographics

Q3.1 Now we'll ask some questions about you and your current and previous housing.

Q3.2 What is the first half of your current residential postcode?

_____

Q3.3 How long have you lived at this address? Years (if less than one year, enter '0')

_____

Q3.4 What is the housing tenure of your main home?

- ○ Owned with a mortgage (1)
- ○ Owned outright (no mortgage) (2)
- ○ Rented from a private landlord (3)
- ○ Rented from a housing association or local authority (4)
- ○ Shared ownership (5)
- ○ Mutual home ownership (6)
- ○ Co-operative (7)
- ○ Live here rent-free (8)
- ○ Other (please specify) (9) _____

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH

Q3.5 What was the first half of the postcode of your previous residential address (or country, if outside the UK)?

_____

Q3.6 How old were you on your last birthday?

_____

Q3.7 What is your marital status?

- ○ Married/civil partner (1)
- ○ Single (2)
- ○ Domestic partnership (3)
- ○ Divorced/civil partnership dissolved (4)
- ○ Widowed/surviving civil partner (5)
- ○ Separated (6)
- ○ Other (please specify) (7)

Q3.8 What type of household do you live in?

- ○ Single adult, no resident children (1)
- ○ Single adult with resident minor children (2)
- ○ Adult couple, no resident children (3)
- ○ Adult couple with resident minor children (4)
- ○ Other multi-adult household (5)

Q3.9 How many people currently live in your household?

▼ 1 (1) ... 8 or more (8)

Display This Question:
If What type of household do you live in? = Single adult with resident minor children
Or What type of household do you live in? = Adult couple with resident minor children

Q3.10 How old are the children living in your household? (*Note: All individuals aged 16 or over are invited to respond to the survey)*

Child 1 (1)	▼ 0 (1) ... 18 (19)
Child 2 (2)	▼ 0 (1) ... 18 (19)
Child 3 (3)	▼ 0 (1) ... 18 (19)
Child 4 (4)	▼ 0 (1) ... 18 (19)
Child 5 (5)	▼ 0 (1) ... 18 (19)

Q3.11 What is your current employment status?

- ○ Full-time paid work (including self-employment) (1)
- ○ Part-time paid work (including self-employment) (2)
- ○ Volunteer (3)
- ○ Student (4)
- ○ Retired (5)
- ○ Unemployed (6)
- ○ Looking after the family home (7)
- ○ Unable to work (8)
- ○ Other (please specify) (9)

Q3.12 What is your household's approximate annual income before tax from all sources?

- ○ less than £10,000 (1)
- ○ more than £10,000 but less than £15,000 (2)
- ○ more than £15,001 but less than £20,000 (3)
- ○ more than £20,001 but less than £30,000 (4)
- ○ more than £30,001 but less than £40,000 (5)
- ○ more than £40,001 but less than £50,000 (6)
- ○ more than £50,001 but less than £60,000 (7)
- ○ more than £60,001 but less than £70,000 (8)
- ○ more than £70,001 but less than £80,000 (9)
- ○ more than £80,001 but less than £90,000 (10)
- ○ more than £90,001 (11)
- ○ prefer not to say (12)

Q3.13 What is the highest educational qualification you have attained?

▼ primary (1) ... no qualifications (8)

Q3.14 What city or town were you born in?

_____
_____
_____
_____
_____

Q3.15 What country were you born in?

- ○ UK (1)
- ○ Ireland (2)
- ○ Other (please write in) (3) _____

Q3.16 What is your ethnic background?

- English / Welsh / Scottish / Northern Irish / British (1)
- Irish (2)
- Gypsy or Irish Traveller (3)
- Any other White background, please describe (4)
- White and Black Caribbean (5)
- White and Black African (6)
- White and Asian (7)
- Indian (8)
- Pakistani (9)
- Bangladeshi (10)
- Chinese (11)
- Any other Asian background, please describe (12)
- African (13)
- Caribbean (14)
- Any other Black / African / Caribbean background, please describe (15)
- Arab (16)
- Any other ethnic group, please describe (17)
- Prefer not to say (18)

Q3.17 What is your religion?

▼ No religion (1) ... Any other religion (8)

Q3.18 I identify my gender as…

▼ Man (1) ... Genderqueer/Non-binary (3)

Q3.19 I consider myself to be…

- ○ Heterosexual (1)
- ○ Gay/lesbian (2)
- ○ Bisexual (3)
- ○ Other (4)
- ○ Prefer not to say (5)

End of Block: Demographics

Start of Block: Covid-19

Q87 The Covid-19 crisis struck a few weeks after our research was launched. We would like to find out if CLH communities and groups are particularly well-equipped to deal with this shock, so we have included a few questions about how you and your community or group are affected. These questions were added on 24 March 2020.

Q88 How has the Covid-19 situation affected your household's day-to-day life?

_____

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH

Q90 How has your CLH community responded to the Covid-19 situation?

_____

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH

Q92 Thinking of yourself and your household, how has living in in a CLH community affected your ability to cope with the situation?

_____

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Current/former member of active CLH group(s) and working towards living in CLH
Or What is the nature of your involvement in CLH? (choose one) = Current/former supporter of CLH group(s) but do not intend to live there

Q91 What measures has your CLH group taken to respond to the Covid-19 situation?

_____

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Current/former member of active CLH group(s) and working towards living in CLH
Or What is the nature of your involvement in CLH? (choose one) = Current/former supporter of CLH group(s) but do not intend to live there

Q89 Thinking of yourself and your own household, how has involvement with a CLH group affected your ability to cope with the situation?

_____

End of Block: Covid-19

Start of Block: Participation in CLH

Q4.1 Now we'll ask about what brought you to CLH, and about activities and interactions in your CLH community or group.

Q4.2 Why did you first become involved in/with CLH? Please choose up to three reasons.

- [ ] For personal/family reasons (1)
- [ ] To share the responsibility for home maintenance/management (2)
- [ ] It's more sociable than conventional housing (3)
- [ ] It's better for the environment/more sustainable (4)
- [ ] To live in a particular area (5)
- [ ] For financial reasons (7)
- [ ] It's aligned with my values (8)
- [ ] Other (9) _____

Carry Forward Selected Choices from "Why did you first become involved in/with CLH? Please choose up to three reasons."

Q4.3 And which of those was the main reason?

- ○ For personal/family reasons (1)
- ○ To share the responsibility for home maintenance/management (2)
- ○ It's more sociable than conventional housing (3)
- ○ It's better for the environment/more sustainable (4)
- ○ To live in a particular area (5)
- ○ For financial reasons (6)
- ○ It's aligned with my values (7)
- ○ Other (8) _____

Q4.4 Before becoming involved with your community led housing project/group, did you have any previous experience with non-standard housing? This would include community-led housing as well as short-life housing, communes, squats, temporary communities such as recovery communities or refuges, etc.

- ○ Yes (1)
- ○ No (2)

Display This Question:
If Before becoming involved with your community led housing project/group, did you have any previous... = Yes

Q4.5 What type of experience was that? Please tick all that apply.

- ☐ lived in non-standard housing (1)
- ☐ worked/volunteered in a sector related to non-standard housing (2)
- ☐ visited non-standard housing (due to friends, family or other social networks) (3)
- ☐ Other (please specify) (4) _____

Q4.6 Thinking about the CLH community where you live or where you are most involved, how participative are the decision-making and/or day-to-day management processes?

- ○ Very participative (1)
- ○ Participative (2)
- ○ Fairly participative (3)
- ○ Not very participative (4)
- ○ Not participative at all (5)

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH

Q4.7 Thinking about the period *before* your CLH group moved into their homes, how much did you participate in the following activities with fellow group members?

	a great deal (1)	a fair amount (2)	not very much (3)	not at all (4)	NA -- was not involved with group before it moved in (5)
Co-design of the building (1)	○	○	○	○	○
Local authority and other external planning meetings (2)	○	○	○	○	○
Group meetings (3)	○	○	○	○	○
Committee membership (4)	○	○	○	○	○
Group dynamic/facilitation meetings (5)	○	○	○	○	○
Group outreach to the wider community (6)	○	○	○	○	○
Networking with other groups/related activities (7)	○	○	○	○	○

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Current/former member of active CLH group(s) and working towards living in CLH
Or What is the nature of your involvement in CLH? (choose one) = Current/former supporter of CLH group(s) but do not intend to live there

Carry Forward All Choices - Displayed & Hidden from "Thinking about the period before your CLH group moved into their homes, how much did you participate in the following activities with fellow group members? "

Q4.8 How much do you currently participate in the following activities with fellow members or supporters of your CLH group?

	a great deal (1)	a fair amount (2)	not very much (3)	not at all (4)
Co-design of the building (x1)	○	○	○	○
Local authority and other external planning meetings (x2)	○	○	○	○
Group meetings (x3)	○	○	○	○
Committee membership (x4)	○	○	○	○
Group dynamic/facilitation meetings (x5)	○	○	○	○
Group outreach to the wider community (x6)	○	○	○	○
Networking with other groups/related activities (x7)	○	○	○	○

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH

Q4.9 Thinking about the first six months after you moved in, how much did you participate in the following activities in your CLH community?

	a great deal (1)	a fair amount (2)	not very much (3)	not at all (4)
Group meetings (1)	○	○	○	○
Committee membership (2)	○	○	○	○
Internal activities (e.g., group meals, gardening) (3)	○	○	○	○
Everyday management and maintenance (e.g, cleaning) (4)	○	○	○	○
Group dynamic/facilitation meetings (5)	○	○	○	○
Group outreach to the wider community (6)	○	○	○	○
Other forms of help/mutual aid (child care, helping neighbours with housework) (7)	○	○	○	○

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH

Q4.10 And how much do you participate NOW in the following activities in your CLH community?

	a great deal (1)	a fair amount (2)	not very much (3)	not at all (4)
Group meetings (1)	○	○	○	○
Committee membership (2)	○	○	○	○
Internal activities (e.g., group meals, gardening) (3)	○	○	○	○
Everyday management and maintenance (e.g, cleaning) (4)	○	○	○	○
Group dynamic/facilitation meetings (5)	○	○	○	○
Group outreach to the wider community (6)	○	○	○	○
Other forms of help/mutual aid (childcare, helping neighbours with housework) (7)	○	○	○	○

End of Block: Participation in CLH

Start of Block: Loneliness

Q5.1 The final set of questions is about participation in social activities, and about neighbourliness and loneliness.

Q5.2 Are you currently a member of any clubs, organisations or societies? For each category, please indicate how often you take part in meetings or activities.

	not a member (1)	more than once a week (2)	weekly (3)	a few times a month (4)	once a month (5)	a few times a year (6)	once a year (7)	less often (8)
Political party, trade union or environmental group (1)	○	○	○	○	○	○	○	○
Tenants groups, neighbourhood groups, Neighbourhood Watch (2)	○	○	○	○	○	○	○	○
Church or other religious groups (3)	○	○	○	○	○	○	○	○
Charitable organisation (4)	○	○	○	○	○	○	○	○
Education, arts or music groups or evening classes (5)	○	○	○	○	○	○	○	○
Social clubs (6)	○	○	○	○	○	○	○	○
Sports clubs, gyms or exercise classes (7)	○	○	○	○	○	○	○	○
Any other organisations, clubs or societies (8)	○	○	○	○	○	○	○	○

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH

Q5.3 How strongly do you feel you belong to your CLH community?

- Very strongly (1)
- Fairly strongly (2)
- Not very strongly (3)
- Not at all strongly (4)

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH
Carry Forward All Choices - Displayed & Hidden from "How strongly do you feel you belong to your CLH community?"

Q5.4 How strongly do you feel you belong to the immediate neighbourhood *around* your CLH community?

- Very strongly (1)
- Fairly strongly (2)
- Not very strongly (3)
- Not at all strongly (4)

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Current/former member of active CLH group(s) and working towards living in CLH
Or What is the nature of your involvement in CLH? (choose one) = Current/former supporter of CLH group(s) but do not intend to live there
Or What is the nature of your involvement in CLH? (choose one) = Lived in CLH in the past but no longer do
Carry Forward All Choices - Displayed & Hidden from "How strongly do you feel you belong to the immediate neighbourhood around your CLH community?"

Q5.5 How strongly do you feel you belong to your immediate neighbourhood?

- Very strongly (1)
- Fairly strongly (2)
- Not very strongly (3)
- Not at all strongly (4)

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH

Q5.6 How often do you chat to fellow residents in your CLH community, more than just to say hello?

- On most days (1)
- Once or twice a week (2)
- Once or twice a month (3)
- Less than once a month (4)
- Never (5)

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH
Carry Forward All Choices - Displayed & Hidden from "How often do you chat to fellow residents in your CLH community, more than just to say hello? "

Q5.7 How often do you chat to the neighbours ***around*** your CLH community, more than just to say hello?

- On most days (1)
- Once or twice a week (2)
- Once or twice a month (3)
- Less than once a month (4)
- Never (5)

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Current/former member of active CLH group(s) and working towards living in CLH
Or What is the nature of your involvement in CLH? (choose one) = Current/former supporter of CLH group(s) but do not intend to live there
Or What is the nature of your involvement in CLH? (choose one) = Lived in CLH in the past but no longer do

Carry Forward All Choices - Displayed & Hidden from "How often do you chat to fellow residents in your CLH community, more than just to say hello? "

Q5.8 How often do you chat to your neighbours, more than just to say hello?

- ○ On most days (1)
- ○ Once or twice a week (2)
- ○ Once or twice a month (3)
- ○ Less than once a month (4)
- ○ Never (5)

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH

Q5.9 How often do you socialise with fellow residents at your CLH community, either at planned events or just informally?

	At planned events (1)	Informally (2)
On most days (1)	○	○
Once or twice a week (2)	○	○
Once or twice a month (3)	○	○
Less than once a month (4)	○	○
Never (5)	○	○

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH

Q5.10 How strongly do you agree or disagree with the following statement? Generally, I borrow things and exchange favours with fellow residents of my CLH community

- ○ Definitely agree (1)
- ○ Tend to agree (2)
- ○ Tend to disagree (3)
- ○ Definitely disagree (4)

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH
Carry Forward All Choices - Displayed & Hidden from "How strongly do you agree or disagree with the following statement? Generally, I borrow things and exchange favours with fellow residents of my CLH community "

X→

Q5.11 How strongly do you agree or disagree with the following statement?
Generally, I borrow things and exchange favours with neighbours ***outside*** my CLH community

- ○ Definitely agree (1)
- ○ Tend to agree (2)
- ○ Tend to disagree (3)
- ○ Definitely disagree (4)

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Lived in CLH in the past but no longer do
Or What is the nature of your involvement in CLH? (choose one) = Current/former member of active CLH group(s) and working towards living in CLH
Or What is the nature of your involvement in CLH? (choose one) = Current/former supporter of CLH group(s) but do not intend to live there
Carry Forward All Choices - Displayed & Hidden from "How strongly do you agree or disagree with the following statement? Generally, I borrow things and exchange favours with neighbours outside my CLH community"

X→

Q5.12 How strongly do you agree or disagree with the following statement?
Generally, I borrow things and exchange favours with my neighbours.

- ○ Definitely agree (1)
- ○ Tend to agree (2)
- ○ Tend to disagree (3)
- ○ Definitely disagree (4)

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH

Q5.13 How comfortable would you be asking a fellow resident of your CLH community to keep a set of keys to your home for emergencies, for example if you were locked out?

- ○ Very comfortable (1)
- ○ Fairly comfortable (2)
- ○ Fairly uncomfortable (3)
- ○ Very uncomfortable (4)

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH
Carry Forward All Choices - Displayed & Hidden from "How comfortable would you be asking a fellow resident of your CLH community to keep a set of keys to your home for emergencies, for example if you were locked out?"

X→

Q5.14 How comfortable would you be asking a neighbour ***outside*** your CLH community to keep a set of keys to your home for emergencies, for example if you were locked out?

- ○ Very comfortable (1)
- ○ Fairly comfortable (2)
- ○ Fairly uncomfortable (3)
- ○ Very uncomfortable (4)

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Lived in CLH in the past but no longer do
Or What is the nature of your involvement in CLH? (choose one) = Current/former member of active CLH group(s) and working towards living in CLH
Or What is the nature of your involvement in CLH? (choose one) = Current/former supporter of CLH group(s) but do not intend to live there
Carry Forward All Choices - Displayed & Hidden from "How comfortable would you be asking a neighbour outside your CLH community to keep a set of keys to your home for emergencies, for example if you were locked out?"

Q5.15 How comfortable would you be asking a neighbour to keep a set of keys to your home for emergencies, for example if you were locked out?

- ○ Very comfortable (1)
- ○ Fairly comfortable (2)
- ○ Fairly uncomfortable (3)
- ○ Very uncomfortable (4)

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH
And What type of household do you live in? = Single adult with resident minor children
Or What type of household do you live in? = Adult couple with resident minor children

Q5.16 How comfortable would you be asking a fellow resident of your CLH community to mind your child(ren) for half an hour?

- ○ Very comfortable (1)
- ○ Fairly comfortable (2)
- ○ Fairly uncomfortable (3)
- ○ Very uncomfortable (4)
- ○ Not applicable (5)

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH
And What type of household do you live in? = Single adult with resident minor children
Or What type of household do you live in? = Adult couple with resident minor children
Carry Forward All Choices - Displayed & Hidden from "How comfortable would you be asking a fellow resident of your CLH community to mind your child(ren) for half an hour? "

Q5.17 How comfortable would you be asking a neighbour *outside* your CLH community to mind your child(ren) for half an hour?

- Very comfortable (1)
- Fairly comfortable (2)
- Fairly uncomfortable (3)
- Very uncomfortable (4)
- Not applicable (5)

Display This Question:
If What type of household do you live in? = Single adult with resident minor children
Or What type of household do you live in? = Adult couple with resident minor children
And What is the nature of your involvement in CLH? (choose one) = Lived in CLH in the past but no longer do
Or What is the nature of your involvement in CLH? (choose one) = Current/former member of active CLH group(s) and working towards living in CLH
Or What is the nature of your involvement in CLH? (choose one) = Current/former supporter of CLH group(s) but do not intend to live there
Carry Forward All Choices - Displayed & Hidden from "How comfortable would you be asking a neighbour outside your CLH community to mind your child(ren) for half an hour?"

Q5.18 How comfortable would you be asking a neighbour to mind your child(ren) for half an hour?

- Very comfortable (1)
- Fairly comfortable (2)
- Fairly uncomfortable (3)
- Very uncomfortable (4)
- Not applicable (5)

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH

Q5.19 If you were ill and at home on your own, and needed someone to collect a few shopping essentials, how comfortable would you feel asking a fellow resident of your CLH community to do this for you?

- Very comfortable (1)
- Fairly comfortable (2)
- Fairly uncomfortable (3)
- Very uncomfortable (4)
- Moderately comfortable (5)
- Slightly comfortable (6)

Display This Question:
If What is the nature of your involvement in CLH? (choose one) = Currently live in CLH
Carry Forward All Choices - Displayed & Hidden from "If you were ill and at home on your own, and needed someone to collect a few shopping essentials, how comfortable would you feel asking a fellow resident of your CLH community to do this for you? "

X→

Q5.20 And how comfortable would you feel about asking a neighbour *outside* your CLH community to do this?

- Very comfortable (1)
- Fairly comfortable (2)
- Fairly uncomfortable (3)
- Very uncomfortable (4)
- Moderately comfortable (5)
- Slightly comfortable (6)

Display This Question:

If What is the nature of your involvement in CLH? (choose one) = Lived in CLH in the past but no longer do

Or What is the nature of your involvement in CLH? (choose one) = Current/former member of active CLH group(s) and working towards living in CLH

Or What is the nature of your involvement in CLH? (choose one) = Current/former supporter of CLH group(s) but do not intend to live there

Carry Forward All Choices - Displayed & Hidden from "And how comfortable would you feel about asking a neighbour outside your CLH community to do this?"

X→

Q5.21 If you were ill and at home on your own, and needed someone to collect a few shopping essentials, how comfortable would you feel asking a neighbour to do this for you?

- ○ Very comfortable (1)
- ○ Fairly comfortable (2)
- ○ Fairly uncomfortable (3)
- ○ Very uncomfortable (4)
- ○ Moderately comfortable (5)
- ○ Slightly comfortable (6)

Q5.22 On average, how often do you…?

	More than once a day (1)	Once a day (2)	2-3 times per week (3)	About once a week (4)	About once a fortnight (5)	About once a month (6)	Less often than once a month (7)	Never (8)
Meet up in person with family members or friends (1)	○	○	○	○	○	○	○	○
Speak on the phone or video or audio call via the internet with family members or friends (2)	○	○	○	○	○	○	○	○
Email or write to family members or friends (3)	○	○	○	○	○	○	○	○
Exchange text messages or instant messages with family members or friends	○	○	○	○	○	○	○	○

(4)

Q5.23 How much do you agree or disagree with the following statements?

	Definitely agree (1)	Tend to agree (2)	Tend to disagree (3)	Definitely disagree (4)
If I needed help, there are people who would be there for me (1)	○	○	○	○
If I wanted company or to socialise, there are people I can call on (2)	○	○	○	○

Q5.24 How often do you feel that you lack companionship?

- ○ I often feel this way (1)
- ○ I sometimes feel this way (2)
- ○ I rarely feel this way (3)
- ○ I never feel this way (4)

Q5.25 How often do you feel left out?

- ○ I often feel this way (1)
- ○ I sometimes feel this way (2)
- ○ I rarely feel this way (3)
- ○ I never feel this way (4)

Q5.26 How often do you feel isolated from others?

- ○ I often feel this way (1)
- ○ I sometimes feel this way (2)
- ○ I rarely feel this way (3)
- ○ I never feel this way (4)

Q5.27 How much of the time during the past week…

	None or almost none of the time (1)	Some of the time (2)	Most of the time (3)	All or almost all of the time (4)	(Don't know) (5)
...did you feel depressed? (1)	○	○	○	○	○
...did you feel lonely? (2)	○	○	○	○	○

Q5.28 How is your health in general? Would you say it is...

- ○ Very good (4)
- ○ Good (5)
- ○ Fair (6)
- ○ Bad (7)
- ○ Very bad (8)

Q5.29 Are you hampered in your daily activities in any way by any longstanding illness, or disability, infirmity or mental health problem?

- ○ Yes a lot (4)
- ○ Yes to some extent (5)
- ○ No (7)

Q5.30 Do you have anyone with whom you can discuss intimate and personal matters?

- ○ Yes (4)
- ○ No (5)
- ○ Don't know (6)

Q5.31 We would be very grateful if you could share any thoughts on whether and how your involvement with community-led housing has helped you in facing loneliness.

_____

Q5.32 Would living in CLH be a good option for more people? Why or why not?

_____

Q5.34 This is the last question of the survey. Please click the right arrow to record the survey response. There is a link on the final page to provide your details if you would like to receive updates about or work or take part in further research.

End of Block: Loneliness

Annex D: Data tables from online survey

Questions were asked of all respondents unless otherwise noted.

INVOLVEMENT IN COMMUNITY-LED HOUSING

Table D1: Nature of involvement in CLH

N=221

Nature of involvement in community-led housing	Count	%
Currently live in CLH	120	54%
Current/former member of active CLH group(s) and working towards living in CLH	72	33%
Current/former supporter of CLH group(s) but do not intend to live there	17	8%
Lived in CLH in the past but no longer do	12	5%

Source: Survey Q2.2

Table D2: Type of CLH involved with (multiple responses allowed)

N=221

Thinking of the community-led housing you are or were most involved in, what type is/was it? (choose all the categories that apply to that CLH scheme)	Count	%
Cohousing	134	61%
Co-op	58	26%
Community land trust	36	16%
Self-build	15	7%
Other (please specify)	12	5%
Tenant management organisation	8	4%
Self-help housing	5	2%

Source: Survey Q2.12

Table D3: Length of involvement (only respondents currently living in CLH)

N=94

In what year did you start living in your current CLH community?	Count	%
2010-2020	67	71%
2000-2009	15	16%
1990-1999	6	6%
1980-1989	4	4%
1970-1979	2	2%

Source: Survey Q2.8

Table D4: Length of involvement (only respondents not currently living in CLH)

N=77

In what year did you become a member or supporter of the group you are most involved with?	Count	%
2015-2019	57	74%

2010-2014	15	19%
2005-2009	5	6%

Source: Survey Q2.11

DEMOGRAPHICS

Table D5: Gender

N=195

I identify my gender as…	Count	%
Woman	121	62%
Man	65	33%
Genderqueer/Non-binary	9	5%

Source: Survey Q3.18

Table D6: Age

N=174

How old were you on your last birthday?	Count	%
20-29	7	4%
30-39	22	13%
40-49	28	16%
50-59	34	20%
60-69	50	29%
70-79	29	17%
80-89	4	2%

Source: Survey Q3.6

Table D7: Marital status

N=201

What is your marital status?	Count	%
Married/civil partner	70	35%
Single	63	31%
Divorced/civil partnership dissolved	28	14%
Domestic partnership	19	9%
Separated	8	4%
Other (please specify)	7	3%
Widowed/surviving civil partner	6	3%

Source: Survey Q3.7

Table D8: Household type

N=200

What type of household do you live in?	Count	%
Single adult, no resident children	59	30%
Adult couple, no resident children	54	27%
Other multi-adult household	51	26%

Adult couple with resident minor children	27	14%
Single adult with resident minor children	9	5%

Source: Survey Q3.8

For those with children, median age of first child was 7. For those with more than one child, median age of second child was 8. (Survey Q3.10)

Table D9: Number of persons in household

N=178

How many people currently live in your household?	Count	%
1	49	28%
2	57	32%
3	19	11%
4	23	13%
5	9	5%
6	13	7%
7	2	1%
8 or more	6	3%

Source: Survey Q3.9

Table D10: Employment status of respondents

N=201

What is your current employment status?	Count	%
Part-time paid work (including self-employment)	64	32%
Retired	62	31%
Full-time paid work (including self-employment)	51	25%
Volunteer	7	3%
Looking after the family home	5	2%
Student	5	2%
Unable to work	3	1%
Other (please specify)	2	1%
Unemployed	2	1%

Source: Survey Q3.11

Table D11: Household income

N=200

What is your household's approximate annual income before tax from all sources?	Count	%
less than £10,000	17	9%
more than £10,000 but less than £15,000	20	10%
more than £15,001 but less than £20,000	29	15%
more than £20,001 but less than £30,000	37	19%

more than £30,001 but less than £40,000	25	13%
more than £40,001 but less than £50,000	12	6%
more than £50,001 but less than £60,000	12	6%
more than £60,001 but less than £70,000	7	4%
more than £70,001 but less than £80,000	6	3%
more than £80,001 but less than £90,000	3	2%
more than £90,001	10	5%
prefer not to say	21	11%

Source: Survey Q3.12

Table D12: Educational attainment

N=198

What is the highest educational qualification you have attained?	Count	%
postgraduate degree	78	39%
university degree (bachelors)	65	33%
professional qualifications	28	14%
secondary	14	7%
other vocational/work-related qualifications	11	6%
vocational	2	1%

Source: Survey Q3.13

Table D13: Country of origin

N=199

What country were you born in?	Count	%
UK	157	79%
Other	37	19%
Ireland	5	3%

Source: Survey Q3.15

Table D14: Ethnic background

N=201

What is your ethnic background? - Selected Choice	Count	%
English / Welsh / Scottish / Northern Irish / British	153	76%
Any other White background, please describe	26	13%
Irish	8	4%
Prefer not to say	3	1%
Any other Asian background, please describe	2	1%
White and Black Caribbean	2	1%
White and Black African	1	0%
Any other Black / African / Caribbean background, please describe	1	0%
Any other ethnic group, please describe	1	0%
Caribbean	1	0%
Chinese	1	0%

White and Asian	1	0%
African	1	0%

Source: Survey Q3.16

Table D15: Faith

N=194

What is your religion?	Count	%
Jewish	2	1%
Buddhist	6	3%
Any other religion	18	9%
Christian (including Church of England, Catholic, Protestant and all other Christian denominations)	37	19%
No religion	131	68%

Source: Survey Q3.16

Table D16: Sexuality

N=199

I consider myself to be…	Count	%
Heterosexual	141	71%
Gay/lesbian	20	10%
Bisexual	19	10%
Prefer not to say	14	7%
Other	5	3%

Source: Survey Q3.19

PARTICIPATION IN CLH

Table D17: Reasons for involvement in CLH

N=221

	this was one of the top three reasons	this was the main reason
It's aligned with my values	63%	39%
It's more sociable than conventional housing	53%	23%
It's better for the environment/more sustainable	43%	10%
For personal/family reasons	19%	6%
Other	16%	13%
For financial reasons	14%	6%
To share the responsibility for home maintenance/management	12%	1%
To live in a particular area	7%	3%

Source: Survey Q4.2 and 4.3

Table D18: Degree of participation in decision making and management

N=191

Thinking about the CLH community where you live or where you are most involved, how participative are the decision-making and/or day-to-day management processes?	Count	%
Very participative	111	58%
Participative	48	25%
Fairly participative	24	13%
Not very participative	6	3%
Not participative at all	2	1%

Source: Survey Q4

Table D19: Proportion of respondents saying they took part in group activites 'a great deal' or 'a fair amount'. Non-residents and residents [before moving in, first six months and now]
Top two responses in each column highlighted

N=83 non-residents, 98 residents

Type of activity	NOT currently living in CLH	Currently living in CLH		
		Before moving into CLH	First 6 months of living in CLH	Now
Co-design of the building	71	36		
Local authority and other external planning meetings	54	18		
Group meetings	92	55	94	88
Committee membership	75	42	85	78
Group dynamic/facilitation meetings	78	37	70	65
Group outreach to the wider community	57	18	45	40
Networking with other groups/related activities	57	27		
Internal activities (e.g. group meals, gardening)			89	85
Everyday management and maintenance (e.g. cleaning)			79	76
Other forms of help/mutual aid (e.g. child care, helping neighbours with housework)			52	59

Source: Survey Q4.7, 4.8, 4.9 and 4.10

*Note: percentage figures are lower in this column because not all respondents were involved with their scheme before moving into it.

Annex E: Propensity score matching analysis

In evaluating a project whose participants were randomly selected, the impact of the project can be calculated by comparing the participants with randomly selected non-participants. In the case of CLH, however, the participants were not randomly selected but rather joined intentionally. One concern in evaluating the effect of CLH on loneliness is that participants might be less lonely than non-participants simply because participants tend to be more active, sociable people in general. In order to calculate an unbiased estimate of the effect of CLH, we need to compare CLH participants to similar people who not taking part in the project, and this needs to account insofar as possible for major factors that might affect loneliness.

With this in mind, we selected the treatment and control groups through a Propensity Score Matching (PSM[2]) technique. The propensity score (PS) expresses how likely a person is to take part in CLH based on observed covariates (in this case related to socio-demographic characteristics and lifestyle). Our survey asked a number of questions about engagement in community activities, taken from the national Community Life Survey, and these were used in the PSM process to select a control group with similar levels of sociability to the treatment group.

In our analysis, we calculated a propensity score defined as the probability of being in the treatment group (i.e. being a CLH participant, whether resident or not), for the individuals who responded to our survey and for respondents to the CLS. The probability was predicted by the following logistic regression, which explains a binary variable of being in a treatment group. The variable takes the value 1 if in, otherwise 0:

Pr(treatment) = $\alpha_0 x_0 + \alpha_1 x_1$,

where
Pr: a probability of being in a treatment group,
x_0 : a matrix of covariates of socio-demographic and socio-economic characteristics
x_1: a matrix of lifestyle or activities,
α_0 and α_1 : a coefficient matrix.

The dependent variable (being in the treatment group or not) is, thus, one for all individuals who responded to the survey for this research, and zero for those in the Community Life Survey. The explanatory covariates, all of which were a binary variable, are given in Table E1. Inclusion of the covariates representing lifestyle and activities effectively addresses the concern about spurious relationships, for example, between loneliness and CLH in our final outcomes. Consider a case where treated people were more likely to be members of a sports

[2] The following acronyms are used:

CLH	community-led housing
CLS	Community Life Survey
PS	propensity score
PSM	propensity score matching
SCLH	survey of community-led housing participants

club. It might be concluded that it was sports-club membership rather than CLH that contributed to loneliness reduction. The PSM avoids this problem, as the matched treatment and control groups are similar in terms of the covariates used to estimate the propensity score (such as being in a sports club or not).

The initial sample size was 10,967 for Treatment Group A (CLH participants): 10,494 from CLS and 203 from SCLH. For Treatment Group B (the subgroup of CLH residents), the numbers were 10,494 and 106 respectively. The sub-sample sizes from SCLH were smaller than the totals shown in the descriptive statistics in Section 3 of the main report because we could not perform logistic tests on individuals with missing values of covariates. Individuals in SCLH with a high number of missing values were withdrawn from the tests, while those with a few missing values were employed after the values were supplemented by the likely values statistically drawn from the relevant information. As CLS consists of a relatively large number of individuals, those with any missing values were withdrawn.

Table E1 Dependent variable and covariates

covariates	name	measurement
dependent variable	treatment =1	takes 1 when individual is involved in CLH / living in CLH community
socio-economic / socio-demographic	tenure: owner	takes 1 when individual owns a home (any mode; any portion)
	age: <50	takes 1 when individual is 49 years old or younger
	age: 50 - 64	takes 1 when individual is 50 to 64 years old
	employment: FT	takes 1 when individual is in full-time employment
	employment: PT	takes 1 when individual is in part-time employment
	income: < £15k	takes 1 when annual household income is less than £15k*
	income: £15k to £30k-	takes 1 when annual household income is £15k to £30k-*
	income: £30k to £50k-	takes 1 when annual household income is £30k to £50k-*
	qualification: HE	takes 1 when highest qualification is university degree or higher
	qualification: secondary	takes 1 when highest qualification vocational/professional qualification
	qualification: other	takes 1 when highest qualification is secondary education
	ethnic: BME	takes 1 when individual is ethnically BME
	gender: female	takes 1 when individual is female
	religion: Christian	takes 1 when individual is Christian
	religion: other	takes 1 when individual's religion is other than Christian
	HH: couple + child(ren)	takes 1 when household composition is a couple with child(ren)
	HH: couple	takes 1 when household composition is couple only
	HH: single + children	takes 1 when household composition is single adult with child(ren)
	HH: single	takes 1 when a household composition was a single adult only
lifestyle	membership: political	takes 1 when individual belongs to political party, trade union or environmental group
	membership: local meeting	takes 1 when individual belongs to tenants group, neighbourhood group or Neighbourhood Watch
	membership: church	takes 1 when individual belongs to church or religious group
	membership: adult education	takes 1 when individual takes part in education, arts or music groups or evening classes
	membership: social club	takes 1 when individual belongs to a social club
	membership: sport club	takes 1 when individual belongs to sports club or gym, or goes to exercise class

Note: * the categorisation allows for a ±£1.9k error of margin.

Table E2 Statistics on covariates used for PSM for Treatment Group A: CLH participants

	all samples			control			treatment		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
treatment=1	10697	0.02	0.136	10494	0.00	0.000	203	1.00	0.000
tenure: owner	10697	0.65	0.477	10494	0.65	0.478	203	0.83	0.379
age: <50	10697	0.51	0.500	10494	0.51	0.500	203	0.30	0.457
age: 50 - 64	10697	0.24	0.429	10494	0.24	0.428	203	0.33	0.470
employment: FT	10697	0.48	0.499	10494	0.48	0.500	203	0.25	0.435
employment: PT	10697	0.19	0.393	10494	0.19	0.391	203	0.32	0.466
income: < £15k	10697	0.43	0.495	10494	0.44	0.496	203	0.21	0.406
income: £15k to £30k-	10697	0.22	0.415	10494	0.22	0.413	203	0.36	0.482
income: £30k to £50k-	10697	0.17	0.376	10494	0.17	0.375	203	0.21	0.406
qualification: HE	10697	0.35	0.478	10494	0.35	0.476	203	0.71	0.453
qualification: secondary	10697	0.46	0.498	10494	0.46	0.499	203	0.08	0.270
qualification: other	10697	0.04	0.196	10494	0.04	0.188	203	0.21	0.406
ethnic: BME	10697	0.17	0.379	10494	0.18	0.381	203	0.05	0.227
gender: female	10697	0.54	0.498	10494	0.54	0.499	203	0.60	0.492
religion: Christian	10697	0.43	0.495	10494	0.42	0.494	203	0.69	0.464
religion: other	10697	0.20	0.399	10494	0.20	0.400	203	0.13	0.335
HH: couple + child(ren)	10697	0.15	0.358	10494	0.15	0.358	203	0.13	0.340
HH: couple	10697	0.31	0.461	10494	0.31	0.461	203	0.27	0.443
HH: single + children	10697	0.02	0.146	10494	0.02	0.145	203	0.04	0.206
HH: single	10697	0.17	0.372	10494	0.16	0.370	203	0.29	0.455
membership: political	10697	0.30	0.457	10494	0.29	0.454	203	0.61	0.490
membership: local meeting	10697	0.22	0.418	10494	0.22	0.417	203	0.30	0.460
membership: church	10697	0.23	0.418	10494	0.22	0.417	203	0.33	0.470
membership: adult education	10697	0.09	0.287	10494	0.08	0.268	203	0.73	0.443
membership: social club	10697	0.21	0.409	10494	0.21	0.407	203	0.39	0.489
membership: sport club	10697	0.34	0.473	10494	0.33	0.471	203	0.61	0.489

Table E3 Statistics on covariates used for PSM for Treatment Group B: CLH residents

	all samples			control			treatment		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
treatment=1	10600	0.01	0.100	10494	0.00	0.000	106	1.00	0.000
tenure: owner	10600	0.65	0.477	10494	0.65	0.478	106	0.94	0.232
age: <50	10600	0.51	0.500	10494	0.51	0.500	106	0.38	0.487
age: 50 - 64	10600	0.24	0.428	10494	0.24	0.428	106	0.26	0.443
employment: FT	10600	0.48	0.500	10494	0.48	0.500	106	0.25	0.438
employment: PT	10600	0.19	0.392	10494	0.19	0.391	106	0.29	0.457
income: < £15k	10600	0.43	0.496	10494	0.44	0.496	106	0.19	0.393
income: £15k to £30k-	10600	0.22	0.414	10494	0.22	0.413	106	0.37	0.485
income: £30k to £50k-	10600	0.17	0.376	10494	0.17	0.375	106	0.19	0.393
qualification: HE	10600	0.35	0.477	10494	0.35	0.476	106	0.69	0.465
qualification: secondary	10600	0.46	0.498	10494	0.46	0.499	106	0.10	0.306
qualification: other	10600	0.04	0.192	10494	0.04	0.188	106	0.21	0.407
ethnic: BME	10600	0.18	0.380	10494	0.18	0.381	106	0.05	0.213
gender: female	10600	0.54	0.498	10494	0.54	0.499	106	0.62	0.487
religion: Christian	10600	0.43	0.495	10494	0.42	0.494	106	0.78	0.414
religion: other	10600	0.20	0.399	10494	0.20	0.400	106	0.12	0.330
HH: couple + child(ren)	10600	0.15	0.358	10494	0.15	0.358	106	0.18	0.385
HH: couple	10600	0.31	0.461	10494	0.31	0.461	106	0.26	0.443
HH: single + children	10600	0.02	0.145	10494	0.02	0.145	106	0.03	0.167
HH: single	10600	0.16	0.371	10494	0.16	0.370	106	0.22	0.414
membership: political	10600	0.29	0.456	10494	0.29	0.454	106	0.58	0.495
membership: local meeting	10600	0.22	0.417	10494	0.22	0.417	106	0.28	0.453
membership: church	10600	0.22	0.417	10494	0.22	0.417	106	0.28	0.453
membership: adult education	10600	0.08	0.279	10494	0.08	0.268	106	0.75	0.432
membership: social club	10600	0.21	0.408	10494	0.21	0.407	106	0.38	0.487
membership: sport club	10600	0.33	0.472	10494	0.33	0.471	106	0.62	0.487

PSM results and the matched samples

After regression, each individual was given a predicted probability of being in the treatment group (a propensity score). Unsurprisingly, those in SCLH tended to have a higher probability. However, the probability distribution areas of SCLH and CLS overlapped (see charts below).

CLH participants and the subset of residents were matched to people drawn from CLS and used for the final comparison tests, based on the following 'good-matching' rules:

- We selected only subjects whose propensity score was within the range common to both SCLH and CLS. That is, CLH participants whose propensity score was higher than the maximum propensity score in CLS were not used for the matching.
- We performed one-to-one matching with the nearest propensity score and without replacement. That is, a single CLH participant was matched with the non-participant with the closest propensity score, and that non-participant was not paired to any other CLH participant.
- There was a limit on the distance of the 'nearest propensity score' - a maximum caliper of 0.15 of the standard deviation of the propensity scores -- in order to exclude bad matches.

Of the total of 203 CLH participants who responded to SCLH, 17 were discarded as their propensity score exceeded the maximum propensity score of the CLS, and a further 29 were discarded as their propensity score failed to find a close match within the caliper. We thus sampled 160 CLH participants, and the same number of non-participants from CLS, for the comparative tests. Of the 160 CLH participants, 84 were CLH residents.

After matching, we examined the matched samples with respect to the balance of all observed covariates. The means of the covariates for the matched treatment and control groups were close, and the PSM distributions were substantially similar to one another after matching (see the following tables and charts). We concluded that the treatment and control groups were fairly similar except for their participation in CLH.

Table E4 Sample sizes *Matching for Treatment Group A: CLH participants*

Before matching		***Matched***		***Unmatched***		***Discarded***	
Control	Treatment	**Control**	**Treatment**	Control	Treatment	Control	Treatment
10,494	203	**160**	**160**	6,409	26	3,925	17

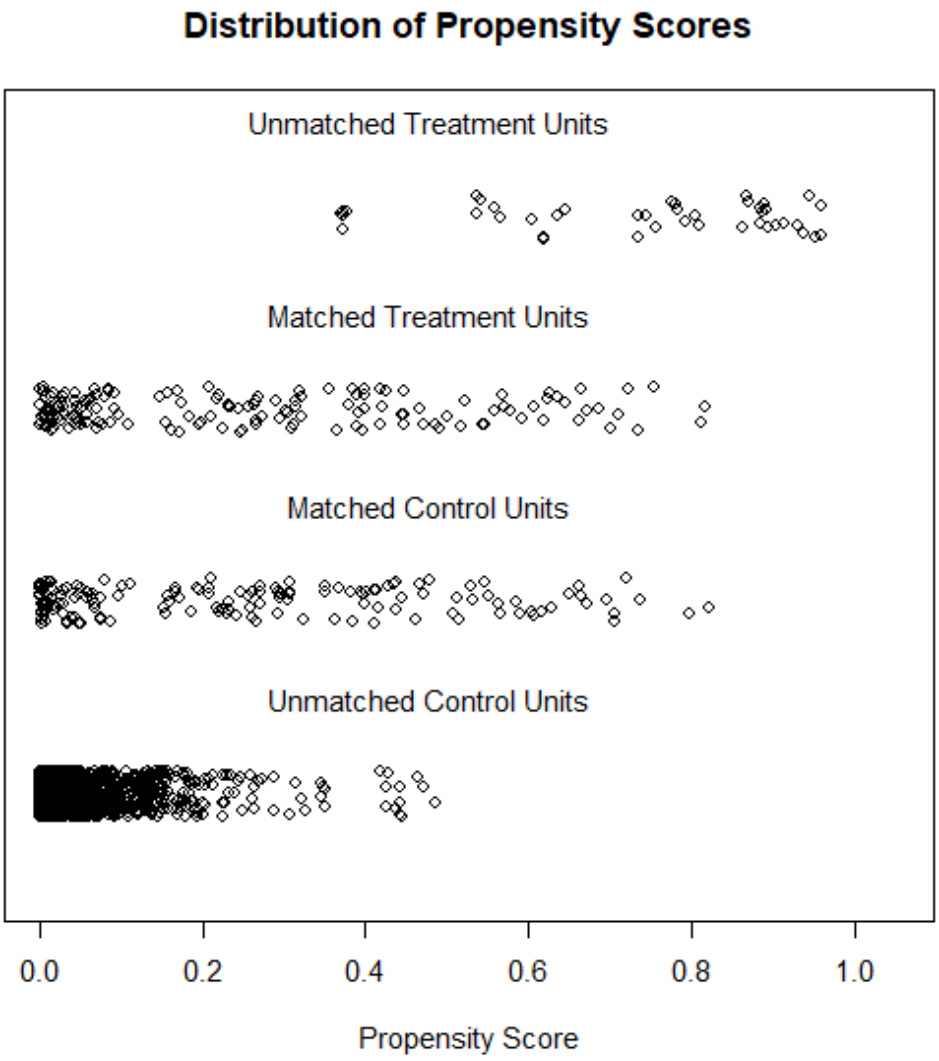
Table E5 Means of propensity score and covariates before and after matching

	Means Treatment		Means Control		SD Control		Std. Mean Diff.	
	Before	After	Before	After	Before	After	Before	After
Propensity score	0.349	0.245	0.013	0.239	0.049	0.227	1.130	0.020
tenure: owner	0.828	0.819	0.648	0.794	0.478	0.406	0.476	0.066
age: <50	0.296	0.338	0.511	0.369	0.500	0.484	-0.472	-0.068
age: 50 - 64	0.325	0.338	0.241	0.325	0.428	0.470	0.180	0.027
employment: FT	0.251	0.300	0.480	0.275	0.500	0.448	-0.527	0.057
employment: PT	0.315	0.300	0.188	0.356	0.391	0.480	0.273	-0.121
income: < £15k	0.207	0.244	0.436	0.263	0.496	0.441	-0.563	-0.046
income: £15k to £30k-	0.365	0.319	0.218	0.300	0.413	0.460	0.304	0.039
income: £30k to £50k-	0.207	0.206	0.170	0.188	0.375	0.392	0.092	0.046
qualification: HE	0.714	0.769	0.346	0.750	0.476	0.434	0.814	0.041
qualification: secondary	0.079	0.100	0.463	0.088	0.499	0.283	-1.422	0.046
qualification: other	0.207	0.131	0.037	0.163	0.188	0.370	0.419	-0.077
ethnic: BME	0.054	0.063	0.176	0.069	0.381	0.254	-0.538	-0.028
gender: female	0.596	0.575	0.538	0.569	0.499	0.497	0.117	0.013
religion: Christian	0.690	0.663	0.424	0.719	0.494	0.451	0.573	-0.121
religion: other	0.128	0.131	0.200	0.088	0.400	0.283	-0.213	0.131
HH: couple + child(ren)	0.133	0.150	0.151	0.150	0.358	0.358	-0.052	0.000
HH: couple	0.266	0.288	0.307	0.269	0.461	0.445	-0.093	0.042
HH: single + children	0.044	0.044	0.021	0.025	0.145	0.157	0.111	0.091
HH: single	0.291	0.250	0.164	0.231	0.370	0.423	0.278	0.041
membership: political	0.606	0.569	0.291	0.538	0.454	0.500	0.642	0.064
membership: local meeting	0.300	0.331	0.223	0.338	0.417	0.474	0.168	-0.014
membership: church	0.325	0.344	0.223	0.338	0.417	0.474	0.216	0.013
membership: adult education	0.734	0.663	0.078	0.594	0.268	0.493	1.481	0.155
membership: social club	0.389	0.400	0.209	0.356	0.407	0.480	0.369	0.090
membership: sport club	0.611	0.594	0.332	0.494	0.471	0.502	0.570	0.205

Note: all covariates are binary variables. Interactions between covariates were not reported.

<u>Treatment Group A:</u> CLH participants

Distribution of propensity scores for the treatment and control groups before and after matching: Part 1



Note: Each symbol represents one person in the dataset.

<u>Treatment Group A:</u> CLH participants

Distribution of propensity scores for the treatment and control groups before and after matching: Part 2

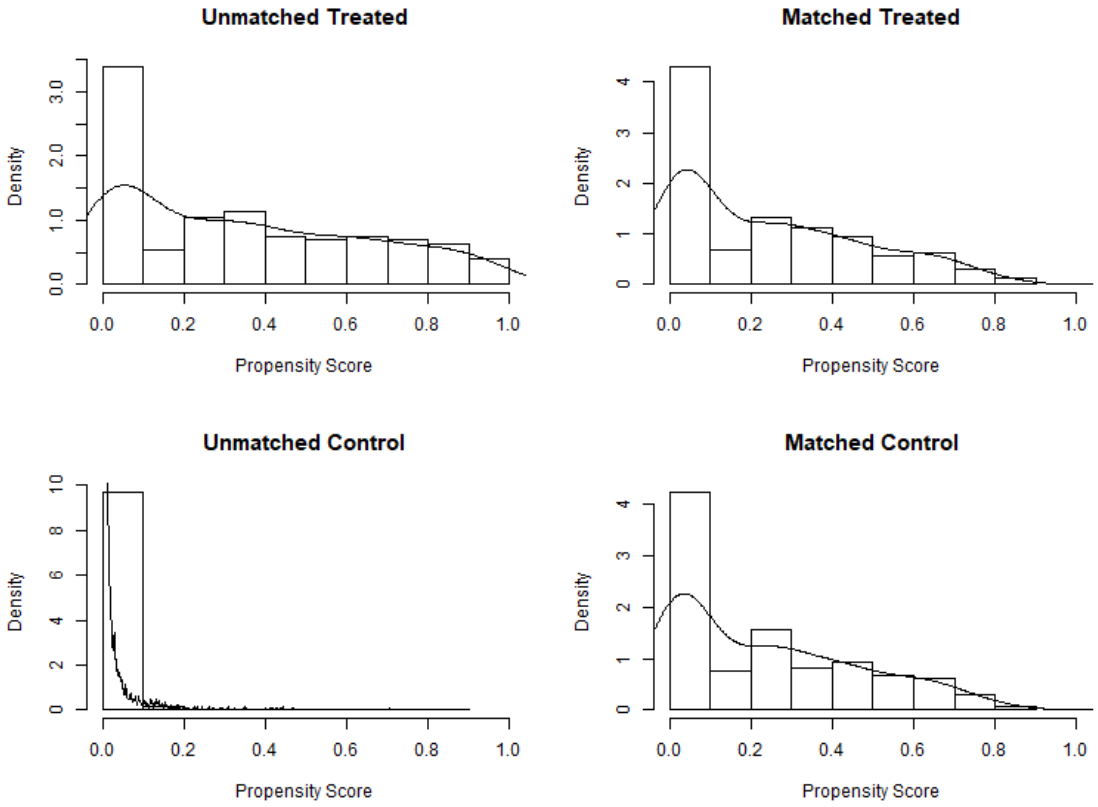


Table E6 Sample sizes *Matching for <u>Treatment Group B</u>: CLH residents*

Before matching		***Matched***		***Unmatched***		***Discarded***	
Control	Treatment	**Control**	**Treatment**	Control	Treatment	Control	Treatment
10,494	106	**84**	**84**	6,840	18	3,570	4

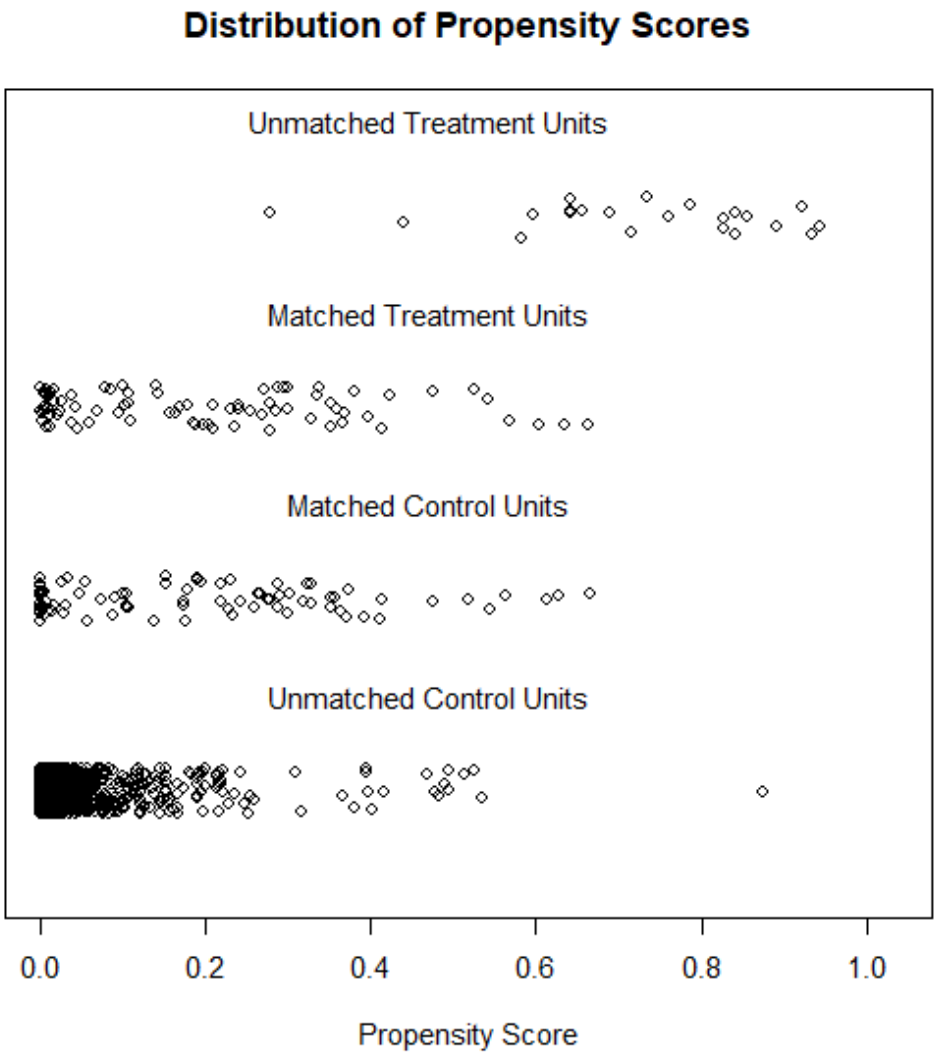
Table E7 Means of propensity score and covariates before and after matching

	Means Treatment		Means Control		SD Control		Std. Mean Diff.	
	Before	After	Before	After	Before	After	Before	After
Propensity score	0.302	0.190	0.007	0.187	0.035	0.176	1.058	0.011
tenure: owner	0.943	0.929	0.648	0.917	0.478	0.278	1.274	0.051
age: <50	0.377	0.440	0.511	0.405	0.500	0.494	-0.275	0.073
age: 50 - 64	0.264	0.286	0.241	0.298	0.428	0.460	0.053	-0.027
employment: FT	0.255	0.298	0.480	0.345	0.500	0.478	-0.515	-0.109
employment: PT	0.292	0.298	0.188	0.310	0.391	0.465	0.228	-0.026
income: < £15k	0.189	0.202	0.436	0.190	0.496	0.395	-0.628	0.030
income: £15k to £30k-	0.368	0.298	0.218	0.369	0.413	0.485	0.310	-0.147
income: £30k to £50k-	0.189	0.214	0.170	0.167	0.375	0.375	0.048	0.121
qualification: HE	0.689	0.750	0.346	0.714	0.476	0.454	0.737	0.077
qualification: secondary	0.104	0.131	0.463	0.214	0.499	0.413	-1.172	-0.272
qualification: other	0.208	0.119	0.037	0.071	0.188	0.259	0.419	0.117
ethnic: BME	0.047	0.060	0.176	0.060	0.381	0.238	-0.606	0.000
gender: female	0.623	0.583	0.538	0.560	0.499	0.499	0.173	0.049
religion: Christian	0.783	0.738	0.424	0.726	0.494	0.449	0.867	0.029
religion: other	0.123	0.143	0.200	0.143	0.400	0.352	-0.233	0.000
HH: couple + child(ren)	0.179	0.202	0.151	0.143	0.358	0.352	0.074	0.154
HH: couple	0.264	0.274	0.307	0.333	0.461	0.474	-0.098	-0.134
HH: single + children	0.028	0.024	0.021	0.024	0.145	0.153	0.041	0.000
HH: single	0.217	0.179	0.164	0.119	0.370	0.326	0.128	0.144
membership: political	0.585	0.536	0.291	0.560	0.454	0.499	0.593	-0.048
membership: local meeting	0.283	0.286	0.223	0.179	0.417	0.385	0.132	0.237
membership: church	0.283	0.310	0.223	0.179	0.417	0.385	0.132	0.289
membership: adult education	0.755	0.690	0.078	0.679	0.268	0.470	1.565	0.028
membership: social club	0.377	0.369	0.209	0.369	0.407	0.485	0.346	0.000
membership: sport club	0.623	0.583	0.332	0.583	0.471	0.496	0.597	0.000

Note: all covariates are binary variables. Interactions between covariates were not reported.

<u>Treatment Group B:</u> CLH residents

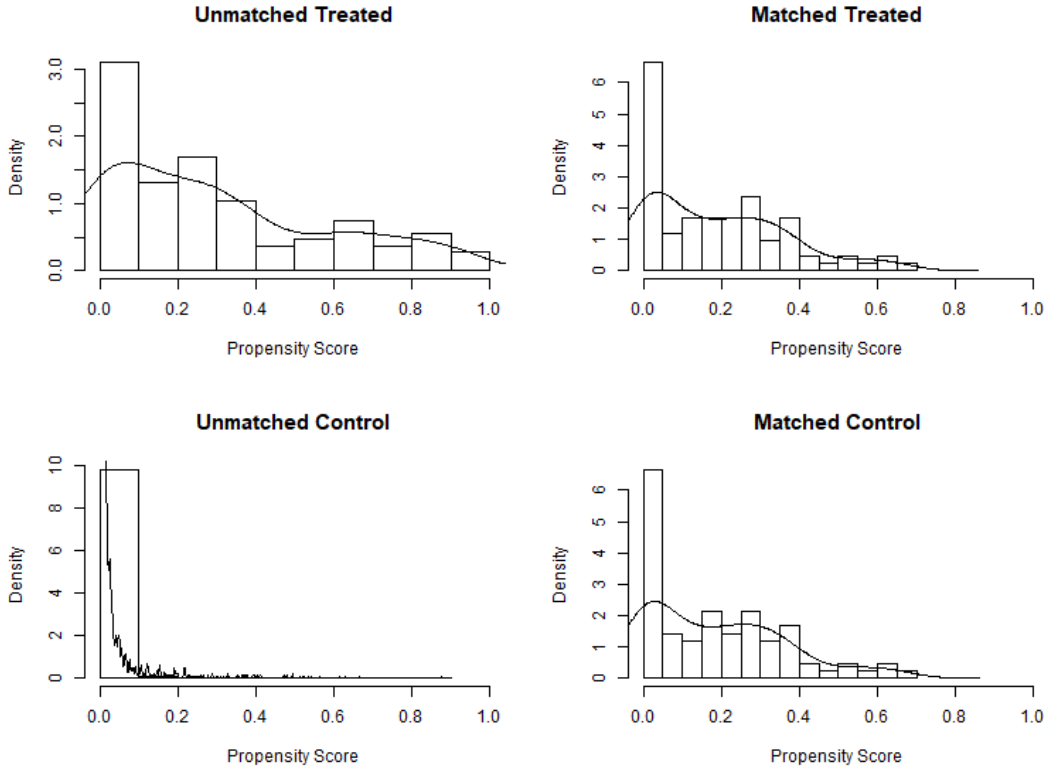
Distribution of propensity scores for the treatment and control groups before and after matching: Part 1



Note: Each symbol represents a person in the dataset.

***Treatment Group B:* CLH residents**

Distribution of propensity scores for the treatment and control groups before and after matching: Part



2

For the comparisons, two kinds of econometric tests were undertaken – a chi-square test and a McNemar test, both of which are widely used in this type of comparison, albeit with some debates on application. A chi-square test (χ^2 in the tables) is generally effective in distributional differences across two more categories (e.g. Agree, Tend to Agree, Tend to Disagree or Disagree), but the test results can be unclear in cases where the two groups were obviously dependent on one another[3]. A McNemar test explicitly adjusts for pairwise dependence but is run only for binary variables (e.g. Agree or Disagree). As reported later, the two tests gave almost same conclusions with regard to statistical significance.

[3] Such cases include, for example, a case where a treatment group consists of people in a post-project period and the control group consist of the identical people in a pre-project period, or a case where a group of children are compared to a group of their parents. Subjects in treatment and control groups made by PSM, like those in this examination, are, however, associated only for the propensity scores but not as strongly associated as, for example, genetically-matched pairs. Thus, chi-square tests are frequently used for PSM pairs. For discussions in this context, see, for example, Thoemmes (2012), Austin (2011), Hill (2008) and McHugh (2013).

Annex F: Statistical tests and their interpretation

Questions compared are summarised in table F1. Items are categorical variables and collapsed binary variables in McNemar tests.

Table F1: Items to be compared

Category	Wording of question from Community Life Survey	Coded as	Measurement: number of categories**
A Loneliness and socialisation	How much of the time during the past week did you feel lonely?	lonely	4 (none or almost none of the time to all or almost all of the time)
	To what extent do you agree or disagree with the following statement? If I wanted company or to socialise, there are people I can call on	social	4 (definitely agree to definitely disagree)
	How much do you agree or disagree with the following statement? If I needed help, there are people who would be there for me	help	4 (definitely agree to definitely disagree)
B Communication with families / friends	On average, how often do you meet up in person with family members or friends?	meet	8 (more than once a day to never)
	On average, how often do you speak on the phone or video or audio call via the internet with family members or friends?	phone	8 (more than once a day to never)
	On average, how often do you email or write to family members or friends?	email	8 (more than once a day to never)
	On average, how often do you exchange text messages or instant messages with family members or friends?	text	8 (more than once a day to never)
C Neighbours and the neighbourhood*	How strongly do you feel you belong to your immediate neighbourhood?	belong	4 (very strongly to not at all)
	How often do you chat to your neighbours, more than just to say hello?	chat	5 (on most days to never)
	How strongly do you agree or disagree with the following statement? Generally, I borrow things and exchange favours with my neighbours.	borrow	4 (definitely agree to definitely disagree)
	How comfortable would you be asking a neighbour to keep a set of keys to your home for emergencies, for example if you were locked out?	key	4 (very comfortable to very uncomfortable)
	If you were ill and at home on your own, and needed someone to collect a few shopping essentials, how comfortable would you feel asking a neighbour to do this for you?	collect	4 (very comfortable to very uncomfortable)

*See Table 1 for wording of modified questions seen by CLH residents

**Some categories were combined due to the small number of respondents.

Test results summary

Table F2: Summary results for Class A Loneliness and socialising

item	*treatment type*	*test*	*significant difference?*	*distributional characteristics*
A1 lonely	PARTICIPANTS	χ2	yes	high proportion of positive responses
		MN	yes	
	RESIDENTS	χ2	yes	high proportion of positive responses
		MN	yes	
A2 social	PARTICIPANTS	χ2	no	
		MN	no	
	RESIDENTS	χ2	yes	high proportion of positive responses
		MN	no	
A3 help	PARTICIPANTS	χ2	no	
		MN	no	
	RESIDENTS	χ2	no	
		MN	no	

Table F3: Summary results for Class B Communication with family and friends

item	*treatment type*	*test*	*significant difference?*	*distributional characteristics*
B1 meet	PARTICIPANTS	χ2	no	
		MN	no	
	RESIDENTS	χ2	yes	high proportion of negative responses
		MN	yes	
B2 phone	PARTICIPANTS	χ2	yes	high proportion of negative responses
		MN	yes	
	RESIDENTS	χ2	no	high proportion of negative responses
		MN	yes	
B3 email	PARTICIPANTS	χ2	yes	high proportion of positive responses
		MN	no	
	RESIDENTS	χ2	yes	high proportion of positive responses
		MN	no	
B4 text	PARTICIPANTS	χ2	no	
		MN	no	
	RESIDENTS	χ2	no	
		MN	no	

Table F4: Summary results for Class C Neighbours and the neighbourhood

item	*treatment type*	*test*	*significant difference?*	*distributional characteristics*
C1 belong	PARTICIPANTS	χ2	no	
		MN	no	
	RESIDENTS	χ2	yes	high proportion of positive responses
		MN	yes	
C2 chat	PARTICIPANTS	χ2	no	
		MN	no	
	RESIDENTS	χ2	yes	high proportion of positive responses
		MN	yes	
C3 borrow	PARTICIPANTS	χ2	yes	high proportion of negative responses
		MN	yes	
	RESIDENTS	χ2	yes	high proportion of positive responses
		MN	yes	
C4 key	PARTICIPANTS	χ2	yes	high proportion of negative responses
		MN	no	
	RESIDENTS	χ2	yes	high proportion of positive responses
		MN	yes	
C5 collect	PARTICIPANTS	χ2	no	
		MN	no	
	RESIDENTS	χ2	yes	high proportion of positive responses
		MN	yes	

Detailed test results and their interpretation and implications

Class A Loneliness and socialising

Codes:

1. Lonely
2. Social
3. Help

A1 lonely

Question: How much of the time during the last week did you feel lonely? (none or almost none of the time, to all or almost all of the time)

For PARTICIPANTS

- There was a significant distributional difference between the treatment and control groups. The significance levels in the results of the chi-square test and the McNamer test (last columns of TABLE F7) were less than 0.05 (a general threshold of statistical significance).
- The adjusted residual (AR) of the chi-square test is an indication of the difference between categories (TABLE F5). In general, an adjusted residual whose absolute value is around 2 or larger indicates a statistically significant difference in that category between the two groups.
- Looking at adjusted residuals of "never / hardly ever", the treatment group had a significantly positive adjusted residual of 3.7 while the control group's equivalent was -3.7. This indicates that CLH participants were less likely to feel lonely than the control group.
- The control group were likely to feel lonely occasionally, with a corresponding adjusted residual of 3.1.
- The McNemar Test table (TABLE F6) indicates a virtual shift between categories of loneliness frequency by CLH involvement.
- 69 control group members occasionally felt lonely (the top row of the last column). Of the CLH participants matched to them, 53 hardly ever or never felt lonely. Similarly, 73 control group members said they never or hardly ever felt lonely. Of the CLH participants matched to them, 50 hardly ever or never felt lonely.
- This indicates that on balance, 30 (53-23) people were shifted from the more lonely to the less lonely category by the treatment, which indicates the positive impact of CLH involvement on reduction in loneliness.

For RESIDENTS

- There was a significant distributional difference between the treatment and control groups. The significance levels in the results of the chi-square test and the McNamer test were less than 0.05.
- Looking at adjusted residuals of "never / hardly ever", the treatment group had a significantly positive adjusted residual of 3.0, indicating that people living in theCLH community were highly likely to almost never feel lonely.
- Of the 32 residents in CLH community matched to control-group members who occasionally felt lonely, 23 almost never felt lonely.
- The results suggest a significantly positive impact of living in CLH community on reduction in loneliness.

'lonely' analysis **<u>Treatment A</u>: CLH participants**

Table F5: Chi-square test

		never; hardly ever	*some of the time; occasionally*	*often; always*	
Control	Count	73	62	7	142
	%	51.4%	43.7%	4.9%	100.0%
	Adjusted Residual	-3.7	3.1	1.7	
Treatment	Count	103	37	2	142
	%	72.5%	26.1%	1.4%	100.0%
	Adjusted Residual	3.7	-3.1	-1.7	
	Count	176	99	9	284
	%	62.0%	34.9%	3.2%	100.0%

Table F6: McNemar test

			treatment group		
			rest	*never / hardly ever*	*total*
Control Group	rest	Count	16	53	69
		% (row)	23.2%	76.8%	100.0%
		% (column)	41.0%	51.5%	48.6%
	never / hardly ever	Count	23	50	73
		% (row)	31.5%	68.5%	100.0%
		% (column)	59.0%	48.5%	51.4%
	total	Count	39	103	142
		% (row)	27.5%	72.5%	100.0%
		% (column)	100.0%	100.0%	100.0%

TABLE F7: Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. level (2-sided)*	
Chi-square Test†	Fisher's Exact	14.093	2	0.001	***
McNemar Test				0.001	***

Notes:
† When the cross-table has cells with an expected count of fewer than 5, Fisher's Exact was used to specify the significance level, otherwise, Pearson's Chi-square was used.
*** indicates 1%-significance level.
** indicates 5%-significance level.

These notes apply to the equivalent tables below.

'lonely' analysis **<u>Treatment B</u>: CLH residents**

Table F8: Chi-square test

		never; hardly ever	*some of the time; occasionally*	*often; always*	*Total*
Control	Count	40	30	2	72
	%	55.6%	41.7%	2.8%	100.0%
	Adjusted Residual	-3.0	2.9	0.6	
Treatment	Count	57	14	1	72
	%	79.2%	19.4%	1.4%	100.0%
	Adjusted Residual	3.0	-2.9	-0.6	
	Count	97	44	3	144
	%	67.4%	30.6%	2.1%	100.0%

Table F9: McNemar test

			treatment group		
			rest	*never / hardly ever*	*total*
Control Group	rest	Count	9	23	32
		% (row)	28.1%	71.9%	100.0%
		% (column)	60.0%	40.4%	44.4%
	never / hardly ever	Count	6	34	40
		% (row)	15.0%	85.0%	100.0%
		% (column)	40.0%	59.6%	55.6%
	total	Count	15	57	72
		% (row)	20.8%	79.2%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F10: Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. (2-sided)*	
Chi-square Test †	Fisher's Exact	9.203	2	0.005	***
McNemar Test				0.002	***

A2 Social

Question: To what extent do you agree or disagree with the following statement? If I wanted company or to socialise, there are people I can call on (definitely agree to definitely disagree)

For PARTICIPANTS

- There were no significant distributional differences between the treatment and control groups.

For RESIDENTS

- The chi-square test showed a significant difference between the CLH residents and the control group in terms of the degree of agreement ("definitely" or "tend to"). With respect to more fundamental perceptions (agree or disagree), there were no significant differences.

'social' analysis Treatment A: CLH participants

Table F11: Chi-square test

		definitely agree	*tend to agree*	*tend to disagree*	*definitely disagree*	
control	Count	86	49	9	1	145
	%	59.3%	33.8%	6.2%	0.7%	100.0%
	Adjusted Residual	-0.5	0.5	0.2	-0.6	
treatment	Count	90	45	8	2	145
	%	62.1%	31.0%	5.5%	1.4%	100.0%
	Adjusted Residual	0.5	-0.5	-0.2	0.6	
	Count	176	94	17	3	290
	%	60.7%	32.4%	5.9%	1.0%	100.0%

Table F12: McNemar test

			treatment group		
			agree	*disagree*	*total*
control group	agree	Count	126	9	135
		% (row)	93.3%	6.7%	100.0%
		% (column)	93.3%	90.0%	93.1%
	disagree	Count	9	1	10
		% (row)	90.0%	10.0%	100.0%
		% (column)	6.7%	10.0%	6.9%
	total	Count	135	10	145
		% (row)	93.1%	6.9%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F13: Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. (2-sided)*
Chi-square Test †	Fisher's Exact	0.762	3	0.901
McNemar Test				1.000

'social' analysis **<u>Treatment B</u>: CLH residents**

Table F14: Chi-square test

		definitely agree	*tend to agree*	*tend to disagree*	*definitely disagree*	
control	Count	42	29	3	0	74
	%	56.8%	39.2%	4.1%	0.0%	100.0%
	Adjusted Residual	-2.1	2.5	-0.4	-1.0	
treatment	Count	54	15	4	1	74
	%	73.0%	20.3%	5.4%	1.4%	100.0%
	Adjusted Residual	2.1	-2.5	0.4	1.0	
	Count	96	44	7	1	148
	%	64.9%	29.7%	4.7%	0.7%	100.0%

Table F15: McNemar test

			treatment group		
			agree	*disagree*	*total*
control group	agree	Count	66	5	71
		% (row)	93.0%	7.0%	100.0%
		% (column)	95.7%	100.0%	95.9%
	disagree	Count	3	0	3
		% (row)	100.0%	0.0%	100.0%
		% (column)	4.3%	0.0%	4.1%
	total	Count	69	5	74
		% (row)	93.2%	6.8%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F16: Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. (2-sided)*	
Chi-square Test †	Fisher's Exact	7.06	3	0.043	**
McNemar Test				0.727	

A3 help

Question: How much do you agree or disagree with the following statement? - If I needed help, there are people who would be there for me (def. agree to def. disagree)

For PARTICIPANTS

- The chi-square test showed a significant difference between CLH participants and the control group. The difference was in the degree of agreement ("definitely" or "tend to"); with respect to more fundamental perceptions (agree or disagree), there were no significant differences.

For RESIDENTS

- The chi-square test showed a significant difference between CLH residents and the control group in the degree of agreement ("definitely" or "tend to"); for more fundamental perceptions (agree or disagree), there were no significant differences.

'help' analysis Treatment A: CLH participants

Table F17: Chi-square test

		definitely agree	*tend to agree*	*tend to disagree*	*definitely disagree*	
control	Count	97	44	5	1	147
	%	66.0%	29.9%	3.4%	0.7%	100.0%
	Adjusted Residual	-1.9	2.5	-1.1	1.0	
treatment	Count	112	26	9	0	147
	%	76.2%	17.7%	6.1%	0.0%	100.0%
	Adjusted Residual	1.9	-2.5	1.1	-1.0	
	Count	209	70	14	1	294
	%	71.1%	23.8%	4.8%	0.3%	100.0%

Table F18: McNemar test

			treatment group		
			agree	*disagree*	*total*
control group	agree	Count	132	9	141
		% (row)	93.6%	6.4%	100.0%
		% (column)	95.7%	100.0%	95.9%
	disagree	Count	6	0	6
		% (row)	100.0%	0.0%	100.0%
		% (column)	4.3%	0.0%	4.1%
	total	Count	138	9	147
		% (row)	93.9%	6.1%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F19: Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. (2-sided)*	
Chi-square Test †	Fisher's Exact	7.742	3	0.032	**
McNemar Test				0.607	

'help' analysis **<u>Treatment B</u>: CLH residents**

Table F20: Chi-square test

		definitely agree	*tend to agree*	*tend to disagree*	
control	Count	51	22	0	73
	%	69.9%	30.1%	0.0%	100.0%
	Adjusted Residual	-2.2	2.4	-1.0	
treatment	Count	62	10	1	73
	%	84.9%	13.7%	1.4%	100.0%
	Adjusted Residual	2.2	-2.4	1.0	
	Count	113	32	1	146
	%	77.4%	21.9%	0.7%	100.0%

Table F21: McNemar test

			treatment group		
			agree	*disagree*	*total*
control group	agree	Count	72	1	73
		% (row)	98.6%	1.4%	100.0%
		% (column)	100.0%	100.0%	100.0%
	disagree	Count	0	0	0
		% (row)			
		% (column)			
	total	Count	72	1	73
		% (row)	98.6%	1.4%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F22: Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. (2-sided)*	
Chi-square Test †	Fisher's Exact	6.478	2	0.027	**
McNemar Test				N.A.	

B Communication with families / friends

Codes: 1. Meet 2. Phone 3. Email 4. Text

B1 meet

Question: On average, how often do you meet up in person with family members or friends? (more than once a day to never)

For PARTICIPANTS

- There were no significant distributional differences between the treatment and control groups.

For RESIDENTS

- There was a significant distributional difference between treatment and control. CLH residents appeared less likely than the general population to meet up in person with family members or friend once a week or more. This could be because the frequency of contact with fellow community residents could satisfy their need for socialising.

'meet' analysis Treatment A: CLH participants

Table F23: Chi-square test

		once a day+	*once a week+*	*once a month+*	*less frequently / never*	
control	Count	28	84	27	6	145
	%	19.3%	57.9%	18.6%	4.1%	100.0%
	Adjusted Residual	-0.6	1.6	-0.6	-1.5	
treatment	Count	32	70	31	12	145
	%	22.1%	48.3%	21.4%	8.3%	100.0%
	Adjusted Residual	0.6	-1.6	0.6	1.5	
	Count	60	154	58	18	290
	%	20.7%	53.1%	20.0%	6.2%	100.0%

Table F24: McNemar test

			treatment group		
			less frequently	*once a week +*	*total*
control group	Less frequently	Count	8	25	33
		% (row)	24.2%	75.8%	100.0%
		% (column)	18.6%	24.5%	22.8%
	once a week +	Count	35	77	112
		% (row)	31.3%	68.8%	100.0%
		% (column)	81.4%	75.5%	77.2%
	total	Count	43	102	145
		% (row)	29.7%	70.3%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F25: Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. (2-sided)*
Chi-square Test	Pearson Chi-square	3.815	3	0.289
McNemar Test				0.245

'meet' analysis **<u>Treatment B</u>: CLH residents**

Table F26: Chi-square test

		once a day+	*once a week+*	*once a month+*	*less frequently / never*	
control	Count	19	47	8	0	74
	%	25.7%	63.5%	10.8%	0.0%	100.0%
	Adjusted Residual	0.2	2.3	-1.2	-3.3	
treatment	Count	18	33	13	10	74
	%	24.3%	44.6%	17.6%	13.5%	100.0%
	Adjusted Residual	-0.2	-2.3	1.2	3.3	
	Count	37	80	21	10	148
	%	25.0%	54.1%	14.2%	6.8%	100.0%

Table F27: McNemar test

			treatment group		
			less frequently	*once a week +*	*total*
Control Group	Less frequently	Count	1	7	8
		% (row)	12.5%	87.5%	100.0%
		% (column)	4.3%	13.7%	10.8%
	once a week +	Count	22	44	66
		% (row)	33.3%	66.7%	100.0%
		% (column)	95.7%	86.3%	89.2%
	total	Count	23	51	74
		% (row)	31.1%	68.9%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F28: Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. (2-sided)*	
Chi-square Test	Pearson Chi-square	13.668 a	3	0.003	** *
McNemar Test				0.008	** *

B2 phone

Question: On average, how often do you speak on the phone or video or audio call via the internet with family members or friends? (more than once a day to never)

For PARTICIPANTS

- There was a significant distributional difference between the treatment and control groups. CLH participants appeared to speak less frequently on the phone or via video or audio call over the internet with family members or friends than the control group.

For RESIDENTS

- There was a significant distributional difference between the treatment and control groups in the McNamer test. CLH residents appeared to speak less frequently on the phone or via video or audio call over the internet with family members or friends than the control group.
- This could reflect high levels of communication within the community itself.

'phone' analysis Treatment A: CLH participants

Table F29: Chi-square test

		once a day+	*once a week+*	*once a month+*	*less frequently / never*	
control	Count	43	88	11	4	146
	%	29.5%	60.3%	7.5%	2.7%	100.0%
	Adjusted Residual	2.2	0.2	-2.9	-0.3	
treatment	Count	27	86	28	5	146
	%	18.5%	58.9%	19.2%	3.4%	100.0%
	Adjusted Residual	-2.2	-0.2	2.9	0.3	
	Count	70	174	39	9	292
	%	24.0%	59.6%	13.4%	3.1%	100.0%

Table F30: McNemar test

			treatment group		
			less frequently	*once a week +*	*total*
control group	Less frequently	Count	4	11	15
		% (row)	26.7%	73.3%	100.0%
		% (column)	12.1%	9.7%	10.3%
	once a week +	Count	29	102	131
		% (row)	22.1%	77.9%	100.0%
		% (column)	87.9%	90.3%	89.7%
	total	Count	33	113	146
		% (row)	22.6%	77.4%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F31: Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. (2-sided)*	
Chi-square Test †	Fisher's Exact	11.294	3	0.010	***
McNemar Test				0.006	***

'phone' analysis **<u>Treatment B</u>: CLH residents**

Table F32: Chi-square test

		once a day+	*once a week+*	*once a month+*	*less frequently / never*	
control	Count	23	41	7	3	74
	%	31.1%	55.4%	9.5%	4.1%	100.0%
	Adjusted Residual	1.9	0.2	-2.2	-0.4	
treatment	Count	13	40	17	4	74
	%	17.6%	54.1%	23.0%	5.4%	100.0%
	Adjusted Residual	-1.9	-0.2	2.2	0.4	
	Count	36	81	24	7	148
	%	24.3%	54.7%	16.2%	4.7%	100.0%

Table F33: McNemar test

			treatment group		
			less frequently	*once a week +*	*total*
control group	Less frequently	Count	3	7	10
		% (row)	30.0%	70.0%	100.0%
		% (column)	14.3%	13.2%	13.5%
	once a week +	Count	18	46	64
		% (row)	28.1%	71.9%	100.0%
		% (column)	85.7%	86.8%	86.5%
	total	Count	21	53	74
		% (row)	28.4%	71.6%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F34: Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. (2-sided)*	
Chi-square Test †	Fisher's Exact	7.093	3	0.068	
McNemar Test				0.043	**

B3 email

Question: On average, how often do you email or write to family members or friends? (more than once a day to never)

For both PARTICIPANTS and RESIDENTS

- The chi-square tests show a significant difference between the treatment and control groups, arising mainly from the proportion of people that almost never emails. With respect to more fundamental behaviours (emailing once a week or more, or less frequently than that), there were no significant differences.

'email' analysis Treatment A: CLH participants

Table F35: Chi-square test

		once a day+	*once a week+*	*once a month+*	*less frequently / never*	
control	Count	32	50	21	41	144
	%	22.2%	34.7%	14.6%	28.5%	100.0%
	Adjusted Residual	0.1	-1.9	-0.6	2.7	
treatment	Count	31	66	25	22	144
	%	21.5%	45.8%	17.4%	15.3%	100.0%
	Adjusted Residual	-0.1	1.9	0.6	-2.7	
	Count	63	116	46	63	288
	%	21.9%	40.3%	16.0%	21.9%	100.0%

Table F36: McNemar test

			treatment group		
			less frequently	*once a week +*	*total*
control group	Less frequently	Count	23	39	62
		% (row)	37.1%	62.9%	100.0%
		% (column)	48.9%	40.2%	43.1%
	once a week +	Count	24	58	82
		% (row)	29.3%	70.7%	100.0%
		% (column)	51.1%	59.8%	56.9%
	total	Count	47	97	144
		% (row)	32.6%	67.4%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F37: Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. (2-sided)*	
Chi-square Test	Pearson Chi-square	8.301	3	0.040	**
McNemar Test				0.077	

'email' analysis **<u>Treatment B</u>: CLH residents**

Table F38: Chi-square test

		once a day+	*once a week+*	*once a month+*	*less frequently / never*	
control	Count	16	24	9	24	73
	%	21.9%	32.9%	12.3%	32.9%	100.0%
	Adjusted Residual	1.3	-2.0	-1.3	2.3	
treatment	Count	10	36	15	12	73
	%	13.7%	49.3%	20.5%	16.4%	100.0%
	Adjusted Residual	-1.3	2.0	1.3	-2.3	
	Count	26	60	24	36	146
	%	17.8%	41.1%	16.4%	24.7%	100.0%

Table F39: McNemar test

			treatment group		
			less frequently	*once a week +*	*total*
control group	Less frequently	Count	12	21	33
		% (row)	36.4%	63.6%	100.0%
		% (column)	44.4%	45.7%	45.2%
	once a week +	Count	15	25	40
		% (row)	37.5%	62.5%	100.0%
		% (column)	55.6%	54.3%	54.8%
	total	Count	27	46	73
		% (row)	37.0%	63.0%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F40: Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. (2-sided)*	
Chi-square Test	Pearson Chi-square	9.285	3	0.026	**
McNemar Test				0.405	

B4 text

Question: On average, how often do you exchange text messages or instant messages with family members or friends? (more than once a day to never)

For both PARTICIPANTS and RESIDENTS

- There were no significant distributional differences between the treatment and control groups.

'text' analysis Treatment A: CLH participants

Table F41: Chi-square test

		once a day+	*once a week+*	*once a month+*	*less frequently / never*	
control	Count	76	51	10	8	145
	%	52.4%	35.2%	6.9%	5.5%	100.0%
	Adjusted Residual	-0.2	0.2	-0.2	0.3	
treatment	Count	78	49	11	7	145
	%	53.8%	33.8%	7.6%	4.8%	100.0%
	Adjusted Residual	0.2	-0.2	0.2	-0.3	
	Count	154	100	21	15	290
	%	53.1%	34.5%	7.2%	5.2%	100.0%

Table F42: McNemar test

			treatment group		
			less frequently	*once a week +*	*total*
control group	Less frequently	Count	2	16	18
		% (row)	11.1%	88.9%	100.0%
		% (column)	11.1%	12.6%	12.4%
	once a week +	Count	16	111	127
		% (row)	12.6%	87.4%	100.0%
		% (column)	88.9%	87.4%	87.6%
	total	Count	18	127	145
		% (row)	12.4%	87.6%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F43: Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. (2-sided)*
Chi-square Test	Pearson Chi-square	.180	3	0.979
McNemar Test				1.000

'text' analysis **<u>Treatment B</u>: CLH residents**

Table F44: Chi-square test

		once a day+	*once a week+*	*once a month+*	*less frequently / never*	
control	Count	47	21	2	4	74
	%	63.5%	28.4%	2.7%	5.4%	100.0%
	Adjusted Residual	1.3	-0.7	-1.2	-0.3	
treatment	Count	39	25	5	5	74
	%	52.7%	33.8%	6.8%	6.8%	100.0%
	Adjusted Residual	-1.3	0.7	1.2	0.3	
	Count	86	46	7	9	148
	%	58.1%	31.1%	4.7%	6.1%	100.0%

Table F45: McNemar test

			treatment group		
			less frequently	*once a week +*	*total*
control group	Less frequently	Count	1	5	6
		% (row)	16.7%	83.3%	100.0%
		% (column)	10.0%	7.8%	8.1%
	once a week +	Count	9	59	68
		% (row)	13.2%	86.8%	100.0%
		% (column)	90.0%	92.2%	91.9%
	total	Count	10	64	74
		% (row)	13.5%	86.5%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F46: Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. (2-sided)*
Chi-square Test †	Fisher's Exact	2.464	3	0.497
McNemar Test				0.424

C Neighbours and the neighbourhood

Codes:

1. Belong
2. Chat
3. Borrow
4. Key
5. Collect

- This part examines interaction and communications with the wider neighbourhood. Recall that CLH residents saw two versions of each question about neighbourhood: one that referred to the CLH community, and one that referred to the surrounding neighbourhood outside the community (table below).
- Because of the differences in wording, which were introduced to differentiate attitudes towards the CLH community from attitudes towards the surrounding neighbourhood, the comparisons are not strictly like-for-like.
- For the PARTICIPANTS analyses (which looked at all respondents, whether living in CLH or not), the questions compared referred to 'your immediate neighbourhood' (for the control group and non-residents) and 'the immediate neighbourhood around your CLH community' (for CLH residents).
- For the RESIDENTS analyses, the questions compared were different. For the control group the wording of the question again referred to 'your immediate neighbourhood', while the question for residents asked about 'your CLH community'.

Neighbours and the neighbourhood—questions compared

	Original question from CLS	**Wording of question seen by CLH non-residents**	**Wording of question seen by CLH residents**
PARTICIPANT analyses	How strongly do you feel you belong to your immediate neighbourhood?	How strongly do you feel you belong to your immediate neighbourhood?	How strongly do you feel you belong to the immediate neighbourhood around your CLH community?
RESIDENT analyses	How strongly do you feel you belong to your immediate neighbourhood?	n/a	How strongly do you feel you belong to your CLH community?

C1 belong

Question: How strongly do you feel you belong to your immediate neighbourhood? (very strongly to not at all)

For PARTICIPANTS

- There were no significant distributional differences between the treatment and control groups.

For RESIDENTS

- There was a significant distributional difference between the treatment and control groups.
- The significance levels in the results of the chi-square test and the McNamer test were less than 0.05.
- Notably, the treatment group's adjusted residual of "very strongly" was significantly positive (5.8).
- Of 25 CLH residents matched to control group residents with little or no sense of belonging to their neighbourhood, 22 (88%) had such a sense to their own CLH community.

'belong' analysis Treatment A: CLH participants

Table F47: Chi-square test

		Very strongly	*Fairly strongly*	*Not very strongly*	*Not at all strongly*	
control	Count	37	61	42	7	147
	%	25.2%	41.5%	28.6%	4.8%	100.0%
	Adjusted Residual	1.0	0.1	0.4	-2.3	
treatment	Count	30	60	39	18	147
	%	20.4%	40.8%	26.5%	12.2%	100.0%
	Adjusted Residual	-1.0	-0.1	-0.4	2.3	
	Count	67	121	81	25	294
	%	22.8%	41.2%	27.6%	8.5%	100.0%

Table F48: McNemar test

			treatment group		
			strongly	***not (at all) strongly***	***total***
control group	strongly	Count	63	35	98
		% (row)	64.3%	35.7%	100.0%
		% (column)	70.0%	61.4%	66.7%
	not (at all) strongly	Count	27	22	49
		% (row)	55.1%	44.9%	100.0%
		% (column)	30.0%	38.6%	33.3%
	total	Count	90	57	147
		% (row)	61.2%	38.8%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F49: Statistical significance in distributional difference between the two groups

		Value	***df***	***Sig. (2-sided)***
Chi-square Test	Pearson Chi-square	5.691a	3	0.127
McNemar Test				0.374

'belong' analysis **<u>Treatment B</u>: CLH residents**

Table F50: Chi-square test

		Very strongly	*Fairly strongly*	*Not very strongly*	*Not at all strongly*	
control	Count	14	37	20	5	76
	%	18.4%	48.7%	26.3%	6.6%	100.0%
	Adjusted Residual	-5.8	3.0	3.0	1.2	
treatment	Count	49	19	6	2	76
	%	64.5%	25.0%	7.9%	2.6%	100.0%
	Adjusted Residual	5.8	-3.0	-3.0	-1.2	
	Count	63	56	26	7	152
	%	41.4%	36.8%	17.1%	4.6%	100.0%

Table F51: McNemar test

			treatment group		
			strongly	*not (at all) strongly*	*total*
control group	strongly	Count	46	5	51
		% (row)	90.2%	9.8%	100.0%
		% (column)	67.6%	62.5%	67.1%
	not (at all) strongly	Count	22	3	25
		% (row)	88.0%	12.0%	100.0%
		% (column)	32.4%	37.5%	32.9%
	total	Count	68	8	76
		% (row)	89.5%	10.5%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F52: Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. (2-sided)*	
Chi-square Test †	Fisher's Exact	34.883	3	0.000	***
McNemar Test				0.002	***

C2 chat

Question: How often do you chat to your neighbours, more than just to say hello? (on most days to never)

For PARTICIPANTS

- The chi-square test shows a significant difference between CLH participants and the control group. This was mainly from the proportion responding "less than once a month or never". With respect to two choices ("once a week or more" and "or less"), there were no significant differences.

For RESIDENTS

- There was a significant distributional difference between the treatment and control groups. The significance levels in the results of the chi-square test and the McNamer test were less than 0.05.
- Notably, the treatment group's adjusted residual of "once a week +" was significantly positive (6.5).
- All 35 CLH residents matched to control-group individuals with no weekly conversations with their neighbours, chatted with their fellow residents once a week or more.

'chat' analysis Treatment A: CLH participants

Table F53: Chi-square test

		once a week+	*once a month+*	*less frequently / never*	
control	Count	89	33	27	149
	%	59.7%	22.1%	18.1%	100.0%
	Adjusted Residual	2.0	0.6	-2.8	
treatment	Count	72	29	48	149
	%	48.3%	19.5%	32.2%	100.0%
	Adjusted Residual	-2.0	-0.6	2.8	
	Count	161	62	75	298
	%	54.0%	20.8%	25.2%	100.0%

Table F54: McNemar test

			treatment group		
			less frequently	*once a week +*	*total*
control group	less frequently	Count	33	27	60
		% (row)	55.0%	45.0%	100.0%
		% (column)	42.9%	37.5%	40.3%
	once a week +	Count	44	45	89
		% (row)	49.4%	50.6%	100.0%
		% (column)	57.1%	62.5%	59.7%
	total	Count	77	72	149
		% (row)	51.7%	48.3%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F55: Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. (2-sided)*	
Chi-square Test †	Fisher's Exact	7.936	2	0.020	**
McNemar Test				0.057	

'chat' analysis **Treatment B: CLH residents**

Table F56: Chi-square test

		once a week+	*once a month+*	*less frequently / never*	
control	Count	41	17	18	76
	%	53.9%	22.4%	23.7%	100.0%
	Adjusted Residual	-6.5	4.4	4.2	
treatment	Count	75	0	1	76
	%	98.7%	0.0%	1.3%	100.0%
	Adjusted Residual	6.5	-4.4	-4.2	
	Count	116	17	19	152
	%	76.3%	11.2%	12.5%	100.0%

Table F57: McNemar test

			treatment group		
			less frequently	*once a week +*	*total*
control group	less frequently	Count	0	35	35
		% (row)	0.0%	100.0%	100.0%
		% (column)	0.0%	46.7%	46.1%
	once a week +	Count	1	40	41
		% (row)	2.4%	97.6%	100.0%
		% (column)	100.0%	53.3%	53.9%
	total	Count	1	75	76
		% (row)	1.3%	98.7%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F58: Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. (2-sided)*	
Chi-square Test	Pearson Chi-square	42.176	2	0.000	***
McNemar Test				0.002	***

C3 borrow

Question: I borrow things and exchange favours with my neighbours (definitely agree to definitely disagree)

For PARTICIPANTS

- There was a significant distributional difference between the treatment and control groups. The significance levels in the results of the chi-square and McNamer tests were less than 0.05.
- Notably, participants' adjusted residual of "tend to disagree" was significantly positive (2.9).
- Of 78 CLH participants matched to control-group members who were happy to borrow and exchange favours, 55 were reluctant to do so in their locality.

For RESIDENTS

- There was a significant distributional difference between the treatment and control groups. The significance levels in the results of the chi-square test and the McNamer test were less than 0.05.
- Notably, residents' adjusted residual of "definitely agree" was significantly positive (6.2).
- Of 37 CLH residents matched to control group members reluctant to borrow, 34 were happy to borrow things and exchange favours with fellow residents.

'borrow' analysis Treatment A: CLH participants

Table F59: Chi-square test

		definitely agree	*tend to agree*	*tend to disagree*	*definitely disagree*	
control	Count	24	54	29	42	149
	%	16.1%	36.2%	19.5%	28.2%	100.0%
	Adjusted Residual	1.2	2.5	-2.9	-0.6	
treatment	Count	17	34	51	47	149
	%	11.4%	22.8%	34.2%	31.5%	100.0%
	Adjusted Residual	-1.2	-2.5	2.9	0.6	
	Count	41	88	80	89	298
	%	13.8%	29.5%	26.8%	29.9%	100.0%

Table F60: McNemar test

			treatment group		
			agree	*disagree*	*total*
control group	agree	Count	23	55	78
		% (row)	29.5%	70.5%	100.0%
		% (column)	45.1%	56.1%	52.3%
	disagree	Count	28	43	71
		% (row)	39.4%	60.6%	100.0%
		% (column)	54.9%	43.9%	47.7%
	total	Count	51	98	149
		% (row)	34.2%	65.8%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F61: Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. (2-sided)*	
Chi-square Test	Pearson Chi-square	12.071	3	0.007	***
McNemar Test				0.004	***

'borrow' analysis **Treatment B: CLH residents**

Table F62: Chi-square test

		definitely agree	*tend to agree*	*tend to disagree*	*definitely disagree*	
control	Count	15	24	23	14	76
	%	19.7%	31.6%	30.3%	18.4%	100.0%
	Adjusted Residual	-6.2	1.7	4.0	2.5	
treatment	Count	53	15	4	4	76
	%	69.7%	19.7%	5.3%	5.3%	100.0%
	Adjusted Residual	6.2	-1.7	-4.0	-2.5	
	Count	68	39	27	18	152
	%	44.7%	25.7%	17.8%	11.8%	100.0%

Table F63: McNemar test

			treatment group		
			agree	*disagree*	*total*
control group	agree	Count	34	5	39
		% (row)	87.2%	12.8%	100.0%
		% (column)	50.0%	62.5%	51.3%
	disagree	Count	34	3	37
		% (row)	91.9%	8.1%	100.0%
		% (column)	50.0%	37.5%	48.7%
	total	Count	68	8	76
		% (row)	89.5%	10.5%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F64: Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. (2-sided)*	
Chi-square Test	Pearson Chi-square	42.238	3	0.000	***
McNemar Test				0.000	***

C4 key

Question: How comfortable would you be asking a neighbour to keep a set of keys to your home for emergencies, for example if you were locked out? (very comfortable to very uncomfortable)

For PARTICIPANTS

- The chi-square test shows a significant difference between CLH participants and the control group, arising mainly from the proportion of people who said they were "very comfortable". With respect to more fundamental perceptions (comfortable or uncomfortable), there were no significant differences.

For RESIDENTS

- There was a significant distributional difference between the treatment and control groups. The significance levels in the results of the chi-square test and the McNamer test were less than 0.05.
- Notably, residents' adjusted residual of "very comfortable" was significantly positive (6.0).
- All 23 CLH residents matched to control-group members hesitant about leaving a spare door key with neighbours for emergencies, were happy to do so with their fellow residents.

'key' analysis **<u>Treatment A</u>: CLH participants**

Table F65: Chi-square test

		Very comfortable	*Fairly comfortable*	*Fairly uncomfortable*	*Very uncomfortable*	
control	Count	73	33	21	19	146
	%	50.0%	22.6%	14.4%	13.0%	100.0%
	Adjusted Residual	3.1	-1.5	-0.9	-1.4	
treatment	Count	47	44	27	28	146
	%	32.2%	30.1%	18.5%	19.2%	100.0%
	Adjusted Residual	-3.1	1.5	0.9	1.4	
	Count	120	77	48	47	292
	%	41.1%	26.4%	16.4%	16.1%	100.0%

Table F66: McNemar test

			treatment group		
			comfortable	*uncomfortable*	*total*
control group	comfortable	Count	65	41	106
		% (row)	61.3%	38.7%	100.0%
		% (column)	71.4%	74.5%	72.6%
	uncomfortable	Count	26	14	40
		% (row)	65.0%	35.0%	100.0%
		% (column)	28.6%	25.5%	27.4%
	total	Count	91	55	146
		% (row)	62.3%	37.7%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F67 Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. (2-sided)*	
Chi-square Test	Pearson Chi-square	9.678	3	0.021	**
McNemar Test				0.086	

'key' analysis **<u>Treatment B</u>: CLH residents**

Table F68: Chi-square test

		Very comfortable	*Fairly comfortable*	*Fairly uncomfortable*	*Very uncomfortable*	
control	Count	34	20	14	9	77
	%	44.2%	26.0%	18.2%	11.7%	100.0%
	Adjusted Residual	-6.0	3.3	3.9	1.8	
treatment	Count	69	5	0	3	77
	%	89.6%	6.5%	0.0%	3.9%	100.0%
	Adjusted Residual	6.0	-3.3	-3.9	-1.8	
	Count	103	25	14	12	154
	%	66.9%	16.2%	9.1%	7.8%	100.0%

Table F69: McNemar test

			treatment group		
			comfortable	***uncomfortable***	***total***
control group	comfortable	Count	51	3	54
		% (row)	94.4%	5.6%	100.0%
		% (column)	68.9%	100.0%	70.1%
	uncomfortable	Count	23	0	23
		% (row)	100.0%	0.0%	100.0%
		% (column)	31.1%	0.0%	29.9%
	total	Count	74	3	77
		% (row)	96.1%	3.9%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F70: Statistical significance in distributional difference between the two groups

		Value	***df***	***Sig. (2-sided)***	
Chi-square Test	Pearson Chi-square	37.893	3	0.000	***
McNemar Test				0.000	***

C5 collect

Question: If you were ill and at home on your own, and needed someone to collect a few shopping essentials, how comfortable would you feel asking a neighbour to do this for you? (very comfortable to very uncomfortable)

For PARTICIPANTS

- There were no significant distributional differences between the treatment and control groups.

For RESIDENTS

- There was a significant distributional difference between the treatment and control groups. The significance levels in the results of the chi-square test and the McNamer test were less than 0.05.
- Residents' adjusted residual of "very comfortable" was significantly positive (5.9). All but one of the 29 CLH residents matched to control-group members who were reluctant to ask their neighbours to collect their shopping, were happy to do so with fellow residents.

'collect' analysis **<u>Treatment A</u>: CLH participants**

Table F71: Chi-square test

		Very comfortable	*Fairly comfortable*	*Fairly uncomfortable*	*Very uncomfortable*	
control	Count	38	45	32	26	141
	%	27.0%	31.9%	22.7%	18.4%	100.0%
	Adjusted Residual	1.3	-1.0	0.0	-0.2	
treatment	Count	29	53	32	27	141
	%	20.6%	37.6%	22.7%	19.1%	100.0%
	Adjusted Residual	-1.3	1.0	0.0	0.2	
	Count	67	98	64	53	282
	%	23.8%	34.8%	22.7%	18.8%	100.0%

Table F72: McNemar test

			treatment group		
			comfortable	*uncomfortable*	*total*
control group	comfortable	Count	45	38	83
		% (row)	54.2%	45.8%	100.0%
		% (column)	54.9%	64.4%	58.9%
	uncomfortable	Count	37	21	58
		% (row)	63.8%	36.2%	100.0%
		% (column)	45.1%	35.6%	41.1%
	total	Count	82	59	141
		% (row)	58.2%	41.8%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F73: Statistical significance in distributional difference between the two groups

		Value	*df*	*Sig. (2-sided)*
Chi-square Test	Pearson Chi-square	1.881	3	0.604
McNemar Test				1.000

'collect' analysis **Treatment B: CLH residents**

Table F74: Chi-square test

		Very comfortable	*Fairly comfortable*	*Fairly uncomfortable*	*Very uncomfortable*	
control	Count	24	23	17	12	76
	%	31.6%	30.3%	22.4%	15.8%	100.0%
	Adjusted Residual	-5.9	2.3	3.4	2.8	
treatment	Count	60	11	3	2	76
	%	78.9%	14.5%	3.9%	2.6%	100.0%
	Adjusted Residual	5.9	-2.3	-3.4	-2.8	
	Count	84	34	20	14	152
	%	55.3%	22.4%	13.2%	9.2%	100.0%

Table F75: McNemar test

			treatment group		
			comfortable	***uncomfortable***	***total***
control group	comfortable	Count	43	4	47
		% (row)	91.5%	8.5%	100.0%
		% (column)	60.6%	80.0%	61.8%
	uncomfortable	Count	28	1	29
		% (row)	96.6%	3.4%	100.0%
		% (column)	39.4%	20.0%	38.2%
	total	Count	71	5	76
		% (row)	93.4%	6.6%	100.0%
		% (column)	100.0%	100.0%	100.0%

Table F76: Statistical significance in distributional difference between the two groups

		Value	***df***	***Sig. (2-sided)***	
Chi-square Test	Pearson Chi-square	36.607a	3	0.000	***
McNemar Test				0.000	***

G: References

G1: References for literature review

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