

Article

Home Use and Experience during COVID-19 in London: Problems of Housing Quality and Design

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Abstract: COVID-19 lockdowns led to a reassessment of housing conditions and created greater awareness of their impact on wellbeing and inequalities. Changes in home use and lived experience during the pandemic were studied through a survey of London residents (n = 1250) in 2021, focusing on issues of housing design, perceptions of housing quality, and future housing expectations. The survey found that a quarter of all dwellings and at least one room in a third of homes were deemed too small and failing to meet the needs of occupants. Renters with a shortage of space and poorly maintained or designed homes suffered most. A total of 37.9% of respondents reported that their wellbeing was affected by housing conditions. While for well-designed homes aspects of dwelling size were considered the highest priority, dwelling layout, usability, adaptability, and flexibility were equally key concerns. However, how problems of housing design, quality, and size are understood often depends on highly individual experiences and expectations. By highlighting the importance of lived experience, the pandemic shows the limitations of current, normative design standards. Future space standards need greater flexibility in the distribution of floor areas and should consider a wider range of home uses to ensure more equitable and long-term housing provision.

Keywords: COVID-19; home use; housing design; housing quality; housing expectations; London



Citation: Jacoby, S.; Alonso, L. Home Use and Experience during COVID-19 in London: Problems of Housing Quality and Design. *Sustainability* **2022**, *14*, 5355.

<https://doi.org/10.3390/su14095355>

Academic Editors: Yupeng Wang, Liyang Fan, Shi-Jie Cao and Xilian Luo

Received: 24 March 2022

Accepted: 21 April 2022

Published: 29 April 2022

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1. Introduction

Housing problems in England were rife before the COVID-19 pandemic. Almost a third of all households (32%) suffered in 2016/2017 from at least one of three major housing problems: overcrowding, affordability, and poor-quality housing [1]. With homes widely recognised as constitutive to public health and wellbeing [1–6], minimum housing and planning conditions are safeguarded by standards and regulations issued by the UK Government [7–10]. The requirements set out in documents such as the Decent Home Standard (2006), Nationally Described Space Standard (2015), or the Building Regulations are key criteria for housing stakeholders and policymakers to assess whether housing is of sufficient quality. Internal housing conditions are widely accepted as a key characteristic of decent homes, along with tenure security, affordability, and area characteristics [11].

While the UK Government often measures the design and quality of new subsidised housing against the recommendations of the National Design Guide (2021) and the Building for a Healthy Life toolkit (2020)—in addition to space standards—these are only general design principles related to issues of health, wellbeing, place, and environment. In contrast, detailed design standards that define housing quality are primarily found in the private sector and are voluntary. For example, the National House Building Council (NHBC) Standards, which are largely concerned with the quality of construction, provide specific technical build requirements and performance standards. The Home Quality Mark by the Building Research Establishment (BRE) gives specific and quantifiable housing quality and performance indicators related to expected running costs, health and wellbeing benefits, and the environmental footprint of a home. Design aspects focus especially on issues of indoor environmental comfort. Similarly, the BREEAM (Building Research Establishment's

Environmental Assessment Method) Domestic Refurbishment certification scheme uses a performance-based assessment of the environmental impact of renovated housing. Its assessment criteria of the design and quality of the indoor environment are consistent with a traditionally greater focus on the relationship between health or wellbeing and environmental comfort, including visual and thermal comfort, air quality, and acoustic performance, but also accessibility and privacy.

However, the evidence and indicators used to determine housing quality, due to the very nature of performance-based standards, are generalisations that cannot take into account the wide and subjective range of how occupants themselves experience environmental comfort or dwelling size. Thus, performance indicators used in building rating schemes such as BREEAM do not guarantee greater user satisfaction as this can significantly depend on design aspects such as the proximity to windows, the spatial layout, or the psychological effect of having control over one's environment [12]. This paper discusses some of the effects that design aspects such as layout, room size, and spatial aspects can have on user satisfaction, housing quality, and health or wellbeing benefits.

Although the relation between poor-quality housing and lived experience has been studied [13], the diverse meanings of housing quality and wellbeing are insufficiently discussed. The COVID-19 pandemic and lockdowns especially have brought the importance of housing design and quality to wellbeing to the fore, as well as significant differences in experience. It has presented unique spatial challenges to some and changed housing preferences and requirements. The impact of this on housing satisfaction, expectations, and needs are studied in the following. Based on an online survey with 1250 London residents conducted in early 2021, this paper discusses how lived experiences and perceptions of housing quality relate to issues of design and use, and how these have affected residents' wellbeing during COVID-19 lockdowns and informed future housing expectations.

The provision of space, in particular dwelling size, is a widely used measure of housing quality and design, with space standards often considered in parallel to issues such as comfort, privacy, utility, and flexibility [10,14–18]. As housing in London is more expensive and older than in most other regions in England or Wales [19], greater problems with housing affordability and quality can be expected. The seven local authorities with the least affordable housing in England and Wales in 2020 were in London [20]. More than half (56%) of London's housing was built before World War II [21], which means a need for regular modernisation and maintenance. Much of the old housing stock has also been converted, with a quarter of flats in London created by subdividing houses [22], which tend to be less efficiently planned, have lower building regulation standards, and are not required to meet space standards. In addition, significant shortcomings in the size and quality of housing built from the 1980s to 2010s have been found across all sectors, particularly in London [7,23–27]. In fact, housing audits by the Commission for Architecture and the Built Environment estimate that 29% of new homes should not have been granted planning permission due to low design quality [28].

The pandemic has exacerbated existing structural housing inequalities by forcing many to spend more time at home, especially exposing issues around insufficient indoor and outdoor space. Problems in accessing affordable and decent homes have led to new mental health and wellbeing problems, marginalised vulnerable populations, and increased housing precarity [29–31]. An estimated 31% of adults in Britain experienced mental or physical health problems due to their housing conditions during the first lockdown in March 2020, with over 10% feeling depressed because of insufficient dwelling space [32]. A survey in June 2020 found a significant decline in mental health, particularly in women, people with disabilities and pre-existing mental health problems, social housing tenants, and frontline workers, with over half (52%) of social housing tenants reporting poor to very poor mental health that had worsened during COVID-19 [2]. According to the Household Resilience Study [33], scores for life satisfaction and happiness declined and anxiety increased across all tenures during COVID-19, but owner occupants gave overall higher wellbeing scores than those renting. This all reinforces evidence that a lack of space

directly affects health and wellbeing [32,34], with the impact highest in the social rented sector but rising fastest in private rented housing [35]. Adding to pre-existing housing failures, the pandemic has thus created an urgency to review problems of housing quality and consider the wider implications of housing design standards.

Many housing design policies in England were historically contingent and intended to solve relatively immediate problems [36,37]. Throughout the last century, government-commissioned housing reports by the Tudor Walters Committee (1918), Dudley Committee (1944), and Parker Morris Committee (1962) aimed to rationalise and regulate the design of postwar public housing by defining space standards. In this process, generalisations of social norms, household composition, and housing contexts around the nuclear family have determined space standards specifically and design standards more generally. This has often limited the consideration of more diverse needs, subjective lived experiences, and individual uses of the home, such as accessibility, shrinking households, and changing cultural experiences, and delayed wider changes to housing space and design. For example, accessible housing design standards were only formally adopted in England by the Building Regulations in 2015 (as a voluntary standard), after increasing pressure to deliver more inclusive design in housing, which also acknowledged a growing ageing population and changes in the understanding of housing quality through lived experience [38].

By bringing the importance of lived experience to the fore, COVID-19 can potentially foster a shift in housing policy and design standards. At moments when habits are changing, opportunities to ‘renegotiate ways of doing things’ arise, along with greater receptiveness to new evidence that can inform different choices [31,39].

With the pandemic having increased housing inequalities but also opportunities for change, it is a critical moment to reflect on the suitability of current housing provision and future needs. Overnight, traditional divisions between living, working, studying, exercising, leisure, and play that informed many past housing choices came abruptly to an end. With all typical and necessary daily activities confined to the home, this created a greater awareness of how important the quality, design, and size of dwellings is to both physical and mental wellbeing, but also that how these factors relate is experienced and perceived subjectively. A change in home use has thus led to a re-assessment of housing expectations, including views on long-term home use, demand, and provision, while reinforcing the need for equitable access to housing, environmental comfort, amenities, and outdoor space. In particular, demands for more flexible space to meet a plethora of emerging working, learning, leisure, and privacy needs have arisen.

In this context, the main question explored is: How has COVID-19 affected the use and experience of homes? This question is linked to a series of sub-questions around the satisfaction with a home, the criteria used to assess housing quality and design, and the determinants of housing expectations. Unlike other studies, this paper is particularly interested in how experiences of COVID-19 at home relate to issues of housing design and how this informs the understanding of housing quality. By analysing the impact of the pandemic on home use and experience and associated effects on housing expectations, this paper aims to clarify the definition of housing quality and design. From this, insights into how occupants evaluate the functionality and usability of their homes are drawn, which can contribute to discussions on how to improve space standards and design controls.

2. Methods

Data were collected through an online survey with residents living in the Greater London area. The survey took place from 2 March to 25 April 2021, when the third national COVID-19 lockdown in England that had started on 6 January 2021 was beginning to ease. From 8th of March, some face-to-face education and outdoor recreation or exercise with a household or support bubble was permitted; from 29 March, outdoor gatherings by up to 6 people or 2 households was possible, outdoor sports facilities opened, and the ‘stay at home’ guidance ended; and from 12 April, non-essential retail opened, and hospitality venues began to serve people outdoors again. Thus, when the survey took place, many

Londoners were hopeful that lockdown restrictions would be fully lifted soon, leading to a relative return to pre-COVID conditions.

A total of 1000 respondents were recruited by 22 March through the online panel provider FindOutNow. The remaining respondents were recruited in parallel using the social media accounts of the School of Architecture at the Royal College of Art (Facebook, Instagram, and newsletters). At the time of the survey, respondents had experienced almost three full national lockdowns and could reflect on this in their responses. However, as no comparable data were collected prior to COVID-19, there are some limitations in determining to what extent certain likes or dislikes about the homes might have existed prior to the pandemic.

The survey consisted of 47 questions that were thematically grouped into questions about the dwelling and survey respondent context, the provision and layout of a dwelling, indoor comfort, dwelling design, the experience of the home and its use during COVID-19, and future housing expectations (Table 1). The questions used a mix of multiple choice and open questions to which respondents could give free answers, and a 7-point Likert scale (Table 1). A comparable approach to measuring the perception and satisfaction of indoor environments is used by the Center for the Built Environment's (CBE) Occupant Survey [40].

Generally greater emphasis was given in the survey to differences in space provision and use than demographic or household variations, as these are more directly related to aspects of design and design controls. While questions about age and household type were asked, economic data were limited, with no information on household incomes collected that would have permitted a comparison between economic and housing quality factors (Table 1). Housing satisfaction instead was studied in relation to user needs and housing quality, which were discussed through issues of dwelling provision and size and dwelling design in relation to use and home experience. These interrelated aspects were also seen as defining how housing expectations are determined.

Table 1. Survey questions (abbreviated and thematically grouped).

Survey Questions	Multiple Choice	Open Question	Likert (7-Point)
Dwelling and respondent context:			
- Location (partial postcode)?		X	
- How long have you lived in your home?	X	X	
- Time spend at home on a typical day during and before COVID (respondent and household)?	X		
- Age group of the respondent?	X		
- Household type?	X		
- Do you own or rent your current home?	X		
- Are you willing to share photos or plans of dwelling (upload option)?	X		
Dwelling provision and layout:			
- House or flat; what kind of house/flat?	X	X	
- Number of dwelling and building floors?	X	X	
- Total number of bedrooms and bedspaces; number used for sleeping?	X		
- Living room used for sleeping?	X		
- Internal dwelling size?	X		
- How do you feel about your dwelling size			X
- Has this changed during COVID?	X		
- Which rooms are (if any) too small; why are they too small?	X	X	
- Access to outdoor spaces?	X	X	

Table 1. Cont.

Survey Questions	Multiple Choice	Open Question	Likert (7-Point)
Indoor comfort:			
- Is the home interior comfortable (natural light, heating, ventilation and air quality, noise)?			X
- Any specific problems with interior comfort?		X	
Dwelling design:			
- What space does the entrance door lead to?	X	X	
- Kitchen, living, and dining room arrangement?	X	X	
- How well do you feel your home is designed?			X
- 3 things you like and dislike about the design of your home (in order of importance)?	X	X	
- 3 things most important in a well-designed home (disregarding your own)?	X		
Dwelling experience and use:			
- Does your current home meet your needs?			X
- How could your home be improved to better meet your needs?		X	
- Was having more than one floor beneficial during the pandemic?	X		
- How important is access to an outdoor space?			X
- Has COVID-19 changed how home is used during a typical day?	X		
- What are the changes (describe activities, where and when they take place)?		X	
- Do you consider these changes temporary?	X		
- Have you changed the furniture layout or bought furniture to accommodate changes in use?	X		
- If so, what furniture changes were made and in which room?		X	
- Has dwelling size or quality affected your wellbeing during COVID-19; if so, how?	X	X	
- Has COVID affected your home or life at home in any other ways you want to tell us about?		X	
Future housing expectations:			
- Has COVID-19 made you consider moving home; if so, why?	X	X	
- What do you look for in your next home (list of priorities)?		X	

Note: The theme of grouped questions is indicated in bold. Where both multiple choice and open question is indicated, a free field for the response was offered. Most questions offered an opt-out to providing a response.

A total of 1613 surveys were started. Incomplete surveys or those with inconsistent responses to questions were removed, leaving 1250 valid surveys. These were analysed using SurveyMonkey's analytical and reporting tools. Responses to the 9 open questions were in addition coded using keywords and shared phrases to match thematically grouped and most common replies.

Participants did not receive compensation for their survey participation; however, FindOutNow offers a free daily prize draw to those taking part in the surveys they promote.

Based on the SurveyMonkey sample size calculator and a London population of 9,002,488 [41], 1250 surveys equate to a 95% confidence level and a 2.8% margin of error. As further detailed below, the sample was overall consistent with available estimates on the distribution of household and property types [42,43], and therefore no weighting adjustment was used.

3. Results

Of the 1250 survey respondents, 39.1% came from the outer and 60.9% the inner London postal region, with 19.5% living within the Transport for London's Zone 1. Respondents were evenly distributed across the age groups from 25 to 64 years (the 25–34 group

made up 20%; 35–44, 20.7%; 45–54, 21.2%; and 55–64, 19%), but the youngest (18–24, 3.0%) and oldest (65+, 14.4%) were less represented.

Most respondents were part of a family household, with less than half (44.6%) living with a partner or spouse and almost another third (29.2%) with children (20.2% dependent and 9% non-dependent). Around every sixth household with a child was a single-parent family. Other respondents shared a household with an unrelated adult (9.1%) or with family members other than their child (14.2%). The distribution found in the survey is generally consistent with UK-wide household data by the Office for National Statistics. In comparison, one-person households are under-represented in the survey at 19.7% of all respondents, as UK-wide 29.5% of households in 2021 were made up of just one person [42].

The number of respondents living in a house (50.1%) or flat (49.9%) was almost the same (Table 2). This roughly corresponds to council tax data from 2018 showing that 54% of dwellings in London were flats [43]. Almost half (49.6%) of the respondents had lived in their homes for more than 10 years and another 16.4% for 5–10 years. This was followed by 19.4% who had stayed in their property between 2 to 4 years and those that had been there only a year or less (13.4%). Those in a house tended to have been there longer (57.9% for over 5 years). Similarly, most owner occupants, who made up just over half of participants (51.3%), had lived in their place comparatively longer: 56.2% for more than 5 years and 45% for more than 10 years.

Table 2. The number of dwelling storeys, bedrooms, and bedspaces according to house or flat types (including number of living rooms used as bedrooms).

Storeys (s)		Bedrooms (b)			Bedspaces (bs)			Livingroom = Bedroom ⁵		
# (s)	n =	# (b)	Used (%)	Average #	Middle 50%	# (bs)	Used (%)		Average #	Middle 50%
Terraced houses (n = 302)										
2	216	604	71.7	2.8	2.0–3.0	990	62.2	4.6	4.0–5.0	3
3+	86 ¹	319	60.8	3.7	3.0–4.0	528	52.8	6.2	5.0–7.0	3
Semi-detached houses (n = 238)										
≤2	193 ²	607	72.5	3.2	3.0–4.0	1003	62.3	5.2	4.0–6.0	12
3+	45	178	75.8	4.0	4.0–4.0	281	64.8	6.5	6.0–7.0	2
Detached houses (n = 76)										
1	12	27	66.7	2.7	2.0–3.0	39	61.5	4.3	2.0–4.0	-
2	51	187	61.5	3.7	3.0–4.0	317	54.6	6.2	5.0–7.0	1
3	13	51	61.4	4.4	4.0–5.0	100	55.0	7.7	6.0–10.0	-
Purpose-built flats (n = 410)										
1	338	563	86.0	1.7	1.0–2.0	972	71.2	3.0	2.0–4.0	34
2+	72 ³	176	82.4	2.5	2.0–3.0	286	71.7	4.1	3.0–5.0	2
Converted flats (n = 219)										
1	156	239	89.5	1.5	1.0–2.0	436	70.6	2.8	2.0–4.0	23
2+	63 ⁴	141	80.9	2.3	2.0–3.0	239	60.7	3.9	3.0–4.0	6

Notes: ¹ Includes 7 at 3+ floors; ² includes 3 at 1 floor; ³ includes 6 at 3+ floors; ⁴ includes 7 at 3+ floors; ⁵ living rooms used as bedrooms.

Differences in housing typology and tenure have an impact on potential overcrowding, as indicated by households using the living room for sleeping (Table 2). For the 65 cases found in flats, which included 27 studios, all used their bedrooms for sleeping, with 85.6% renting and 60% stating that their homes were too small. These respondents were equally distributed between the ages of 25 to 64 (91%) and came from a smaller household (41.5% from a one-person household, 23% living with a partner/spouse, 18% with children or relatives, and 12% with unrelated adults). In comparison, for the 21 cases in houses, 62% used all available bedrooms, with 62% owning their place and only 14.3% feeling that their homes were too small. These respondents were comparatively younger (39% between 25–34 years old) or older (26% above 64 years old) and came from slightly larger households

(48% living with a partner/spouse, 56% with children or relatives, and 22% with unrelated adults). In some houses, sleeping in living rooms is more likely to occur due to accessibility problems than a lack of bedrooms, as they are normally located on the upper floors.

Houses also had an average under-occupancy rate of 30.8% and flats of 14.5% when comparing the total number of bedrooms in a dwelling to those used for sleeping, or 40% and 30.2%, respectively, when comparing bedspaces (counted as one per single and two per double or twin room). At the same time, only five survey respondents reported more occupants than bedspaces in a dwelling, a clear sign of overcrowding. However, the survey did not collect all the age, gender, and relationship data of all occupants needed to fully assess overcrowding. Statutory overcrowding, as defined by the Housing Act 1985, is also increasingly considered to be an insufficient measure that underestimates the problem [9,44]. Generalising, large, terraced houses have the lowest occupancy rates and small flats have the highest (Table 2). Yet occupancy rates range widely, even when simply comparing the number of bedrooms to the number of occupants, and indicate overall high levels of under-occupancy (Table 3).

Table 3. Bedrooms (b) and persons (p) per dwelling.

	1p	2p	3p	4p	5p	6p	7p	8p	10p	Undeclar	Total
1b	132	104	1	2	-	-	-	-	-	2	241
2b	58	172	106	45	-	1	-	-	-	8	390
3b	22	99	126	109	30	7	-	-	-	3	396
4b	5	26	31	47	25	14	4	1	-	3	156
5b+	3	6	8	14	10	8	1	2	1	1	55

Notes: b = bedroom; p = person. Twelve respondents did not declare the number of bedrooms or occupants.

3.1. Design and Quality of Homes

Dwellings are largely organised around a corridor or hall leading to an entrance door (78.9%), with a small number directly entered through a room or living area (7.7%). Having a separate kitchen, living, and dining room is the most common internal arrangement (40.5%)—even if these rooms might be connected by openings (not doors)—followed by a combined living-dining room with a separate kitchen (25%), and kitchen-diner with a separate living room (17.8%). The combination of living-dining-kitchen (16.6%) exists in both very large and small dwellings, with roughly a third each distributed across units with one, two, and three or more bedrooms. For example, it can be found in an open-plan layout resulting from extending a house at the ground-floor level as well as sub-standard conversions or small purpose-built studios.

3.1.1. Environmental Comfort

When asked about how comfortable their home is, measured against standard environmental aspects, the great majority was at least moderately and around one third very satisfied with the levels of natural light, heating, ventilation and air quality, and noise (Figure 1). However, 33% (n = 413) of all survey respondents replied further to a contingency question about specific environmental problems they experienced. Among the issues related to natural light (34%) was a lack of or too small windows (7.3%), blocking of light by structures and trees (5.3%), and building orientation (3.6%). Heating was a problem for 41.9% and was largely caused by poor heat distribution and retainment due to inadequate thermal insulation and draught proofing (15.7%) or insufficient and not properly working heating systems (17%). More commonly reported ventilation and air quality issues affecting 35.1% were lacking cross ventilation and operable windows (5.6%) and background or mechanical ventilation (2.9%), leading to damp, mould, and condensation problems (6.8%). In addition, external factors such as air pollution (7.7%) and smells (2.2%) were mentioned by a small number. However, the most common complaint, by almost three-quarters of respondents (74.1%), was about noise. This was especially a problem in flats (48.4%), with complaints split between noisy neighbours (30.3%) and external noise pollution from roads and planes (28.8%).



Figure 1. Comfort in home interior based on environmental factors.

Respondents not satisfied with their indoor comfort levels (score 1–3) were predominantly 25–54 years old (69.5%), lived with a partner/spouse (35.5%) or on their own (24%), and rented (64%). At the same time, those moderately satisfied (score 4) were also mainly 25–64 years old (83%), lived with a partner/spouse (42.5%) and/or children (26%) or on their own (20.5%), and rented (54%). In comparison, respondents fully satisfied (score 5–7) were more even distributed in their age (from 25–65+ years old), lived with a partner/spouse (46%) and/or with children (29%) or a in one-person household (18.5%), and had higher rates of home ownership (50%).

3.1.2. Design

Asked to assess if their homes meet their needs and how this might relate to the dwelling design, almost half of all respondents believed that their needs were more than adequately met (Figure 2). However, around a sixth felt that this was inadequate and only every eighth home met the needs of its occupants completely. Similarly, less than one in nine considered their home very well designed. This indicates a sizable number of homes with potentially significant problems.

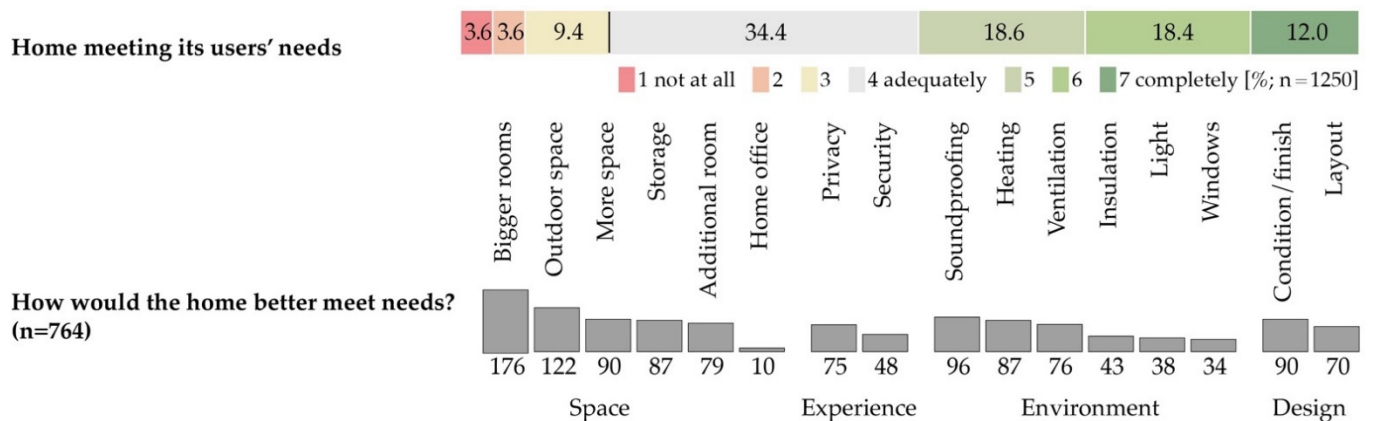


Figure 2. The home and user needs.

A total of 61.1% (n = 764) of survey respondents listed a wide range of needs and issues that limited the usability of their homes (Figure 2). The greatest number of these replies (46.2%) related to dwelling or property size. Almost a quarter wanted bigger rooms, including more living space (11.4%). Every tenth required at least one additional room, often for use as a toilet, bathroom, or bedroom. Around every twelfth needed a bigger home or generally more space and storage. A small number wanted a separate space for homeworking. Many also mentioned access to any or more open space (16%), particularly gardens and balconies (to flats). Also related to dwelling size was the request for greater privacy (9.8%), which was often associated with perceptions of security (6.3%).

While increasing space is generally impossible or requires long-term planning and substantial investment, many suggested needs and improvements related to resolvable issues around maintenance and the upgrading of homes to increase environmental comfort

(30.6%). More soundproofing (12.6%) was a recurrent demand, followed by around a tenth having issues with heating and ventilation (about half of this with thermal insulation), then natural light, and a small number wanting more, larger, and insulated windows (4.5%). This was often linked to complaints about the state of repair, lack of modernisation, and poor-quality materials, finishes, and detailing (11.8%). Finally, the need for better planning and design of homes to improve the layout and usability of existing space was raised by 9.2% of respondents.

Although only 17.5% of all survey respondents found the design of their home inadequate, many more were unhappy with specific aspects (Figure 3). Questioned about the three things they liked or disliked about their home’s design in order of importance (Figure 3), the five most often mentioned positive features related to room size (28.5%), outdoor space (41.8%), dwelling size (28.5%), internal layout (27.4%), and privacy (24.7%). The five least liked aspects were a lack of storage (40.7%), noise (26.2%), general state of repair (24.9%), quality of interior finishes and materials (19.9%), and the size of rooms (19.5%). Replies are thus inconsistent when compared and point to diverse understandings of housing conditions, expectations, and needs that inform individual responses.

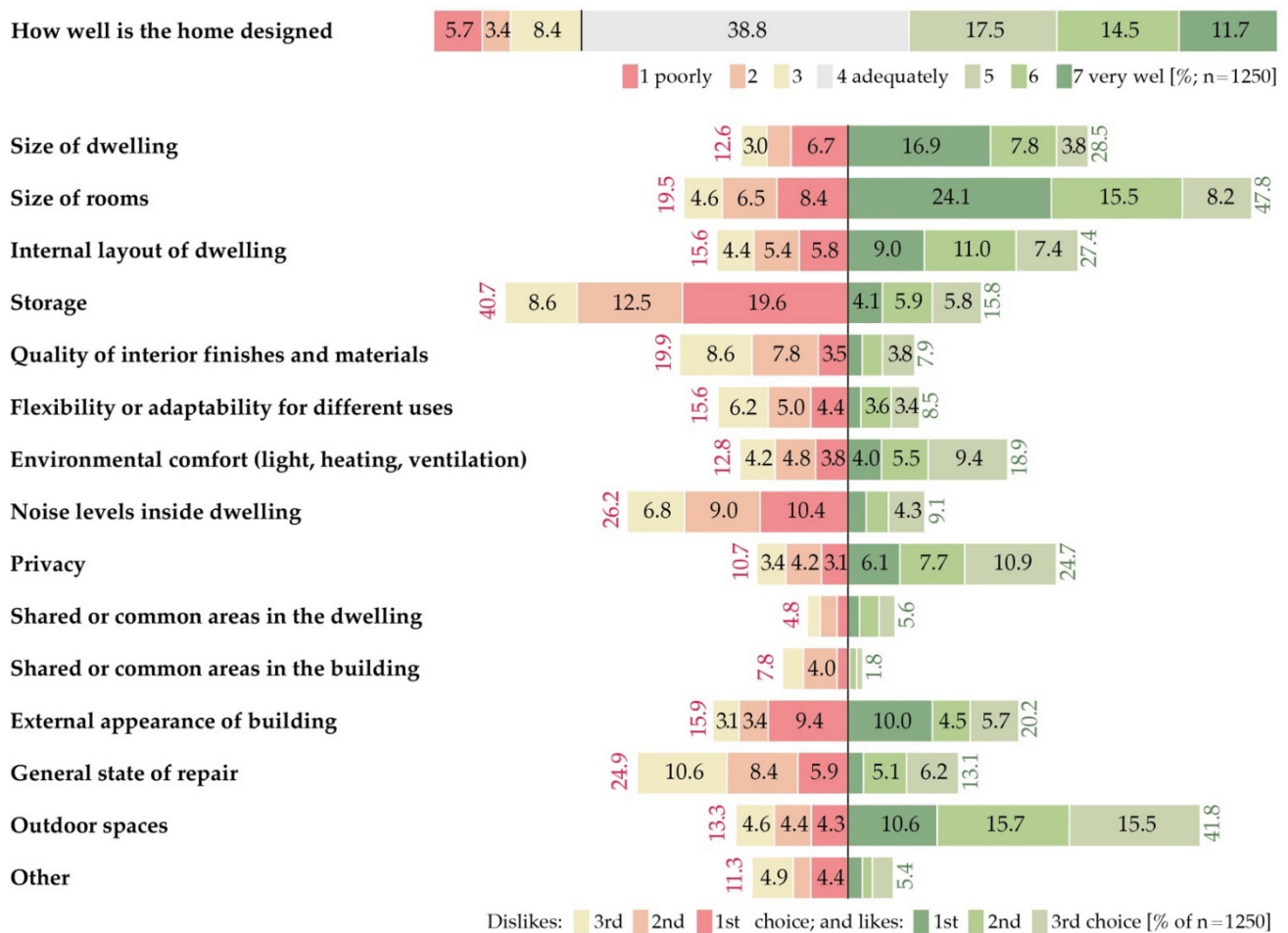


Figure 3. How well is the home designed and likes and dislikes about the design of the home.

Those with negative views on how their homes were designed and feeling that their homes did not meet their needs came mostly from the age groups of 45–54 (29%) and 25–34 (21%), who lived on their own (29%) or with a partner/spouse (28%), and rented (66%), while those overall satisfied were quite evenly distributed across the age groups from 25 to 64 years old (79%), lived with a partner/spouse (48%), and owned their home (54%).

To contextualise the perception and experience of housing design, respondents were asked what they considered important in a well-designed home, to which 89% (n = 1113) replied. In order of priority and considering only the first criteria, the top five were dwelling size (25.2%), room size (16.2%), light (13.7%), layout and design (12.8%), and outdoor space (5.9%). However, considering all the replies (up to three per respondent), at 41.2% the layout and design of dwellings was the most frequent answer (Table 4).

Table 4. The most important aspects of a well-designed home.

Criteria for Well-Designed Homes	First Criteria		Second Criteria		Third Criteria		Total n =
	n = 1113	%	n = 1097	%	n = 1079	%	
Layout/design	142	12.8	160	14.6	157	14.6	459
Dwelling size	281	25.3	84	7.7	73	6.8	438
Light	152	13.7	176	16.0	88	8.2	416
Outdoor space	66	5.9	114	10.4	197	18.3	377
Room size	180	16.2	93	8.5	64	5.9	337
Storage	46	4.1	105	9.6	91	8.4	242
Privacy	43	3.9	65	5.9	69	6.4	177
Quality of materials/maintenance	36	3.2	46	4.2	75	7.0	157
Sound insulation	26	2.3	47	4.3	61	5.7	134
Heating	30	2.7	50	4.6	42	3.9	122
Kitchen	47	4.2	35	3.2	19	1.8	101
Environmental comfort	35	3.1	33	3.0	22	2.0	90
Ventilation	24	2.2	26	2.4	28	2.6	78
Thermal insulation	14	1.3	23	2.1	23	2.1	60
Location	12	1.1	15	1.4	29	2.7	56
Energy efficiency, sustainability	11	1.0	13	1.2	23	2.1	47
Bedroom	14	1.3	12	1.1	13	1.2	39
Living room/space	15	1.4	10	0.9	12	1.1	37
Bathroom/WC	14	1.3	3	0.3	20	1.9	37
Security	11	1.0	9	0.8	11	1.0	31
Accessibility	15	1.4	7	0.6	7	0.7	29
Parking	3	0.3	8	0.7	13	1.2	24
Windows	6	0.5	7	0.6	10	0.9	23
Safety	8	0.7	8	0.7	5	0.5	21
Ceiling height	4	0.4	5	0.5	6	0.6	15

3.2. Dwelling Size

The survey shows that different aspects of dwelling size in relation to individual needs and usability are of great importance to occupants and determine how many assess the design and quality of homes. Alarming, a quarter of dwellings were deemed overall too small (26.8%), and over three-quarters (77%) of respondents found at least one room or area lacking in size for their needs (Figure 4). Responding to the contingency question about which rooms are too small (n = 963), the top three answers were kitchens (46%), storage space (42.8%), and bedrooms (32.3%) (Figure 4). However, the pandemic only affected how 14.2% of all respondents felt about the size of their homes. Of these (n = 178), 68.5% lived in a flat—which two-thirds rented (65.6%)—with 92.6% having changed how they used their

home during the pandemic, 80.3% considering moving, and, importantly, 72.9% stating that the size or quality of their home had affected their wellbeing during COVID-19.

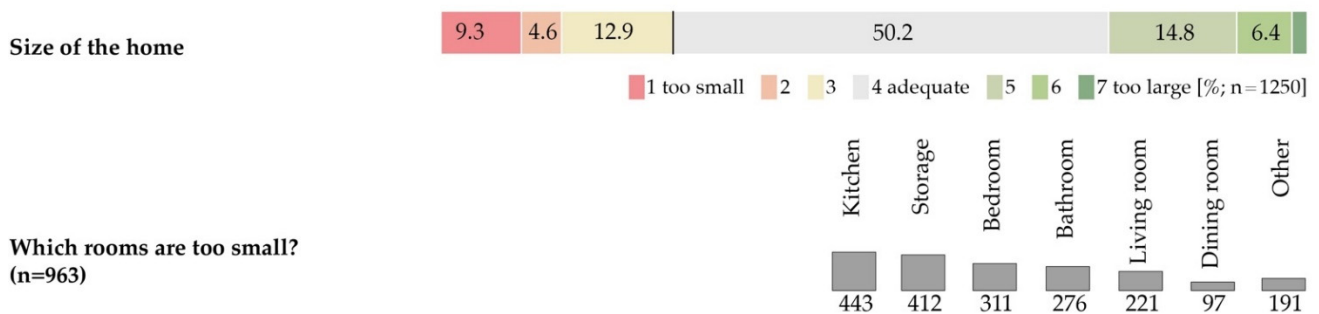


Figure 4. Dwelling and room size.

The profile of those who felt that their home was too small was mostly those who were 35–54 years old (51%), lived with a partner/spouse (40.5%), sometimes with dependent children (25%) or on their own, and rented (55%). Those finding their dwellings size at least adequate or better were equally distributed across the age groups from 25 to 64 (79%), living with partner or spouse (45%) and/or a child or family member (43%), and owned their home (50%). In contrast, those finding their homes too large were older (55 to 65+; 59%), lived just with a partner or spouse (59%), and owned their home (55%).

3.3. COVID-19 Impact on Home Uses and Experiences

COVID-19 not only radically changed the average time spent at home, but also how 67.8% of households used them. According to the survey, respondents spent on average 22–23 h a day at home during the pandemic; indeed, for 61% it was 22 h or more (Figure 5). In comparison, the average time before the pandemic was 13–14 h. As the respondents (n = 617) reported, many changes to activities during a typical day related to homeworking (98.9%) and homeschooling (15.1%) (Table 5). The reply to an open survey question by one of the respondents: ‘there has been someone working or homeschooling in every room apart from the bathroom’ was not uncommon for those living in smaller or fully occupied dwellings. Exercising (9.2%) and more leisure and play activities (7.9%) at home had also noticeably increased, however, these are likely to be underreported, as they were already common daily activities before the pandemic for some.

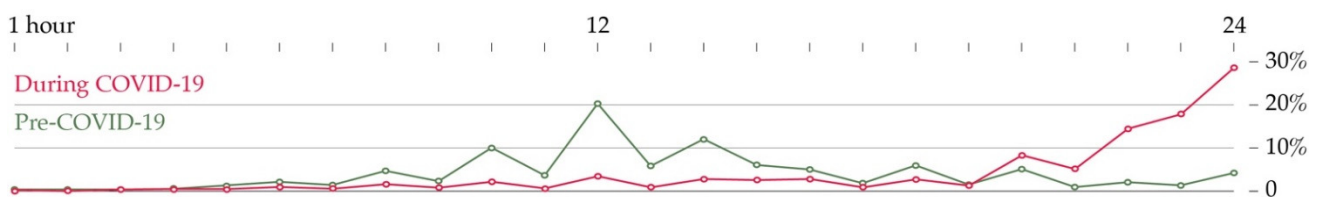


Figure 5. Time spent at home during a typical day.

To accommodate unplanned and sustained new home uses, existing spaces and rooms sometimes had to be adapted, converted, or rearranged. A total of 29.5% of all survey respondents changed their furniture layout or bought new furniture during the lockdowns. Based on replies from respondents (n = 306), the most purchased items were desks or tables (74.2%), chairs (38.3%), furniture for storage (10.1%), IT equipment (8.8%), sofas (5.2%), TVs (3.9%), exercise equipment (3.6%), and beds (2.9%). However, of the 62.1% respondents who had made changes to their home, half (49.9%) considered these temporary and only 14% saw them as permanent. This might be partially explained by the survey taking place when there was great hope for an imminent end to national lockdowns and a return to pre-COVID work conditions.

Table 5. Main changes in home use due to COVID-19.

Activities	First Use		Second Use		Third Use		Total n =
	n = 617	%	n = 368	%	n = 174	%	
Working from home	439	71.6	139	37.8	32	18.4	610
Homeschooling	49	7.9	31	8.4	13	7.5	93
Cooking and eating	15	2.4	34	9.2	27	15.5	76
Exercising	12	1.9	27	7.3	18	10.3	57
Leisure and play activities	14	2.3	25	6.8	10	5.75	49
Shielding, self-isolation	8	1.3	3	0.8	2	1.2	13

The access to, size, and privacy of an outdoor space had an immediate effect on how people could cope with staying more at home. While just less than half (45.7%) of all respondents felt that having more than one floor in their dwelling was beneficial during the pandemic, almost all (97.4%) agreed that access to an outdoor space was important, including 74% who considered it very important. A total of 60.2% had access to a private rear garden or patio, 30% to a private front garden, and 18.2% to a balcony or terrace, while 15.3% could use a shared garden or open green space. Only 13% of dwellings provided none of these.

For many, the intensified use of their homes resulted in diminished privacy and a need to agree on how households could use available spaces. The frequency and duration of activities taking place at home during lockdowns exposed limitations of how dwellings were planned in the past for sharing. For example, as a respondent to an open question explained, measures such as ‘we now calculate cooking times so as not to overcrowd the kitchen’ had to be taken.

The survey found that the size and quality of a home impacted the wellbeing of 37.9% of all respondents during COVID-19, with a further 9.2% being unsure. A quarter (n = 350) gave more detailed replies (Table 6). Many responses were about mental health, health, and wellbeing issues caused by the pandemic (41.1%), using words indicating a lack of space and mobility, such as ‘claustrophobic’, ‘cramped’, ‘cut off’, ‘confined’, ‘trapped’, and ‘imprisoned’. Some also expressed strong negative emotions, such as feeling ‘overwhelmed’, ‘anxious’, ‘stressed’, ‘depressed’, ‘unmotivated’, ‘frustrated’, ‘lonely’, ‘isolated’, and ‘sad’. Physical housing problems were increased by parallel social problems, as feeling isolated and lonely was common as socialising with family and friends was restricted. The pandemic thus evidently exacerbated existing housing inequalities. While one survey respondent said, ‘we love our house, so when school shut, we were fine’, another wrote, ‘horrible, depressing environment—being here makes me suicidal’.

Spending prolonged time at home made some experience shortcomings in dwellings size and flexibility (38.9%), a greater need for privacy and quiet (24.9%), the importance of access to outdoor space (24.9%), and poor housing conditions and design (19.1%) as problems that could seriously affect their wellbeing. However, the pandemic also had positive effects, leading to more socialising and communal activities within a household or ‘support bubble’. For instance, some households spent more time cooking and eating together (6.1%). A total of 25.4% of respondents mentioned positives when asked how dwelling size and quality impacted their wellbeing (Table 6). Positives especially related to having enough space to use homes flexibly while maintaining sufficient privacy (19.7%), the ability to access an outdoor space (13.1%), and the quality and design of a home (8.3%).

Those stating that the dwelling size and quality had an impact on their wellbeing during COVID-19 lockdowns were younger (25–44 years old; 53%), lived with a partner or spouse (45%) and/or a child or family member (39%) or on their own (19%), and rented (52%), whereas those who did not report being affected in their wellbeing by their housing conditions were older (45–65+; 64.5%), lived with a partner or spouse (45%) and/or a child or family member (43.5%) or on their own, and owned their home (55%).

Table 6. Impact of dwelling size and quality on wellbeing.

Aspects	First Response		Second Response		Third Response		Total n =
	n = 350	%	n = 199	n	n = 151	%	
Sufficient space (positive)	55	15.7	9	4.5	5	3.3	69
Access to outdoor space (positive)	21	6.0	20	10.1	5	3.3	46
Housing quality, design (positive)	18	5.1	6	3.0	5	3.3	29
Negative feelings, mental health	92	26.3	31	15.6	21	13.9	144
Not enough space	83	23.7	31	15.6	22	14.6	136
Privacy and noise	35	10.0	27	13.6	25	16.6	87
No access to outdoor space	33	9.4	20	10.1	14	9.3	67
Housing condition and design	14	4.0	25	12.6	28	18.5	67
Working from home	27	7.7	16	8.0	10	6.6	53
Being in same space/same routine	25	7.1	10	5.0	8	5.3	43
Sedentary lifestyle	11	3.1	6	3.0	2	1.3	19

3.4. Future Housing Expectations

A third of all survey respondents (35%) stated that COVID-19 had made them consider moving home. Common reasons are captured by the response: ‘I would like more space and some outdoor space.’ When subsequently asked what they looked for in their next home, the answers of respondents (n = 352) were around more internal space (67.3%) and access to outdoor space (61.1%), referring mostly to private gardens but sometimes also to public or open spaces in the vicinity (Table 7). Another high priority was having more rooms (36.1%), which did not necessarily mean a larger home. Location (32.4%) and the layout, condition, design, and quality as well as the potential to extend or convert a home (29.5%) were also mentioned as important. However, living in central London has become less of a priority and many considered further out locations, as working from home deprioritised workplace proximity. In addition, social space, privacy, and a quiet and bright home were deemed essential, which, as the survey indicates, were often related to problems of homeworking and being able to separate work from living or ‘home’ activities.

Table 7. Criteria for next home.

Criteria	First Criteria		Second Criteria		Third Criteria		Total n =
	n = 352	%	n = 323	%	n = 272	%	
More space	108	30.7	82	25.4	47	17.3	237
Outdoor space	98	27.8	72	22.3	45	16.5	215
More rooms	45	12.8	49	15.2	33	12.1	127
Location	31	8.8	35	10.8	48	17.7	114
Layout/design/quality/condition	18	5.1	31	9.6	55	20.2	104
Social space	22	6.3	33	10.2	26	9.6	81
Privacy	17	4.8	16	5.0	13	4.8	46
Storage	4	1.1	19	5.9	14	5.2	37
Noise/quiet	11	3.1	11	3.4	11	4.0	33
Light	11	3.1	12	3.7	7	2.6	30
Property type (house)	18	5.1	3	0.9	5	1.8	26
Parking	1	0.3	9	2.8	13	4.8	23
Work from home space	6	1.7	10	3.1	4	1.5	20
Accessibility	1	0.3	10	3.1	2	0.7	13

The survey overall suggests a significant rise in demand for larger dwellings with more rooms and an outdoor space, located in less central and dense areas and meeting more diverse privacy requirements. Of all respondents who considered moving home because of COVID-19 (35%), 13.5% gave as their reason having fewer people in their home or immediate surroundings, 11.4% wanted to live in the countryside, and 5.5% said they disliked their flatmates, neighbours, or urban neighbourhood.

4. Discussion

The pandemic has been a test for how well current homes are designed for new needs and use. Studies before COVID-19 estimated the average time of Europeans at home as between 14 to 16 h a day, but found variations between countries and genders [34,45]. During lockdowns, this increased to more than 22 h a day and heightened awareness of housing conditions and the benefits of well-designed and spacious homes or the negative effects of non-decent and insufficiently large homes on physical and mental wellbeing. However, the lived experiences of the home varied greatly. For example, while 85% of homeworking adults welcome a hybrid model of working in the future—as this was found to improve a work–life balance [46]—the survey shows that some suffered from a lack of home and work life separation and a sedentary lifestyle, which could combined create health and wellbeing problems.

COVID-19 has forced drastic lifestyle changes on many who previously spent much of their time outside their home, enjoying the traditional benefits of urban life. As highlighted by the survey, it compressed more activities such as homeworking, homeschooling, and exercising into homes (Table 5). With this, new problems of privacy and demands for differently sized and flexible spaces that can accommodate these activities grew. The likes and dislikes of homes (Figure 3) indicate that many survey respondents wanted more privacy (441 mentions) not only in but also around their homes, such as private outdoor space (686). Others wanted not just larger dwellings and rooms (1354 mentions) but also more rooms, understanding flexibility not merely in terms of space and open plans layouts—which did not work well in fully occupied dwellings—but specifically in relation to a home’s adaptability to different uses (301). At the same time, COVID-19 self-isolation and social distancing requirements gave safety within and outside a home—even between household members—a new meaning. All these changes have potential implications for the future planning of dwellings.

However, the discussion of dwelling design and usability in regard to size, flexibility, or extra rooms in homes started well before the pandemic. In the *Space in New Homes* study (2009), while occupants expressed overall satisfaction with the design and layout of their homes, they preferred more flexible and adaptable rooms that could be used for multiple purposes [47]. In *The Way We Live Now* (2012) survey, participants asked for short- and long-term storage provisions, private outdoor space, access to green public spaces, enough space for domestic utility tasks, privacy, and leisure, as well as flexible layouts that take new home technologies into account [48]. The study also found that participants desired better information about their homes, including quantifiable aspects around space, thermal comfort, and energy efficiency. Overall, more space has been historically the most common demand shared by occupants regardless of tenure [48,49]. These demands have, as this paper demonstrates, not only been reiterated but also made urgent by the pandemic.

Due to homeworking and staying local, housing expectations noticeably changed during lockdowns. Those who could afford to moved out of cities into larger properties—34% of tenants relocating between May to August 2020 in Great Britain paid on average 23% more in rent for an additional 1.4 bedrooms in comparison to their previous home [50]. According to SpareRoom, between August 2019 and August 2020, the demand for gardens (98%), patios or balconies (96%), rooms with an en-suite (44%), and shared living rooms (43%) grew, with top priorities for new homes being a spacious home (38%) with a garden or balcony (30%), that’s under a 10-minute walk to green space (53%) and a supermarket (53%) [51]. While the survey shows that 35% of respondents considered moving due to the

experience of lockdowns, according to Greater London Authority data [52], 43% of Londoners would like to move but 54% of them within London. The current trend thus seems to be moving out of inner London, but future work arrangements will have a significant impact on future housing demands and locations as well as the planning of new homes.

Nevertheless, the pandemic is arguably merely accelerating a misfit between housing provision and needs by adding to growing demand for homes and neighbourhoods that can accommodate changing lifestyles and use. The need for new types of housing had already started with demographic shifts that began much earlier, including that towards an ageing society and the demise of the traditional nuclear family—with married couples living with dependent children representing only 18% of all households in the UK in 2021 [42]. This is in parallel to a decrease in household size from 2.4 persons in 2019–2020 to 2.2 in 2020–2021 [53].

As indicated by the survey, the pandemic has exerted greater pressure on available space and, where it was not possible to accommodate new functional requirements, some experienced wellbeing and health problems. However, even before the pandemic, as a study by the RIBA in 2011 found, the average new home in England was 8% short of the recommended minimum dwelling size, equating to 4 m² for a typical one-bedroom flat for two persons [54]. Those who already had a lack of space and rooms before the pandemic have suffered the greatest, as have those living in poorly maintained and designed homes [2,29,30,32].

The survey further shows an inequitable distribution of space between those who own or rent and between different property types. The relationship between property types and occupancy rates is partially explained by historical urban development—with more flats built in inner London—and demographic change and economic standing. For example, the profile of one-person households in houses (n = 56) is someone older than 55 years (71.4%) who tends to live in a suburban home they have owned (81.2%) for more than 10 years (71.4%). In contrast, those using their living room as a bedroom in flats (n = 65, of which 41.5% are studios) are of working age—relatively equally distributed between 25 to 64 years old (90.8%)—and have lived more centrally in a rented place (84.6%) for over 5 years (60.4%). This demonstrates a relationship between the evolution of household sizes, housing location, and property type, evident in shrinking household sizes in suburban houses and growing household sizes in central London flats.

In addition, in owner-occupied properties, on average 56.8% of bedspaces are used, whereas this is 72.6% in rented homes. This finding is supported by other data showing that the average floor space per person in London is 33 m², but 41 m² for owner occupants and only 26 m² for renters [52]. Yet comparative data on dwelling sizes in the UK, despite often being supplied by the Office for National Statistics, can be contradictory. Although UK dwellings are frequently called the smallest in Europe with reference to Evans and Hartwich's summary of *Housing Statistics in the European Union 2002* [55], the same set of statistics from 2010 shows the UK as having in the 2010s the fourth highest usable floor area per person (44 m²) in the EU [56]. While average room sizes are small in the UK, the average number of rooms per dwelling is high and occupancy rates low.

Occupancy rates matter because they not only determine the space available to each person but are also used to determine appropriate space standards and dwelling design. This can have a great impact on the wellbeing and lived experience of occupants, requiring better control of occupancy standards in relation to space standards [44]. However, despite size clearly being a key housing concern, how occupants measure it is often subjective and based on individual needs and expectations. Only 21.8% of all survey respondents attempted to provide a dwelling size in square metres or feet—with numerous replies unrealistically small or large and making the number and quality of replies insufficient for reliable comparison. That occupants have little sense of the floor area of their home is largely due to a housing market that prioritises room numbers over room sizes, with bedrooms often subjectively marketed as a 'good-sized' double or single. Tellingly, *The Way We Live Now* survey [48] found participants struggling to estimate how much space

they needed for their daily activities. This illustrates the practical and cultural limitations of space standards in England, as for these to be effective, a common understanding of how floor areas and dimensions relate to dwelling usability is required. Also, the same floor area does not necessarily give the same usability or functionality, as this can depend on other factors such as room shape, orientation, environmental comfort, furnishing and equipment, and accessibility.

Other than size, the quality and design of domestic space are essential. A report on overcrowded dwellings found that 77% of respondents agreed that the quality of domestic space determines the quality of family relationships by offering privacy, reducing depression and anxiety, and supporting healthy child development [57]. However, despite wide recognition of the positive role housing plays in public health, local communities, placemaking, or social welfare and equity, what is specifically meant by housing quality and good design is often difficult to define. For example, the Royal Institute of British Architects' Social Value Toolkit for Architecture [58], a response to the Social Value Act of 2012 and an attempt to measure the value of architectural design, underlines this difficulty by providing performance targets and metrics to quantify social value as a financial return on investment without any specific references to housing design or housing qualities.

This housing survey found that 41.2% (n = 1113) of respondents recognise the importance of the layout and design of dwellings for a well-designed home (Table 4). However, unlike more objective or quantifiable housing problems, design was understood in many ways. Most commonly, it referred to the layout of dwellings and the flow of spaces and their functionality, adaptability, and flexibility. It further meant the interior design and decor or shape of rooms, the appearance and style of the dwelling and its exterior, and the design of technical services for durability and ease of maintenance. Although respondents were to disregard their own homes, analysing individual survey responses suggests that immediate housing conditions and experiences have a direct influence on how they define a well-designed home. For example, among those who complained that their homes were too small (n = 335), 43.9% felt that their homes did not meet their needs, of which 96.3% referred to aspects of size and space when asked about their priorities in well-designed homes.

Another important aspect of housing design is environmental comfort, which is extensively controlled by building regulations through measurable performance standards that new buildings must meet. Light, heating, and air quality are immediately tangible problems that have connected housing design and public health agendas since the nineteenth century, with postwar housing explicitly planned to improve housing quality in respect to bright, warm, and ventilated homes as set out in the Tudor Walters, Dudley, and Parker Morris housing reports from 1918, 1944, and 1962. Given that the recognition of noise pollution as an environmental concern is comparatively recent, first regulated in the UK by the Noise Abatement Act of 1960, it is unsurprising that noise was the most mentioned problem in relation to environmental comfort, greatly affecting the wellbeing of survey respondents. This points to a need for better regulation of noise pollution and sound insulation, and not only in older and converted housing. The importance of a good acoustic design of housing to wellbeing has received little attention and upgrades remain difficult and expensive [59].

The survey responses, particularly around the likes and dislikes of homes (Figure 3), point to the difficulty of defining reliable assessment criteria for housing design quality, as what is deemed important or sufficient greatly varies and might be specific to each dwelling context and household. A quantitative comparison on its own can thus be misleading, as not all housing design and quality failures have the same impact on the wellbeing of occupants or home usability. There are thus noticeable differences in how shortcomings in housing design and provision are experienced, partially depending on previous experiences and cultural expectations. Lived experiences and individual needs should thus be given greater consideration by treating space and occupancy standards and dwelling usability criteria not only as technical standards but also as part of social policy, which will benefit from including what might seem to be marginal perspectives and needs [60].

According to the survey, problems of housing conditions and size were often experienced in parallel to stressful interpersonal relationships as well as social isolation. The pandemic and its economic downturn also led to job losses and growing utility bills, especially in old and poorly maintained properties, which could increase stress. This is in addition to known health issues such as dampness and mould or cold and draughty homes [5]. Thus, serious housing problems are not necessarily indicated by large numbers of respondents reporting the same problem, but are more likely to occur when several problems come together.

What the various findings in the survey underline is that home ownership is a good indicator of perceived higher housing quality and greater housing satisfaction by the respondents. Household size has some impact too, as this directly relates to the space available to each person in a dwelling. However, this can be much more difficult to assess on its own without fully knowing the household composition, needs, and dwelling provision. The respondent's age seems to matter generally less, unless this is linked to homeownership, as those older and owning their homes tend to have more space available and therefore are often more satisfied with their homes. This does not necessarily mean that homeownership generally performs better, but that there are aspects linked to it that are important to housing quality and wellbeing such as the ability to make changes to a home and maintain it, benefits that need to be better regulated in the rental sector.

5. Conclusions

There is an urgency to consider emerging housing needs from regulatory and design perspectives. Based on past assumptions of dwelling use that were translated into minimum dwelling sizes, existing space standards are not suitable for everyone and must be reviewed beyond the scope of studies that were undertaken before the introduction of the current Nationally Described Space Standard in 2015 [7,9,61]. However, the survey shows that space standards on their own are a coarse means of design control with little relevance to large and under-occupied properties and insufficient in scope to prevent non-decent housing.

On top of existing provisions, often additional spaces are needed such as separate storage rooms or box rooms (traditionally used as a storage or small bedroom) and a modern version of the parlour, which was a room for social functions that could also be used in 'cases of sickness in the house, as a quiet room for convalescent members of the family [...] that is generally required for home lessons by the children of school age, or for similar work of study' [62]. While housing in the past did not necessarily provide more space, it was distributed differently. In fact, the often-cited Parker Morris standards had a minimum overall floor area range of 75–93.8 m² for a five-person dwelling, whereas the equivalent range in the current Nationally Described Space Standards is 86–99 m². Future space standards and housing policy should permit more design flexibility and consider a wider range of functions and uses than is currently the case. For example, rather than setting minimum room sizes, space standards could permit flexibility in distributing minimum usable floor areas over different rooms, but would require further legislation to prevent overcrowding.

The pandemic raises both general questions about failures in housing design and provision as well as specific questions about a dwelling's design. It hereby challenges some of the basic principles of compact urban development and sustainability, reliant on increasing density while enhancing placemaking at the neighbourhood scale. COVID-19 has led to greater local solidarity and social networks of support, and a new focus on the scale of the home. In future, the interior design of dwellings must be better connected to the planning of urban neighbourhoods, requiring an integration of scales that is currently often ignored.

While the percentage of perceived substandard dwellings in the survey might appear low, housing problems with serious effects on health and wellbeing are often hidden in comparatively small numbers of interrelated factors. For example, problems of dwelling size are exacerbated by privacy and overcrowding issues, poor sound insulation, lacking natural

light or ventilation, as well as long-term maintenance and modernisation failures. Thus, housing quality and design must be understood in more holistic and user-centred terms.

This must be supported by more interdisciplinary studies of how people experience their homes and their design. For example, the current lack of a detailed understanding of how homes are used prevents more inclusive policymaking that considers the diverse range of household compositions and needs. Different housing-related policies, regulations, and standards must work better together. As the survey reveals, issues of environmental comfort, housing conditions, layout, new work practices, and domestic daily routines are directly interrelated. To translate this into improved housing design and standards, from a regulatory perspective greater policy intervention and coordination is required, but also a greater emphasis on design solutions, to achieve equitable housing.

Author Contributions: Conceptualization, S.J.; methodology, S.J. and L.A.; formal analysis, S.J.; writing—original draft preparation, S.J.; writing—review and editing, S.J. and L.A.; visualization, S.J.; project administration, L.A. All authors have read and agreed to the published version of the manuscript.

Funding: This research was supported by the Prosit Philosophiae Foundation.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Ethics Committee of the Royal College of Art (Application Number SJ/3/2020, 4 February 2021).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Not applicable.

Acknowledgments: We thank Dean Black for his contribution to the survey design and Seyithan Ozer for his valuable feedback.

Conflicts of Interest: The authors declare no conflict of interest.

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