


## Article

# Key Elements for a New Spanish Legal and Architectural Design of Adequate Housing for Seniors in a Pandemic Time

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**Abstract:** The provision of housing for the elderly in Spain has been approached from a public policy perspective to understand social housing and the allocation of specialized social services. The lockdowns in cities and the need to remain at home with social isolation and social distance has especially affected the most vulnerable groups, creating situations that widen the gap in the provision of adequate housing. Research is being carried out by a team of researchers at the University of Málaga, funded by European FEDER funds awarded by the Andalusian Regional Government (VIDA project), to analyze the main characteristics connected with “ideal” adequate housing for a vulnerable senior person living alone or in social isolation due to the quarantine period. In this study, we draw a line between the need for adequate housing, the chance to remodel, and the opportunity to propose new Spanish legal approaches from an architectural perspective within the scope of alternative typologies of housing. This article deals with the preliminary findings of the research connected to the architectural review, exploring key elements for senior housing design, and highlighting the need to approach the issue by proposing a new regulation.



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**Keywords:** accessibility 2; housing typology 3; COVID-19 4; social isolation 5; regulations 6; architectural barriers

## 1. Introduction

The United Nations (UN Habitat) Strategic Plan 2020–2023 [1], published some months before the COVID-19 health emergency declaration by the WHO, included a link to the Sustainable Developments Goals and the effects of sustainability parameters in cities. “Smartness” as a tool for the integration of technology in cities [2], centric smart-cities, and communities, contrasted with the effects of domiciliary lockdowns and isolation measures to prevent the spread of the disease, which ended up affecting the most vulnerable groups of the population.

The fact of the progressive aging of the Spanish population, which in 2019 reached 9.055.580 seniors (that is, 19.3% of the total population) according to INE [3], has overall affected the definition of social intervention in the Spanish socio-democratic state. In addition, this has been projected into a law on the elderly and a law on assistance to the elderly within the Spanish legal framework. This legal framework was heavily impacted by the pandemic. This paper does not explore the legal approach to the housing sector after COVID-19, nor the social change connected to it. It focuses on the presentation of preliminary findings which connect the idea of sustainability and adequacy to the need for housing for seniors. Therefore, it addresses the first part of our study, by checking the suitability of actual regulations and their disconnection from the technical requirements.

### *Objectives of the Research*

The aim of this research is to:

- (1) Explore the stock of housing for the elderly in Spain in accordance with the regulations that establish the building standards for this specific segment of the population.

- (2) Examine housing needs for older people and related architectural requirements from a socio-legal perspective.
- (3) Propose a new typological approach that policymakers can promote.
- (4) Explore the changes needed to propose new regulations, derived from the above analysis, with particular attention to the impact of the pandemic on the provision of adequate housing for this segment of the population.

This research is divided into three sections. Firstly, the main aspects from the literature review are described, with particular attention to the regulations. Secondly, we explain the main methods used in the study to address the research objectives, present the main hypothesis, and discuss the former with the data provided. Finally, we propose some adjustments of typologies in the housing offered for seniors. Our conclusion shows the evidence of the above data on the need for regulatory changes that impact architectural design.

## 2. Literature Review

This is not the first time that the rights of the elderly have been addressed in Spanish academic literature [4]. From the legal point of view, the analysis of public policies for the elderly has been integrated into two main areas: civil law and the right to care for the elderly at family level [5] and public administrative law, with care for the elderly as a vulnerable population [6], which involve the protection of the rights of the elderly by the public authorities and their projection in the public sphere. Both elements of public and private law coexist when studying accommodation for the elderly [7].

The Spanish constitution does not attribute a significant number of provisions relating to the rights of the elderly. The opposite is true. Article 50 of the Spanish Constitution [8] refers to the recognition of the rights of older people in a very general way. It does not even mention the need for adequate housing. On the contrary, the Spanish text involves the public authorities in the provision of the public system of social services, which will also include aspects related to housing. Needless to say, this is insufficient to meet their housing needs, and therefore specific regulations and private sector initiatives have had to address this issue.

Since 1978, the Spanish offer of accommodation for the elderly has based its contributions on the definition of public social service residences or homes for the elderly, which are closer to health centers than to autonomous units [9]. Moreover, the number of public places for seniors in homes for the elderly was also insufficient [10]. This has had an impact on the supply of units on the private market and on the need for an agreement to provide space for seniors in private facilities [11]. These units were not affordable, nor culturally accepted by those who were willing to stay at home and age in place [12]. As a result, family members became the primary caregivers of the elderly [13] in this first stage, and the family home became the home of the elderly. Chronologically, this moment correlated with the enactment of the Dependencies Act, 2006, and the recognition of vulnerability to people with any type of disability or impairment. The Dependencies Act did not devote any specific attention to housing, but rather to home services for dependent people ([14] pp. 70–81).

In addition, many of the family units, where seniors were aging, lacked renovations and refurbishments to meet the needs of the elderly [15]. On the other hand, the improvement of the quality of life and life expectancy in Spain in the 1980s and the aging of the general population expanded the need for having a gerontologist and designing a specific policy for seniors.

Thus, from the mid-1990s to 2007, all Spanish regions and authorities established regulations on the care of the elderly, and some began to propose specific housing models that focused more on the removal of architectural barriers [16] than on any other aspect. Housing projects and planning did not include specific typologies for seniors, but economic support aimed at adapting housing to remove architectural barriers. Public subsidies were then allocated to improve affordability and promote housing for private or public entrepreneurs with little interest in refurbishment.

A review of the existing literature shows that the housing crisis that affected Spain from 2007 onwards was followed by a burgeoning interest in active aging at the European level [17], so gerontologists, sociologists, architects, lawyers, and policy makers addressed the need for housing for seniors. Since in Spain older people mostly owned their units free and clear [18], without mortgage charges, their units were less likely to be foreclosed or subject to eviction, demonstrating their important role in supporting families that received more attention to their needs. This led to the first Spanish promotion of assisted housing for seniors. However, new types of families emerged and the composition of the family changed. Thus, many old people ended up living alone in their “inappropriate” units. In this context, the COVID-19 pandemic forced the population to stay at home and clearly demonstrated the challenges and the inadequacy of housing to cope with a healthy social, work, or family life [19].

Within this context, the first part of the VIDA project, carried out during 2020, examined the architectural characteristics of units for seniors and the regulation connected to it, seeking new proposals for policymakers. This paper explores a mere fragment of that research and shows the preliminary findings of studying the existing Andalusian typology of housing for seniors and its disconnection from architectural requirements and seniors’ needs.

### 3. Materials and Methods

To address the goals described above, it is necessary to understand the research context for this piece, and, briefly, the main steps undertaken within the VIDA research project. As a preliminary step towards defining the specific characteristics of households adapted to the needs of this sector of the population, the work carried out in the framework of the VIDA research project during the year 2020 and the first quarter of 2021 established an initial relationship between disability problems and the population aged 65 and over.

This step profited from a Delphi analysis carried out by VIDA sociologists between December 2020 and May 2021. This Delphi analysis also included a diagnosis of the housing needs of the elderly population and focused on the need for a new type of housing for the elderly, drawing conclusions from a sociological perspective. These Delphi results are in press, and will be publicly released at the end of 2021.

The sociological analysis was followed by an extensive review of the existing literature, focusing on legal and architectural sources. The literature reviewed addressed the case of housing adapted to vulnerable groups. This review included an analysis of the legal and, therefore, technical requirements for promoting this type of housing. Secondly, a table was drawn up showing the relationship between the characteristics required by specialized users (companies and associations working with this sector of the population) and the requirements of the regulations in force.

Finally, a correlation of variables was developed. This correlation paid attention to the level of dependency and how disability criteria can be applied to older persons in relation to their age. In order to complete the table and to identify the main points to be addressed for pre-positive ad hoc regulation on the subject, a mixed approach was adopted. This mixed approach was carried out in a systemic chronology combining quantitative and qualitative analysis. This mixed approach was enriched by the results proposed from the Delphi model developed specifically to study the correlation between housing technical arrangements and social needs.

At the same time, a non-exhaustive search was conducted on the web with keywords such as “dwellings,” “older people,” and “adapted,” to locate references of companies or entities that carry out work for the elderly and that have reflected on the characteristics that their homes should have. As a result of this search, a set of 9 electronic sources were selected related to home help companies [20], home services [21], companies with mechanisms for removing architectural barriers [22], companies specialized in renovations, accessible spaces [23], press [24], dedicated websites [25], real estate portals [26], and professional search companies [27].

In order to limit the scope of work of this research, the analysis of technical regulations has focused on CTE and Andalusian legislation: Decree 72/1992, of 5 May, approving the Technical Standards for Accessibility and Removal of Architectural, Urbanistic and Transport Barriers in Andalusia; Decree 293/2009, of 7 July, approving the Regulations on Accessibility, Infrastructure and Accessibility and Transport Standards in Andalusia; the Order of 5 November 2007 regulating the Procedure and Requirements for the Accreditation of Centers for the Care of Older People with Dependency in Andalusia; and the Regulatory Ordinance on Accessibility of the City of Malaga, as an example of regulation in a medium-large municipality.

The development of the methodology described above allowed us to trace two hypotheses:

- (a) "The main differentiating factor that a home for the elderly should have is the availability of accessibility conditions appropriate to the problems of dependency that arise in this age group."
- (b) "The pandemic has accelerated the need for a new typology of housing for seniors which is more connected and integrated into the health and social services system."

#### 4. Results

The first hypothesis was tested with the following results, which can be summarized as follows:

- The Spanish legal requirements for a housing policy for the elderly are insufficient to meet the needs of the elderly.
- Two key concepts and their projection should be addressed in the new housing typology for older people: accessibility and vulnerability.

##### *4.1. Spanish Legal Requirements for a Housing Policy for Seniors Are Insufficient to Address Their Needs*

Spanish legislation is structured on three levels according to the country's administrative structure (state, regional and local regulations) and the 1978 Spanish constitution. In the housing sector, the responsibility for specific designs lies with the regional authorities, while the coordination of technical standards is laid down at national level. The 17 Spanish autonomous communities can regulate the characteristics of buildings in their area of competence, including welfare and accessibility policies. In the exercise of these powers, the communities have enacted bylaws to facilitate access and remove architectural barriers, as well as to regulate residential centers for the elderly. The rules contained in the regional regulations focus on common housing spaces and regulate a minimum reserve of suitable housing for the promotion of sheltered or subsidized housing by the public authorities. It is only in these cases that there are specific characteristics that the dwelling must meet and that make it possible to assess the extent to which a dwelling can be considered capable of meeting the needs of a person with a particular disability.

In this context, the Technical Building Code, CTE, designed as a performance regulation, sets out the minimum requirements for buildings throughout the country. Section 9 of the Basic Document for Safety of Use and Accessibility, DB-SUA, structured into different basic documents according to their subject matter, sets out the accessibility conditions that buildings must meet. In this section, however, the CTE does not regulate the interior conditions of houses, which is usually left to regional regulation.

At the municipal level, municipalities are empowered to supplement these standards with specific ordinances and, in many cases, they have issued municipal ordinances on accessibility. Although each autonomous community and municipality has been able to draw up its own specific regulations, the reality is that there are no essential differences between them in terms of the performance and technical conditions they require of the buildings they regulate.

In fact, it is not easy to find references in the Spanish technical literature to specific studies on the characteristics that homes for the elderly should have. Existing references usually come from the reflections of companies dedicated to the care of this sector of

the population that, at some point, express their opinion on the characteristics that these accommodations should have. Regarding the regulation of the subject, different levels must be considered. Thus, in addition to the coexistence of the constitutional right to housing and the general provisions enacted for the allocation of resources for housing projects, a systemic approach to regional housing provisions and addressing the affordability of social housing can be added. In addition, due to the pandemic situation, a package of legal provisions was enacted to prevent foreclosures and protect vulnerable people who have difficulty paying rent or who have been economically affected by the pandemic [28]. One case of particular relevance is the regulation of energy poverty (which is one of the elements found in many old units where the elderly live alone). Thus, the general provisions of the CTE had to be supplemented by public policies on energy efficiency, derived from European directives, with a significant impact on housing promotion, but without adjusting the case of housing for the elderly either in regional or national legislation. With respect to accommodation for the elderly, the closest legislation is a regional regulation on the conditions to be met by residential centers for dependent elderly people, day centers or day-stay units (DUs), and night centers or night-stay units (UENs) [11].

This way, a first correlation is established between the elderly and their situation (level of vulnerability). This circumstance allows a first approach to the problem as an accessibility problem based on the analysis of this legislation. In fact, over and above the provision of services that these centers must have to function properly, these regulations tend to end up referring to the general regulations on accessibility. The reference to the status of dependency included in the above-mentioned regulations focuses the problem or differentiating factor of this sector of the population on its highest level of dependency. Given the fact that the national regulation on dependency was promulgated in 2006 and was not fully implemented until 2010, the lack of assessment of many older people regarding their level of dependency did not affect or improve their quality of life at home.

#### *4.2. Two Key Concepts and their Projection Need to Be Addressed in the New Typology of Housing for Seniors: Accessibility and Vulnerability*

##### *4.2.1. Accessibility as a Key Concept in a Model of Housing for Seniors*

Accessibility [29], a concept that we will find associated with the reflections and regulation of spaces intended for the elderly, is defined as the ease with which one place can be reached from another; consequently, it is a spatial quality. As a concept it is not an absolute, but a relative one that varies depending on the characteristics of the user, the type of displacement, and other conditions such as climatic factors and the quality of roads. It must therefore be assessed on the basis of a diversity of circumstances that may disrupt mobility in different ways. Similarly, it must be understood holistically and in such a way as to ensure not only access, but also movement, use, orientation, security, and functionality.

The Spanish set of laws has addressed the case of accessibility as an issue to be included in national legislation on disability—the Royal Legislative Decree 1/2013, of 29 November, on the general rights of people with disabilities and the prevention of social exclusion—and in legislation relating to the elimination of architectural barriers, as provided for in Law 15/95 of 30 May. This 1995 provision includes a reference to people over 70 years of age and reminds us of the trichotomy of regulations that involve health provisions affecting older people, as we have already stated [9]. From a legal point of view, lack of accessibility is linked to possible discriminatory behavior by private or public entrepreneurs and owners. This article adds a new element to that trichotomy that we can explore.

The lack of autonomous mobility translates into a situation of captivity of the person concerned, sedentarism, lack of relationships, and segregation, which led the Andalusian Ombudsman to highlight in his 2003 report the need for the integration of “people imprisoned in their homes” [30,31]. This implies the development of processes of social exclusion, understood as multidimensional phenomena that weaken the economic, political, socio-cultural, and spatial links between individuals and society—links that, to the extent that they are weaker, increase the degree of vulnerability of the individual [17]. On

the other hand, improving accessibility also means improving the habitability of spaces, a quality which does not only benefit older people. The development of accessible spaces makes them sustainable, healthy, and inclusive—sustainable insofar as the characteristics of the homes and the buildings that house them do not force them to abandon them or the neighborhoods where they are located because they are the oldest population. At the same time, they offer a comfortable environment to all citizens because they are true “livable landscapes.” These spaces are healthy because the elimination of the aforementioned barriers prevents accidents and mitigates suffering. Finally, these spaces are inclusive, since they do not segregate or exclude population groups based on their disabilities. This idea of inclusion is reinforced by the Spanish constitution, which states in Article 9.2 that “It is the responsibility of the public authorities to promote conditions in which the freedom and equality of the individual and of the groups to which they belong are real and effective; to raise any obstacles that prevent or hinder their realization...”

Consequently, it can be said that policies to improve accessibility are inseparable from those to keep the elderly in their habitual residence and from the objective of reducing the length of institutionalization and hospitalization, not only of the elderly population, but also of the injured and convalescent [6]. Given this situation, there is an urgent need to reflect on the specific characteristics of housing intended for this sector of the population in Spain, given the lack of general legislation on the typology of housing for the elderly.

Besides this, the promotion of autonomy and self-reliance is linked to active aging policies. As has already been explained in a comparative study on the subject [12], active aging policies focus on prolonging the independence of users by adapting traditional residential types with the idea of postponing the need for relocation to specialized centers or homes for the elderly, avoiding the high economic impact of the increase in the number of people demanding specialized centers. Providing a home tailored to the specific needs of older people therefore means seeking greater personal autonomy and enabling independent living, but also reducing the need for institutionalization and family support.

Furthermore, the progressive aging of the population because of the increase in life expectancy, coupled with the change in family structures, that until 2019 [3,32] favored coexistence in the same family nucleus of several generations, force us to reflect on the specific characteristics of housing intended for the elderly. In addition, it is relevant to note that according to the INE in 2019, 43.6% of people living alone were over 65 years old, which means that when the COVID-19 isolation policies were implemented (in Spain in March 2020) a high percentage of older people were isolated at home.

Given the fact that technology is present in the whole analysis, the role of IT in smoothing communication among generations (living in different units) and the role of devices in improving the connectivity of the house (by the integration of elements of e-health, comfort areas, and safe spaces), proved to be especially important in a pandemic time.

Finally, an assessment has been made of the bodily functions to which legislators and experts pay the most attention when calling for specific household conditions for this segment of the population.

#### 4.2.2. Dependency and the Level of Seniors' Vulnerability as a Key for a New Type of Housing

Dependency is the result of events that cause a physical, mental, or intellectual disability that requires significant assistance in carrying out daily activities. The International Classification of Functioning, Disability, and Health (ICF) goes a little further. For the ICF, it is the result of the interaction between a person with a disability (listening, moving, taking care of oneself, etc.) and the environmental or attitudinal barriers that he or she may encounter. In this way, the concept of functioning is considered as a global term that refers to all bodily functions, activities, and participation, and that of disability, which includes deficiencies, limitations in activity, and restrictions in participation.

The ICF is part of the “family” of international classifications developed by the World Health Organization (WHO) and provides the conceptual framework for codifying a wide range of health-related information in a standardized and unified language. As

a classification, it has been accepted as one of the United Nations social classifications and incorporates the Standard Rules on the Equalization of Opportunities for People with Disabilities. The classification defines the health components and some health-related components of well-being, such as education and work. Therefore, the domains included in the ICF (understood as the relevant and practical sets of physiological functions, anatomical structures, actions, tasks, or related spheres of life) can be considered health domains and “health-related” domains, and are described from the bodily and individual point of view in two basic lists: (1) functions and structures of the body, and (2) activities and participation.

As a classification, it groups the different domains of a person in each health status according to what the person affected by a disorder or disease does or can do. Thus, the concept of functioning is understood as an umbrella term that refers to all functions, activities, and participation of the body, while disability encompasses deficiencies, activity limitations, or participation restrictions.

In describing situations related to human functioning and its limitations, the CCF provides a framework organized into two parts:

Part 1. Functioning and disability

- (a) Body functions and structures
- (b) Activities and participation

Part 2. Contextual functions

- (c) Environmental factors
- (d) Personal factors

The functional and disability components are divided into two groups. On the one hand, the “body” component differentiates between the functions of the body’s systems and the structures of the body. At the same time, in the first case, it distinguishes between bodily functions (physiological functions of bodily systems, including psychological functions) and bodily structures (anatomical parts of the body such as organs, limbs, and their components). The “activities and participation” component covers all areas that indicate operational aspects from an individual and social perspective. Deficiencies are defined as problems in bodily functions or structures associated with a significant deviation or loss. We consider bodily functions as the object of a greater interrelationship between the individual and the home. The ICF classifies them into eight categories:

- Sensory functions and pain: functions of the senses (sight, hearing, taste, etc.) as well as the feeling of pain.
- Voice and voice functions: functions involved in the production of sound and the voice.
- Functions of the cardiovascular, hematological, immunological, and respiratory systems: functions involved in the cardiovascular, hematological, and immune systems, as well as in the respiratory system.
- Functions of the digestive, metabolic, and endocrine systems: functions related to ingestion, digestion, and elimination, as well as those related to metabolism and the endocrine glands.
- Genitourinary and reproductive functions: urinary and reproductive functions, including sexual and reproductive functions.
- Neuromuscular and motion-related functions: related to motion and mobility, including the functions of bones, muscles, joints, and reflexes.
- Functions of the skin and related structures: functions related to the skin, nails, and hair.

The normative requirements arising from the above-mentioned standards have been compared with the assessment of two types of sources, legal and statistical. In addition, on 17 and 18 December 2020, an expert panel was held within the framework of the Fifth International Congress on the State of Smart Cities: Socio-Legal Conditions and Meeting the Needs of Adequate Housing for Older People.

This hypothesis has been verified by analyzing data from the National Institute of Statistics (INE). INE has conducted three macro-surveys on disability in Spain (1986, 1999,

and 2008) on disability and deficiencies of the Spanish population (EDDM), the Survey on Disability, Impairments, and Health Status (EDDS 1999), and the Survey on Disability, Personal Autonomy, and Dependency Situations (EDAD 2008). Both EDDS 1999 [18] and EDAD 2008 information is available on the INE website. Consultation of the data for the 2008 EDAD (Tables 1 and 2) confirms that more than 4 million Spaniards suffer from some type of disability, of whom some 2.5 million (2.4494) are over 65 years of age. This represents just over 61% of disability cases and supports the thesis that disability cases are concentrated in this age group.

**Table 1.** Spanish population in households with some type of disability, according to age and sex.

	Unit: Thousands of People		
	Both Genders	Males	Females
Total	3.8479	1.5477	2.3002
From 0 to 5 years	60.4	36.4	24.0
From 6 to 64 years	1.5604	754.5	805.9
From 65 to 79 years	1.2013	454.8	746.5
From 80 to older	1.0258	301.9	723.9

Source: Survey on Disabilities, Personal Autonomy, and Dependency Situations. 2008. INE.

**Table 2.** Spanish population in residences and hospitals with some type of disability, according to age and sex.

	Unit: People over 6 Years Old Residing in some Type of Center		
	Both Genders	Males	Females
Total	269.139	93.546	175.593
From 6 to 64 years	46.879	29.005	17.874
From 65 to 79 years	59.366	26.439	32.927
From 80 to older	162.894	38.102	124.793

Source: Survey on Disabilities, Personal Autonomy, and Dependency Situations. 2008. INE.

In fact, with a life expectancy in 2008 of 77.77 and 84.11 years for men and women, life expectancy without disability is reduced to 71.27 and 73.75, respectively (Table 3), and 269,139 people have been able to find solutions to these disability problems in specialized centers and residences (Table 2).

**Table 3.** Health and life expectancy of the population by age and sex.

Unit: Years	LE: Life Expectancy	LEFD: Life Expectancy Free of Disabilities
Both genders	80.94	72.49
Males	77.77	71.27
Females	84.11	73.75

Source: Survey on Disabilities, Personal Autonomy, and Dependency Situations. 2008. INE.

According to data collected in the INE newsletter [15], the main disability groups affecting residents of Spanish households are mobility (6.0% of the population), domestic life (4.9%), and self-care (4.3%). This means that, of the total population with disabilities, 67.2% have mobility or movement limitations, 55.3 % have problems related to housework, and 48.4% to housework and their care and hygiene. The most frequent bone and joint deficiency is bone and joint problems.

This presents a picture in which more than 1.6 million people find it difficult to move outside the home (Table 4).

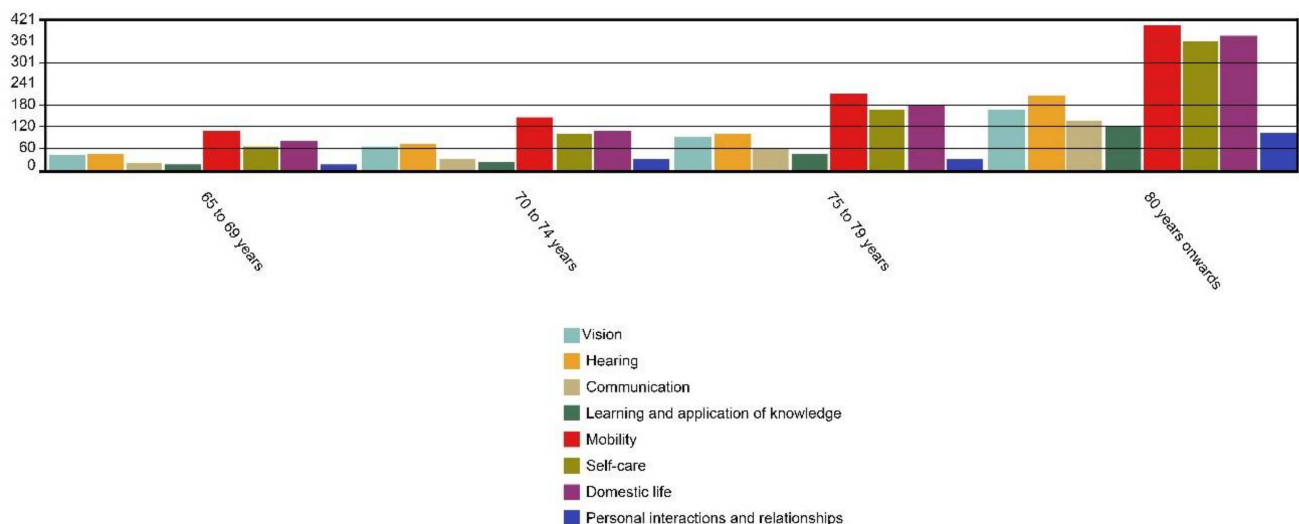


**Table 4.** Distribution of the different types of disability among people over 6 years of age in Spain.

	Unit: Thousands of People		
	Both Genders	Males	Females
Total	3.7874	1.5109	2.2765
Vision	979.0	371.3	607.7
Hearing	1.0641	455.7	608.5
Communication	734.2	336.6	397.5
Learning and applying knowledge and developing tasks	630.0	264.5	365.5
Mobility	2.5354	881.5	1.6539
Self-care	1.8245	645.0	1.1795
Domestic life	2.0792	605.8	1.4734
Interaction and personal relationships	621.2	291.7	329.5

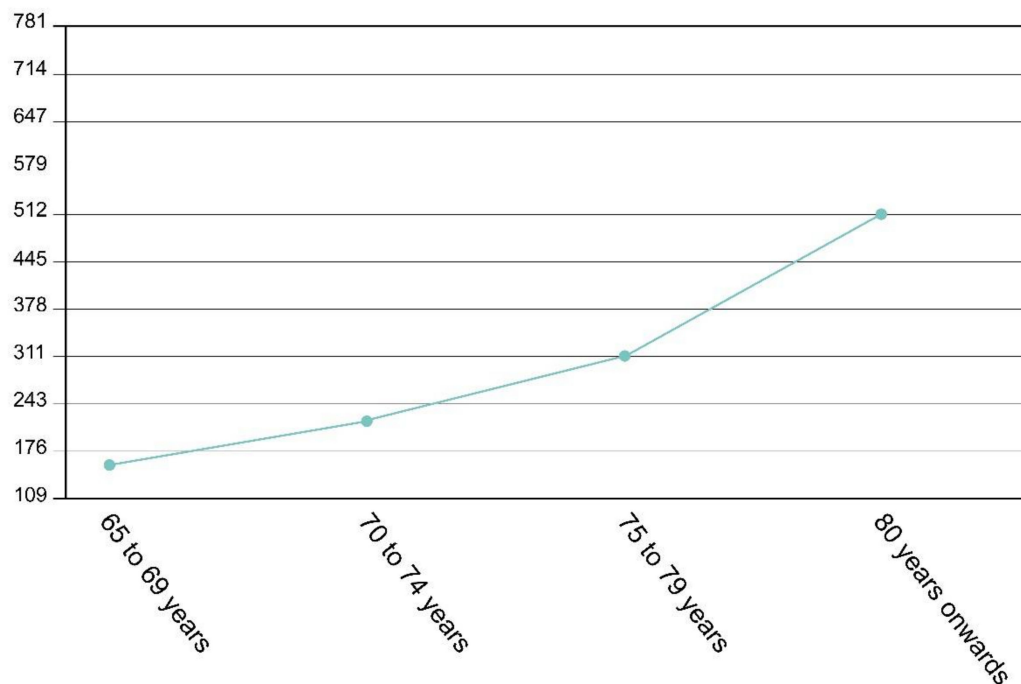
Source: Survey on Disabilities, Personal Autonomy, and Dependency Situations. 2008. INE.

However, it should be remarked that mobility is not only limited by problems in the locomotor system, but also by the loss of visual acuity, coordination of movements, or orientation (Figure 1), and that all these deficiencies are accentuated with the increasing age of a person (Figure 2).



**Figure 1.** Population rate over 65 years of age with disabilities, distributed according to type of disability. Source: Survey on Disability, Personal Autonomy, and Dependency Situations; ESD 2008.

The panorama presented by the real estate world has been backed up by data obtained from the 2011 Population and Housing Census, the last official census in existence [18]. Although recently many municipalities have carried out numerous actions aimed at improving the accessibility of the built landscape, in 2011 only 23.09% of buildings were accessible and those with accessibility were reduced to 6.27% with elevators (Table 5). As a result, 1.2 million households where people with reduced mobility live have barriers in buildings such as stairs without ramps or mobile platforms.



**Figure 2.** Total rate per 1000 inhabitants of the population over 65 with disabilities in Spain. Scheme 2008.

**Table 5.** Percentage of accessible buildings and properties with a lift in Spain.

Unit: Percentage		
Total		
	Buildings	Estates <sup>1</sup>
Accessible (%)	23.09	33.42
With elevator (%)	6.27	41.15

<sup>1</sup> An estate must be understood as each module that a building encompasses. Source: Population and Housing Census 2011. I.N.E.

In the survey “Accessibility and Urban Space” carried out by the ACCEPLAN Project of the Institute of European Studies of the Autonomous University of Barcelona, which served as the basis for the preparatory studies for the I National Accessibility Plan 2004–2012 of the Department of Labor and Social Affairs (I Accessibility Plan 2004–2012), 83% of the residential buildings analyzed had access problems at the threshold, while 96% had inaccessible spaces within their own homes for people with disabilities.

Furthermore, according to the data collected in the INE newsletter [15], 51.5% of disabled people say they have difficulties in getting on with ease in their home or building, especially on stairs (43.3%) and bathrooms (29.8%). Figures increase up to two-thirds in the age group 80 years or older.

Irrespective of whether or not these data are updated, the reality is that they show a picture in which the country’s housing stock and buildings suffer from serious accessibility deficiencies. These deficiencies are more visible in the case of older people, although they also affect other age groups. This situation requires an effective response using universal design, which refers to the design of products and environments to be used by all, without the need for adaptation or specific design.

Having confirmed the hypothesis that the distinguishing feature of housing intended for the elderly is greater accessibility, the information from the three reference sources mentioned (expert plans, sources consulted, and reference standards) were cross-referenced in order to structure a table in which the experts’ suggestions are related to the different areas and elements of the house—the requirements envisaged in the standards and the

eight categories of functional disabilities of the International Classification of Functioning, Disability, and Health.

## 5. Discussion

The actions that can be carried out on a home can be classified into 10 different areas, which, at the same time, act on a total of 34 different elements (Table 6).

**Table 6.** Areas and elements of a home susceptible to a design adapted to different disabilities.

Spaces of the House	Items or Indications for Use
Entrances	Access
	House doors
	Corridors
	Lobbies
Terraces, balconies, and roofs	Height of the different elements
Living room and dining room	Clearances and distances
	Furniture
Kitchen	Clearances and distances
	Worktop
	Sink faucet
	Characteristics and recommendations for use of kitchen elements
Bedroom	Free space and distances
	Floor
	Furniture
	Environment control
Bathroom and toilet	Obstacle free space
	Sink
	Toilet
	Shower
	Grab bars
	Design features
Windows	Complementary installation
	Manipulable opening and closing systems
Technology and environmental control facilities	Sill height
	Height and distances
	Extension cords
	Telephony
	Communication system
Illumination	Environment control
	Intensity
	Orientation
Stimulation	Sensors
	Objects
	Color of the wall paint

In many cases, action on these 34 elements of the dwelling is not limited to a single decision, but accessibility is the result of various design corrections that the analyzed regulations have not always taken into account. In total, 133 design proposals have been identified, of which 88 are purely architectural, while the remaining 45 correspond to the areas of furniture or decoration. Of these 88 proposals, 61 have already been included in some type of regulation (a conclusion that refers to the regulations analyzed for this work: CTE, the Andalusian Accessibility Decree, and the Malaga City Council Accessibility Ordinance). In other autonomous communities or municipalities these figures may vary slightly, and most of the unregulated proposals concern issues related to the characteristics of the furniture.

Finally, it has been observed that most of the proposals for adapting housing to the needs of the elderly concern disabilities related to neuromuscular and motor functions, sensory functions (sight) and pain; the rest are treated in the background (Table 7).

**Table 7.** Number and percentage of proposals associated with the different disabilities of bodily functions.

Body Function According to the CIF	Number of Associated Proposals	% of Total Proposals
Mental functions	6	3.70%
Sensory functions and pain	40	24.69%
Voice and speech functions	5	3.09%
Functions of the cardiovascular, hematological, immune, and respiratory systems	0	0.00%
Functions of the digestive, metabolic, and endocrine systems	0	0.00%
Genitourinary and reproductive functions	0	0.00%
Neuromusculoskeletal and movement-related functions	107	66.05%
Functions in the skin and related structures	1	0.62%
—	3	1.85%
<b>Total</b>	<b>162</b>	<b>100%</b>

The provision of adequate services for the regulation of the accommodation of the elderly, in the scenario examined, has focused on the regulation of residences and care spaces, leaving aside the home itself, as shown in the case of the Andalusian set of laws, whether examining Decree 72/1992, of 5 May, approving the Technical Standards for Accessibility and Removal of Architectural, Urbanistic and Transport Barriers in Andalusia; or the subsequent Order of 12 February 2020, modifying that of 21 July 2008, on the technical requirements applied for subsidized housing in Andalusia. At the national level the same is true, when reviewing, for instance, the regulation included in the Spanish Housing Project and the Spanish Technical Building Code.

Therefore, the provision of so-called housing for the elderly in Spain did not consider all the variables and technical requirements, as was shown above, since the housing-for-seniors-adapted subsidies were targeted to address physical impairments more than other disabilities equally significant for livable and adequate housing. This inadequacy was particularly visible in the case of forced quarantine due to COVID-19 [19].

## 6. Conclusions

The distinguishing feature of housing for the elderly from the general supply is the need to address the main disability problems experienced by this segment of the population. These problems have not been specifically addressed in the current legislation, which has focused, in general, on accessibility and mobility issues. Thus, the removal of

architectural barriers or the integration of health services in units are only some of the elements to be considered. The pandemic has strengthened the role of units as spaces for self-development and healthy recovery, while creating social distance and forcing a dilemma of fast connectivity. According to the surveys carried out by the INE, it can be concluded that a differentiating characteristic of the older population is the increase in disability problems, which places life expectancy without such limitations at 72.49 years.

The preliminary findings of this study show that technical requirements need to be adapted to new standards, while regulations need to address the reality of family structures different from those existing at the time the regulations were adopted.

According to this specific characteristic, the differentiating feature of housing designed for this population sector should be an adapted design able to address seniors' needs. As stated in the Materials and Methods section of this article, in Spain there is no specific regulation on the characteristics that dwellings for the elderly must have or on the obligation to develop them. Spanish regulations are limited to dealing in a cross-cutting manner with a building's accessibility and mobility requirements. In the case of residential buildings, these requirements focus on common areas. Within this context, the accessibility and mobility requirements for dwellings are limited to the percentage of "adapted dwellings" that must be built in each development once it reaches a certain number of dwellings.

The minimum number of dwellings is a requirement established by national regulations (Rulemaking, Article 111, Act 38/1982, of 7 April, on the Social Integration of the Disabled, LISMI, article 57.1; modified by article 19, Act 26/2011, of 1 August, on regulatory adaptation to the International Convention on the Rights of Persons with Disabilities) which may be low, as it does not consider the real percentage of the elderly population that may require this adaptation. The greatest disability problems among the older population are associated with problems of mobility, self-care, and domestic life (Figure 1), although this INE classification does not show which bodily functions are affected.

The analysis of the design proposals and obligations for adapted housing for the elderly shows that all the spaces and facilities in a home can be subject to universal design (Tables 6 and 8). These proposals and regulations focus mainly on neuromusculoskeletal and movement-related functions and, to a lesser extent, on sensory and pain-related functions (Table 7). The preliminary findings of this paper show that the correlation between the variables that connect vulnerability, dependency, and accessibility (previously explained in Section 4.2.2: Dependency and the level of senior's vulnerability as a key for a new type of housing), has not been translated into standards or technical requirements within the units of the Spanish set of laws. Thus, the inadequacy of the existing stock of Spanish homes for older people has had a negative impact on the way they faced isolation due to COVID-19. This means that specific consideration should be given to extending the scope of this regulation to better address accessibility issues and to take into account types of disabilities other than lack of or limited mobility.

**Table 8.** Conclusion of test parameters to be considered in the design of this type of housing; regulations to be complied with and elements that are not included in the regulations.

Materials/Spaces	Position	Element to Check	Condition Searched		
Floor	Interior	Non-slip material	-	Gradient < 6%	Category 1
				Gradient ≥ 6% and stairs	Category 2
	Exterior	Non-slip material	-	-	Category 3
Accessible itineraries	Lobby	Free circumference not swept through doors	-	-	Ø ≥ 1.50 m
		Free circumference in front of accessible elevator	-	-	Ø ≥ 1.50 m
		Free width	-	-	≥1.20 m
	Corridor	Isolated narrowing	-	Length of narrowing	≤0.50 m
				Resulting free width	≥1.00 m
				Separation to doors or changes of direction	≥0.65 m
		Free turning space at the bottom of corridors larger than 10 m	-	-	Ø ≥ 1.50 m
		Free passage of entrance doors and openings	-	-	≥0.80 m
		Horizontal free space on both sides of the doors	-	-	Ø ≥ 1.20 m
		Angle of opening of doors (including exterior doors)	-	-	≥90°
	Crossing gaps	Opening or closing system		Height of the crank	0.80–1.20 m
				Separation of the hatch to the door plane	0.04 m
				Distance from the mechanism to the corner meeting	≥0.30 m
	Transparent or glazed doors (O3)		Horizontal signage along its entire length	0.85–1.10 m; 1.50–1.70 m	
Wide signalling strip (fully transparent doors with automatic opening or without actuating mechanism) perimeter			0.05 m		

Table 8. Cont.

Materials/Spaces	Position	Element to Check	Condition Searched
		Double-leaf doors	Without automatic and coordination mechanism, minimum passage width in one of them
			-
			$\geq 0.90$ m
		Automatic doors	Clearance width
			-
			$\geq 1.20$ m
			Speed reduction mechanism
			-
			$\leq 0.5$ m/s
	<b>Windows in corridors</b>	They do not invade the corridor at a height of less than 2.20 m	-
			-
			(O2) Window mechanisms shall be located at a height between 0.80 and 1.10 m. (O3) Glass doors shall be made of safety glass, or shall have a protective base 0.40 m high
		Height saved by the flight	With elevator as an alternative
			-
			$\leq 3.20$ m
			Without elevator as an alternative
			-
			$\leq 2.25$ m
		Minimum number of steps per flight	3
			-
			Maximum number of steps without intermediate rest $\leq 16$
<b>Accessible itineraries</b>		Step	-
			-
			$\geq 0.28$ m
	<b>Stairs</b>	Riser	-
			-
			0.13–0.185 m
		Relation Step/Riser	-
			Between two consecutive floors of the same staircase, all the steps have the same footprint and all the steps of the straight sections have the same footprint. Between two consecutive stretches of different plants, the back footprint does not vary by more than $\pm 1.00$ cm
			$0.54 \text{ m} \leq 2C+H \leq 0.70 \text{ m}$

Table 8. Cont.

Materials/Spaces	Position	Element to Check	Condition Searched
		Free width (In curved sections, the area where the footprint < 0.17 m should be excluded)	-
			≥1.00 m
		Maximum angle of the partition to the vertical plane	-
			≤15°
	Landing	Intermediate	With access doors to dwellings. Width
			≥Width of stairs Ø ≥ 1.20 m free
		No doors to dwellings. Width	
		≥Width of stairs Ø ≥ 1.00 m free	
		Back	
		Of take-up and landing	
			Ø ≥ 1.00 m free
			Width
			≥Width of stairs
			Back
			Ø ≥ 1.20 m free
		Distance from the edge of steps to doors	-
			≥0.40 m
	Banister	Position	Ladders with a width ≥ 4.00 m
			Central banister
		Maximum separation of banisters	
		4.00 m	
		Stairs having a height ≥ 0.55, of a width exceeding 1.20 m	
			Banister on both sides of the staircase and continuous, including landing
	Measures	Greater dimension of the capable solid	
		0.045–0.05 m	
		Height	
			0.90–0.95 m
	Directrix		Straight or curve, radius = 30.00 m
			Straight
	Width		-
			≥1.20 m



Table 8. Cont.

Materials/Spaces	Position	Element to Check	Condition Searched		
		Longitudinal slope (horizontal projection)	Length sections < 3.00 m	10.00%	
	-		Length sections $\geq$ 3.00 m and < 6.00 m	8.00%	
	-		Length sections $\geq$ 6.00 m	6.00%	
		Transverse slope	-	$\leq$ 2 %	
		Maximum stretch length (horizontal projection)	-	$\leq$ 9.00 m	
	Landing	-	Width	$\geq$ Width of ramp	
			Back	$\geq$ 1.50 m	
			Access ramp to the building. Back	$\geq$ 1.20 m	
		Distance from the edge of the ramp to a door or corridor with less than 1.20 m of width	-	$\geq$ 1.50 m	
Accessible itineraries	Accessible ramps	Handrail	Position	On ramps having a height major than 0.185 m with a gradient $\geq$ 6%	
			Characteristics	Capable solid dimension	0.045–0.05 m
				Height	0.90–0.95 m; 0.65–0.75 m
				Extension at the ends on both sides (sections $\geq$ 3 m)	$\geq$ 0.30 m
		Banister	-	Unevenness > 0.55 m	0.90–1.10 m
				Unevenness > 0.15 m	0.90–1.10 m
		Height of socket or lateral protective element on free edges, on ramps with a maximum height difference of 0.55 m	-	$\geq$ 0.10 m	

Table 8. Cont.

Materials/Spaces	Position	Element to Check	Condition Searched		
Vertical communication	Accessible elevators		-	Housing buildings with PB+1 that have 6 dwellings or less	Structure estimate for elevator shaft
		Consideration of future installation		Buildings in which up to two floors must be saved from an accessible main entrance to the building or to a dwelling or community area or which have 12 or fewer flats on floors without an accessible main entrance to the building (DB-SUA 9)	
			-	Buildings with more than 6 dwellings that develop at most in PB+1 or with any number of dwellings from PB+2	Installation of accessible elevator
		Obligación de instalación de ascensor accesible	-	Buildings where more than two floors need to be saved from an accessible main entrance to a dwelling or communal area, or where there are more than 12 dwellings on floors without an accessible main entrance to the building (DB-SUA 9)	
		Free space in front of the lift	-	-	
Wide passage of doors	-	-	$\geq 0.80$ m		

Table 8. Cont.

Materials/Spaces	Position	Element to Check	Condition Searched
Internal measures (Minimum dimensions)	Without accessible houses	One or two doors facing each other	1.10 × 1.40 m
			In elevators with double perpendicular door:
		1.20 × 1.20 m	
		1.40 × 1.40 m	
	With accessible houses	Two doors at an angle	In elevators with double perpendicular door:
			1.20 × 1.20 m
		One or two doors facing each other	1.10 × 1.40 m
			In elevators with double perpendicular door:
		1.20 × 1.20 m	
		1.40 × 1.40 m	
In elevators with double perpendicular door:			
Interior characteristics	Telescopic opening doors	-	Telescopic opening door
		H interior	≤1.20 m
	Buttons	H exterior	≤1.10 m
		Self-relief numbers and Braille system	-
	Handrail	Height	0.800–0.90 m

Table 8. Cont.

Materials/Spaces	Position	Element to Check	Condition Searched		
Vertical communication	Accessible elevators	Indicators	Access	Luminous and acoustic arrival indicators	-
			Doors	Indicators indicating the direction of movement	-
			Frame	Number of the plane in braille and Arabic numerals in relief at one height	≤1.20 m
				Voice synthesizer	-
Collective use spaces	Parking	Amount	-	Exclusive use of each dwelling	1 × reserved housing
			-	Collective use	1 × every 40 or fraction
			Transfer area	Perpendicular	Lateral free space
				Parallel	Free space at the rear
	Transfer area shared between two parking places	-	It is allowed if it has a width ≥	1.40 m	
	Electric mechanisms	Height of switches	-	-	0.80–1.20 m
		Height of the sockets	-	-	0.30 m
	Lobbies, stairs, doors and exits	Doors	General	Easily identifiable, with sufficient force to open the exit doors	≤25 N (≤65 N when the doors are fire resistant)
				Sliding doors	No risings are available on the pavement
				Indicative band in colour	H 0.60–1.20 m
Automatic opening with sensitive vertical sweeping devices				Speed-decreasing mechanism	0.50 m/s
			Sensitive devices that open doors in case of imprisonment	-	

Table 8. Cont.

Materials/Spaces	Position	Element to Check	Condition Searched
			Devices preventing automatic closing while the threshold is occupied
			Manual mechanism of automatic stop
	Emergency exits	-	By simple pressure and have double flat bar
			H 0.20 m y 0.90 m
	Lighting	Permanent	Minimum intensity
		Switches	Equipped with light pilot
			300 lux
			-

Source: VIDA research team's own design.

Analysis of the characteristics of existing adapted housing compared with those planned outside this legislation should make it possible to assess the economic impact of the further adaptation of housing in general. This will allow a better match between investments for policymakers and the definition of a new typology.

We propose a complete table of characteristics which will make it possible to draw up a checklist for assessing dwellings from the point of view of their suitability for older people. This table (Table 8) which is now being implemented in a web application, will be presented and completed by the end of 2021. Within Table 8, a comprehensive list of specific features that housing adapted to the needs of older people will require has been established. This table is being implemented as a web application that will be set up as a testing tool.

Within this context, a proposal for a new national housing regulation represents an opportunity to reflect the need for a new type of housing for older people since, at the time of writing, this new typology is not defined. Moreover, the closest approach to regulating the characteristics of housing suitable for the needs of older persons is to be found in the reservation of housing suitable for accessibility standards in promotions with the protections established by the DB-SUA document, belonging to the CTE, for the regularization of good accessibility in wheelchairs, as seen above.

Consequently, it is of as great an importance to consider the housing needs of an elderly population which requires specific care and attention, as much as it is to provide them with adequate financing for their housing needs.

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