

# Residential vulnerability and the housing question: a social and spatial-oriented analysis for the Andalusia metropolitan areas

Vulnerabilidad residencial y la cuestión de la vivienda:  
una aproximación socio-espacial para las áreas metropolitanas andaluzas

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## Abstract

The mismatch between basic household needs and the conditions and characteristics of dwellings is at the centre of residential vulnerability. According to the guidelines established in the international and national level, this paper aims to apply a two-dimensional perspective in urban and housing research. Indeed, the concept of residential vulnerability is used to address, jointly, the areas and social groups at risk due to housing characteristics and conditions. By analysing 2011 Population and Housing Census data, three indicators were developed, linking physical housing conditions to relevant social dimensions. This integrated perspective is used to identify the size and range of residential vulnerability situations brought about by the physical characteristics of dwellings and how they link to relevant social dimensions in the Andalusia metropolitan system. Results revealed significant deficiencies in housing conditions, yielding different impacts by metropolitan area and social group. Although the reported problems did not affect a sizeable proportion of the population, they proved relevant given the severity of the issues addressed and the social groups

involved. These shortcomings should constitute a priority for sustainable housing policies and urban plans.

**Key words:** residential vulnerability, housing quality, substandard housing, metropolitan areas.

## Resumen

El desajuste entre las necesidades residenciales de los hogares y las características de la vivienda supone un elemento constituyente de la vulnerabilidad residencial. De acuerdo con las directrices establecidas a nivel internacional y nacional, este artículo aplica un enfoque integral en el análisis de la realidad urbana. Así, el concepto de vulnerabilidad residencial es empleado para analizar conjuntamente las áreas y grupos sociales en riesgo debido a las características de la vivienda. A partir de los Censos de Población y Viviendas de 2011, se han desarrollado tres indicadores que permiten analizar la dimensión y alcance de las situaciones de vulnerabilidad residencial provocadas por las características físicas de la vivienda, y su relación con otras dimensiones de la vulnerabilidad social en el sistema metropolitano andaluz. Los resultados muestran importantes deficiencias respecto a las condiciones de las viviendas, con diferente intensidad entre las distintas áreas metropolitanas y grupos sociales. Aunque los problemas identificados afectan a una proporción reducida de la población, cuentan con gran relevancia debido a la gravedad de las situaciones residenciales que representan y los grupos sociales afectados. Estas problemáticas deben constituir un objetivo prioritario de las políticas de vivienda social y espacialmente sostenibles.

**Palabras clave:** vulnerabilidad residencial; calidad de la vivienda; infravivienda; áreas metropolitanas.

## 1 Introduction

The Spanish housing system is strongly determined by a private market weakly covered by social housing policies (Trilla, 2001; Scanlon et al., 2015). It is characterised by very high levels of ownership and very low –almost non-existent– levels of public housing,<sup>1</sup> compared to other European countries (Castles & Ferrera, 1996; Allen et al., 2004). This home ownership model has been in place since Franco's dictatorship, continuing on into later neoliberal policies

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1 Although the home ownership rate has declined in recent years, in 2017, 77% of the population lived in owned properties, 12 percentage points above the EU area – 18 countries (latest available data from the European Union – Statistics on Income and Living Conditions). Regarding social housing, this has been mainly provided in the form of owner-occupation (Scanlon et al., 2015).

(Feliciano & Aalbers, 2018) and the late capitalism's accumulation processes centered on the real estate sector (Lois González et al., 2016). Similar to other EU nations, and even to a greater extent, Spain has experienced both a financial and real estate boom and crisis over the last fifteen years, a climate which evidenced the weaknesses and problems underlying the housing supply market (Romero et al., 2012; Feria & Andújar, 2015). On the other hand, social housing policy has played a subordinate role throughout this period in relation to private sector intervention in the housing market. However, the failures of the private housing provision system highlight the need for public policies which guarantee the constitutional right to 'decent housing'.<sup>2</sup> This brings to the forefront two interrelated issues: identifying those social groups in need (a key component of social vulnerability) and identifying the specific spatial location of housing stock failing to meet basic decent home standards. The link between these two issues is extremely important when it comes to setting precise guiding targets for housing policies and plans in both spatial and social terms.

According to that, the article seeks to provide theoretical and empirical tools that can be used to correctly identify, measure and assess a key issue related to the housing question from an integrated perspective, and which herein are explored by adopting the notion of residential vulnerability. As will be shown, different housing scenarios may be related to vulnerability. In this paper, focus is placed on scenarios related to physical housing quality. Thus, the paper revisits an urban and housing problem which has lessened in recent decades but has not been completely fixed, especially for certain social groups and urban neighbourhoods. New conceptual and empirical tools to address the problem are proposed. From this perspective, the objectives are:

1. to test a conceptual framework for analysing the housing problem in terms of social vulnerability, being flexible enough to address both the social and physical dimensions of households, dwellings and residential areas. To this end, the concept of residential vulnerability is considered crucial to tackling this issue;
2. to establish criteria for measuring housing quality combined with social dimensions in order to identify situations that fall under residential vulnerability;

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<sup>2</sup> 'Vivienda digna' in the Spanish Constitution (art. 47).

3. to apply the analysis to a specific large-scale and complex housing context, namely the Andalusia metropolitan system, where measures and indicators can be tested to prove their effectiveness at both a theoretical and normative level; and
4. to provide conceptual references and empirical results that may prove useful in the design and implementation of public policies and plans.

The paper is structured as follows: first, the theoretical background is given, highlighting the relationship between housing and social vulnerability. Second, a description is provided of the indicators used which respond to the proposed conceptual framework (Physical Accessibility, Household Density, and Housing Quality), together with a brief explanation of the source data and the spatial scope of analysis. Third, a metropolitan-scale analysis of all three measures are performed, linking housing stock and specific vulnerable social groups: the elderly population in the first; the foreign population in the second; and a set of socioeconomic vulnerability indicators in the third. Finally, the main outcomes of the analysis are discussed and summarised from the perspective of enhancing knowledge about residential vulnerability to work towards targeted, social and spatial policies.

## **2 Theoretical framework**

### **2.1 Towards an integrated approach in urban and housing studies**

Since the 1990s, urban development has been high on the global, European, national and local political agenda. The development of strategies and guidelines that have been promoted across all levels has seen the social dimension grow in importance when defining urban sustainability in terms of equity, integration and social cohesion (Dempsey et al., 2011). Furthermore, and in relation to the aforementioned, progress has been made in acknowledging the need for taking an integrated approach to urban development, from both a knowledge (analysis and diagnosis) and intervention perspective. This calls for a comprehensive territory-centric approach, yet intersectorial in nature, where cities are the key sites for achieving this objective, simultaneously integrating social, economic and environmental challenges (McGranahan et al., 2016).

In terms of housing, this is reflected in a growing commitment to urban regeneration and intervention in the consolidated city, pursuing access to adequate housing for all social groups on the one hand, and efficient and sustainable land consumption up against urban sprawl initiatives on the other. Housing (having access to an adequate housing) is conceived as a key element in terms of social equity. For example, the first target of the 2030 Agenda for Sustainable

Development (GOAL 11) is “to ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums” (United Nations, 2015). At a European level, the EU Framework for Action for sustainable urban development had already established as one of its four objectives “Promoting equality, social inclusion and regeneration in urban areas” (European Commission, 1998). The Urban Acquis (2005) set out the “integration of disadvantaged groups of population (...) [and] physical urban revitalization” (Urban Future, 2005) among its objectives; and the 2007 Leipzig Charter on Sustainable European Cities highlighted the need for “making greater use of integrated urban development policy approaches” (Ministers, EU, 2007), driving forward integrated actions that combine improvements to the physical environment with a boost to the economy and employment, social cohesion and inclusion; and ensure that “special attention is paid to deprived neighborhoods within the context of the city as a whole” (Ministers, EU, p. 5).

These guidelines show the need for an integrated approach to the housing question. As mentioned above, this entails the need to build theoretical and analytical tools that are able of integrating the social and spatial dimensions in urban and housing studies. In the following section, the concept of residential vulnerability is developed in order to advance towards this objective.

## **2.2 A conceptual proposal for analysing housing-related vulnerability from an integrated approach**

The concept of social vulnerability allows grasping the gradual and evolving nature of social exclusion. Alguacil defines vulnerability as “that process of uneasiness caused by the combination of multiple disadvantage dimensions, during which all hope for upward social mobility (...) is considered as extremely difficult to reach” (2006, p. 161). However, the author points out a fundamental issue: the population identified as vulnerable is far from being a homogeneous group; instead, it is greatly fragmented, making it difficult to identify collective strategies for change (Alguacil, 2006, p. 161). Vulnerable situations can differ greatly from one another, as they are the result of the combination of different aspects of social life.

Thus, vulnerability is a more dynamic and gradual concept that leads the dichotomy “poverty/non-poverty” or “satisfied/non-satisfied” need, overcoming the kind of in-out dichotomy and the material one-dimensional concept of poverty, as is described by Subirats (2006) among others. On the other hand, the concept of vulnerability can also be useful to find a balance between objectivism and constructivism epistemologies. Indeed, Fabre points that: a) it

allows to address inter-subjectivity as it focuses on people, groups and communities, b) it does not neglect the structural elements that show the inequality between these groups; c) it allows describing risk levels, and d) designing resistance mechanisms (Fabre, 2015, p. 30).

Regarding housing-related vulnerability, the housing system can play a key role in social stratification (Marsh & Mullins, 1998), either promoting social inclusion or contributing to social exclusion (Somerville, 1998). It could be argued that the housing dimension is not only another feature of vulnerability, but also an essential, core component of social integration. Researchers see it as an indicator in itself of a family's well-being (Alonso, 1991). As Cortés & Navarrete point out, housing is essential to the process of social inclusion for any person, and particularly for those groups facing greater difficulties, because it is through housing that we can insert ourselves into the society we live in (Cortés & Navarrete, 2009).

Living in a dwelling without basic facilities, or in a high-density household, can make it difficult to achieve the right level of educational and professional integration. Furthermore, living in a dwelling with accessibility problems is likely to render daily life complicated for some social groups, especially the elderly population, thus generating or contributing to their isolation. In other words, having access to a living space for a secure period of time and which meets the physical requirements that underpin the residential context is a necessary and key part of achieving full social integration.

In last decades some critical voices have been raised against the lack of a theoretical body that has dominated housing research oriented to social policy (Kemeny, 1992; Clapham, 1997; Jacobs & Manzi, 2000). For these authors, policy-oriented research relies in a positivism epistemology (Jacobs, 2002;) and does not allow identifying the malleable condition of material and social relationship, nor the way in which different social groups experience or can react to determine physical conditions (Bartram, 2016). Epistemologies as social constructionist or postmodern geography have called to the need to include individuals experiences as "an active process of interpretation rather than a passive material apprehension of an external physical world" (Jacobs & Manzi, 2000). Even if this approach is necessary to deconstruct assertions that dominate urban and housing studies without questioning about individuals experiences, its main weakness is to keep off the analysis in objective terms and to preclude the possibility to set up criteria for measuring residential inequality in structural terms.

As stated above, the concept of vulnerability is useful to find a balance between objectivism and constructivism epistemologies as it allows addressing inter-subjectivity by focusing on people, at

the time it does not neglect the structural elements (Fabre, 2015). Thus, the notion of residential vulnerability could be fruitful as it allows establishing objective criteria to identify risk situations related to housing, but also to consider social agents' response or malleability and their own experiences. However, it must be pointed out that here is considered that there are some housing situations that generate themselves residential vulnerability, although social agents would have more or less capacity to transform those situations, or they perceive them in different ways and degrees. Moreover, the term of residential vulnerability takes into account that the consequences of housing problems go much further than the housing dimension, contributing or generating itself a situation of vulnerability to social agents.

On the other hand, not only social actors' experiences have to be considered, but their own characteristics in interaction with the physical conditions in which they unfold. According to a Council of Europe report, "vulnerable social groups from the point of view of housing can be defined in the context of the homelessness problem (...) including every housing situation that could be considered inadequate in the legal, social and 'physical' sense" (Council of Europe, 2008, p. 15). Accordingly, Bartram reviewed the main approaches adopted in studies on housing-related material and social vulnerabilities, stating that "researchers have not settled on conceptual tools to account for and study the role of both social and material characteristics of people and their housing" (2016, p. 469). To move this forward, Bartram argues that material characteristics (physicality of dwellings) as well as social characteristics (people themselves) should be considered, focusing on why people live where they do (or who is likely to live where) and how social and material vulnerabilities are related. This is a relevant assessment, but it is worth noting that material and social vulnerability are two dimensions of the same unequal reality. If we take them as separate entities, it becomes extremely difficult to adopt an empirical and theoretical approach to understanding the relationship between housing-related social and material vulnerability.

From this perspective, the notion of residential vulnerability could also be a fruitful way forward. Similar to Kemeny's approach in his sociology of residence (1992), which attempts to break down the dichotomy between dwelling and household by proposing the household-in-dwelling concept, residential vulnerability invites us to conceptualise the interrelationship between social and material dimensions. It is the people themselves who are vulnerable, but their housing conditions can be the root of this vulnerability. Moreover, objective housing conditions may lead to varying degrees of vulnerability for different households and social agents. That is, while some

physical housing conditions are enough to place their residents in a vulnerable situation, others emerge precisely from the interaction between housing conditions and household characteristics.

Specifically, risk of vulnerability occurs when the minimum requirements of a dwelling (once inhabited) are not met, which rests on three basic premises: habitability, developed through safe construction practices, basic facilities, and housing density conditions; stability, by guaranteeing permanent housing rights; and urbanization, through successfully integrating the dwelling into the urban fabric, which should deliver all the necessary public services (Cortés et al., 2013).

Thus, residential vulnerability can be defined as all those situations brought about by housing inadequacies related to the household domain that cause disadvantage in a specific sociohistorical residential context, and that can be experienced in different degrees by the social groups whom it affects. Some may only be physical problems, others could be deemed inappropriate in line with household characteristics, and others could be affordability and stability issues. Regarding physical housing characteristics, residential vulnerability may be caused by not complying with some minimum standards (e.g., basic facilities, health standards) or by not adapting to the needs of the resident population (e.g., sufficient space, special needs). The proposal is based on the points made above, summarised as follows:

1. The need for an interpretive and analytical framework that integrates social and physical dimensions of housing-related vulnerability. From this perspective, the concept of residential vulnerability seems to encompass both dimensions and enables interaction between them. Empirically, this calls for measures that identify physical housing deficiencies; analyse dwelling and household characteristic interaction; and explore the differences between social groups (e.g., the elderly population).
2. The need to address how residential vulnerability interacts with other types of social vulnerability, which can improve or worsen the situation brought on by residential issues. Arguably, if social agents are also vulnerable in other fields, they would be less likely to see an improvement in their residential position, failing to reach integration.
3. The need to establish criteria associated with a particular residential context. More importantly, any housing position analysis should be conducted by addressing the relational nature of the



field.<sup>3</sup> Residential vulnerability situations must therefore be defined according to the sociohistorical residential context in which they are embedded.

### **2.3 Physical housing conditions and residential vulnerability in a Spanish and Andalusian residential context**

The actual urban dynamics cannot be understood without taking into account the economic, political and social context in which they are located. The consolidation of a postfordist productive system based on flexibility (Castel, 2003) and the widespread expansion of neoliberal ideology (Brenner & Theodore, 2002), have caused a growing dualization of the socio-labour structure (Castells, 1989) and a precariousness of those social sectors that are excluded in the new productive organization (Wacquant, 2007). This generates an increase in social polarization, reflected in a generalized increase in inequality and social vulnerability. Social changes that generate different urban and spatial processes as residential and ethnic segregation (Crowder and Krysan, 2016; Van Ham and Tammaru, 2016) the generation of disadvantaged or vulnerable neighborhoods (Alguacil et al., 2014; Arias, 2000; Egea et al., 2008; Egea & Nieto, 2015; Ministerio de Fomento, 2015; Cornado et al., 2017; Temes, 2014); gentrification (Hochstenbach and Musterd, 2016; 2017), territorial stigmatization (Wacquant, Slater & Pereira, 2014; Slater, 2009, 2016), among others; processes that in combination give rise to a socio-spatial inequality that Marcuse and Van Kempen have called *quartered city* (Marcuse, 1989; Marcuse and Van Kempen 2000).

Spain is among the European countries worst hit by the recent crisis (Aalbers, 2013). Since the beginning of the global financial crisis, residential vulnerability related to access (affordability) and stability has seen a dramatic increase (Colau & Alemany, 2012). Spanish housing policy has always been subordinated to the needs of the capital reproduction without “giving reality to a public housing stock, as a right for anyone who does not want to face the free housing market.” (López & Rodríguez, 2010, p. 269).<sup>4</sup> This housing system, with a very low presence of public housing, places individuals and families with the responsibility of being able to afford a decent

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3 The concepts of social and housing position are used here in the way of Bourdieu's theory of social field. From his perspective, social world is a relational system in which social agents are positioned through the volume and distribution of each different kind of capital accumulated (economic, cultural, social and symbolic) and by the value assigned to each of them in specific field (Bourdieu, 1998, 1990; Bourdieu & De Saint Martin, 1990). Each of those fields are relatively autonomous domains with “specific stakes and interests, which are irreducible to the stakes and interests specific to other fields (Bourdieu, 1995, p. 72) and that is structured by “a state of power relations among the agents or institutions engaged in the struggle” (Bourdieu, 1995, p. 73).

4 For a complete analysis of the urban development model in Spain from the political economy perspective, it can be consulted this same reference (López & Rodríguez, 2010), as well as Sevilla (2015).

housing. The amount of economic capital accumulated is the key determinant in access to housing, with an important role of families helping in the purchase of homes (Allen et al., 2004; Arbaci, 2007; García, 2010). The already unfavourable residential context that the most precarious social groups (e.g., youth, immigrants, the elderly) find themselves in has been exacerbated, leading to extremely harsh situations such as evictions; this is driven by the financialization of the housing process and the attribution of credit to households that would not be eligible under normal circumstances (Rolnik, 2009, 2012, 2013).

The labour market crisis (highly dependent on the construction sector during the country's economic growth period), combined with the tightening of mortgage criteria and the subsequent pressure put on the limited private rented sector, have made it considerably more difficult for certain social groups to afford adequate housing. Problems such as a rise of evictions because people are unable to keep up on their mortgage or rent payments has, understandably, attracted a lot of attention in critical academic research and among social movements (García-Lamarca, 2017; Vives-Miro et al., 2018; Colau & Alemany, 2012).<sup>5</sup>

This paper focuses on residential vulnerability brought about by housing quality. The reason is that from the mid-1990s to 2007, Spain experienced high rates of housing stock growth, even exceeding population growth (Feria, 2018). As for housing stock growth figures, one might expect residential problems, especially those related to physical housing conditions, to have been solved during this period. However, we still find dwellings in deplorable condition and a significant imbalance between households and dwellings. Thus, it is necessary to focus on the scale of housing quality problems and the affected social groups. Even though the number of dwellings with major physical problems has declined over the past few decades, there is still housing stock with major deficiencies, representing far from adequate levels of housing quality.

In spatial terms, new housing stock during the boom years was not equally distributed geographically. Housing building expansion was mainly in metropolitan areas and along some tourist coastlines, mostly linked to the former (Feria, 2018). For this reason, among others, the analysis focuses on metropolitan areas as the potential territories where housing quality-related residential vulnerability may have declined thanks to large-scale housing construction schemes.

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5 Colau and Alemany (2012) analyze the role of the administration in the period of very strong real estate expansion and inflation, as well as the emergence of the "Mortgage Affected Platform" (Plataforma de Afectados por la Hipoteca) as a social response to one of the most serious problems generated by real estate financial speculation.

Furthermore, housing quality problems in metropolitan areas reveal processes of urban inequality, which respond to dynamics different to those produced in rural areas.

The application of a relevant territorial scale, accompanied by consequent analytical spatial disaggregation, is key to understanding urban phenomena (Feria et al., 2015). However, at least for this and other related topics, it is seldom applied in Spanish urban and regional studies.

On the other hand, while the common factors of the Spanish housing system have been elucidated, we need to consider its internal disparities. Spain enjoys regional autonomy when it comes to health, education and housing policy matters, among other aspects, which allow us to label it “‘de facto’ [as] a federal country” (García, 2010, p. 968). By focusing our attention on the Andalusia metropolitan areas, which not only make up a single sociohistorical residential context but also represent a relatively wide-reaching and diverse universe in their size, urban structure and dynamics complexity (Feria, 2013), similar to medium-sized EU countries, we are able to draw firm and comparable conclusions.

### **3 Methodological issues: measures, data sources, and spatial scope**

#### **3.1 Measures**

As stated above, the aim was to couple social and physical dimensions of housing-related vulnerability using conceptual and analytical tools that moves forward in an integrated approach to the housing question.

Once the concept of residential vulnerability in this respect has been presented, a shift needs to be made to the empirical dimension by establishing objective and relevant indicators for their analytical application. This work addresses residential vulnerability derived from physical housing conditions that can lead to situations of vulnerability in itself, or produce it through a combination of dwelling and household characteristics. To this end, indicators that enable us to link both social and physical dimensions of housing-related vulnerability are needed. The indicators used are consequently described, pointing out the household characteristics that could cause residential vulnerability, their measures and the adopted thresholds.

The first indicator addresses physical accessibility problems by analysing the dwellings and residents of buildings with four or more storeys and no lift (including the ground floor). This situation does not generate in itself residential vulnerability scenarios among the entire population, but it does among those groups for whom access to a lift may be a necessity, particularly those with reduced mobility such as people with disabilities or the elderly.

This indicator was developed by linking the variable 'number of floors' with the variable 'lift'; a building is then considered to pose severe accessibility problems when it is over three-storeys high and has no lift. It should be noted that the floor on which the dwelling is located is unknown; from this perspective, the only information available is the building's total number of floors. This means that not all residents in a 4-storey building face accessibility problems regarding their dwellings, as they may live in a lower floor, including the ground floor. Irrespectively, this indicator allows us to identify the number of residents in buildings lacking basic accessibility features.

The elderly represents one of the most vulnerable social groups for housing (Auría & Pérez, 1991; Benito-Martínez & Benito-Lozano, 2013) and they face major challenges in their everyday lives because of physical changes with ageing and diminished mobility, unable to adapt their dwellings or building facilities. Although the literature shows that ageing in place is viewed positively and often preferred by the elderly, because of place attachment to home and community (Wiles et al., 2012), this population may experience significant daily problems and feel trapped in their homes if living conditions are substandard.<sup>6</sup> Therefore, in order to perform residential vulnerability analysis here presented, focus was placed on the over-65s, a group at greater risk of accessibility problems.

The second indicator addresses household density. This was a significant issue in Spain from the mid-1950s through to the 1980s, a time of mass construction of mostly small-sized dwellings. Coupled with relatively large families, it resulted in overcrowded dwellings, affecting quality of life and even health standards. Although nowadays this no longer holds such relevance, an evaluation of this housing stock dimension is still needed, particularly among groups who find it difficult to access housing, for whom overcrowding may become an undesirable path to finding housing they can afford.

The rate that follows shows the relationship between household size divided by the number of available rooms minus one (the kitchen), with the exception of single-room dwellings, in which case no room is deducted. The continuous variable has been regrouped into three distinct categories as shown in Figure 1. According to similar studies (Melki et al., 2004 & HUD, 2007), the optimal rate between the number of residents in a dwelling and the number of available rooms is less than one person per room.

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<sup>6</sup> For a comprehensive review of "ageing in place" literature, see Andrews and Philips (2005).

Figure 1. Household Density Index, classification of values

<b>HOUSEHOLD DENSITY INDEX = Household size / (Number of rooms in the dwelling -1)</b>
- Extreme Density: HDI > 2 individuals per room
- Moderate Density: $1 \leq \text{HDI} \leq 2$ individuals per room
- Satisfactory Density: HDI < 1 individual per room

Source: own elaboration, based on Melki et al. (2004) and HUD (2007)

The immigrant population is one example for whom overcrowding has become an undesirable path to finding housing they can afford. While it is true that conditions vary by nationality (Hernández & López, 2013), it is the immigrant population which often lives in smaller dwellings with a fewer number of rooms. Consequently, the focus of this indicator analysis is on the difference between national and non-national populations.<sup>7</sup>

Lastly, the housing quality indicator addresses housing situations that fail to meet the minimum physical requirements due to a lack of basic facilities or structural problems. Basic facilities include a water supply, plumbing facilities, a sewage system and facilities for satisfying the basic needs of all members of society. Dwellings or buildings without basic facilities affect all residents, not only placing them in a situation of residential disadvantage in the Spanish and Andalusian context, but also preventing them from integrating as they should into other social spheres.

A selection was made of dwelling and building variables from the 2011 census corresponding to the basic facilities a dwelling should have within the sociohistorical residential context under study, acknowledging that these deficiencies immediately expose inhabitants to a situation of residential vulnerability. Specifically, five variables were extracted from the 2011 Census, deemed essential for identifying major problems associated with housing stock quality:

- Bathroom with WC. Categories: Yes / No
- Bathtub or shower. Categories: Yes / No

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<sup>7</sup> The analysis of the immigrant population was performed using the variable 'nationality' instead of 'country of birth'. 'Nationality' refers to a legal status that allows us to identify a turning point in the complex integration process; it is difficult to pinpoint the moment in which the individual stops being an immigrant—not only in the legal sense but also socially and symbolically. Furthermore, obtaining nationality is not a definite route to full integration, and housing inequality may persist thereafter. Nationality is usually obtained at an advanced stage of the migration process and is associated with a better position than earlier on in the process, that is, upon arriving to the host country. These results have been compared to those reported under 'country of birth', showing that foreign-born individuals live in worse household density conditions than those who have already acquired Spanish nationality.

- Water supply system. Categories: Yes<sup>8</sup> / No
- Sewage system. Categories: Yes<sup>9</sup> / No / No available information
- Building condition. Categories: Extreme / Precarious / Inadequate / Standard / No available information

Based on a combination of these variables, a scale was developed ranging from extreme to standard situations, establishing the following housing quality conditions (see also Figure 2):

1. Extreme: primary residences in extremely poor condition, due to either construction problems or a lack of basic facilities. Dwellings deemed extreme are those located in a “dilapidated” building; those located in buildings in “poor condition” and lacking any basic facilities; and those dwellings without three or four basic facilities, regardless of the building’s condition.
2. Precarious: dwellings with structural problems which require solutions or lacking in basic facilities. This also includes dwellings located in buildings in “poor condition” with all basic facilities available; and those located in buildings which have officially been registered as “inadequate” or “in good condition”, but still lack one or two basic facilities.
3. Inadequate: dwellings with structural weaknesses (located in buildings officially registered as “inadequate”) but equipped with all basic facilities. The census definition of “inadequate” is fairly heterogeneous, yet all dwellings are located in buildings in need of improvement.
4. Standard: dwellings in standard physical condition and which meet minimum standard housing requirements at a societal level. This includes housing free from structural problems and with all basic facilities.

Figure 2. Housing quality indicator categories

		Lack of basic facilities				
		Not lacking	1	2	3	4
Building's condition	Extreme	E	E	E	E	E
	Precarious	P	E	E	E	E
	Inadequate	I	P	P	E	E
	Standard	S	P	P	E	E

E: Extreme  
P: Precarious  
I: Inadequate  
S: Standard

Source: own elaboration

8 Recoded from variable categories “Public Water Supply” + “Private Water Supply”.

9 Recoded from variable categories “Sewage System” + “Other”.

In order to analyse the relationship between quality-driven residential vulnerability and social integration, the housing quality indicator was cross-referenced with social vulnerability indicators related to the fields of production and education: activity status (for the working-age population); schooling of under-16s; and educational attainment of the 16-plus population.

As can be observed, the variables used to construct the indicators largely correspond to those most frequently used in the unit-of-analysis approach of urban vulnerability research,<sup>10</sup> as shown in Table 1 (Alguacil et al., 2014; Egea et al., 2008; Egea & Nieto, 2015; Ministerio de Fomento, 2015; Cornado et al., 2017; Temes, 2014).

**Table 1. Most frequently used dimensions and indicators in urban vulnerability research**

DIMENSION	INDICATORS
Sociodemographic	<ul style="list-style-type: none"> <li>• Demographic ageing</li> <li>• Proportion of foreign population</li> <li>• Single-parent families</li> <li>• Dependency ratio</li> </ul>
Socioeconomic	<ul style="list-style-type: none"> <li>• Unemployment rate</li> <li>• Precarious job market (instability and low income)</li> <li>• Educational level</li> <li>• Income level</li> </ul>
Residential and urban context	<ul style="list-style-type: none"> <li>• Dwelling conditions (lack of basic facilities)</li> <li>• Dwelling size</li> <li>• Building conditions</li> <li>• Age of housing stock</li> <li>• Housing density / Overcrowding</li> <li>• Accessibility problems</li> <li>• Urban services and equipment</li> </ul>

Source: own elaboration

### 3.2 Data sources and spatial scope

This analysis has been developed based on data extracted from the 2011 Housing and Population Census, which no doubt represents the last chance in Spain to conduct an analysis by crossing sociodemographic, socioeconomic and residential dimensions with a territorial breakdown scale

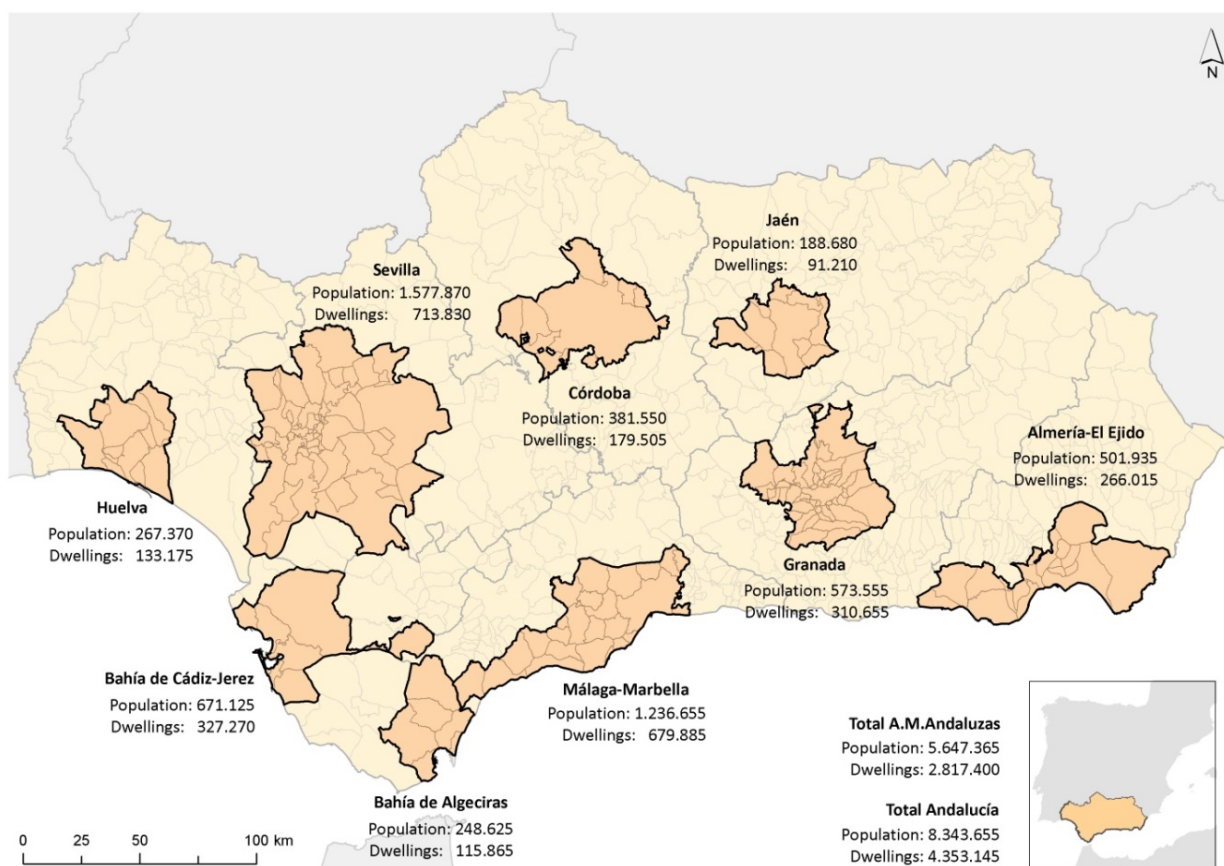
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<sup>10</sup> These studies adopt a basic-unit-of-analysis spatial delimitation, which may be either neighbourhoods or census tracts, depending on the availability of disaggregated information. The concentration of indicators of social and housing disadvantage on these spatial units are analysed, as are, at times, other urban indicators related to the presence or absence of services and equipment, urban integration, etc.

similar to the one addressed in the present study. It is worth noting that in 2011, the Population and Housing Census ceased to be an exhaustive count; a model based on administrative records accompanied by a sample survey was adopted.<sup>11</sup> This change has had a significant impact on the census information available depending on the territorial disaggregation level, which has conditioned the analysis units in this study.

Regarding housing data, it has been carried out the research using the INEbase system, obtaining tables with up to five entries to produce our analysis indicators. Regarding population data, the IECA (Andalusian Statistics and Cartography Institute) provides with census microdata. Although these data do not identify municipalities with less than 20,000 inhabitants by name, they have allowed to identify which metropolitan areas they belong to, thus making it possible to apply the indicators on a metropolitan area level.

Figure 3. Basic data corresponding to the Andalusia metropolitan areas



Source: own elaboration, based on Population and Housing Census data (2011)

11 There are no plans for more Population and Housing censuses in Spain that enable this type of analysis, meaning that this represents a final opportunity to analyse the intensity with which social and residential vulnerability crisscross with socioeconomic variables, and a territorialised analysis.



The analysis covers the nine Andalusia metropolitan areas,<sup>12</sup> which make up a relatively large and diverse universe, not only in size and hierarchy but also in its functional and morphological configuration (Feria, 2013). This universe encompasses more than five and a half million people and its housing stock includes over two million dwellings (see Figure 3).

## **4 Residential vulnerability derived from physical housing conditions**

### **4.1 Accessibility for the elderly**

In general terms, there is a significant proportion of dwellings with basic facility issues regarding accessibility: nearly 14% of all dwellings and 12% of the Andalusia metropolitan system population are affected. However, the share of buildings with more than three storeys and no lift yields significant variations from one metropolitan area to another, reflecting the various housing typologies (see Table 2) and differences in percentages of older housing stock. Thus, the highest figures of buildings with accessibility problems are likely due to a higher percentage of housing built between 1960 and 1980, a significant construction period of buildings with this deficiency. On the other hand, metropolitan areas as Almeria-El Ejido or Granada, with lower percentages of dwellings with accessibility problems, present higher proportions of single-family dwellings built in 1990 and 2000 linked to the metropolitan suburbanization process.

The older population is highly affected by accessibility problems. Among all those living in dwellings with accessibility problems, 16.6% is aged over 64. This group is over-represented among residents in buildings with severe accessibility problems. This reality has a twofold impact: from a qualitative point of view, accessibility problems represent a particular disadvantage for the elderly; and from a quantitative standpoint, the elderly are the group most affected by this problem across all metropolitan areas. The desired scenario—which sees housing adapted to life stages—would be, a priori, to find a lower proportion of older adults living in buildings that lack accessibility features. However, the opposite occurs: there are more elderly residents in these buildings (14.4%) than there are under-65s (11.8%).

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12 The delimitation of metropolitan areas used is based on the functional integration of supra-municipal areas that make up a unitary market of residence and work, which reflects both the increase in the collective 'living space' and the different spatial strategies of economic agents (Feria, 2004). Its methodology is based on commuting (Feria, 2013; Feria et al., 2015; Feria et al., 2018), attending to the widespread use of this variable for the definition of the metropolitan phenomenon at international level, including right now Urban Audit and INE (Spanish National Statistical Institute).

Table 2. Primary residences in buildings with more than three storeys and no lift.  
Andalusia metropolitan areas (2011)

Metropolitan area	Number of dwellings with available information	Number of dwellings in buildings with more than three storeys and no lift	Dwellings in buildings with more than three storeys and no lift (%)
Almeria-El Ejido	168,790	16,320	9.7
Bahia de Algeciras	87,775	11,645	13.3
Bahia de Cadiz-Jerez	236,405	45,255	19.1
Cordoba	138,905	31,885	23.0
Granada	215,620	14,965	6.9
Huelva	93,590	14,540	15.5
Jaen	67,975	6,180	9.1
Malaga-Marbella	459,385	36,790	8.0
Sevilla	554,980	91,210	16.4
Total Andalusia MA	2,023,420	268,790	13.3
Total Andalusia	3,002,745	326,580	10.9

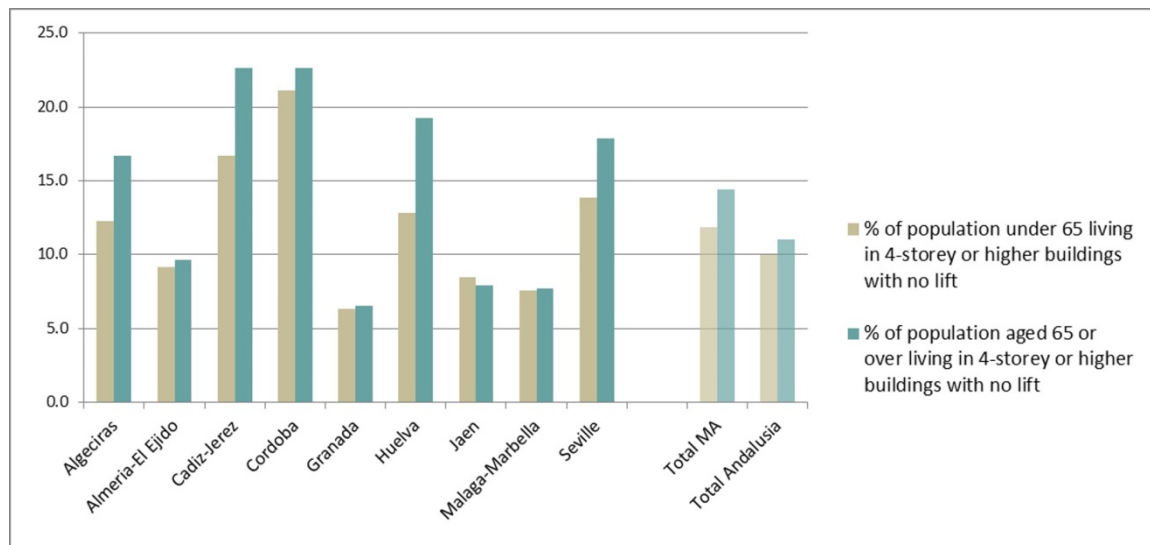
Source: own elaboration, based on Population and Housing Census data (INEbase, 2011)

It is possible to distinguish between two types of metropolitan areas based on age-group distribution in buildings with accessibility problems (Figure 4). The first corresponds to a homogeneous age distribution in these buildings, whereas the second corresponds to considerably more elderly people living in buildings with accessibility problems than their under-65 counterparts. In the latter case, the elderly's strong presence in these types of buildings may find its answer in their occupancy of an older residential stock that has not been adapted to the functional needs of its residents.

Notably, women account for 60.6% of the elderly population living in buildings of this type. Even this is partly due to the demographic structure (57.4% of all over-64s are female), there is a vulnerability aspect affecting women that cannot be explained by this specific population structure. The proportion of people over 64 living in buildings with accessibility problems, is 2 points higher within women than men. In addition, Women's vulnerability to this issue becomes

increasingly problematic if we take into account that 34% of women aged over 64 residing in buildings with accessibility problems live alone, as opposed to 14% of men belonging to this group. Regardless of whether the demographic structure or different housing strategies for men and women are responsible for this outcome, it is clear that women are more likely to be exposed to housing with accessibility problems.

**Figure 4. Residents in buildings with more than three storeys and no lift by age group (percentages). Andalusia metropolitan areas (2011)**



Source: own elaboration, based on Population and Housing Census microdata (2011)

#### 4.2 Household density

As stated above, the relationship between household size and the number of available rooms in the dwelling may generate situations of housing density above adequate levels. These can be situations of extreme density (more than two individuals per room) or moderate (between one and two individuals per room).

According to the Household Density Index, 54% of Andalusia metropolitan residents experience a satisfactory combination of household size and number of rooms available in their dwelling, and on the opposite spectrum, 2.5% of the population (138,412 residents) live in extreme density. But it does not affect all social groups equally, being evident that the immigrant population is overrepresented in high household density situations, especially when the situation get worse: among the total population affected by extreme density, 24.5% are non-nationals, a threefold increase on the percentage of immigrants recorded in total population figures.

However, it is needed to distinguish between labour migration and other forms of migration, given the heavy presence of retired British and north-European citizens in some Andalusia metropolitan areas, including Malaga-Marbella and Granada. One would imagine that their housing conditions differ from those belonging to the first group; therefore, a separate analysis was carried out on nationals from OECD countries. A comparison of the situations by nationality reveals that while the average HDI of immigrants from OECD countries is lower than that of nationals, the foreign population from other countries records the highest HDI, rising to 1.31 individuals per room (see Table 3a). In addition, the analysis of variance (ANOVA) shows that the differences between the means of, at least one, of the groups are statistically significant; as well as that the housing density is influenced by the nationality (Table 3b).<sup>13</sup>

**Tables 3a and 3b. Household density for national and non-national residents in the Andalusia metropolitan system, 2011. ANOVA test (Analysis of variance)**

a) Descriptives' table

NATIONALITY	MEAN	N	STD. DEVIATION
Spanish	0.9006	5,185,693	0.51415
OECD countries	0.8554	139,992	0.52675
Other countries	1.3158	334,025	0.79254
Total	0.9239	5,659,711	0.5439

b) ANOVA table

	SUM OF SQUARES	DF	MEAN SQUARE	F	SIG.
Between groups	54774,740	2	27387,370	95711,567	0,000
Within groups	1619496,088	5659708	,286		
Total	1674270,829	5659710			

**Key:** N: population size; F: Fisher-Snedecor's F; DF: Degrees of freedom; Sig.: Significance

Source: own elaboration, based on Population and Housing Census microdata (2011)

13 When F is greater than 1, the null hypothesis tends to be rejected and it can be concluded the existence of significant differences between the means.

The following table (Table 4) shows that household density problems most affect foreign individuals from non-OECD countries, which suggests that there are two parallel realities at play. As detailed below, the percentage of non-OECD citizens living in satisfactory household density conditions is 30 points lower than within the Spanish citizens.

Once again, this gap widens when we take into account extreme household density, which affects a rate nearly five times higher within the aforementioned group than within Spanish citizens. Thus, we can draw the conclusion that non-OECD residents experience overcrowding considerably more than the other populations. This is brought about by housing access 'strategies' derived from the unduly high prices set by the market and by owners' discriminatory practices, who take advantage of the emergency housing situation and the lack of knowledge surrounding the housing market (Algaba, 2003).

The percentage of individuals experiencing moderate household density was usually lower among people from other OECD countries, with the exception of the Jaen metropolitan area (see Figure 5). This is likely due to labour migration, even though the countries of origin are OECD countries.<sup>14</sup>

In terms of extreme density situations (see Figure 6), the gaps widen even further between different population groups across most metropolitan areas. Huelva is a particularly interesting case, with the highest percentage of non-OECD citizens experience this household situation and the biggest difference compared with the rate of Spanish citizens. Significant differences between the two population groups are observed in Algeciras and Almeria-El Ejido. This is likely due to the higher number of non-nationals working in the agricultural sector, where they find themselves subject to very precarious social, labour and housing conditions.

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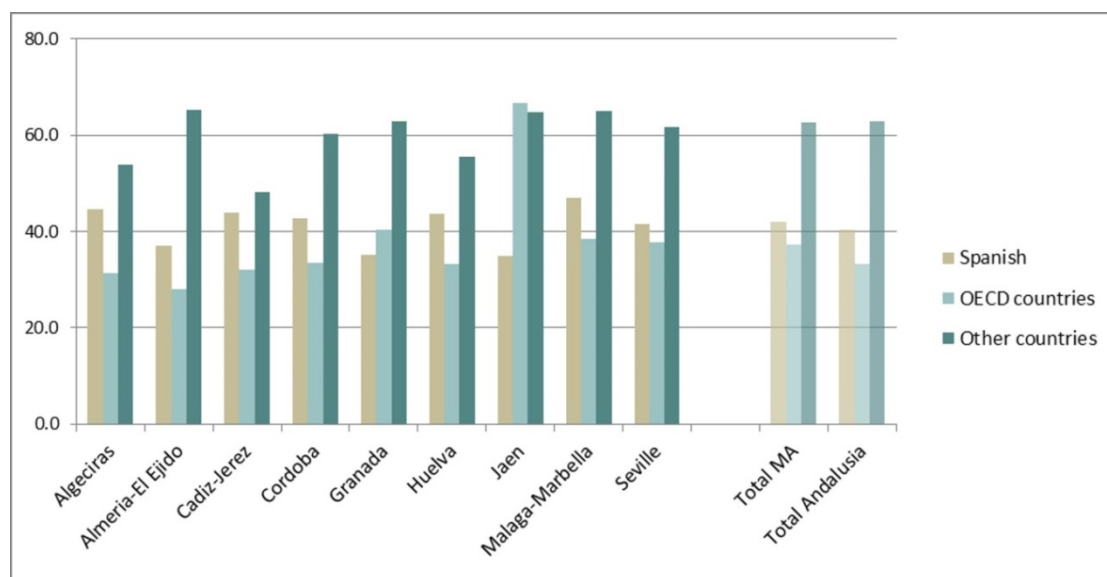
14 Specifically, 53% of OECD-born residents in the Jaen metropolitan area are Polish, and it is highly likely that this figure represents rural labour migration than tourism-driven migration.

Table 4. Household Density Index categories for national and non-national residents in the Andalusia metropolitan system (2011)

NATIONALITY	EXTREME HOUSEHOLD DENSITY	MODERATE HOUSEHOLD DENSITY	SATISFACTORY HOUSEHOLD DENSITY	TOTAL
Spanish %	104,510 2.0	2,182,339 42.1	2,898,844 55.9	5,185,693 100.0
OECD countries %	2,809 2.0	52,161 37.3	85,022 60.7	139,992 100.0
Other countries %	31,094 9.3	209,652 62.8	93,279 27.9	334,025 100.0
Total %	138,413 2.4	2,444,152 43.2	3,077,145 54.4	5,659,710 100.0

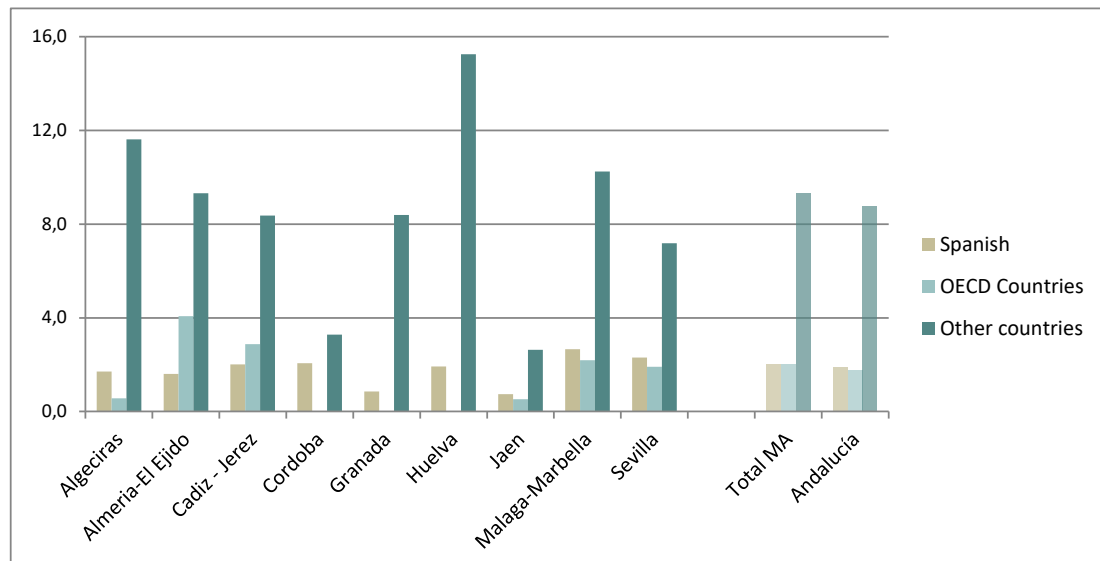
Source: own elaboration, based on Population and Housing Census microdata (2011)

Figure 5. Individuals in moderate household density by nationality (percentages). Andalusia metropolitan system (2011)



Source: own elaboration, based on Population and Housing Census microdata (2011)

Figure 6. Individuals in extreme household density by nationality (percentages).  
Andalusia metropolitan system (2011)



Source: own elaboration, based on Population and Housing Census microdata, 2011.

#### 4.3 Housing quality indicator and social vulnerability measures

As previously explained, the housing quality indicator is used to identify all housing situations that fail to meet minimum physical requirements due to a lack of basic facilities or structural problems. One would expect the number of people and dwellings affected to be relatively low, as the deficiencies measured should have already been addressed in a residential context like Andalusia.

It is worth recalling here that the housing quality indicator enables to identify four categories through a combination of basic facilities in the dwelling and the building's condition. These categories start from "standard" and grow in severity to 'inadequate', followed by "precarious", and ending in "extreme".

In this section, the main findings from the analysis on the scale of dwellings and residents affected by the housing quality problems identified in the Andalusia metropolitan areas are presented. This is followed by a look at how it links to other social vulnerability dimensions.

##### a) Housing quality indicator

Most of Andalusia's metropolitan housing stock meets standard living conditions (circa 93% of primary residences). Although this figure reveals a high number of dwellings performing at normal quality levels, it does mean that almost 7% of primary residences for which data is available fall below the minimum physical quality level deemed acceptable in this residential

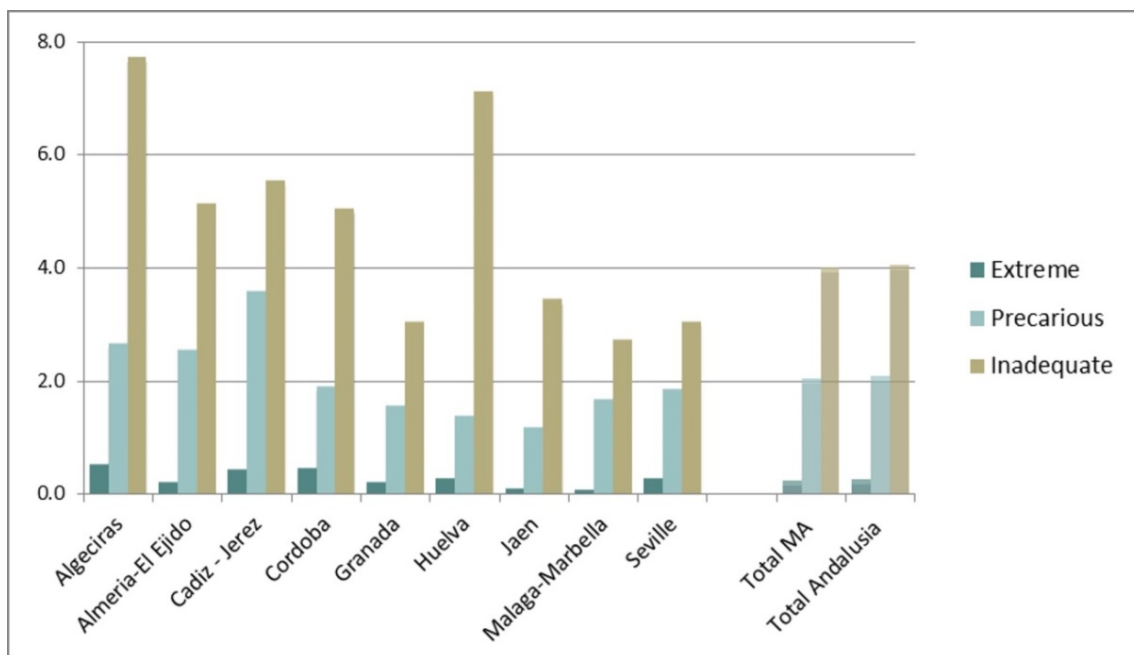
context. This affects, to be exact, 354,000 individuals without basic facilities or living in dwellings with structural problems, with notable differences among metropolitan areas.

Table 5. Housing quality of primary residences in the Andalusia metropolitan areas

METROPOLITAN AREA	PRIMARY RESIDENCES	%	EXTREME	%	PRECARIOUS	%	INADEQUATE	%	STANDARD	%
Almeria-El Ejido	168,780	100	365	0.2	4,020	2.4	8,730	5.2	155,655	92.2
B. Algeciras	87,775	100	360	0.4	2,420	2.8	6,700	7.6	78,280	89.2
B. Cadiz-Jerez	236,410	100	1,210	0.5	8,775	3.7	14,115	6.0	212,295	89.8
Cordoba	138,900	100	600	0.4	2,635	1.9	7,285	5.2	128,360	92.4
Granada	215,615	100	430	0.2	3,710	1.7	7,175	3.3	204,285	94.8
Huelva	93,590	100	280	0.3	1,380	1.5	7,015	7.5	84,915	90.7
Jaen	67,975	100	95	0.1	905	1.3	2,365	3.5	64,605	95.0
Malaga-Marbella	459,395	100	345	0.1	7,580	1.7	14,055	3.1	437,425	95.2
Seville	554,985	100	1,535	0.3	10,575	1.9	18,805	3.4	524,095	94.4
Andalusia MA.	2,023,425	100	5,220	0.3	42,000	2.1	86,250	4.3	1,889,915	93.4
Andalusia. Total	3,002,745	100	8,335	0.28	65,910	2.19	130,050	4.3	2,798,455	93.2

Source: own elaboration, based on Population and Housing Census microdata (2011)

Figure 7. Percentage of individuals living in substandard dwellings according to the housing quality indicator



Source: own elaboration, based on Population and Housing Census microdata (2011)



As might be expected, the number of people living in substandard dwellings diminishes as housing quality worsens. Housing stock classified as inadequate is that which yields the highest figures within the substandard categories of housing quality, specially in some metropolitan areas such as Algeciras and Huelva. Housing classified as precarious represents the primary residence of 2% (almost 115,000 individuals) of the total population of Andalusia's metropolitan system. In this case, the metropolitan areas with the highest numbers are Cadiz-Jerez, Algeciras and Almeria-El Ejido. The percentage of people living in extreme dwellings is very low across all metropolitan areas, although this translates into almost 13,300 individuals in housing with severe deficiencies.

*b) Social vulnerability measures and housing quality*

As previously discussed, situations of residential vulnerability derived from housing quality can be aggravated through the combination with other types of social vulnerability. As such, it is necessary to examine how these situations intermingle, which is performed here by cross-analysing them with socioeconomic vulnerability indicators.

First, it should be noted that dwellings in extreme and precarious condition boast a younger age structure than the remaining housing categories, whereas those groups living in inadequate dwellings have fewer children and are over 64 years of age. In terms of nationality, non-OECD residents report worse housing conditions than their Spanish counterparts, presenting percentages in substandard housing quality categories that nearly double those of Spanish citizens (see Table 6).<sup>15</sup>

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15 For the purpose of this analysis, it would be useful to have data on ethnic groups, given that the Roma population is one such group which faces considerable housing challenges in Spain. Moreover, a third of the Spanish Roma population lives in the Andalusia region (FSG, 2007). However, population and housing censuses do not offer this kind of information.

Table 6. Housing quality indicator categories for national and non-national residents in the Andalusia metropolitan system (2011)

	SPANISH	(%)	OECD COUNTRIES	(%)	OTHER COUNTRIES	(%)	TOTAL	(%)
Extreme	11,836	0.2	106	0.1	1,326	0.4	13,268	0.2
Precarious	98,772	1.9	2,431	1.7	13,730	4.1	114,933	2.0
Inadequate	197,880	3.8	3,983	2.8	24,610	7.4	226,473	4.0
Total substandard	308,488	5.9	6,520	4.7	39,666	11.9	354,674	6.3
Standard	4,738,478	91.4	128,300	91.6	283,078	84.7	5,149,856	91.0
No building information	138,727	2.7	5,173	3.7	11,282	3.4	155,182	2.7
Total	5,185,693	100.0	139,993	100.0	334,026	100.0	5,659,712	100.0

Source: own elaboration, based on Population and Housing Census microdata (2011)

Table 7. Housing quality indicator categories for the unemployed and inactive population. Andalusia metropolitan system (2011)

	ANDALUSIA. TOTAL	HOUSING QUALITY INDICATOR				
		EXTREME	PRECARIOUS	INADEQUATE	TOTAL SUBSTANDARD	STANDARD
Unemployment rate <sup>1</sup>	38.92	44.43	47.10	49.69	48.66	36.14
Inactivity rate <sup>2</sup>	22.24	25.46	23.91	21.91	22.70	22.59

**Note 1:** The indicators are calculated based on the population corresponding to each housing quality indicator category. Unemployment rate = ((Long-term unemployed individuals + unemployed individuals seeking their first job) / Labour force) \* 100

**Note 2:** Inactivity rate = ((Individuals with a permanent disability + Retired persons, pensioners or rentiers + Other situations) / Population 16 to 64 years of age) \* 100

Source: own elaboration, based on Population and Housing Census microdata (2011)

Secondly, taken together, individuals living in substandard dwellings (extreme, precarious and inadequate) report lower rates of labour market integration than those living in standard quality dwellings (Table 7). On the one hand, individuals living in substandard quality dwellings participate, to a lesser extent, in the labour market, yielding lower labour force participation rates.

This is due to the increased level of inactivity among people living in the worst quality housing stock (extreme and precarious categories). On the other hand, unemployment reaches close to 13 percentage points higher among substandard dwelling residents: almost half of the labour force is unemployed, compared to 36% of those living in standard dwellings. Job precarity is particularly notable among those residing in inadequate dwellings, where almost half of the labour force is unemployed.

Extreme housing residents reported the lowest activity rates.<sup>16</sup> Regarding the causes of this inactivity, differences by housing quality category are also found: those most strongly related to vulnerable situations, especially due to a permanent disability, are higher in substandard dwellings. In contrast, the highest proportion of inactive groups because of “other situations” (mainly homemakers and students) is found in standard dwellings (Table 8).

**Table 8. Housing quality indicator categories for inactive groups (percentages).  
Andalusia metropolitan system (2011)**

	ANDALUSIA. TOTAL	HOUSING QUALITY INDICATOR				
		EXTREME	PRECARIOUS	INADEQUATE	TOTAL SUBSTANDARD	STANDARD
Individuals with a permanent disability	7.8	8.0	9.9	9.5	9.6	7.4
Retired persons, early retirees, pensioners and rentiers	26.9	29.8	27.8	31.2	30.0	27.8
Other situations	65.3	62.2	62.2	59.3	60.4	64.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: own elaboration, based on Population and Housing Census microdata (2011)

Third, a useful indicator to measure social vulnerability positions is the educational attainment of the 16-plus population. Once again, people living in substandard dwellings report the worst

<sup>16</sup> Among them there is a high proportion of retired persons, early retirees, pensioners and rentiers. It is important to bear in mind that individuals aged over 64 are not included in these indicators and that those living in extreme quality dwellings present a younger age structure. Thus, higher inactivity levels in extreme dwellings cannot be explained by age distribution differences.

figures: almost 40% did not complete primary education or are unable to read or write, compared to 25% residents in standard dwellings (see Table 9). This percentage is especially high in inadequate dwellings, which is likely due to the higher rate of elderly occupancy. Those who finished compulsory schooling represent a higher percentage of residents in extreme condition dwellings.

Finally, for individuals under the minimum working age, a lower school attendance rate was reported by those living in substandard dwellings, mostly under extreme conditions (see Table 10). Although the percentage of non-attendees drops considerably when we take into account compulsory school age (6 to 15 years, both inclusive), it is still three times higher than the percentage of residents in standard quality dwellings.

**Table 9. Educational attainment and housing quality (16-plus population).  
Andalusia metropolitan system (2011)**

	EXTREME	PRECARIOUS	INADEQUATE	TOTAL SUBSTANDARD	STANDARD	TOTAL
Unable to read or write, or did not complete primary education	31.3	38.6	39.3	38.8	25.6	26.3
ESO diploma or FP I (middle grade)	39.1	35.4	36.4	36.2	34.7	34.8
Baccalaureate or FP II (upper grade)	15.2	15.4	13.2	14.0	19.6	19.3
Higher education	14.4	10.6	11.1	11.0	20.1	19.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: own elaboration, based on Population and Housing Census microdata (2011)

Table 10. Housing quality indicator categories for school non-attendees.

Andalusia metropolitan system (2011)

	EXTREME	PRECARIOUS	INADEQUATE	TOTAL SUBSTANDARD	STANDARD	TOTAL
Individuals under 16 years	17.7	11.1	10.8	11.2	9.16	9.4
Individuals of compulsory school age (6 to 15 years)	3.0	2.5	1.5	1.9	0.9	1.0

Source: own elaboration, based on Population and Housing Census microdata (2011)

## 5 Discussion and conclusions

It has been addressed the issue of vulnerability derived from physical housing conditions, a subject which still holds relevance despite it taking a backseat to other housing problems that have increased in scope and severity in recent years. From this perspective, the concept of residential vulnerability has been showed to be useful, in that it encompasses both physical and social dimensions related to housing. Its usefulness has two aspects: first, it enables to consider objective material housing conditions that place residents at a disadvantage; and second, it allows us to identify situations of vulnerability by combining dwelling and household characteristics. The soundness and range underlying the concept has been tested through an empirical analysis which meets size and spatial disaggregation requirements.

In general terms, the analysis results reveal a housing stock with deficiencies which draws residents into a vulnerable situation. Although some of the reported problems only affect a small proportion of the population, they are still relevant because of their severity, leading to situations of residential vulnerability. This outcome has a varying impact on Andalusia's metropolitan areas and diverse social groups. Further outcomes should be emphasized here.

The first outcome is the significant number of buildings with severe accessibility deficiencies, which particularly impact the elderly population. This appears to be the result of a strong correlation between this population and older housing stock according to the results of other studies (Lebrusán, 2015). A desirable situation would be dwellings better adapted to people's life cycles, albeit not easy. The elderly are generally reluctant to move out of their homes (Módenes, 1998), so reconditioning buildings and dwellings would be a suitable option.

Second, the differences observed between Spanish and non-OECD citizens indicate that overcrowding—or high household density—is a consequence of the challenges that the latter population faces to find a route into the housing market (Algaba, 2003; Fernández y Checa, 2003; Trilla & Aramburu, 2002 cited in Colectivo IOE, 2005). Third, the analysis has revealed low numbers of dwellings in unacceptable condition. However, this does not diminish the fact that more than forty-seven thousand dwellings in the Andalusia metropolitan system are in extreme or precarious condition according to the housing quality indicator. The significant stages of deterioration that these dwellings undergo move them further away from the minimum housing standards that society expects. As such, this should be seen as a priority for housing policymakers.

The empirical analysis has clearly shown a correlation between social position and housing condition from the perspective of vulnerability, created by a housing system characterized by a predominant private market, practically non-existent levels of public housing, and policies that have a history of encouraging homeownership. The Andalusian housing policy has not contradicted the established national guidelines, just trusting that it is the spontaneous inertia of the market that solves the problems that appeared the growth and transformation of cities (Egea et al., 2008), which has created a highly segmented housing market with a strong correlation between social and housing positions. This is especially noticeable in the case of migrant status, which is inexorably linked to increased residential vulnerability. Regarding social vulnerability, individuals living in substandard housing report lower indicators of educational and labour integration. This clearly shows that housing condition is a dimension of exclusion; not only does it correlate with all other social vulnerability dimensions, but it even exacerbates them. However, this correlation between social and housing positions does not respond to a linear relationship. Not all indicators of socioeconomic vulnerability present their worst data among the population living in housing in extreme conditions. Thus, the relationship between the different indicators of social vulnerability and the indicator of housing quality seems to manifest the unequal occupation of substandard housing by social groups, which is surely linked to the historical configuration of the city. As other studies have shown (Arias, 2000; Torres & Ojeda, 2004), the deficiencies of the housing stock of the Andalusian cities, as has also occurred in other European cities, are fundamentally linked to the historical centres; the housing estates developed during the 60s and 70s to absorb migrated population to the city, but also to relocate groups of shanty towns and urban centres; and traditionally isolated settlements that have been absorbed by the urban growth of the city. This varied configuration of urban disadvantage and its unequal social occupation

seems to explain the differences in the relation between social vulnerability indicators and housing quality.

In methodological terms, the approach presented here is complementary and alternative to the traditional two main lines of research developed in Spain in relation to urban and housing-related vulnerability. One of these lines deals with the residential conditions of specific social groups, in which the spatial dimension does not exist or is secondary. On the other hand, some studies analyse spatial units by combining sociodemographic, urban and housing indicators that converge in certain urban spaces. Methodologically, the approach developed in this research presents both advantages and disadvantages in relation to traditional studies focused on detecting vulnerable areas (Alguacil, 2006; Alguacil et al., 2014; Cornado et al.; 2017; Egea et al., 2008; Ministerio de Fomento, 2015; Temes, 2014). These spatial-unit approaches are undoubtedly relevant for detecting the spatial concentration of vulnerability at intra-urban level. However, their main weakness lies in not being able to analyse the degree of residential vulnerability experienced by residents —who are, after all, identified as vulnerable— nor the actual combination of these problems. The proposal presented here allows to construct complex indicators that link social and residential dimensions and to apply them in specific residential contexts, moving the conceptual proposal of residential vulnerability forward.

In this regard, the approach is innovative, at least in the Spanish context, since no studies have been found that have employed the construction of complex indicators that: a) integrate residential and social conditions, b) take as a unit of measure individuals and households, c) are able to be applied in a delimited, but at the same time complex, territorial scenario. The only antecedent in which synthetic indicators of social and residential vulnerability of individuals and households are employed is the result of an ad hoc field work in the irregular settlement of Cañada Real (Madrid) (Cortés et al., 2013).

Moreover, by focusing on nine Andalusia metropolitan areas (based on microdata analysis), the study adheres to the aforementioned requirements. Although the analysis was confined to census variables which limited the possibility of spatial disaggregation when applying complex indicators, its theoretical and empirical nature makes it replicable to other medium or large-sized metropolitan/urban systems and contributes meaningful insights. In a normative level there is no doubt that residential vulnerability derived from physical housing conditions should be high up on the academic and policy making agenda. Despite the fact that in Andalusian housing policies immediately prior to the date of analysis rehabilitation became a priority axis of action (BOJA,

2007; BOJA, 2008), the problem of housing quality has not been solved, causing situations of residential vulnerability to socially vulnerable groups. Thus, coupled with other relevant issues, it is crucial that the material dimensions of housing be included within the concept of residential vulnerability. This will allow us to focus attention on other structural issues of urban sustainability, and will also help guide public policies in this matter. To achieve this, it is necessary to gather complete and disaggregated data. More detailed studies are needed to analyse residential vulnerability, providing greater spatial disaggregation and more social and housing variables. Taking into account the forecasted trend behind official statistics in Spain, and with a view to engage in other extremely important issues such as perceived vulnerability, it is necessary to undertake these types of studies by using surveys and to apply qualitative methodology to understand if and how vulnerability is perceived and experienced, which future research will seek to address. Above all, there is a need to develop new conceptual tools and measures capable of identifying other housing problems, which are often hidden behind aggregated data.

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