Evaluation of the Impact of the Covid-19 Pandemic on People and Organisations in Long-Term Care Facilities of Catalonia and Proposals for Improving the Care Model: The Resicovid-19 Project

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ABSTRACT

Background: During the first wave of the COVID-19 pandemic, it is estimated that around 25% of infected residents in Nursing Homes in Catalonia died, which accounted for more than 50% of total COVID-19 deaths in the region. This devasting impact not only highlights the structural deficits of the long-term care facilities system, but it also provides a unique opportunity to gather evidence to support a redesign of the health and social care models–a redesign that focuses on individuals and their singularities, and is equipped with the staff and infrastructure required to meet their needs.

Methods: The ResiCOVID-19 project will include five work packages to assess the impact of the COVID-19 pandemic (from March 2020 to June 2022) on the individuals living in long-term care facilities in Catalonia, their family members, health care workers, and the organisations themselves. In this project, we will develop proposals for improvement and indicators for the long-term care model in Catalonia to better adapt to the current and future needs of people-centred care through conducting a rapid review, analysis of international experiences, retrospective analysis, and a cross-sectional study. The analysis will be conducted both from a quantitative and a qualitative perspective, measuring the impact at a system level as well as at a setting and individual level, including residents, families, professionals, and managers of long-term care facilities.

Conclusions: The ResiCOVID-19 project is expected to have a significant impact at different dimensions, including the care model, social and organisational aspects (on professionals and facilities), systemic efforts (both for the healthcare and the social systems), and scientific contributions (providing evidence in a field of limited research in Catalonia).

BACKGROUND

The COVID-19 pandemic has had a devastating impact, especially on long-term care facilities (LTCF) (Edelman et al., 2020). Precisely, in nursing homes (NH), it is estimated that around 25% of infected residents died during the first wave, which accounts for more than 50% of total COVID-19 deaths in Catalonia (Comas-herrera et al., 2021; Zalakaín & Davey, 2020), although exact figures are uncertain due to testing limitations at the beginning of the pandemic. The proportion of those deaths corresponding to NHs residents would have been 35% for cases confirmed by PCR tests and 70% if cases with symptoms compatible with COVID-19 (Comas-herrera et al., 2021; Zalakaín & Davey, 2020). Unfortunately, there is a lack of official data on the causes and characteristics of their deaths. According to a population-based cohort study before the COVID-19 pandemic, the profile of individuals living in NHs in Catalonia is made up of 72% women and 28% men, with a mean age of 86 years and an annual mortality of 20% (Amblàs-Novellas et al., 2020a). NH residents present high multimorbidity, with a 46% prevalence of dementia and high complexity, and 51% have high risk-adjusted morbidity, based on the Adjusted Morbidity Groups (AMG) classification. This population classification algorithm allows the grouping of patients in mutually exclusive categories based on their level of risk, considering morbidity and complexity (Barrio-Cortes et al., 2020).

In all LTCFs, the COVID-19 pandemic has significantly affected the physical, psychological, and social well-being of the residents, their families, and the professionals working in these facilities (Palacios-Ceña et al., 2021). This fact was especially observed in health workers due to major difficulties in decision-making processes (Amblàs-Novellas et al., 2020b; Amblàs-Novellas & Gómez-Batiste, 2020; Aronson, 2020). Professionals had to make difficult ethical-clinical decisions regarding hospital transfers, end of life, or severe existential distress. Likewise, they suffered the effects of the overburdened healthcare and social resources caused by the pandemic (Quigley et al., 2020), as well as the emotional impact resulting from the crudeness of some of the situations faced and their own vital risk (Brady et al., 2021). Professionals were frequently isolated from their relatives (Iaboni et al., 2022), particularly in the first stages of the pandemic, due to the lack of individual protection equipment (IPE) (Milnes et al., 2019; To et al., 2011). To our knowledge, there is still no official data or literature on the number of healthcare professionals infected with COVID-19 in Spain or Catalonia or on its impact on family members and caregivers. The World Health Organization (WHO) estimates that between 80,000 and 180,000 healthcare workers could have died from COVID-19 between January 2020 and May 2021, converging to a medium scenario of 115,500 deaths (World Health Organization and Health Workforce Department, 2021).

The measures taken to contain the pandemic prioritised safety over other principles, such as the rights of patients and their families. There were restrictions on visits and involvement in decision-making processes, leading to social isolation and loneliness (Ickert et al., 2021). The combination of multiple factors had systemic and individual effects (Amblàs-Novellas et al., 2020a; Aronson, 2020; Hand et al., 2018; Lansbury et al., 2017). These measures had a significant impact that could be as devastating as the primary disease itself, or even greater (Aronson, 2020; Galea et al., 2020; Pfefferbaum & North, 2020; Thompson et al., 2006), especially in end-of-life situations (Simard & Volicer, 2020; Verbeek et al., 2020). At the physical level, an increase in geriatric syndromes, such as immobility and delirium, was observed among residents (D'Adamo et al., 2020; Poloni et al., 2020). At the psychological level, there was increased suffering, emotional distress, feelings of threat, uncertainty, frustration, and guilt or grief over the loss of close residents among professionals and families (Simard & Volicer, 2020). At the social level, ties and interpersonal relationships were highly affected, leading to situations of loneliness (Armitage & Nellums, 2020; Banerjee & Rai, 2020).

At the systemic level, stigmatisation of the long-term care sector appeared in the media, increasing the pressure on the professionals and the residents' families. It should be noted that the WHO denounced that older adults living in NH were initially invisible to the system since a strictly hospital-based approach was prioritised in response to the pandemic, and they were later stigmatised (Kluge, 2020).

RATIONALE

The COVID-19 pandemic has shown the structural deficits of the LTCF system and the health care patients receive in these facilities (Dykgraaf et al., 2021). However, it also offered a unique opportunity to provide evidence to support a redesign of the health and social care models–a redesign that focuses on individuals and their singularities, and is equipped with the staff and infrastructure required to meet their needs.

There is no published evidence on the impact of the pandemic on long-term care in Catalonia, including a participative, qualitative, and prospective approach (D'Adamo et al., 2020; Fallon et al., 2020; García-Basteiro et al., 2020; Lau-Ng et al., 2020; Quigley et al., 2020; Rada, 2020; Wu & McGoogan, 2020). Therefore, the ResiCOVID-19 project aims to conduct a systematic description and comprehensive analysis of the impact of the COVID-19 pandemic on the LTCF system in Catalonia.

There is growing consensus on the need to implement improvements at the service, the organisational, structural, competence, and capacity levels to outline future responses. However, there is insufficient evidence on what actions should be undertaken or how they should

be implemented. These improvements should also be based on a detailed descriptive mixed analysis, according to the characteristics and preferences of residents and their families, as well as the expertise of the professionals responsible for the institutionalised people's care and of the national and regional policymakers (Aronson, 2020; British Geriatrics Society, 2020; D'Adamo et al., 2020; Werner et al., 2020; World Health Organization, 2016). This study will considerably increase the evidence and consensus available to decision-makers who face these urgent questions.

METHODS/DESIGN

STUDY OBJECTIVES
The study has two main objectives that include several specific objectives (Table 1).

GLOBAL OBJECTIVES
O1. Assess the impact of the COVID-19 pandemic on the individuals living in LTCFs in Catalonia, their family members, the staff working at these facilities, and the organisations themselves, from March 2020 to June 2022.

O2. Develop improvement proposals for long-term care facilities at the care level, training, organisational, structural, and systemic levels to better adapt to people-centred care's current and future needs.

STUDY DESIGN AND SETTING
This project will involve five work packages (WP) to respond to its different objectives: three to achieve the main objective O1, and two for the O2. All WPs are detailed in Tables 2 and 3.

WP1) Systematic Review of the Literature for International Contextualisation Purposes
Several systematic reviews focusing on different key topics and methodologies will be conducted; all of them are detailed in Table 2.

WP2) Big Data Analysis
This WP will be conducted using a retrospective population-based study (March 2020) using the register of morbidity and use of health resources of the Catalan Health Service. The objectives, variables, and expected results of this WP are summarised in Table 4.

WP3) Fieldwork in a Multicentre Sample of Residents and LTCFs
The study will include a multicentre sample of LTCFs, managers, relatives, professionals, residents, and

	OBJECTIVES OF THE RESICOVID-19 PROJECT.
Global Objective	**O1 To assess the impact of the COVID-19 pandemic on the individuals living in LTCFs in Catalonia, their family members, the staff working at these facilities, and the organisations themselves, from March 2020 to June 2022.** (Table 2)
Specific Objectives	**O1.1** To retrospectively estimate the impact of the pandemic in terms of global outcomes: rate of female and male residents and workers infected with COVID-19, mortality rate, hospitalisations, and dependence. **O1.2** To retrospectively assess the association between this impact and structural, organisational, and process factors of institutionalised people in LTCF, focusing on gender and the clinical complexity of the residents receiving care. The SARS-Cov-2 infection rate of the Basic Health Area they belong to will be considered. **O1.3** To gather information on the individual factors associated with the impact of the pandemic based on a sample of residents, where the incidence of mortality and COVID-19-related hospitalisations will be verified, as well as drug use and predicting and protective factors against COVID-19 concerning gender and other reasons. **O1.4** To describe the characteristics and needs of the residents (following the first COVID-19 outbreak) according to gender. **O1.5** To explore/understand the impact perceived during the COVID-19 pandemic in the dimensions of caring and living in nursing homes through a qualitative study with a gender perspective. The individual processes and the structural factors associated with this impact will be analysed. The aim is to learn about the residents' experiences, their relatives, the professionals involved, the organisational leaders in the LTCF system, and the policymakers. **O1.6** To identify adequate response factors and mechanisms, perceived obstacles and difficulties, as well as ethical aspects, challenges, and opportunities for improved care and adaptation to the crisis emphasizing the ethical implications of the aspects assessed.
Global Objective	**O2 To develop improvement proposals for long-term care facilities at the care, training, organisational, structural, and systemic levels to better adapt to the current and future needs of people-centred care.** (Table 3)
Specific Objectives	**O2.1** To gather experience and national and international evidence to identify good care, training, organisational, structural, systemic, and gender-sensitive practices derived from the response to COVID-19 in the LTCF setting. **O2.2** To explore proposals for improvement on care, competencies, organisational, structural, and systemic practices with the residents, family members, professionals, and responsible staff at the facilities and planners, with a gender-sensitive approach including the perspective of both genders. **O2.3** To propose indicators and quality standards propositions based on the review of the literature and the opinion of health experts and managers, to assess the proposed improvements.

Table 1 Study Objectives.

Abbreviations: LTCF, long-term care facility.

	O1 DESCRIPTION OF THE IMPACT OF COVID-19 IN LTCF		
Work Packages	**WP1. A systematic review of the literature for international contextualisation purposes.**	**WP2. Big data analysis.**	**WP3. Fieldwork in a multicentre sample of representative individuals and nursing homes.**
WP Specific Objective	Related to O1.6, O2.1, O2.3 To assess the evidence published internationally on the impact of the COVID-19 pandemic in LTCF care settings from the beginning of the pandemic until today.	Related to O1.1 and O1.2 To assess the impact of the COVID-19 pandemic on individuals living in LTCF in Catalonia from March 2020 to the present date. Specific Objectives (Table 4).	Related to O1.2, O1.3, O1.4, O1.5, O1.6 To describe the impact on individuals living in LTCFs and their relatives, the staff, management teams, and organisations from a quantitative and qualitative perspective of the COVID-19 pandemic.
Methodology	**a)** Scoping review using the principles of realist synthesis based on a search for articles published from January 2020 to June 2022 targeting older residents, including any study describing or evaluating a program or initiative that sought to alleviate loneliness or social isolation among care home residents. Data will be extracted and analysed narratively using the dimensions of intervention components, context, mechanisms, and outcomes for synthesizing. Any outcome reported quantitatively or qualitatively, including adverse effects, is extracted (Solé-Casals et al., 2022); b) Review of grey literature and initiatives used in LTCF to face the COVID-19 pandemic challenges; c) Report of an international review of Good Clinical Practices and improve responses to the COVID-19 pandemic	It will involve a retrospective analysis (March 2020) of data from the Registry of morbidity and healthcare resources used by the Catalan Health Service of the population living in LTCFs.	It will involve a retrospective study to assess the impact of the COVID-19 pandemic and a cross-sectional study to assess the characteristics of people living in LTCF and their care model. Mixed **quantitative/qualitative** study (Tables 5 and 6).
Variables	Not applicable	Described in Table 4	Described in Table 6.
Population	Not applicable	Population living in LTCFs in Catalonia (living in these facilities at some time during the study period).	A multicentre sample of LTCFs, managers, relatives, professionals, residents, and stakeholders will participate.

Table 2 Design and Methodology for Developing Global Objective O1.

Abbreviations: LTCF, long-term care facility.

stakeholders. Two different studies will be performed: a retrospective and a cross-sectional study. Both will be carried out with quantitative (Tables 5 and 6) and qualitative methodology (Table 7).

WP4) International Benchmark for Proposals for Improvement of the Long-term Care Model

This WP will include an international benchmark of improvement measures through semi-structured interviews and a literature review that will analyse 14 countries, as well as reviews that will assess improvement proposals to achieve the specific objective O2.1.

WP5) Consensus of Proposals for Improvement with Stakeholders

This WP will be performed with the main stakeholders of the LTCF sector, including residents, policy planners, and key sector organisations, as detailed in Table 3.

The expected results of WP4 and WP5 involve building a menu of improvement proposals at different levels with the agreement of all stakeholders involved in the LTCF, indicators, standards, and a final report.

Sample Size Consideration/Calculation

The sample for both quantitative studies (retrospective and cross-sectional) conducted on WP3 will be selected from a stratified set of 912 LTCF according to size, type of care facility, and type of governance, using the following categories:

- According to size: small (from 0 to 50 patients), medium (from 50 to 100 patients), and large (over 100 patients).
- According to type: older adults, people with intellectual disabilities, and people with mental illness.
- According to governance: public, private, and private with some public funding.

The representation of the different territories of Catalonia according to their population will also be considered.

	O2 PROPOSALS FOR CARE MODEL IMPROVEMENT	
Work packages	**WP4 International benchmark of proposals for improvement**	**WP5. Consensus on proposals for improvement with the stakeholders involved**
Specific Objective	O2.1, O2.2 To identify proposals for improvement and good COVID-19 response practices, consensually agreed upon by the European Ageing Network (EAN) and the International Federation on Ageing (IFA), jointly with the public authorities, research organisations, and/ or representative platforms of at least six countries.	O2.3 To develop proposals for improvement at the service, training, organisational, structural, and systemic levels to better adapt to the current and future crises towards people-centred care.
Methodology	Structured interviews and systematic review of documents and literature to identify and describe good practices. Benchmark meeting with international stakeholders.	Care model surveys (ACPG scale) and quality of care will be collected from the cross-sectional study (WP3), asking for proposals for improvement for each element analysed. It will also include the proposals identified through literature review (WP1) and the International Benchmarking (WP4). Specific surveys, interviews, and workshop design will involve other relevant stakeholders to co-create the proposals for improvement.
Population	Individuals representing the reference countries.	A wide range of stakeholders will be involved, from the people living in LTCFs, relatives, professionals, and managers, to planners, policymakers, LCTF organisations, experts, relatives' organisations, etc.

Table 3 Design and Methodology for Developing Global Objective O2.

Abbreviations: LTCF, long-term care facility.

	O1. DESCRIPTION OF THE IMPACT OF COVID-19 IN THE LTCF SETTING WP2. BIG DATA ANALYSIS OF THE REGISTRY OF MORBIDITY AND HEALTHCARE RESOURCES USE OF THE CATALAN HEALTH SERVICE.		
WP2 Specific Objectives	**I. To analyse the incidence, mortality, lethality, and use of residential health resources in each of the different waves of the COVID pandemic (aggregated data) in nursing homes of Catalonia.**	**II. To assess excess residential mortality during the different waves of the COVID-19 pandemic (aggregated data). To explore structural factors affecting this impact at residence type (nursing homes, disability, or mental health), titularity, or the number of places.**	**III. To generate a predictive model. To evaluate, through a multi-variate model type, the factors that have influenced excess mortality (disaggregated data).**
Variables	• COVID-19 **incidence.** • **Assessment of health outcomes (mortality).** • **Assessment of the use of resources (referrals to ICU services, hospitalisations, visits by primary care teams).** A general descriptive study and a comparative study will be performed on each of them, with a cohort of similar characteristics but of subjects not living in nursing homes	• **Multi-variate analysis:** for all cases above. The nursing homes' characteristics and the incidence of COVID-19 in the municipality where the facility is located will be considered. • **Analysis of the immunisation process (residents and professionals).**	• **Multi-variate analysis:** for the area's demographic, socioeconomic clinical, structural variables, and COVID-19 incidence.

Table 4 Specific Objectives and Variables of Work Package 2: Big Data Analysis.

Abbreviations: LTCF, long-term care facility; ICU: Intensive Care Unit.

Finally, a simple random sampling will be performed within each stratum, selecting 45 LTCFs. From each selected LTCF, a randomised 25% of residents will be recruited, aiming to reach a sample of over 400 residents. One manager and a maximum of six relatives and professionals of each LTCF will be selected from among those who wish to participate.

Each LTCF selected will be contacted by email and telephone. A video about the project, its implications, and opportunities for their participation will be sent, and they will be offered a short online meeting to answer their questions and explain the project. If the LTCF refuses to participate, the next person on the randomised list will be contacted.

O1. DESCRIPTION OF THE IMPACT OF COVID-19 IN THE NURSING HOME SETTING WP3. FIELDWORK IN A MULTI-CENTRE SAMPLE OF REPRESENTATIVE INDIVIDUALS AND LTCF	
Methodology	This WP uses two methodologies: - A retrospective study to assess the impact of COVID management (from March 2020) in each LTCF through a structured questionnaire. - A cross-sectional study through structured questionnaires to LTCF residents, relatives, professionals, and managers (O1.4, O1.6). A pilot test will be carried out in three LTCFs, one of each type (geriatric, disability, and mental health), to validate the feasibility of the study and adjust the different questionnaires.
Sampling	The sample of both studies will be a stratified sample of 45 LTCF in Catalonia according to: 1. facility size 2. facility type 3. ownership 4. territorial representation (geographical region). In each selected LTCF, a sample of residents, professionals, relatives, and managers will be selected following the following selection criteria: - Residents will be randomised, and 25% of them will be recruited; in small LCTF (capacity of ≤50 residents), 100% of residents will be recruited. The goal will be to achieve a total sample of 600 residents based on the logistic capacity of the team. - Relatives and professionals that meet the participation criteria and will be willing to participate will be selected, with a maximum of six relatives and six professionals in each LCTH. - Every LTCF manager will be recruited.
Variables	Described in Table 7.
Population	**Retrospective study:** People living in the selected facilities during the study period (March 2020-present date). **Cross-sectional study:** People admitted to sites when conducting the fieldwork, relatives, professionals, and management staff.

Table 5 Quantitative Study of the WP3. Fieldwork in a Multi-Centre Sample of Representative LTCF.

Abbreviations: LTCF, long-term care facility.

O1. DESCRIPTION OF THE IMPACT OF COVID-19 IN THE NURSING HOME SETTING WP3. FIELDWORK IN A MULTI-CENTRE SAMPLE OF REPRESENTATIVE INDIVIDUALS AND LCTF		
Study Type	Retrospective	Cross-sectional study

Variables	- **Individual factors (characteristics of the individuals)**: variables of the information systems of each facility (functional status, geriatric syndromes), use of resources.
	- **Structural factors (LTCF characteristics):**
	  • Physical characteristics: accessibility, physical space, occupancy, ownership, and typology.
	  • Staff: number, professional category, contract types, dedication in hours, gender and nationality, and availability of external professionals.
	- **COVID-19 impact and organisational factors during the pandemic:** incidence, morbidity, mortality, testing and vaccination (residents and professionals), isolation, protocols implemented, sectorisation, availability of Individual Protection Equipment, and technological innovations.
	- **Systemic factors:** Territorial integration indicators (external professionals' cooperation, accessibility to other resources, transfers).
		Each population group of the LTCF model will have a structured questionnaire.
		Resident Variables: multidimensional assessment and situational diagnosis, sociodemographic, Covid-related variables, morbidity, drug use, nutrition (MNA), symptoms (pain and dyspnoea), geriatric syndromes (falls, dysphagia, urinary and faecal incontinence, delirium, and constipation), sensory deficits (sight and hearing), functional capacity (modified Barthel Index), cognitive capacity (GDS), emotional status (DME), loneliness (EDSOL), social network (Lubben), the meaning of life, impact of Covid on health and quality of life, PCC/MACA stratification (NECPAL), and frailty (modified IF-VIG).
		Residents with sufficient cognitive capacity will respond to a person-centred attention questionnaire (ACP-G).
		Professionals and management staff Variables: Professionals' and managers' questionnaires will be the same with the following variables: sociodemographic (sex, age, professional category, charge, time shift, working hours/week, and contract type), emotional status (DME-caregiver), a person-centred attention questionnaire (ACP), a quality-of-care questionnaire, impact of Covid on health and quality of life and a work capacity index (NTP 1147 Workability).
		Relatives Variables: Relatives will complete a shorter version of the professionals' questionnaire, removing the quality-of-care questionnaire and the work capacity index.

Expected Results	The expected results will be the analysis of the impact of the COVID-19 pandemic on the LTCF.	Expected results will be the description of the residents' characteristics, relatives', and professionals' data, and the impact of the COVID-19 pandemic on each group.

Table 6 The Quantitative Study Variables of WP3. Fieldwork in a Multi-Centre Sample of LTCF.

Abbreviations: LTCF, long-term care facility; ACP-G, Person-centred Care-Gerontology; MNA, Mini nutritional assessment; GDS, Geriatric Depression Scale of Yesavage; DME, Emotional Distress detection Questionnaire; EDSOL, Existential Loneliness Detection Scale; PCC, Complex chronic patient; MACA, Advance Chronicity Care Model; NECPAL, Palliative Care Needs Questionnaire Instrument.

	O1. DESCRIPTION OF THE IMPACT OF COVID-19 PANDEMIC IN LTCF **WP3. FIELDWORK IN A MULTI-CENTRE SAMPLE OF REPRESENTATIVE INDIVIDUALS AND LTCF**
Methodology	The qualitative study will focus on the impacts and responses on two levels: in specific sub-group of LTCF (residents, relatives, care workers, and managers) and the health and social care system (planners and decision-makers) Regarding the former, we will conduct: - A study of five LTCFs, which will imply two weeks of participant observation; in-depth individual interviews with at least the manager, six care-workers, six family members, and six residents; and group photovoice discussions with those interviewed residents, relatives, and care workers willing to delve deeper and share their pandemic experiences. Photovoice will be implemented and adapted to each case to convey their experiences graphically through photographs and elicit group discussion. - To complement the former approach, five interviews with relatives of residents who died during the first waves of the pandemic and five with care-workers who quit or were physically or psychologically harmed. These interviews will complement the study of the five LTCFs to grasp those impacts that happened in the past and might not be visible through the former approach. Regarding the systemic level: - At a minimum, eight detailed interviews will be conducted with planners with some responsibility in the LTCF setting. - A documentary analysis of news, legal documents approved during the pandemic, protocols, procedures, action recommendations, technical documents, and political positioning notices will be performed.
Sampling	For the study of long-term facilities: - We will select a sub-group of five LTCFs of the representative sample of facilities in Catalonia chosen to conduct the WP3 based on territory, size, type (geriatric, mental health, and disability), and ownership. Facilities with varying degrees of impact of COVID-19 will be selected, with different models of care, giving priority to facilities where the incidence of COVID-19 has been higher and seeking to ensure heterogeneous effects and responses by the facilities to the pandemic during its different waves. - Participants will be selected according to the interest sparked during the observation period, their availability, their presence in the LTCF during most of the pandemic, and diversity of backgrounds (gender, ethnicity, profession, etc) and experiences, as well as frailty and disability (for residents). We seek to include the broadest range of profiles possible. Regarding the systemic level: - **Participants** will be sought from different decision-making levels and spheres, provisions of LTCF and health services, such as ACRA and ICS, funding entities such as CATSALUT, and managers associated with the Health Department. We will also include grassroots organisations (family associations) and unions. The maximum number of participants will be established based on the saturation of the information obtained.
Population	Residents from the facilities will be selected during the study, their relatives, the professionals involved (healthcare, social, and support staff), management teams, planners, and other relevant stakeholders.

Table 7 A Qualitative Study of WP3. Fieldwork in a Multi-Centre Sample of LTCF.

Abbreviations: LTCF, long-term care facility; PC, Palliative care; ACRA, Associació Catalana de Recursos Assistencials; ICS, Institut Català de la Salut; CATSALUT, Servei Català de la Salut.

Study Duration

The project's total duration will be 18 months, with the schedule detailed in Table 8.

Data Collection, Validation, and Management

Data management and analyses (data entry, cleaning, and handling of missing data) will be performed by the Data Analysis and Modeling Research Group (DAM) of Uvic-UCC. Data will be anonymised, password-protected, and stored on a secure server, whose access will be limited to the investigators. Data protection and use will be conducted in compliance with Spanish laws. Data obtained will be anonymised, analysed, and used only for the scientific purposes of the study. No transfer of data will be authorised.

DISCUSSION

There are currently around 59, 000 individuals living in LTCFs in Catalonia, with approximately 912 facilities–this

information was provided by the Register of Entities, Services, and Establishments of Social Services (RESES) of the Department of Social Rights of the Generalitat of Catalonia, through a database of all the homes for the older people, disabled, and mental health patients in Catalonia, not accessible publicly through their website ("Register of Entities, Services and Social Establishments (RESES)," n.d.). The ResiCOVID-19 project has broad multidisciplinary partnerships involving the five WPs of the project, academic partnerships, and a comprehensive, multidimensional, and systemic approach based on a multimodal/mixed methodological approach that combines descriptive analysis and prospective proposals for improvement. Therefore, the ResiCOVID-19 project is expected to have a significant impact at different levels: on the model of care and organisation, social and organisational aspects (on professionals and facilities), systemic efforts (both for the healthcare and the social systems), and scientific contributions (providing evidence in a field of limited research in Catalonia). Its results will help build on learnings from the response to the pandemic

ACTIVITIES	TIME OF EXECUTION OF THE PROJECT (MONTH)																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Preparation of documents and review by the CREC	X	X																
A. Systematic review	X	X	X	X	X	X												
B. Big Data Analysis			X	X	X	X												
C. Multi-centre cohort			X	X	X	X	X	X	X	X	X	X	X					
D. Improvement consensus													X	X	X	X		
E. International benchmarking					X	X	X	X	X	X	X	X	X					
Communication to society	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Interim objective analysis							X	X	X	X								
Publications							X	X	X	X	X	X	X	X	X	X	X	X
Final report																X	X	X

Table 8 Schedule of the ResiCOVID-19 Project.

and support the recovery of care and social well-being in care home settings. Additionally, given its nature, this project is expected to have significant transformative potential in policymaking and long-term care settings in Catalonia (Table 9), both from the individual perspective of the residents and their family members (personalised care model) and from the collective standpoint (care-organisational model).

This analysis will be essential to understanding key elements of the impact of the pandemic and to finding answers to some current and future questions, offering a unique opportunity to restructure the LTCF care model. The ResiCOVID-19 project will also offer the opportunity to establish Catalonia as a global leader in long-term care research. Participating researchers possess significant expertise in the NH setting and COVID-19, and are internationally recognised for their work, with 30 active international research projects. For example, the project's Principal Investigator was the leading officer in Palliative Care for the WHO (Gómez-Batiste et al., 2012).

A comprehensive communication plan will be deployed targeting both the scientific community and the public (Supplemental Table 1).

The new specific measures and actions that should be derived from this project would be the following:

At the MICRO level (individualised model of care), co-design of a model centred on the characteristics, preferences, and values of the individual should give way to a new care paradigm for people living in a long-term care setting, from ethics in care to gender perspective and respect for the individuality of each person.

At the MESO level (care/territorial model), with the incorporation of the managing teams of nursing homes and the different individuals responsible for territorial planning to provide care response during this crisis, these entities are expected to become additional stakeholders in territorial planning, encompassing both health and social perspectives.

At the MACRO level (policies), a truly transformative dynamic is sought with the consensus and endorsement of the main stakeholders with decision-making powers and the authority to implement new policies in this area.

STUDY LIMITATIONS AND RISKS

The sample selection of LTCF in WP3 may have some limitations regarding representativeness. This fact will be minimised by the several stratifications based on their characteristics. Additionally, to overcome potential refusals to participate, a communication plan to contact the LTCF has been established, and several LTCFs will be in backup to contact if some refuse to participate. For each refusal, a new LTCF within the same stratified characteristics will be contacted. Although most assessment instruments used have been previously validated, given the characteristics of the resource, the participants, and the scope of the variables, adaptations will be introduced to facilitate the management thereof. In the case of individuals/residents with cognitive limitations preventing direct participation, data gathering will be performed based on the assessment/perception of the professionals and/or family members, which could entail a representativity bias. Fieldwork may be affected by the pandemic if new restrictions are imposed. However, a contingency plan has been developed to allow the adaptation of a large part of the data collection.

THE TRANSFORMATIVE CAPACITY OF THE RESICOVID-19 PROJECT
a) It stems from a careful diagnosis of reality, resulting from a systematic and thorough assessment process and a wide methodological perspective, as well as from the territorial dynamics already established for collaborative work among care devices and different providers, where Central Catalonia has a wide tradition and consolidated experience in providing comprehensive care.
b) It involves those who have faced this pandemic daily and where a process of co-designing the model is proposed based on their actual needs. This project also includes the professionals and executives from the sector, emphasizing the importance of a comprehensive care model, interdisciplinary work, and the expertise and support of the professionals as fundamental backbones of the nursing home model.
c) It implies a high component of change for individuals integrating the work teams and organisations and a strategic vision to ensure that the transformative action becomes effective.
d) It proposes specific change adaptation measures through a continuous improvement process, identifying opportunities, providing an innovative view, and promoting a pragmatical implementation of the consensually agreed care model. It will incorporate a gender perspective, understood as gender-sensitive research, considering gender and its multiple social, theoretical, and methodological dimensions in all the project phases to promote innovation in research.
e) It incorporates a specific information proposal aimed at the general population to explain results, remove stigmatisation, and enhance the value of this area, which was highly impacted by the pandemic.

Table 9 Points Supporting the Transformative Capacity of the ResiCOVID-19 Project.

STRENGTHS AND EXPECTED RESULTS

The ResiCOVID-19 project entails a broad multidisciplinary partnership involving a comprehensive, multidimensional, multidisciplinary, and multicentred systemic approach based on a multimodal/mixed methodological approach. Furthermore, it combines the perspectives of description and prospective proposals for improvement. It includes the systematic description of the impact of the COVID-19 pandemic at the global and the settings level, looking at the individual level of residents, professionals, relatives, and leaders, as well as the post-COVID-19 pandemic description of characteristics of the different actors and the perceived impact of many stakeholders. The objectives and actions for improvement are based on the proposals of all these actors with a co-creative methodology. The main outcome of this study will include a systematic, detailed description of the impact of the COVID-19 pandemic in the LTCF sector, as well as a comprehensive and systematic list of proposals for improvements based on the findings and the participation of the main actors. The ResiCOVID-19 project is expected to have a significant impact at different levels: on the model of care and organisation, social and organisational aspects (on professionals and facilities), systemic efforts (both for the healthcare and the social systems), and scientific contributions (providing evidence in a field of limited research in Catalonia).

ABBREVIATIONS

AMG   Adjusted Morbidity Groups
DAM   Data Analysis and Modeling Research Group
IPE   Individual Protection Equipment
LTCF   Long-term care facilities
NH   Nursing Homes
WHO   World Health Organization
WP   Work packages

DATA ACCESSIBILITY STATEMENT

The datasets generated and/or analysed during this study will be available from the corresponding author upon reasonable request.

ADDITIONAL FILE

The additional file for this article can be found as follows:

- **Supplemental** Table 1**.** Comprehensive communication plan of the ResiCOVID-19 project. DOI: https://doi.org/10.31389/jltc.213.s1

ETHICS AND CONSENT

The ResiCOVID-19 project will be performed in accordance with the Declaration of Helsinki and the Good Clinical Practices for research. The Research Ethics Committee of the Universitat de Vic – Universitat Central de Catalunya (Uvic-UCC), code 181/2021, and the Ethics Committee of Universitat Oberta de Catalunya (UOC), code 20210621_dlopezgo_Resicovid, approved the project in terms of its methodological, ethical, and legal aspects. This project mainly focuses on the essential principles of bioethics, given the characteristics of the special vulnerability of individuals receiving care. No undesirable effects are expected, and no financial or insurance compensation is considered for the participants.

Before collecting data in the facilities (WP3), informed consent to participate in the study will be obtained from the centres' directors and other participants (workers, residents, and family members), including information on the study through an informative

session and a written document. There will be specific, informed consent for residents with a legal guardian who can sign on their behalf. During the focus groups, participants will be asked to agree not to disclose the statements made by other people participating in the activity. A professional will monitor data collection. Individuals with cognitive impairment willing to participate in qualitative interviews will be explained the study in simple terms, including potential risks and implications of taking part. The verbal agreement of the individual will be required on several occasions (consent is considered a process), and they may always be accompanied by family members or staff. Two qualified professionals, one from the long-term care facilities and one from the ResiCOVID-19 project, will determine the capacity of each resident to answer the questionnaires.

The identification of long-term care facilities and their participants will be coded and pseudo-anonymised through the REDcap platform, with identification codes remaining in possession of the investigators and protected.

Two Clinical Research Committees who assessed the project considered obtaining explicit patient consent for publication unnecessary because the data used did not compromise patients' anonymity. The anonymisation was performed following Spanish legislation on Data Protection (Law 15/1999 on Data Protection and CEE 2016–679 regulation). Data were dissociated, and a code number was used for each patient. Moreover, the data were not provided to outside personnel or entities.

COMPETING INTERESTS

The authors have no competing interests to declare.

AUTHOR CONTRIBUTIONS

All authors contributed to the study's conception and design. The acquisition, analysis, and interpretation of data were developed by JAN, LCP, JJR, DL, JCM, ARA, ACH, and XGBA. JAN, LCP, JJR, and XGBA drafted the work, and all authors substantively revised it. All authors have approved the submitted version (and any substantially modified version that involves the author's contribution to the study) and have agreed to be personally accountable for their contributions and to ensure that questions related to the accuracy or integrity of any part of the work, even those in which they were not personally involved, are appropriately investigated, resolved, and documented in the literature.

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