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Telecare: Technological Innovations for Remote Care

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Abstract[1]

Telecare is a remote care service that has flourished in recent years because of the many benefits it offers to users, their caregivers, and the health and social services system as a whole. In Europe, the penetration rate of telecare among people older than 65 ranges from below 3% to 11%. In Latin America and the Caribbean, available telecare does not yet meet the existing need for care services, and the region lacks studies that provide a broad perspective on the service's potential impact on the region. In this report, we explore the main characteristics and challenges for telecare services and summarize available evidence about its many benefits and potential savings for health and social services systems. The report also compiles regional telecare prices and concludes that the service costs an average of 25 USD a month, which is lower than other care services. This report details the progress that various countries in Latin America and the Caribbean (Argentina, Barbados, Brazil, Chile, Colombia, Costa Rica, Cuba, Mexico, Peru, and Uruguay), Europe, and Asia have made in using this service and gives simple steps for a successful rollout.

Keywords: Telecare, long-term care, care services, care dependency, aging, Latin America and the Caribbean

JEL Classification Codes: J14, J18, O33, O54

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Section 1. Introduction: Advantages of Telecare Services

Latin American and Caribbean countries are aging faster than the rest of the world. Between 1990 and 2020, the region's population over age 65 grew from 21.4 million to 58.7 million. The proportion of the population over age 65 rose from 4.8% to 9%. In addition, this region is estimated to have nearly eight million people over age 65 who are experiencing care dependence, meaning that they require assistance to carry out at least one basic activity of daily living (BADL). People experiencing care dependence make up 14% of the population over age 65. This proportion is expected to rise to 16% by 2050, increasing from eight million to twenty-three million people (Aranco et al., 2022).

With more people experiencing functional dependence and families providing fewer unpaid care services, it is essential to develop quality, affordable care services. Telecare is one of five types of services offered by long-term care systems alongside residential care facilities, home care, day centers, and services for caregivers (Cafagna et al., 2019). Telecare is a remote service operated 24 hours a day, 365 days a year, which provides an immediate response and care to older people and people experiencing care dependence. Telecare allows the user to communicate immediately with remote operators from anywhere in the home using a push-button. In this way, the user may simply speak with someone or, in case of an emergency (e.g., a fall), request help to mobilize the right resources for the situation. Because telecare is delivered remotely, it plays no part in the performance of basic activities of daily living.

The advantages of telecare are many. The first centers on the service's users. Telecare is associated with enhanced quality of life and perception for its users (Liu et al., 2016; Morris et al., 2014), who report feeling more secure, calm, and independent, as well as less lonely (Beale et al., 2010; Giraldo-Rodríguez et al., 2013; Brownsell & Hawley, 2004; Tunstall, 2020). The COVID-19 pandemic has exposed the importance of tools to prevent depression and loneliness. Isolation has provoked an explosion of cases of loneliness, depression, and anxiety in older people (Vázquez Resino, 2021) and, in some countries, telecare has been their sole means of contact with other people and the outside world. Evidence has also shown that telecare postpones the institutionalization of older people experiencing care dependence (Carretero, 2015; Tunstall, 2020). This effect is relevant given older adults' aversion to institutionalization (Costa-Font 2017) and the benefits lauded by the World Health Organization (WHO) of staying in your own home as you age (WHO 2015, Chapter 2).

Telecare also benefits caregivers. It is deemed to lighten caregivers' workload (in terms of visits, calls, and mental load) and lower their stress levels (Beale et al., 2010; Mitseva et al., 2009). In addition, families report that, even if their elderly family members live alone in their own homes, with telecare they feel more assured (Giraldo-Rodríguez et al., 2013; Tunstall, 2020).

Additionally, telecare benefits the health and social services system. This service is associated with a decreased use of ambulances and other deployments of assistance (involving government services and/or family members) (Hugoogsgift Contreras et al. 2020). Telecare also reduces the instances of hospitalization (Tchalla et al., 2012),

required hospitalization time (Carretero, 2015), and residential care facility expenses because institutionalization is delayed, as mentioned earlier.

Finally, there are strong financial reasons for promoting the use of telecare over other care services that require more human resources, provided the user's level of care dependence allows for this approach. On average, we estimate it costs 25 USD per month to provide telecare service in Latin America and the Caribbean, while home care cost an average of 673 USD per month, and residential care facilities cost 804 (Fabiani et al., 2022). Telecare costs may decrease further with technological advances and large-scale use resulting from government contracts. Its low cost allows many users to be served at a lower cost.

Because of these benefits, in recent years telecare services have expanded worldwide. In Europe, telecare's penetration rate among people over 65 ranged from 3% to 11%. In Latin America, the governments of Uruguay, Chile, and Cuba are noted for providing telecare services, while other countries like Mexico, Colombia, and Peru have developed early pilot programs. Costa Rica is close to launching a pilot telecare program as part of its national long-term care policy. There are also examples of positive experiences in the private sector. However, this care service still needs to develop and expand significantly in Latin America and the Caribbean to meet existing needs and fulfill market potential.

This report is structured as follows:

- Section 2 describes the main characteristics of the telecare service, particularly how it works, its different modalities, target population, and prices.
- Section 3 summarizes existing empirical evidence on how adopting telecare affects its users, their caregivers, and the health and social services system as a whole.
- Section 4 describes telecare experiences in Europe and Latin America and the Caribbean.
- Section 5 addresses the challenges involved in rolling out this service.
- Section 6 describes the main steps needed to implement telecare and suggests how to overcome some of the challenges mentioned.
- The final section presents our conclusions.

Section 2. Features of Telecare Services

2.1. How Telecare Works

Telecare is a remote service that provides an immediate response and care to older people and people experiencing care dependence. This note lays out two basic requirements for telecare services:

- Care must be constantly available 24 hours a day, 365 days a year.
- The service must be able to deploy resources in the event of an emergency.

Telecare can thus be distinguished from other services that are not constant or that are unable to respond to emergencies.

Telecare is based on immediate communication from anywhere in the user's home, allowing the user to simply speak with someone or, in the event of an emergency, request the mobilization of appropriate resources. Telecare is mainly offered via a telephone, whether by landline, cell phone, or VoIP (communication over the Internet). The service assists users with their needs and any emergencies, employing a series of technological devices and remote operators working from an assistance center.

The main device is a bundle consisting of a **remote control unit (RCU) or push-button and a base communications unit.** The user may wear the push-button as a pendant or bracelet designed for use during daily activities (even in the shower). In an emergency, the user presses the push-button to instruct the base unit to automatically make a hands-free call to the assistance center. Some devices do not require a button to be pressed because they automatically detect sudden falls.

The **base communications unit** allows the user to call the assistance center without needing to hold the phone; the device is connected to a landline phone or uses a SIM card. Hands-free communication within a radius of approximately 50 meters means that users can be helped in emergency situations.

Remote operators at the **assistance center** help users 24 hours a day, 365 days a year, following protocols tailored for each situation. If the user calls the assistance center by mistake or simply wishes to speak with someone, the remote operator is trained to stay on the line and learn about the user's health and social situation. If a user calls due to an emergency, a remote operator will attend to him or her within approximately 30 seconds and deploy the resources required for each situation, depending on the user's profile. In some countries, maximum response times are even shorter and are regulated (for example, the mandated response time in Spain is 10 seconds). Resources that may be deployed in an emergency include: calling a family member, an ambulance, healthcare professionals, the fire department, and 911. The assistance center's remote service is complemented by in-person staff who gather users' social and medical information, provide follow-up in complex cases, maintain contact, and coordinate with social services and other public services. In some countries, the service also includes first-response

vehicles staffed by personnel trained in first aid who attended to the person until a medical team arrives.

Peripheral devices or sensors are other telecare devices. They automatically detect risk by monitoring users' routines and react to unexpected changes in these processes. Examples of peripheral sensors include smoke, door-open, gas, motion, chair occupancy, and fall detectors.

In addition to fixed telecare, mobile telecare has been developed in recent years. This is a form of telecare for older people with a high degree of autonomy and quality of life who spend hours away from their homes. A mobile device connected to the 3G, 4G, 4G-LTE, or 5G telephone network gives the user immediate voice communication with the assistance center and allows geolocation so the user can be assisted if needed.

Table 1 presents definitions and differences between the various remote assistance services.

Table 1. Telecare, Telemedicine, and Telehealth Defined

Telecare did not develop in isolation. It emerged after or in tandem with other remote services made possible by technology.

Telemedicine: medical intervention service in which healthcare professionals use information and communication technologies to diagnose, treat, prevent disease and injuries and conduct research and evaluation. The ultimate aim is to advance the health of individuals and their communities (WHO, 1998).

Telehealth: includes telemedicine as well as care and social services provided by professionals (e.g., nurses, pharmacists, etc.). Literature on the subject often uses the terms "telehealth" and "telemedicine" as synonyms. Examples of these concepts are glycemic and blood pressure monitoring and follow-up based on the results (Bower et al., 2011; Steventon et al., 2012), as well as remote medical guidance and consultations (Hsu et al., 2010; Martin-Lesende et al., 2013), messaging and reminders (Pérez Ewert et al., 2016), meetings to share experiences and prevent loneliness (Bond et al., 2010; Dew et al., 2004), among many others. The preceding description highlights the sporadic nature of the remote support and assistance that telemedicine and telehealth provide, while telecare focuses on providing constant support.

Telecare: a service that provides remote social care using telecommunication devices (Empirica, WRC & EC, 2010). It encompasses telecare and other services that are delivered occasionally or that are unable to respond to emergencies. One example of telecare that falls outside the definition of telecare is the telephone support, remote check-ups, and monitoring provided to older people at risk of suicide in northern Italy (De Leo et al., 2002). Another example is a Danish program that recruits volunteers to call older people who feel isolated at home and want companionship.

These services are not always provided in isolation. Telecare is often combined with telemedicine and telehealth to focus on caring for users and their entire social and healthcare environment. The base communications unit thus becomes a hub for receiving and responding to health data, behavior sensors, video consultation, contact with social and

healthcare services, etc. For example, Telecare Bahamas offers telecare service using the Link+ platform, which integrates all medical devices in the patient's home through a fully automated, contactless Bluetooth system. The device sends doctors real-time updates about the user's blood pressure, glucose and oxygen levels, temperature, weight, electrocardiogram readings, or a combination of these factors and can also be customized to suit each user's needs (Telecare Bahamas, 2022).

2.2. Telecare Modalities

The birth of telecare is closely tied to the origins of telecommunication because these technologies laid the foundations for remote emergency services. We can therefore say that the genesis of telecare was when the radio and telephone were first used to remotely aid an isolated person or to give medical or social help to someone to meet a specific need (IMSERSO, 2011).

Telecare has changed as technology has evolved and progressed and as the teams in who provide the service have innovated. Today, there are four distinct telecare modalities (Tunstall, 2020):

***Reactive telecare**:* As its name suggests, reactive telecare responds immediately in an emergency. Under this modality, the user directly communicates with the assistance center using any of the devices mentioned above (usually push-buttons). Once communication has been established, the necessary resources are deployed to respond to the emergency (contacts with access to the user's home or medical or emergency services). For example, in case of a fall—which is one of the main causes of disability and mortality in older people (Tinetti & Speechley, 1989)—the user can press the push-button, and remote operators will locate family members or emergency services to deal with the situation (Brownsell & Hawley, 2004; Tchalla et al., 2012).

***Proactive telecare**:* This telecare modality supplements reactive services to prevent critical situations. An assistance center with a proactive approach generates broader and more comprehensive support for its beneficiaries and their caregivers. Users are better served by the assistance center through daily, weekly, or monthly calls (depending on users' social and healthcare needs), as well as weekly or annual home visits, and through information, orientation, and advice campaigns. Proactive telecare is characterized by reminders (by telephone or messaging) urging users to adhere to treatments and medications or to stay hydrated in hot weather. It includes videoconferences so contact with professionals is maintained (García Martínez and Bermejo Nieto, 2004; Ramos Michel et al., 2017).

Personalized telecare: Some proactive telecare services have evolved by personalizing the service according to each user's specific needs. By identifying and prioritizing individuals' needs, these services refine their actions and prevent or detect situations that compromise users' health or safety. Personalized telecare increases the frequency of proactive contacts with users experiencing greater care dependence and adapts interventions to users' profiles and chronic diseases. For example, round-the-clock systems to monitor vital signs and advise patients with chronic obstructive pulmonary

disease are available (Sicotte et al., 2011), as are activities to develop skills that offset deficits linked to neurological disorders (Ramos Michel et al., 2017).

Predictive telecare: Although this telecare modality is still being developed and has fewer users compared to other modalities, it has great potential. The main aim of predictive telecare is to detect potential risks using sensors and other devices that gather information about users' routines and use this information to head off emergency situations. This type of service gathers daily information about home activities and uses artificial intelligence to analyze the data and detect suspicious changes in behavior.

One example of predictive telecare devices are sensor tags placed on everyday objects and motion detectors at key points in the home that detect unusual situations (Cruz-Martín et al., 2008; Mitseva et al., 2012). The sensors can detect motion, speed, humidity, temperature, etc. If a user has not turned on the coffeemaker, has not sat in an armchair, or has not opened the refrigerator—as they usually do every morning—an alarm may be triggered. Activity monitoring can also be used to detect problems with nutrition, dementia, etc. Other technologies have been developed to take vital signs, such as blood pressure, using touch-free sensors (Harris & White, 2013) and cell phones can now detect falls using acceleration sensors (de Oliveira et al., 2021).

The evolution of telecare—from reactive to predictive—is cumulative. This means the latest iteration of predictive telecare also provides personalized, proactive and reactive services. People can always call in an emergency (reactive Telecare), but additional services are added on top of that basic service.

Table 2 presents robotics as a potential telecare modality that will see an increase in development in coming years.

Table 2. Robots: Telecare of the Future?

The rise of robotics broadens the telecare spectrum. Ropero et al. (2017) present a robot, accompanied by a sensor and data processing system, which detects abnormal situations and takes action. The robotic platform is trained to respond to emergencies, independently locating users anywhere in the home and mobilizing to assist them. The robot has cameras that allow the assistance center to observe the situation and communicate with users through the robot.

PaPeRo (Partner-type Personal Robot) accompanies individuals experiencing dementia during their daily activities. This robot can hold conversations, suggest activities for users, and give reminders (Inoue et al., 2012).

Telecare may also use devices that facilitate specific activities for users depending on their degree of care dependence. For example, the HAL (Hybrid Assistive Limb) and SAS (Stride Assistance System) robots help individuals who are experiencing limited mobility to walk (Shimada et al., 2009; Watanabe et al., 2012).

Robotic telecare technology promises to radically reduce prices and costs for monitoring calls and care from assistance centers (Inoue et al., 2012).

In addition to these four modalities, telecare can be classified according to the technology used. These categories are **first-generation** (or fixed telecare), which uses push-buttons pressed by users to report an emergency in the home; **second-generation** (or mobile telecare), consisting of monitoring sensors that track the user inside and outside the home; and **third-generation** (peripheral sensors), which include artificial intelligence devices placed in the home, such as smoke, fall, gas, and other detectors that react when an unusual event occurs.

2.3. Target Population

Telecare is meant to serve people experiencing mild or moderate care dependence and older people who live or spend much of their time alone (Giraldo-Rodríguez et al., 2013). Mild or moderate care dependence means the inability to perform instrumental or personal-care activities of daily living, so outside assistance is required (EC, 2015). Whether or not telecare is a suitable tool for a person's care, or whether home care is also required depends on each user's degree of care dependence because, as a remote service, telecare does not help with BADL.

Most telecare users are female. Large-scale research conducted in France, Scotland, Uruguay, and Spain indicates that 77%, 62%, 81%, and 73%, respectively, of the population studied were women (Tchalla et al., 2012; Beale et al., 2010; Geriatricarea, 2021; Hugoosgift Contreras et al., 2020). This result is consistent with evidence that women live longer than men in most of the world (Aranco et al., 2022).

In terms of age, each country creates its own criteria for eligibility for public sector services. In Uruguay, for example, people are eligible for telecare services from the care system after age 70. However, 72% of users are over 80. In Spain, the age for eligibility for telecare services used to be the retirement age of 65, but there was a push to revisit this criteria. Advances in health and improved quality of life allow many to remain independent at this age. Consequently, age 70 is now used as the eligibility criteria for care services, and 90% of telecare users are currently over 80 (Entrambasaguas Garrido, M., personal communication, 2021). Other studies place the average age between 73.8 and 79 years (Hugoosgift Contreras et al., 2020; Tchalla et al., 2012).

Some typical eligibility requirements for telecare are a lack of severe hearing impairments or mental illness that would prevent users from expressing or orientating themselves (Giraldo-Rodríguez et al., 2013). Technological developments help overcome these barriers and facilitate universal access to the service. For hearing-related limitations, there is already a mobile device that allows people with impaired hearing or communication to contact the assistance center by text or pictograms (for people who do not read or write) or by video (if they use sign language). There are also examples of people with dementia accessing telecare services. The Barcelona City Council in Spain and the Helsinki City Council in Finland already have specially designed technology for people with mild or moderate cognitive impairment that allows them to be located when they are away from their homes. Also, telecare is extended to caregivers of people experiencing dementia.

In terms of scale, in the different European countries, between 10% and 33% of people over 65 are experiencing care dependence (EC, 2015). In 2007, this figure reached 20.7 million older people throughout Europe (Carretero, 2015), a number projected to rise. In Latin America and the Caribbean, there are currently around 8 million people over 65 who are experiencing care dependence, representing 14% of the population in this age group. By 2050, 23 million people are expected to be experiencing care dependence in Latin America and the Caribbean, which would represent 16% of the population over age 65 (Aranco et al., 2022). telecare therefore has a key role to play within this subset of the population, although its development in Latin and Caribbean countries is still limited due to scarce or nonexistent public care services (Aranco et al., 2022) and the reduced purchasing power of potential private-sector users.

2.4. Prices

Telecare service prices vary by region and modality. Prices also depend on whether the service is public or private and differ according to user income level and contract term. It is important to differentiate between equipment prices and monthly service charges. A distinction also needs to be made between the price that the service provider charges the government, and the price that the government (in some cases) passes on to users. This section presents different examples of monthly telecare prices for service delivery, as well as equipment prices, and offers a perspective on different experiences in Latin America and the Caribbean as well as in Europe.

2.4.1. Service Prices

The price of service delivery is an essential component of telecare. Table 1 shows the monthly average prices paid for telecare in Europe and Latin America, with columns showing the public sector's role in delivering the service and subsidizing its price, and whether the service is provided free of charge to some user categories.

In general, we can see that prices in Europe range from a minimum of 15 USD per month in Spain to 33 USD in Sweden. The range is smaller in Latin American and Caribbean countries: prices run from 18 USD in Mexico to 30 USD in Barbados. Services are provided free of charge to the entire population in some cases, as described in Section 4.

Each country has different rates, conditions, technologies, and sales volumes. Especially for Latin America and the Caribbean, the table reflects information currently available from the public and/or private sector for a basic telecare service, meaning a first-generation system. For example, in Chile, the average monthly price refers to the service provided by a private company selected through a competitive bidding to serve approximately 2,000 users. The information for Costa Rica and Uruguay, where telecare service is part of the national health strategy, comes from the public sector. On the other side, the information about Argentina, Barbados, and Mexico refers to the average price charged by the private sector. The figures for Colombia reflect both public and private sector data.

Table 1. Delivery of Telecare in Europe, Latin America, and the Caribbean

Countries	Average Monthly Price	Public Sector Contributes?	Free Service for Certain User Categories?
Europe			
United Kingdom	US$17 - US$19	Yes	Yes
Sweden	US$27 - US$33	Yes	Yes
Spain	US$15	Yes	Yes, in most cases
The Netherlands	US$16 - US$33	Yes	Yes
Germany	US$20	No	No
France	US$16	Yes	Yes
Portugal	US$22	Yes	Yes
Latin America and the Caribbean			
Argentina	US$27	No	No
Barbados (and Anglophone Caribbean countries)	US$30	Yes	Yes
Chile	US$22	Yes	Yes
Colombia	US$28	Yes	Yes
Costa Rica	US$24	-	-
Mexico	US$18	No	No
Uruguay	US$26	Yes	Yes

Sources: European countries except Portugal and Spain: CODA Strategies (2017). Portugal: Prepared by the authors based on Helpphone (2022) and Portuguese Red Cross (2022). Spain: Entrambasaguas Garrido, M., personal communication (2021). Argentina: Oliveri (2020). Barbados: Caribbean Telehealthcare Services (2022). Chile: Prepared by the authors based on Molina et al. (2020) and Forttes, P., personal communication (2022). Colombia: Prepared by the authors based on the surveys of Aranco et al. (2022). Costa Rica: IMAS (2021). Mexico: González-González et al. (2019). Uruguay: Colacce and Manzi (2017).

Note: Prices for Europe were converted to USD at the March 28, 2022 exchange rate (1 EUR=1.10 USD). Local currency data for Mexico and Uruguay was adjusted for the 2017 exchange rate using World Bank information (2022). Current information for Costa Rica does not allow us to classify the modality used in providing this service.

2.4.2. Equipment Prices

The cost of telecare technology is relevant, even for most sophisticated modalities, which will become more fully established in coming years even though their current scope is limited. However, data on this sector is limited. In the Table 2, we present the costs of some devices in Europe and Latin America.

Table 2. Equipment Prices in Europe and Latin America (in USD)

Device	Country			
	France	Scotland	Spain	Uruguay
Console	US$154	-	US$165	US$140 - US$160
Smoke detector	US$73	-	-	-
Gas detector	US$145	US$128	-	-
Door-open alert	-	US$52	-	-

Source: France: Prepared by the authors based on Carretero & Kucsera (2015). Scotland: Beale et al. (2010). Spain: Entrambasaguas Garrido, M., personal communication (2021). Uruguay: prepared by the authors.

Note: European prices were converted to USD at the March 28, 2022 exchange rate (1 EUR=1.10 USD).

Devices to optimize telecare service are constantly being developed, and prices will fall as technology advances. The future of telecare is promising and has the potential to reach even more users.

2.4.3. Conclusions about Prices

The average price for telecare is less than that of other dependent care services, such as residential care facilities, home care, and day centers (Fabiani et al., 2022). Telecare requires fewer human resources and less infrastructure, and its relatively low marginal costs allow a more affordable and far-ranging service.

Telecare prices may decrease as large-scale government contracts increase access to the service. Therefore, the public sector plays a role is key in expanding the service, reducing prices, and promoting telecare companies. Spain is a clear example of this drop in prices. When the government's reactive telecare service was launched in Spain in the late 1990s, the government paid telecare service providers approximately 30 euros per month. The increased number of users and average term of service helped cut prices sharply. Between 2009 and 2012, the average number of users of government services provided through the company Tunstall—one of the main providers in the Spanish market—rose to 104,000, and the average price the company charged the government for the service was 20 euros. Between 2013 and 2016, the number of users rose to an average of 254,000, and the price fell to 16 euros. In 2017, 330,000 users were recorded, and prices fell to 14 euros. In addition to offering lower prices, the service was becoming

more sophisticated because telecare evolved from reactive to proactive, and then to personalized (Entrambasaguas Garrido, M., personal communication, 2021).

Different actors may cover telecare costs. When the service is provided by the public sector, the government either engages a company or runs the service itself. The government may bear the entire cost of the service or pass on some or all costs to end users. This is the case, for example, for Sweden, the United Kingdom, Spain, France, Italy, Portugal, Uruguay, and Chile. When the public sector passes on the cost to the end user, it may charge a fixed amount or charge according to the user's income. When the service is provided by the private sector, as in The Netherlands (CODA Strategies, 2017), the company charges the individual user directly. A national flat rate may also be applied, as is the case in Germany (ibid).

Section 3. Empirical Evidence of Telecare's Impact on Care

The field of telecare research is still limited. However, researchers have gathered empirical evidence on the impact of using technologies in caring for people. This evidence can be divided into three categories:

- The first concerns the impact on people receiving the care, meaning telecare users. Studies have measured telecare's impact on factors tied to quality of life, user perception, and health indicators (Liu et al., 2016; Morris et al., 2014). Delay in institutionalization is also included.
- The second includes caregivers (formal or informal). These studies highlight how the availability of telecare impacts caregivers' workloads and stress levels.
- The third refers to the economic repercussions of telecare for the health and social services system. Hospitalization rates, number of available beds, and savings at residential care facilities are some of the indicators assessed.

The findings are presented below.

3.1. Telecare's Impact on Users' Independence, Quality of Life, and Institutionalization

Users are the group most impacted by telecare. Its effectiveness in helping older people and people experiencing care dependence to live safely and independently in their own homes is what sets it apart in much of the specialized literature on telecare (García Martínez and Bermejo Nieto, 2004). telecare has been found to impact various aspects of its users' lives, giving them greater autonomy, reducing the number of falls, and improving cognitive levels (Liu et al., 2016). There is evidence that technologies have been successfully used in care to promote older adults' mental health and sense of empowerment (Morris et al., 2014). However, few studies are rigorous in their methodology. More high-quality quantitative assessments are needed to continue.

demonstrating the benefits of telecare (Lamont et al., 2018; Peek et al., 2014).

Next, we will describe telecare's positive impact on users' perceptions (Liu et al., 2016).

A Scottish telecare development program found that predictive telecare improved users' perceptions of their quality of life: 60.5% of the sample reported that their quality of life improved either greatly or slightly; 93.3% of users reported feeling more secure; 69.7% perceived greater independence; and 27.1% of people surveyed said their health had improved (Beale et al., 2010). Similar results were reported in a cross-sectional study that was part of a pilot program for proactive telecare in Mexico (Giraldo-Rodríguez et al., 2013): 32% of the 378 older people surveyed noted that they felt more independent; 68.8% felt calmer; and 89.8% felt safer upon using telecare.

In Yorkshire, the United Kingdom incorporated technologies into its telecare service to detect falls: 58% of users in the treatment group reported increased independence, 61% felt a greater sense of security, and 72% felt more comfortable upon using telecare services. In general, 90% of those surveyed indicated that they were satisfied with the telecare device (Brownsell & Hawley, 2004). It is important to bear in mind the small sample size when interpreting these results.

The reactive telecare service in Spain clearly benefits its users (Tunstall, 2020). Of the 1,200 beneficiaries surveyed, 78% perceived greater autonomy in their activities, 96.1% felt more secure, and 92.3% reported that they felt less lonely after receiving telecare services. These benefits and changed perceptions were noted six months after the service was launched.

The Department of Health (England) used a randomized controlled trial to assess the difference in impact of proactive and predictive telecare on 1,189 users compared to reactive telecare. An average of four types of peripheral devices were installed, including environmental sensors, health monitors, simple organizational objects, and user-adapted technology. The physical and mental health of users in the treatment group surpassed that of the control group, with a statistically significant difference (Hirani et al., 2013).

Some studies found improvements in people's health, but more rigorous research is needed in this area. In Mexico, 52% of users noted improved health. This finding was confirmed by 41.5% of professionals, who asserted that they observed positive changes in their patients' health. These improvements may be associated with proper adherence to treatments and medications due to monitoring and alarms. Of professionals surveyed, 18.9% reported that they had written fewer prescriptions for telecare users, while 24.5% thought demand for healthcare services had decreased (Giraldo-Rodríguez et al., 2013).

Apart from an enhanced perception of autonomy and quality of life, several studies found concrete results showing greater levels of independence: older people were able to remain in their homes longer while using emergency services less.

Several studies (Carretero, 2015; Tunstall, 2020) found a marked delay in institutionalization. Carretero assessed a telecare program in the United Kingdom that, in 2004, delayed the institutionalized of its users by an average of 18 months compared to previous years' cohorts. From 2011 to 2018 in Spain, a longitudinal study involving 256,000 beneficiaries indicated that institutionalization was delayed by 8.6 months among telecare users (Tunstall, 2020). Delayed institutionalization is a very important

benefit of telecare given older adults' aversion to being institutionalized (Costa-Font, 2017), in addition to evidence that aging in place allows people to maintain a sense of belonging and identity, which in turn increases their confidence, security, and levels of autonomy (WHO 2015, chapter 2).

3.2. Telecare's Impact on Caregivers' Well-Being and Time Spent

Not only does telecare benefit its users, it also benefits the entire safety net associated with caring for older people or people experiencing care dependence. Therefore, we must study how the work of formal and informal care personnel changes after telecare services are set up to supplement or replace work done in person. The impact that telecare has on users' perceived autonomy and quality of life tends to indirectly affect their caregivers (Bhattacharyya et al., 2015) in ways explained below.

Evidence shows that introducing telecare reduces caregivers' workload and stress levels. ISISEMD (Intelligent system for independent living and self-care of seniors with mild cognitive impairment or mild dementia) is one of the pilot programs for care in Europe that can be considered predictive telecare. A randomized study found that informal caregivers benefit from the use of telecare because they are able to spend less time providing in-person care (using alarms and video calls instead). After telecare was set up, in a standardized stress test, caregivers reported a drop from 31.82 to 14.83 points. They also reported receiving fewer calls, making fewer visits per day to people experiencing care dependence, and spending less time thinking about providing care (Mitseva et al., 2009). Similar results were found in Scotland: 74.3% of formal and informal caregivers reported lower stress levels after telecare was introduced, and formal caregivers reported making fewer visits (Beale et al., 2010).

Researchers assessed caregivers' perceptions in Latin America and the Caribbean in a telecare pilot program in Mexico. Of those surveyed, 84.7% of caregivers reported greater peace of mind regarding care, and 89.8% of families felt more secure with the program. From the perspective of formal caregivers, 94.3% deemed the program to be of value in monitoring and caring for users (Giraldo-Rodríguez et al., 2013).

3.3. Telecare's Impact on Economic and Institutional Aspects of the Health and Social Services System

The health and social services system is the third area where telecare has a positive impact. Although there is still scant empirical evidence on this aspect, some studies attempt to estimate telecare's effect on hospitalization, home discharge, bed occupancy, and other factors.

3.3.1. Use of Ambulances and Other Emergency Mobilizations

A groundbreaking longitudinal study conducted by Hugoogsgift Contreras et al. (2020) assessed the impact of telecare services on ambulance use in Spain. The rollout of telecare has reduced care-related emergency mobilizations by 27.9%. In particular, ambulance use fell by 33.3%, emergency trips by users' family members decreased by

19.9%, and the use of other government emergency mobilization services fell by 11.2%. With the exception of high-risk care-dependent users, emergency mobilizations decreased at all levels of care dependence.

The French telecare program (ESOPPE) succeeded in reducing older people's falls by providing sensor-activated lights and alarms to guide people in the dark. A longitudinal study of this program identified two groups with similar characteristics. One group received telecare and the other did not. The study found that 30.9% of the treated group experienced falls, compared to 50% in the control group (Tchalla et al., 2012).

3.3.2. Hospitalizations and Hospital Bed Occupancy

Demand for hospitalization also fell. The same study on the French telecare service (ESOPPE) found that 9.6% of telecare users were hospitalized, compared to 25% of the control group (Tchalla et al., 2012). A study on West Lothian Telecare with 1,700 older people found the program reduced hospital stays (Carretero, 2015). Only 1.4 per 1,000 older people in the region where telecare was in place occupied hospital beds, compared to 2.47 per 1,000 older people in the rest of Scotland. Hospital stays were reduced to 30 days on average, compared to 112 day stays by non-users of telecare. Consequently, it is estimated that 3,000 hospital bed days were freed up in the first year telecare was used.

3.3.3. Residential Care Facility Admissions and Bed Occupancy

In addition to fostering users' autonomy, in Spain users' institutionalization was delayed after telecare was expanded, as mentioned earlier (Tunstall, 2020). In monetary terms, this delay in institutionalization means savings of approximately 22,000 pounds sterling per user in the services provided by residential care facilities.

Similarly, the companies partnering with the TDP (Scottish Telecare Development Programme) estimate that Scottish telecare delayed 518 admissions to formal care homes, thereby saving 62,000 occupied bed days in these homes. In monetary terms, the savings from these delayed admissions to residential care facilities amounts to 3.4 million pounds sterling (Beale et al., 2010).

Section 4. Telecare Experiences around the Globe

This section presents the main experiences with telecare service in Europe, Latin America, and the Caribbean. Annex I describes other experiences worldwide. These examples provide an overview of practices characteristic of this service, as well as current results in terms of its dissemination and coverage.

4.1. Europe

Telecare's penetration rate varies among different European countries. In the United Kingdom and Scandinavian countries, more than 11% of people over 65 have a telecare device. Central and Eastern Europe report penetration rates below 3% (Coda Strategies,

2017). As for the technologies used up to 2010,[2] the first-generation technology market (push-buttons) has developed more than the second-generation (monitoring sensors) and third-generation technology markets (artificial intelligence devices) (Deloitte Centre for Health Solutions, 2010).

The United Kingdom has more than 1.7 million users, and its market is largely controlled by the government's service. Sweden records more than 222,000 users, with an entirely public-sector market run by municipalities. In Spain, the service is also primarily managed by local governments: of a market of approximately one million users, 800,000 are from the public sector.

In the Netherlands, telecare services are privately run, and public sector support is quite limited due to the lack of telecare development policies. The services are used by approximately 240,000 users. The French market is also mainly managed by the private sector, with support from the public sector. The subscriber base has grown significantly in recent years to more than 585,000 customers today. In Germany, non-profit organizations provide telecare services, with around 500,000 users (Coda Strategies, 2017).

In Italy, the telecare service is administered by local governments, especially in the northern regions and major cities. In the rest of the country, the private sector has a larger presence. In Portugal, the service is provided by local authorities, private companies, and non-profit organizations. The service offered by the Portuguese Red Cross, one of the country's chief providers, has more than 5,000 users nationwide (Portuguese Red Cross, 2022).

4.1.1. Spain

Since the 1990s, Spain has delivered telecare services through subsidies from the public administration, autonomous communities and, in some cases, local bodies. There are two models for publicly financed telecare services:

1. Services implemented in-house by the government (Andalusia).
2. Services delivered by corporate providers, as in Barcelona (which we will describe in more detail below), the Madrid City Council with 115,000 users, Castilla–La Mancha with 59,000, the Basque Country with 50,000, and Castile and León with 29,000 users.

Andalusia

Among the government models for in-house implementation, the service provided by the Autonomous Government of Andalusia has the most telecare users (238,000 in 2021). It delivers the service from its own assistance center, which has more than 100 operators (Junta de Andalucía, 2022).

[2] This is the most recent information currently available.

This is a proactive telecare service because operators provide direct care in the event of an emergency, are familiar with users' personal circumstances, and periodically make proactive contact with users and individually monitor them to foster a sense of security and companionship. The service is provided directly by the government, which enhances social and healthcare service integration. Besides contacting designated family members and emergency services in a crisis, the assistance center is able to authorize health and social services as it detects a need for them. For several years now, it has installed smoke and gas detectors in homes for at-risk users. Additionally, the service has some experience with mobile telecare.

In terms of the user profile, all people over 65 and all people experiencing care dependence, regardless of degree, may access this service. Users must only reside at their customary residence and have a landline telephone. The service is compatible with most services and economic benefits, apart from residential care services. The monthly cost of the service is 20.5 USD, and subsidies covering between 80% and 40% of the cost are applied, based on the user's economic means. People over age 80 are completely exempt from paying.

Barcelona

The Barcelona City Council's current telecare program was launched in 2013 to replace the state-run telecare program launched in 2005 by IMSERSO (Spanish Institute of the Elderly and Social Services) (Navarro, 2017).

The program delivers personalized telecare, supplemented by in-home services: installers, social workers, and mobile units or first-response vehicles. These mobile units are sent to the user's house in the event of a minor emergency to assess or even resolve the situation. It also offers a keyholding service that allows emergency access to people's homes.

This service has approximately 100,000 users served by 114 remote operators. Users over age 75 who live alone or are alone most of the day as well as people with health issues requiring special care qualify for this service. Both the equipment and the service are provided by private companies hired through a competitive bidding process. The companies offer a price for each device and additional value for the service.

The service offers three levels of care: basic, medium, and high. The level is determined by the frequency of monitoring calls (every 15, 30, or 45 days) and the safety devices to be installed in the home.

4.1.2. United Kingdom

The United Kingdom stands out for having the most telecare subscribers, with more than 1.7 million users (Coda Strategies, 2017). The service is generally provided by local authorities or associated agencies and rarely by private companies (Yeandle, 2014). In 2010, the public sector accounted for 90% of spending on telecare, and the private sector 10%. The country's telecare and telehealth market is very fragmented, with more

than 80 operators and more than 25 in the National Telehealth Framework (Deloitte Centre for Health Solutions, 2010). The main companies operating in the sector are Tunstall, Tynetec, Chubb, and Possum (Coda Strategies, 2017).

In the late 1990s, the government began investing in various telecare projects. In 2006, 80 million pounds sterling were awarded to city councils as Preventative Technology Grants to develop telecare services in collaboration with the National Health Department and other local, voluntary authorities and independent sectors as well as service users and caregivers. These grants aimed to increase the number of telecare beneficiaries and reach at least 160,000 older people nationwide. Some of these funds were used to conduct small-scale pilot studies. Others were used to gradually incorporate telecare into health, social care, and housing services. In terms of results, around 150,000 new telecare users were recorded in 2006-2007, and another 161,000 in 2007-2008 (Turner and McGee-Lennon, 2013). Currently, evidence regarding the benefits of telecare is mixed and, to a large extent, consists of small-scale pilot studies. The country's main programs include:

- The 31 million pound sterling Whole System Demonstrator (WSD) program was launched in 2008 by the Health Department to better understand the impacts of integrated telehealth and telecare (Barlow et al. 2012). This program was the world's largest randomized controlled telehealth and telecare trial, and 6,191 patients and 238 family doctors participated in three locations: Newham, Kent, and Cornwall (Department of Health and Social Care, 2011). Outcomes show significant benefits from telehealth, particularly a 45% reduction in the mortality rate and a 20% drop in hospital admissions. On the other hand, the telecare component did not show similar benefits for any of the sixteen outcomes measured (Wright, 2020).

- The 3millionlives (3ML) campaign was created in 2011 by the Health Department to hasten the rollout of telehealth and telecare in the United Kingdom and increase its global competitiveness. Another aim was to enhance users' quality of life by bringing down costs and allowing them to manage their own affairs at home (Wright, 2020). However, authorities have acknowledged that this initiative has not progressed as expected.

Another key entity in the UK is the Telecare Services Association (TSA), the largest telecare and telehealth network in the United Kingdom and in all of Europe. The TSA has more than 340 organizations and promotes user-centric quality standards for telecare (TSA, 2022).

In Scotland, the Scottish Centre for Telehealth was formed in 2006. It became part of NHS 24 in 2009 and was renamed the Scottish Centre for Telehealth and Telecare (SCTT) in 2010. It was founded to foster and guide the development of telehealth and telecare services.[3] Later, the *eHealth Strategy for Scotland 2011-2017* placed telehealth

[3] The national strategy aimed to offer telecare services to 75,000 personas by 2010 and ensure that another 19,000 people could continue living at home (Turner and McGee-Lennon, 2013).

and telecare at the center of the process of transforming how health and care services are delivered in Scotland. This strategy was set in motion through the *National Telehealth & Telecare Delivery Plan 2012-2016*. In 2015, 11% of the population over 65 were using telecare equipment. In 2018, the *Digital Health and Care Strategy Paper* laid out plans for continuing the digital transformation of health and care in Scotland (Wright, 2020). This strategy was updated in 2022 to include lessons learned from COVID-19 and the digital transformation arising from the pandemic.

In Wales, a telecare strategy was launched in 2005. Between 2006 and 2009, the Welsh government gave local authorities 9 million pounds sterling in funding through the Telecare Capital Grant to deliver telecare equipment to 10,000 homes (Barlow et. al, 2010). In 2009, the program exceeded this target: 18,000 homes had received telecare service by that time.

In Northern Ireland, the telecare market is largely made up of private providers from the social housing sector. The Fold Housing Association and Age NI are the main actors, having installed more than 23,000 alarms. There is also government aid for users who meet the criteria of the Community Care Grant (National Disability Authority, 2018).

4.1.3. France

There are approximately 585,000 telecare subscribers in France, so it joins Spain and the United Kingdom as countries with a relatively high number of service users. The service is used by 10% of people over 75 and is marketed by both public and private actors.

Under one arrangement, a provider may participate in competitive biddings organized by local communities and only provide the technical service, without playing a role in offering the service to users. Another arrangement is a public service delegation contract (DSP), under which a company wins a competitive bidding process and then handles both the technical and commercial sides of the service. In the first case, the public sector has greater control over the supply and greater independence in dealing with the provider (Coda Strategies, 2017). Telecare providers include “specialists,” mutual and other insurance companies, and stakeholders from the non-profit sector, which form this market’s three large strategic groups. The five main providers in France are Vitaris, Présence Verte, GTS Mondial, Europ Assistance and Filien ADMR, which constitute over 70% of the telecare market (ibid*)*.

The French telecare market has two main funding models: public and private. Publicly funded services include economic aid to help recipients buy telecare services:

- The APA, which is an allowance for people over 60 who need help performing basic activities of daily living. APA advisers are often the ones who suggest this service to potential users.
- The Disability Allowance (*Prestation de Compensation du Handicap*—PCH), which provides disability benefits, including telecare subscription.

- The Retirement and Occupational Health Fund (*Caisse d'Assurance Retraite et de the Santé Au Travail*—CARSAT), the Mutual Agricultural Fund (*Mutualité Sociale Agricole*—MSA), the Social Security Scheme for the Self-Employed (*Régime Social des Indépendants*—RSA), and other supplementary pension funds that help older people maintain their autonomy. These funds cover telecare expenses and offer support in prevention (workshops on nutrition, memory, and fall prevention) and activities of daily living (domestic assistance, shopping, overnight care, etc.).

City councils also contribute to installation costs or subscription costs for people who do not receive an allowance.

In the case of private funding, users bear the cost and deal with providers directly. Providers' commercial offerings vary by product and service.

4.2. Latin America and the Caribbean

In Latin America and the Caribbean, people experiencing care dependence tend to receive informal care, primarily from female family members (ECLAC, 2012; Stampini et al., 2020). From an economic, social, and cultural perspective, the move to formal care can mean a huge challenge for households, which delays the deployment of telecare.

Brazil and Mexico were the first countries to promote the use of telecare, launching an initial pilot study in 2008 and 2009. Apart from the experiences of Uruguay, Chile, and Cuba, there are currently no other Latin American or Caribbean countries where the public sector offers large-scale telecare services.[4] Several countries in the region have launched pilot experiences and other initiatives on a limited scale. The outcomes have been favorable. The private telecare service model in Latin America and the Caribbean has not yet been developed to meet existing need and market potential. In demographically significant countries like Brazil, Colombia, Mexico, and Argentina, where telecare should be a business opportunity and an attractive model for investment and creating quality jobs, few companies provide this service; those generally do so on a small scale. Preliminary studies record a total of just over 20 telecare companies in the entire region.

The limited development of telecare services in Latin America and the Caribbean can be explained by little or no coverage of public care services (Aranco et al., 2022), potential users' limited purchasing power, the lack of telecommunications infrastructure in some countries, and mistrust of telecare security. We will discuss some of these challenges for the growth of telecare in section 5 below.

This section details the most relevant public- and private-sector experiences in the region.

[4] Costa Rica has begun including telecare in the design of its 2021-2031 National Care Policy.

4.2.1. Uruguay

In 2015 the Uruguayan government created the National Care System (*Sistema Nacional de Cuidados*—SNC) under Care Act No.19353 (*Ley de Cuidados Nº19.353*). A cornerstone of the law was subsidizing at-home telecare through companies authorized by the SNC (Government of Uruguay, 2021).

People over 70 experiencing mild or moderate care dependence are eligible to receive the service. The potential population (universe) experiencing mild or moderate care dependence was 28,468 people in 2016, and the population (universe) actually reached in 2020 was 1,700 users. Telecare applicants must request the service and be assessed to ensure they meet care dependence criteria before finally receiving an allowance based on their health and social profile. To calculate the allowance, a sum of 269 USD,[5] which is equal to a disability allowance in 2019, is subtracted from the recipient's total monthly income and the result is then divided by the number of people in the household. The per capita values are:

- Monthly income of less than 300 USD: 100% of the total subsidy from the SNC-free of charge.
- Monthly income of 300 to 601 USD: 67% of the subsidy shared between the user and the SNC. User's monthly cost: 9 USD + taxes.
- Monthly income of 601 to 1101 USD: 33% of the subsidy shared between the user and the SNC. User's monthly cost: 17 USD + taxes.
- Monthly income greater than 1101 USD: 0% of the subsidy. User's monthly cost: 26 USD + taxes.

Among eligible subsidy applicants who have still not engaged a company, there is a high proportion of individuals qualifying for a small subsidy. This indicates that the subsidy amount has a large bearing on the decision to engage telecare services through the system (Aranco et al., 2019).

The Uruguayan government, through the Social Development Ministry (*Ministerio de Desarrollo Social*—MIDES) and the SNC, engages, controls, and subsidizes the telecare service for the described population. Once accepted into the program, users may freely choose among the five approved companies, entering into renewable annual contracts. This allows the user to choose a new company at the end of that contract. The companies approved by the MIDES are ANDA, Cavida, Centel, Confianza, and Help Line. The most commonly used technologies include first-generation alarms.

4.2.2. Chile

In Chile, several municipalities engage telecare companies to provide the service free of charge to older residents. These municipalities include Vitacura, Cerrillos, Las Condes, and Recoleta.

[5] Prices in Uruguayan pesos were converted to dollars at the exchange rate of March 28, 2022 (1 UYU=0.0241 US$).

In 2018, the Vitacura municipality launched a proactive telecare program for people over 60 who live alone. The program currently has more than 2,000 beneficiaries. Subsequently, the Recoleta municipality set up a similar program. The service is provided free of charge to its users, and municipalities pay approximately 15 USD per month per user for a telecare service with 4-year contracts. Unlike some experiences in Spain and Italy, where the telecare programs offer a keyholding service to hold users' house keys in case of emergency, Chile has developed a model with a community-based component. This model does not involve a keyholding service; rather it uses information about the user's family,trusted neighbors (some of whom may hold users' house keys) and the neighborhood/community priest (Forttes, P., personal communication, 2022).

Within the context of the COVID-19 pandemic, the national government has set up a proactive telecare pilot program for vulnerable older people. The program is delivered through a private-public partnership involving the National Seniors Service (*Servicio Nacional del Adulto Mayor*—SENAMA), the Metlife-Provida Foundation (*Fundación Metlife-Provida*), and the Chile Foundation (*Fundación Chile*) (Molina et. Al, 2020). Its 1,750 users are older people experiencing social vulnerability and living in the Biobío, Ñuble, Araucanía, and Metropolitan regions. This program's main innovations were in using telecare in a context of high social vulnerability and employing smart phones specially adapted for this purpose instead of telecare devices. Smart phones were adapted to work like telecare devices by adding a button that, when pressed, immediately connects with the assistance center and by incorporating technical alarms that send alerts if the device's battery charge is low (SENAMA, 2020).

In Chile's private sector, six companies deliver telecare services: Gerontek, Telemedcare, Europ Assistance, Grupo EULEN (an affiliate of Grupo Eulen España), Atenzia (an affiliate of Atenzia España), and Alai Secure. Services cost between 18 and 25 USD per month per device (Molina et. al, 2020).

4.2.3. Mexico

In Mexico, in 2009, the Mexican Social Security Institute (*Instituto Mexicano del Seguro Social*—IMSS) set up a reactive telecare pilot program. The program consisted of 24-hour telephone support with rapid responses to crises or emergencies, providing information, guidance, and referrals. Users were people over 60 who lived alone or were alone most of the day. The program had 404 users with an average age of 78, most of whom had been widowed (42 %). Women made up 66% of users. Although the program was found to have positive effects on users' health and quality of life and on the peace of mind of both users and their caregivers (Giraldo-Rodríguez et al. 2013), the program was discontinued.

In the private market, four companies offer telecare service: Cuida Más, CARE 60, VigilÁngel, and Gericare. In general, the services offered by these companies combine telephone calls for monitoring and care with consulting and supervisory medical services and/or caregivers or nurses. Most of these companies are national in scope, although some focus on specific cities (Mexico City, Monterrey, Nuevo León, and León,

Guanajuato). These companies have been active in the market for various lengths of time: one began offering its services 17 years ago while others are new.

4.2.4. Argentina

In 2018, the municipality of Tigre in the province of Buenos Aires, Argentina, teamed up with the Argentine Red Cross to set up an at-home telecare pilot program for people over 65 living alone. Services included rapid deployment emergency services, assistance and emotional support, especially in cases of loneliness or anxiety, as well as reminders (about medications, birthdays, etc.) (Oliveri, 2020). In March 2019, the pilot program had 30 users, but in 2020 the partnership between civil society and the government ended. Currently, the Argentine Red Cross continues to serve pilot program participants.

Argentina has four domestic companies (Atempo, El Puente, Prosegur and Emergencias) and one non-profit organization (Red Cross) that offer telecare services directly to users in the city of Buenos Aires and in some areas in the Argentine provinces. Most beneficiaries are older people living alone and experiencing care dependence. In addition to the basic telecare service, some services include buying over-the-counter medicines and providing personalized reports on the user's mental and physical condition (Oliveri, 2020). This type of service costs 27 USD per month, and the device costs 37 USD.

The Argentine Red Cross has been operating its telecare service for 12 years and currently has more than 3,000 users. The service is generally financed by social welfare funding, and only 5% of users pay for themselves (Cuba, R., personal communication, 2022).

Section 5. Telecare Challenges

There are several challenges involved in developing telecare. The main challenges pertain to older adults' perceptions of using care-related technology (Peek et al., 2014; Yusif et al., 2016). Recognizing and tackling these challenges is essential to successfully implementing telecare.

5.1. Technological Challenges

One of the main challenges of implementing telecare is some older people' difficulty using technologies. In general, the target population for telecare has little digital know-how, which may discourage them from using this service (Jensen, 2014; Nash & Gremillion, 2004; Cohen-Mansfield et al., 2005). Currently the most common devices are the ones easiest to use. However, digital technologies could make this service an enormously powerful tool, and this is where older adults' digital deficit could hinder the advance of telecare.

The quality and quantity of existing telecommunications infrastructure is decisive for accessing and operating the devices involved in telecare. Technical limitations (Simpson, 2004; Asi & Williams, 2018; Zentz, 2018) as well as sluggish data transmission from the base unit to the assistance center (Currie et al., 2015) may discourage telecare players from investing in different regions. Telecommunications infrastructure problems

are key points to be considered when formulating policies to promote telecare in Latin America and the Caribbean (Saigí-Rubió et al., 2021).

5.2. Stigmatization

Regardless of the telecare modality used, most older people are concerned about the stigma that using an electronic device for their care may carry (Peek et al., 2014). An alarm device (the push-button, for example) may be a sign of care dependence, provoking worries and negative perceptions (Brownsell & Hawley, 2004; Goodwin, 2010; Yusif et al., 2016). To mitigate this challenge, proponents of telecare must be judicious in how they promote it. For example, they can emphasize the service's upsides and project the image of support for the semi-independent person instead of pointing out the user's problems (Bentley et al., 2016). Telecare can be installed and operate in a way that is discreet and inconspicuous in the user's surroundings (Ziefle et al., 2011). There should be a focus on normalizing the use of care-related technology, just as the use of eyeglasses has been normalized, so telecare will not carry a stigma in the future.

5.3 Suspicion of Security

Mistrust of the service may stem from an unfounded fear of home intrusion and illegal use of user data by third parties (Ziefle et al., 2011).

Providing security is one of the cornerstones of telecare (EPTA, 2019; Lamont et al., 2018; Peek et al., 2014). In high-crime societies, people's fear of granting a stranger access to their home, as well as and mistrust of the system in general, can hinder development of the service. Telecare services must be molded to the user's social context to guarantee security and peace of mind. For example, some Chilean municipalities do not offer a keyholding service for users' housekeys. Instead, they rely on a strong community and on-the-ground effort to gather the information of family members and neighbors who may hold keys (Forttes, P., personal communication, 2022).

Research has also found that perceived threats to users' privacy are another challenge for telecare (Peek et al., 2014). Two types of privacy concerns are involved: personal privacy and data protection. The first refers to people's fear of constant monitoring by outsiders, and the second to the right of individuals to control third parties' access to their personal information (Yusif et al., 2016). However, except when sensors are used, the assistance center has no access to information about happenings in the user's home unless the user presses the push-button. There are technologies that safeguard individuals' privacy and protect against hacking, and new technologies are being developed that may continue to improve this aspect (EPTA, 2019). To overcome this challenge, services must have data protection regulations and show that they adhere to them. We recommend this accreditation be an essential condition for participating in competitive biddings. Although privacy concerns are an obstacle to using telecare, some studies find that older people are, to a certain extent, prepared to sacrifice privacy in exchange for added autonomy (Lorenzen-Huber et al., 2011; Townsend et al., 2011).

Section 6. How to Implement Telecare

Telecare's effectiveness essentially depends on how it is implemented. The design and rollout of telecare benefits from the involvement of its potential users so the service can meet their needs in the best way possible (Tinelli et al., 2019). This section describes the principal resources involved in implementing telecare (human, technological, and telecommunications resources) as well as aspects related to procuring, regulating, monitoring, and evaluating the service.

A government must first select a mechanism for providing telecare services. There are two options: engaging one or more corporate service providers and assuming governance and control of the system, or handling the service in-house. The main benefits of engaging corporate providers are decreased complexity and increased speed of startup. The advantage of the government providing the service in-house is the potential for using the telecare service as a platform for integrating health and social care services.

6.1. Public-Private Partnerships: Implementing Telecare through Service Providers

To launch telecare using private companies, first the providers need to be awarded a contract via a competitive bidding process or other means. The bidding process assesses companies in terms of the service they offer, their quality, experience, technology, standing, and price. In some cases, one or more successful bidders assume responsibility for comprehensive telecare management (providing equipment, running the assistance center, installation, technical visits, etc.) for a pre-established term. In other cases, the government acquires the technology installed in homes and then engages a company (which may be the same company that sold the technology) to manage the service. There are also two contract models depending how users are assigned to service providers:

- **One company per territory:** one company is hired per territory, and eligible users are assigned to a specific company. For example, Barcelona, Madrid, and some municipalities in Chile use this model.

- **Voucher system:** several companies are authorized to provide the service. Potential users receive a government voucher equivalent to the total or partial cost of the service and may then choose from among different companies to receive the service. Uruguay uses this voucher system: after users undergo a health and social assessment, they receive a voucher and hire the service for a year, with the option to change companies or renew the service with the original company at the end of the term.

To ensure telecare quality, governments are advised to set standards for service providers, monitor these standards on an ongoing basis using reports and inspections, and impose penalties for non-compliance. Drawing from Uruguay's experience, companies may be required to meet standards for testing and the quality of devices used,

response times for incoming calls, periodic and post-emergency monitoring, and other aspects. The penalties for non-compliance in Uruguay are fines and potential loss of license for the provider. To improve telecare quality, it is also important to assess service outcomes, in addition to auditing companies (Goodwin, 2010).

Most Latin American and Caribbean countries lack overarching legislation on the development of teleservices. This gap leads to bureaucratic obstacles to implementing telecare (Saigí-Rubió et al., 2021) and setting quality standards for the service. Countries need regulatory frameworks to establish rules of play for the different actors involved in this service: companies, governments, users, etc. (EPTA, 2019).

6.2. Governments Implementing Telecare In-House

Some governments decide to provide telecare directly, as in Andalusia (Spain), Scotland, and a pilot test conducted in Mexico, among others (Beale et al., 2010; Giraldo-Rodríguez et al., 2013; Kelly 2005; Carretero, 2015; Tchalla et al., 2012). The three key components for providing telecare that guarantees that users receive high standards of quality and security are: human resources, hi-tech equipment, and telecommunications. These components are also essential when companies are the ones implementing the service, but in that case the companies are in charge of managing them.

6.2.1. Human Resources

Telecare personnel, both at the assistance center and in the field, are key to service quality and outcome. The service's ultimate success depends on personnel's sense of empowerment, empathy, manner, patience, training, and knowledge of how to handle different situations (Goodwin, 2010). Therefore, all professionals involved in delivering telecare must receive ongoing training (Carretero & Kucsera, 2015).

Remote Operators

Remote operators work in shifts, making and receiving calls. Assistance centers must remain open 24 hours a day, every day of the year. According to international best practice, shifts must be six or eight hours, although twelve-hour shifts also exist. There must be at least five remote operators per center, with one remote operator for every 800 telecare users, approximately. The optimum number of remote operators also depends on the telecare modality. Proactive telecare makes it possible to reduce center staff since, although the assistance center makes more outgoing calls to users, incoming calls are reduced by more than 50%. This reduction is because the number of outgoing calls can be controlled, unlike the number of incoming calls.

In past years, remote operators were required to have an academic background in social work. However, to avoid high turnover, most organizations no longer require this training, although they ensure that remote operators have preliminary training, and they supervise calls as part of ongoing development. Although remote operators are sometimes located far from the population served in geographic terms, we recommend hiring employees

from the same place as users, so operators are more familiar with the local culture as well as available community and government resources (IMSERSO, 2011).

Territorial Coordinators and Other In-person Support

Territorial coordinators conduct the initial home visit to gather the person's health and social care information and also make follow-up visits (these are generally annual, but may be more frequent for complex cases). These coordinators liaise between the telecare service and existing public and social services in the territory. The recommended ratio of territorial coordinators to users is one per 700 or 1000.

In some instances, first-response vehicles staffed with personnel trained in basic first aid are also included in the service. This personnel is responsible for dispatching keys that users have given to family members, neighbors, or telecare providers and for attending to the person until health services arrive.

Installers and Technical Support

Installers are responsible for installing, maintaining and, if necessary, replacing technological equipment. For the service to function at its best, users must be given ongoing technical support as well as training in the installed technologies (Lamont et al., 2018; Peek et al., 2016).

The team is completed by two leadership positions: a general project coordinator and an assistance center coordinator.

6.2.2. Technology-based Equipment

Devices of At-Home Units

As mentioned earlier, telecare base units may be fixed or mobile and include a **remote control unit or push-button and a radio receiver base unit. The remote control unit or push-button** must be small and lightweight, water-resistant (even in the shower), include its own battery (no need to recharge), and have a clearly identifiable button (distinguished by feel or color) that, when pushed, makes the calls. The **radio receiver base unit** must have a speaker with remote, adjustable volume control and allow phone calls to be made to the assistance center by landline or cellular phone.

Assistance Center Hardware and Software

Hardware must allow multiple calls and text messages to be made and received simultaneously. All telecare hardware must be redundant, meaning that it guarantees that data is protected and the service continues to run even under extreme circumstances (power outages, fires, telephone or data outages, etc.). It should also be scalable to grow along with the number of users.

For **software,** there are currently different platforms specially designed to support telecare operators. When a call comes in, these platforms display for the operator all information on caller: name, age, date of birth, address or GPS coordinates at the time of the call, medical history and medication record, history of previous contact with the assistance center, healthcare provider, family contacts with and without house keys, as well as government and community resources that may need to be mobilized in each case (social and medical emergency services, security, etc.). A center's software should also automatically create a record of all operations and reports.

When the service is implemented in-house by the government, the only bidding processes or other procurement processes are for purchasing, maintaining, and updating the technology and providing the associated technical support. Bidding processes should assess bidders based on the technology's features, quality, warranties, technical support, and price. Successful bidders agree to predetermined terms, remuneration, and the potential for renewing the contract within specific parameters.

6.2.3. Telecommunications

A **SIP trunk and a redundant IP PBX** are required. A **SIP trunk** is a voice communication service that uses the telephone network and guarantees as many simultaneous calls as the service may require with a single number required to initiate the communication process. In an emergency, an operator must stay on the line with the user while also making calls according to the corresponding protocol (e.g., to emergency services and a family member).

The redundant **IP PBX** is an IP telephone switching system that makes calls over the Internet without using telephone resources. It instead uses the LAN and WAN

infrastructure to automatically relay user data to the assistance center when the user presses the push-button in an emergency.

Section 7. Conclusions

In recent years, telecare services have grown significantly worldwide because of their many benefits for users, caregivers, and the health and social services system. In Europe, telecare's penetration rate among people over 65 ranges from less than 3% to 11%.

However, there is still no appreciable expansion of telecare services in Latin American and Caribbean countries. Apart from Uruguay, Chile, and Cuba, there are currently no other countries in the region where the public sector offers large-scale telecare services. The situation in the private sector is similar: there are few examples of companies providing this type of service, and those that do exist are generally small scale.

In conclusion, the supply of telecare in Latin America and the Caribbean does not yet meet current needs and potential market demand, curtailing its benefits and potential to drive the "silver economy" (Okumura et al., 2020; Jiménez et al., 2021). Implementing this service could generate opportunities for creating quality jobs and for investment, as it did in Europe, where the value of the telecare market ranges from 110 million USD in France to 337 million USD in the United Kingdom (Coda Strategies, 2017). Several European examples show that it is often demand from governments that want to fund telecare programs that drives the emergence and growth of telecare companies. The companies that add telecare to their portfolio are generally already in the care or technology service market.

Telecare also presents challenges, such as older adults' difficulty using new technologies, scant and poor telecommunication infrastructure in some countries, fear of stigmatization, and security concerns. To overcome some of these challenges, it is crucial to implement the service well. Telecare will be successful if users' needs are prioritized as it is developed and if the technology is accepted and used with training.

Finally, telecare has evolved in recent years, from serving users who require immediate assistance to a more active approach that customizes the service. We do not know what the future of telecare may hold, but today's advancements are encouraging. One such advancement is the development of robots that can help stimulate older adults' physical and cognitive abilities. With new technological systems and devices, the quality of home care will continually go up and its costs down.

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Annexes

Annex I –Telecare Experiences Around the Globe

Europe

Italy

Italy is characterized by its aging population. Within the European Union, this country has the highest proportion of people over 65 (23.2%) (EC, 2021). In recent years, various municipalities have launched telecare initiatives for older people. The private sector also provides nationwide telecare services.

Milan

The Milan City Council offers a reactive telecare service that also includes a weekly courtesy call (at times and on days selected by the user) to monitor older peoples' needs. The initiative aims to serve people over 70 and those in a documented situation of care dependence, including people with disabilities.[6] The service is free for people over 85 living alone, regardless of income. In all other cases, the service charge depends on the applicant's income level (Comune di Milano, 2021).

Veneto

The service focuses on detecting emergency in the user's home. telecare is offered free of charge to all users and is intended for anyone over 60 and anyone at risk socially and/or physically. Specifically, Veneto provides a telecare service in which assistance centers intervene in emergencies (accidental falls, illness, theft, fraud, etc.). There is also a "remote control" service that phones users at prearranged times. At the end of each phone call, the center asks the user to press the remote assistance button to make sure it is working properly and the user knows how to use it.

EBM S.p.A. is the company hired to provide the telecare service in the Veneto Region. Its staff is trained to provide remote assistance when dealing with emergency and urgent situations (Regione Veneto, 2019).

Turin

The city of Turin offers a reactive telecare service to people aged over 60, whether or not they are self-sufficient. Citizens can choose the provider from an approved list for their district of residency. Costs depend on whether or not users are self-sufficient (Comune di Torino, 2010).

Cruz Verde also offers a telecare service for frail and vulnerable older people living alone. This service allows continuous contact with the person—even in the absence of alarms—through companion calls made at set times and intervals. The service operates 24 hours

[6] Under Italian law, the disability must be 66.6% or more ("*invalidità 2/3*").

a day and is administered by Piccoli Progetti Onlus (Piprò), a social cooperative with which the Turin Cruz Verde has signed a special agreement and guarantees funding from its own revenue from the ''five per thousand'' tax.[7] Users also pay 15 euros per month to defray telecare expenses (Associazione Nazionale Pubbliche Assistenze, 2017).

Florence

Firenze Telec@re has been active since 2005. This service provides daily, weekly, or monthly remote telephone monitoring according to the user's degree of autonomy and their caregivers' assessment. Typically, users give the assistance center a copy of their house keys to allow rapid access in an emergency. Keys are held by an association of the user's choosing that is close to their home. Firenze Telec@re has three service packages that cost from 20 to 40 euros per month (or 51.65 euros for users who do not live in the municipality of Florence). These packages offer various levels of care and personalization. The city council bears the cost of the service if the annual income of the household, meaning the user and his or her spouse, is 7,000 euros or less.

The service is administered by Montedomini pursuant to a special agreement between the Municipality of Florence and the city's health authority. Established in Florence in 1476, Montedomini is the Florentine public administration center within the social service and welfare system dedicated to health and social care for older people and people with disabilities, among others (Montedomini, 2022).

Naples

The telecare and telecontrol service in Naples prevents critical events that could cause users to permanently lose their autonomy. The initiative focuses on helping older people remain in their homes and promoting their autonomy within their environment. The service is for residents over 65 with reduced autonomy and without adequate family support, as well as people with disabilities. In addition to the reactive telecare service, operation center operators make periodic remote control calls to confirm that the device is working, check on users, and learn what they need or want in order to assume total responsibility for the user. The service charge is set according to household income level (Comune di Napoli, 2022).

Portugal

The Portuguese Red Cross provides a nationwide telecare service to anyone experiencing care dependence (due to advanced age, illness, disability, or isolation). It provides a personal schedule and active support, a physician who makes house calls, as well as telephone medical checkups. The service has been delivered in collaboration with Vodafone Portugal since 2009 and currently serves more than 5,000 people. The device may be fixed or mobile, as required by users (Portuguese Red Cross, 2022).

[7] Five per thousand (5 x 1000) is a portion of the income tax that the Italian government distributes among entities that conduct socially relevant activities, such as nonprofit scientific research.

Established in 2005, Residências Montepio is a nonprofit company in the Montepio Group that specializes in managing retirement homes, assisted living facilities, and day centers. This company operates in eight residential facilities throughout the country (Residências Montepio, 2022).

Notable among private sector actors is Helpphone, which has 20 years of experience in telecare. Each device transmits a unique identifier that makes it possible to recognize the caller, even if they cannot speak. Identifier information helps operators properly classify and follow up on incoming calls (Helpphone, 2022). In recent years, Portuguese municipalities have gradually embraced telecare solutions, delivered under commercial agreements with the Portuguese Red Cross and Helpphone.

There are other telecare initiatives at the municipal level. For example, Lisbon offers a free reactive telecare service to citizens over 65 and to people who are at least 60% disabled. Beneficiaries are given telephone equipment that is connected to the Joint Operations Room (*Sala de Operaciones Conjuntas*—SALOC) where civil protection experts, the fire department, and municipal police help ensure personalized service and immediate attention in emergency situations. A group of volunteers was set up to monitor beneficiaries, keep the city in closer contact with telecare beneficiaries, and combat their loneliness and social isolation through periodic telephone contact (Câmara Municipal de Lisboa, 2021).

Malta

Telecare Plus was launched in 1991 as an emergency community telephone service for older people and other people with special needs. This reactive service is administered by Active Ageing and Community Care and is for people over 60 with a chronic disease. Customers pay a nominal fee of 4 euros per month (plus a refundable deposit of 25 euros for the equipment). In some cases, older people who live alone receive the service free of charge. Telecare and Telecare Plus serve around 8,000 subscribers and handle 900 to 1,000 calls per month. In 2013, the program was upgraded from Telecare to Telecare Plus. The upgrade allows users to install the activation device on a smoke detector, an intruder alarm, or a wrist fall alert device (Government of Malta, 2020).

Asia

Japan

Japan’s aging population has increased notably in recent decades and continues to pose a challenge for the country. Nevertheless, the telecare market is still limited. Some pilot studies, such as the Promotion Model, have been launched in the country. This large-scale project aimed to help municipalities adopt a set of 20 telecare services designed for older people. However, despite broad support for telecare, results have so far been fragmented (Turner and McGee-Lennon, 2013).

Since 1980, Japan has promoted national strategies to develop robotic assistance to help older people in the home. Significant advances have been made in this market segment.

Robotic care has gained relevance compared to traditional telecare systems. The country has a solid reputation for designing and manufacturing mechanical and electronic equipment. Meanwhile, the market has also focused on developing mobile telephony that, among other things, makes it possible to detect when people with dementia are wandering (DTI, 2004).

Israel

The Maccabi Healthcare Services (MHS) is the fastest growing and second largest Health Maintenance Organization (HMO) in Israel and controls 25% of the Israeli HMO market. It represents a non-profit health mutual fund that delivers health care to more than two million members. The Maccabi Telecare Center (MTC) is a multidisciplinary healthcare center founded by the MHS in 2012 that provides telemedicine to patients with complex chronic ailments. The MTC serves approximately 6,000 patients and has delivered services to more than 22,000 since its inception (Porath et al., 2017). In addition to telemedicine services, the MTC aims to provide high-quality, proactive, at-home telecare to complex chronic patients through education, empowerment for self-care, and coordination with various care providers. The center mainly uses the following devices: tablets for face-to-face communication to facilitate clinical assessment (e.g., of injuries), glucose monitor transmitters installed on the patient's telephone, electronic pillboxes that transmit information about medications taken as well as timing and potential dosage errors. Each patient is assigned a personal nurse who proactively monitors the user's health to prevent complications through early detection of changes and interventions in real time. The team fully cooperates with primary care physicians and other health professionals at a variety of treatment facilities (Porath et al., 2017).

Latin America and the Caribbean

Brazil

In 2008 in the Brazilian state of Santa Catarina, the Joinville municipality pioneered a telecare service for older people who live alone, serving 500 users (da Mota Peroni, pending publication). Since 2013, the Santos municipality in the state of São Paulo has offered a telecare service to older adults with chronic ailments who live or spend part of the day alone (Santos, 2019). A positive aspect of this experience is that telecare is integrated with the healthcare system. Users are enrolled in the program at polyclinics, and one of the requirements is that the older person has to have received health checks at the facility for at least 6 months, followed by a home visit from a community health worker. The service also includes ambulances.

The Telecare Network of Minas Gerais (*Rede de Teleassistência de Minas Gerais*—RTMG) is a public association of seven universities formed in 2005 to develop, roll out, and assess remote healthcare systems. The project has five planks, including innovation in the teleconsultation model to support primary healthcare professionals. The RTMG was initially funded by the state government of Minas Gerais, the Minas Gerais Research Foundation (*Fundação de Amparo à Pesquisa do Estado de Minas Gerais*), and the Funding Authority for Studies and Projects (*Financiadora de Estudos e Projetos*), It

connects specialists at university hospitals with healthcare professionals through teleconsultation and telediagnosis, and the project is active in 780 municipalities within the state (Centro de Telessaúde, Hospital das Clínicas, UFMG, 2022).

In the private sector, Tecnosenior, IrisSenior, Caregiver Digital, HelpCare, TeleHelp, and Lincare are the main providers (De Podestá Gaspar, 2018). The most common technologies used are first- and second-generation alarms.

Costa Rica

In 2020, the Benefits Administration of the Costa Rican Social Security Fund (*Dirección de Prestaciones Sociales de la Caja Costarricense de Seguro Social*—CCSS) launched a project designed to deliver telecare services to older people, people with disabilities, and insured people with chronic or acute illness (Instituto Mixto de Ayuda Social, 2021).

Within the framework of the 2021-2031 Costa Rican National Care Policy, the base model for care includes telecare for all people experiencing severe care dependence and 70% of people experiencing moderate care dependence. The service aims to assist 8,778 users and is estimated to cost 24 USD per month (Instituto Mixto de Ayuda Social, 2021). This policy already has the backing of a law. The national law passed in 2022 that created the National Social and Health Care System for Older People and Older People Experiencing Care Dependence (*Sistema Nacional de Cuidados y Apoyos para-Personas Adultas and Personas Adultas Mayores en Situación de Dependencia*—SINCA) envisaged the creation of a helpline to advise caregivers over the phone, practice telemedicine, conduct videoconferences, etc. The National Communications Fund (*Fondo Nacional de Comunicaciones*—FONATEL) is responsible for installing the technological platform and other care-related devices for caregivers and people requiring care (Legislative Assembly of the Republic of Costa Rica, 2022).

Colombia

In Colombia, since 2017 the Antioquia Chapter of the Red Cross has provided a free, personalized telecare service to users with chronic diseases such as hypertension and diabetes using first- and second-generation technologies. The intervention program *Cercanos* is delivered under Special Cooperation Agreement No. 140C-2014 between Ruta N, Universidad de Antioquia, Universidad Pontificia Bolivariana, UBIQUO, CES, CCUA, and the Medellín Health Department (*Secretaría de Salud de Medellín*) to run the project "Developing STI[8] Solutions for Telehealth in the Department of Antioquia." Principal services include offering home visits by healthcare professionals, 24-hour monitoring and care, reminder calls for appointments and taking medications, and home-based educational talks (Red Cross, Antioquia Chapter, 2022).

The at-home telecare service is part of the "Developing STI Solutions for Telehealth" project in the department of Antioquia, which seeks to coordinate innovative initiatives in telemedicine, tele-education, and telecare, funded by the Science, Technology, and

[8] Science, Technology, and Innovation.

Innovation Fund of the General Royalties System (*Fondo de Ciencia, Tecnología e Innovación del Sistema General de Regalías*). The service is currently in a trial phase involving users from the new Health Care Promotion Agency (*Entidad Promotora de Salud*—EPS) who receive care at the Promedan IPS health center (Red Cross, Antioquia Chapter, 2022.).

Peru

Since 2014, ASISPA Peru, in collaboration with the Department for Older People (*Dirección de Personas Adultas Mayores*—DIPAM) of the Ministry of Women and Vulnerable Populations (*Ministerio de la Mujer y Poblaciones Vulnerables*—MIMP) initiated a pilot program to serve vulnerable older people experiencing care dependence. This 4-month service was for older people in the Lima province. ASISPA is a private Spanish nonprofit organization that has operated in Peru since 2013. It aimed to replicate the successful experience in Spain by developing the first at-home telecare project in Peru.

ASISPA Peru currently offers care and prevention via a telecare service year round, 24 hours a day. This organization gives guidance through at-home telecare (medical and psychological). It also handles urgent care and organizes recreational activities (Ministerio de la Mujer y Poblaciones Vulnerables, 2015).

Cuba

In 2004, Cuba launched telecare in the Lisa municipality with 89 older people who lived alone. This initiative was later rolled out to the capital's other municipalities, eventually reaching 1,528 older people with an average age of 75 (ECLAC, 2007). In 2005, telecare achieved nationwide status with the National Community Social Services Program (*Programa Nacional de Servicios Sociales Comunitarios*) for older adults and people with disabilities, and in particular to bedridden people (Alfonso González et al., 2020). Various institutions participate in this program: the Ministry of Public Health (*Ministerio de Salud Pública*—MINSAP), Cuban Postal Company (*Empresa de Correos de Cuba*), Cuban Ministry of Construction (*Ministerio de la Construcción de la República de Cuba*—MICONS), and Cuban Ministry of Transportation (*Ministerio de Transporte de Cuba*—MITRANS). Service beneficiaries are people experiencing severe disability and physical or social risk who live alone or are alone most of the day (Romero Almodovar, 2019). Telecare is a Cuban social service offered free of charge or at a modest cost that is adjusted according to each beneficiary's household income and need (Portal de la Red de Salud de Cuba, 2006).

Barbados

Caribbean Telehealthcare Services (CTS) is the principal provider of telecare products in Barbados. This company offers first- and second-generation products for anyone vulnerable or at risk. It provides the following services:

- I-Care Home Unit: for at-home installation. This device has an alarm button connected to the operations center and includes an option for smoke and fall detectors;

- Safety Mate – Out of the Home: this option uses a mobile telephone so it can work outside the home and track the user;

- I-Track Locator: this device is ideal for vulnerable adults, especially those with dementia. The locator is precise to within a radius of 10 meters from the user's location and has an alarm button that allows communication. The device detects when the user moves outside of a specific location.

CTS is based in Barbados and also operates in Anglophone Caribbean countries. It currently has users in Barbados, Jamaica, Trinidad, and San Cristóbal. The I-Care Home Unit and I-Track Locator services cost 1 USD per day while Safety Mate – Out of the Home costs $0.50 cents per day. The company offers family discounts (Caribbean Telehealthcare Services, 2022).