

debates and issues

The potential value of a geographic information system for public service planning for older people in the African region

Gabrielle Kelly, gkelly@sifar.org.za

Robyn Black

Samson Institute for Ageing Research, South Africa

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Introduction

People require access to specific health, care and social services in order to maintain their health, well-being and quality of life as they age. While there are government, non-governmental organisation (NGO) and private sector services and resources available to older persons in South Africa, there are significant inequalities in terms of access to these services. There is also limited community-level demographic, socio-economic, health or service-availability data on older people, and the data that do exist are not necessarily centralised or easily accessible. This restricts policy development and planning around older persons' needs.

As South Africa develops policies and strategies in response to the United Nations Decade of Healthy Ageing (2021–30), a detailed understanding of the unmet needs among older people in various geographical areas is key for policymakers and service planners to understand what interventions are required to support an ageing population. Geographical information systems (GISs), which make it possible to spatially represent demographic, health, socio-economic, environmental or service-location data, are increasingly used in public health planning to understand disease prevalence, health risks and access to services within particular areas and population groups. While a GIS alone cannot provide a full account of older people's complex health and social needs, it can be a valuable intervention to identify gaps in services and resources available to older people at the community level. It can also inform further research on the needs and status of older people by illustrating where data gaps exist.

The Samson Institute for Ageing Research (SIFAR) has identified the value of creating a GIS that consolidates existing demographic and health data and resources

relevant to the needs and interests of older persons in Africa. In 2021, the SIFAR developed ‘Who What Where’, an open-source interactive data and demographic online mapping platform for and about older persons.¹ It is currently being piloted in South Africa and is the first such offering on the continent. It aims to: provide valuable information for researchers; provide evidence for advocacy and awareness raising around older persons’ issues; and support the planning and implementation of interventions to meet the needs of older persons. This article discusses the implementation of this platform to provide insights on some of the possibilities and limitations of using a GIS to address service gaps among older populations in low- and middle-income country (LMIC) contexts.

The value of GISs for strengthening access to services

Using a GIS for disease mapping and spatial analysis can play a potentially significant role in identifying vulnerable populations and ensuring that preventable deaths are avoided and disease burden is lessened among these groups (Ruktanonchai et al, 2021). It can also be used in planning services for specific population groups, such as older persons (Hames et al, 2017). It has been shown to be particularly useful given the important role that geography can play in health-service utilisation among older people, especially when mobility issues are a factor and there is limited suitable public transport (Higgs, 2009; O’Mahony et al, 2019), or where limited health resources exist in remote and rural areas (as is often the case in countries in the African region) (Geldsetzer et al, 2020).

In LMIC settings, the mapping of age and gender data at the sub-national level has been used by public health planners for tracking disease burden. Sites like Africa GeoPortal provide demographic, environmental and agricultural data for countries across the continent.² These platforms have proved to be valuable in understanding population and geographic characteristics that may affect health status, patterns of disease, risks and outcomes, access to resources, and developing appropriate and timely responses, as well as for disaster management (Ruktanonchai et al, 2021). In preparing and managing disaster situations, a GIS can be useful in analysing the spatial correlation between hazard-prone areas and the location of vulnerable people, and for such groups as older persons, who may find it difficult to evacuate (Contreras Mojica and Kienberger, 2012). In the context of the COVID-19 pandemic, GIS mapping has been used extensively across the globe to plan local responses based on population density, infections, and risk and vulnerability factors, and to share information with the public on vaccination services. In sub-Saharan Africa, it was used to map the physical access of older people to healthcare facilities to understand the implications for COVID-19 care in the region (Geldsetzer et al, 2020).

A GIS has also been employed to provide users with information on public and private services. An example of one such successful and targeted GIS intervention in South Africa is ‘Youth Explorer’.³ This platform targets both policymakers and institutions/collectives working with youth to connect youth to nearby services, and maps rich, youth-specific data down to the community level. It also has the option to combine data views so that the availability of services relative to the needs of the youth population can be established and gaps identified. The success of this initiative has been driven by strong buy-in and collaboration between academia, the government and civil society, combined with significant local and global funding.

Limitations and challenges of a GIS in LMIC settings

In LMICs, the development of these systems has been met with mixed success (Ruktanonchai et al, 2021). Challenges have included: a lack of qualified staff; the use of outdated data; the absence of a timely and accurate integration of data; the costs of hardware and software; and decision makers not understanding their value or application, leading to a corresponding lack of financial support (Molla et al, 2017).

Data are generally uploaded to the system using web-scraping technologies that extract data directly from websites, gathering high volumes of data and making system maintenance and updating data simple. However, this involves complex technology that relies on software experts to implement, which can be expensive upfront. The availability, validity and reliability of the data collected are also dependent on the quality of the data available on existing websites. Community-based organisations, such as older persons' organisations, may not have websites or be listed on any public platform, especially in LMIC settings. An alternative approach is the manual collection and uploading of data, which requires full-time maintenance and places heavy reliance on time-constrained civil servants and NGOs to continually provide information for upload. Opensource platforms like OpenStreetMap reduce reliance on software developers by utilising crowdsourced data, but they are dependent on the interest, awareness and skills of individuals to populate them and keep them up to date.⁴

Another limitation is the lack of research and related data on older persons' health and well-being in LMICs, and in the African region in particular, which makes it challenging to reliably determine the needs of the older population and to identify service gaps using GIS data. Large-scale surveys and health information systems often do not capture data that are sufficiently disaggregated by age to provide insights on older persons, and many demographic and health surveys specifically exclude people over age 59. These data-collection practices currently limit what data are available to determine older persons' needs. Strengthening and standardising data collection on older persons at a global level would significantly improve the value of GISs.

The who, what and where of resources and services for older persons in Africa

The 'Who What Where' platform was designed and created through a collaboration between the SIFAR and software development company OpenUp, and is currently being piloted in South Africa. The platform provides demographic and multifaceted health and functional profile information on the older (60+) population disaggregated to the community level, which can be overlaid with GIS data on locally available services and resources relevant to older people. The intended users of the platform are NGOs, government departments, researchers and international development partners involved in developing policy and interventions focused on older persons.

Information available on the platform

The 'Who What Where' interactive resource map provides three categories of information through the 'Point Mapper', 'Rich Data' and 'Data Mapper' tabs. The 'Point Mapper' function is an interactive set of geolocated points of reference and resources that can be seen when the map is explored (see Figures 1 and 2). The location

Figure 1: 'Point Mapper' view of Western Cape Province

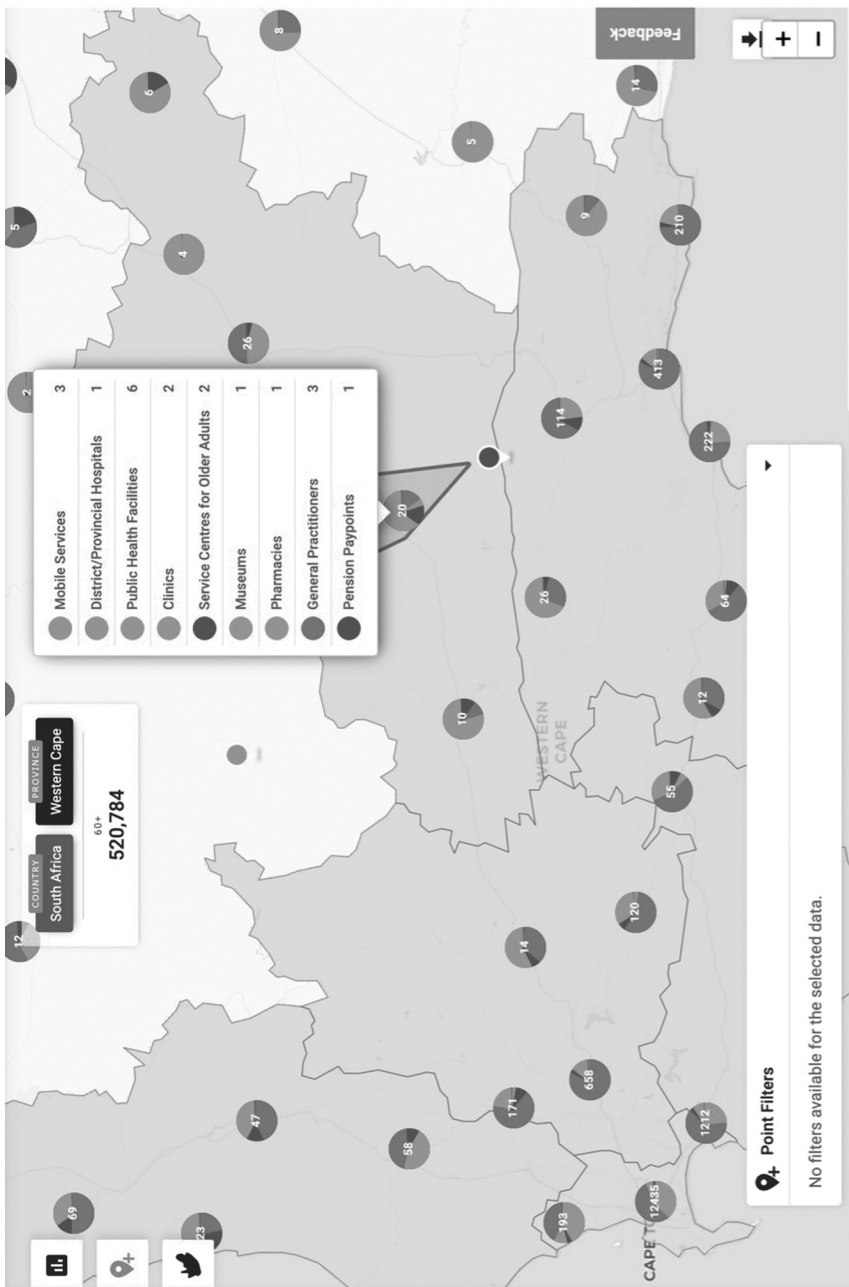


Figure 2: Detailed point data for specific services at the community level



(address) and contact details of resources are stored in the list of data sets and pop up on the map once selected. Examples of data sets include accommodation, ageing services, healthcare professionals, transportation and community services, and users can select more specific options within these categories (for example, home-based care services or pension pay points).

The 'Rich Data' and 'Data Mapper' functions provide demographics, health and economic data on a specific area (see [Figure 3](#)). The information available for these functions is provided by the 2016 Community Survey, and 2022 SA Census data will be included when available.

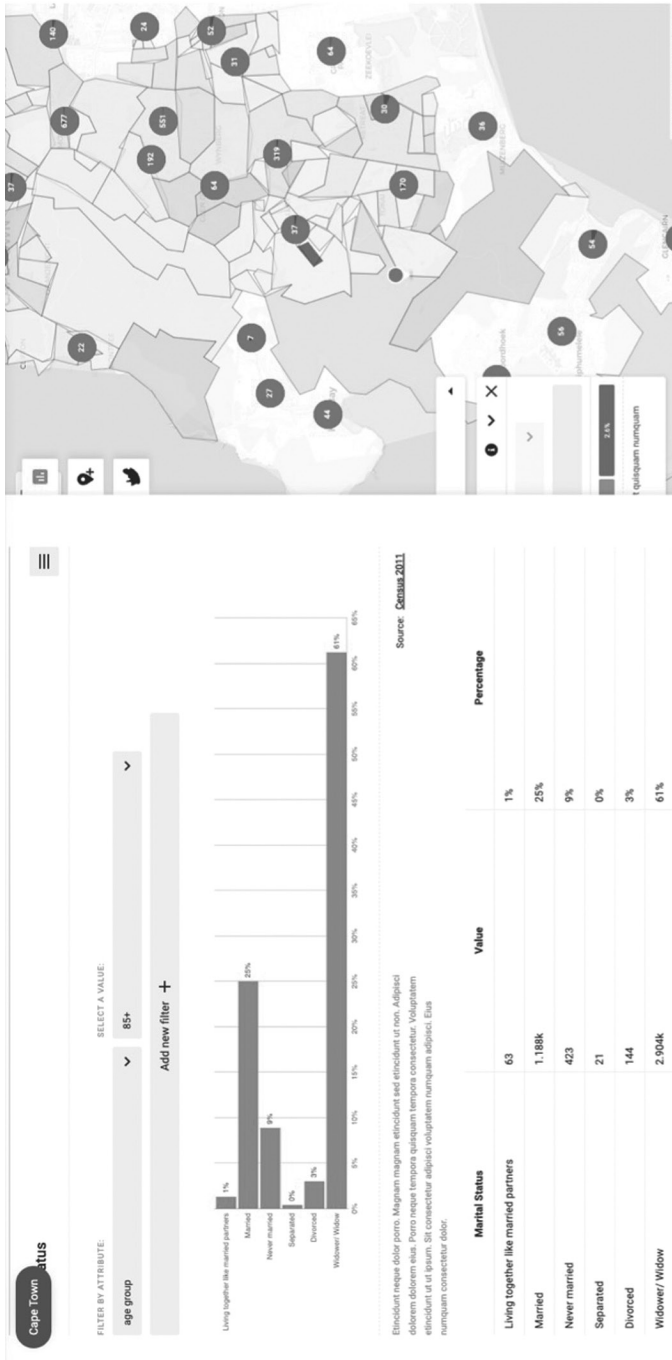
Other information sources currently used include: Medpages, the largest source of healthcare provider contact information in Africa, with whom the SIFAR has an information-sharing user agreement; the Western Cape Government open-source website; and data and information shared by community-based organisations. Currently the 'Point Mapper' data are primarily focused on resources available in the Western Cape of South Africa. While Medpages data have been provided at a national level, community-based and government resources have only been included for the Western Cape due to capacity and data-access issues. In 2022–23, the SIFAR plans to incorporate community-based and government resources from other provinces in South Africa. This will involve collaboration between the SIFAR, OpenUP and national community-based organisations, as well as access to provincial open-source resource information. To date, there has been little response from national government in terms of providing access to data in other provinces, and significant resources will be required to obtain data on public and NGO services, either via web scraping or from government departments and civil society organisations directly.

Lessons learned and the way forward

As South African information sources are not centralised and collaboration between government, community-based services and the private sector is uncommon, it has been difficult and time-consuming to access information available across all sectors in the entire country. Information is also shared in varying formats and differs in terms of the quality and level of detail available, and some information overlaps or is outdated and obsolete, making data cleaning a challenging endeavour. While the purpose of the development of 'Who What Where' has been to remedy the fragmented availability of, and access to, information, it is possible that not all the information is accurate and up to date, so the platform will rely on user feedback to improve data quality over time.

The SIFAR has funding to maintain the website over a multi-year period, but the sustainability of such a system relies on uptake and use by the government, as well as coordination between government sectors (already identified as a challenge); getting government buy-in will be critical to the success of the platform. Working with external software developers requires constant communication to ensure that both parties' expectations with regard to functionality, data uploading, user-interface development and deliverables are aligned. While developing the platform has been time-consuming, with this groundwork completed, it is expected that the platform can be rolled out easily in other countries in the region. Piloting the system for eight African countries, in collaboration with the World Health Organisation African Regional Office, is currently under way.

Figure 3: Rich data viewer



While developing and implementing targeted GISs, such as ‘Who What Where’, certainly involves challenges and limitations, doing so can potentially add significant value for those advocating for the rights and needs of older people and developing contextually appropriate policies and programmes. In addition to being useful from a policy, programming and advocacy perspective, older persons’ organisations and other providers that see value in the platform could also use it to make area-based referrals to services and could be encouraged to update or share new data directly through the platform.

While the platform is currently not suitable for use by older persons, with user engagement and testing, it could be adapted to include an easy-to-use resource map to connect older people and their families with information and services, and to support and empower them in managing their own or a family member’s care. In Europe, interactive platforms to support older people’s long-term care needs by promoting community participation and self-management are effective (for an example of such a platform, see Willard et al, 2018). For this to work in LMIC contexts, it is important for policies and programmes to be put in place to improve digital connectivity and improve digital skills to increase older persons’ capacity to participate in our rapidly digitalising society.

Notes

¹ See: <http://whowhatwhere.co.za>

² See: www.africageportal.com

³ See: www.youthexplorer.org.za

⁴ See: www.openstreetmap.org

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Conflict of interest

The authors both work for the SIFAR, which developed ‘Who What Where’. Gabrielle Kelly was not involved in the development of the platform, whereas Robyn Black was. This article draws from the SIFAR’s experiences of, and reflections on, developing the platform, and we do not therefore see this as a conflict of interest, but we thought it important to declare our involvement upfront.

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