RURAL AGING: THE GEOGRAPHIC REACH OF SERVICE ACCESS IN

UTAH, IDENTIFYING BARRIERS AND SOLUTIONS

by

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ABSTRACT

Rural Aging: The Geographic Reach of Service Access in Utah, Identifying

Barriers and Solutions

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This dissertation examines access to age-related services in Utah across two

studies. **Study one** uses spatial data from multiple public sources. I calculated potential

spatial access (PSA) to age-related services as *population over 55/# age-related services,*

including hospitals, nursing homes, hospice providers, Area Agencies on Aging, and

senior centers. PSA was calculated using county and census tract boundaries. Mean PSA

differed based on use of counties versus census tract boundaries, $t(614.65) = -7.52$, $p >$

.001. Because counties have more heterogeneity in population distribution, census tract

PSA was inferred as more locally accurate ($M_{PSAratio} = 11:1000$). Using Ordinary Least

Squares (OLS) regression, rurality, economic typology (dominant industry), retirement

destination status, and broadband access were used to predict census-derived PSA. OLS

results suggested that broadband access was significantly associated with higher PSA

($\beta=0.016068$, $p < .001$), while retirement destination designation predicted lower spatial

access (β= -0.008446, $p < .001$). The model explained roughly one third of the variance in access to age-related services (multiple R^2=0.3486; adjusted R^2=0.3376, $F(10, 593)$ = 31.73). Spatial analysis revealed that with a 50km buffer PSA and predictor variables were spatially dependent, λ=-0.020274, LR=301.01, $p < .001$, meaning that the predictor variables significantly affect PSA, and other variables are needed in future models to predict additional patterns in error.

Guided by Bronfenbrenner's Process-Person-Context-Time model, **Study Two** used a qualitative participatory research orientation with 10 stakeholders in Utah's age-related service system to identify local barriers and solutions to accessing rural age-related services. Thematic analysis revealed that communities faced barriers common to rural areas (local service insufficiencies, distance and time concerns, and structural/systemic issues), and reported assets from aging in rural areas. Participants also discussed how transitions in community context, including increased recreation, tourism, and retirement in-migration, were new challenges impacting service access. Solutions included strategies for making information better known and centralized, systemic changes, and more access to telehealth.

The joint results of these studies will be delivered in reports to communities of interest, combining descriptive maps from the geospatial data and knowledge from participants about barriers and starting points for solutions.

(143 pages)

PUBLIC ABSTRACT

Rural Aging: The Geographic Reach of Service Access in Utah, Identifying Barriers and

Solutions

Alexandra T. Schiwal

This dissertation includes two studies of rural age-related services in the state of Utah. The first study combines geospatial, demographic data (number of people over 55) and age-related services (hospitals, hospice providers, nursing homes, senior centers, and Areas Agencies on Aging) at the county level and census-tract level to determine localized differences in proportional access to age-related services. Higher and lower proportions are then predicted by contextual factors including rural/urban gradient, economic industry, and broadband access. Results demonstrate that broadband access was significantly associated with higher access to age-related services, but being a retirement destination (increase in people over 65 in county from 2000-2010) was associated with lower spatial access to age-related services. The second study involved in-depth interviews with stakeholders from communities across Utah, and qualitative analysis to identify specific barriers to age-related service access in their communities. This approach generated knowledge about challenges to accessing services and stakeholder-supported starting points and solutions for overcoming some of the identified barriers to age-related services in these communities. Taken together, the spatial data and responses from persons living and serving older adults in rural communities complement an understanding of facilitators and barriers to service access, paired with solutions.

DEDICATION

This dissertation is dedicated in memoriam to my Papa, Francis J. Schiwal. Papa had many roles including farmer, teacher, grandpa, friend, and catalyst for my pursuit of gerontology as a field of study.

I would be remiss if I did not also dedicate this dissertation to the two greatest sources of auditory inspiration during my hours at the computer, John Denver and Paul Simon.

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I would not have finished this program without several (some might say too many) trips home to the great state of Montana, my favorite trails, friends, and breweries. I owe my all to my hardworking, loving parents, Fred and Sheila, who always answer their phones, and siblings Mariah, Shawn, Katie, and Julia, who usually call me back – I am glad I was born into this specific group of weirdos that support each other, and I am full of gratitude every day. Nana – thank you for making me take home leftovers every time I visit, I don't eat them, but they reminded me that I should call. I owe recognition to my roommate, Peter for his support – you are a solid and reliable person, 9/10 would recommend. Lastly, I cannot close this acknowledgments section without stating my appreciation for the pure, unconditional love and support when I was most exasperated from my sweet dogs Teddy, Pepper, and Hops; there would not be a dissertation without them; R.I.P. Bones.

-Alex T. Schiwal

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CHAPTER I

INTRODUCTION

Shifting demographics, changes in the timing of life events, and migration within the last several decades have led to a growing population of older adults, with insufficient age-related services to support them (Berry & Kircschner, 2013; Glasgow, 2000; Hodge, 2008). Rural areas may be particularly vulnerable to gaps in services as migration trends continue to demonstrate a more rapid increase in the proportion of older adults remaining in and moving to these areas, while young and working-age people leave for various reasons. Innovations in technology in the last few decades benefitted many populations, but access to these innovations is not evenly distributed across geographic and social classes, with both rural and poor urban populations lacking parity with more populated or wealthy districts. Economic shifts and downturns have widespread influence, but there are amplified effects in small communities and structurally disenfranchised communities. Shortages in the workforce, technology disparities, and budgetary restrictions, contribute to challenges in the maintenance of enough existing age-related services in rural communities and the ability to expand to meet the growing need. The combination of these factors may leave rural people lacking or behind in in-person services as they age.

Technology-driven solutions, such as internet-delivered education, social support services, health and wellness monitoring, and telehealth appointments with medical specialists, are only a partial solution to the challenges in service parity, particularly for older adults in rural areas, as many people lack access to adequate broadband and are unable to find out about such services. Communities, formal and informal support networks, and aging adults will need specific strategies to develop care networks,

communicate about the needs of their community and develop solutions for a comprehensive approach to rural age-related services. In this dissertation, through a two-paper format, I will first use Geographic Information Systems (GIS) analysis to examine the dispersion of age-related services across Utah, proportional to the 55+ population, accounting for variance in the rurality of communities, dominant economy, migration through retirement, and the availability of broadband services. I define age-related services as health or community centers that are key access points for older adults; in this study I have included hospitals, nursing homes, hospice providers, senior centers, and Area Agencies on Aging, which were available as geodata and selected intentionally for the variety of services captured (health services, community-based, and end-of-life services). Through GIS analysis I first identified specific areas that have potential service disparities (overall proportion of age-related services to population 55+ in a geographic area). In the second step of the analysis, I will examine how a higher or lower proportion of age-related services is related to the dominant economy, broadband access, poverty, and migration (of retirees and overall population loss). In the second paper, I will use qualitative interviews to summarize the specific barriers to rural age-related service access from the perspectives of service providers, caregivers, and administrators, identifying themes and specific solutions to rural aging issues, and receptivity to technologically-delivered age-related services. The GIS analysis, perceptions, and online practice perspectives will provide insight into developing future services for rural older adults as this population continues to increase in the state.

Demographic Changes: Emphasis on Rural Age-related Service Access

The population of older adults in the U.S. is growing as a proportion of the whole, with the population aged 85+ increasing from 43.1 million (in 2012), to an estimated 83.7 million by 2050 (Ortman, Velkoff, & Hogan, 2014). Concurrently, the population aged 18-64 that works to support older adults, formally (via tax base) or informally (via care), is expected to decrease slightly as a percentage of the total population (Alzheimer's Association, 2017; Ortman et al., 2014) but more so in rural areas (Parker et al., 2018). Further, rural areas have higher proportions of older individuals than do urban areas, and rural areas are expected to continue to have large numbers of older adult migrating into or remaining in them in coming decades (Glasgow & Brown, 2012). Recent demographic and migration trends have not only shifted the population proportions of older and younger adults, but also the proportions of educated and less educated people living in rural and urban areas, with the education gap remaining (Glasgow & Brown, 2012). Although, more rural people have access to education than they previously did, the proportion is still lower than urban areas, but across the spectrum of urban and rural, poverty is still the greatest predictor, and an outcome, of low educational attainment (United States Department of Agriculture Economic Research Service, 2017). In areas with low education, low income, and a high proportion of older adults, it is likely that there would be inadequate age-related services, as the community and tax-base could not sustain an appropriate level of services to meet the need due to an inadequately prepared workforce and the inability to pay for services.

Older adults in rural areas are also less likely than urban older adults to have the benefit of adult children living nearby, or co-residing with their children (Dorfman, 1995;

Glasgow, 2000), limiting their capacity to receive adequate informal support in rural areas. In part, this trend is due to migration; older adults tend to retire to non-metropolitan or rural areas, while younger people migrate out of these areas for a variety of reasons (Glasgow, 2000) and more highly-educated younger people leave rural areas compared to individuals with only a high school education (Lichter & Brown, 2011). A caveat to this is that people of all ages, migrate at higher rates to retirement destination counties and recreation-dominant locations, both for the scenic and recreation benefits, (Johnson & Lichter, 2013), increasing the population and boosting the economy in select rural areas, however the influx of people can strain the existing resources in the communities (Johnson & Beale, 2002).

While these problems are not limited to rural areas, because poverty is a primary driver of many of the disparities across the spectrum of rural to urban, this dissertation places emphasis on transitional (mostly rural), rural, and frontier communities that have long-term trends of population aging (higher proportions of older adults) and resource scarcity, and these issues are compounded by the space and distance between services and people. In general, the economies of rural areas generally include higher rates of poverty, lower employment, lower average education, lower overall income, and therefore a smaller tax-base compared to larger communities; likewise, they may have limited capacity to support age-related services "due to a fragile tax-base and a lack of corporate or private giving" (Bull, Krout, Rathbone-McCuan, & Shreffler, 2001, p. 356). Furthermore, limitations in broadband access for rural populations impact regional economies (Cronin, McGovern, Miller, & Parker, 1995; Salemink, Strijker, & Bosworth, 2017) as well as access to online health and age-related services and information (Rains,

2008).). These challenges associated with rural areas can be barriers to developing formal and informal service networks for older adults and people who care for them.

State-specific Demographics: Focus on Utah

Utah is an ideal state to study such trends in its current and projected demographics reflect growth, both in-migration to the state and internal migration across metro and non-metro areas. Utah's population is growing especially rapidly, leading the nation in growth rate due to fertility rates and net migration to the state (U.S. Census Bureau, 2016). There is also added complexity when one takes into consideration projections for the state's growth in the next 50 years. The Kem C. Gardner Policy Institute (Perlich, Hollingshaus, Harris, Tennert, & Hogue, 2017) provided a detailed report indicating a near doubling of the total population, from 3 million, to 5.8 million, an increase in life expectancy by an average of 4 years for men and 6 years for women, and a doubling of the population over 65. Changes are occurring rapidly, but not uniformly. Geographically, the population increases are expected to occur in greatest raw numbers along the already populated urban front, although all counties are projected to see an increase. Transitional counties, which are counties that are neither urban or rural, but are connected by highway to urban centers or have a population greater than 50,000 (Perlich et al., 2017; Rural Planning Group, 2018), are expected to grow disproportionately higher, as are recreation destinations and retirement counties. However, there is projected out-migration of young adults from rural counties, leaving more older adults and fewer working age adults to sustain economies in these regions (Rural Planning Group, 2018). As the regional population shifts continue, much emphasis will be placed on the urban

core within the state, leaving rural areas potentially more vulnerable to weak economies and service shortages. With smaller budgets for rural areas, the need for and availability of age-related services should be identified, as preemptively identifying "at risk" areas may help prevent further service access disparities across locally increasing concentrations of older adults, while efficiently allocating the limited resources to the most needed areas.

Rural: What Is It?

The definition of "rural" shifts, but the U.S. Census Bureau classifies urban areas as areas of more than 50,000 people, urban clusters as areas of 2,500-50,000, and rural is anything outside of that or an area with 2,500 or fewer people (Ratcliffe, Burd, Holder, & Fields, 2016). Most of the land area in the US is designated as rural, and approximately 20% of the population lives in a rural area (Ratcliffe et al., 2016). In Utah 97% of the land area and 12% of the population is rural (Cromartie & Bucholtz, n.d.). It is important to note, however, that rural is not just an ecological and spatial designation. Beyond, census and other ddesignations, there are sociocultural components, including the people and patterns that characterize rural communities (Hodge, 2008; Rowles, 1988). Isolation, varying in degree, is common across rural designations, but improvements in transportation and communication technology are changing this (Flora, 2018). The maintenance of capital, or various resources, social, financial, natural, or otherwise, are other defining features (Flora, Flora, & Gasteyer, 2018) that set rural communities apart from urbanized ones. Rural communities, have fewer residents, and by association smaller economies and tax bases. although the social capital, or mutual trust and built

relationships, are a benefit of such communities. Despite commonalities, rural as a designation does not mean monolithic, and there is also tremendous variation from community to community, justifying the need for local analysis and community-driven solutions, both between rural and urban designations, and within rural designations. .

Benefits of Rural Life

While there are economic and other challenges in rural, less densely populated areas, there are challenges in communities of all sizes and this dissertation is not intended to demonstrate that only rural communities have concerns. There are many benefits of rural communities and many rural residents are satisfied with their lives. The Robert Wood Johnson Foundation (Robert Wood Johnson Foundation, RWJF, 2018) conducted a national survey of rural Americans to assess their attitudes, and in this survey, results revealed that most rural adults feel a sense of connection to their community, enjoy their family, and the people in their community (RWJF, 2018). Rural people benefit from the sense of connectedness and knowing all, or most, of the individuals in a community, and this benefit sets less densely populated areas apart from more densely populated ones.

Challenges

There are many challenges in rural areas. Some issues that exist in the field of aging and are exacerbated in rural areas are the growing population of the oldest-old (people over age 85), shortages of health and age-related services access (formal and informal), environmental barriers (transportation, technology access), negative stereotypes about aging, economic disparities (Glasgow & Berry, 2013; RWJF, 2018),

and internet connectivity disparities (LaRose, Gregg, Strover, Straubhaur, & Carpenter, 2007; Salemink et al., 2017). Rural individuals are also concerned about challenges to their community posed by opioids and drug abuse health, personal finances, and access to healthcare (RWJF, 2018). The closing of rural health centers and limitations on other age-related services like home-health, as there are not enough qualified employees to hire in many rural areas are also concerns (Chipp et al., 2011; Hart, Pirani, & Rosenblatt, 1991; Hicks, 1990; Rural Health Information Hub, 2018). While hospital closures have affected low-income urban areas, over 120 hospitals have shut their doors in rural communities since 2005 (Health Resources Services Administration, 2017), with 64 closing from 2013 to 2017 (U.S. Government Accountability Office [GAO], 2018). A hospital closure in a rural area can be particularly damaging to the community because they community may lack any other health service options. According to the detailed report from the GAO (2018), most rural hospital closures have taken place in the south eastern United States, among hospitals with high percentages of Medicare beneficiaries, and closures are often related to financial distress. The impacts of this can ripple through a community.

<div align="center">

Economics

</div>

Economics, both personal and regional, can influence many facets of a person's life, including their health, access to services, and regional infrastructure. A recent study on all-cause mortality from 1969-2009 showed lower life expectancy for residents of rural areas compared to urban areas, related to steeper poverty gradients in rural areas (Singh, Azuine, Siahpush, & Kogan, 2013). Further, adults in rural areas, according to the

Behavioral Risk Factor Surveillance System, are more likely than urban counterparts to

be uninsured and to have put off needed care due to the cost (Bennett, Olatosi, & Probst,

2008). Access to services, particularly preventative and educational services, regardless

of dominant rural economy, will be important to track in the coming years. Policymakers

and administrative personnel will need to clearly identify areas of service-shortages

relative to the aging populations. Being able to classify how an area is economically

supported and whether it is an area of poverty, high in-migration of older adults (whether

it is a retirement destination) is useful metric for making comparisons. There is a

foundational support for a relationship between service access, broadband access, and

economic typologies (Rains, 2008; Salemink et al., 2015; Whitacre, Gallardo, & Strover,

2014; Whitacre, Strover, & Gallardo., 2015), but the specific degree to which access to

aging and health services varies by economic typology and broadband access is not

empirically specified.

Barriers to Age-related Services in Rural Areas

In the last several decades, scholars have identified many barriers to providing

and accessing age-related services in rural areas. In some cases, services are entirely

lacking, or are available but not meeting the needs of the population (Bennett et al., 2008;

Goins, Williams, Carter, Spencer, & Solovieva, 2006; Virnig, Ma, Hartman, Moscovice,

& Carlin, 2006). Barriers to accessing age-related services are environmental in nature,

owing to the geographic dispersion of services that encompass the very nature of rural

areas (Buzza et al., 2011). Additional barriers include the lack of funding in rural budgets

to provide services (due to limited tax bases and/or lack of other private and public

funds), coupled with the increased expense of providing services, such as higher transportation and delivery costs (Bull et al., 2001; Goins et al, 2006), ineffective or insufficient communication between providers and the community, and relatively low numbers of participants to make services viable (Li, 2006; Sanders, Saunders, & Kintzle, 2009). The insular nature of rural communities and the stigma associated with sensitive topics can also be a barrier to accessing services (Rowles, 1988; Sanders et al., 2009; Zanjani & Rowles, 2012). These problems exist to varying degrees across all communities, and there are disparities to be addressed across the globe, but the intersection of economics compounded by lower total numbers, with older populations, and being further from resources compound to justify the emphasis on rural populations in this manuscript.

Implications

While many of the barriers have been clearly defined for age-related service access in rural areas, the explicit translation of barriers into actionable steps towards public policy and methods for overcoming barriers has been slow to happen. From a provider perspective previously mentioned, communication, administrative, and structural barriers delay efforts to improve service access, or make efforts seem insurmountable (Sanders et al., 2009). Researchers have identified local-scale solutions and made recommendations for proactive policies to take-on the challenges to accessing a variety of services in rural areas.

Scant empirical research exists on the translation of identifying barriers into identifying solutions, although a few were identified. Sanders et al. (2009) examined

barriers to adult day services within their local community, in Iowa, and based on the results of the mixed methods study, developed an action task force to address the overwhelming barriers and to build capacity of those in this network to provide such services. Their study highlighted the nature of effective rural policymaking, wherein policies need to come from within the community, be highly localized, and involve active collaboration between stakeholders, even those that are geographically far apart (Sanders et al., 2009; Salemink et al., 2017). Further, effective policy recommendations should be proactive, rather than reactive, as such policies can increase disparities leaving many rural communities to play catch up with more urbanized ones where many policy efforts are often initially focused (Salemink et al., 2017).

Current Studies

This dissertation encompasses two manuscripts; one that addresses the identification of highly localized areas of age-related service shortages (census tracts), examining the effects of local economic factors, retirement in-migration, and broadband availability on service access. The results of this dissertation, when written into a combined report delivered to stakeholders, may inform policymakers' decisions on how best to provide needed services to communities by (1) identifying potential shortage areas; and (2) determining what the risk factors are for communities that have lower access to age-related services at a localized level. The second manuscript addresses the perspectives of stakeholders involved in rural age-related services, including service providers, state administrators, and current and former caregivers of older persons. The purpose of the second manuscript was to gather the information from each of these

individuals, generate knowledge about the specific barriers faced by participants in the system of delivering and accessing rural age-related services, now and in the future, and lastly, identify the participants' ideas and solutions for overcoming these barriers. The results will be informative for general community members, local age-related service stakeholders, and policymakers, particularly at the local and state levels, to prompt further discussion and actions to overcome their specific issues identified in these communities using the assets and solutions suggested and identified by this sample of engaged stakeholders.

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CHAPTER II

GEOSPATIAL ANALYSIS OF FACTORS ASSOCIATED WITH DISPARITIES IN

AGE-RELATED SERVICES

Introduction

The life course perspective suggests that individuals' developmental actions and outcomes are influenced by the socioeconomic and historic environment (Giele & Elder, 1998). The geographic locations, regional norms and broader cultures, and historic period in which people are placed, are highly influential for individuals and for cohorts (Elder, Johnson, & Crosnoe, 2003; Giele & Elder, 1998). As such, in late life, older people in rural areas, or areas that experience service or income disparities, may be at risk of negative developmental outcomes, including increased all-cause mortality (Singh, Azuine, Siahpush, & Kogan, 2013) due to lack of access to both brick-and-mortar and internet-delivered age-related services and information.

Service availability (primary care, hospitals, medical specialists, dentistry, hospice, etc.) varies by population density and by region (Meit et al., 2014; Virnig, Ma, Hartman, Moscovice, & Carlin, 2006). Areas that have lower population density have higher poverty, or are very remote and have difficulty attracting and retaining providers, and struggle to sustain services financially (Meit et al., 2014; Rural Health Information Hub, 2018). Rural areas are aging at faster rates than urban areas proportionally, as migration and retirement trends continue (Glasgow & Brown, 2012) leaving more adults over 65 and fewer young adults to continue to work in and maintain local services and economies.

The disparity in access to age-related services is associated with negative outcomes for people of all ages, but particularly older adults in rural areas. Poorer cardiovascular health, dental decay and disease, poorer mental health, and higher rates of substance misuse are some of the outcomes associated with inadequate access to services (Hartley, 2004), extending to increased all-cause mortality, meaning shorter life expectancies, even when controlling for metro and non-metro poverty (Singh, Auine, Siahpush, & Kogan, 2013). Accurate identification of shortage areas for the growing population of rural older adults can be a means of minimizing the previously mentioned negative outcomes, as policies and programs can be targeted to the populations with high needs and an understanding of local risk factors.The current study uses Geographic Information System (GIS) analysis to examine associations between the availability of various types of age-related services proportionally to the population over 55, and the association of service available with important geographically dependent factors, including, rurality, United States Department of Agriculture, Economic Research Service (USDA ERS, 2017) economic typologies and retirement destination status, and broadband access. This study focuses on Utah specifically for two reasons. First, the Utah Automated Geographic Reference Center (Utah AGRC; established in 1984) was one of the first geospatial reference centers in the United States (Utah AGRC, 2018), yielding an abundance of high-quality publicly available data for the state. Secondly, as discussed below, Utah is a paradigm of population growth for the rural west.

Utah Migration and Aging Projections

Population projections in Utah reveal several interesting trends that make this state a prime target for this study. A detailed report on Utah's current population and projections over the next 50 years based on census data, migration, and other data shows that Utah's population is just over 3.1 million residents, with a median age of 31.2 years (Perlich, Hollingshaus, Harris, Tennert, & Hogue, 2017). The projections in this report predict increased average lifespan, higher than national population growth rate (total population greater than 5.8 million), increased median age of resident, and a doubling of the population of people over 65 years, from 10.2% to over 20% of the population (Perlich et al., 2017). The bulk of growth is expected along the Wasatch front - the part of the state that is already the most densely populated - containing the capital, Salt Lake City, and the surrounding suburbs of Weber, Davis, and Utah County. Washington County, a county in the southernmost corner of the state, is projected to have the greatest percentage of growth by 2065 (Perlich et al., 2017). This county is a popular retirement destination and recreation location (county seat, St. George, UT), and this development may affect its growth in jobs, economies, access to technology and broadband services, and age-related services. Further, according to the report (Perlich et al., 2017), one-third of the projected population growth in Utah will be due to net migration into the state – and as mentioned, the population growth is concentrated in the already densely populated urban corridor clustered along the interstate system. The growth in the more rural areas within the state will not happen at the same rate as the urbanized counties, although they will see some degree of growth. However, the *State of Rural Utah Annual Report* (Rural Planning Group, 2018) projected that rural areas in Utah will also experience out-migration of young adults to urban or transitional areas, leaving these areas with potential

workforce and service shortages, but stable or increasing numbers of older adults. The net

increase in populations across the state will require more services in general, but the

higher proportions of older people in more regionally isolated areas will require careful

planning to meet the needs of the aging population.

Age-related Services and Disparities

Disparities in the availability of age-related services are exacerbated by the recent

generational aging trends and migration. Age-related services include many types of

services from hospitals and primary care to respite services, home care, senior centers,

health promotion and prevention education, and hospice for older adults. These services

target maintaining and improving the quality of life for older adults and their caregivers,

and more broadly, the communities in which people live. Access to age-related services,

whether face-to-face, distance-delivered telehealth, or other types of internet-based

services, varies greatly from location to location, with rural and remote areas lacking in

service access relative to population demand (Innes, Cox, Smith, & Mason, 2006).

Thorpe, Thorpe, Kennelty, and Pandhi (2011) used data on community-dwelling elders

from the Wisconsin Longitudinal Study and found that rural older adults were more

likely than urban-dwelling older adults to have difficulties and barriers to healthcare

services. Through latent classes analysis these researchers identified barriers to health

and age-related services asaccess, accommodation, and affordability categories (Thorpe

et al., 2011). Virnig et al. (2006) identified disparities in hospice access, and found that

rural areas were more likely to be unserved than urban counties, furthermore, remote

rural areas that were not adjacent to urban areas were even less likely to be served by

hospice services. As a whole, rural areas are unserved and underserved in the areas of health and age-related services, with additional barriers to access such as distance, technology, waitlists, fragmented local governments, and cost (Bascu et al., 2012; Craig & Manthorpe, 2000). This is not to say service disparities do not exist in more densely populated areas, but that the cumulative barriers that are unique to rural areas exacerbate such disparities, particularly in the rural southeast (Hartley, 2004; Meit et al., 2014). Distance to services and limited transportation prevent many rural people from accessing health and age-related services (Bascu et al., 2012; Buzza et al., 2011; Strauss, MacLean, Troy, & Littenberg, 2005; Syed, Gerber, & Sharp, 2013). Telehealth and other distance-delivered services that involve the use of broadband connections are one recommended policy solution to overcoming transportation barriers in accessing services for rural older adults (Syed et al., 2013), but there are disparities in the availability in broadband internet across rural and urban locations, with less access in more rural areas and very poor urban ones (FCC, 2018; Fernandez, Reisdorf, Dutton, & Hampton, 2018; Salemink, Strijker, & Bosworth, 2017).

Rurality

According to the Office of Management and Budget (OMB) statistics and Census data from 2000, 97% of the land area in Utah is rural, meaning areas with 2,500 or fewer people, and 12% of the state's population lives in a rural area (Cromartie & Bucholtz, n.d.). There are rural, transitional, and urban counties in Utah (Rural Planning Group, 2018), using the U.S. Census codes for counties; rural counties are defined by having no cities over 50,000, transitional counties are connected to an urban county via borders or

an interstate or if they are not, they have a city with a population over 50,000, and urban

areas defined as counties that have cities or population centers over 150,000 (Ratcliffe,

Burd, Holder, & fields. 2016; Rural Planning Group, 2018). According to this definition,

16 of 29 counties in Utah are rural. This group examined the trends in population growth

and economic prospects and the results showed transitional counties are more like urban

counties than rural ones. This trend is expected to continue, demonstrating out-migration

of young people that will fill jobs, contribute to the economies, and support older adults

as they transition out of the workforce. This, in addition to other factors, worsens

economic prospects for rural areas, particularly ones that are supported by a single

industry such as agriculture or mining (Rural Planning Group, 2018).

Of note, the status of rurality is often assigned at the county level, however

population distribution across most counties is not homogeneous. Rural to urban

gradients can be applied to smaller units of geography, such as districts, census tracts, or

only include actual city and population cluster boundaries, and the way rural

classification is measured and applied will affect the interpretation and outcomes.

Economic Typologies

The economies of urban, or densely populated, areas are more diverse (have

more types of industries supported) than rural areas, which is important because diversity

in industry types is a protective factor during economic crises (Rural Planning Group,

2018). The USDA ERS, publishes county typology codes based on the industry that

contributes 20% or more to the county's economy, classifying all counties into the

following categories:

Six *mutually exclusive* categories of economic dependence:

1) farming, 2) mining, 3) manufacturing, 4) Federal/State government, 5)

recreation, and 6) nonspecialized counties

Six *overlapping* categories of policy-relevant themes:

1) low education, 2) low employment, 3) persistent poverty, 4) persistent child

poverty, 5) population loss, and 6) retirement destination (USDA ERS, 2017).

These typologies are not only useful for policy and planning purposes, but there are

tangible impacts on the lives of individuals that live within their bounds. Typologies are

related to the financial capital that people possess, along with the built capital, or health

and service infrastructure (Hart, Pirani, & Rosenblatt, 1991; Holmes, Slifkin, Randolph,

& Poley, 2006), and the broadband and internet connectivity infrastructure that is

sustained and accessible by the community (Whitacre, Gallardo, & Strover, 2014;

Whitacre, Strover, & Gallardo, 2015). As rural areas continue to diverge from transitional

and urban areas in demographics, policy and programmatic innovation can help mitigate

disparities in age-related services and associated negative outcomes.

Highspeed Broadband Access

Broadband is directly related to rurality, health and age-related service access, and

local economies in several ways. Highspeed broadband means internet speeds that meet

the Federal Communications Commission (FCC) definition of 25Mbps download and

3Mbps upload, and is mandated by the 1996 Telecommunications Act to be provided to

the American public in a "timely fashion" (FCC, 2018, para. 1). There has long been a

rural-urban divide in broadband access, owing to the complicated nature of installing

infrastructure in rural areas relative to the demand (Salemink, Strijker, & Bosworth, 2017). Even with efforts to close this gap, the most recent report from the FCC (2018) indicates that 96.5% of the population of urban areas has access, but only 69.3% of rural populations, and 64.6% of Tribal populations had access to highspeed broadband. Broadband connects people to many services by enabling searches for medical providers, participation in telehealth, and search and access to health-related information; individuals with highspeed internet are more likely to use the internet for health information, as opposed to dial-up users (Rains, 2008). Highspeed broadband internet access, does not mean that someone is using telehealth, but this infrastructure is a necessary means for accessing such services. Although, broadband use differs by age, as adults 55-75 have high rates of use of home, internet, broadband, and other technologies, than adults over 75 years of age (Anderson & Perrin, 2017). Highspeed broadband is also important to service infrastructure for providers and users as many systems move online and highspeed broadband internet facilitates the provision of many in-person services (Perzynski et al., 2017; Whitacre, Wheeler, & Landgraf, 2016).

Beyond the level of individuals, business and services require access to broadband for optimum functioning in today's increasingly connected world. Access to highspeed internet boosts local economies through new job creation (Katz, 2018), enabling of larger employers to expand services via "satellite clinics" (Katz, 2018, p. 96), and spillover across sectors from increased communications. Furthermore, highspeed broadband is associated with weakened migration, as it provides flexibility and dampens the effects of other factors that influence a person's decision to migrate (Winkler, 2017). High-speed broadband is an essential service for building capacity in work, health, service, and social

networks, and creating direct access to online services like telehealth (Nancarrow, Banbury, & Buckley, 2016) The direct access in a local area to in-person services has not been linked to highspeed broadband availability in that same area, as a spatially dependent relationship.

Potential Spatial Access

Policies and measures of access to service have shifted as new methods have been developed, yet accurate measures that reflect patterns of likely service use are less common. As demographics, economics, technology access, and service availability fluctuate, policies and plans should be proactive in nature, rather than reactive "catch-up" policies. Catch-up policies continue to leave rural areas lagging in economic development, parity in services like broadband internet and other technologies, and quality health services (Salemink et al., 2017). There are noted challenges with how to target policies in expansive rural areas where populations are diffuse, but needs are high. A problem with many methods of identifying service shortages by geographic area is that the boundaries used in such analyses are often large, covering unequal concentrations of people and services within those boundaries. More specifically, designations of service availability by county may cover too broad an area (parts of the county are extremely isolated while others have high concentrations of the population, some are wealthy and some are low-income), while also not really capturing the true distance of likely usable services. In some cases, the closest services and therefore the services used by individuals may be in the next county over, not within the county the individual lives in.

The concept of *potential spatial access* includes available services to a population

in a defined geographic area, usually within a specific distance (Khan, 1992, p. 275; Luo, 2004). Potential spatial access is moderated by barriers and facilitators, which can be factors including economics, infrastructure, age, and others that increase or decrease the potential access to services for the population in question (Joseph & Phillips, 1984; Khan, 1992; Luo, 2004). Several ways of measuring spatial access exist as people have developed more methods of spatial analysis. Some previous researchers have used a floating catchment system (Luo, 2004) to more accurately assess the healthcare access within a specific radius, rather than within the boundaries of the county. This method is effective, because there is a known ratio of providers to individuals and it accurately assesses potential spatial access. Other ways of measuring this can include spatial autocorrelation, spatial regression, and point pattern analysis to determine if the variable of interest is spatially associated, or related to the value of points it is next to, or if it is random.

Current Study

In this study, I aim to integrate several layers of data and compare the effects of measuring service availability at the county level versus the local (census tract) level. In a state like Utah where many of the counties are larger in square miles than some Eastern states, this may more meaningfully identify areas with lower spatial access to age-related services. Service shortages are potentially washed out or exaggerated at the county level, depending on the county, because both the population and number of services are clustered in dense non-random areas (cities), but are counted within in a comparatively large geographic boundary.

Using spatial regression on the census-level data, I examine the association between potential spatial access to age-related services and geographically related factors, including rurality, economic typologies, retirement destination status, and broadband access. In sum the results of this series of analyses may provide support for *local* assessment of needs, rather than *county* level, and will help identify factors that are contributing to lower potential spatial access in Utah that may inform future policy recommendations.

Research questions:

1. How do mean level proportions of age-related services compare at the county level versus the local census tract level?

2. Is potential spatial access to age-related services (a continuous variable) higher or lower as a function of rurality, economic typology, retirement-destination status, and broadband access? Are the associations between potential spatial access and predictor variables spatially dependent?

3. What types of communities have the lowest access to age-related services?

Methods

Data

The data for this analysis came from multiple sources. Table 1, below, shows both the source, year, and type of data for all variables.

Table 1

Variables by Source,Year, and Data Type

Dependent Variable – the bolded variable, calculated at census tract and county level the mathematical combination of the non-bolded variables			
Variable	*Source*	*Year*	*Type*
Population 55+ by Census Tract	American Community Survey, US Census	2016, 5-year estimate	Geographic Information System(GIS) Designation: Census tract Variable Type: Ratio
Age-related services: Hospitals, nursing homes, hospice, senior centers & Area Agencies on Aging	Utah.gov OpenData	2015	GIS Designation: Point Variable Type: GIS Geodata
Potential spatial access (PSA)	$$PSA = \frac{Aging\ Services}{Population\ 55+}$$		**GIS Designation: Census tract Variable Type: Ratio**

Independent Variables – only used in census-level OLS and spatial analysis

Variable	*Source*	*Year*	*Type*
Economic Typology Categories include: Farming (0,1) Mining (0,1) Manufacturing ((0,1) Recreation (0,1) Government (0,1) Non-specialized (0,1)	ERS	2015	GIS Designation: County (For each mutually exclusive category) Variable Type: Dichotomous
Retirement Destination Categories include: 0) No	ERS	2015	Designation: County Type: Dichotomous

1) Yes

Rural/Urban area Designations include: 0) Rural 1) Urban Cluster 2) Urban	US Census Population calculation	2011	Designation: Census Block Type: GIS Geodata, Ordinal
High-speed Broadband Access Designations include: 0) No Access 1) Access	Automated Geographic Reference Center (AGRC) & The Governor's Office of Economic Development	2018	Designation: Census Block Type: GIS Geodata, Dichotomous

Age-related Services

Hospitals, primary care facilities, nursing homes, hospice providers, senior centers, Area Agencies on Aging are the available age-related service typologies. These data are coded within the centroid of the zip code wherein they are registered, aligning them within the census tracts. Because there are many types of services included in this analysis and there are no existing standards for each of them on facility-to-population ratios, an aggregate number of all age-related services in a given region will be used as the indicator . This is as opposed to other methods used for identifying shortage areas, which are calculated by provider full-time equivalents (FTE) to population in county ratios.

Population

The population of adults 55 and older will be used, not only because this captures

the Baby Boom population that is rapidly growing into utilizers of age-related services,

but also because this is the population that is legally entitled to most age-related services

under the Older Americans Act (1965; United States, 1978). The population data come

from the American Community Survey (ACS) 2016 5-year census tract level data (U.S.

Census Bureau, 2016). The data were downloaded from the American Fact Finder (U.S.

Census Bureau, 2019). A raw number of adults over 55 years was calculated, based on

the available data of percent of total per census tract. Calculations of exact numbers were

computed with a formula function during data cleaning in R Studio with *tidyverse* (R

Core Team, 2018; Wickham, 2017). I checked 5 counties at random in the data file for

accuracy and found that there were no errors in such calculations. The total number of the

population per census tract was used as the indicator for local census-tract level analyses.

Within counties, the total population of each county was summed and used as the

population indicator for the county level analysis.

Rurality

Rurality is measured in this study using the geodata from the Automated

geographic Reference Center (AGRC) file identifying urban areas (50,000+) and urban

clusters (2,500 – 50,000 people) from the 2010 Census codes and following Census

definitions of rural and urban. The remainder of the land areas were recoded from NA to

rural meaning fewer than 2,500 people in a single area. This was used as a three category,

ordinal variable with 0 = rural, 1 = urban cluster, and 2 = urban, reclassified from the

two-category variable (urban and urban cluster) in R.

Economic Typology

The economic typology codes came from the ERS (USDA ERS, 2017) and they were coded dichotomously for each of the six mutually exclusive categories, which included farming, manufacturing, government/Federal, recreation, mining, and non-specialized counties. As stated above, these are identified by industries that contribute a substantial proportion of labor and business earnings in a county (about 20%) and more than any another industry (USDA ERS, 2017).

Another category from the ERS that can be applied to a county with any of the listed economic typologies was also included to account for the high proportion of migration into an area of people over the age of 60 – this category is called *retirement destination*. USDA-ERS applies this code to counties where the population of adults over 60 increased more than 15% between the 2000 and 2010 census (USDA ERS, 2017). Two other variables were identified as important, but ultimately were excluded due to lack of variance, including population loss (where a county experienced a population decline in the 1990-2000 and 2000-2010 censuses, USDA ERS, 2017), and persistent poverty, indicating 20% or more of the population has been below the poverty line since the 1980 census (USDA ERS, 2017). Both population loss and persistent poverty categories only applied to one county out of 29.

Broadband Access

The Automated Geographic Reference Center (AGRC) is a state geospatial office, and they maintain several publicly available datasets of geospatial data, both nationally and for the state of Utah. For this dissertation, I utilized their state-wide updated GIS

Shapefile of broadband internet. To clean the data file to only include high speed availability, the data file was opened in R, and then using *tidyverse* (R Core Team, 2018; Wickham, 2017) it was filtered with download speed greater than or equal to 25Mbps per second and upload speeds greater than or equal to 3Mbps per second which is the federal standard of highspeed coverage (Federal Communication Commission, 2018). After this step, the data set was recoded as a simple dichotomous variable with no access (0) or access (1) to indicate whether highspeed broadband was available. This data is associated with the location of the census block, indicating whether any point in the block is served with high-speed broadband.

These data were combined using spatial overlays, meaning that the data were merged into one file, common spatial attirbutes. Before combining data, each set was checked to ensure it was in the same coordinate reference system, and for this series of analyses, all data were in North American Datum (NAD) 83, Universal Transverse Mercator (UTM) zone 12N, which is the standard regional projection for the state of Utah.

Analysis

Step One

The analysis was accomplished in two steps as described above. Potential spatial access, meaning the service that a population is likely to use (Khan, 1992), was computed both at the county level and at the local level (census tracts). Potential spatial access (PSA = *# age-related services/population over 55; see Table 1)* is a continuous value, where higher decimal proportions indicate more potential spatial access (higher

proportion of age-related services, per older person, in that designated boundary) and lower values indicate less potential spatial access (lower proportion of age-related services, per older person, in that designated boundary) to the age-related services in this study (hospitals, hospice providers, nursing homes, AAAs, and senior centers). A Welch's two samples t-test was used to determine if the mean potential spatial access at the county-level was statistically different from the mean proportion of age-related services at the census tract level.

Step Two

Based on best practices outlined in Anselin (2005), an ordinary least squares (OLS) regression analysis, was used to examine associations between the continuous dependent variable (PSA), and the independent variables of rurality, economic typologies (farming, mining, recreation, government, manufacturing, and non-specialized), as well as retirement-destination status, and broadband access. Following the OLS, I transformed this data to be entered in a spatial regression model, including building a neighborhood and weights matrix, calculating Lagrange multiplier statistics, and finally, computing a spatial error model. Creating a neighborhood is a process that connects points or polygons and their attributes within a specified structure. This neighborhood matrix is a necessary step in spatial modeling, as it assigns weights to distance, not a separate model. For example, creating a matrix of a census tract, its population, and all the census tracts immediately adjacent to it to determine if nearby populations are correlated, assuming a square census tract, the tract would have a matrix of four neighbors each, or eight if counting diagonal. For this specific analysis, I created a

neighborhood weights structure that accounts for the influence of the neighbors (points of

PSA) within a 50km (31.04mi) radius – using straight line distance, and not counting the

influence of neighbors outside this radius to capture local influence, and to account for

the irregular shapes of census tracts. This neighborhood and weights matrix is delivered

as a line of code into the regression equation. This process determines if there is a spatial

relationship between potential spatial access at one point, the independent variables, and

the potential spatial access at points that are considered neighbors. In sum, the spatial

modeling determines if the variables have a spatial relationship, meaning that the location

of points and attributes are significantly related to their location to one another on a

plane. The spatial error model which is an extension of spatial regression modeling,

controls for the variance in the predictor variables in the OLS model, to determine if the

influence of error or unexplained spatially-dependent factors contributes to potential

spatial access.

Results

Potential Spatial Access: Comparison of County and Census-tract Approaches

The results of a Welch's two-sample *t* test indicated that the mean potential

spatial access to age-related services differed significantly when measured at the county

level ($n = 29$), versus the census area level, $n = (603)$, $t(614.65) = -7.52$, $p > .001$. The

mean level of potential spatial access per county is 0.001284713; roughly 1 service per

1000 persons over age 55 in the county. The mean level of potential spatial access per

census tract is 0.011668191, or roughly 11 total services to 1000 people over age 55 in a

census tract.

Regression and determining spatial relationships. The OLS regression was constructed using R Studio and several spatial data packages including *sp* (Bivand, Pebesma, & Gomez-Rubio, 2013; Pebesma & Bivand, 2005), *rgdal* (Bivand, Keitt, & Rowlingson, 2019), and *spdplyr* (Sumner, 2019). This regression was constructed with PSA (defined by census tract) as the outcome, and all independent variables were entered into the model, with population percent over 55 as a control. The results of this regression showed that over 30% of the variance of potential spatial access was explained by the independent variables included in this model, multiple *R*-squared: 0.3486, adjusted *R*-squared: 0.3376 , *F(10, 593) =* 31.73*, p < .*001. The included control variable, the percent population over 55, was not statistically significant. However, being less urban (β = -0.006125, *p < .*001), and being a retirement destination predicted lower spatial access (β = -0.008446, *p < .*001), while nearly all the economic typologies were significantly associated with higher potential spatial access. Having access to high-speed broadband also predicted higher potential spatial access (β = 0. 016068, *p < .*001).

Table 2

OLS Regression for Census Level Potential Spatial Access

	Model Parameters	
	Estimate β	Std. Error
Rural	-0.006125 ***	0.001660
High-speed	0.016068***	0.003741
Percent over 55	-0.026786	0.019874
Economy		
Farming	0.010434	0.006095
Mining	0.020387*	0.008350
Manufacturing	0.071877 ***	0.005835
Government	0.071877 ***	0.005835
Recreation	0.021341 ***	0.006151
Non-specialized	0.034089 ***	0.005972
Retirement Destination	-0.008446 ***	0.002479

p-value: < 0.001 "***" 0.01 "**" 0.05 '*'

Multiple *R*-squared: 0.3486, Adjusted *R*-squared: 0.3376

F(10, 593) = 31.73, p < .001

After running the OLS regression, the next step was to add a neighborhood and weights structure for the census level data, accounting for the influence of neighboring services within a 50km radius of a point, as described above. Results are displayed as

lines between points (connections of neighbors) in Figure 1. The bounding box for the

points in this figure is the state of Utah.

Figure 1. 50km Neighborhood of PSA in Utah
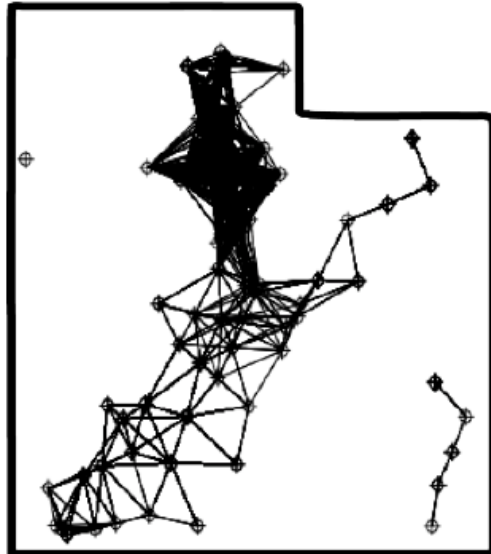
Figure 1. 50 kilometer neighborhood between points of potential
spatial access.

Using this neighborhood, or model of how the data are related, the Lagrange

Multiplier test was calculated to determine models that test for error and lag model fit in

the data. A linear model error test and a robust missing lag test had the highest

significance (190.74, $df = 2$, $p < .001$), suggesting that a spatial error model should be run

with the data. This is essentially an indicator that the error, or that the *noise* in the spatial

data is worth investigating, rather than the lag, or further-away neighbor effects. The

results of the simple spatial error model were significant, $\lambda = -0.020274$, LR $= 301.01$, p

$< .001$, meaning that there are significant spatial relationships in the trend, and in the

spatial error. Figure 2 below shows the trend map of potential spatial access points

(numerical values reflect range of beta coefficients) and in the right part of the image, it

shows the residuals, or the unaccounted-for variation in potential spatial access. The

bounding box for points in Figure 2 is the state of Utah.

Figure 2. Trend And Residuals In Potential Spatial Access In Utah.

Trend

[-0.01162,0.01472]
(0.01472,0.04106]
(0.04106,0.0674]
(0.0674,0.09373]
(0.09373,0.1201]

Residuals

[-0.07174,-0.03625]
(-0.03625,-0.0007509]
(-0.0007509,0.03474]
(0.03474,0.07024]
(0.07024,0.1057]
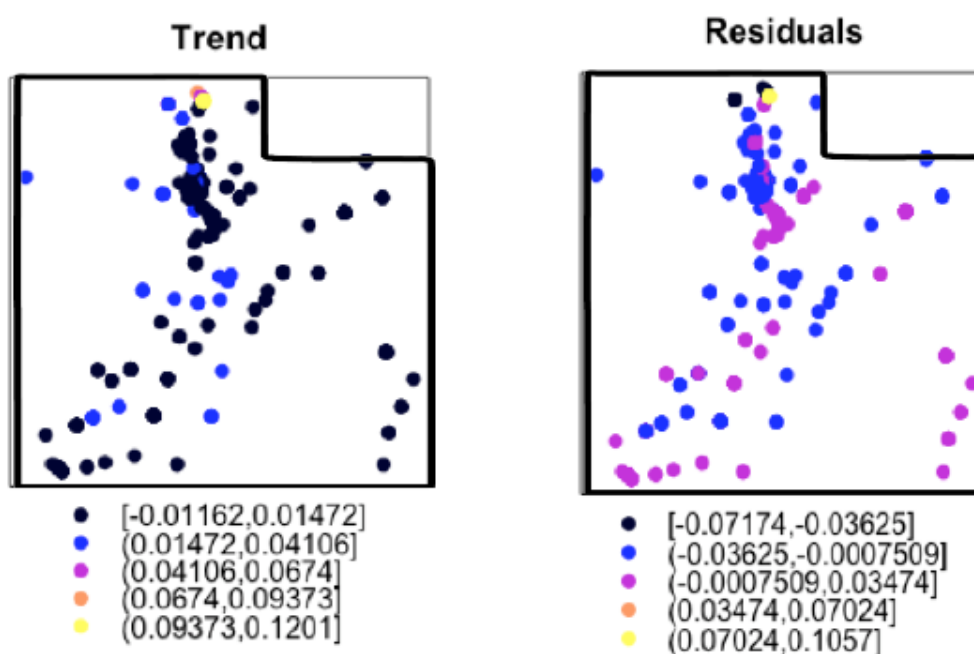
Figure 2. Trend in potential spatial access shows census tract specific patterns, after controlling for the predictor variables in the model. Lower potential spatial access shows a trend across remote areas of the state and in some transitional and urban areas (black dots in Trend map). The residuals (blue and fuchsia dots in Residuals map) show that there is a pattern, or multiple patterns, in the unexplained variance in these areas that have lower potential spatial access. The numbric values are ranges in the beta coefficients for the spatial error model, with negative values indicating "low" potential spatial access.

The model results and figure above show that both rural and urban areas had variation in

potential spatial access to age-related services, and that this variation is a function of

location in space, within this neighborhood structure, controlling for the predictor

variables in the model (percent over 55, rurality, economic typology, retirement

destination status, and broadband access). In addition, there was missing explained variance, owing to other factors that contribute to service availability. In other words, there were other factors, in addition to the ones identified in the linear model, that were associated with these locations, that contributed to the significantly higher or lower levels of potential spatial access to age-related services.

Discussion

The results of this multi-step analysis of geographic availability of age-related services relative to the population aged 55+ (potential spatial access, PSA), have three main takeaways, summarized here, and described in more detail below. The first finding is that the comparative county-census level analysis demonstrated that the vast size of the geographic area of counties relative to the dispersion of people and services, may have exaggerated or underestimated potential spatial access to age-related services. Second, based on the results of the OLS regression analysis, having access to high-speed broadband was associated with higher potential spatial access. Economic indicators of predominant county industry did not *differentially* explain access to age-related services in this study, but living in a retirement destination county, when controlling for the percent of people over 55, was significantly associated with lower potential spatial access to services. Third and finally, the spatial error model demonstrated that there is unexplained variance that is significantly associated with a spatial distribution of potential spatial access to age-related services, controlling for the predictor variables, suggesting that more explanatory variables should be built into future models.

In answering the first research question, this manuscript served to support that

county level assessments of service access exaggerate or can hide the true spatial accessibility of services. Using the same equation, but different boundaries, the ratio of services to people over 55 in a county was 1:1000, but in a census tract was 11:1000. While reporting the average is misleading because of county and census tract heterogeneity across the state, it demonstrates that local level analysis can provide more accurate information about what services a population of interest has access to and this information can be used in needs assessment, planning, and policy. A specific example from a census tract in a rural county, of Beaver Utah, is the ratio of 13:1000 (age-related services per 1000 population) at the county level and 5:1000 at the census level in one tract. Likewise, in urban Salt Lake county, the potential spatial access is about 1:1000 but in one census tract within this county the ratio is 5:1000 and in another census tract it is 18:1000 illustrating that county-level analyses misses the heterogeneity that is identified at the local level. Given that this dissertation is measuring service access at the facility-to individual ratio rather than the FTE provider to individual ratio, as is typically done in assessing healthcare provider shortage areas, it is difficult to say what the threshold is for being considered too low on PSA at the local level. In future studies this exploratory model could be refined and compared to other indicators of service shortages to identify critical ratios, at-risk ratios, and so on, at the local level. Including the spatial modeling component is one effort to further explore and refine such a model.

　　To address the second research question, through a multi-step spatial analysis I sought to understand how availability of age-related services (hospitals, nursing homes, hospice providers, senior centers, and AAAs) relative to the population of people over 55, fluctuated over space as a function of rurality, economic typology, in-migration

(retirement populations), and broadband access. Most surprisingly, all types of economies, excluding farming due to limited numbers of farming areas, were associated with higher potential spatial access. One reason why these economic types did not have differential predictive utility from one another may be because regional income was not available to include in the model or because variation in industry (economic typology) was overshadowed by variation in broadband access, due to its relationship with jobs and the economic sector (Katz, 2018). While economic indicators of poverty would also have been desirable in these models, the USDA-ERS variable of persistent poverty was not included because only one county in Utah had persistent poverty (San Juan county, which overlaps with Tribal lands), making the lack of variance across counties too minimal for meaningful analyses at the aggregate level. Additional analyses must incorporate robust data on regional incomes to determine how this contributes to the potential spatial access, because it is documented that the lower tax bases and incomes across rural areas contribute to difficulty maintaining and expanding services (Bull, Krout, Rathbone-Mclean, & Shreffler, 2001) and this would provide information on inter-urban poverty differences in service access. This is not to say persistent poverty is not an important indicator, but broader ranging measures of income and economic well-being may explain more of the regional variation in potential spatial access.

The most intriguing finding from the USDA-ERS data, was with retirement-destination status counties, meaning that there was at least a 15% increase in the number of people over 60 moving into a given county between 2000 and 2010. This variable showed a significant association with *lower* potential spatial access ($\beta = -0.008446$, $p < .001$), *controlling for the overall percent* of the population over 55 in each locality. This

indicates that the increases of older adults over long periods of time (~10+ years) put communities in a position of lower PSA to age-related services, however the underlying reasons for this significantly lower rate warrants further exploration. Net in-migration, especially of older adults, is projected to drive population growth in Utah between now and the year 2050 (Rural Planning Group, 2018). The projections for Utah indicate that retirement areas will grow – there will be more areas designated as "retirement destinations" and that existing ones will continue to see growth. This growth, coupled with the knowledge from this study that retirement destinations have lower PSA to age-related services can serve as an alert to communities that have, or are projected to have this designation. Further, this suggests an avenue for policymakers and service providers to adjust to meet the growing need for services in these existing areas, and to carefully assess projected retirement destinations (e.g. up-and-coming recreation areas) that will necessitate proactive planning of services and infrastructure to meet the projected growth and demand. Another interesting facet of the OLS model was that being more rural was associated with lower potential spatial access, when controlling for the percentage of adults over 55, such that even if there are more older adults, proportionally, in a rural community, the proportion of services is less there than in an urban community. Retirement destinations status and proximity to urban centers and associated services, should also be examined in future models, to determine how level of rurality relates to retirement-destination status.

In addition to the economic industry and retirement predictors, broadband was a variable identified as a barrier and enabler of PSA. Access to high-speed broadband (download speeds greater than 25Mbps/s and upload speed greater than 3Mbps/s) was

significantly predictive of higher potential spatial access ($\beta = 0.016068$, $p < .001$) and no

broadband access is associated with lower potential spatial access to age-related services.

The topic of rural broadband has received recent media attention (Ali, 2019; Otelco,

2019; USDA, 2019) and scholarly attention (Drake, Zhang, Chaiyachati, & Polsky, 2019;

Ko, Routray, & Ahmad, 2019) with pundits, policymakers, scholars, and individuals

calling for parity in rural access, accountability in government provision of rural grants,

and identifying the real-world outcomes associated with lags in access, like stagnant

economies and lower access to telehealth. This study's finding in context, supports that

areas with access to broadband have increased access to in-person age-related services.

Future analyses can examine if this is because of overall higher incomes of residents

permits them access to broadband and the ability to sustain age-related services

(wealthier neighborhoods), and/or if lack of high-speed broadband itself limits age-

related services from expanding or maintaining presence in an area, in-spite of the varied

economic circumstances (high-income or mixed income retirement-destination

communities with poor broadband service).

Lastly, the spatial error model was significant, and demonstrated that there is a

significant spatial relationship in the residuals of this spatial model. This finding means

that the noise in the spatial data is spatially dependent, and it is happening within the built

neighborhood (points in a 50km distance), controlling for the effects of the predictor

variables included in the OLS regression model. This can be interpreted as a trend in the

regions across southern, central, and parts of urban Utah (interstate corridor), and we can

conclude that the additional unexplained variance is significantly tied to location in

space, it is not spatially random. Adding other explanatory variables in future models can

help identify predictors of this unexplained variance. Variables including other economic indicators, demographics including racial and ethnic backgrounds, religious concentrations, and other built infrastructure (road networks, rather than straight line distance) are potential variables that could influence this spatial pattern in Utah communities. Additionally, different neighborhood and weights matrices should be tested to explore the extent of the spatial relationship (neighbors at a lesser/greater distance).

Study Limitations

All data were collected between 2010 and 2017, with retirement destination status based on 2000-2010 population changes. Modeling the current distribution of health and aging infrastructure and population *data projections* could increase the utility of the model by highlighting existing and projected disparities in potential spatial access. For example, one census tract may appear to have adequate coverage of age-related services currently, but rapid growth of retirees in this area over a short time could make this census tract area vulnerable to shortages in the future. Additionally, including the additional aging supportive services, such as telehealth options, home-healthcare, access to transportation services, and cellular access (as an alternative internet option to broadband) could impact future calculations of potential spatial access of age-related services.

As stated above, a limitation of this model was the lack of a suitable control for income or poverty, which inhibits the extension of these findings, but this element may have been alluded to in the spatial error model. The spatial error model showed a distinct pattern in the residual error and this may be related to regional or neighborhood level

income. Follow-up research should incorporate more income-related economic markers, although this will take collaboration with experts in economics, as finding variables that accurately reflect local level income differences may be challenging. For this exploratory model, the efforts to include the economic and other markers came from USDA ERS indicators (persistent poverty, low education), and while this approach is sufficient, the lack of variability in Utah on these indicators impacted the predictive utility of these variables in the model. Only one county repeatedly met the criteria for these designations, San Juan County, which shares borders with the Navajo Nation, and which has experienced systemic inequality leading to higher rates of poverty and lower rates of educational attainment. Furthermore, as reported in the FCC's annual report (2018) Tribal areas have a distinct disparity in highspeed broadband access. In this preliminary exploration, tribal boundaries and racial and ethnic demographic information were not included to determine how these factors influenced potential spatial access. Further models should incorporate this information to identify the intersection of racial and enthnic identities, and Tribal boundaries with economic indicators, broadband availability, and potential spatial access to health and age-related services. Lastly, a limitation of this analysis is the use of the broadband availability data, which does not equate to actual usage rates. However, this information was not available for the state of Utah in a geospatial format at the time of analysis, therefore, for this exploratory model, availability rates are a sufficient proxy.

Implications of the Current Study

The implications of this research for policy and practice are two-fold. First, needs

assessments and planning projects should incorporate local-level (census tract) data to get a more representative picture of potential spatial access, shortages, and community needs at a local level to capture boundaries of actual use, and not rely on county data, per se. County estimates, particularly in Utah where county boundaries are vast, ignore the heterogeneity within counties and may over or underestimate access to services. Secondly, communities that are at risk of low spatial access to age-related services are more likely to be rural and retirement destination areas, but potential spatial access is increased by availability of highspeed broadband. The OLS analysis showed that broadband is associated with higher potential spatial access to in-person services, yet many areas are un-served by high-speed broadband; individuals and local and state policymakers should assess and plan to increase the broadband access communities that lack access, to boost economic vitality health and health and age-related services access, both in-person and those delivered via an internet connection (Drake et al., 2019; Ko et al., 2019). Further, stakeholders, including community members, planners, and policymakers should reflect on the demographic make-up of their community and review the projections for in-migration; this planning should focus on understanding increases in the number of older adults (retirement destination areas) and attempting to accommodate the infrastructure and services of these areas.

<div align="center">**Conclusion**</div>

This manuscript served explore differences in the scale of analysis of potential spatial acces to age-related service in the state of Utah, comparing county and census level proportions. The results deomstrated that census-tract level proportions were more

informative for the services (facilties) included in the data. Secondly, the predicotrs included in the OLS regression (rurality, economic typology, retirement destination status, and broadband availability) explained 34% of the variance in potential spatial access to hospitals, hospice providers, nursing homes, senior centers, and Area Agencies on Aging relative to the population over 55. Broadband availability was significantly linked to higher access to these in-person services, not just online health information, or telehealth services. Retirement-desitination areas were signifacntly associated with lower potential spatial access, and this requires further exploration as to why a change of more than 15% in the population of pople over 60 is not related to higher proportions of aging services. Lastly, these variable were spatially dependent within a 50km straight-line radius, in addition to spatial dependence of unexplained error to be explored in future research.

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CHAPTER III

BARRIERS AND ACTIONS TO IMPROVE ACCESS TO AGE-RELATED

SERVICES FOR RURAL INDIVIDUALS: A QUALITATIVE STUDY

Introduction

The developmental phase of *late life*, where adults are refered to as *older adults*,
is typically defined as people aged 65 and older, however the Administration on Aging
eligibility criteria for many age-related services includes persons aged 55 and over
(United States, 1978). The network of individuals that participate in age-related services
includes these older adults, but also their formal and informal caregivers, health and age-
related service providers, and state and federal administrators. The members of the age-
related service network interact across various parts of a bioecological system
(Bronfenbrenner, 1979), but as every person ages, there is often overlap in the
experiences of these individuals. As the population of older people in rural areas is
increasing at a higher rate than in urban areas (Glasgow & Brown, 2012), and more
barriers to accessing appropriate age-related services exist in rural areas (Thorpe, Thorpe,
Kennelty, & Pandhi, 2011), understanding how to overcome barriers to age-related
services in rural areas becomes increasingly important. In the current study, I use a
qualitative approach to capture the input of people who use and/or administer age-related
services in rural areas. The goal of the study is to interview the stakeholders in the age-
related service system to catalogue and understand barriers, strengths, and processes
within the local context(s), and then identify solutions and action points that are
community-derived. The solutions and action points from within this sample of

stakeholders will then be disseminated to a broader group of stakeholders in the age-related service system through various means, including reports, news releases, newsletters, and presentations.

Bioecological Theory: Framing How Contexts
Impact Aging-service Access

Bioecological theory, specifically Bronfenbrenner's Process-Person-Context-Time (PPCT) model (Bronfenbrenner & Morris, 2006) posits that interrelation of processes and personal factors are the engine of development within nested contexts, across time. According to Bronfenbrenner (1979) context encompasses four levels of an individual's environment: (1) the *microsystem* includes the people immediately involved in a developing person's life; (2) the *mesosystem* is defined as interactions between microsystems, for example an older adult's in-home caregiver and spouse; (3) the *exosystem* are indirect influences that extend to the community, government, and other such networks; and (4) the *macrosystem* is the broader culture a person is embedded in (Bronfenbrenner, 1979). These contexts influence a person, through proximal processes (daily interactions), and across time (Bronfenbrenner & Morris, 2006).

This theory is appropriate for studying the aging person, family caregiver, service provider, or administrator, as they navigate their personal and family contexts, and as they use or provide age-related services, thus involving the exosystemic and macrosystemic levels when considering an individual's development within the rural context. For example, an older adult who repeatedly engages in daily processes in a kin network, within his or her rural community, may be lacking access to age-related services, and over time will be at risk of negative developmental consequences or not

experience the positive consequences associated with access (access to preventative care or nutrition service offered at senior center). Alternatively, he or she may draw in other resources (e.g. family member that is a registered dietician) that allows for successful navigation of age-related challenges in lieu of services within the rural context. At the level of the exosystem, policies and availability the local government to provide services (e.g. a nearby Area Agency on Aging office) can integrate with members of the micro- and mesosystems (e.g. service providers and family caregivers), which then extends influences back to the individual.

Rurality

The concept of *rural* includes influences on multiple levels. Most of the land in the US is designated as rural, and approximately 20% of the population lives in a rural area (Ratcliffe, Burd, Holder, & Fields, 2016), and in Utah specifically, 97% of the land and 12% of the people are rural according to census definitions (Cromartie & Bucholtz, n.d.); however, the construct of rural extends beyond a demographic and spatial designation. There are sociocultural components to rurality, including the people and patterns that make up the small communities. As identified in an ethnography of a rural town, rural culture is defined by the slow pace of life, the extremely local scale for which events are deemed important, the created sense of community, and the consistent daily routines and interactions that make up daily life (Rowles, 1988). There are also shared values that exist in rural communities (Rowles, 1988) including practicality, friendliness, and a strong sense of community (Falk & Kilpatrick, 2000; Rowles, 1988). Moreover, harnessing the sense of community as a shared value is a form of social capital that can

lead to increased social interactions, reciprocity, and helping actions that can benefit members of the community (Falk & Kilpatrick, 2000). The types of community, communication, and services are important components of rural areas, but specific ways in which various components of rural communities can be leveraged to overcome the barriers to age-related service access are not explicitly identified in literature.

Age-related Services in a Rural Context

Age-related services include primary health and hospital access, as well as home and community-based services, and informal supports that help build networks and provide care. In many studies, individuals in rural communities are found to be disadvantaged, in terms of service accessibility. Informal (unpaid, often family) caregivers in rural areas have similar needs as caregivers in urban areas, but they have greater difficulty accessing services, finding culturally-sensitive services, and finding services that take their geography into consideration (Crouch, Probst, & Bennett, 2017; Innes Cox, Smith, & Mason, 2006; Ratcliffe, Burd, Holder, & Fields, 2016; Rowles, 1988). The difficulties with accessing services include the actual distance caregivers and people with dementia must travel to utilize services, lack of transportation options, shortages of choice in services or appropriate services (Bascu et al., 2012; Craig & Manthorpe, 2000; Innes et al., 2006;

Morgan, Semchuck, Stewart, & D'arcy, 2002). Distance and transportation are very clear barriers in to services in rural areas (Bull, Krout, Rathbone-McCuan, & Shreffler, 2001; Buzza et al., 2011; Li, 2006; Strauss, MacLean, Troy, & Littenburg, 2006). Lack of knowledge, lack of technology, and small budgets are also barriers and

policy needs require local support (Bull et al., 2001; Li, 2006). It is important to note that not all service needs are necessarily disadvantaged for rural individuals: Bascu et al. (2012) identified that older adults in rural areas described an ease in creating a sense of social connectedness to receive help when needed - a clear benefit of living in a smaller community. However, people in rural communities are also at risk for adverse health conditions. A meta-analysis revealed people in rural areas are more likely to have Alzheimer's disease than their urban counterparts (OR = 1.50, 90% CI 1.33–1.69; Russ, Batty, Hearnshaw, Fenton & Starr, 2012). Lacking appropriate service options, other challenges can make it difficult to reach populations and provide services. Baernholdt. Yan, Hinton, Rose, and Mattos (2012) found that in a national sample, people in rural areas had lower quality of life, lower social functioning, and that rural areas had more people below the poverty line than people in adjacent-to-urban or urban areas. Challenges are not unique to rural areas, but the combination of multiple challenges complicate service access.

Identifying barriers and shortages is not just for descriptive purposes; these efforts can also be a catalyst for making improvements. Sanders, Saunders, and Kintzle (2009) examined barriers and experiences of rural shortages for adult day services, and found through mixed methods evaluation, that funding, systemic barriers, and community-based barriers prevented growth of these program. However, they used this information to propose four initiatives to begin to address the barriers to increasing service access. The localized level of analysis proved effective in creating actionable strategies for rural age-related service improvement (Sanders et al., 2009). There are many other local, rural programs to address service needs of older adults, as evidenced by the Rural Health

Information Hub's (2018) list of rural programs, but the localized nature of rural programs requires inquiry and input from the communities and other stakeholders to determine which programs/services are needed and could be effectively implemented.

Current Study

The current study follows a participatory research orientation to integrate the perspectives of stakeholders within the age-related services system to document how they perceive regional barriers and challenges, to identify current and future solutions and starting points for overcoming barriers, and uncover how this specific group of stakeholders perceives the future of rural age-related services, specifically perceptions about the potential of online and telehealth services. Park (2006) noted that "participatory research is an action-oriented activity in which ordinary people address common needs in their daily lives and, in the process, generate knowledge" (p. 83). This orientation was selected purposefully because I seek to synthesize input from the research participants, who are active members of their local communities and part of the age-related service network, and to document knowledge from the interviews, delivering the combined results back to the participants' communities and to other stakeholders in ways that can spur understanding, and initiate action to address the issues at hand. Following the recommendations of Bradbury-Huang (2010) by "including stakeholders' ways of knowing," "building capacity for ongoing change efforts," and engaging with significant problems (p. 99) this project has and will incorporate these concepts during the interview, analysis, and the process of delivering the written results to stakeholders and communities.

Questions to guide analysis:

1. What are the strengths of the rural/age-related service community?

2. What are the perceived barriers to rural service access?

3. What strategies and solutions do these participants have for overcoming the challenges and barriers identified in their communities?

4. What are the perceptions of the future of age-related services including the acceptability of online and telehealth services?

The goal of this project is to use targeted inquiry via interviews with stakeholders (older adults, current/former caregivers, service providers, and state administrators) to clearly document the perceptions of local assets and challenges related to age-related services specifically in Utah, which in turn can lay the groundwork to identify starting points and solutions for future collaboration across these local communities and in this state. The outcomes of this study will be summarized and delivered back to stakeholders that participated in the study as well as to the wider community of Utah State University Extension specialists, Area Agencies on Aging (via the Association of Area Agencies on Aging), and local senior centers.

Methods

Recruitment

Ten individuals were recruited through dispersion of electronic flyers, internet searches of state administration serving rural areas in the field of age-related services, and through word of mouth. Paper flyers were left at senior centers, libraries, doctors' offices, Area Agencies, community centers, and universities throughout the state by the primary

author, and Extension Faculty. These were also distributed by email individually to people who were on state listservs of age-related services. To target selection of stakeholders, we required the individual to meet any of the following inclusion criteria: being an older adult (55+ as defined under the Older Americans Act), having caregiving experience (formal or informal), or being a service provider to older adults, and living in an area of less than 50,000 people, or having experience working in such an area; all particpants needed to live in Utah to inform the local perspective and for this study. Efforts were made to first recruit by category (state administrator, service provider, caregiver, and older adult), but as discussed in more detail in the results section, individuals represented multiple stakeholder roles. The efforts included contacting people in each category, attempting targeted recruitment (caregiver groups, contacting lists of administrators), but participants revealed that they actually fit into multiple categories.

Participants

There were three male participants and seven females. Their ages ranged from 40 to 80 years old. Of the eight participants that agreed to report other depgraphic information, seven were married, one was divorced, eight were White/Caucasian, four reported annual household incomes less than $50,000, three reported annual household incomes greater than $50,000, and one preferred not to answer. Regarding education status, one had a highschool level education, three had some college, one had a professional degree, and three participants had a 4-year degree. The participants' locations stretched from northern Utah's tiny lake towns and moderate sized University towns, to large metro areas, tourism dominant areas in the east of the State, and remote

areas in the central part of the state. This wide geographic range delivered a glimpse into

the barriers, strengths, and solutions to issues in accessing age-related services for aging

populations across the state (summarized in Table 1), but especially in rural areas as all

participants interfaced with the rural component or service access in some way.

Table 1

Description of Locations of Stakeholders

City A	Urban area, county population > 1,000,000, non-specialized (multi-industry) economy, (*2*)
City B	Urban cluster, county population < 125,000, non-specialized (multi-industry) economy, (*3*)
City C	Urban cluster, county population < 50,000, non-specialized (multi-industry) economy, (*1*)
Town D	Urban cluster, county population < 10,000, recreation economy, (2)
Town E	Rural area, county population < 2,500, federal/state government economy, (*1*)
Town F	Rural area, county population < 2,500, recreation economy, (*1*)

This table describes the primary location of the stakeholders at the time of the interview;

several participants provided services across multiple regions (rural and urban) of the

state. Parenthetical number (#) indicates number of subjects from region.

Procedures

Participants completed an informed consent and brief demographics

questionnaire, interviews ranging from 35 minutes to 90 minutes; 8 of 10 interviews were

between 45 and 60 minutes long. The interviews took place between January 2018 and

April 2019. Six interviews were conducted over web-based video using Zoom software

(Yuan, 2018), two were conducted by phone, and two were conducted in-person. Efforts

were made to ensure the participants were comfortable with the mode of interview and

that the audio-only recording quality was sufficiently high-quality to enable the artificial intelligence transcription software (Otter.ai; Liang & Fu, 2019) to transcribe with minimal error.

The interview participants provided responses to the open-ended questions in Appendix 1. More follow-up questions were included in each interview, as participants revealed information, and additional questions were added to interviews based on emergent ideas or themes from previous interviews. Audio recordings of interviews were stored in an encrypted cloud-based system (Box, via Utah State University license). The interviews were transcribed using Otter.ai, a transcription program that employs voice recognition artificial intelligence to quickly transcribe interviews (Liang & Fu, 2019) and has encrypted storage. The participants were assigned pseudonyms in any copies of transcripts to preserve anonymity, and pseudonyms and other descriptors are used throughout the manuscript to preclude identification of subjects

This project was approved through Utah State University's Institutional Review Board (IRB) for the protection of human subjects as a research project and separately as a dissertation.

Analysis

Two researchers participated in the coding process – this served the purpose of ensuring consistency in the code application, discussing context and meaning of themes, and maintaining the integrity of the codes truer to the participants' meaning. I was the primary coder and my major advisor acted as a secondary coder. We alternated coding interviews as first-coder, then reviewed the other's codes, added codes, and made memos

as we coded. We met in-person intermittently to discuss the first cycle coding process, and we completed the transitional and second cycle coding together. The specific steps in our analysis plan that were specified a priori are outlined below.

The first step in the analysis of this data was for both members of the qualitative research team to read the transcripts over several times to become familiar with the data, while making researcher memos, or notes about the data to return to in later discussions. Secondly, Dedoose (SocioCultural Research Consultants, 2018) coding software was used, which is a low-cost, user friendly, encrypted program which allows for several members of a research team to access the data, maintain an organized data-base of codes, questions, and notes.

The first cycle coding methods applied to the data used two styles: in-vivo and process coding. In-vivo coding, which uses the participants' own words, or segments of the transcripts as codes to break ideas or segments of the transcripts up, while staying true to the original meaning of the participant (Strauss & Corbin, 1998) was used for coding descriptive narrative. Process coding (Strauss & Corbin, 1998) where actions are coded as gerunds, or words ending in –ing was used as a first cycle method for coding actions, solutions, or other such segments of data. These methods were appropriate for this analysis as I was identifying specific actions (process codes) and ways of overcoming the identified barriers to rural age-related services (in vivo). Operational diagrams of the first-cycle codes were used as a transitional method of coding (Saldaña, 2016), meaning we roughly sketched diagrams or models of how these codes could fit together, although this process did not lead to a diagram that fit the codes, it instead produced tables to organize the hierarchy of axial codes, and subthemes. The second cycle coding, axial

coding, was used to refine the initial codes, reducing them into similar and related categories (Glaser, 1978) and to clarify the characteristics of the categories, or the conditions in which they occurred and the consequences or outcomes (Charmaz, 2014; Saldaña, 2016). These axial codes became the major headings in the assets and challenges table and in the solutions table.

We completed the first cycle coding independently, alternating as "first coder" for the interviews, then reviewing and recoding each other's interview. We met to discuss coding process after each coding session was complete, roughly groups of three interviews coded in a span of about two weeks, to address minor code conflicts or discuss code application or meaning. These meaning consisted of reviewing transcripts for context. An excerpt of one interview for which I was first-coder is included in Appendix 3. For the transitional coding and second cycle coding, we met for a full day to discuss all the interviews and codes, and sketch the diagrams, determining that hierarchal tables with axial codes and subthemes were the best represesntation of the data. We identified axes by discussing themes, major and minor, through each interview and revering to the in-vivo codes and broader excerpts for context. Axial codes were codes that multiple recurring themes fit under, and themes were recurring in multiple time across multiple interviews, but fit under a broader axial code. All codes were sorted into axial categories, and those that did not fit, were discussed and determined to not be relevant to the guiding questions, were discussed and categorized under new subthemes.

Conflicting codes or disagreement about meanings between researchers was resolved by having definitions of each code in Dedoose to increase consistency of codes, using in-vivo (actual-words of participants) coding and process-coding, which are

methods that simplify the meaning of the code, and by referral to excerpts in discussion to clarify meaning in context. Disagreemnents, or lack of clarity, happened with less than 5% of all codes. When this happened, I and the second coder, referred back the transcript and discussed the code in contxt of the rest of the participant's words. This facilitated clearer meaning and moved us forward in agreement. Throughout this manuscript rich, thick description of the methodology and results is used to establish credibility (Morrow, 2005).

Quotes were transcribed in Otter.ai and maintained natural speech, meaning all the pauses, interruptions, and corrections were left in the transcription. However, given that this dissertation is only sharing content and knowledge from the interviews and not seeking to preserve speech patterns or unique cultural elements of speech, the quotes were edited to remove verbal clutter to improve the readability (Oliver, Serovich, & Mason, 2005). The following phrases were frequently removed: *you know, so, um,* and *I mean.* These removals did not change the meaning of the participants' ideas.

The results are written in narrative, answering the guiding questions. After completion of this dissertation, a report will be disseminated to Area Agency on Aging (AAA) offices and Utah State University Extension faculty, as well as interested state administrators and/or service providers via email or mailing lists, which is a common way of communicating at the administrative level in this community. For disseminating to rural older adults, we will ask AAA offices to share the documents with their senior centers via newsletters, and we will have identified local newspapers and bulletins to reach rural older adults in order to disseminate it in in a way that is sensitive to their ways of knowing (Bradbury-Huang, 2010). These steps will be completed after the conclusion

of the study and presentation of the dissertation's results.

Reflexivity, Credibility, and Trustworthiness

As a first-generation doctoral candidate from a rural background I approach this study acknowledging that I have developed my personal and professional thoughts, opinions, feelings, and ways of knowing from two worlds - the academic world and the rural world that I grew up in; both have noted sets of strengths and several challenges. Bridging this gap, I have personal experience with barriers experienced by rural individuals in accessing services, the appreciation of rural communities and social support that exists in these networks, experience providing care to older adults in rural and urban settings and navigating such service systems, but also I have gained experience in the academic world of grant writing, research, program management, and professional networks. In this study I recruited among specific groups to triangulate data across people with various roles in their communities (caregivers, administrators, and service providers) to demonstrate credibility of the responses (Anney, 2014). However, as I discovered in the interviews and discussed in-depth in the results below, individuals have multiple roles and the lines are sometimes blurred, as are the lines between my experiences as a rural, first-generation student, former caregiver, and a researcher. What is important is the ability to first acknowledge and maintain an awareness of these multiple roles and subjectivities, and understand how they inform behavior. Throughout the study I acknowledge these roles, questioned my own orientation to research, and continue to do so. Rigor in methodology remains important to me, so that work I produce is accurate within the specified framework and that biases do not seep in unaccounted for. In

conducting the interviews, I briefly introduced myself as a person with a rural background, having caregiving experience, and now as a researcher, to establish rapport and credibility with the participants, but also to set boundaries for transferability in the study (Morrow, 2005). Throughout the interview I withheld my own responses, continuing to the next question, to avoid inserting myself and my own opinions into the interview, and informed the participants that this would be the rhythm of the interview and I asked them to provide as much response and description to in their responses as they could to increase the credibility of the data (Morrow, 2005).

In coding, both myself and the second coder brought our expertise in this context to the table, so we could understand what the participants were referring to, through acronyms, vague mentions, or brief descriptions. However, I had the rural background and the second coder served as an outside perspective on this contextual factor. The second coder in this study is a research associate professor with an emphasis in Adult Development and Aging. Her background is rich in age-related content and services, as she has been involved in the higher education and service system in Utah for 10 years. However, she did not come from a rural background, and instead lends a suburban/urban perspective from the east coast. Through the data analysis, I frequently utilized the in-vivo coding method to avoid putting my pre-conceived or "pet" ideas over the words and ideas of the participants. Out of the many tools that I used, taking time between conducting the interviews and coding proved most beneficial. By doing so, I could shelve my initial impressions of the conversation after making memos during and immediately after the interview, and code the data with a fresh perspective some weeks later. I tracked this process and discussed it through peer debriefing with the secondary coder to

establish trustworthiness (Morrow, 2005). For example, immediately after one interview I thought that the content was not extremely detailed given the shorter interview time, but I made a memo about themes related to the guiding questions and my impressions, waited two weeks to review the transcript, then completed the first cycle coding several weeks later. After discussing the coding with the secondary coder, this interview was determined to be thematically rich, despite my initial impressions based on the shorter duration and tone of the interview.

Results and Discussion

Emergent themes from the data are categorized into one theme about participant characteristics, and remaining themes related to the guiding questions. The participant characteristics are described first, then the content relating to the guiding questions is discussed in narrative. Regarding the presentation of these themes, participants are not described by their specific job title, location, or other unique information to prevent the identification of the individuals and protect their privacy and the confidentiality. This is particularly important because administrators or service providers in prominent or very small communities may be vulnerable to identification. However, location and place are important in understanding participant context. Therefore, a summary of participants' locations is included in Table 1. In the materials that are delivered back to communities and stakeholders results, suggestions, and solutions will be delivered in aggregate format to ensure the protection of privacy. When quotes are provided in this dissertation, they will be identified by a brief history of the person in narrative or parenthetically (*Male, former caregiver, volunteer, state administrator*) or if the quote is related to the context,

rather than the individual in context, it will be listed as (*City/Town X*) and this location

will correspond to the region descriptions in Table 1. We, the research team, made the

decision on quote attribution based on the content of the excerpt whether the quote was

related to person factors (roles) or context factors, in accordance with the guiding theory

(Bronfenbrenner & Morris, 2006). Participant descriptions and locations are intentionally

not linked anywhere in this document.

Participants: Multiple Roles

All 10 participants were involved in the system of age-related services in two or

more ways, including being older themselves, being a current or former caregiver of a

family member or other older adult, volunteering their time in some capacity in the field

of aging, working directly in age-related services (nursing, consultation, facility

management), or working at the administrative level with local and state governments.

This was reinforced as a theme after coding their responses. It became apparent that the

concept of multiple roles was a theme, albeit about participants and not research

questions, per se, because it became obvious that people have multiple intersections or

points of entry for becoming more involved as stakeholder in the age-related service

system, getting deeper into the trenches or having multiple points of connection. This

participant-characteristic theme of multiple roles ties into to the other themes that map

onto the research questions.

Some of the identified role transitions of participants (or gaining multiple roles

beyond their primary stakeholder role) were the onset of caregiving, and the occurrence

of a precipitating event that lead to a person needing care, the transition from caregiving

to wanting to help others (volunteering), working in the industry (nursing, community education), getting more involved by owning an age-related services business, transitions from work to retirement, from retirement to community involvement (administration, advising). An example of this type of transition is one participant that was employed in a creative industry, retired, was a caregiver, and is now volunteering while building community partnerships among existing age-related services so that others may have easier.

> I'm fortunate enough to just volunteer, whatever I'm doing right now. I'm pretty lucky and you think that your isolated experiences make you the best, it's hard to let somebody else come in and deal with things. Then there's the financial aspect, so, if you don't have really good insurance, most people can't afford private pay, so it's left to you doing it, then it just compounds and compounds - what you do? I just want to make sure that other people don't get as burned out as I got, and are prepared for what's coming forward.

Another individual reported her multiple roles as a person with degrees in a biological science, former distance caregiver, through her transition in retirement and involvement in a local senior center, pursuit of online education, which led to interface with local governments and involvement with local age-related services:

> I've gotten involved with some of the activities that they do at the senior center, not a lot, but a few. They're always amenable to new things to do there. So more than likely, it [the newspaper mentioned classes at the senior center]. I was interested and I started going there and then met people who are either on the mayor's board or just coming off, or they knew about it, and somehow my name

got floated and approved by the mayor. So that was fun.

The decision to get more involved, or to develop multiple roles, either happens actively through seeking volunteer opportunities and becoming more integrated in that way, or by falling into the system by utilizing everyday resources. People that are stakeholders in the age-related services system have variation in age, gender, profession, geography, and as highlighted in these examples, their educational backgrounds differ as well. The creative strengths and benefits of people's multiple roles and entrance point of age-related services and educating individuals earlier in the lifespan could be a valuable way to engage more people as stakeholders.

In addition to the multiple roles of individuals, the agencies and services served multiple roles. As these facilities often were the only agency or provider in an area, administrators took on more roles than were defined by their job, which may have helped the community, but also created time and role strain among providers.

>A family member, or somebody in the community will contact me and say… it seems like this person might need help. So, then I find a way to get in touch with family members. And that's usually been the best mode of communication, is through family members. And just explaining what we're able to provide. We're a level one assisted living. I feel like, and it's probably just because the position I'm in [*being only provider in community*], but I feel like I'm kind of the person that everybody is asking about, what do we do. I also let them know [about the] Area Agency on Agency for [our] multi-county region. I mean, you look on their website for age-related services, and there are just a ton of different services that are available. I pass that information along to them. (*Male, nurse, business owner,*

service provider, community partner)

Multiple roles or expectations from a service can indicate that other needed services are lacking or that people are lacking information. Very engaged individuals provide referrals and information via many different modes of communication, and they become more engage as stakeholders as they participate in more levels of the age-related service system.

Themes Related to Rural Challenges and Assets

The rural component of the interviews was asked about as a stand-alone topic, for example "Do you consider the place you live in to be rural? What is your experience living or working in a rural area?" Rural influence was also asked about relation to other topics as a follow up, for example, following a question about community engagement I asked "How, if at all, did that differ in the rural and more urban places that you lived?" and in some cases there were similarities across the rural and urban spectrum according to this sample of stakeholders. These differences or similarities will be noted in the narrative when relevant.

Table 2 below summarizes the general themes that arose in each category of challenges. In the narrative following the table, each theme will be discussed with the contextual assets woven throughout (how the context impedes or facilitates ease of access), with supporting excerpts in the participants own words included to show the specific local perceptions of the identified assets and challenges in these communities and in the age-related service system, by these stakeholders.

Table 2

Assets and Challenges Identified by Utah Stakeholders

Rural Assets
Values that are strong in community self-reliance, independence, connection to place
Creative solutions when faced with challenges
Strong sense of **community and social support**

Local Service Insufficiencies
Lacking specific services including: adult day centers, overnight care, home health, medical specialists, preventative options, mental health care
Lacking infrastructure: broadband connection and technology for telehealth, venues for public forums, staff and workforce
Transportation options including non-emergency medical transport, public transportation, inadequate routes for alternate transportation (bike paths, walking paths off highway), and transportation that was accessible for an aging population
Lacking information, **communication, and knowledge** about services and what to do when facing an age-related incident (of self or family)

Location and Distance
Distance discussed as the time it takes to get to destination and the costs (financial and physical) of repeated travel on older adults and caregivers
Repeated need to **travel** over an hour for services (medical appointments)
Rural areas feel **isolated** from the capital in the flow of information, money, and services

Regional Transition
Regional transitions (**retirement, recreation, migration**) affecting the population, economy, and services in the area

Structural and Systemic
Stigma about being older that inhibits people from using age-related services.
Funding for programs is not allocated based on need and is unstable and goes away just when a program is becoming known and effective
Personal finances of individuals were "always an issue" with themes ranging from income inequality in local communities, to not knowing how to manage finances, not being able to pay for costs of care, families assisting in costs of care, being concerned about outliving one's savings, and planning for long term care and end of life.
The **coverage and qualifications** of different programs (Medicaid, Medicare) acts as a barrier to accessing and maintaining service presence in certain areas
Concerns about **quality of care and end of life** provided by private facilities medical professionals

Notes. Broader themes are identified by italics. Subthemes are identified by bold font.

Rural assets. Rural communities are diverse and there are positive and negative aspects of all communities irrespective of their rural or urban designation. In this sample of stakeholders, there was an overall expression of positivity regarding "rurality" from those that lived in rural areas, as many made the choice to move to such areas, or had lived in their communities a long time. From those that worked in such communities, there were also reported assets. Participants noted that there were many strengths of their rural communities including social support, a willingness to help, and people that were able to come up with creative solutions in the absence of a needed service.

Values. The participants in rural areas had shared values, indicating independence and self-reliance, and there was also a strong connection to place. These values were related to people wanting to move-to or remain in these communities in-spite of challenges, and they also helped some of the people cope or adapt to challenges, as reported in these excerpts about rural values. As one participant mentioned, "Well you kind of feel like in our small community, we have the downtown, everybody knows my mom so they'll bring her back if she walks out." (*Female, former and current caregiver, provides services in aging community*). Another reported, "Well, I still live here because I love my rural life." (*Female, retired from creative industry, volunteer, community partner*).

Creative solutions. The participants noted that the rural values also played into creative solutions, because of the desire of people in these areas to remain independent or be self-reliant.

The rural areas tend to have to be more self-reliant. Their clients are used to being self-reliant and not having access to services. So, I see a lot more creative survival skills going on with caregivers, not always functional, but they definitely have to think out of the box more. (*Female, former caregiver, state administrator*)

These excerpts demonstrate positive values associated with rural life: self-reliance, the general sense community, and appreciation for rural culture. Participants had passion for the places that they lived in.

***Community and social support*.** Another asset of rural communities is that the smaller populations allow for a strong sense of community, cultivating more community engagement. A participant in one of the smallest communities repeatedly mentioned this, comparing it to larger cities he had lived in in other states. He expressed real appreciation for the social support that was abundant in his small community.

I mean, they're not strangers, everybody knows everybody. Nobody's going to be left out in the cold, I don't think. Everybody takes care of everybody. Just really beautiful. I guess it's only 500 year-round people. It's all very feasible. Everybody does know what is happening. In areas I've lived in before, there'll be people that would be forgotten, unless it's their next-door neighbor of course. When you're in a neighborhood, you might know the old lady that lives down the street all by herself. And you might want to check and see how she's doing. And people know if there's a flood or something like that, they're going to go and check on her if the power's out. (*Town F*)

The individuals in all interviews reported that there were several strengths and benefits of their communities that supplemented the lack of specific services and other challenges,

although they were clear to identify that their communities still had needs, as is described below.

Local Service Insufficiencies

There were multiple things in the local context that were lacking including services, infrastructure, transportation, and communication and knowledge. The various combinations of these things not having presence in a community lead to challenges in having a satisfactory or appropriate level of access to age-related service, as reported by participants.

Lacking Specific Services. Within the challenge of lack of services, specific services for informal caregivers were identified including the need for adult day centers, respite care, 24-hour (overnight) care, variety of choice in home health providers, and support for family caregivers at a distance, either ones that travel to and from the individual or arrange care remotely.

> We're lacking in a lot of home health because unless you're on a Medicaid waiver, you don't seem to be getting it. Unless it's private pay and then it's just really hit and miss in who you actually want in your house. To do private pay, you know everybody, their history, and some of them I don't want in my house. (*Female, former and current caregiver, provides services in aging community*)
>
> [*Speaking about adult day center*] … And there was no facility in this entire valley where a person in the so-called sandwich generation had the opportunity to have their adult parent cared for. Well, they went off to work and while they took care of their own children, their family, and it was a screamin' need."(*Female, current*

caregiver, former community service provider)

This lack of services in the exosystem was negative for some of the participants – they were unable to get the services they needed in their communities, and some caregivers reported stress and burnout, due to lack of needed services.

In addition to the specific services for caregivers, other services like medical specialists were not present in many areas. The quote below demonstrates how the lack of providers intersects with other challenges like the family being at a distance, lack of transportation, and the financial and physical cost and distance of traveling.

So, we do take our residents to physicians' offices, and oftentimes because they require specialized services like cardiology, nephrology, or things like that, those aren't found in our area. So, you're either heading to [redacted City name 1] or to [redacted City name 2] - that's a huge burden on us. So, it's very difficult for the resident. First, usually, when we take them to [City 1], which is only 45 minutes away, by the time you get there, they have the appointment and get back they're just exhausted. So, it wears them out, plus, whoever takes them, which is usually me, I'm exhausted. (*Male, nurse, business owner, service provider, community partner*)

The participants noted that because there were not enough services nearby, this required travel over long distances, but they were lacking means of transportation to get to these services.

Lacking infrastructure. As discussed, there are existing challenges in rural areas that were also identified by these participants, demonstrating that there are similar challenges in the infrastructure of rural communities to implementing some solutions,

like telehealth, as demonstrated by these participants.

> I think [*telehealth*] has got great potential for support groups in the future in rural
>
> areas. The barrier to it is if you're extremely rural, and you don't have an internet
>
> connection, that's a challenge. (*Female, former and current caregiver, provides*
>
> *services in aging community)*
>
> [*on staffing shortages in home health*] Home health might be a lack of competent
>
> staffing. Being a CNS, or a CNA, CNS is the home health, I think a lack of
>
> competent people trained people, and people don't want to work for less money
>
> than you could make waiting tables in the summer. (*Town D)*

Transportation. Transportation options were one of the most frequently identified challenges among rural participants, due to the lack of public transport, unsafe alternative routes, amount of money it costs to drive and stay elsewhere, and the inaccessibility of transportation for older people, people with functional impairments, and people with dementia. Non-emergency medical transport and improved trails were some of the areas suggested for improvement as these were reported as insufficient, but finding sustainable ways to pay for transportation was identified as an added challenge. As one participant noted:

> Well, if there was even an informal, or entrepreneurial private sector that would
>
> feed into the transportation system. There are a lot of areas [outside this region]
>
> that people don't even have to have a car, because they can just call Uber or they
>
> can call Lyft. Well guess what's here? Nothing. There were a couple of times
>
> from an outpatient procedure, after colonoscopy, I just checked myself out and
>
> walked home, which you know, it's about a five-mile walk. The hospital didn't

bother to ask where I live. They said, "Well, we don't like you to do that." I

thought there was no way to get home. So, I walked home and then the next

morning I walked back and got the car. It's good exercise, but maybe not the best

thing to do right after you've had that sort of a procedure. Or if you've been under

an anesthetic, maybe walking around isn't the best thing to do. (*Female, retired*

from science industry, community partner)

The cost involved in that transportation is kind of is prohibitive, but we have to do

it. If there were some way to have those and to have that type of service available

[*doctors*] over telehealth or whatever, I think that would be phenomenal for a

community like ours. (*Male, nurse, business owner, service provider, community*

partner)

Communication and knowledge. Another challenge in getting people into

services is that people lack the right information, and they do not know where to look for

appropriate information or services. Participants also noted that this was a function of the

aging system all over, but that some rural individuals had further restricted options for

information and services. When a crisis happens, they noted that it is too late for

individuals and families to take advantage of many services that would have been useful

in minimizing the negative outcomes or helping families adjust. The mesosystemic

processes and interactions (daily interactions) don't include any of the exosystemic

services, and this lack of integration leaves them in the lurch when they need to reach

outside that network. In an older person's health or care crisis, families and individuals

scramble to find the right resources, often starting with a doctor, emergency room, or care

facility, but providers aren't always aware of all the programs they can refer people to,

and there is confusion about what programs the person is qualified for.

> I don't think people are prepared for when parents need a transition. The biggest
> area that is lacking is the ability to know what to do, what your parents need,
> when a change [occurs] or when something needs to happen with Mom or Dad,
> what are we going to do? And then everybody goes into panic mode. Nobody
> knows what to do, nobody knows what programs are available, who to contact, so
> they usually contact me and I say, well, you can contact XYZ, I walk them
> through the spiel of what we're able to provide. (*Male, nurse, business owner,*
> *service provider, community partner*)

> There is lack of communication, lack of knowledge of what programs are where,
> and who should know about them, and if these are done or not on purpose with
> outreach and communication, or if it's just omission. Because you don't know
> where to go and advertise your program, right? I think there needs to be better
> communication between federal and state programs, especially, state and county
> programs such as AAAs that are on the ground in the trenches, [with] people who
> could provide so much linkage. (*Female, community program administrator,*
> *Veteran's Administration expert*)

> [*on how people find out about services*] I'm not really sure, I think I think they're
> completely unaware of how they might qualify for formal services, and that's
> where I serve a useful purpose. I can say, you totally qualify. You're homebound,
> you have a skilled need, and so on. So, I think they're just uninformed. And we
> have to kind of figure that out for them. (*Female, nurse, business owner,*
> *consultant*)

Location and Distance

Distance. Not only did participants discuss the long distances between services that they were required to travel, but the interesting emergent subtheme relating to distance that illustrates how this factor as a challenge, is that nearly every mention of distance to services was actually in terms of the time it took to travel to the destination. The best example of this is when I asked one participant how frequently she needed to travel for an appointment with her mother to a specialist and we had the following exchange, [*Participant discussing the frequency of visit*] "You also want to know the distance, too, probably?" *Me: "Yeah." Participant:* "Oh, my goodness, its four and a half hours from here to Location." (*Town D*). The participant was aware, automatically, of the time it took her to get to the location, but not necessarily the miles, even when she offered to provide me with distance information. All other participants also reported distance as time as a descriptor, at least once in their interview. The noted exception to reporting distance as time was when they were reporting about long-distance caregivers, for example "they live 1,500 miles away." Thus, the distance-as-time phenomenon likely applies to locations within driving distance or within certain boundaries, dependent on type of travel, or depending on the frequency and duration of the travel.

Traveling. Participants frequently reported the need to travel, as previously discussed with the lack of services and specialists, but they also discussed the physical and emotional energy it required to travel such distances, especially with frail older adults or people with dementia. One participant reported, "We probably made three or four trips to, no we had to do it more than that. Probably about five or six trips to City A to do the

diagnosis, the testing, and stuff like that." [*referring to 5 hour drive to City A for mother with dementia*] (*Female, former and current caregiver, provides services in aging community*). Another reported the following:

> Depending on what the need was, with my daughter who had [serious illness], for quite a number of times we were going every day. Sometimes we were in [redacted City]. A lot of times, we simply could not access support services because they were far away and if you're caring for someone to take them that far isn't fair to the person as well as the caregiver. Yeah, you'll have great time when you get there. But it's going to take us a week to prepare for and recover from that. With my husband who had dementia, again the neuroscience research center is awesome, but to take a person with dementia down there, it's a joke. (*Female, retired from creative industry, volunteer, community partner*)

The frequency of trips and travel was exhausting, took up resources, and they later discussed alternative solutions that did not require travel would benefit their communities.

Dispersion and isolation. In addition to the distance and travel, participants explicitly noted feelings of isolation within and between their communities, feeling forgotten in funding and service decisions, and they surmised that individuals in the capital city or at the federal level assumed it was easier to plan events and travel to the more populated areas. This, as indicated below, was challenging and frustrating for participants, not feeling that their exosystem and macrosystemic contexts were integrated. As one participant mentioned, "They [*the state providers*] kind of forget we're down here." (*Town D*). Another, not living in a rural area, but having experience with the

context, said, "Well, I just think there's a whole wheelbarrow of reasons. But I think because they are rural, it's kind of easy to say 'out of sight, out of mind.'" (*City A*). Other participants from a different location reported the following.

> Sometimes things are forgotten up here, when the event might be happening in the capital, they think, "Oh, that's too far to go and too far for us to bring this service." So, over the years, it has felt more rural, on occasion, you know, to get access to really good information and classes and things like that. State meetings, like hospice association meetings always take place down there [*at the capital*]. Over the years too, we were forced to go down there for anything too major we had to go south to get any out of the ordinary services. (*City B*)

> I think it's probably inherent in any state, if you take what that capital is doing, the influx of money that is distributed within the, circumference of the capital. Unfortunately, Utah's not big enough to have other cities have equal size to capitals. So, if you think of the state of California and you think of all of those huge cities, or you take state of New York, or you take the other bigger cities, they have to distribute things more because there's a higher population ratio, and we just don't have it here. [*Some areas*] are growing pretty fast, but it's still not equitable in distributing all of that information." (*City B*)

Regional Transitions

Retirement, recreation, and migration. An emergent subtheme in this study related to the exosystem and macrosystemic influence of the area in which the participants lived, the demographic trends, and how this affected their local economy,

services, and individual perceptions. The increase in the number of retirees, seasonal or part-time residents, tourists, and shifts in working professional was described sometimes as a challenge to services for rural residents, as several individuals discussed below.

> Some of your seniors coming in here, they don't have cars, they want public transportation and our town doesn't have public transportation. So I don't know if it's a lack of….well, I think we just focus on tourists, I'll be honest. I think we're so focused on tourists that we're not focused on residents. Whether, they're old residents or young residents, which might be a cultural thing for our town. (*Town D*)

Another resdent of the same region, reported the following, [*discussing the effects of recreation on staffing*] "But I think that's a local thing. I don't think that's all over the state. I think that's just because when the tourists hit, you can make quite a bit of money waiting tables." (*Town D*) The other resident of the same region, referred to the regional impact of recreation and tourism, beyond the employment issues, mentioning the cost of living, and demands on infrastructure.

> It's my understanding our hospital is a good bit more expensive than [*ones in town ~12 miles away*]. All those things have an impact. Especially on seniors. From what I see in a rural area, [they] don't necessarily have the resources. If this was not a tourist area - we have a lot of seniors here because they have second homes here, obviously they are quite wealthy, but I would think that would be more similar to rural areas without a tourist component - that people initially don't have necessarily large resources. During tourist season, even the fast food joints, the prices go up from the winter. The restaurants and other eating establishments are

already kind of pricey, a lot of them raise the prices during the tourist season. So

those would be issues. And of course, even with them medical facilities, there are

more people using those facilities, especially during the tourist season and locals

that need access might be more difficult or take longer to access the facility and

the services. (*Town D*)

Influxes of tourists were described in-terms of the often negative reprucussions on the

locals. In another, smaller recreation and retirement community, this was not the same,

and there was an attitude of camaraderie, as one participant reported, "So, although many

of our friends here are not originally from here, they are people who also came here to get

away from it all. They call them 'move-ins.'" (*Town F*) These excerpts demonstrate

spontaneous (un-elicited via a specific prompt) responses from participants on the

influence that their local context, and the influence of time, whether through seasonal or

longer-term transitions in these areas, has on their access to services. This theme -

references to tourism, changes driven by recreation, migration of retirees into

communities, and how this impacts local, rural communities - was not something I

intended to explore, although it emerged as a facet of the local and rural context. The two

participants from the recreation-dominant Town D were very forthcoming in their

feelings on tourism, and this theme permeated their interviews, from the changes in

retirement, effects on current residents' access to services, and cost of living for residents

that lack the higher income of those that move to such areas. Other participants reference

retirement, seasonal migration, as having similar influences. Migration, retirement, and

regional transitions are themes that should be explored further with deeper work

specifically focused on this emergent phenomenon.

Structural and Systemic

   Stigma. Another surprising challenge in service access identified by the stakeholders was stigma about aging by older adults themselves, particularly in using senior centers, which are the most widely available services in very rural areas. One participant reported, "It's funny how people - when they get older - they don't want to go where are the other old people are, [and] still think of themselves as young or whatever." (*Male, animal science and horticulture specialist, community service provider*). Another shared insight from past experience at the senior center.

> I noticed that was the hardest thing for you'd see, children or a brother and a sister or whatever, come and bring mom to the senior center and boy, she didn't want to be there. Once they could get her to cross the threshold and she saw people that she knew. It was a hard thing for seniors to admit that they can't do it anymore themselves [and] that they need the help. So, I guess that comes through education or just helping people know there's no shame in being old, it's okay to be old, it's okay to need help, it's okay to use your cane, it's okay to use the walker. (*Female, current caregiver, former community service provider*)

This is an example of confirmation bias. There were many instances of rural older adults not wanting to go to the senior centers because of the stigma associated with what the centers mean (that they were "old"). This dissuaded them from engaging in services that they needed and contributed to many experiencing social isolation.

   Funding. The major challenge to age-related service access and implementation of solutions was financial stress and funding gaps. When discussing programs, service

providers often discussed that they could not get funding or didn't know where to start, or

that funding dried up or disappeared before the program was established. They reported

that "good programs" were not able to maintain their presence because there was no

sustainable funding mechanism, and/or that the funding environment was unstable. This

issue is not specific to rurality as the macrosystemic influence of the government and

culture of programmatic funding was part of the identified set of challenges, although

some challenges in funding were exacerbated in rural areas because they were

"forgotten" in funding allocation decisions.

> I think it's just the conundrum. We often see that we have services, we want to get
>
> these services out, and we want to get these programs out. But it just seems to be
>
> a merry-go-round, where we can get something built because we've been getting
>
> funding, then we get it built, we get it going, and then all the sudden - move,
>
> time's up, you're not going anymore with our money. (*Female, community*
>
> *program administrator, Veteran's Administration expert*)

The time limited nature of the funding cycles made it difficult to get programs sustained,

and this was a challenge in providing continuous services.

Financial challenges. Further, individuals' personal finances prevented access to

many services because many people were above the threshold for Medicaid, so they did

not qualify for those providers, but they were not able to afford private pay services.

The most frequent recurring barrier was paying for long-term care.

> My very first client - I went to see them - it was he and his wife. I said, 'What is
>
> your biggest concern about your health and your situation?' And he said, 'I am
>
> afraid we're going to outlive our money.' That's a really realistic problem - you

know, 'Our house is paid for we're retired, on a fixed income, we've got some

investments, but we end up needing assisted living or nursing home, we're going

to live longer than our money can provide for us.' (*Female, nurse, business*

owner, consultant)

The general theme, as reported by one participant was, "Finances are always an issue."

(*Female, retired from creative industry, volunteer, community partner*), whether it was

personal finances or programmatic funding.

The financial and funding problems were not limited to rural areas; they were a

problem socially at the level of the macrosystem and the exosystem. Funding issues were

made more challenging by other barriers in rural communities, such as not having as

many options to choose from for services, and the funding stream reaching these

communities last, and in smaller amounts that couldn't maintain sufficient services in the

communities.

Coverage and qualifications. The subtheme within structural barriers that

emerged, also was not just limited to rural areas but that was a related to person factors,

and forces in the macrosystem, and this had to do with people "falling through the

cracks" or not being "pigeonholed" into the program that met their needs, either because

the program did not offer coverage for their specific needs, or they did not meet the

qualifications of the program that was available in their area.

Because you're actually paying for Medicare and it doesn't pay home health and I

don't know if they can [*cover*] occupational therapist or not…we finally got

occupational therapists, but they're all Medicaid, they don't go into private

homes." (*Town D*)

"I've been working in hospice and home health for 23 years…People don't qualify

for home health, and they don't qualify for hospice, but they have a lot of needs.

(*Female, nurse, business owner, consultant*)

The hard part is going to be picking up all the people who don't get pigeonholed

into a particular group. I think that's a challenge that needs to be least recognized

if not addressed, or try to address it in several different ways. (*Female, retired*

from science industry, community partner)

When people fell through the cracks, were in transition, or on the financial cusp of being

able to qualify, there was little support for them in coverage, direction (options and

guidance), or services.

Quality of care and end of life. Another emergent theme brought up repeatedly

as a concern in age-related services, that was present in personal processes and across all

levels of context, but made more challenging by the barriers in rural communities at the

level of the exosystem, was accessing quality care and end of life care. Participants felt

that there was not a medical system designed to provide high-quality end-of-life care

because of the corporatization and privatization in the industry, the fact that they felt that

doctors didn't engage with older adults, and there was social hesitancy to engage in

discussion around end of life.

Our country, whether its drug companies or the assisted livings…they're all about

making a buck. They're not about taking care of people. The enticements are out

there and they don't follow through and they're taking advantage of that

population. I truly resent that. They're not about just the feeling and the caring of

seniors. It's not just oh, 'We love seniors.' It's the idea of 'We kind of like seniors,

but we think we can make some really good money doing this.' (*Female, nurse, business owner, consultant*)

End of life was brought up frequently, in terms of the stigma and societal fear of discussing it openly, hospice being an exceptional service that should be advertised and taken advantage of earlier, and systemic issues in end of life.

[*Discussing case of unnecessary surgery in older adult*] That was a lot of years ago, but it's like, oh my goodness. So offensive to me. It cost us a huge amount of money. What kind of end of life did he have? So, I think we need to get better at talking about our choices and talking about our end of life care. I've been saying that for 23 years, because people don't want to talk about that. (*Female, nurse, business owner, consultant*)

[*Speaking about hospice*] *...* Now I am very, very well-aware of the service we've been able to access and how it's benefited me in so many ways, as well as Bill. I have two sets of eyes that can watch, and look and see and make sure that everything's moving along. And that the purpose is to help Bill get the very best care and, and have the best the best available as he finishes out his journey. (*Female, current caregiver, former community service provider*)

This topic was discussed in relation to use of services, stigma, finances, and virtually every other challenge in rural areas. One case that counters this idea, was presented in the smallest community, and it demonstrated that the rural assets of self-sufficiency and close communities could also make it easier to keep track of the status and needs of the community members.

I know for instance, my wife at the [medical reception] counter took care of

somebody who came in who said that this lady I just brought in here, she's on

hospice care. They seem to know when they need that around here. (*Town F*)

Overall, the stakeholders in this study identified barriers specific to their communities,

some reflecting what exists in other communities, some region specific, and these lay the

ground work to community driven starting points for solutions.

Solutions

Some solutions have been alluded to throughout the narrative, but many solutions

were pieces or small actions that, when aggregated, could lead to action and

improvements to age-related service access overall. While some solutions were about the

aging-service system itself, others were location specific. If the solution was location

specific, the quote is provided with the parenthetical location (*City, X*). If no specific city

is given, this solution or starting point was not tied to location, then the participant

characteristics are provided. Solutions are summarized in Table 3.

Table 3

Solutions and Starting Points to Improve Access to Age-related Services

Communication, Marketing, and Engagement
Selecting appropriate and accessible **means of communication**, accessible venues
Creating a **centralized online resource** for information and questions
Hosting **public forums** to share information and for providers to network
Using **religious and other informal networks** to communicate and share information
Being **persistent and vocal**
Capitalizing on shared experiences to develop network and build community engagement
Training and Education

Training and **educating the public** with new and existing materials to increase knowledge of aging and services to reduce stigma about aging and service use
Training emergency personnel to respond to complex cases (dementia and mental health)
Educating and **training medical providers** about appropriate programs, aging, and person-centered care

Programs and Policies

Incentivizing **informal support and caregiving**

Implementing transportation programs

Future of Age-related Services

Telehealth

Notes: Broader themes are identified by italics. Subthemes are identified by bold font.

Communication, Marketing, and Engagement

Means of communication. To implement and make a program well-known, appropriate means of communication and marketing were solutions suggested by the stakeholders. Using local ways of knowing and communicating included ideas such as: word of mouth, paintball scatter [multiple methods], newspapers, bulletins, and call lists. Participants also suggested talking to groups that have had recent successful events to identify and borrow strategies for recruitment and communication in the given local area. Building relationships in the local communities and not further isolating groups or communities were also suggested ways to improve program reach, particularly for research and other state programs. Another specific strategy for building relationships with a wider audience included the following suggestion.

[*On recruitment*] "It'd have to be something more than an email. Especially, if it's

for social services, senior social services, it would have to be more of a flyer,

somebody being able to set up a little table outside of the grocery store with a

flyer that you hand out to people, saying you're going to be doing this." (*City C*)

Centralized source of information. One participant specifically suggested a centralized online forum for information with questions and answers; other participants mentioned repeatedly that people needed to have questions answered and did not know where to look. Given that this was one of the most prominent themes, this solution was very salient.

Just having some sort of public forum or a place where people can have their questions answered on a pretty consistent basis. That really goes back to what I said about the communication - people just not knowing. There is such an such a booming population of seniors in that area [*lacking knowledge*]. (*Male, nurse, business owner, service provider, community partner*)

A website that was a centralized directory, with frequently asked questions (FAQ), live chat, which was well-marketed and accessible would be a well-supported solution to address this identified need.

Public forums. In addition to options for online community forums and FAQ, the participants also suggested that on-site public forums could provide information, and build awareness of programs among community members, and provide opportunities for networking between other providers, as suggested by one participant.

If that sort of outreach can be done for the different social services groups, even if it's just once a year, and it could be combined with an informational aspect for the public. It would provide a networking forum for all the different providers… as soon as you meet somebody that face to face, that sort of contact is valuable, because then a member of the public comes in and asks a question to one person,

[and] they say, well, we don't do that, but you make that referral. That's the way

to pick up the person who is going to fall through the gaps. (*Female, retired from*

science industry, community partner)

These means of formally distributing and marketing information were suggested as

starting points in Utah communities for improving access to services. These strategies or

suggestions may not be specific to Utah, but the means of communication should be

assessed at the local level, as repeated by participants.

Religious and informal networks. One theme that was regionally salient to Utah

was the influence of the religious network in sharing information. There are predominant

religious institutions in many regions of the US, but the specific dominant religion in

Utah, and its organizational structure, may make for a particularly effective method of

information dissemination. Specifically, the predominant religion in Utah is very

cohesive, with a centralized base and hierarchical structure that allows for efficient

communication of information to the community level. Participants saw this structure as

useful to capitalize on. In larger communities it was identified that there was less of a

centralized network for how information spreads, and lower proportions of persons who

were not members of the dominant religion. This was compared to the very small

communities where higher proportions of people were likely to be connected to the

church or to another member of the church community. Repeatedly, the predominant

religious network was brought up as both a strength to increase connection among people

and disseminate information quickly, and to reach populations that are typically hard to

track. Alternatively, the in-group/out-group dynamic of church membership was also

discussed, such that non-members may be left out of information dissemination via

church communication, so this suggestion should be managed carefully. The following
excerpts demonstrate this solution.

> I honestly think that getting messages passed through the church is probably a
> very effective way because everybody still goes to church, even if they're 150
> years old, they still want to get out and go to church. I wonder if this would work.
> We haven't proposed any plans. But we thought maybe that's the way to get
> messages out there, is bring them up in church meetings, because everybody
> seems to attend those. So maybe that's an effective [*way of spreading
> information*], that's probably the way you could reach the most amount of people
> at one time is through those meetings. (*Town E*)
>
> [*Talking about models of informal support through church*] "I think that those
> issues might actually work better in the more rural areas, because they have to
> depend on each other. But again, City B has got a weird tipping point, because it's
> broken into these other communities and you have the divisiveness of your church
> members and non-members. But hopefully some of these models will come
> forward and people will see how that benefits everyone. (*City B*)
>
> There's a bulletin board there and people post all their needs, businesses,
> everything on the poster on the board there. And it's neat to see. But people do
> save it. The only other place you can find out information about what's going on
> is at church of course. (*Town F*)

Integrating the predominant religious network in with other non-ecclesiastic networks
may facilitate communication while also reducing the isolation of non-church members.
This structure would integrate the person and information across multiple contexts,

micro-, meso, exo-, and macro- systemic, and be involved in their daily processes and interactions, or routine transmissions of information. Community engagement through communication that fit the local area was key.

Being persistent and vocal. Being the "squeaky wheel" was suggested to get programs in place, to address service shortages, and/or to keep funding streams secured and sustained. Being persistently vocal about community need, building community awareness and getting people to champion a cause, as well as electing local leaders that offered community support were all suggested solutions. These meso and exosystemic communication processes were considered the builders of community engagement. Vocal and engaged communities were the keys to sharing information, making programs known and sustaining them.

> [*On meeting local needs through vocal engagement*] "I really don't know what would help fill that gap other than just keep on trumpeting it, and people that are in the business, know the business, seeing the needs, and doing whatever they could take to make it happen. Even with the slow start, you can start out with a few customers because you got to have the money that they bring in that keeps the place running. But I'm sure that somebody with marketing skills and an education in finance and whatnot, they'd know how to work on that. (*Female, current caregiver, former service provider in age-related services*)

Related to being vocal, more tangible actions like influencing local elections were pinpointed as additional ways to make changes to policies that affect older adults and those that carefor them, as reported by this particiant, "I think it does start at the local level with who you elect as your representatives who will defend your cause. And

seek[ing] the lobbyists and the attention to bring that forward." (*Female, retired from creative industry, volunteer, community partner*)

Capitalizing on shared experiences. To engage more people as stakeholders in age-related services, participants shared how illness (or caregiving) as a shared experience can bring people together. Someone's experience with cancer, dementia, or with an older family member falling, was a transition that brought the supportive network together. This naturally would support a more comprehensive approach for engaging people as stakeholders and building community engagement.

> They should all be working together. So, part of what we talked about at the meeting the other day was, how can they better partner with other things, because [*Alzheimer's*], it's one of the diseases, and cancer, are the two diseases that probably every single person can tell a story of someone that they've been affected by. So, if that circle is that close, they should be able to network with a number of places to do that … so everybody isn't reinventing the wheel at the same time. (*Female, retired from creative industry, volunteer, community partner*)

Capitalizing on these shared experiences can unite people, across generations, from different backgrounds, and engage people and organizations across different parts of the community. Capitalizing on this sense of community can help communicate knowledge, develop informal call networks and volunteer networks, and get people to be persistent and loud about their needs. These efforts were identified targets for moving forward towards improving age-related services through engaging the community.

Training and Education

Education and communication of knowledge were regarded as important solutions across all classes of challenges. The more people know about programs, aging, where to go and what to do, the more this information can be used to assist them if they reach a point of crisis.

Educating the public. Stakeholders noted that building educational capacity can proactively address what will be a growing need, as the population of older adults increases. General education about what programs are available, and the qualifications and criteria for such programs, was brought up frequently as an informational need. Additionally, making some existing educational resources more well-known was also supported. End-of-life complexity was brought up as a challenge, but education was considered part of a solution for addressing this issue.

There are existing resources on starting conversations on end of life decisions, and sharing these were suggested as a solution. In addition, more education was suggested with the aims of reducing stigma, improving quality of life, and appropriate services for older adults in end of life.

> [*Talking about specific guide on end of life*] [There] is a super cool guide that comes in a multiplicity of languages, and they make them for dementia, they make them for just families, they make them for children, or younger people, and then for older people, and all kinds of stuff. But anyway, it's a guide that walks you through thinking about later life goals and decisions. It's a super friendly way of doing it and non-threatening, and I teach it every semester to my students, and then encourage them to go home, right before Christmas break or before

Thanksgiving break. I'm encouraging [them] to start those conversations with

their families about advanced directives. Just getting people to do an advanced

directive, which is free, we offer them through the Commission on Aging, and

getting people thinking about that kind of stuff. (*Female, former caregiver, state*

administrator)

[*On current state initiatives*] But what we've tried to do in the last four years is

really emphasize the education and getting out in the community. Finding people,

getting them educated, and not reliant on a government program. Because this

[*program*] is short term, many of the others are until you die. But you got that

they're means-tested programs, this one is not. And the goal is to help people stay

in their home longer. Education is really the key to doing that. Not just spending

money and inviting private or a provider to come in and take care of it for you.

(*Female, former caregiver, state administrator*)

These current education initiatives are happening and expanding the reach of these, and

other such resources was suggested as a solution. Empowering community members with

knowledge about many age-related issues to reduce stigma and provide a comprehensive

awareness of resources was a starting point identified in this study.

Training emergency personnel. Further education and training had to do with

specific categories of professionals. Many participants shared their concerns with

wandering family members, having to interface with emergency services (policy, fire,

ambulance) when caring for older adults. A participant suggested and is currently

working towards training emergency personnel to respond to complex dementia cases.

Other trainings for emergency response professionals to meet the needs of the aging

community would be a starting point to assess and explore further.

> I want to follow through this year with the certification for emergency personnel
>
> to be trained with violent elder individuals, not just dumping them in the ER. But
>
> we also don't have facilities in City B that can handle it and physicians who are
>
> able to take that on. The one physician that helped us when my husband wigged
>
> out, he's left City B. If you have those emergency people trained, they need to
>
> have a facility that can adequately accept these individuals, and then there has to
>
> be medical personnel that can follow through and take over and we don't have
>
> those things. (*City B*)

Training medical providers. This subtheme centered on medical providers,

relating to end of life care, and this was the topic of holistic or person-centered care. The

participants suggested reframing age-related medicine away from the model that split

appointments into 15-minute increments and towards the model that accounts for the

whole person, which is a macrosystemic solution, that would need to take place on a

macro-time scale, as this is long-term shift in medicine.

> Well, I think we need to look at caring for seniors more the way other countries
>
> do, and God forbid - socialized medicine. I think we need to look at the whole
>
> picture. Not just little snippets of it and maybe to come together as a community
>
> and say, this is what we care about. (*Female, nurse, business owner, consultant*)

Programs and Polices

Incentivizing support. Some participants suggested solutions involving programs

that incentivized informal and family caregiving, both to reduce the dependence on more

expensive formal services and to reduce the financial burden on family caregivers. This suggestion, that has elements in the that include proximal processes in mesosystem, and elements in the exosystem (work place, local and state governments), but the broader cultural shift of workplace policy would need to be a macrosystemic change.

> [*talking about lost time working for* caregiving] It'd be nice if there was a mechanism to offset that, when you had something catastrophic going on. To make life a little bit easier for caregivers, so they don't have to take a cut in pay, or they can still get the same benefits that they would if they weren't going to work every day as opposed to like, they can't go to work every day, because half their day is going to be spent taking care of somebody. (*Female, retired from science industry, community partner*)

Implementing transportation programs. For afore-mentioned challenges in transportation, participants suggested private sector solutions, volunteer ride networks, use of vans and buses that access rural routes, and transportation that specifically is accessible to older adults and people with mobility impairments. Existing transport in rural communities is not usable or the operators are not comfortable with the frailty of the passengers. Although there was not one solution that was a fit across all communities, a common theme in solutions was using informal connections (church networks, phone trees, social networks) to get some alternate transportation options in place, in addition to rideshare services. Some areas lacked public transport and transport between larger cities for medical appointments. One participant detailed his options for senior transportation, in his local community.

> Number one is, we could always put [*transportation*] back on families just as they

would do if their family member was at home. The second solution is what we

have in place now, and that is: we are the solution [*facility provides transport*].

The third option would be to create a transportation company with a van with

services like that. I don't know how, but I believe that there are ways that

Medicare or there is some reimbursement that could happen at the state level to

help with transportation. (*Town E*)

This approach advocated for an accessible van to transport older adults and take the

burden off providers and families. This solution addressed some of the common

challenges identified by other participants in non-medical transport and inaccessible

transport for older adults, and for providers in having an exhausting role.

Future of Age-related Services

One of the questions I asked was "What do you think about telehealth and internet

delivered services as a solution to overcome some of the barriers in rural areas?"

Following up with questions about whether people would use these services, if they

would be practical, and what their concerns were for the future of age-related services.

Additional concerns about the future were detailed in challenges sections – end of life,

finances, and regional issues were themes in concerns, but were dispersed throughout the

interviews, thus by the time I reach this topic toward the end of the interviews,

participants responded "Mostly, the things we have already been talking about."

Telehealth. There was much support overall for telehealth and internet delivered

services as solutions to the challenges in services access. The individuals that are

involved in these communities believe that there are avenues where telehealth would be

useful, that older adults would be receptive to such technologies with assistance, and that it would address specific needs. In some areas these services are already available, but in others there are challenges associated with the actual infrastructure needed to support telehealth. Some participants reported not having the broadband access, nor the technological infrastructure to facilitate delivery.

Telehealth was regarded as a solution to the barriers of time, distance, travel, and the lack of available providers in many areas. Insurance companies are willing to reimburse for telemedicine in many cases and participants reported that they, and the individuals in their communities, would be receptive to telehealth if appropriate training and technology would be made available. They saw multiple areas where such services would be a solution to share information or alleviate the travel burden that is imposed by their locations.

> [*Talking about dementia or aging webinar presentations*] I also wonder if having an option of offering some of this information from more knowledgeable people, and not everybody's in a position to travel to every community. Just offer it to the south; you probably wouldn't want to offer to the state because if you took questions, it can be overwhelming. Offer one to the southeast portion, or the Southwest portion, a few counties, I think things like that. (*Male, animal science and horticulture specialist, community service provider*)

Teledelivered services like webinars and other forums also have utility in community engagement and education. People are not able or willing to drive to the capital or other large cities for such meetings, as already discussed, but they could join remotely at a local senior center, library, or in their home to learn about a new service or policy.

Synthesized Discussion

The knowledge generated from this study echos knowledge form other studies on service access and aging in rural areas, and the particpants also generated knew knowledge that is specific to their communities and the region in which the research was conducted, Utah. The assets and values of the rural communities in this study demonstrate that the smaller communites have established social capital, meaning there is mutual trust and support (Flora, Flora, & Gasteyer, 2018), that incentivizes them to remain in such communities, in spite of the challenges, including lack of built capital, or infrastructure. The relationships and sense of of community, that was reported by some and suggested as something that can be capitalized on by others, is a hallmark of this social capital. It was an interesting finding that there existed a strong sense of community and communication, but the topic of communication was often not was services were available. Two potential explanations are that many services are delivered top-down from the state, and therefore have not saturated the rural network to be communicated, and second, that these communication netwroks are substituting communication about informal services and supports. This distinction, or other explanations, requires additional inquiry.

Relating back to the underlying framework, Bronfenbrenner's ecological systems theory and person, process, context, time (PPCT, Bronfenbrenner & Morris, 2006), the interview content demonstrates that nested in a developmental context, individuals interact with different components of their environment to access services. One of the emergent findings fit in the person factor, of participants having multiple roles. This

included the person(s) that participated in the interviews engaging in proximal processes across the microsystem of caregiving, in the mesosystem of developing informal supports as a creative solution when other services were not available (daily interactions with neighbors and community members), in the exosystem to get involved in community, church, and government programs thereby building community engagement and service capacity, and finally, their discussion of structural issues in the macrosystem.

The contextual findings of interest, that were not specifically queried of the participants, but which arose organically, were the emergent themes in the local context of Utah. Specifically, these rural communities were dealing with the influence of retirement migration, recreation and tourism. These communities also organically discussed the role of the predominant religious group, and including this existing network to facilitate communication and dissemination of information. The time component was present in the data, and participants reported that program development and implementation take time, as these processes require that multiple groups, in overlapping systems, need to work together to meet an overarching goal. As described by Bolender and Kulscár (2013) younger older adults and family tend to migrate to areas with many natural resource and recreation amenities, but fewer service options, potentially straining services, especially when combined with season influxes of tourists. Older groups of adults (75+ or those in poorer health) migrate to less conventional retirement desitination areas with amenties like health facilties and ones that are closer to urban area (Bolender & Kulscár, 2013). In the context of these community transitions that show older adults overall, migrating to non-metro areas, but for different reasons, depending on their age, this inform local policies and program to proactively address projected growth in

retirement and recreation driven migration. Recreation areas, in particular, need to be aware of the overall increases of year-round and seasonal migration across age groups, but implement policies that focus on local residents.

In the context of the field at large, identified challenges map on to several barriers identified in other communities, demonstrating that there are similar challenges across rural areas, including lack of services, transportation, regional and programmatic finances (Bull et al., 2001; Rural Health information Hub, 2018; Thorpe et al., 2011), lack of knowledge and communication, and structural and systemic barriers (Kelley et al., 2018). The solutions identified by the current stakeholders included increasing education, increasing centralized knowledge sources, building community engagement and leadership, aiming for sustainability, and pursuing telehealth and internet delivered services are viable means of increasing access to age-related services. Other models of participatory action research (Kelley et al., 2018) have identified that local, culturally sensitive models that incorporate these elements can lead to effective programs, for example a formal palliative care program for First Nations people (Kelley et al., 2018), and phone and internet-based models of telehealth, which demonstrate improved quality of life for older adults (Marx et al., 2019). Implementation of community-informed programs in Utah may also be effective means to address the identified challenges in ways that meet the needs of the community and are culturally relevant to the many populations in this state.

Limitations

The limitations of this study include a possible selection bias of the participants

that were willing to participate in these interviews. This was a group of very engaged and dynamic community members, with multiple points of entry in formal and informal age-related services, and their perspectives may not be typical or representative of the other people in their own communities or in the state. By casting a wide geographic net, but sampling a few individuals from each community, I intentionally tried to adjust for this bias, to capture a credible picture of these communities. Nonetheless, these results may only represent the opinions of these stakeholders. However, many of them were experts in their fields or communities providing credibility to their responses, but more comprehensive representation across communities, ages, economic backgrounds, and racial and ethnic identities, would provide a more complete picture of the assets, challenges, and solutions that would be informative in Utah. However, this sample was racially and ethnically homogenous, and informants from other racial and ethnic groups would improve the study. There may be challenges and solutions unnacounted for in the Hispanic or Latino population, which makes up 13% of the population, and minorty shares of Utah's total population are expected to exceed 30% by 2050 (Perlich, 2008). In the recruitment phase of this research, I made multiple attemps to recruit from a diverse sample, however, ppotential participants did not return calls or emails after multiple attempts. Future research will be designed to incorporate more user-friendly and less time intensive interviews, with surveys available in multiple languages, for example an open-ended Qualtrics survey, available in English and Spanish.

Additionally, this study could have been improved with more targeted inquiry and better tracking of the questions asked. The project evolved with the interviews over the course of 1.5 years, and although the interviews were recorded and the questions

recorded in a document, the depth of follow-up questions and content shifted in each

interview depending on the expertise of the individual present. The limitation in this is

that the drift from the original questions and focus was not sufficiently documented

through appended versions of the questions (recorded but not all were written down) and

researcher memos. Better documentation through memos of changing questions,

participant characteristics would have provided more credibility to the researcher and

results.

Future Directions

Following the the basis of participatory action research, the knowledge generated

from this inquiry will be delveirev back to the communities and the stakeholder network.

Because of the interesting findings on communities in transition, reports will also

integrate descriptive maps of the state by economic type (to show where recreation and

retirement growth are happening). For local communities, a summary of the closest local

resource will be included (Area Agency on Aging and senior center contact information)

and newsletters will emphasize community engagement, topics of concern (challenges),

and bullet points of starting solutions. These various materials will be created and

distributed after the completion of this dissertation, but as an extension of this exploratory

work in the local context (Utah communities).

Future research should expand on these ideas by following up with the production

and dissemination of the materials to stakeholders, but then surveying other groups of

stakeholders about their reaction to the presented ideas. Additionally, conducting a

statewide age-related service needs and assets assessment would be a very practical next

step that would be representative of the state and inform this exploratory local work, but also be an additional deliverable from the voice and data of the people in this action framework to get more services to this population. Further, picking one or two of these identified solutions and engaging these stakeholders, and others, using the participatory action framework to bring this idea into action and practice would be the culminating step, including process and outcomes evaluation of the implementation.

Conclusions

The results of this qualitative study do not serve to say that I nor the participants in these interviews have identified comprehensive solutions to address all the challenges in rural communities, or age-related service access. Instead, these results are an effort by and for these specific stakeholders and their communities, to identify challenges, inventory assets, and outline solutions as a starting point. The use of multiple types of stakeholders in these interviews, and the commonalities among their responses, suggest that making connections between various levels (person, service provider, state administration) is feasible and worthwhile. These various stakeholders and their broader local communities can collectively contribute to these issues. The participants generated an extensive list of challenges and an equally extensive combination of solutions. These materials will be synthesized and delivered into brief reports to afore mentioned agencies and to the general audience of older adults and other stakeholders (caregivers, adult children). The reports delivered to the state will discuss "state" level concerns, but also emphasize the "forgotten" or isolated perceptions of non-capital cities and towns.

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CHAPTER IV

INTEGRATIVE DISCUSSION

Discussion

This dissertation used two different methodological approaches to gain a more comprehensive view of the geographical reach of age-related service access in Utah, focusing on the rural nature of the state. In the first paper I descriptively mapped service proportions at two scales, county and census-tract (local), and examined factors that facilitated or inhibited potential spatial access (PSA) to age-related services at the local level. In the second paper, I synthesized information from the narratives of aging persons, caregivers, service providers, and state administrators to identify assets of rural aging, as well as challenges to access, and potential solutions. Results of the two studies are complementary, although both studies have minor limitations, the results and future directs that are proposed contribute to the knowledge of rural communities, older adults, and access to age-related services in Utah.

Major Findings

The major findings of this dissertation were that local census-tract level analysis revealed more about PSA, than did county-level assessment, and that factors that acted as barriers or enablers of service access, both explained and unexplained, were significantly tied to a proximal area around points of access. Collectively, these findings suggest that the immediate geographic context for a given individual or population influenced their access to age-related services, dependent upon the presence or absence of combinations

of micro, exo, macro, and chrono-system contextual factors. By this, I mean that the interactions across people, places, culture, and time that surround an individual, influence his or her access to services.

Barriers and Solutions

Barriers brought up by stakeholders aligned closely with existing literature, namely that distance and travel time, lacking knowledge, lacking programmatic funding, and personal financial barriers complicate service access in rural areas. To my ability to identify such sources, it has not been clearly explicated how individuals can use resources to overcome barriers to access age-related services in rural communities. By integrating the spatially-dependent variables, which support that there are disparities in highspeed broadband access and the differences in the distribution of the number of older adults across the rural-urban spectrum, these data support the verbalized challenges by the individual stakeholders in the qualitative study. Although there is persistently insufficient infrastructure and broadband coverage in many rural areas, as identified in both the qualitative study and in the GIS analysis, there is still interest in telehealth as a solution to some of the other identified challenges. As a whole, community engagement, marketing, and public education in easy-to-access locations are other avenues to increase people's knowledge of age-related services and access to appropriate services at the state- and local levels. Because changing demographics, lack of infrastructure, and regional separation were identified as challenges, being able to visually present a map of these differences to state and policy decision-makers provides another level of support for this issue, and can further facilitate discussions about improving service access in "risk"

areas.

Explaining the Unexplained

  The unexplained variance in the spatial analyses showed that there was a spatially-dependent pattern across several communities that were not accounted for in the predictors that were included. However, stakeholders from some of these areas spoke on the financial issues in these areas, both individual and programmatic that impact service access. Taking these accounts into the context of other literature (Bull, Krout, Rathbone-McCuan, Shreffler, 2001; Ford, Wong, Jones, & Steel, 2016) I can speculate that some part of the unexplained variance is likely economic/financial, as qualitative (Bull et al., 2001) and metanalytic research (Ford et al., 2016) have provided support that socioeconomic factors that are at play in rural areas are associated with low access to age-related services. Further, the participants discussed stigma about aging, and from other studies (Stewart, Jameson & Curtin, 2015; Warburton, Scharf, & Walsh, 2017) there is support that rural communities experience more stigma about mental health, seeking support, and being older and less independent given the self-sufficient values present in such communities, and speculatively, this could influence the demand for age-related services and therefore the availability. Additionally, participants reported traveling for services along the main arteries, and this region in Utah is where growth is projected, therefore, interstate and major road networks could also contribute to variance in PSA.

Regional Influence

A focus of the GIS analysis and an emergent theme in the qualitative study was that of regional transitions, such as economies (recreation) and migration (retirement). GIS analyses supported that these are particularly vulnerable areas, as age-related services are lower in proportion in Utah's retirement destination communities than in non-retirement destination communities. The spatial analyses showed that five of six economic typologies were significantly associated with increased PSA, but that retirement destination counties were associated with lower PSA.

Individuals in rural communities and in the age-related service network are aware of the influence recreation and retirement, and how this impacts access to services. As stakeholders across various counties described the influence of their regional economy, there were associations with migration, focuses on tourists, and difficulty obtaining services. While the recreation county designation alone didn't account for lower likelihood of service availability, when more older adults moved into the area in the previous decade, there was a significant association with lower potential spatial access to services. This was echoed by respondents, as they indicated that local governments continued to "focus on tourists" as populations increased and an area became dominated by a recreation economy. This concept of a high-aging, recreation-dominant, low-service risk area was alluded to and supported in the GIS paper and triangulated in the qualitative study. Explicit examination of this relationship is warranted as this state, and others in the region, are projected to continue to grapple with such trends.

Limitations

There are limitations to this research; foremost among the limitations is the absence of an economic indicator in the spatial analyses. As a predictor of PSA, this would have been key in controlling for the variance across the rural urban gradient, and controlling for the strength of the association of access to high-speed broadband and PSA. It is documented that regional and individual income contributes to availability of local services broadband access (Shapiro, 2015), and varies in rural and urban neighborhoods (Federal Communications Commission - FCC, 2018). Further modeling should include several economic indicators and be conducted in collaboration with economics professionals, however as an exploratory first step in predictors of PSA this study contributed important information about the regional influence of broadband availability and retirement migration trends. Another limitation is the use of census tracts – while this unit is a proxy for local analysis, census tracts are not spatially equal and they vary from 1,200 to 8,000 people, within their boundaries. This boundary does not account for economics, boundaries of use, or extreme density differences, a population to distance weighted measure would improve the strength of this model if revised (U.S. Census Bureau, 2018). By including the neighborhood and spatial model with the 50km buffer, this was likely resolved, but more spatial models should be run (10-100km) to determine the strength or distance at which this model is no longer significant, meaning that variables are no longer spatially dependent. As revealed in the qualitative study, there is a high degree of travel for service and individual desire to use online services and telehealth. This is a limitation in current data and methodologies, but the combination of the GIS with the more contextual qualitative results in the current dissertation, helps

offset the limits of GIS-only approach, by triangulating the needs of communtiies and availability of service not measured quantitatively.

These studies were conducted independently, however, from the outset, aligning the quantitative and qualitative studies could have further strengthened both studies. For example, knowing the limitations of the GIS datasets in economic/income variables could have helped in targeting questions more specifically in the qualitative analysis. Likewise, if the themes from the qualitative study were available before the GIS analyses, additional factors could have been considered for the predictive models if such data were available, potentially identifying more contributions to the error variance. Expansion to other methods in follow-up studies may help reach a more diverse cross section from Utah communities, particularly underrepresented communities.

More stakeholder perspectives would strengthen the study. A survey with multiple choice and short answer responses, focus groups, and other forums could also be used in future studies to gather more information and to build rapport within these communities, in addition to including more targeted inquiry about regional transition (retirement and economic type [recreation]).

Future Directions

The quantitative piece complements the qualitative piece because it demonstrates the lack of services in the communities of these individuals and corroborates the risk factors for services insufficiencies. The data from this analysis will be used to make descriptive maps that will be included with reports to Area Agencies on Aging and state administrators showing the county typologies, types, and locations of services, and

broadband access. This can help policy makers understand where the risk areas in the state are, where there are disparities in services, and what areas may or may not be candidates for online services. The combination of visual map data and the quotes from participants in those areas can provide a full picture of the region.

For the publication of the research contained in this multi-paper format dissertation, I will complete separate manuscripts, one for the spatial analyses and one for the qualitative analysis. This is for two reasons; first, the complexities of combining both analyses in full would make for an extremely long manuscript and difficult to target to a journal, and secondly, the dissertation was designed with the manuscripts separate thus, they will be published as such. Future research may incoprate more planful, mixed-methods approaches.

Future research should further explore models of PSA, including economic markers, racial and ethnic information, and Tribal boundaries. These important layers may add to the model by explaining important regional variation with quantitative and spatial data. Further, deeper and more targeted explorations on the effects of regional transitions (retirement, economic shifts [tourism]) on service access should be examined using an integrative, mixed-methods approach.

Conclusions

The geographic reach of rural service access in Utah varies from community to community, and it depends on how you look at *reach.* If examining reach of services occurs at the county level, it is likely that variation will be washed out or exaggerated by the size of the county and distribution of the people in that county, but if reach is

measured locally, it may be more reflective of the actual PSA, or actual services that are

realistically available or likely to be used by a person (Khan, 1992). The factors that

influence PSA are significant and spatially dependent, although not all of them are

identified. A person in a context may face several challenges, that are nested in their

context, including regional influences like migration, retirement, and economy

[recreation and tourism]. These factors reduce service access by increasing the number of

people placing demands on services (or decreasing in the case of out-migration), and

leaving local and rural communities to respond to these challenges with creative

solutions.

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APPENDICES

Appendix 1. Question list for qualitative study.

1. Can you describe your experience living/working within a rural area?

2. What are some strengths of this community?

3. Are you aware of age-related services in your area? What services? What services have you used/provided?

4. How do you provide information about these services?

5. Did people in your area rely more on formal (paid or subsidized services) or informal (family, friends, church – unpaid services) to help?

6. How do you know this (observation, data)?

7. How do families access these services? At what point do they choose to get services?

8. What roles do other family members, church, and or community members play in caregiving or respite care?

9. How do see the division of caregiving tasks with other family members? (proximity, gender, resources, relationship closeness, or other factors)

10. How have you made caregiving resources with families' other responsibilities, such as outside employment or life? How is this impacted by the rural nature of the community you provide services to?

11. How do you go about asking for or getting support from extended family, church members, or other members of the community?

12. What other services are your aware of? Are there caregiver support services that are currently lacking in your area that would improve your own aging experience or your ability to serve people in your area?

13. What are the needs of your community (that you felt as a caregiver or that you know of)?

14. Are there things that get in the way of providing services in your area that help support family caregivers? Go back to each individually to elaborate: Transport; systemic; wait times; difficulty disseminating information or enrolling people?

15. How do you navigate around these barriers or are you able to at all? (ask for each individually)

16. What are your perceptions of these barriers? Are they insurmountable or are there solutions to get around them?

17. What solutions do you have for barriers or challenges in your area?

18. Regarding the future of rural age-related service, what are your opinions regarding online, telehealth, and in-person services?

19. Are people receptive to these? How might you envision them working across the state?

Appendix 2. Example of Researcher Memo from Qualitative Process

February 17, 2019

Throughout this interview, and others, particpants refer to distances as the time it takes to get there [to a service/medical appointment], rather than the driving distance (miles), far more often than not. They will say two hours away, four hours away, etc. This is an interesting way to quantify the burden of travel and lost time for the people who live far from services. While mapping, I am measuring in straight line distances, but an average drive time of 30 minutes, the literature says that people are willing, on average, to drive about 30 minutes for a service, but it seems that the "average" was not collected based on typical drive times in western states or in very rural samples. I would be interested to see more data on this.

Appendix 3. Examp le of codes applied to excerpt of transcript

Excerpt	Codes applied
But we even charged such a minimal amount to what the rest of the state … we only charge about $2,000 a month for all services.	*charging less than other services*
Down here, [the need for service and knowing that amount] sends people into panic mode, what are we going to do. Obviously, funds or, or money's always an issue, but, but then just really the lack of knowing what to do	*panicking and crisis at onset of age-related change* *charging less than other services* *money's always an issue* *lacking knowledge* *lacking communication* *not knowing what to do*

Alexandra T. Schiwal

Curriculum vitae
2019

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Education

Utah State University	Ph.D. Human Development & Family Studies, Adult Development & Aging	2019
University of Montana	B.A. Psychology, Gerontology	2014

Employment History:

2018 – Present: Research and Grant Assistant, Center for Persons with Disabilities, Logan, UT

2015 – 2019: Research Assistant/Teaching Assistant, Utah State University, Logan, UT

2014 – 2015: Evaluation Assistant, Clinical & Research Consulting, PLLC, Missoula, MT

2013 – 2015: Research Assistant, Rural Institute on Disability, University of Montana, Missoula, MT

2013 – 2015: Caregiver, Home Instead Senior Care in collaboration with the University of Montana, Missoula, MT

2012 – 2013: Developmental Assistant, Missoula Developmental Services Corporation, Missoula, MT

Scholarly Presentations:

Fauth, E. B., **Schiwal, A.,** Novak, J. R., & Levin, M. E. (2019, May). *An Acceptance and Commitment Therapy (ACT) intervention for at-home caregivers of persons with dementia: Positive caregiver outcomes within a novel, online, self-guided program.* Poster presented at the International Association of Gerontology and Geriatrics - European Region Congress; Gothenburg, Sweden.

Schiwal, A.T., Fauth, E.B., Novak, J., & Levin, M. (2018, September). *Acceptance and Commitment Therapy for Caregivers.* Human Development and Family Studies Research Day; Logan, UT.

Schiwal, A.T., Fauth, E.B., Novak, J., & Levin, M. (2018, April). *Acceptance and Commitment Therapy for Caregivers - Recruitment.* Utah Aging Alliance; West Valley City, UT.

Schiwal, A.T., Fauth, E.B., Novak, J., & Levin, M. (2018, March). *Acceptance and Commitment Therapy for Caregivers – Program for Extension Partnerships.* Utah State University

Extension Conference; Thanksgiving Point, UT.

Schiwal, A.T. (2014, April). *Analysis of factors that influence visits to a healthcare professional*. Poster presented at the University of Montana's Conference on Undergraduate Research, Missoula, MT.

Schiwal, A.T. (2013, November). *The effect of message framing on smoking attitudes.* Presented at Advanced Research Methods Conference Day at the University of Montana, Missoula, MT.

Published Manuscripts

Berendts, C., Ravesloot, C., & **Schiwal, A.T**. (2016). Can people catastrophize barriers? An exploratory analysis of the association between pain catastrophizing and perceptions of environmental factors. *Disability and Health Journal*, *10*(2017) 65-72.

Manuscripts in Preparation

Schiwal, A.T., Fauth, E.B., Wengreen, H., & Norton, M.C. The Gray Matters app targeting health behaviors associated with Alzheimer's risk: Improvements in intrinsic motivation and impact on diet quality and physical activity. *International Journal of Geriatric Psychiatry. (under review).*

Schiwal, A.T., Fauth, E.B. 2019 Geospatial analysis of factors associated with disparities in age-related service.

Schiwal, A.T., Fauth, E.B. Barriers and actions to improve access to age-related services for rural individuals: a qualitative study.

Teaching Experience

Online, Undergraduate –
Spring 2019, **Graduate Instructor,** FCHD 4240 Social & Family Gerontology, Utah State University, 42 students

Spring 2018, **Graduate Instructor,** FCHD 4240 Social & Family Gerontology, Utah State University, 35 students

Fall 2017, Teaching Assistant, FCHD 3540 Adult Development & Aging, Utah State University, 60 students

Spring 2017, Teaching Assistant, FCHD 1500 Lifespan Development, Utah State University, 150 students

Fall 2016, Curriculum-development Assistant, FCHD 4240 Social & Family Gerontology, Utah

State University

Fall 2016, Teaching Assistant, FCHD 1500 Lifespan Development, Utah State University, 150 students

Fall 2015, Teaching Assistant, FCHD 3540 Adult Development & Aging, Utah State University, 60 students

Face-to-face, Undergraduate –
Fall 2016, Teaching Assistant / Guest Lecturer, FCHD 4240 Social Gerontology, Utah State University, 10 students

Fall 2015, Teaching Assistant, FCHD 2660 Parenting & Child Guidance, Utah State University, 50 students

Grants

2019, Status, **Funded,** Funder: United Way of Cache Valley, Institution: Center for Persons with Disability – Bridgerland Literacy Program, Location; Logan, UT, Amount: $4,600.00

2019, Status: **Pending**, Funder: Retirement Research Foundation, Institution: Center for Person with Disabilities, Location: Logan, UT, Amount: $85,515.19, Role: Evaluator

2019, Status: **Unfunded**, Funder: CHS, Institution: Center for Person with Disabilities, Location: Logan, UT, Amount: $99,384.75, Role: Co-Principal Investigator

2019, Status: **Pending**, Funder: Wish You Well Foundation, Institution: Center for Person with Disabilities, Location: Logan, UT, Amount: $9,684.88, Role: Grant-writer

2018, Status: **Funded**, Funder: Administration on Community Living, Institution: Center for Person with Disabilities, Location: Logan, UT, Amount: $2,100,000.00, Role: Research Assistant

2018, Status: **Unfunded**, Funder: Spencer Foundation, Institution: Center for Person with Disabilities, Location: Logan, UT, Amount: $50,000.00 Role: Research Assistant

2017, Status: **Unfunded**, Funder: Utah State University Research and Graduate Studies, Institution: Department of Human Development and Family Studies, Location: Logan, UT, Amount: $1000.00, Role: Research Assistant

Honors & Recognition

2016 – 2017: Phyllis R. Snow Graduate Student Scholarship

2010 – 2014: University of Montana, Dean's List

Professional Organizations

2019 - Gerontological Society of America

<u>Related Professional Certifications and Skills</u>

2019: RStudio:
      Markdown, Spatial Data

2019: Adobe:
      In-Design, Illustrator

2018: ArcGIS

2018: Qualtrics

2017: Mplus

2017: RedCAP

2015: SPSS

2014: Certified Microsoft Excel Master User