Applied Policy Project:

EMERGENCY PREPAREDNESS AMONG THE ELDERLY HOMEBOUND AND ISOLATED IN ALBEMARLE COUNTY AND CHARLOTTESVILLE

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Disclaimer: The author conducted this study as part of the program of professional education at the Frank Batten School of Leadership and Public Policy, University of Virginia. This paper is submitted in partial fulfillment of the course requirements for the Master of Public Policy degree. The judgements and conclusions are solely those of the author, and are not necessarily endorsed by the Batten School, by the University of Virginia, or by any other entity.

Honor Pledge: On my honor as a student, I have neither given nor received aid on this assignment.

Danielle Spach

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List of Terms and Abbreviations

Adult Services Program (ASP)

Census American Community Survey (ACS)

Charlottesville-UVA-Albemarle Office of Emergency Management (OEM)

Community Emergency Response Team (CERT)

Federal Emergency Management Agency (FEMA)

Jefferson Area Board for Aging (JABA)

Thomas Jefferson Health District (TJHD)

Executive Summary

Elderly homebound individuals are disproportionately more vulnerable to emergencies than the general population due to a greater presence of physical, cognitive, and emotional disabilities. Additionally, they are often excluded from emergency preparedness education events because of isolation from the community. This analysis will provide a background, stakeholder analysis, criteria, several policy options and a recommendation on how to increase emergency preparedness among the elderly homebound population. The four alternatives below will be compared based on effectiveness of preparing the homebound population for emergencies, improving emergency response, economic cost, and implementation feasibility.

Policy Options

1) OEM continues emergency preparedness education through assisted living facilities and senior community outreach

2) Include additional emergency preparedness information with home-care paperwork

3) A voluntary registry database documenting special emergency medical needs

4) A volunteer program where community members sponsor elderly homebound individuals and teach them emergency preparedness

This analysis recommends that the Charlottesville-UVA-Albemarle Office of Emergency Management implement **Option 2: Include additional emergency preparedness information with home-care paperwork.** Based on the evaluation of criteria across options, this program would reach the largest amount of the homebound population and cost the least amount per participant over the next 10 years.

Problem Statement

The Charlottesville-UVA-Albemarle Office of Emergency Management is responsible for ensuring that the community is adequately prepared for emergencies through education, exercises, and partnerships with community agencies. The elderly homebound population is vulnerable to emergencies because of decreased mobility, decreased sensory awareness, physical limitations, and isolation from the community (Fernandez, Byard, Lin, Benson, & Barbera, 2002). When an emergency or disaster occurs, public safety officials in Albemarle County and Charlottesville City face difficulties in knowing where elderly homebound individuals are located. **Without knowing the location of the elderly homebound, this population is less likely to receive information on how to prepare for an emergency and limits public safety's ability to provide critical medical care or extra assistance to this population.**

Background

Emergency Management Cycle

The five mission areas of emergency management are prevention, protection, mitigation, response, and recovery from emergency situations and threats (Federal Emergency Management Agency, 2018). The emergency management cycle is one way to ensure mission areas are met. The proceeding background and stakeholder sections mirror the emergency management cycle by describing vulnerabilities elderly homebound face during emergencies, the current concentration of elderly homebound throughout the city and county, and current preparedness outreach strategies for the elderly homebound among stakeholders.

Elderly Homebound Vulnerabilities: Complex Medical Needs and Lack of Preparedness Education

Elderly citizens with special medical needs are often disproportionally affected by disasters because of health conditions and an increased likelihood for emotional trauma during stressful events (Aldrich & Benson, 2007; Fernandez et al., 2002). Hurricane Katrina and Rita brought national attention to the vulnerability of those with disabilities in emergencies. In 2005, those aged 60 or older made up 15 percent of the New Orleans population. During Hurricane Katrina and Hurricane Rita, 71 percent of those who died were over the age of 65 (Aldrich & Benson, 2007). The most common causes of death among the elderly during Katrina were isolation and running out of medication (Aldrich & Benson, 2007).

Limited mobility prevents homebound individuals from being invested and involved within the local community. This is largely due to isolation from community organizations (Wyte-Lake, Claver, Der-Martirosian, Davis, & Dobalian, 2018). Isolation decreases the ability for the elderly to receive education on how to prepare for the unexpected and limits the availability of social support. Lack of preparation and contingency planning among senior populations can exacerbate the need for medical attention during a disaster. A 2016 study created an emergency preparedness checklist derived from FEMA recommendations in order to measure the level of individual preparedness for an unexpected event. (Gerson et al., 2017). The target population was elderly adults aged 65 years or older who also received home-care services in the San Francisco area. The study included 50 participants. Sixty-six percent of participants stated they lived alone and 41% mentioned that their health or disability kept them homebound. The results of the study concluded that 60 percent of participants did not have a back-up plan for caregiver assistance and 56 percent did not have plans for a back-up electricity source for electrical equipment (Gerson et al., 2017). This lack of information can make it difficult for community members with special medical needs who live alone to be self-sufficient and safe during an emergency.

Elderly Homebound: A Difficult Population to Identify

Albemarle and Charlottesville do not currently have a robust and uniform way to identify where elderly homebound individuals are concentrated. This information is important for prioritizing where to focus emergency preparedness outreach and education. Data on the

concentration of elderly homebound individuals is fragmented across departments and organizations. For example, the Albemarle Fire Department and Albemarle Department of Social Services started a partnership to communicate when someone requesting emergency assistance could possibly qualify and benefit from adult protective services. Community organizations like JABA and Meals on Wheels have lists of clients who are isolated due to medical conditions.[1]

All of these measures of the elderly homebound population are contingent on staff reaching out to homebound individuals or homebound individuals reaching out to the community. If an individual does not contact an institution, then it is nearly impossible to know where they are located. Departmental and organizational lists are also insufficient for estimating the level of need among the elderly homebound for the entire city and county. There are a few studies within the literature that attempt to estimate the prevalence of homebound individuals within the United States or other localities. The estimates of the elderly homebound population run between 5.6 (Ornstein et al., 2015) and 19.6 percent (Musich, Wang, Hawkins, & Yeh, 2015)of those 65 or older.

Concentration of Elderly Homebound in Albemarle and Charlottesville

I attempt to estimate the concentration of the elderly homebound population in Charlottesville and Albemarle County using the Census Bureau's American Community Survey (ACS) 5-year disability and group living estimates. ACS contains data on six disability types including hearing difficulty, vision difficulty, cognitive difficulty, ambulatory difficulty, self-care difficulty, and independent living difficulty (Bureau, 2017). Ambulatory, cognitive, and independent living difficulty are the most common disabilities within the elderly homebound population (Musich et al., 2015). If I incorporated all three categories to estimate the concentration of elderly homebound, my estimate could be an over-estimation because individuals could have more than one disability. I decided to use the independent living difficulty estimate because the Census definition accounted for people who have difficulty doing errands due to a physical, mental, or emotional problem (Bureau, 2017).

It is possible that individuals counted in the Census for independent living difficulty live in assisted care facilities. The scope of this paper does not include those who are isolated within assisted care facilities because within the last 10 years these facilities experienced improvements in emergency preparedness due to state regulations after Hurricane Katrina and Rita. In the State of Virginia assisted living facilities must have emergency preparedness plans and contact their local emergency coordinator annually (Virginia State Board of Social Services, 2018). Annual contact with these facilities allows the Charlottesville-UVA-Emergency Coordinator to better understand and address the preparedness needs of those in assisted living. This level of information is not known for individuals who receive in-home medical care. I've included a map of the estimated concentration of those 65 or older in group living because areas that have a high concentration of elderly with independent living difficulty and a low concentration of group living elderly should be prioritized before areas with a high concentration of group living elderly.

[1] Information retrieved from interviews with local departments and organizations from November 2018-December 2018

Albemarle Concentration of Elderly Homebound

Primary Target Areas in Albemarle

- Monticello
- Northern Scottsville
- Western Red Hill
- Southern Cale
- Southern University
- Southern Crozet

There is a high concentration of elderly homebound in southeastern Albemarle, southern Crozet and the voting districts surrounding Charlottesville. Based on Map 2, the concentration of group living elderly in Albemarle County does not seem to affect the concentration of elderly homebound in southeastern Albemarle and Crozet. Areas such as Monticello, Scottsville, southern County Green, eastern Red Hill, and Crozet have a large concentration of elderly homebound and the lowest level of group living elderly. This suggests that a large amount of homebound within these areas do not live in an assisted living facility. Other areas of Albemarle such as Agnor-Hurt, Pantops, and Free Bridge do have a high percentage of elderly in group living. These areas are likely to have a large amount of their elderly with independent living difficulty living in assisted care facilities.

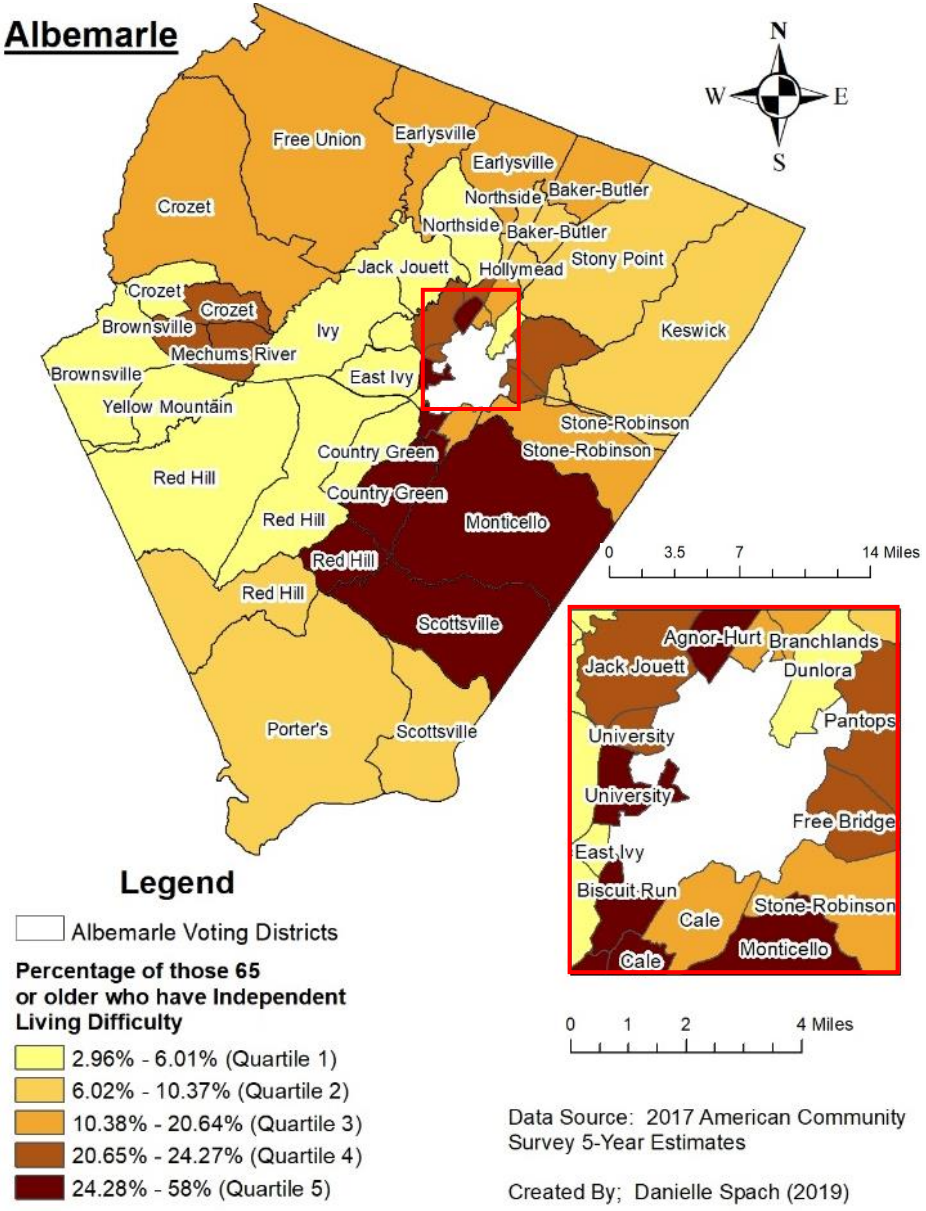
Charlottesville Concentration of Elderly Homebound

Primary Target Areas in Charlottesville

- Belmont
- Locust Grove
- Barracks/Rugby
- Southern Greenbrier
- Rose Hill

Overall concentrations of elderly homebound individuals are less in Charlottesville versus Albemarle. Some areas of Albemarle have 58 percent of the elderly population with independent living difficulty while the highest concentration of elderly independent living difficulty in Charlottesville is 40 percent. The highest concentration of elderly homebound is in the center, southeast edge, and northeast edge of Charlottesville. These areas also have low percentages of elderly individuals living in group quarters as depicted in Map 4.

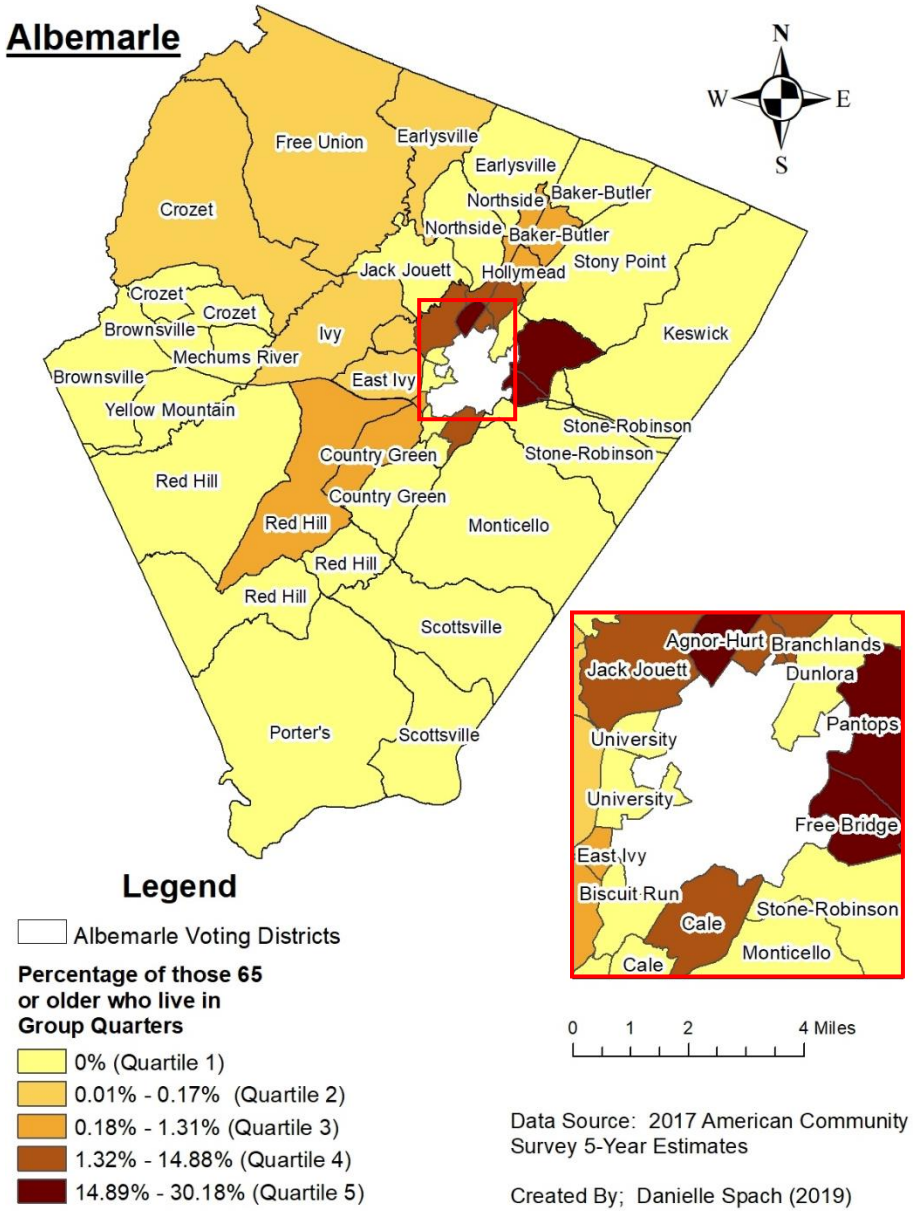
Map 1: Concentration of Homebound Individuals in Albemarle County



Data Source: 2017 American Community Survey 5-Year Estimates

Created By; Danielle Spach (2019)

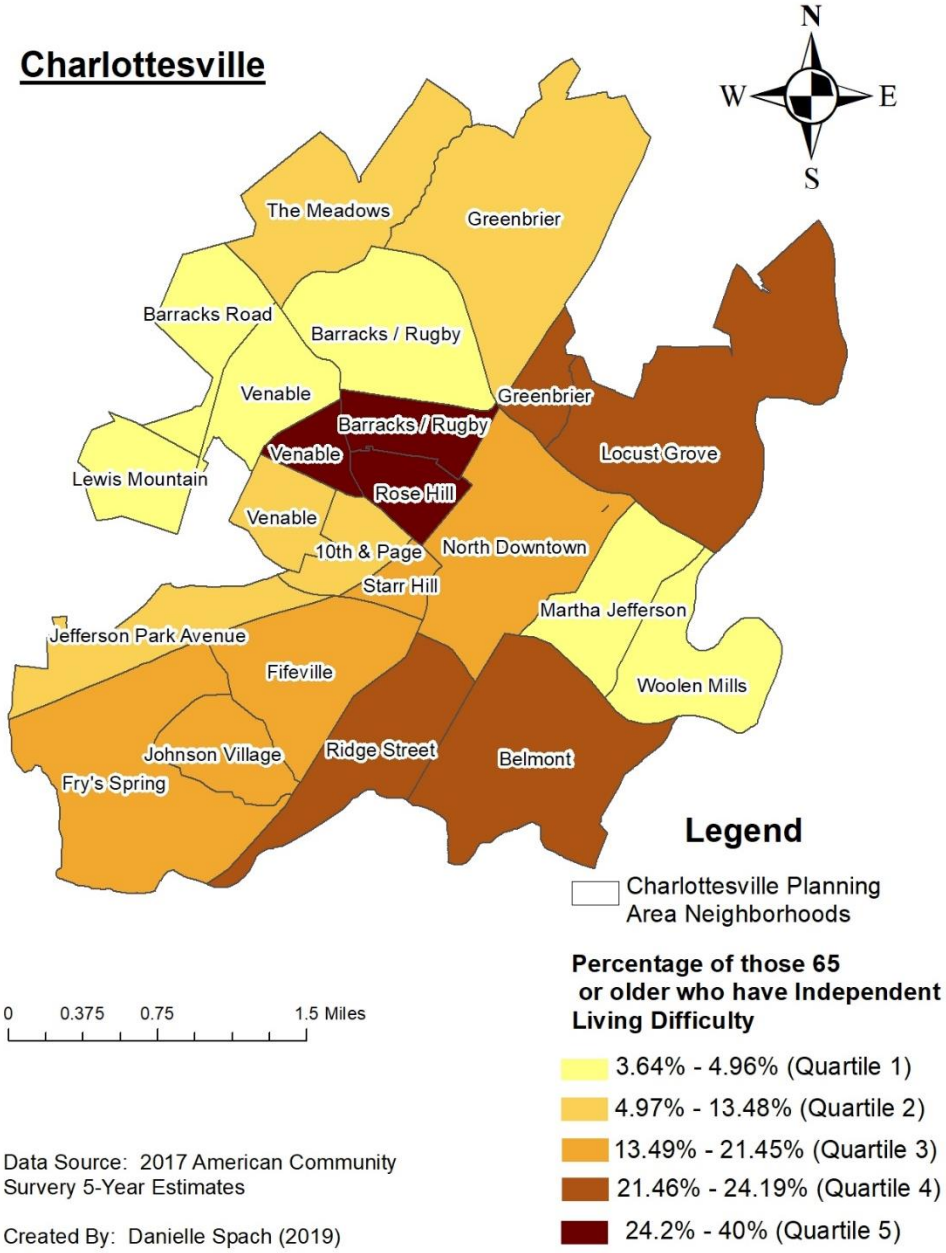
Map 2: Concentration of Group Living Elderly in Albemarle County



Data Source: 2017 American Community Survey 5-Year Estimates

Created By; Danielle Spach (2019)

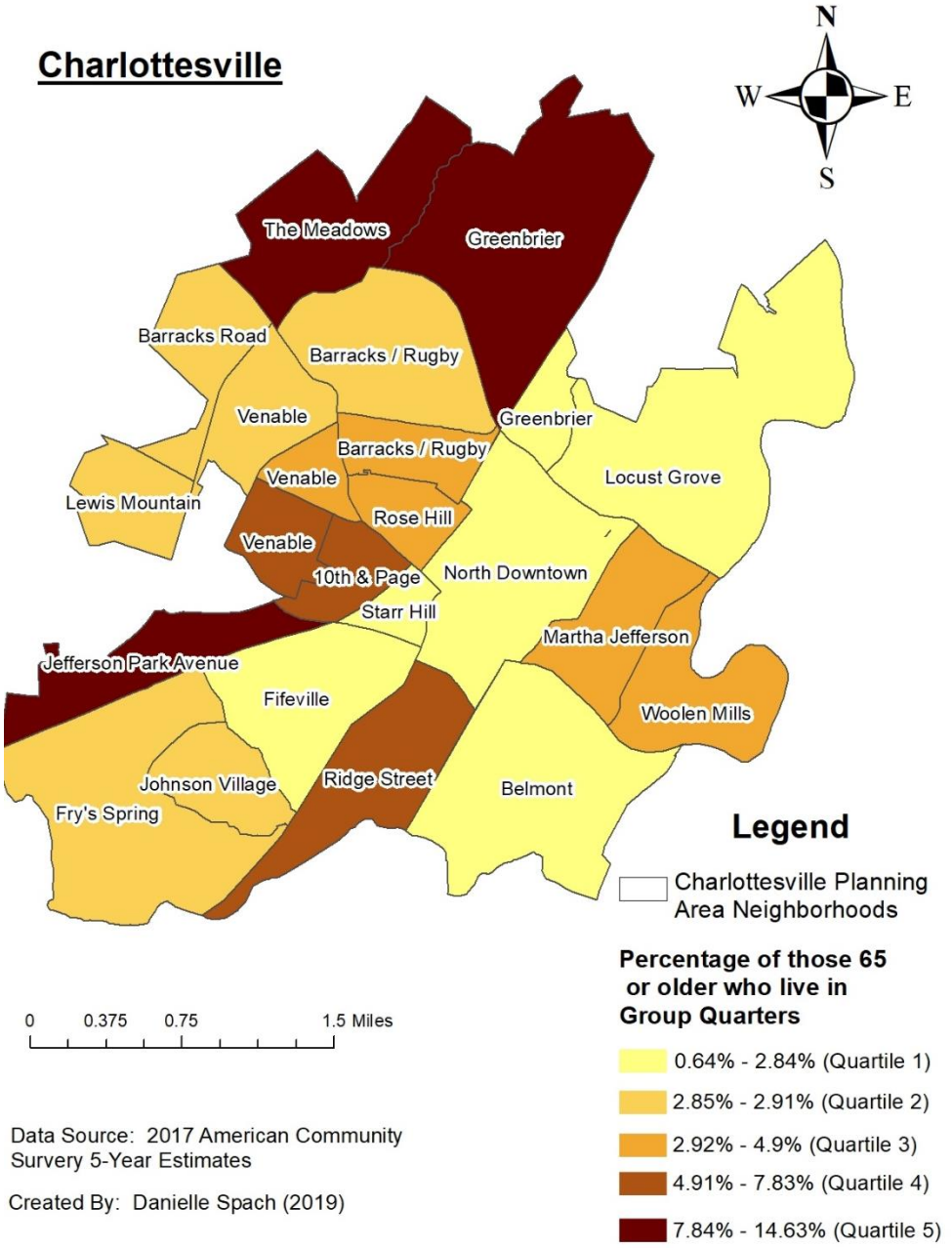
Map 3: Concentration of Homebound Individuals in Charlottesville



Data Source: 2017 American Community Survery 5-Year Estimates

Created By: Danielle Spach (2019)

Map 4: Concentration of Group Living Elderly in Charlottesville



Data Source: 2017 American Community Survery 5-Year Estimates

Created By: Danielle Spach (2019)

Albemarle & Charlottesville Percentage of Elderly Disabilities Compared to the Region

Some emergencies such as hurricanes and floods effect not only Albemarle and Charlottesville but the entire Central Virginia region. In these circumstances, regional emergency planning and coordination could be required. It is important to understand the magnitude of elderly vulnerability in neighboring localities to infer what type of assistance could be needed during a regional emergency. Localities with a higher percentage of elderly with ambulatory, self-care or independent living difficulty will likely need additional resources.

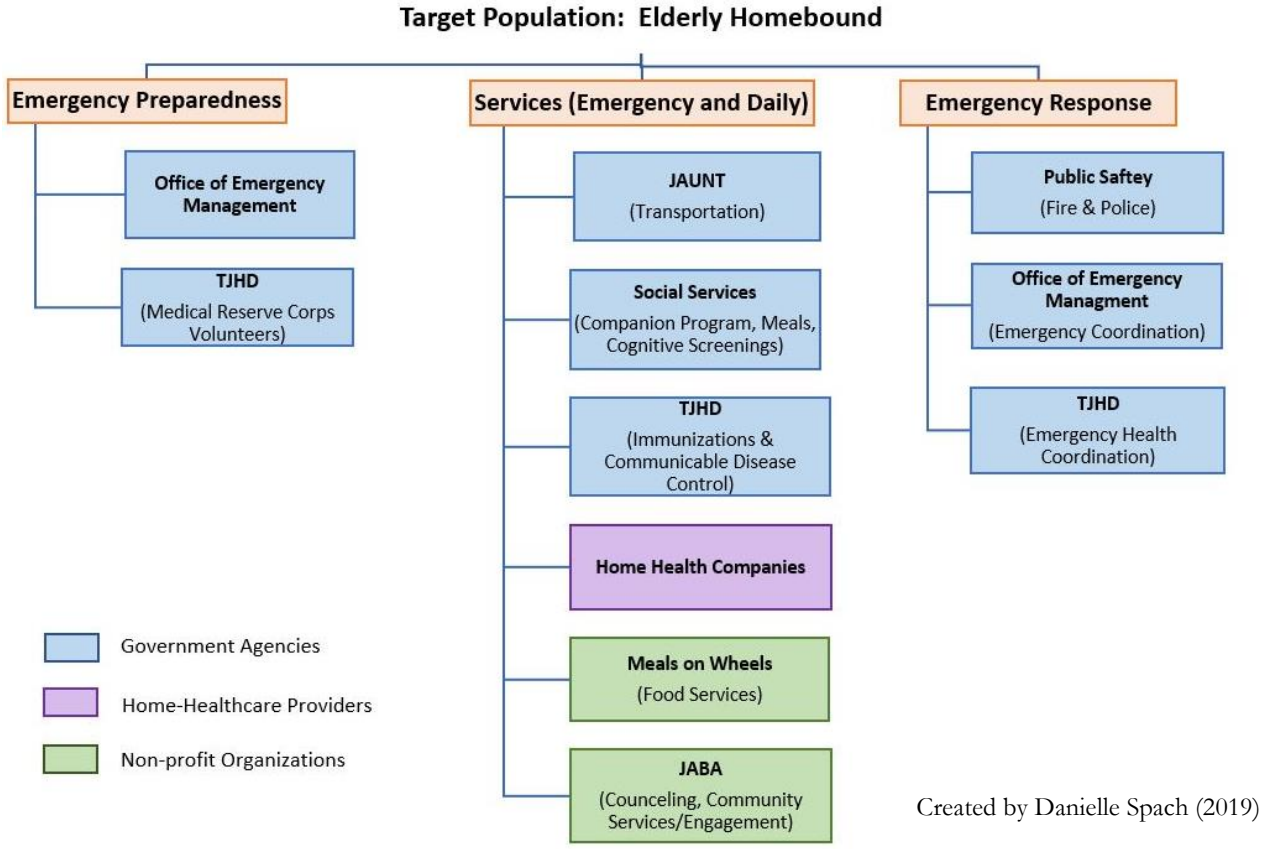
Percentages of the elderly population 65 or older with ambulatory, self-care, and independent living disabilities for Charlottesville/Albemarle, Fluvanna County, and Louisa County are displayed in Table 1. According to 2017 ACS data, Louisa County's percentages of elderly with ambulatory, self-care, and independent living difficulties are slightly lower than Albemarle and Charlottesville but still high. Fluvanna County's percentages are the lowest out of the three areas. As a result, Fluvanna County is likely to experience less emergency situations involving disabled elderly than Albemarle/Charlottesville and Louisa County during a regional disaster.

Table 1: Percentage of Population 65 and older with Ambulatory, Self-Care, and Independent Living Disabilities (Census Bureau 2013-2017 American Community Survey Estimates, 2017)

	Charlottesville/Albemarle	Fluvanna County	Louisa County
Ambulatory Difficulty	28.02%	15.59%	24.07%
Self-Care Difficulty	9.01%	5.71%	7.45%
Independent Living Difficulty	16.80%	8.52%	12.01%
**Data based on Census 2017 American Community Survey 5-Year Midpoint Estimates tables (B18105, B18106, and B18107)*			

Stakeholder Analysis:

Addressing the emergency needs of the elderly homebound population in Charlottesville and Albemarle County requires the participation of multiple organizations. I interviewed members of local departments and non-profit organizations from November 2018 to January 2019 to understand what type and level of expertise each organization brings to the table. This is not an exhaustive list of all the organizations that could be involved, but does cover key players within the community. These organizations serve the elderly homebound population by providing disaster preparedness education, daily services, and emergency assistance. The table below depicts how each organization serves the elderly homebound.



Created by Danielle Spach (2019)

1. **Government Organizations**

   Charlottesville-UVA-Albemarle Office of Emergency Management- The Charlottesville-UVA-Albemarle Office of Emergency management is responsible for the emergency preparedness, response, and recovery needs for the City of Charlottesville, Albemarle County, and the University of Virginia. The Office currently addresses senior emergency preparedness by facilitating workshops and seminars at assisted-living facilities and senior communities. Seminar topics include how to prepare an emergency kit, home safety, and local hazards within the area. The number of workshops and seminars per year fluctuates based on demand within the community and the number of unexpected emergencies. On average, the Office provides two to three senior preparedness events a

year and reaches about 90 seniors.[2] There is currently no formal mechanism to record feedback from participants. According to the Emergency Management Coordinator anecdotal and verbal feedback from participants has been positive.

Thomas Jefferson Health District (TJHD)- TJHD is comprised of five health departments within Charlottesville/Albemarle, Fluvanna County, Green County, Louisa County, and Nelson County. Their region covers 245,000 residents with 150,000 living in Charlottesville/Albemarle (Virginia Department of Health, 2019). TJHD works with the Office of Emergency Management to ensure those with medical support needs are accounted for during an emergency.

The U.S. Department of Health and Human Services created the EMpower tool to help localities gain information on individuals likely to be homebound due to medical complications. EMpower provides TJHD data on the medical needs of community-dwelling elderly reliant on electricity-dependent medical equipment (U.S. Department of Health & Human Services, 2019). Some of the information from EMpower is publicly available such as the total number of electricity-dependent claims by zip code. TJHD has access to more specific information such as an individual's address, health care provider, and type of electricity dependent equipment (U.S. Department of Health & Human Services, 2019). From my interview with the Local Health Emergency Coordinator, I learned that for past two years TJHD used EMpower to help determine where to emphasize education and outreach based on the areas with a high concentration of electricity dependent equipment. In preparation for Hurricane Florence in 2018, TJHD used the equipment and health care provider information to make sure medical equipment providers had a process for delivering equipment to clients in case of a power outage.

Albemarle & Charlottesville Social Services (Adult Protective Services and Adult Services Program)- The Adult Services Program (ASP) provides individuals 60 or older screenings for nursing level care and assisted living care. ASP also has a companion program that provides meal preparation, risk prevention, and community interaction to those who are elderly, have limited financial means, and have a physical, emotional, or cognitive disability. The companion program does not currently address the full need of the elderly population because there is a waitlist. When an emergency approaches or occurs, Social Services provides the vulnerable elderly population with preparedness information by contacting individuals on the companion client and in-home care lists. If there is a possibility that community members will need to evacuate, Social Services is the lead agency for emergency shelter coordination. The department works with the American Red Cross to set up shelters, staff shelters, and providing the community with shelter information.

Public Safety (Fire and Police)- Albemarle and Charlottesville Fire Departments respond to the emergency medical needs of the elderly homebound population. The Albemarle and Charlottesville Police Departments monitor incidents of senior citizen exploitation and investigate cases of elder abuse. If time permits, wellness checks are used by both Fire and

[2] Information taken from the Office of Emergency Management's public outreach tracking document. The document is an excel spreadsheet containing a broad list of preparedness workshops from 2014-2018.

Police to alert vulnerable communities during intense weather events and to provide information during an emergency. Additionally, the Albemarle Fire Department is testing a program where they notify Albemarle Social Services when an elderly individual calls 911 multiple times a week. The goal is to help identify community members who could benefit from the Adult Services Program or need additional medical attention.

JAUNT- JAUNT plays an important role in providing transportation to members of the community who are unable to drive. According to JAUNT's Chief Administrative Officer, JAUNT has approximately 500-550 clients a day in the urban ring and about 700-800 clients a day in rural Albemarle. Elderly clients tend to live in the urban ring of Charlottesville and Albemarle County and primarily use JAUNT for doctor's appointments and personal activities. Changes in services due to emergency events are communicated to clients through direct contact from drivers, social media, and sometimes through phone calls or email. It is sometimes difficult to reach elderly clients because they may not have a phone, email, or access to social media. In these circumstances, contact from drivers about impeding weather events is often used to disseminate information to elderly clients.

2. **Non-profit Organizations**
   Jefferson Area Board for Aging (JABA)- JABA provides services to community members who are 60 years and older or 18 years and older with a certified disability. JABA is not designated as an emergency services provider but does assist other organizations in making sure that members of the community are prepared for an emergency. JABA assists with disaster notification and preparedness by maintaining a list of frail seniors, sending information to outreach counselors, and providing in-service trainings at the Senior Center. To help form a community with their clients the organization runs a friendly caller and visitor program for several clients. This program gets information out to clients during an emergency.

   Meals on Wheels- Meals on Wheels primarily assists the elderly homebound population by providing meals to community members who are unable to cook for themselves due to physical, medical, or mental limitations. The organization currently has about 200 active clients (Charlottesville/Albemarle Meals on Wheels, 2016). According to the Client Manager, a large portion of clients live in the Charlottesville metro area, but their services go as far north as Earlysville. During blizzard and snow storms Meals on Wheels gives out Blizzard Bags to clients (Charlottesville/Albemarle Meals on Wheels, 2016). These bags contain 2-3 days worth of non-perishable food items, describe where clients can receive weather updates, and how to sign up for Code Red which is the City and County's emergency alert system. The organization utilizes radio, TV, and phone services to send out their service status during emergencies.

3. **Home-Healthcare Providers-** The Virginia Department of Health Office of Licensure and Certification is in charge of the certifying home-healthcare companies in Virginia. There are two types of home healthcare providers: certified home health agencies and home care organizations. Certified home health agencies accept Medicare and Medicate clients and provide skilled nursing services. Home care organizations provide personal care services to

increase resident safety within the home and do not accept Medicare or Medicaid clients (Virginia Department of Health Office of Licensure and Certification, 2012). As of November 2012, there were five certified home health agencies and seven home care organizations in Charlottesville/Albemarle. Home-healthcare providers are not required to communicate to the Office of Emergency Management on an annual basis (Virginia State Board of Social Services, 2018) but are encouraged to facilitate emergency planning. The current Emergency Management Coordinator has had several preparedness conversations with the certified home health agency Continuum Home Health Care managed by the University of Virginia Health System. Other home health organizations have not yet reached out to the Emergency Management Coordinator but the Office of Emergency Management is open to continuing preparedness meetings with home healthcare providers.

Certified Home Health Agencies
CareSouth Homecare Professionals
Continuum Home Health Care
Interim HealthCare
Pediatric Connection, Inc
Sentara Home Care Services

Home Care Organizations
AmeriCare Plus
At HomeCare Staffing
Care Advantage Plus, LLC
Home Instead Senior Care
Maxim Healthcare Services
Nursefinders of Charlottesville
Senior Helpers

Criteria

Criteria are important for evaluating whether an option successfully addresses the problem of inadequate emergency preparedness among elderly homebound individuals in Charlottesville and Albemarle County. Each policy option will be judged based on its effectiveness, cost, and difficulty of implementation. Descriptions of all three categories are briefly defined below.

1. **Effectiveness of the preparedness education strategy:** The amount of elderly homebound who receive preparedness information and the number of elderly homebound individuals who receive medical care during an emergency are two elements of evaluating whether a policy alternative is effective.

    a) ***Amount of homebound who get information and are more prepared for an emergency***: There is a trade-off between the number of people a policy reaches and the depth of information provided to a participant. Education materials such as flyers are able to reach a large segment of the population, but readers could be less likely to retain the information. Complex programs reach a small segment of the population, but allow for repeated interactions with participants and continual learning. Education initiatives are only effective if the information is received and individual behavior changes as a result of the information.

    At a minimum, the literature defines a prepared individual as having an emergency plan, stockpiled supplies, and an emergency contact (Chandra et al., 2011; Gerson et al., 2017). The effectiveness of each policy option will similarly be quantitatively evaluated based on the number of participants likely to have an emergency plan, stockpiled supplies, and an emergency contact. I use preparedness estimates from the San Francisco home-care study as a baseline to estimate the likely obtainment of each category within the elderly homebound population. In the study, 40 percent had an emergency plan, 40 percent had stockpiled supplies, and 66 percent had an emergency contact (Gerson et al., 2017). These percentages are not used if the circumstances of an option lend itself to using a different estimate. An individual would need to have all three markers of preparedness in order to be considered effectively prepared for an emergency.

    b) ***Ability to mobilize resources and information during a disaster to address the medical needs of the homebound population:*** Some policy options will document demographic information for participants such as phone number, email, address, emergency contact, special medical needs etc. The specificity of information will differ among options. Public safety departments could use the demographic information to better understand the medical needs and location of the elderly homebound. A list of addresses could allow for wellness checks before a disaster occurs. Phone numbers and email could serve as a secondary notification system to send out alerts. This criterion will be evaluated qualitatively as a low, medium, or high benefit to public safety. The more readily accessible the information is the greater the likelihood for public safety to use the information in a meaningful way.

2. **Cost:** This criterion will measure the total administrate and economic costs and costs per participant for each policy option. Policy options can have one-time costs and costs that are on-going such as staff time and education materials. The two categories of costs within the presented policy options are personnel costs and material costs. Costs are determined based on market prices, wages, and estimates from literature and case studies.

3. **Implementation and Feasibility:** This criterion will be evaluated qualitatively as either a low, medium, or high likelihood of implementation. All policy options will involve buy-in from community organizations. Adoption of a policy option is more likely if the option has support from multiple stakeholders. After initial adoption, it is important for a policy option to be sustainable. Sustainability will be evaluated based on the amount of information that needs to be updated and the amount of staff needed to complete the policy.

Alternatives

There are four policy options presented to address emergency preparedness education for elderly homebound individuals. All of the options occur at the outreach and education stage of the emergency management cycle. A main role of the Office of Emergency Management is to develop and implement public awareness and education programs that are accessible to individuals with functional needs and disabilities (City of Charlottesville, University of Virginia, & Albemarle County, 2017). These interventions are designed to improve personal preparedness and to give the Office of Emergency Management and public safety partners information on the emergency needs and preparedness gaps within the elderly homebound community.

Policy Options

1. OEM continues emergency preparedness education through assisted living facilities and senior community outreach
2. Include additional emergency preparedness information with home-care paperwork
3. A voluntary registry database documenting special emergency medical needs
4. A volunteer program where community members sponsor elderly homebound individuals and teach them emergency preparedness

Continuation of the status quo and implementation of the home-health care option could begin by the end of 2019. The voluntary registry and community buddy program are long-term options because they require a larger financial and logistical investment. Implementation of the voluntary medical registry and the community buddy program could begin as early as the end of 2020. The longer-term policy options may also be feasible contingent on an increase in either staff or grant funding. ***All effectiveness and cost estimates are over a ten-year performance time period from 2019-2029.*** Monetary values are in 2018 dollars and future costs and benefits were discounted to present value using a 3 percent discount rate.

The Charlottesville-UVA-Albemarle Office of Emergency Management currently has two full-time employees. Regional coordination with community partnerships and departments will be utilized in all policy options because of the limited staffing capacity of the Office of Emergency Management. Utilizing community engagement from multiple organizations is also helpful because it gives advocates of older and disabled adults the opportunity to learn and contribute to emergency policies and management within the City and County (Aldrich & Benson, 2007).

Option 1 (Status Quo): The Office of Emergency Management continues emergency preparedness education through assisted living facilities and senior community outreach.

Primary Stakeholders: Office of Emergency Management, Non-profit Organizations, JAUNT

Description: This option evaluates what would happen if the Office of Emergency Management continued to address homebound emergency preparedness through presentations and workshops at senior centers and assisted living facilities. The Office of Emergency Management, on average, holds two workshops for senior citizens every year with 45 participants attending each workshop according to their public outreach events tracking document[3]. The exact number of events per year can fluctuate depending on the number of events and emergencies that occur within the region. For example, outreach events were not scheduled from July 2017-December 2017 because of preparation and recovery from the August 11th and 12th riots in Charlottesville. Topics covered in the workshops include how to make an emergency preparedness kit, locations of city and county emergency shelters, and the importance of having an emergency contact.

This option assumes that there is a lack of information about preparedness strategies among the senior population and that presenting preparedness information will directly motivate behaviors such as creating an emergency plan, stockpiling emergency supplies, and having an emergency contact. Within the literature, there is limited evidence on the magnitude of the connection between educational campaigns on emergency preparedness and behavioral change. There are however, some educational strategies linked to the retention of emergency preparedness information. If the information focuses on future losses, comes from multiple sources, and includes some form of interpersonal communication participants are more likely to remember the information (Wood et al., 2011).

If the Office of Emergency Management continues to implement this option, effectiveness measures on changes in participant preparedness will be important because of the lack of a strong causal link between preparedness education and increased preparedness behavior. OEM does not currently have a formal mechanism to record workshop attendance, participant feedback, or measure preparedness behaviors. This prevents OEM from evaluating the effectiveness of their current program. Sign-in sheets could be available at preparedness workshop meetings to ensure an accurate count of participants. There could also be sections within the sign-in sheet for participants to provide an email, address, or phone-number in case they want more information. Participant feedback could be given at the end of the presentation to gage how helpful participants thought the workshop was in teaching them about emergency preparedness. For participants who provided contact information, OEM could send out a questionnaire via mail, email, or by phone several weeks after the workshop asking whether the individual had an emergency plan, stockpiled supplies, and an emergency contact. Individuals that had all three would be considered prepared for an emergency.

[3] The public outreach tracking document is an excel spreadsheet created by the Office of Emergency Management. It contains a broad list of preparedness workshops from 2014-2018.

Analysis:

	Effectiveness		Costs		Implementation & Feasibility
	Number of Prepared Homebound Participants	Ability for Public Safety to Mobilize information	Cost per Prepared Homebound Participant	Total Cost	
Option 1: Status Quo	43	Low/Medium	$158.89	Total: $6,864 *Personnel: $2,099* *Equipment: $4,765*	High

Effectiveness: Preparedness workshops are not targeted specifically to the elderly homebound population but more broadly to the senior community. It is unlikely that all 90 participants per year will be homebound. A lack of transportation and medical limitations could prevent homebound individuals from attending the workshops. It is likely that at least a small number of participants will be homebound or exhibit some level of ambulatory or independent living difficulty. I made the assumption that 20% of participants (18 participants) every year are likely to be homebound because this is close to the prevalence rate of elderly with independent living difficulty within the area (U.S. Census Bureau 2013-2017 American Community Survey 5-Year estimates, 2017). There is no indication that the percentage of homebound participants with an emergency preparedness plan and an emergency contact will increase above the baseline for this option. For this reason, I used the baseline estimates of 40% (7.2 participants per year; 43 participants over 10 years) of the homebound population having both an emergency preparedness plan and an emergency contact (Gerson et al., 2017). If the County and City receive federal grant funding for preparedness education, it is likely that all participants will have some stockpiled emergency supplies because they receive a starter emergency kit at the end of the workshop.

Public safety could gain a small amount of contact information and location of vulnerable elderly if participants voluntarily fill out their address, phone, or email on the sign-in sheet. This would not be a robust way to collect data on the homebound population because the sheet could get misplaced and there is not an easy way to keep the information updated.

Costs: The main costs associated with this option are the time of OEM staff and non-profit organizations coordinating the events and material costs for informational pamphlets. Costs of time was measured by hourly wage salaries multiplied by the number of hours OEM and non-profit organizations spend preparing and attending the workshop. OEM will spend about two hours preparing for a workshop and one and a half hours conducting a workshop. Workshops require a small amount of preparation time because outlines for the presentation and informational materials already exist. All OEM has to do is print the information. Emergency preparedness kits and printing materials are needed for this option. Traditionally, emergency preparedness kits and half the cost of printing materials has been covered by federal grants. Out of pocket, the Office of Emergency Management spends about $500 on printing costs according to the Emergency Management Coordinator. Non-profit personnel typically do not spend time preparing for the workshop but do attend the hour and a half presentation.

Implementation & Feasibility: This option is highly feasible because there is little to no indication that the Office of Emergency Management will not be able to conduct at least two emergency preparedness seminars for the senior population every year. Unless there are multiple large-scale emergencies throughout the year, the OEM staff currently has enough time to facilitate two workshops. Preparation for the workshops does not require a large amount of time from OEM staff because the informational materials are already created. The Office also already has an established relationship within multiple senior communities, JABA, Meals on Wheels, and other non-profit organizations who attend the workshops.

Option 2: Include additional emergency preparedness information within home-care paperwork

Primary Stakeholders: Office of Emergency Management, Home Health Companies, and Thomas Jefferson Health District

Description: Some individuals are homebound because of a medical condition and require in-home medical care. The Office of Emergency Management could partner with local homecare providers to include emergency preparedness information within home-care packets. This option incorporates some of the educational components of the status quo to a population that the Office of Emergency Management does not have easy access to. Due to physical and medical limitations, it could be difficult for a homebound individual to attend a preparedness workshop within the community. Home health aids have regular contact with their clients and transportation by homebound individuals is not needed to receive the emergency preparedness information.

There are about 260 home health aids in the Charlottesville area (Bureau of Labor Statistics, 2018) and twelve companies that provide either high skilled nursing services or services to assist with self-care (Virginia Department of Health Office of Licensure and Certification, 2012). OEM would need to establish a relationship with all of the providers to ensure that home health aides are providing consistent preparedness education information to clients. Contact information for homecare companies is listed on the Virginia Department of Health Office of Licensure and Certification website.[4] Once OEM establishes relationships with home health providers, OEM could host a semi-annual meeting for home health aids where the office updates home health aids on current preparedness initiatives and information. This would help ensure that there is consistency across information sources.

The main difference in the home-care paperwork option versus the status quo is that preparedness information is likely to reach a larger segment of the homebound population. Ideally, anyone receiving home health care would get the emergency preparedness information from their home health aide. I used estimates from a 2011 study and Medicare's definition of homebound to estimate the number of individuals 65 and older receiving in-home medical care. The 2011 study estimated that 5.6 percent of the community-dwelling Medicare population was homebound under Medicare's homebound definition (Ornstein et al., 2015). Medicare defines homebound status as receiving full-time healthcare through a home health agency (Medicare.gov, 2018). There are currently about 19,000 individuals 65 or older receiving Medicare in Charlottesville and Albemarle according to 2017 ACS 5-year estimates. There is likely 1,064 elderly homebound individuals using home health services in Charlottesville and Albemarle based on the 5.6 percent estimate.

[4]https://www.vdh.virginia.gov/OLC/Facilities/documents/2012/pdf/2012%20HCO%20public%20directory.pdf

Analysis:

	Effectiveness		Costs		Implementation & Feasibility
	Number of Prepared Homebound Participants	Ability for Public Safety to Mobilize information	Cost per Prepared Homebound Participant	Total Cost	
Option 2: Home-Health Flyers	426	Low	$152.30	Total: $64,879 *Personnel: $60,114* *Equipment: $4,765*	High

Effectiveness: Similar to the status quo option, this option assumes that presenting emergency preparedness information to individuals receiving home-care services increases the likelihood of partaking in behaviors that improve preparedness. It is unlikely that the percentage of homebound who are prepared will be different from the status quo because this option uses a similar education strategy. Therefore, baseline percentages for individual preparedness are used to measure the number of prepared homebound participants as a result of this option. This option provides similar information within the status quo to a larger population. As stated above 1,064 elderly homebound individuals are likely to receive the preparedness information from home-health aids. Forty percent of this population (426 people) is likely to have an emergency plan, stockpiled supplies, and an emergency contact.

There will not be a large amount of additional data that public safety can use to help with emergency planning. Home health aides can report the number of individuals they give the information to but they are unlikely to be able to share the contact information of their clients. This makes it difficult for OEM to measure the effectiveness of this option because there is no direct way for them to measure whether individuals are increasing preparedness behavior. Increases in preparedness behavior would have to be communicated from the individual, to the home health aide, and then to OEM.

Costs: Personnel costs are higher than the status quo option because this option requires the coordination of 260 health aids in addition to OEM preparing for and facilitating the semi-annual preparedness meetings. The semi-annual meetings are likely to run about two hours and require 5 hours of preparation from the Emergency Management Coordinator. Hourly wage estimates for home health aide, the emergency management coordinator, and time of meeting and preparation were used for measuring personnel costs. Equipment costs are the same as in the status quo option. Flyers and informational packets will need to be printed by OEM to give to in-home healthcare companies. Printing costs $500 for the office annually.

Implementation & Feasibility: In the first year of implementation OEM will need to spend some time networking and building rapport with in-home healthcare companies. Once relationships are established, the time commitment of OEM will be similar to what is already committed through the preparedness workshops. In-home healthcare companies are not currently required to have annual contact with the Emergency Management Coordinator but as the region continues to experience emergencies, there will be a greater incentive to make sure staff and clients are well-prepared.

Option 3: Create a voluntary registry documenting special emergency medical needs of citizens with access and functional limitations.

Primary Stakeholders: Office of Emergency Management, Public Safety, Thomas Jefferson Health District, Social Services

Description: A voluntary registry documenting special emergency medical needs primarily focuses on providing information about the homebound population to public safety departments. There would be a place for individuals to record their unique medical needs, address, phone-number, email, and emergency contact. Providing this information would be voluntary and an individual could decide to not fill out every question. Addresses could help emergency responders plan specific areas where wellness checks could be useful in making sure a vulnerable community is ready for an impeding emergency.

Case Study: Texas Regional Advisory Council Pink Vest Program

The Southeast Texas Regional Advisory Council created a pink-vest program to better identify individuals within their community with unique medical needs. Community members who signed up received a pink vest to wear in the case of an emergency. The program was created mainly for those receiving at-home care (Flynn, 2018). 2-1-1 operators were able to roll out telephone messages to participants when Hurricane Harvey started to approach the Houston area through the areas Catastrophic Medical Operations Center. The phone line operators identified and assisted over 15,000 homebound individuals with special medical needs (Flynn, 2018). Federal health officials also used Medicare claims to estimate the areas that had a large population dependent on electricity powered devices such as ventilators, oxygen concentrators, and electric wheelchairs (Fink & Blinder, 2017).

Data within the registry could be used as a notification tool to send out emergency messages to participants. The city and county currently use Code Red for emergency notifications (Charlottesville-UVA-Albemarle Office of Emergency Management, n.d.). This database is good for sending out mass notifications to a specific geographical area but does not allow localities to send information based on medical or age characteristics. Individuals providing phone numbers and emails would create a mechanism for public safety to send notifications via phone or computer to homebound individuals.

Analysis:

	Effectiveness		**Costs**		**Implementation & Feasibility**
	Number of Prepared Homebound Participants	Ability for Public Safety to Mobilize information	Cost per Prepared Homebound Participant	Total Cost	
Option 3: Voluntary Medical Needs Registry	271	High	$446.88	Total: $121,195 *Personnel: $78,095* *Equipment: $43,100*	Low

Effectiveness: The voluntary medical needs registry has the potential to reach a large segment of the elderly homebound population. The number of individuals who participate will largely be a factor of the amount of time OEM spends promoting the new program. I estimated the number of sign-ups based on sign-up trends from the Code Red notification system. Participation rates in Code Red increased to 21 percent of the entire Albemarle and Charlottesville population within the first full year of implementation (Charlottesville-UVA-Albemarle Office of Emergency Management, 2018). According to ACS 5-year estimates, 619 is 21 percent of the population 65 and older with independent living difficulty in Charlottesville and Albemarle. One limitation to this estimate is that Code Red data is only available for this past year because the city and county started using it in 2017. Participation trends in the future could vary wildly and it is unlikely that every year there will be a large increase in participation. Because of this, I estimated that 57 additional homebound individuals would join the program the eight years after the initial completion of the project. This would be a 1 percent increase in participation every year. Over the 8-year period 676 homebound individuals would likely sign up for the program (619 initially + 57 over the next 8 years). Not everyone who participates in the notification system will be prepared for emergencies. I used the baseline estimate of 40% of the population being prepared because there is no indication that this option will directly increase emergency plan writing, stockpiling of goods, or getting an emergency contact. Forty percent of the 676 people who participate is 271.

Costs: A large amount of costs for the voluntary medical needs registry will occur upfront with the purchase of a database system. Additional costs within the first couple years of the program will be promoting it within the community. According to the Emergency Management Coordinator, the office spends on average 10 hours a month promoting Code Red. Once the database is created, it could be beneficial for OEM to hire a part-time database manager in order to regularly update the data and protect the sensitivity of the information. Estimates for the economic costs of time were calculated using 2017 and 2018 Bureau of Labor and Statistics estimates of the mean wage of an emergency management coordinator and database manager.

Implementation & Feasibility: A budget proposal would likely have to be approved by the county to implement this alternative because the initial start up costs would be high due to the purchase of the database. This will take time and could slow down the start date of the project. It is also unlikely that OEM will have the financial means to hire a database manager and pay for the database unless the position is grant funded.

Option 4: Create a Volunteer Program where community member sponsors a homebound individual to teach them emergency preparedness

Primary Stakeholders: Office of Emergency Management, Social Services, Meals on Wheels, and JABA

Description: This option attempts to alleviate the isolation of elderly homebound from the community while also increasing emergency preparedness. Community members would volunteer bi-weekly or monthly to check in on homebound individuals. The meetings would most likely take place within the home of the homebound individual. During visits, volunteers would make sure that the individual was prepared for an emergency by providing emergency supplies and working through the process of creating an emergency preparedness plan. Ideally, the volunteer could also serve as an emergency contact for homebound individuals who do not already have one.

The Office of Emergency Management would be the lead agency in charge of the program. OEM would be responsible for recruiting both volunteers and homebound individuals willing to participate. The Office of Emergency Management has access to some volunteers through the Community Emergency Response Team (CERT). CERT is an organization that educates community members about local hazards and how to prepare for an emergency (Department of Homeland Security, n.d.). CERT members would likely be interested in participating in the elderly homebound volunteer program because it also focuses on emergency preparedness. According to the Emergency Management Coordinator, there are currently about 35 routinely active CERT volunteers. OEM could also ask Meals on Wheels or JABA for volunteers since they already serve the homebound population. The Department of Social Services could be a valuable asset to finding homebound individuals willing to participate because their companion program often has a waiting list. Social Services also has as rigorous screening process to make sure that client homes are safe for volunteers and staff.

This volunteer program would consist of managing a large number of people. Based on the active members in CERT, there would be 35 volunteers and 70 homebound individuals if each volunteer had two buddies. The Office of Emergency Management is currently ill-equipped to manage a program this large because there are only two people on staff. Before the program starts, OEM would likely have to hire a part-time volunteer coordinator to work a least 10 hours a week. The volunteer coordinator would be responsible for recruiting volunteers, coordinating schedules, providing materials to volunteers, and managing data.

Analysis:

	Effectiveness		Costs		Implementation & Feasibility
	Number of Prepared Homebound Participants	Ability for Public Safety to Mobilize information	Cost per Prepared Homebound Participant	Total Cost	
Option 4: Community Preparedness Buddy Program	70	Medium	$49,431	Total: $3,460,181 *Personnel: $3,455,916* *Equipment: $4,265*	Medium

Effectiveness: The volunteer program would likely have the highest percentage of participants who are prepared for an emergency. All participants would be prepared for emergencies because volunteers could help create an emergency plan, provide emergency supplies, and be the emergency contact for their buddy. The number of homebound individuals who participate in the program will always be limited by the number of volunteers. If there are only 35 volunteers over the next 10 years then only 70 homebound individuals will be able to participate during this time. I assumed a constant rate of volunteer engagement over the next 10 years because of the large amount of volunteer labor present within local non-profit organizations.

This option would provide a medium amount of information to public safety departments. The main limiting factor is that the volunteer program would reach a small number of the homebound population. There would be an abundant amount of demographic and medical information for participants in the program. This information for 70 homebound participants however would not be representative of the entire homebound population because the homebound population is much larger.

Costs: While this option allows for establishing a deep relationship with homebound individuals and repeated interactions, the coordination and personnel costs are large. According to the Emergency Management Coordinator, there are currently about 35 routinely active CERT volunteers. There should be a similar number of active volunteers for this program. Each volunteer would spend 2 hours a month with clients (24 hours per volunteer per year) and the volunteer coordinator would work 10 hours a week (520 hours per year). If grant funding was available for the part-time volunteer coordinator, the program would still have a high cost per participant at $47,853.95.

Implementation & Feasibility: The feasibility of the volunteer program would be medium contingent on OEM hiring a part-time emergency volunteer coordinator. OEM already manages the CERT program and current staff would not have enough time to manage an additional program. If a volunteer coordinator is not hired, this alternative will be highly infeasible. OEM already has an established relationship with the Department of Social Services and non-profit organization so coordinating between organizations for volunteers and information sharing should not be incredibly

difficult. There is a small amount of data that would need to be updated regularly. The office would need to update contact information and rosters whenever an individual joined or left the program.

Evaluation of Options

The following outcomes matrix displays trade-offs between the four policy options based on the criteria of effectiveness, costs, and implementation. Estimates for each value are for program performance over the next 10 years and all criteria are weighted evenly.

Outcomes Matrix: Based on Program Performance Over the Next 10 Years

	Effectiveness		Costs		Implementation & Feasibility
	Number of Prepared Homebound Participants	Ability for Public Safety to Mobilize information	Cost per Prepared Homebound Participant	Total Cost	
Option 1: Status Quo	43	Low/Medium	$158.89	Total: $6,864 *Personnel: $2,099* *Equipment: $4,765*	High
Option 2: Home-Health Flyers	426	Low	$152.30	Total: $64,879 *Personnel: $60,114* *Equipment: $4,765*	High
Option 3: Voluntary Medical Needs Registry	271	High	$446.88	Total: $121,195 *Personnel: $78,095* *Equipment: $43,100*	Low
Option 4: Community Preparedness Buddy Program	70	Medium	$49,431	Total: $3,460,181 *Personnel: $3,455,916* *Equipment: $4,265*	Medium

The home-health flyer and voluntary medical needs registry options both have the capability to access a large segment of the homebound population compared to the status quo and the community preparedness buddy program. The voluntary medical needs registry however, costs significantly more in total and per prepared individual when compared to the home-health flyer option. Some of these costs could be lowered if the database and database manager were funded by federal grants. If OEM received a federal grant for the voluntary medical registry, costs per prepared homebound participant would decrease to a more manageable $165.39. The grant would have to be renewed every year and there is no guarantee that it would be rewarded. Because of this, the feasibility of a federal grant funding the voluntary medical registry for 10 years is low.

Recommendation

I recommend that the Charlottesville-UVA-Albemarle Office of Emergency Management implement **Option 2: and include additional emergency preparedness information within homecare paperwork.** This option has the ability to reach the largest amount of elderly homebound and costs the least per prepared individual. Home-health aids already have an established relationship with homebound individuals. There is also an opportunity to expand emergency preparedness communication between home-health aids and OEM similar to what is required for assisted-living communities.

Implementation

The Office of Emergency Management should first contact Continuum Home Health Care because they have already shown interest in emergency preparedness planning through past contact with the Emergency Management Coordinator. If Continuum Home Health Care chooses to participate, OEM could either run a small pilot program with the one provider or contact other providers to participate. Either way, implementation of the program should start in areas that have the highest concentration of home health clients or the highest concentration of elderly homebound (Map 1 and Map 3).

Primary Target Areas in Albemarle

- Monticello
- Northern Scottsville
- Western Red Hill
- Southern Cale
- Southern University
- Southern Crozet

Primary Target Areas in Charlottesville

- Belmont
- Locust Grove
- Barracks/Rugby
- Southern Greenbrier
- Rose Hill

It is important that all sources of emergency preparedness information have a consistent message and do not contradict each other in order to prevent confusion and increase the likelihood of remembering what is presented (Wood et al., 2011). During initial meetings there should be discussion about how the home health organization presents emergency preparedness information if at all. If the organization does have emergency management information to give to clients, OEM should make sure that the information is appropriate and complementary to current pamphlets and flyers.

Evaluation of the program will rely heavily on home health aides and their ability to collect information. They are the ones who will meet with the homebound individual regularly and will be the best judge of whether or not they have engaged in emergency preparedness actions. Home health aids could remind clients about how to prepare for an emergency throughout the year. Additionally, a document with several questions such as "Do you have an emergency plan? Do you have supplies for an emergency? Who is your emergency contact?" could gage preparedness levels among clients.

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