Chapter 15
Contributing to Geriatric Health and Well-Being Through Improving Community Resilience Capacities

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Abstract This chapter provides clinicians and other healthcare and caregivers an appreciation of how improved community health resilience can help assure disaster preparedness of the geriatric population through enhancing the resilience of individuals and hospitals, health centers, eldercare facilities, and essential logistic chains that serve seniors. The chapter also discusses the challenges facing the elderly in facing disasters and collaborative actions key community stakeholders can take to support unique needs of older residents.

Keywords Resilience • Community resilience • Health resilience • Geriatric resilience • Geriatric health • Resilient communities • Preparedness • Disaster response

The world population is aging. Today many individuals live longer and enjoy an active life. However, many seniors have a range of physical and/or mental challenges. Individuals over 65 years of age, even those with active lifestyles, are subject to decreasing physical and biological reserves that can be exacerbated under conditions of emergencies. Geriatric health and well-being—*geriatric resilience*—are

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dependent on, and are an integral element of *community health resilienc*e: the ability of individuals and the regions in which they live, to withstand and adapt to major adverse health events. Identifying vulnerabilities, hazards, consequences, and risks can help with behavioral, social, and economic factors affecting this segment of the community and develop necessary preparedness and response resilience programs [1, 2]. Many older individuals live on a limited income, alone, isolated from the rest of the community and are susceptible to severe psychological impacts following disasters [3]. By itself social isolation is an important health risk factor predicting morbidity and mortality events and is further compounded by disasters [4, 5].

Over the past decade, disasters and other events in the USA and many regions of the world have provided case studies of the inordinate burden on the elderly victims of such events. These impacts were documented following Hurricane Katrina in 2005; Superstorm Sandy, which decimated parts of New York and New Jersey coasts, in 2012; the 2011 Joplin, Missouri, and Tuscaloosa, Alabama, tornado outbreaks; the earthquakes in Japan and Christchurch, New Zealand in 2011; and the 2004 Indonesian Tsunami. A 2006 US federal report estimates that 71 % of those who died as a result of Hurricane Katrina were older than 60, and nearly half were older than 75 years. About 2 weeks after Hurricane Sandy, the *New York Times* reported that nearly half of those who died in the storm were 65 or older [6]. Many of these elderly victims drowned at home, while others died from various storm-related injuries, hypothermia, and associated comorbidities. Sandy also caused the evacuation of more than 6,200 people from 47 nursing and adult care homes. Hundreds were displaced, living in different nursing homes or other temporary facilities weeks to months after the event, many still sleeping on rows of cots in overcrowded community rooms with some continuing to pay their care facilities although they were not living in them [7]. Even less catastrophic events can wreak physical and mental havoc on individual and societal health, and place inordinate burden on geriatric populations and their care-givers. Well-publicized incidents in disasters of eldercare facilities and hospitals with geriatric patients resulted in steps to identify and address these needs and make them a priority in disaster preparedness and planning for community resilience [2, 8].

Community Health Resilience for Geriatric Health and Well-Being

Community resilience and specifically community health resilience is essential to ensure geriatric population needs are accounted and incorporated into preparedness, response, and recovery planning. In 2011, 13.3 % of Americans, or 41.4 million people, or one in every eight individuals, were over the age of 65 (US Census Bureau 2012). Older men are more likely to be married, than older women. It is estimated that 28 % of older individuals live alone, with half of the older women living without companions (46 %). The average income of men and women ranged from 27, 707 to 15, 362 USD, with 3.6 million (8.7 %) surviving on an income

below the official poverty level. By 2060, it is estimated that 92 million people, will be over the age of 65. Many older adults have chronic health problems that affect their ability to live independently. The aging process has been implicated with potential loss of learning skills, physiological reserve capacity, and relying on relatives for support to handle preparations and respond to disasters. Many older adults are able to live in their environment because services are provided by their communities [9].

Geriatric Resilience Challenges

Many studies have documented the chronic health consequences in the aftermath of disasters. About 80 % of older individuals have at least one chronic health condition [10]. According to the US latest census, as of 2010 over 30 million individuals aged 65 and older reported living with one or more disabilities, and it was estimated that in 2009 over 1.3 million seniors resided in nursing care facilities and required specialized care. Thus it is not surprising that disasters result in higher mortality among older individuals [11, 12].

Needs. Older community residents have different levels of personal resilience and special needs beyond healthy younger individuals in functional areas, such as: communication; reliance on medical care and support; preparing meals; driving and availability of transportation; response time; night vision; hearing; and situational awareness. In some instances, the level of physical and/or cognitive disabilities requires assisted living or nursing care support. With advancing age, individuals exhibit slower responses to emergencies. If older adults are moved to a shelter, they may be at risk for falls, dehydration, delirium, infections, and medication reactions. Many of them also require a special diet based on their health or medications they take. Temperature regulation in older adults may put them at risk for hypothermia and hyperthermia. Many of these individuals may not know their medications or have extra supplies of medications to bring along. Some may have pharmacological dependency.

Seniors, reflecting the population as a whole, are also from diverse cultures, and could have limited English proficiency or be non-English speaking. Past experience has shown that many elder citizens may refuse to leave their dwellings even when the situation is clearly life-threatening. Disorientation to time and place and forgetfulness has been documented, when placed under stress or in unfamiliar surroundings. Without a care-giver or family member present, seniors may not be able to provide information on where they live, how to reach relatives, on their medications or dose levels, or even who they are. Apart from the elderly themselves, first responders, caregivers, and family may need assistance with managing an individual who is unstable, or has a terminal or contagious condition that requires observation and ongoing treatment. Seniors who live at home and rely on homecare assistance to be independent in daily activities may lose this support during an emergency or a disaster. Such support may include medical and specialized supplies (diapers, formula, bandages, colostomy supplies, etc.), refills on medications,

durable medical equipment (wheelchairs, walkers, scooters, etc.), service animals, and/or attendants or caregivers [13].

Depression in the older population is also a factor as individuals are less likely to get involved with mental health professionals due to a perceived stigma attached to it [14, 15]. Many seniors are reluctant to leave familiar settings and may refuse help from strangers. Signs of depression and other mental challenges need to be monitored for individuals who refuse to depart their homes and for those placed in shelters during disasters as they may be unable to cope with the loss of a stable environment and confused by constantly changing conditions brought about by the disaster (particularly if they have dementia, Alzheimer's, or psychiatric conditions such as schizophrenia or intense anxiety) [14].

Capabilities Required. In order to meet these geriatric resilience needs to prepare for, respond to, and recover from disasters and other events with significant consequences; there are a broad range of capabilities required at the individual, organizational, and particularly at the community level. *At the individual level*, it is important to help improve personal preparedness and resilience for the elderly and their caregivers, to include individual and family preparedness education by local government and human service entities, keeping in mind that many elderly may have one or more disabilities. According to the US Census report, in 2010, people 80 and older are about eight times more likely to have a disability than the youngest group. About 8.1 million people had difficulty seeing, about 7.6 million people experienced difficulty hearing, and roughly 30.6 million had difficulty walking or climbing stairs, or used a wheelchair, cane, crutches, or walker. *At the organizational level*, capabilities are needed to assure service continuity and handle medical surge at eldercare facilities, hospitals, and health clinics. These capabilities include redundant and resilient communication systems, remote storage of health data, identification of essential staff and training and exercising personnel on emergency procedures. At the *community level*, necessary capabilities include informed first responders and public health officials on the needs of the elderly and how to meet these needs, response and recovery plans and procedures for meeting the above noted needs, and training and exercising with social service groups and institutions that serve the elderly.

In sum, geriatric resilience requires a holistic *community resilience* approach that focuses on improving preparedness from the individual, organizational, to the community level. This necessitates that clinicians and other healthcare and caregivers who have responsibilities for the care and quality of life of the elderly become engaged in, and help improve community health resilience.

Importance of Infrastructure Interdependencies to Geriatric and Community Resilience

Typically in the United States, a team of providers and organizations ranging from visiting nurses, Meals on Wheels, physical therapists, personal care attendants, homemakers, physicians, and other specialists care for our frail older adults along

with any available family members. These providers and organizations, as well as the individuals they serve and the communities in which they live are dependent on interconnected infrastructures and essential services that are vulnerable to damage and disruption. Because of these linkages, even limited, single-point events can cause cascading impacts that can leave individuals and communities without these services for days, weeks, and in extreme cases, for months. Many lifelines (energy, water and waste-water systems, and communications) and other infrastructures, such as transportation, healthcare facilities, and food production and distribution, are part of a complex network of physical, electronic, and virtual systems and assets. Often these systems and assets—e.g., pipelines, cables, substations—are collocated and can collectively fail or sustain damage in floods, earthquakes, deliberate or inadvertent events (natural gas pipeline explosions or terrorist attacks, disruptions from aging or deteriorating infrastructure, etc.) [16].

The result can be significant health and safety, economic, and environmental impacts to communities with widespread destruction and/or prolonged disruptions of electricity, natural gas, water and sewer services, food and pharmaceutical availability and distribution, and communications, including phone, internet, and critical IT services. Hospitals, health clinics, nursing homes, and other facilities that serve the elderly may lack capacity to deal with the disruption of these services and of other essential needs, such as bio-hazardous waste removal, laundry services, medical supplies, and security and IT technical support. Prolonged loss of critical services can force evacuation of these facilities and put at risk seniors who are living at home.

Building Resilient Communities

As noted, health resilience for the elderly residents requires assuring that the many needs and services are tailored to their specific needs and continued during and after the event. This means health resilience for seniors is clearly an element of, and dependent on broader community resilience.

Fundamentals of Community Resilience

Before examining geriatric resilience and how it can and should be incorporated in a community's resilience planning, it is important to understand the fundamentals of community resilience. Community resilience and particularly community *health* resilience has emerged as a priority goal from the national to local levels in recognition of the fact that after a disaster, a community should focus on returning to functionality and prosperity as quickly as possible. A community's ability to return to a "new normal" is based on its resilience, or its capacity to withstand, respond positively to, adapt, and recover expeditiously from a crisis or adversity [17]. Over the last several years, there have been a number of public-private sector initiatives undertaken by national, state, and local governments with stakeholders in a number

of countries, which have validated that a *whole community* approach to resilience is required [18]. This approach entails bringing together public and private sector and non-profit stakeholders to identify the community's collective needs to prepare for, respond to, and recover from an emergency event, and determine what capabilities are required to be resilient in the face of all-hazards threats.

While there is no agreed definition of community resilience, it can be described as: *the ongoing and developing capacity of the community to account for its vulnerabilities and develop capabilities that aid that community in (1) preventing, withstanding, and mitigating the stress of a health incident; (2) recovering in a way that restores the community to a state of self-sufficiency and at least the same level of health and social functioning after a health incident; and (3) using knowledge from a past response to strengthen the community's ability to withstand the next health incident* [19].

This holistic approach has been further developed and applied specifically to community *health* resilience by two independent pilot projects [20], a national community health resilience conference, and a follow-up Community Health Resilience Initiative sponsored by the U.S. Department of Homeland Security Office of Health Affairs in cooperation with the U.S. Department of Health and Human Services [21].

These studies, and lessons learned from recent disasters and incidents, workshops, and exercises have shown that the needs and respective capabilities required for resilience at the community level are many and diverse. They also underscore that geriatric resilience is either directly or indirectly bound up with virtually all of these requirements. These needs and capabilities can be categorized in different ways. For the purposes of examining community health resilience, they can be described by the following dozen broad focus areas. Examples of needs/capabilities for each of the focus areas are noted in parenthesis [22].

Community Resilience Focus Areas

1. *Emergency Preparedness and Related Public Health and Healthcare Plans and Resource Issues (medical surge capacity, availability of pharmaceuticals, medical, and other materials, availability of essential services, power, and fuel, including for backup generators, ambulances, etc., critical vendor availability, healthcare facility-related public safety and security issues, access to personal protective equipment, alternative care facilities, effectiveness of preparedness plans, prioritized distribution of vaccinations/anti-virals, availability of medical/hygiene supplies, lab analysis capabilities, and disaster sheltering)*
2. *Communications, Critical IT Systems, Information Sharing, and Health Data Issues (alert and warning/notifications, public health messaging to eldercare facilities and other institutions with significant populations, data collection and dissemination, availability of patient health data, IT systems reliability, resilience, and security, and HIPAA restrictions on individual health information)*

3. *Critical Infrastructure and Associated Interdependencies; Risk Assessment, and Mitigation (identification and prioritization of critical assets, interdependencies-related vulnerabilities and preparedness gaps, ensuring confidentially of proprietary and sensitive infrastructure-related data, assessment of potential and cascading impacts on infrastructures and essential services, including impediments to response and recovery, and identification of potential mitigation measures)*
4. *Coordination and Collaboration across Jurisdictions, Sectors, and Disciplines (Creation or strengthening of cooperative mechanisms to foster coordination and collaboration, including "whole community" collaborative of public, private, and non-profit organizations and associations with roles and responsibilities or interests in preparedness, public health, and resilience)*
5. *Continuity of Business and Operations, and Supply Chain Management (economic consequences of different scenarios, identification of essential operations and activities, assessment of potential disruptions to services and identification of potential mitigation, workforce policy issues, involvement of broad range of businesses in preparedness activities, training of employees and testing of continuity plans and procedures)*
6. *Response Challenges (incident management/unified command/area command, roles and missions, security for vaccine distribution in transit and for dispensing organizations on site and for grocery stores and pharmacies, mutual aid agreements, availability of emergency managers and first responders, and resource requirements and management)*
7. *Recovery and Long-Term Restoration Needs (restoration management structure—what organizations and how organized, roles and missions, decision-making, prioritization of service restoration, resource requirements and management)*
8. *Human Factors, including Physical and Mental Health and related Community, Family, and Individual Issues (understanding and dealing with psychological impacts of affected individuals, including at-risk populations (elderly, disabled, economically disadvantaged, children, pregnant women) and ethnic and cultural groups, identifying and addressing family assistance needs, education and academic institutions, eldercare facilities, community centers, and daycare centers)*
9. *Legal, Policy, and Liability Issues (for government agencies, for businesses, contractual issues, information from/coordination with regulators, privacy issues, ethical issues, liability associated with vaccine distribution and administering and volunteerism)*
10. *Public Engagement, Empowerment, and Information, including Media (procedures for coordinating cross-jurisdiction public health and other emergency information, what information to convey, regional coordination process and mechanisms, plans for maintaining public confidence and outreach to groups servicing at-risk populations, cultural and faith-based groups through social and conventional media and personal contact)*
11. *Training, Exercises and Education (tools for broad and at-risk populations, including the elderly, inclusion of health clinics, human care, eldercare facilities in workshops and exercises)*

12. *Financial and Broader Resourcing Challenges (financial and technical resources from federal, state, and local agencies, businesses, and other organizations, including foundations, for implementation of prevention, mitigation, and other health and safety resilience activities, including post-event recovery needs)*

The Community Resilience Improvement Process

Gauging community resilience requires examining these needs and determining to what extent they are relevant for that particular community and if so, what capabilities are necessary to meet these needs that should be incorporated into a strategy for action to make the improvements. To accomplish this it is necessary for a "whole community" approach that brings together the array of stakeholders—practitioners and experts—that have roles and responsibilities or vested interests in emergency preparedness and resilience, including government agencies at all levels, utilities, businesses, human services, and community and other non-profit organizations. This coalition of stakeholders will determine the community's collective resilience gaps and recommended actions (the action plan) through a process that includes educational seminars, workshops and tabletop exercises, and collection of information through other means (e.g., stakeholder surveys and work groups).

Benchmarking for long-term recovery includes defining best practices for each category of stakeholders such as individuals, businesses, communities, aid organizations/social entrepreneurs, state, local, and federal government. Best practices may point to a larger role of the federal government. Some best practices should consider benchmarking the role of social entrepreneurs and their interactions with the affected community. Social entrepreneurs' role after a disaster was described as "often alert to neighborhoods' needs in a way that government agencies are not. Social entrepreneurs don't just fill the gaps in needed services—they also work to galvanize the support that is essential for community resilience."

Importance of Scenario-Based Workshops and Exercises. Scenario-based discussion workshops and exercises are particularly valuable in uncovering infrastructure interdependencies-related weaknesses and consequences and other potential issues for elderly individuals. Scenarios could focus on loss of essential services, e.g., a prolonged power outage, communication impediments, evacuations of eldercare facilities or hospitals, onsite treatment, transportation needs for elderly residents, short and longer-term housing of displaced elderly, ethnic group-related language problems, scarcity of key medical equipment, and disruption of medication deliveries for the elderly. When these workshops and exercises are developed and largely facilitated by a stakeholder planning group, they can be excellent mechanisms for raising awareness of emergency managers, public health, and utility operators who need to have an understanding of impacts on seniors and other at-risk individuals, and undertake measures to lesson risks and educate and inform the public on geriatric resilience needs. These workshops and exercises also demonstrate what needs to

be done on an organizational and collaborative basis to make needed enhancements. Types of questions they might ask participants to address include:

1. *How long could your facility operate without power, water systems, or critical services?*
   - *What back-ups (emergency power generators with sufficient fuel, access to satellite phones or other resilient communications) are available?*
   - *What food, medical, and other resources would be needed and how would they be obtained in a post-disaster situation?*
2. *How would you provide and receive the necessary information to/from utilities supporting your facility based on the magnitude and duration of the outage or get help from emergency responders if emergency transportation was needed for seniors?*
   - *Which agencies or organizations would you look to for this information?*
3. *How will those evacuated in an emergency be tracked if they lack identifications?*
4. *What organizations are responsible for meeting the needs of the elderly post-disaster?*
5. *What resources would be available post-disaster to assist with elderly needs?*
   - *How would these resources be obtained?*
6. *What provisions will be made after a major disaster for providing caregivers to assist the elderly who are either at home or in longer-term temporary housing:*
   - *To check on their status?*
   - *Provide supervision and assistance with medications, food, and using medical equipment?*
   - *Provide for health treatment and mental health counseling?*

Community Resilience Process Outcome: An Action Plan

The community resilience process outcome is a set of needs and recommended actions to develop or improve existing capabilities incorporated into an action plan. This action plan, along with other local preparedness activities, can serve as the basis for a sustainable, ongoing, resilience improvement process to enable the community, and the organizations and individuals that comprise it, to withstand any adverse significant event [23].

The path forward for the stakeholders involved in developing the action plan at this point is to determine the priority activities they wish to undertake. These may be short-term low-hanging fruit, medium-term (18 months to 2 years) projects, or long-term (multi-year) activities that could include building additional facilities, repairing or upgrading infrastructure, or developing tools or other capabilities. Stakeholder organizations will need to determine among themselves an implementation approach

that identifies which agencies or organizations will take the lead for a specific project and how to secure necessary resources to undertake these activities.

Building Upon Existing Capabilities and Best Practices. It is likely that some of the activities in the Action Plan may have already been developed by other localities in other regions or nations, including international organizations. These solutions, where possible, should be identified and customized. It should be taken into consideration that the Action Plan is an initial step towards community resilience and will be augmented over time based on lessons learned and additional needs from disaster and incidents, workshops, and exercises.

Sustaining Momentum Towards Community Resilience to Assure Geriatric Resilience

Building community resilience is difficult work. Challenges include:

- Maintaining stakeholder involvement and interest after the action plan has been developed and the initial impetus for and interest in resilience has waned.
- Finding and acquiring necessary financial and technical support in a constrained budget environment, and "political" support from government, private sector, and political leaders who may not understand the importance of resilience.
- Lack of resilience standards, guidelines, mandates, or incentives.
- Emergency management and public health officials with limited staffs and/or reluctance to move beyond traditional ways of carrying out their missions that exclude "civilians" from direct participation in resilience improvement activities.
- Utility owners and operators, and non-governmental and community organizations which, for legal, liability, proprietary, or cultural reasons, avoid involvement in regional workshops and exercises and other activities to improve resilience.
- Jurisdictions and organizations that are disinclined to take a regional or community-wide approach to collaboration and focus inward.

These challenges can be overcome with support from a facilitating organization and from community leaders, including local emergency management, public health, and other similar officials with disaster resilience missions, and major businesses in the community. Universities and colleges in many regions today are also providing valuable support, including expertise or meeting locations. And despite the budget challenges, there are a growing number of organizations—business, foundations, as well as government agencies—willing to provide modest resources. This should increase as national governments embrace the need for community resilience.

Determining Progress Made towards Community Resilience. As noted, there as yet is not any agreement on what constitutes community or health resilience. Perspectives among organizations and disciplines vary on what resilience means and entails. At the same time, a community resilience action plan, as it is updated over time with activities completed and additional needs and improvement activities incorporated into it, can provide a demonstrable way to gauge progress.

Benefits of the Community Resilience Process for Geriatric Health

As we have seen, the elderly have a range of needs that can become critical in a disaster or significant event. Communities may be less prepared to provide assistance to their elderly residents due to the lack of awareness of their needs, of targeted training, or availability of resources in times of disasters. Developing and implementing a stakeholder-validated holistic community resilience strategy with the capabilities to support it will benefit both the elderly and the surrounding community. The approach and outcomes can also serve as a model for other regions.

While it is important to underscore the need for awareness on the part of caregivers and families of seniors, and to the extent possible, of the elderly themselves, they are only as resilient as the community in which they reside. Through involvement in a sustainable, action-oriented community resilience improvement process, practitioners and others who have roles and responsibilities in geriatric health and eldercare can become more knowledgeable about threats and consequences that put seniors at risk, the challenges faced, and what capabilities and resources care providers will need. Healthcare providers will also build relationships with emergency management, public health, and other government officials, representatives of utilities, and other key service providers that will be instrumental in response and recovery *before the disaster happens*. This is particularly important to understand and address the interdependencies-associated resilience shortfalls that can create significant vulnerabilities with far-reaching consequences, complicate response, and impede expeditious recovery.

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