Providing Shelter to Nursing Home Evacuees in Disasters: Lessons From Hurricane Katrina

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Objectives. We examined nursing home preparedness needs by studying the experiences of nursing homes that sheltered evacuees from Hurricane Katrina.

Methods. Five weeks after Hurricane Katrina, and again 15 weeks later, we conducted interviews with administrators of 14 nursing homes that sheltered 458 evacuees in 4 states. Nine weeks after Katrina, we conducted site visits to 4 nursing homes and interviewed 4 administrators and 38 staff members. We used grounded theory analysis to identify major themes and thematic analysis to organize content.

Results. Although most sheltering facilities were well prepared for emergency triage and treatment, we identified some major preparedness shortcomings. Nursing homes were not included in community planning or recognized as community health care resources. Supplies and medications were inadequate, and there was insufficient communication and information about evacuees provided by evacuating nursing homes to sheltering nursing homes. Residents and staff had notable mental health–related needs after 5 months, and maintaining adequate staffing was a challenge.

Conclusions. Nursing homes should develop and practice procedures to shelter and provide long-term access to mental health services following a disaster. Nursing homes should be integrated into community disaster planning and be classified in an emergency priority category similar to hospitals. (*Am J Public Health.* 2008;98:1288–1293. doi:10.2105/AJPH.2006.107748)

During and after disasters, the adequacy of response by public health agencies, medical providers, and public safety officials is influenced by the degree to which planning has addressed needs of special populations, such as vulnerable older people.[1–7] Previous research has found that nursing homes received notably less support than did hospitals from federal, state, and local response agencies during and after disasters.[1,2] Nearly 2 million Americans reside in about 18 000 nursing homes.[8] In the coming decades, nursing homes will care for many more frail older people with increasingly complex health needs.[7,9,10] The disaster following Hurricane Katrina further demonstrated that our nation's disaster management system does not respond adequately to the needs of frail older persons in nursing homes. About 70 nursing home residents died in 13 nursing homes during the immediate aftermath of Katrina.[11] In addition to hurricanes, nursing homes are vulnerable to earthquakes, tornados, chemical spills from train accidents, and widespread lasting power outages caused by ice storms. The public health system and nursing homes need to incorporate the special needs of older populations into disaster planning, training, and education.[1–7,9,12–14]

We present experiences and perspectives of administrators and staff at nursing homes in the Gulf Coast region that sheltered evacuees from Hurricane Katrina's path. Such facilities are often called "sheltering" nursing homes. From their experiences, we sought to identify needs for preparedness training in nursing homes that may shelter evacuees from disaster areas and related practice and policy needs of the public health system.

METHODS

Sample

We studied all nursing homes that could be identified 3 weeks after Hurricane Katrina as having sheltered nursing home evacuees; we focused on evacuees primarily from affected areas in Mississippi. We contacted the Mississippi Health Care Association and asked for assistance identifying and contacting all sheltering nursing homes. The association directed us to a list of 11 sheltering nursing homes on their Web site. We identified 1 additional sheltering nursing home by interviewing individuals at those listed sites. We also contacted the Gulf States Association of Homes and Services for the Aging, and they identified 2 additional sheltering nursing homes in Louisiana.

The 14 sheltering nursing homes in our study averaged 108 beds (range=12–216, SD=47.5). Twelve were for-profit facilities. Ten were in Mississippi, 2 in Louisiana, 1 in Oklahoma, and 1 in Arkansas. They received a combined total of 458 evacuees (average=32.7; range=3–38, SD=23.2).

Four nursing homes in Mississippi were selected for site visits. The 4 were selected to provide diversity: 2 were urban and 2 rural; 2 were closer to the path of Katrina and 2 were more distant; 1 included both a nursing home and a rehabilitation center; and the facilities had varying numbers of evacuees, from 3 to 50. The resources available to us for this rapid-response research limited us to 4 site visits.

Survey Measures and Interview Process

Five weeks after Katrina, and again 15 weeks later, in-depth telephone interviews were conducted with administrators of the 14 nursing homes. Discussion guides for all telephone interviews and site visits are shown in Table 1. All telephone interviews were conducted by the same author (C. B. C). At least 1 other author (C. B. D) and another professional staff member took detailed notes for all interviews. Notes were transcribed promptly after each interview and reviewed by 2 of the authors (C. B. C and C. B. D). Corrections were made promptly, to ensure accurate notes. The

TABLE 1—Telephone and In-Person Discussion Guides for Administrators and Staff in Nursing Homes Sheltering Hurricane Katrina Evacuees: Gulf Coast, 2005–2006

Type of Interview	Discussion Guide
5 weeks post–Hurricane Katrina	
Phone interviews with administrators (N = 14)	How did your facility prepare to receive residents evacuated because of Katrina?
	What type of information was received about residents evacuated to your facility?
	How did you contact family members of the evacuated residents?
	Based on your experience following Katrina, describe your preparedness recommendation.
9 weeks post–Hurricane Katrina	
In-person interviews with administrators (N = 4)	Describe what happened following Katrina.
	Describe strategies that worked well and those that did not work well.
	What did you learn because of Katrina?
	Describe any new strategies you have incorporated into your plan.
In-person interviews with staff (N = 38)	Describe your experiences caring for nursing home evacuees.
	What problems did you face caring for evacuees?
	What was helpful in caring for evacuees?
	What did you learn caring for evacuees?
20 weeks post–Hurricane Katrina	
Phone interviews with administrators (N = 14)	Describe status of your facility, staff, evacuees, residents, families of residents.
	Describe any changes to your preparedness plan.

average interview at 5 weeks lasted 25 minutes (range = 14–47 minutes). The average interview at 20 weeks lasted 15 minutes (range = 8–34 minutes).

Four of the authors (S.B.L., S.X., C.B.C., C.B.D.) conducted site visits 9 weeks after Katrina; all 4 authors participated in every site visit and interviewed a total of 4 administrators and 38 staff members. Administrators and staff were asked to describe events after Katrina and to focus on their experiences receiving and caring for evacuees. The lead author (S.B.L.) conducted the in-depth interview with the administrator and took detailed notes. The authors (S.B.L., S.X., C.B.C., C.B.D.) also met individually with staff members to conduct interviews. Each researcher took field notes and elaborated on them immediately after the visits. The average site visit lasted 2 hours and 48 minutes (range = 1.25–4 hours). The average administrator interview lasted 88 minutes (range = 20 minutes–2.25 hours). We interviewed 24 direct-care staff (i.e., certified nursing assistants, licensed nurses, physical therapists, social workers, dietary aides), and 14 support staff (i.e., business, maintenance, and marketing managers, medical records and administrative staff, housekeepers). These interviews ranged from 5 to 20 minutes, with most lasting 8 to 10 minutes.

In addition to interviews with administrators and staff, during each site visit we toured the facility, observed the nursing home's setting and physical features, and studied its model (medical or social care). In 3 of the 4 nursing homes, we observed and spoke briefly with residents. Immediately after each visit, S.B.L. conducted a debriefing session with all participating authors and recorded impressions.

Analytic Procedures

Although we used interview guides, our research was primarily phenomenological; in our analysis we used grounded theory to identify major themes.[15] We also critically evaluated the findings of previous studies.[2–7,12–14,16,17] After conducting the interviews and site visits and having analyzed the data, we found that the Bioterrorism and Emergency Preparedness in Aging (BTEPA) study provided a useful conceptual framework for presenting some of the results. The BTEPA framework was developed using an extensive evidence review.[3]

Detailed notes of the telephone interviews and site visits were transcribed promptly by the research team; this provided the qualitative data. We used thematic analysis[18] to organize the content and to identify patterns and themes in the data.[19] Five authors (S.B.L., J.N.L., S.X., C.B.D., J.V.E.R.) participated in the thematic analysis. Three authors (S.B.L., J.N.L., C.B.D.) also examined responses in the telephone interviews conducted at 5 and 20 weeks, to take advantage of the longitudinal study design. Beginning with the BTEPA framework, 3 of the authors (S.B.L., J.N.L., S.X.) developed 8 domains of disaster preparedness for nursing homes, and drafted their definitions. We used these domains to organize the presentation of some of our findings. All authors agreed on representative examples and quotations for presentation.

RESULTS

Evacuation, Baseline Interview, and Follow-up Interview

An average of 267.5 miles were driven by each evacuating nursing home during the evacuation (SD = 50.7). Ten nursing homes evacuated to elsewhere in Mississippi: 4 from coastal areas (average travel 141 miles), and 6 from the southwestern portion of the state (average 192 miles). Remaining nursing homes evacuated to adjacent states (average over 700 miles). Two evacuating homes were in Louisiana (average 78 miles).

Table 2 shows the distribution of evacuees at the baseline interview and 5 months later, when 11 facilities were still providing shelter. The mean number of evacuees at baseline was 38.7 (range = 3–68). Five months later, the mean number of remaining evacuees was 9.6 (range = 1–28). Although we did not ask administrators why their facilities continued to shelter evacuees, those at 9 facilities provided the following reasons (number mentioning each reason in parentheses): evacuees like it here and want to stay (6); evacuees do not want to be moved or displaced again (2); family members of residents have been

TABLE 2—Number of Evacuees at Baseline and 20 Weeks Following Hurricane Katrina: Gulf Coast, 2005–2006

Facility Number	Evacuees Sheltered	Evacuees Remaining After 5 Months
1	20	0
2	60	16
3	3	3
4	6	0
5	36	2
6	60	9
7	50	28
8	5	0
9	24	3
10	26	20
11	16	12
12	63	1
13	20	3
14	68	9

evacuated or displaced (2); and evacuating facilities are still being repaired (2). In 6 of the 14 facilities, administrators mentioned at 20 weeks that evacuees had adapted well. In 3 facilities, administrators observed that they "have seen an increase in depression and anxiety" or that evacuees were either "more demanding" or "miss home."

Twenty weeks after Katrina, 9 facilities indicated they were doing well, "everything is back to normal," or "things have finally settled down." The remaining facilities did not report such improvements; 2 said that things were not better or had gotten worse; 2 also said they were coping or adapting to changes; and 1 did not comment on general status. In the category of preparedness recommendations, there were few notable differences between responses received at weeks 5 and 20. However, responses about preparedness had become more specific at 20 weeks, when several administrators spoke about upgrading contracts for gas or fuel, water, medical supplies, power needs, and transportation.

At week 20, only 1 administrator said the facility had made changes to its disaster plan. Eight others were considering or making changes to their plans. Of the 6 facilities that had not made changes and were not thinking about doing so, 2 said their plan worked as designed or that they were satisfied, 1 had confirmed arrangements with community agencies and reviewed its plan, 1 was not aware of changes that needed to be made, and 2 did not know if changes had been made.

Results by Preparedness Domain

Our results support 8 preparedness domains (i.e., groups of related issues to be considered for understanding preparedness). Six relevant BTEPA domains[3] were revised for application to nursing home preparedness (Table 3, domains 3–8). We also extend the BTEPA framework and identify 2 domains that address practice and policy needs of the public health preparedness system that are particularly relevant to nursing homes (Table 3, domains 1 and 2).

1. Incorporating the needs of nursing homes into disaster plans. All 14 administrators and several staff members provided comments in this domain. Most administrators said that local, state, and federal agencies provided little help. One commented, "There were no other agencies involved. We tried to contact FEMA and the Red Cross, but they were no help." There was considerable evidence that nursing homes were not included in community preparedness planning. An administrator in a very rural area emphasized, "We were on our own! We just have to handle it."

Many administrators spoke about problems obtaining gasoline from law enforcement officials. Gasoline was needed to run emergency generators and for daily staff commutes into work. In a representative comment, an administrator said, "The gas stations gave the gas to hospitals but not to the nursing homes. We asked the sheriff to help, but the police threatened to arrest our staff if they took gas." Three administrators emphasized that nursing homes have needs similar to hospitals. One commented, "There needs to be recognition that nursing homes need to be high-priority facilities and treated more like hospitals."

2. Using nursing homes as a community resource during a disaster. Two administrators in rural areas emphasized that their facilities were important community health care resources. In one instance, the administrator and the director of nursing commented that their facility had more activity caring for seriously ill individuals who were among the evacuated residents than did the local hospitals. Another administrator emphasized that older people in the community sought services in Katrina's aftermath: "Everybody on oxygen concentrators started flooding the nursing home because we were the only ones with power. They would spend time at the nursing home then return home and come back as needed. We set them up and let them stay for 2 to 3 hours."

3. Ensuring that core functions are maintained during a disaster. Even before Katrina, most administrators and staff recognized the need for stockpiled supplies. However, after Katrina, most recognized the need to increase their resources in order to be prepared in 3 areas. In the first, they spoke of the need to increase material supplies, including food, water, medications, personal hygiene items, intravenous liquids, batteries, and other items, beyond the recommended guideline of 3 days—to at least a week. Eight administrators emphasized the need to increase material supplies to meet needs of staff of evacuated facilities and their families, as well as families of their own staff who sought shelter. In a representative comment, an administrator said, "Our biggest problem was that we got more people than we anticipated. We got the residents and their families, and the staff and their families. And we got dogs, cats, and people who followed the buses. We ended up with more people to feed." Related to supplies, several spoke about nursing home design issues. For example, a medical records professional said, "[you need] to have the washer and dryer hooked up to the generator to keep some clothes clean, [and you] need emergency plugs in each [resident's] room. The kitchen needs to be hooked up to a generator." (Facilities had gas for cooking but lacked emergency lighting in their kitchens.)

In the second area, 8 administrators spoke about the need to call in off-duty staff, ask staff to work overtime, use agencies to obtain additional staff, or include staff from evacuated facilities to care for evacuees. In the third area, 3 administrators emphasized the need to develop stronger relations with

TABLE 3—Eight Domains of Disaster Preparedness for Nursing Homes Based on Discussions With Administrators and Staff in Nursing Homes Sheltering Hurricane Katrina Evacuees: Gulf Coast, 2005–2006

Domain	Preparedness
Incorporating the needs of nursing homes into disaster plans	Disaster preparedness coordinators need to include the needs of frail older people who reside in nursing homes in their planning. Nursing homes should be in an emergency priority category similar to that of hospitals to facilitate having lifelines restored (such as critical utilities) and access to ambulances and other emergency vehicles for evacuation.
Using nursing homes as community resources during a disaster	Nursing homes have important resources, including health care professionals, medical resources, and supplies. Thus, they can contribute to community recovery after a disaster.
Ensuring that core functions are maintained in a disaster	Preparedness requires nursing homes to continue to carry out normal daily operations, with adequate supplies. Training is needed to maintain adequate stockpiles of supplies and staffing levels. Additional supplies are needed for staff and family members of the evacuating and sheltering nursing homes. Nursing homes should have back-up vendor arrangements.
Incorporating care approaches responsive to the needs of diverse stakeholders	Nursing homes will serve an increasingly diverse group of older people in terms of race and ethnicity. Nursing homes should develop processes to ensure that care is sensitive to residents with diverse backgrounds.
Developing geriatric-specific protocols for managing across the continuum of care	Nursing homes should have established triage and care procedures that address special needs of older people. Nursing homes must ensure that medical information, medications, and medical supplies accompany evacuated residents. Nursing homes need plans to receive evacuees.
Developing strategies to maintain mental health	Nursing homes need to address mental health needs of residents, evacuees, and staff. Frail older people are more susceptible to depression following a disaster because of relocation and loss of family. Staff may experience long-term stress associated with extra workload in the facility and also with the need to address personal and family losses from the disaster.
Coordinating and planning for transportation	Nursing homes need adequate evacuation plans that accommodate wheelchairs and provide adequate heating, cooling, food, water, and medications during travel.
Ensuring communications	Nursing homes must have back-up systems to communicate with local law authorities and families of residents; land line phones, cell phones, and Internet service may be disrupted for several weeks.

Note. Six education and training, clinical practice, policy, and research areas for nursing home preparedness were developed (domains 3–8). Two additional domains (1 and 2) that address practice and policy needs of the public health preparedness system were identified as being particularly relevant for nursing homes.
Source. Adapted from Johnson A, Howe JL, McBride MR, et al.[3]

community leaders, local fire and utility departments, and the local preparedness system. They said strong community relations are essential to obtaining needed supplies, such as gasoline. One put it this way: "You need to work closely with the local people. These are the people who are going to help you if something happens."

4. Incorporating care approaches responsive to the needs of diverse stakeholders. Several administrators and staff noted a need to address evacuees' culture. Two commented, "It's been a culture shock for us and them." "They were used to their lifestyles." A third put it this way, "They are looking forward to moving back home. The weather is much colder here. . . . And of course they want red beans and rice every Monday." There were no comments about care differences associated with race or language.

5. Developing geriatric-specific protocols for managing across the continuum of care. Most administrators and staff observed a need to triage evacuees. Almost all administrators said their triage worked well. They spoke about using registered nurses to triage evacuees on arrival, immediately assessing their medical needs (e.g., performing "finger sticks" for blood sugar levels). Administrators and direct care staff emphasized that evacuees received proper identification and chart documents were completed by registered nurses as soon as they were received. A representative comment by an administrator: "When the first group arrived, we set up a triage, prepared warm baths, and fed them." Another administrator commented, "An assembly line of 7 nurses, administrative clerks, and an activity director was staffed to complete admissions on each person." There was considerable evidence that administrators and staff addressed the special needs of evacuees, ensuring that all were well hydrated and fed and kept cool, clean, and reassured.

Responses that identified shortcomings of evacuating nursing homes emphasized the lack of information about evacuees' medical care, such as charts, care plans, medications, and personal medical equipment. Only 6 administrators said evacuees arrived with their medical charts or a listing of medications. Only 3 said staff from evacuating facilities brought evacuees' medications. Most administrators and several staff members said more information should be sent with evacuees. In a representative remark, an administrator highlighted the "[need to take] the whole medical chart for each resident, or at least the last month's chart on each resident, rather than just a transfer sheet."

Several administrators spoke about the lack of a formal plan to receive evacuees. One said, "We have a sheltering agreement with some other facilities, but not to take residents in, only to send them out." A second commented, "We had a plan to evacuate our place but not much of a plan on how to accept people from other facilities."

6. Developing strategies to maintain mental health. In 8 nursing homes, staff were managing well at both 5 and 20 weeks after evacuees were received. In 6, however, there was evidence of stress associated with staffing,

such as staff shortages. Staff were reported to be "tired" at both 5 weeks and at 20 weeks; there were reports of inadequate staffing, staff losses, and staff exhaustion. Five administrators spoke in the 20-week interview about longer-term concerns, including visits by the Mississippi Department of Mental Health to help evacuees and staff "deal with loss and grief" and problems with financial payments associated with evacuees. The director of one nursing home resigned, reportedly because of stress that resulted from Katrina. Sheltering nursing homes also had to deal with long-term staff displacement, such as temporary living in trailers. Four administrators said their staff members were continuing to deal with personal losses 5 months after Katrina. One commented, "It was more traumatic for our staff than we expected because, in dealing with the losses and traumas of the sheltered residents, they didn't get to deal sufficiently with their own losses . . . such as missing rooftops and other property damage." Three spoke about the importance of mentally preparing staff for a disaster.

Emotional stress was also evident among evacuees. One administrator commented, "We've seen an increase of depression and anxiety with the evacuees. Some residents cried about the situation because families can't come visit like before."

7. Coordinating and planning for transportation. Although our focus was on sheltering nursing homes, all administrators spoke about the need to improve transportation, both because poor transportation affected evacuees' physical and emotional health in sheltering nursing homes and because half of sheltering nursing homes transported evacuees themselves. Administrators observed that vehicles used for evacuation should be equipped for the needs of disabled older people and that staff and supplies need to be adequate for travel. Most evacuees were transported in buses without air conditioning during hot and humid weather. One administrator commented, "The air conditioning on the bus had failed. It was at least 120 degrees on the bus. There was no lift." Most administrators commented that multiple nursing homes generally identify the same transportation companies in their evacuation plans.

8. Ensuring communications. All administrators and many staff members mentioned the need to improve communications with suppliers, law enforcement officials, and families of residents. Administrators said landline telephones, cell phones, and Internet communications were down or unstable for weeks after Katrina. One commented, "[The food supplier] couldn't deliver food because food orders were placed on the computer." Administrators in rural areas emphasized that they were "on their own," with little contact outside their facilities. Half of the administrators and many staff members said communicating with evacuees' families was difficult because land telephone lines and cell towers were inoperable and because of the massive relocation of families. Several administrators told us it took them at least a week to contact families, longer in many instances.

DISCUSSION

Our study of sheltering nursing homes after Hurricane Katrina provides new insights in 2 areas: first, nursing homes are community health care resources, and second, they may already be well prepared for emergency triage and treatment. Our results underscored previous research findings showing that following a disaster, nursing homes may need to address mental health needs and cultural preferences of evacuees and the mental health needs of residents and staff over long periods.[2,16,17] There is considerable evidence that nursing home residents have substantial unmet mental health needs[20–22]; these needs exacerbate the challenges of providing long-term mental health services to residents following disasters.

As a result of Katrina, most nursing homes in our sample experienced physical damage or loss of power and communications that in many instances lasted several weeks. Several staff members of the sheltering nursing homes suffered long-term losses to their homes or other personal property. The sheltering nursing homes we studied exemplify extreme conditions that facilities need to anticipate to prepare adequately for a disaster. Long-term consequences for sheltering nursing homes following a disaster can include loss of staff and continuing staff shortages. They can also include reduced productivity associated with fatigue, problems with emotional health, the ongoing need of staff to address their own housing, transportation, family issues, and other challenges.

Consistent with previous studies, our results provide evidence that supplies were inadequate to meet the needs of residents and evacuees.[1,4,5,12,13] Our study highlights the need for additional supplies after a disaster, such as food for family of staff and for their pets. Also consistent with previous research, there were major shortcomings in transportation and communication.[1,2,4–6,12–14] Most nursing homes were unprepared to communicate with vendors and families in the absence of landline phones, cell phones, and the Internet. Loss of all of these communication tools for a period following a disaster should be anticipated.[1,2,4–6,12–14] In 2 areas that have received less attention, evacuating nursing homes did not send adequate care information with evacuees, and most sheltering nursing homes did not have formal procedures to receive evacuees. Despite these shortcomings, initial triage worked well; only after triage did problems arise.

Although the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) requires preparedness plans,[6,23] only 7% of US nursing homes are accredited by the Commission.[6] The Centers for Medicare and Medicaid Services also requires plans[6,23] but does not specify plan characteristics,[6] and states oversee the plans.[1,6,14,23] These required plans do not address the wide range of challenges we found that notably affect the ability of sheltering nursing homes to provide adequate care after a disaster. All nursing homes should develop formal procedures to receive evacuees. Nursing homes need to plan for enhanced access to mental health services for evacuees, residents, and staff in the immediate and longer-term aftermath of a disaster. When evacuating, nursing homes should have plans to send care information, medications, supplies, staff, and equipment. Our study results indicate that disaster planning should be incorporated in nursing home certification requirements and in licensing exams for administrators. Policymakers need to recognize nursing homes as important health care resources. Nursing

homes should be in an emergency priority category similar to that of hospitals, integrated into community disaster planning, and involved with their local emergency management divisions.[2,14]

Given the need for rapid-response research, budget limitations, and the intense recovery activity at the time we conducted this study, a larger survey was not feasible. However, we were able to collect information about affected individuals' experiences while the recovery process was continuing, thus, limiting recall bias. Our findings may not be generalizable to all Gulf Coast states or to the entire country. Nonetheless, the lessons learned suggest implications for other types of disasters and other areas of long-term care. The disaster-related problems faced by nursing homes we studied can occur in the "tornado alley" of the central and southeastern United States, earthquake-prone regions of the West Coast and other areas, or anywhere that a railroad or roadway carrying hazardous materials exists. Fires, power outages, and chemical spills or explosions can affect large areas, as can ice storms and heat waves. The need to evacuate quickly can occur at any time, as can the need to shelter and be self-sufficient for a period of time. It would be useful to examine how the findings of this study are transferable to other types of long-term care facilities, such as assisted living facilities, for future research and policy development. ■

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Contributors

S.B. Laditka originated the study and its design, conducted interviews, analyzed the data, and drafted the article. J.N. Laditka contributed to the study design, analyzed the data, and drafted the article. S. Xirasagar contributed to the study design, conducted interviews, helped to analyze the data, and reviewed and contributed to the article. C.B. Cornman contributed to the study design, conducted interviews, and reviewed and contributed to the article. C.B. Davis contributed to the study design, conducted interviews, analyzed the data, and reviewed and contributed to the article. J.V.E. Richter contributed to the study design, analyzed the data, and reviewed and contributed to the article.

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Human Participation Protection

This study was approved by the Institutional Review Board at the University of South Carolina.

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