

## ISSUES IN NURSING HOME EVACUATIONS

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*The issue of planning for evacuations of nursing homes and related health care facilities concerns both emergency planners and disaster researchers who cite the lack of empirical data on the problems of special populations during emergency evacuations. Although most evacuations of such facilities are carried out successfully, the effectiveness of an evacuation (as measured by time to evacuate) is limited by certain constraints. This study examines selected organizational characteristics of nursing homes and related health care facilities which experienced either a partial or complete evacuation of their facilities. Among the factors affecting facility evacuations are resources, the type and number of clientele, and community characteristics such as population density. Although the issues are related to general evacuation concerns, the findings suggest that individuals within specialized populations are unlike other victims of disaster with particular needs that require different management strategies to expedite an evacuation efficiently.*

During the last two decades the number of events resulting in evacuations has risen dramatically as populations increased and expanded into areas more exposed to threats. With the lessons learned from those experiences a substantial knowledge base for promoting efficient evacuations (Perry and Lindell 1978; Quarantelli 1980; Perry 1985). Emergency planners now understand the resources and strategies required to evacuate most populations from threatened areas without injury or loss of life. Yet few community evacuation plans include specific provisions for institutionalized or other specialized populations that require additional assistance to participate in a emergency evacuation. Furthermore, those plans that do address institutional populations are generally not based on any previous experience nor systematic studies.

While there has been a sizable amount of literature accumulating on the problems of the elderly in disaster (Hutton 1976; Huerta and Horton 1978; Kilijanek and Drabek 1979; Clive 1983), the treatment of elderly groups residing in specialized facilities such as nursing homes and related home care units has been lacking (Seliger and Simoneau 1986; Tierney et al. 1988;

Vogt 1988). Unlike other victims of disaster, the situation of nursing home populations is unique because the limitations on individual client mobility translates into dependent evacuee populations that require additional resources in coping with an evacuation. Those limitations may result from physical or psychological impairments or be rendered by a combination of both. When evacuees require assistance to initiate or facilitate withdrawal behavior, the common assumption of most evacuation models of personal responsibility is violated. The situation arises when an evacuee is non-ambulatory or is impaired to the point that the speed of individual movement is much less than that of other able-bodied evacuees cannot be maintained and interferes with other evacuee movement in route to safety (Archea 1979). Most individuals institutionalized or housed in specialized facilities providing chronic health care are incapacitated to the point where they are unable to deal with an emergency evacuation either physically or mentally, putting residents and emergency responders at greater risk than other victims in a crisis situation.

Reviews of evacuation studies have cited the need for more detailed and systematic investigations of evacuation behavior of institutionalized populations (Quarantelli 1980; Drabek 1986). Aside from a few specific studies (Stallings 1975; Hahn 1982; Bolin and Klenow 1983; Bolin and Bolton 1986; Tierney et al. 1988; Brown et al. 1988) and anecdotal observations (Fritz and Marks 1954; Rosow 1955; Taylor et al. 1970; Scanlon et al. 1980) social scientists have generally overlooked the behaviors and problems of organizations that result when either a partial or total evacuation occurs at a specialized facility (Drabek 1986; Vogt and Sorensen 1986). This omission follows from a concentration on individual, not organizational, behavior patterns observed in hazardous situations and is reflected in the concentration on individual case studies.

### ISSUES IN EVACUATION PLANNING FOR SPECIAL POPULATIONS

Evacuation for whatever reason implies disruption of social lives and normal routines for all involved in the event. For those populations without the resources to cope as individuals—the institutionalized, disabled, elderly, children or those incarcerated—an emergency requiring withdrawal from a home facility places additional strain on organizational care-giving capabilities for that special population. The issues identified in planning for the evacuation of special or institutionalized populations reflect general planning concerns. One issue centers on the preparedness of the organization for an emergency prior to

organizational evacuation plans as to adequacy in coping with an emergency of how those plans are developed or coordinated with external agencies. A second issue involves how and when organizations receive warnings and through what types of sources. The degree of interorganizational flexibility can affect the timing of warning response. Because of the overriding responsibility and liability as care providers, organizations may be forced to evacuate their populations when a recommendation arrives from an official source whether or not management perceives the threat as real. Other issues concern decisions on what people within the facility are evacuated and how shelters are chosen. Issues raised by some organizations has been adequacy of officially assigned shelters. Generally the complaint has erupted when organizations were subsequently forced to move their clients after the initial withdrawal. Other issues raised in caring for special populations are related to role abandonment, the difficulties of maintaining adequate level of client care while absent from the facility, communication problems with other organizations and agencies, and the fear of health impacts from moving clients away from the home facility.

One particular area of strain for organizations caring for elderly clients with limited mobility involves transportation planning. Unlike evacuations of the general public that have historically depended on personal vehicles (Lindell et al. 1985), organizations servicing nursing home or other medically dependent populations require special types of transport at the time of the emergency to move individuals and equipment from their facilities. One major concern in evacuating is obtaining vans with wheelchair lifts, buses for group transport, or trucks for hauling wheelchairs and medication carts to shelter sites. The problem of attending to clients with limited mobility is closely related to suitability of shelters. While most nursing homes and related health care facilities are one or at most two storied for practical purposes, shelters such as public schools and churches are often more than one level. This can be a significant drain on personnel forced to lift clients and equipment up and down levels.

Another factor affecting specialized groups reflects management's concerns on segregating clients from the general public. The separation within health care facilities is both physical, for health and safety concerns of clients, as well as psychological. The psychological aspect is basic to the organizational care provider structure inherent within institutions whose rules encompass all behavior of its clientele. That plans for institutions, especially mental and health care facilities or correctional facilities developed to move client popula-

Common to most health provider facilities is the basic split between a large managed group of clients and a small supervisory staff, some of which possess elite professional status. Distancing provides staff members with a certain degree of power over the clients—a power augmented by the dependence of the clients through conditions resulting from infirmity, age, gender, or legal status. The staff-client relationship has further implications in responding to an emergency because perceptions of threat are defined by the management or staff personnel, not by an individual client. The problem is exacerbated by personnel lack of direct involvement in developing emergency strategies. Tierney et al. (1988) found that although many California nursing homes had subscribed to a generic plan prided by outside consultants, few administrators had instituted the recommendations regarding staff and client preparedness measures.

### OBJECTIVE OF RESEARCH

To determine if the questions were significant for emergency planners, a study was developed to analyze the issues. The goal of this research was to identify the social factors, including the constraints and facilitators, that direct or influence organizational responses to emergencies resulting in evacuations of populations within nursing homes and related care facilities. The unit of analysis was the organization. The conceptual framework was adapted from Quarantelli's (1980) macro-level model of evacuation behavior for a community threat. The model states that the threatened community (in this case, the immediate environment of the specialized facility) provides a context for the disaster threat and subsequent impact; the context includes capabilities and resources, social linkages and the prevailing social climate both within and external to the organization (Quarantelli 1980 p. 24). Five factors significant to response and analyzed in this study were resources, social climate, social linkages, extracommunity setting, and threat. These factors influence performances of personnel within the organization and by extension, predict both the time to evacuate and the evacuation rate per person.

### METHODOLOGY

#### Choosing the Universe

The first task in examining evacuations of specialized populations was identifying facilities that had experienced an evacuation of some or all of their premises to determine the universe from which to draw a sample. Assuming hazards and threats to people are considered newsworthy items

(Kreps 1980; Rossi et al. 1981), we searched the Nexis/Lexis computerized wire services data base to locate reported incidences of evacuations in syndicated newspapers between November 1, 1983, and December 31, 1987. Out of the 960 articles reporting evacuations of specialized populations we found 35 articles relating actual evacuations of nursing homes and two other articles reporting preparations for evacuation of such facilities in the United States. In further pursuit of the media reports of evacuations during Hurricane Elena, we were referred to a public document prepared for Pinellas County that listed 19 nursing homes among the number of medical facilities which were evacuated. Personal interviews conducted with staff members at two institutions in Tennessee provided the opportunity to test the survey instrument.

#### Census of Evacuations

Sixty-two nursing homes and related home care facilities were identified as having evacuated some or all of their premises between October 1, 1983, and December 31, 1987. Coincidentally, one facility within this population evacuated twice on separate occasions approximately one year apart but for two different types of threats. These two evacuations were treated as separate cases, bringing the number of cases to sixty-three. Included in the 63 cases of reported evacuations were 19 nursing homes in Pinellas County, Florida, evacuated during Hurricane Elena in 1985. During the period of interviewing, two evacuations of nursing homes occurred that were used as case studies. Our census is 65 cases of evacuations.

#### Data Collection

Given the paucity of evacuations, a decision was made to collect information through telephone interviews from each facility in the universe rather than a selected sample. A survey schedule was designed to measure the factors in macro-level model of evacuation behavior for a community threat as defined by Quarantelli (1980). The instrument elicited information on how the threat was detected, whether detection was internal or external, and, if external, if it was from a local or extracommunity source or if an official notification was made to the facility managers. Frequency of past evacuation experiences was also determined. The interview form was pretested with several nursing home administrators prior to data collection. A form letter explaining the purpose of the study was sent to each facility prior to the telephone interview.

Beginning with the initial information about the threat, the respondent was asked to describe the evacuation to the point where all clients were returned to the facility. Although most questions did not have fixed answers, questions were directed to gaining basic information about the number of clients and staff, contacts with agencies, evacuations plans, associations with other groups, and other data pertinent to the organization's operations. Specific data was gathered on time to prepare and evacuate and on the return times to the facility. Immediately following the interview, data was transcribed to coding sheets and entered into a computerized data base.

### Data Analysis

First, the univariate statistics were compiled to provide a quantitative description of the characteristics of organizations and of the evacuation process. At that time we analyzed the nonresponders to see if systematic bias was introduced into the analysis from nonresponse. Bivariate analysis was used to examine hypotheses generated from the analytic framework. Contingency tables analyzed measured levels of association when variables were nominal. T-tests were used to determine differences in means between dichotomous and continuous variables. Pearson's correlation was used when both variables were continuous. Lastly, a regression model examined the analytical framework as specified. Variables chosen represent elements of the theoretical model. The selection of variables was based on the univariate and bivariate analysis and on having reasonably complete data on each variable. In this paper I discuss the univariate findings and the results of the regression model.

### UNIVARIATE DISTRIBUTION

General characteristics of the forty-six responding organizations were first examined for variations in threat, resources, social climate, social linkages, extracommunity setting. Second, we examine the evacuation experience and effectiveness. The evacuation experience is described by destination sites, shelter selection, distance travelled, assistance during evacuation, and the number of clients picked up by kin or others are first examined. Evacuation effectiveness is examined by the time it took to evacuate and the rate of evacuation. Finally we examine the changes the organizations intend to make in future evacuations.

### Threats

Threats, which caused evacuations, were placed in four categories: (1) weather (N=37), (2) human (N=7), (3) external mechanical failure (N=19), and (4) internal mechanical failure (N=2). Fifty-seven percent of the evacuations occurred because of weather-related threats. Twenty-three evacuations (including the 19 in Pinellas County) were caused by hurricanes, nine were related to floods, three to external fires (such as forest fires), and two to other types of weather problems. The Pinellas County group of evacuations substantially alters the analysis. When the Pinellas County group was omitted from the analyses, the evacuations due to weather were reduced to 32 percent of the census and 39 percent of the sample. Still the largest single cause of evacuations is hurricanes—23 cases including 19 from Pinellas County. The large number of evacuations from hurricanes corroborates Wright and Rossi's (1981) conclusion that individual victimization by hurricanes is the most common form of disaster experience. Thus the skewing toward weather related causes is almost entirely due to the group of Pinellas County evacuations. However, hurricane threats are such frequent occurrences in the South that some other locality could replace Pinellas County if a different four year period is studied.

A third of all evacuations were caused by mechanical failure. If Pinellas County cases are omitted, 32 percent of the census and 42 percent of the evacuations were due to external mechanical failures. Of the 19 evacuations related to external mechanical failures were eight caused by train derailments, seven initiated by explosions or fires near the facility, three prompted by on-site chemical spills, and one caused by a truck carrying explosives having jackknifed close by the facility. Mechanical failures internal to the facility accounted for two evacuations. Threats were then regrouped into two categories, weather (37) and non-weather related (28), because the human and internal mechanical categories had few cases and to match the common typology of **natural** versus **technological** hazards. The number of clients evacuated from 46 facilities interviewed ranged from 4 to 274, with a mean of 80 clients.

### Resources

To analyze the level of preparedness, four questions were included about emergency planning. Organizational personnel were asked first if they had an emergency plan prior to the actual evacuation and if so, whether that plan included specific procedures for evacuation. Then we asked how

employees learned about emergency procedures, including evacuation, and what level of training was used to instruct staff about those procedures.

Personnel in most organizations considered themselves prepared for emergencies because of the use of fire drills. Only one organization, a very small home health care unit, reported not having disseminated any information to staff about emergency procedures prior to the evacuation. Three organizations reported giving new employees manuals with emergency guidelines outlined. Ten reported having monthly fire drills along with in-service training on emergency preparedness. Over half, 24 of the 43 reporting (or 56%), reported conducting monthly fire drills on each shift with in-service training and at least mock simulations of evacuations of the facility yearly.

On-premise drills were conducted with or without an external emergency agency's attendance. Approximately 80 percent of the facilities reported using fire drills on premises as means to inform staff about emergency measures. Some facilities reported that personnel from the fire department visited the facility monthly and conducted fire drills which had to meet the fire department's standards. Yet of all the evacuations, only four in the group of 46 respondents were due to fires. Two of those fires were attributed to client negligence; the other two blamed on electrical problems. The incongruity of preparedness for threat from fire becomes even more dramatic when the number of evacuations related to weather is noted—36 evacuations were related to weather.

To determine if preparedness for evacuations was associated with concern for threats, administrators were asked why they had plans to evacuate. Of those responding, seven reported having plans as a "company policy." Ten mentioned planning as being "a good idea." Six reported living in a hazardous area and thus needing to be prepared for an emergency. Three reported that emergency plans were needed for licensing or for other regulations, including insurance coverage. Several informants were unable to answer the question for the organization, with "being unsure" as the major response.

The potential number of staff available to assist in an evacuation ranged from one person at a small home facility with 5 residents to 182 staff members at a facility caring for 274 clients. The measure is suspect, however, because some administrators would include only patient staff without other personnel such as maintenance staff, dieticians, social workers, or activity directors who may have helped out during the actual evacuation.

Organizations used a variety of sources of help in evacuating. Generally off-duty staff were called to expedite the evacuation. Thirty-four facilities in our sample called in the entire staff, with all patient care and all management personnel responding. Two other facilities called only management staff while one organization called only patient care personnel for assistance. Three facilities reported that all staff arrived voluntarily at the facility without being summoned. Four facilities did not call extra staff because they weren't needed or there wasn't time before the evacuation started.

Other sources of assistance came from local external emergency organizational help, nonlocal external emergency organizational help, volunteers with ties to clients or staff within the facility, or from other volunteers or assistants without ties to facility. In the local external emergency help category, aid was received from police, fire departments, sheriffs and local emergency organizations, including emergency teams, paramedics, or county civil defense agencies. In the nonlocal external emergency aid category, help was received from National Guard, state agencies or civil defense, or from sources outside the county in which the evacuation occurred.

Subsequently the category of volunteer help was divided to test the hypothesis that aid received from volunteers with ties to residents or staff of the facility may be more accessible and/or more available in times of threat with short forewarning. One category of volunteers included families, friends, in-house volunteers who regularly assisted at the home, and other helpers with ties to clients in the facility. The second category of volunteers consisted of all others such as the Red Cross, medical personnel, or staff of ambulances or buses who assisted in evacuating clients to shelters when called by the facility. Of the 27 organizations reporting help from external sources, 12 reported that volunteers with ties to clients or staff personnel were the **only** source of assistance. Thirteen organizations reported receiving help from local emergency agencies as well as volunteers. Thirteen facilities were only assisted by emergency personnel, no volunteers. Two facilities reported receiving aid from four sources—volunteers, other non-official helpers, local emergency personnel, and non-local emergency personnel. Six facilities reported not receiving any aid from any outside sources whether from volunteers or emergency personnel.

### Social Climate

To examine perceptions of risk two questions were asked about past evacuations. Managers were first asked whether they had ever evacuated or

had prepared to evacuate in the past. Thirty-five of 43 respondents (or 78%) reported no evacuation in the past at their facility. The range of past evacuations within the rest of the group varied from one to four. Five respondents reported having evacuated the facility once in the past, two reported having evacuated twice, one director reported evacuating three times, and two directors reported four evacuations of the facility sometime in the past. We did not ascertain exactly when those past evacuations took place. Of 45 organizations responding to our question on having to prepare to evacuate in the past, 40 (or 89%) reported no preparations. Only two organizations reported one past preparation with no evacuation. Three organizations reported preparing to evacuate twice in the past but never leaving their facility.

The average ratio of clients to staff ranged from between five clients to one patient care staff to ten clients to one patient care staff with a mean of 3.8 clients to one staff member. In retrospect, asking for the number of registered nurses, licensed practical nurses and aides employed by the organization may have provided a more accurate measure. Physicians did not participate actively in most evacuations. It is unclear whether physicians were involved in transfers of clients to hospitals during evacuations or in discharging clients from the hospitals once the evacuation was over. We did not learn of any instances in which assistance in evacuating was rendered by physicians or other specialists such as podiatrists or dentists. Housekeeping, maintenance people, and other employees such as activity directors regularly on the premises were mentioned most frequently as collaborating with the regular patient care givers in the event.

We also determined who made the decision to evacuate. As expected, the majority (64%) of decision makers for the organizations were administrators and/or directors of nursing of the nursing homes. These persons were normally in charge of all operations at the facility except for direct medical services provided by physicians or dentists. Only four facilities were evacuated through decisions made by another staff member such as a safety director or maintenance person. Twelve nursing homes (22%) reported the decision to evacuate was made externally through an authoritative source. Orders to evacuate were received from police, fire personnel, local or state government officials or civil defense personnel: "We didn't make the decision—it was made for us" was a frequent comment. "When they tell you to leave, you leave," said a director.

Determining how the organization learned of and confirmed the threat also identified linkages between the nursing homes and the community. Of 46 respondents, twelve organizations (26%)

internal source such as a report by a staff member or from a fire alarm. Almost three times as many, or 34 organizations, reported learning of the threat from an external source. Thirteen of those 34 organizations were alerted by local emergency units such as the police, fire or sheriff's office. Fourteen facilities reported being notified by personnel from civil defense units, rescue squads or emergency management teams or acted on information to evacuate from other official sources, such as the mayor or governor's office. Two organizations reported hearing of the threat initially through the media but waited for further notification from authorities before making the decision to evacuate. Seven organizations were unsure about how the threat was initially determined.

The number reported evacuated included only clients and not the number of staff who may or may not have evacuated with clients. In some instances staff stayed with the vehicles making multiple trips with separate groups of clients to shelters, while other staff drove personal vehicles or rented U-haul trucks to the sites setting up supplies for clients who would be transported later to the shelter. In other cases staff assisted in the evacuation efforts and later returned to the facility to call client's families or provide other assistance such as cooking or cleaning. Other managers reported all staff left immediately with the clients along with volunteers and all other helpers.

Three measures were used as indicators of organizational constraints—average age of clients, percent of non-ambulatory clients, number of staff, and the number of floors. The average age of clients ranged from 44 to 93 years of age with a mean of 74.86 years. The number of non-ambulatory clients ranged from none to one hundred percent with a mean of 41.1 percent non-ambulatory clientele. As expected most facilities were one floor (37 facilities), five had two floors, three had three floors, and one had six floors.

### Social Linkages

Sixty-one percent of the facilities in the sample were affiliated with a larger organization. Seventeen of the reporting 44 facilities were independent, 27 were connected to larger corporations. Thirty-seven of the 42 organizations reported that staff commuted less than ten miles to work. Five reported that some staff lived beyond a ten mile radius. Forty-two of the 45 responding organizations provided long-term care—over six months—to clients. Only one provided short-term care and two provided care during the day. Twelve

Linkages between clients and the community was examined. Twenty-one facilities reported that no clients were picked up by friends, kin or guardians. Only at one facility, a retirement home associated with a nursing home, were half the residents picked up by friends or relatives and taken to safety. In this case 75 persons were taken to homes of family and friends with the other clients going to official Red Cross shelters or to the homes of staff from the facility. Three other facilities reported having 20 to 22 clients picked up at the time of the evacuation. In 21 facilities evacuating, the number of clients picked up by outside persons ranged from one to twelve. Three facilities had between 10 and 12 persons picked up. Eighteen of the 21 facilities had five or fewer clients picked up from the facility prior to the organizational withdrawal.

### Extracommunity Factors

From secondary sources we determined the population of the county for each facility and calculated the county's population density. The most densely populated area was Pinellas County with 2,889 persons per square mile. The population density of places ranged from 22.3 persons per square mile to 2,889 persons per square mile, the mean being 1,173.7 persons per square mile.

Organizations generally used a number of shelters either consecutively or simultaneously. The general evacuation pattern was for clients to be divided up and transported to two locations. Skilled care facilities generally used a hospital for at least one evacuation site for some of their clients.

Of the forty-six reporting destinations, about one third (16 facilities) used only one site for shelter. Another third (15 facilities) used two places as evacuation sites. Seven organizations used three sites, with another seven organizations utilized four sites. Only one organization chose more than four sites, with clients being divided up among 10 hospitals and several nursing homes.

Of the 15 organizations that reported going to two places, ten made simultaneous moves to two sites and remained at those two locations throughout the evacuation. Five organizations made consecutive moves. Organizations moved all clients to one shelter, then moved clients to another location. In a few instances, the second move was necessitated by the host facility being unable to accommodate the evacuees for the length of time required for the entire evacuation. In other cases clients had been moved to the safety outside the facility and were then transported to a more appropri-

The shelters utilized ranged from schools, hospitals, other nursing homes, hotels, parks, churches to individual homes. Some organizations shared official shelters with other evacuees from the general public. This presented problems for some organizations with mentally impaired individuals. Nor were all shelters on one level, which meant that equipment, such as wheelchairs and heavy medication carts, had to be hauled up and down stairs.

Of 45 organizations reporting shelter sites, two organizations only used hospitals as shelters for their clients, eight used one or more other nursing homes and at least one hospital as shelters, four used a hospital and a designated shelter, one used a hospital plus another nursing home and another type of shelter and one used a hospital plus a church. Seven only used other nursing homes as shelters. One used a nursing home plus the homes of staff. Of those using schools for shelters, eight used schools only, three used schools and a hospital, and two used schools and other nursing homes. Four used other types of shelters such as churches, motels, hotels or recreational buildings. Four organizations were able to use part of their own facility as an evacuation site.

### Evacuation Effectiveness

Evacuation effectiveness was measured by the time to evacuate to safety. The times taken to evacuate ranged from 10 minutes to seven hours with a mean of 2.5 hours. To standardize for different size institutions the time was divided by the number of clients yielding a ratio of time (in minutes) expended per client. The evacuation rate ranged from .08 minutes per person to 6.20 minutes per person with a mean of 2.19 minutes per person. One finding is that time to evacuate is not related to number of persons evacuated.

### MODELING EVACUATION EFFECTIVENESS

The framework for analyzing the factors that affect evacuation hypothesizes that the effectiveness of the evacuation depends on the type of threat plus the availability of resources, social climate of the organization, social linkages to the community and the extracommunity setting (Quarantelli 1980, Perry 1987). The general model to be tested appears as follows:

Effectiveness of Evacuation = Type of Threat + Resources + Social Climate + Social Linkages + Extracommunity Factors

Effectiveness of evacuation was operationalized as time taken to evacu-

recorded. This produced a measurement (TIMEVAC) which could be compared across the entire census of facilities. TIMEVAC was used (rather than time per client) because it was not related to the number of persons evacuated.

The type of threat was treated as a dichotomous variable as to whether the hazard was weather related or not (THREATD).

Resources were measured by three variables: the number of sources of external help (NUMHELP), the ratio of staff to clients (RATIOSP), and the presence of an evacuation plan (EVACPLA).

Social climate was measured by the number of clients evacuated (PEREVAC), the average age of cliental (AVEAGES) and the percentage of non-ambulatory clients (AMBULAT).

Social linkages were measured by association with a larger organization (DEPEND).

Extracommunity was measured by population density of the community (POPDEN) taken from secondary sources.

The regression equation using standardized coefficients from the full model is as follows:

$$\text{TIMEVAC} = 0.000 - 0.306 \text{ THREATD} + 0.403 \text{ NUMHELP} - 0.253 \text{ RATIOSP} + 0.091 \text{ EVACPLA} - 0.010 \text{ PEREVAC} + 0.116 \text{ AMBULAT} - 0.083 \text{ AVEAGES} + 0.056 \text{ DEPEND} + 0.735 \text{ POPDEN}$$

The independent variables in the model explained 54 percent of the variance in the dependent variable of evacuation time. Variables with a significance of less than .05 were then removed from the full model in order of their importance to estimate the most parsimonious model.

The standard coefficients of the ordinary least squares estimate of the most parsimonious model is as follows:

$$\text{TIMEVAC} = 0.000 - 0.310 \text{ THREATD} + 0.426 \text{ NUMHELP} + 0.720 \text{ POPDEN}$$

All variables were significant at P less than 0.02 (THREATD: P=0.016, NUMHELP: P=0.002, and POPDEN: P=0.000).

The analysis is of some interest because the factors used in the full and reduced model explain 54 percent and 56 percent of the variance respectively, suggesting that the variables should be used in further testing of hypotheses.

The model needs further testing across other special populations before any conclusions can be drawn. However, the results are somewhat unusual.

As expected, the equation supports the proposition that the response to non-weather threats is faster than to weather related threats. This supports the general notion that evacuation response time is dependent on the urgency of the threat. The equation further suggests the greater number of sources of help, the longer the evacuation time. One explanation is that the lack of urgency allows additional help to be mobilized. Another explanation is that the mobilization of help delays the evacuation. Further, the greater the density of population of the county, the longer the evacuation time. Again we can only speculate that the most obvious conclusion is that the more densely populated areas have more congested roads networks and more distant care centers.

The regression equation as hypothesized by Quarantelli's theoretical model suggests that the variance can be explained by the ratio of clients of staff, the amount of resources available in the way of assistance, and the higher population density of the area in determining the time needed to evacuate.

## SUMMARY

The issue of evacuation planning remains significant for nursing home and related health care organizations as well as for emergency responders. One widely used example of good practice for managing organizational response to emergencies is the development of a mutual aid plan specifying the types of assistance available from the public or private sectors and knowing the appropriate mechanisms for initiating requests for same (Kartez 1988, p. 4). While no emergency plan can be expected to address every issue, most emergency practitioners envision planning as an ongoing process that encompasses all levels of organizational management, encourages ongoing coordination among agencies, and allows for maximum flexibility in response to emergencies. The application of that planning logic could increase preparedness organizations of chronic health care facilities and reduce the reliance on ad hoc measures during an actual event.

Although the actual number of volunteer responders cannot be counted on in any given situation, plans can address the types of situations in which volunteer assistance can be readily accommodated into the evacuation experience. The limitations on physical mobility of clients indicate that the greatest use for volunteers may be in extending the physical resources of staff by performing more carry-type tasks—either in attending to clients or in removing equipment necessary for care at shelter sites.

The second issue relates to preparedness for evacuations. It is clear that preparing for emergencies receives low priority within most facilities.

zations studied. The utilization of fire drills to prepare for all types of emergencies when the majority of events were nonfire related suggests that greater attention from regulatory or licensing agencies on the types of evacuations organizations plan for is needed. The ready availability of generic emergency plans may have reduced involvement in actual planning by the organization (Tierney et al. 1988). At the minimum, fire or other official personnel who regularly address health-care staffs on emergency procedures need to expand their repertoires to include other types of emergency responses.

The issue of warnings reaching administrators of specialized populations in enough time to effectively move their clients to safety remains problematic. Contrary to the disaster literature on individual tendency to deny risk when confronted with a threat, in this study there was no evidence to suggest that the first reaction to threat was denial. On the contrary, several administrators reported setting in motion immediate preparations for evacuation even when told by authorities that an evacuation was uncertain at the time of warning. It is apparent that most emergency responders were aware of the specialized populations in their jurisdictions, often remaining to help after issuing a warning message. In only one case was an organization warned, and then "forgotten" by authorities.

The findings overall support the proposition that continuity and adaptation of structure characterize organizations during crisis situations (Kreps 1978; Stallings 1987; Drabek 1986). The proposition is also supported that the greater the continuity between disaster roles and normal responsibilities, the less problematic disaster mobilization is likely to be (Drabek 1986). Part of continuity of care may be due to legal mandates that directly relate to nursing homes and similar care facilities and not to other types of organizations. Health care organizations must continue providing an adequate level of client care because of local and state regulations, insurance provisions, and federal statutes. Other specialized populations may or may not receive similar treatment. Organizations caring for incarcerated individuals, for example, may view their obligation as protecting society from their clients. The continuity of care would be personified in keeping their populations away from the public at large.

The last issue reflects equity and the distribution of resources. Being institutionalized should not mean that clients lose their identities as individuals at risk. Being impaired physically or mentally should mean that greater and more sensitized, not less, attention, is expended on helping specialized populations cope with an emergency evacuation. The issue goes to the heart of the organization's responsibilities in evacuation planning. The

same considerations for emergency preparedness should go for the welfare of elderly impaired citizens and to other specialized populations with needs different from the more vocal components of the general population. It is to the credit of nursing homes administrators and staff alone that so few tragedies have resulted from evacuations.

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