Demographics and emergency management: knowing your stakeholders

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Two of the primary objectives of emergency management are the continuation of government and the delivery of vital services to the residents of an area affected by natural or technological disaster. Just as every individual is different, every community, whether large or small, is also different. In order to effectively meet the needs of a community during a disaster, it is necessary for the emergency manager to understand the composition of that community. This work will discuss the impacts of demographic changes on society, and the use of demographics in emergency management. It will also outline some basic techniques for use by emergency managers, and will identify some resources, which may be consulted when applying demographics to an emergency management system.

Introduction

Demographics is the study of human populations. The applied science of demographics is an extremely useful resource that is held in high esteem by conventional government planners, health care providers and the advertising industry, among others. The use of demographics revolves around several key assumptions, however, the assumption central to effective emergency management is that individuals have very different needs and engage in different activities at varying points in their lives. The typical seventy-five-year-old is far more likely to require evacuation transportation than the typical twenty-year-old. It therefore follows logically that, if one wished to predict the number of buses needed for evacuation at some point in the future, knowing the relative growth of that segment of the population which normally uses emergency shelters would be valuable as a predictor. From the perspective of risk management, the emergency manager needs to understand who his stakeholders are, and what is important to them. (Boughton, 1998)

The noted Canadian economist, Professor David Foot, says that 'demographics can be used to explain two thirds of all social phenomena' (1996). The two key factors that must be considered are the number of people in each age group, and the likelihood of a given individual experiencing a particular need. In general terms, twenty-year-olds don't have heart attacks, and seventy-year-olds don't go hang-gliding. The ability to perform this type of general trend prediction has the potential to become an extremely useful tool in the hands of emergency managers. Before viewing the implications for emergency management in detail, it is appropriate to briefly visit the major demographic trend that makes the use of demographics both interesting and useful.

Following the close of the Second World War, western industrialized societies experienced a period of elevated birth rate, which was unprecedented in history. This post-war 'Baby Boom' is one of the most studied social phenomena of the twentieth century. Generally regarded as that group of people born between 1946 and 1966, the Baby Boom generation is the largest generation ever born. It is also the generation with the lowest reproductive rate in recorded history. This has created an age group 'bulge' in the population. Communities typically experience sharp increases in the demand for certain age-dependant services, such as education, followed by a rapid decline in demand for those services, and a corresponding sharp increase in demands for the next type of age-dependant services, such as employment. For this reason, the Baby Boom generation is also one of the most difficult phenomena to accommodate for planning purposes, particularly with respect to publicly operated services, including emergency management.

Within North America, and presumably elsewhere in the developed world, a look at the education system will show the myriad of classrooms, built for the Baby Boomers but now empty, and even entire school buildings made surplus by sharply declining school enrollment. During the 1950s,'60s and '70s, everyone thought that the growth would just continue. When viewed from the approach to the millennium, however, it has become obvious that the population growth bubble has burst. It is increasingly clear that, barring unforeseen social phenomena, any element of societal infrastructure built to accommodate the Baby Boom generation is transient; yet this generation must still be accommodated for planning purposes. While many disasters cannot be predicted with any reliability, the social trends that impact on our ability to respond to disasters effectively can.

Impacts on emergency management

Population age is a major demographic factor that affects emergency management planning. Members of the public who are twenty years of age do not have the same abilities, capabilities or needs as a seventy-five year old, or a four year old. The twenty-year-old who can drive, bicycle or even walk to an emergency shelter may require transportation when he ages. A prudent emergency manager would be well advised to know whether there are enough buses or ambulances in the area to transport the elderly to safety? (Hanna, 1996). A community with a larger proportion of elderly requires more evacuation transportation than a younger community. However, until the emergency manager knows precisely how many senior citizens are being planned for, there is no real means of identifying whether such plans are adequate. Evacuation plans which assume that the majority of people would simply get into their cars and leave become increasingly unreliable as the Baby Boom generation ages.

The elderly are also more likely to experience medical emergencies, as part of an ongoing community emergency. These medical emergencies will also be more serious in nature, as well as demanding more in the way of medical resources. There is a clear correlation between age and the severity of medical emergencies. Research conducted at Toronto E.M.S. in Canada identified the fact that, of those calls identified by algorithm as life threatening, such as cardiac arrests, seventy five percent of patients were over forty years of age (Ferrier, 1998). By way of contrast, the

same research indicated that among those with relatively minor injuries, such as limb fractures, only about fifty one percent were over age forty. While plans for a simple first aid station might be adequate in the emergency shelter of a younger community, more elaborate medical support may be required for a shelter in a community of retirees.

Similarly, small infants and children have special needs in an emergency (EMA, 1996). These needs may be medical, dietary, or simply occupational. A community with large numbers of children or infants may wish to stockpile or develop emergency purchase arrangements for items such as diapers or infant formula, or they may wish to ask those who have agreed to operate emergency shelters to develop a children's activity program. Children also need to be counseled by specialists, if they are available, following a disaster. A prudent emergency manager is aware of these issues, and should be able to identify the need for such services and whether or not they have pressing relevance within the local emergency plan.

The needs of those with disabilities must also be addressed. The emergency manager must know how many blind or deaf people live in the local community. These individuals may very well miss local emergency notification messages, and may require special efforts to reach safety. Similarly, those with mental and physical challenges may require special evacuation assistance, shelter arrangements, or special medical support. But before the emergency manager can undertake any of these worthwhile projects, the size and nature of the group must be properly identified. Does the community need to spend a large portion of its disaster preparedness budget making an emergency shelter fully accessible, or does the size of this subset indicate that simple, basic accommodations for the disabled are adequate, freeing precious money to be spent on a more needed aspect of preparedness?

Length of residence in a community is also a determining factor. It has been demonstrated repeatedly that, in the case of recurring phenomena such as tropical cyclones, long time residents are far less likely to evacuate than 'first timers; are (Beaulieu, 1996). This generally holds true until the community is struck by a truly catastrophic event, and then resumes as time and distance permit the community to place the event behind them. This is highly significant for the emergency manager, since a community with large numbers of new residents, or with a recent catastrophic event, is likely to experience far more demand for shelter space than a community with a relatively stable population.

Additionally, the world's population has become increasingly mobile in the latter half of the twentieth century, and this also has impacts on emergency management. As people continue to emigrate to more developed countries in search of a better life, the ethnic composition of once homogenous societies is forever changed. It may no longer be enough to disseminate emergency instructions in English, and emergency managers become challenged by 'getting the word out,' despite substantial language barriers. Has the ethnic composition of the community changed, requiring expensive translations of emergency preparedness information, or has it remained the same?

Clearly, if the emergency manager is to disseminate information and to plan for and provide emergency services effectively, the composition of the target audience must be known and understood. Demographics can greatly aid in the acquisition of that knowledge. While not yet in wide use in emergency management circles, the applied science of demographics can be a valuable tool for the planning and provision of emergency services during a disaster.

Tools of the trade

In most developed societies, a Census is conducted by the government on a regular basis, usually at five or ten year intervals. Information is collected community by community, and the result is a relatively accurate picture of the composition of each community, in terms of age, gender, total population, language and ethnicity, education and socio-economic status. For larger cities, these are referred to as Census Metropolitan Areas (CMAs) in Canada, and in the United States they are referred to as Metropolitan Statistical Areas (MSAs). In smaller communities, the data is usually collected within predetermined boundaries called tracts, which include adjacent rural areas. This data can be used to provide the emergency manager with a relatively accurate portrait of the community served. While most governments normally provide this information for a fee, such as publishing and selling the national census, many will also make this information available free of charge for other government agencies. The information is also generally available in the reference section of most university libraries.

Most governments also develop demographic projections of population for planning purposes. In these projections, population is usually identified in five-year age groups, or cohorts, and may include gender data. The increase or decrease in population is projected by cohort for each year of a twenty-five year period. These projections are based on census data, and on certain key assumptions, such as birth rate, mortality rate, and migration patterns. This information is used by the government to identify future revenue sources, and to identify increases and decreases in the need for various types of government services. While the federal government conducts the Census, the provincial or state department responsible for finance usually creates demographic population projections. Once again, while these are generally for sale to the private sector, they are normally provided free of charge to other government agencies.

Another useful source of data, particularly for those agencies with limited resources, includes municipal planning departments, which generally need to generate these projections for their own purposes. Emergency managers should also consider a strategic alliance with a local university, particularly with the Social Sciences or Geography departments. The development of this information can be provided free of charge to emergency managers, while second or third year students receive the opportunity to apply some of their skills and training to a project with real-life implications. By incorporating this process into the university program, the emergency manager is provided with regularly updated data. In this manner, both the emergency manager and the university derive benefits.

There may be those cases in which resources for the production of case-specific projections, such as a local university, are not available. In these cases, the process of demographic projection can be conducted directly by the emergency manager. The process is relatively uncomplicated, and involves specific steps. These include the collection and analysis of historical data, the identification of target groups of stakeholders, calculation of relative growth rates for the population in these subsets of stakeholders, and a calculation of future requirements for the service in question which are based upon the growth rates previously mentioned.

The first stage in this process is to gather and analyse historical data. In the case of determining future emergency shelter requirements, one should examine shelter registration records. While some communities still do not register shelter

occupants, they are losing a potentially valuable source of information for future planning. Armed with these records, however, it is possible to identify which groups, such as elderly or families with small children, have actually used the shelter in the past. By arming oneself with this basic information, it becomes possible to determine how large that particular subset of people was within the community, and the need for service provision, relative to group size.

To illustrate, the local emergency manager knows that at the time of the last tropical cyclone there were 5,000 people over age sixty-five in the community. According to shelter records, 3,500 of those 5,000 required shelter. One can then create a basic assumption to the effect that, with respect to the provision of community shelter, one needs to be able to accommodate seventy percent of the over sixty-five age group. This function must be performed for each group for which data is available, and it is simplest to determine the subsets using the same five-year age cohorts included in the census and population projection data. By then looking at projections of future population, if the emergency manager notes that in ten years the over sixty-five population of the area will have doubled, it is a fair assumption that shelter demand will double as well.

The emergency manager now knows that within ten years the emergency plan will need to provide shelter resources for approximately 7,000 people over 65 years of age. By repeating this process for each of the age cohorts, the emergency manager will be able to arrive at an understanding of the normal needs of the stakeholders for emergency shelter, both now and ten years into the future. This provides the emergency manager with a window of time in which to develop the availability of the shelter space which will be needed, and provides the opportunity to become pro-active instead of reactive. In most cases, the application of these projections to resource requirements is a matter of simple arithmetic.

In a similar scenario, an emergency manager knows that there are currently sufficient buses to evacuate the 600 school children in the service area. If the emergency manager also knows that the number of people in that age group will decrease by 20 percent over the next five years, then it logically follows that the emergency manager will need to have access to 20 percent less buses for school children within the next five years, if the evacuation plan is to be effective. This may permit the reallocation of some buses to another emergency task, such as providing evacuation for seniors. Similar exercises can be developed regarding shelter space, emergency food stocks, and a host of other emergency commodities.

The Census data provides the emergency manager with a valuable insight into the composition of the community being served as well as what the current needs of that community are likely to be. This information is valuable for the purpose developing the current emergency plan. The demographic projections provide an insight into what future needs are likely to be, and permit the emergency manager to become pro-active by identifying future needs and matching resources to those needs before the disaster occurs.

Conclusion

While the incidence of disasters cannot generally be predicted, their impacts on a given community often can. The key to achieving this is an understanding of the composition of a given community in terms of key factors, such as age, gender, ethnicity, and religious beliefs. Certain groups within a larger community often have special requirements that must be considered when preparing an emergency plan.

For many years, most emergency managers have attempted to mitigate physical threats to the community; identification of needs has largely remained an exercise in hindsight. The use of demographics can provide a means to change this. Until emergency managers clearly understand who their stakeholders are, both now and in the future, advance planning will never be fully effective, and unpleasant surprises will frequently occur during disaster responses.

Other sectors of government routinely use demographics to identify populations, and to plan for future specific needs. The science of demographics is also utilised by health care providers throughout the world for planning purposes. The techniques used are every bit as valid for those who determine the steps which need to be taken to prepare for an emergency. The twenty-year-old who simply rides his bicycle or drives his car away from danger may require a bus or even an ambulance to do the same when he is eighty.

The key to success is a strategy of identification and mitigation. Once the needs of a given community are more completely understood it becomes possible to identify whether the community's resources are adequate to meet those needs in an emergency. Armed with this understanding, it is possible to begin a process to mitigate any shortfalls in resources, so that when and if the time ever comes when those resources are needed, the impacts of the disaster on the population are minimised. The community becomes truly prepared.

The essential point is that the use of demographics permits us a window through which to view our communities, in order to identify those variables affecting community needs. The consideration of these variables within communities is as critical to the process as hazard identification or risk assessment, when formulating an emergency plan. In particular, we need to use these variables to identify those in the population who are likely to have special needs, and to ensure that the resources within our communities are adequate to meet those needs, both now and in the future.

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About the author

Norman Ferrier joined the staff of Toronto E.M.S. in 1974. He worked initially as a paramedic, and became a District Supervisor in 1981. His involvement in emergency management began in 1983, when he wrote, choreographed and staged his first full scale exercise for a Toronto area hospital as part of its' accreditation process. Norm is a graduate of the Canadian College of Emergency Preparedness and a certified exercise designer. He still works for Toronto E.M.S. as an emergency planner, and does emergency planning consulting with other public sector agencies on behalf of that organization.