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Dimensions in Health

Defining and Understanding Vulnerable Populations in New Mexico Volume 2



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Foreword

Last year the UNM College of Nursing doctoral students initiated a special book in our class on *Rural and Cultural Health*. The book addressed key issues on health status and health disparities in the state of New Mexico and became Volume 1 in an ongoing series compiled by the experienced cadre of advanced practice nurses, educators, clinicians, and administrators who comprise our nursing PhD students. This year an entirely new group of our nursing doctoral students have taken on a similar challenge. In Volume 2, they tackle a unique set of problems, issues, and health-related questions, based on their respective areas of interest for practice and research.

Health disparities and inequities exist globally, nationally, and locally. The current national health care environment could be characterized as a crisis, especially for marginalized, economically deprived, culturally misunderstood, and immigrant populations. Demographic and economic trends suggest that intense attention and resources are needed for an increasingly inadequate health care system, both at national and statewide levels. New Mexico ranks among the poorest states for adequate management of communicable, noncommunicable, and sociobehavioral health conditions. In addressing that context, the authors bring their best thinking, efficient planning, and attention to social justice into their writing. We invite the readers to share in the analysis and problem-solving urgently needed in our state, and to honor the traditions that rural cultures bring to the dialogue in such disquieting times. In the words of Kay Moon, writing in Hasselstrom et al. (1997), *Leaning Into the Wind*,

My future is this holy place,
Where the mountains of my past
Scrape the sky of my present.

Here in the silence
Between the trees. (p. 195)

Jennifer B. Averill, RN, MSN, PhD

Introduction

We, the second PhD cohort in the College of Nursing, present Volume 2 in *Dimensions in Health*. Like the first cohort, we are a diverse and determined group. And, like the first cohort, we are resolved to meet the challenges that face nursing in the 21st century and that test our personal and professional excellence. In this volume, we expand on issues that affect those in rural New Mexico and continue to focus on the experiences and problems of disadvantaged and vulnerable New Mexicans.

We are a close-knit group and very supportive of each other. Under the leadership and guidance of Jennifer Averill, we began this volume with anticipation and excitement, realizing that we would be “in print” and that we might have a larger readership than usual for our extensive research. We have tried to deal thoroughly and thoughtfully with issues that interested us and that we felt were important as we considered how culture in its myriad forms influences and shapes us.

We come from varied professional cultures. Maribeth Doren is an administrator. Keri Black is a Nurse Practitioner who works in Urgent Care. Mary Ann Osuchowski-Sanchez is a Nurse Practitioner who practices in northern New Mexico. Martha Faulkner is a Nurse Practitioner who works in pediatric mental health. Yolanda Morales is a Clinical Nurse Specialist practicing in an adult mental health setting. Rebecca Mayo is a Nurse Practitioner in Cardiology.

We are inspired by the cohort that preceded us, and we offer our heartfelt encouragement to those who will follow. We hope that we can fulfill the potential the faculty of the College of Nursing saw in us when we were selected as the second cohort. We thank them for their confidence in us and for their support in our professional growth. We sincerely hope that our contributions to this volume are reflective of our increasing academic maturity and will illuminate and inspire further consideration of the issues we present.

Rebecca Mayo

Dedication

We dedicate this volume to our families, friends, teachers, colleagues, and patients – those whose good will, encouragement, patience, willingness to share and, when necessary, forgive, has all the difference. We won't forget you, ever.

In Gratitude

Occasionally, we have the great good fortune to have a teacher who not only inspires through her teaching, but also through her personal example of kindness, fairness, and respect. Jennifer Averill is such a teacher. We wanted you to know.

Acknowledgements

A very special thank you to Anne Mattarella for her invaluable expertise in editing, and for her patience and encouragement.

1 Caring for the Next Generation: Access to Health Care Services for Children and Adolescents Living in New Mexico

Maribeth Doren, RN, MSN, MBA, CCM

The purpose of this chapter is to discuss access to healthcare for children in rural areas and to identify barriers to access for those living in rural New Mexico. Health care access problems in rural areas are not that different from access issues in health care systems in general. General access issues include a shortage of medical resources, lack of specialty services, and hospital closings. These issues, among others, affect both access and health care quality (Touati, Contandriopoulos, Denis, Rodriguez, & Sicotte, 2004). Other authors disagree, pointing out that health disparities and health care access issues are more pronounced in rural racial and ethnic minorities (Eberhardt & Pamuk, 2004; Probst, Moore, Glover, & Samuels, 2004; Vasas, 2005).

Background and Literature Review

There are a variety of population characteristics contributing to health disparities: (a) gender, (b) age, (c) race, (d) ethnicity, (e) education, (f) income, (g) social class, (h) disability, (i) geographic location, and (j) sexual orientation (Eberhardt, & Pamuk, 2004; NIH Cancer Institute, n.d.; Vasas, 2005). The health disparities of location and age are the primary focus of this chapter. In this chapter, rurality is the proxy for location and children and adolescents between birth and 20 years of age is the variable for age.

Rurality

The U.S. Census Bureau estimates there are approximately 54 million people who live in areas defined as rural. This means that approximately 20% of the population lives in rural communities. While this percentage may seem low, it is estimated that 80% of the land mass of the United States is classified as rural (Bushy, n.d). This estimate varies depending on who is reporting the statistic and which definition of rural they are utilizing to report population and land mass estimates.

Neither rural nor rurality are easy concepts to define or operationalize since the notion of rurality means different things to different people. Complicating this issue is the fact that governmental agencies also define rural very differently. Examining these definitions and concepts is important for both nursing researchers and policy-makers (Bushy, n.d.; Bushy, 1999; Hart, Larson, & Lishner, 2005; Weinert, 2002; Weinert & Burman, 1999). Most definitions include geographic and population factors, as well as individual subjective perceptions (Bushy, n.d.). Many of the reporting structures for rurality show rural and urban communities as opposing dichotomies. The risk of a dichotomous

approach is that there is a wide variation in rural communities, and this approach simply does not address the diversity that is present in rural populations in the United States. For the purpose of this chapter, I will use the Office of Management and Budget taxonomy to determine the non-metro/rural classifications in New Mexico. I have selected this taxonomy as a method to research the availability of services for children and adolescents because it allows me to research specific identified areas of the state to determine the availability or lack of services.

Access to Health Care Services

Access to health care is a major challenge in rural America, as rural dwellers often have limited access to health care services, high rates of poverty, and lack of adequate and reliable transportation and are at higher risk for chronic illness and accidental death than urban dwellers (Alverson et al., 2004; Eberhardt, & Pamuk, 2004; Gallagher, 1999; Mitchell & Gaskin, 2005; NIH Cancer Institute, n.d.; Sanford, Johnson, & Townsend-Rocchiccioli, 2005; Weinert, 2002). Many of the challenges related to health care access are due to a lack of local expertise, resources, economic infrastructure, recruitment and retention of health care professionals, a small population base, reimbursement issues, and significant distances from expertise and service (Alverson et al.). Lack of access to health care services often creates economic barriers since recruiting businesses is more difficult in remote areas (Alverson et al.).

In many cases, children and adolescents requiring specialty health care must travel hundreds of miles to regional specialists to receive care. This requires dependable transportation, lodging, and money to pay for food and gas to make appointments. Additionally, when weather is inclement, there are physical challenges to reaching the regional centers.

Health Insurance Coverage

Rural residents have fewer choices of health plans since many managed care organizations do not serve rural residents (Eberhardt & Pamuk, 2004; Sanford et al., 2005; Weinert, 2002). Additionally, in rural areas, physicians may not be members of HMOs. In areas where there is little or no industry other than agriculture, the availability of health insurance plans is limited. Fewer rural residents receive insurance from their employers than their suburban counterparts (Eberhardt & Pamuk).

More than a third (36%) of rural children have no insurance or have had a gap in insurance in the past 3 years. In comparison, 31% of children living in urban areas have this same gap in insurance coverage (Eberhardt, & Pamuk, 2004; Gallagher, 1999; Probst et al., 2004). Being in a racial or ethnic minority status, low parental education, and low income were factors that increased the risk of loss of insurance. Additionally, because of restricted eligibility periods and the need to show eligibility for coverage more frequently, children and adolescents covered by Medicaid are at higher risk for loss of coverage over the course of a year than those with private insurance (Freedman & Boyer, 2000; Probst et al.).

Unmet Health Needs

Unmet health needs can reflect poor access to care, inadequate recognition of care needs, or inadequate recognition of health problems by medical professionals. All of these are important factors that affect overall health status (Liberatos, Elinson, Schaffzin, Packer, & Jessop, 2000). In a recent study, researchers quantified unmet needs of a pediatric population by measuring symptoms and comparing those symptoms with the expected number of children who should receive health care services. In this study, 59% of children and 57% of adolescents should have received care for their condition, while approximately 48% did receive care for their reported symptoms. Parents who sought care for their child or adolescent tended to have more education and be at a higher socioeconomic level. Additionally, in this study, adolescents in poor health or with chronic disease received care less frequently because their parents saw seeking care for acute symptoms as burdensome (Liberatos et al.; Probst et al., 2004; Starfield, Riley, Witt, & Robertson, 2002).

While there is little evidence of rural-specific disparities in rates of human immunodeficiency virus (HIV) infection, immunizations, and infant mortality, there are indicators that suggest that screening rates for illness are lower in rural areas. Additionally, rural residents are at a higher risk for chronic illness and disease (Eberhardt & Pamuk, 2004; Gallagher, 1999; Probst et al., 2004; Weinert, 2002). There is also evidence on a national basis that non-White, rural children and adolescents have a higher rate of unmet health needs, lower immunization rates, self-reported foregoing needed care, lack of access to a regular source of health care, and fewer physician visits (Dess, 2001; Probst et al.).

Medical Home

Historically, the definition of a medical home is the presence or absence of a primary or usual source of care, generally, a pediatrician or family practice physician. In 2002, the American Academy of Pediatrics issued a policy statement that included a detailed definition of medical home. This definition includes seven dimensions with 37 discrete concepts that determine whether the medical home exists for a particular child or adolescent (Bethell, Read, Brockwood, 2004; Olsen & Swigonski, 2004; Sia, Tonniges, Osterhus, & Taba, 2004). The ideal model of care outlined by the American Academy of Pediatrics includes care for children and adolescents that is provided by well-trained physicians who provide primary, preventative, acute, and chronic care that is comprehensive, accessible, family-centered, continuous, compassionate, culturally effective, and coordinated with other services that are received outside of the medical home (Bethell et al.). Medical home is becoming the standard of care for all children and adolescents, not just those with special health care needs (Sia et al.).

The goal of a medical home is to reduce fragmentation, gaps, delays, duplication, and other practices that characterize fragmented care. Fragmentation of care is expensive, inefficient, and hazardous to a child's or adolescent's health since important care may be missed or delayed because of fragmentation (Sia et al., 2004). While the concept of

medical home seems promising, particularly in reducing health disparities and improving quality of health care, there are three major identified barriers to implementing the concept of medical home: (a) pediatricians are untrained in the concept of medical home, (b) the need for coordination of care across the continuum is difficult to attain, and (c) lack of reimbursement for well-child supervision and care coordination (Sia et al.).

Implementation of the medical home concept has been slow in New Mexico. The University of New Mexico has several multidisciplinary clinics held for children and adolescents with special health care needs. These clinics are held in Albuquerque and do not include a primary care physician. Specialty physicians; social workers; nurse case managers; physical, occupational, and speech and language pathologists; dietitians; and other specialists care for patients who visit these clinics. Once the child's visit is complete, a multidisciplinary report is prepared and sent to the primary care physician. Multidisciplinary clinics without primary care physician participation are not true medical homes since the medical home concept requires care be provided by a primary care physician who then coordinates the child's care. One issue with the medical home model in New Mexico has been the lack of available pediatric services in many areas. Until this disparity is resolved, implementation of the medical home concept will be difficult to actualize on a statewide basis.

Service Availability

Access to health care requires health care professionals to provide services. In rural America, estimates suggest that 65% of rural residents live in areas designated as wholly or partially health professional shortage areas (HPSA). There are greater shortages in counties where more than half of the population belongs to a racial or ethnic minority. Four of every five rural counties that have a high Hispanic population are HPSA areas, 83% of counties where Blacks are the majority are HPSA areas, and 92% of counties where American Indian or Alaskan Natives are in the majority are HPSA areas (Agency for Healthcare Research and Quality, 2000; Probst et al., 2004; Sanford et al., 2005).

New Mexico is the fifth largest state in the United States, with approximately 122,000 square miles of area. Distance to providers is almost always an issue for patients. For instance, from the town of Hobbs to Albuquerque and back takes approximately 10 hours by car. New Mexico also has a shortage of both primary care and specialty physicians, as well as nurses; physical, speech and language, and occupational therapists, and other health professionals and paraprofessionals. Evidence of this shortage is clear, since 29 of 33 New Mexico counties are full or partial HPSAs (Effertz, n.d.). The national average for physicians per 100,000 population is 226. New Mexico has only 194 per 100,000 population. A total of 64.4% of physicians practice in Los Alamos, Santa Fe, and Bernalillo counties, while only 38.7% of the population live in these counties. When looking at specialists, the concentration in Los Alamos, Santa Fe, and Bernalillo county are even more pronounced. For instance, 86% of the state's radiologists live in the three counties identified above (Effertz).

Services for Children and Adolescents in New Mexico

New Mexico ranks among the lowest in health statistics for children and adolescents. New Mexico has 498,000 children. Fourteen percent of these children lack health insurance. The median income of families with children in 2003 was \$35,300, which is well below the national average of \$50,000. New Mexico also falls behind in educational performance, immunization rates, low birth weight babies, child death rate, teen death rate, and teen birth rate. Furthermore, compared with the national average, New Mexico has a higher percentage of teens who drop out of high school, teens who have dropped out of school and do not work, children living in poverty, and children in single-parent households. See Table 1 for statistics comparing New Mexico to the national average (Annie Casey Foundation, 2005).

Table 1
Health Indicators: New Mexico Compared With National Average

| Indicator | New Mexico Average | National Average | Better/Worse Than National Average | National Rank |
|---|---------------------------|-------------------------|---|----------------------|
| Percent low birthrate babies | 8 | 7.8 | Worse | 27 |
| Infant mortality rate (deaths per 1,000 live births) | 6.3 | 7 | Better | 17 |
| Child death rate (deaths per 100,000 children aged 1-14) | 24 | 21 | Worse | 34 |
| Teen death rate (deaths per 100,000 teens aged 15-19) | 94 | 68 | Worse | 42 |
| Teen birth rate (births per 1,000 females aged 15-19) | 62 | 43 | Worse | 48 |
| Percent of teens who are high school drop-outs (Aged 16-19) | 10 | 8 | Worse | 39 |
| Percent of teens not attending school and not working (aged 16-19) | 10 | 9 | Worse | 34 |
| Percent of children living in families where no parent has full-time, year-round employment | 39 | 33 | Worse | 46 |
| Percent of children living in poverty | 26 | 18 | Worse | 48 |
| Percent of children living in single parent households | 36 | 30 | Worse | 46 |

(Adapted from the Annie Casey Foundation. *State of New Mexico Strategic Plan FY 2007, 2005*)

Accompanying the issues with health indicators is the lack of health care providers in New Mexico. Rural areas suffer from the lack of providers more than urban areas. In Albuquerque, Santa Fe, and Los Alamos, services are more readily available, while in other areas of the state, access is more difficult. In many counties, there are no pediatric primary care providers, and in most counties in New Mexico, there are not any pediatric

specialty providers. There are outreach services available in some areas of New Mexico, though these are generally sporadic in nature.

The State of New Mexico strategic plan outlines several areas specifically and nonspecifically related to child and adolescent health: (a) increase immunization rates for children, (b) reduce teen pregnancy, (c) reduce child and adolescent obesity and diabetes in all populations, (d) reduce teen suicide, (e) expand health care services in rural and underserved areas using telehealth, (f) expand health care for children and adolescents through school-based clinics, and (g) improve access to preventative and restorative oral health services to children (New Mexico Department of Health, n.d.-b). In the section entitled Efforts to Improve Accessibility, I will discuss three areas that serve to address portions of the strategic plan, outreach services, telehealth, and school-based clinics. In the next section, I will present an overview of the services that are available in rural New Mexico.

Primary and Specialty Care Services

Pediatric primary care services are available in limited areas of the state. Of the 33 counties in New Mexico, only five have pediatricians or pediatric practices. In many of these areas, there are services available from family practice physicians, though there are areas of the state that do not have any services available. For instance, in Lordsburg, New Mexico, there are no physicians in private or group practices. Residents in that area must travel to Silver City, Deming, or Las Cruces if they wish to receive services in New Mexico. There are services available in Arizona, though these services are located approximately the same distance from Lordsburg as Deming. It is apparent that there are too few providers in most counties of New Mexico to adequately care for the population. The more remote or rural the area, the more likely it is that there are too few health care providers to care for the population.

While there may not be pediatric primary care or specialty care providers in many areas of the state, there are county health clinics in each county. These county health department clinics often have very limited hours and services, though they are available for some basic services in each county. These clinics help bridge the service gap, though with limited clinic hours and availability of staff, these clinics are not enough to provide services to those who need them in remote areas.

Community Support Services

There are home health agencies in 24 of 33 counties in New Mexico. The majority of these agencies provide pediatric services, though their scope of service is sometimes limited. Additionally, there are issues with remote locations since most agencies limit their service area to between 50 and 100 miles from the office. Even when a location is within a given service area, there are limitations on the number of visits an agency can make. Even if there is funding in place, many agencies lack sufficient professional staff to make all the necessary visits. Nurses in many outlying areas work many days in a row to care for their patients, which leads to burn out and frustration and ultimately increases

turnover (Fazzone, Barloon, McConnell, & Chitty, 2000). The breakdown of agencies by county is presented in Table 2.

Table 2
Home Health Agencies by County

| County | Number of Agencies | Number Providing Pediatric Services |
|---------------|---------------------------|--|
| Bernalillo | 9 | 9 |
| Catron | 0 | 0 |
| Chaves | 4 | 2 |
| Cibola | 0 | 0 |
| Colfax | 0 | 0 |
| Curry | 3 | 3 |
| De Baca | 0 | 0 |
| Dona Ana | 7 | 4 |
| Eddy | 6 | 2 |
| Grant | 2 | 2 |
| Guadalupe | 0 | 0 |
| Harding | 0 | 0 |
| Hildago | 0 | 0 |
| Lea | 3 | 2 |
| Lincoln | 2 | 2 |
| Los Alamos | 1 | 1 |
| Luna | 2 | 2 |
| McKinley | 2 | 2 |
| Mora | 2 | 2 |
| Otero | 1 | 1 |
| Quay | 1 | 1 |
| Rio Arriba | 1 | 1 |
| Roosevelt | 1 | 1 |
| Sandoval | 0 | 0 |
| San Juan | 5 | 5 |
| San Miguel | 2 | 2 |
| Santa Fe | 2 | 2 |
| Sierra | 2 | 2 |
| Socorro | 1 | 1 |
| Taos | 1 | 1 |
| Torrance | 0 | 0 |
| Union | 1 | 1 |
| Valencia | 1 | 1 |

(Adapted from Home Health Compare, n.d.)

Medically Fragile Waiver

The Medically Fragile Waiver Program is a Medicaid waiver that provides home and community based services to children who are both medically fragile and developmentally delayed or at risk for developmental delay. Children who are medically fragile have one or more chronic physical conditions that require prolonged dependency on medical care, skilled nursing, and technology. Medically fragile conditions necessitate frequent medical supervision and consultation of a physician, administration of

specialized treatments, and dependency on medical technology, such as ventilators, dialysis machines, enteral or parenteral nutrition, or continuous oxygen therapy. There is both a medical and financial qualification. To qualify financially, the child must qualify for the State of New Mexico Medicaid program. There are a limited number of slots available in each county, and services are first come first served. This often necessitates a waiting list for services (New Mexico Department of Health, n.d.-a.). Additionally, even after services are approved, there may not be sufficient professional staffing to cover individual needs. While medically fragile services are invaluable to the children of New Mexico with chronic medical conditions, there is limited access to services, particularly in rural areas, because of shortages of professional personnel.

Family Infant Toddler Program

The Family Infant Toddler Program provides services to children from birth to age 3 who have a developmental delay of 25% or more in one of five developmental areas, an established condition that generally leads to developmental delay, or a medical or biological risk for a developmental delay. The program provides early intervention services in an attempt to support both children and their families and to decrease the effects of developmental delay (New Mexico Department of Health, n.d.-a). Early intervention services include: assistive technology; audiology services; special instruction; health services; medical services; nursing services; and physical, occupational, and speech and language services. The program also offers service coordination, psychiatric services, and social work services. Children receive services in their homes or in community settings. There are service providers in each county of New Mexico. In fiscal year 2005, the program provided a total of 279,540 hours of service to 9,171 children. While these services are invaluable to children who are aged 3 and under, there are gaps in service once the child reaches the age of 3. After age 3, the child transitions to public school system for services. Additionally, in some areas, there are reported shortages of some professionals that provide covered services leading to delays in service (New Mexico Department of Health, n.d.-a).

Efforts to Improve Accessibility

Outreach Clinics

There are a number of outreach clinics in New Mexico. University of New Mexico Hospitals holds pediatric specialty outreach clinics in all regions of the state. The frequency of these clinics varies from monthly to one or two times a year. The area with the broadest scope of services from the perspective of pediatric specialty clinics is Las Cruces. The following pediatric specialty clinics visit Las Cruces: cardiology, endocrinology, genetics, hematology, immunology, neonatology, nephrology, pulmonology, dysmorphology, neurology, high-risk obstetrics, orthopedics, and pediatric surgery. Orthopedic clinics also travel to Farmington, Shiprock, Taos, Santa Rosa, Clovis, Roswell, Carlsbad, Deming, and Silver City. While there are outreach clinics in each of these areas, there is limited availability of services. For instance, for orthopedic clinics, parents must bring any x-rays they have. If the child needs further x-rays or other

medical testing, they must travel to Albuquerque, where the quality of x-rays and scans are better than those available in other outlying areas. There are no surgical or diagnostic services available at outreach locations (Alex Hindi, personal communication, November 7, 2005).

One pediatric cardiology practice not associated with the University of New Mexico also offers outreach services. Pediatric Cardiology Associates of New Mexico offers outreach clinics in Las Cruces, Gallup, Santa Fe, Roswell, Clovis, Farmington, Shiprock, and Silver City. Pediatric Cardiology Associates holds clinics in Las Cruces weekly, in Santa Fe three times a month, in Gallup, Roswell, Clovis, and Farmington monthly, and in Shiprock and Silver City quarterly (Pediatric Cardiology Associates, n.d.).

While the availability of outreach clinics is helpful to residents living in outlying areas, the scope and location of these services is such that many of the state's rural residents do not benefit from either the frequency or the scope of services available. For outreach services to be more accessible and available, locations need to be expanded and a full scope of services available in each region of the state. This is not easily accomplished. Taking providers out of their primary site then leaves that site with limited or no services. This is a promising trend in access to health care for rural residents, but more availability and a broader scope of service would improve outreach services in outlying areas.

School-Based Health Clinics

In the 1970s, school-based clinics became a reality. The goal of the clinics was to reach more children and adolescents and provide them with health care services that were comprehensive, accessible, affordable, and confidential. Eventually, the clinics began to focus more exclusively on reducing risky behaviors, particularly in relation to high-risk sexual activities. While this was a noble goal, recent evidence suggests that school-based clinics have not been able to document effectiveness in reducing risky behavior (Gallagher, 1999).

In recent years, there has been an increase in the number of school-based clinics, school-linked health centers, and school health centers. The clinics are generally on campus or at an easily accessible site near the school. The clinics are usually associated with a middle or high school and staffed by physicians, nurses, nurse practitioners, medical assistants, social workers, and counselors (Gallagher, 1999).

The initial goal of school-based clinics was to improve access to primary care, since adolescents have the lowest rate of primary care of any age group. Access to primary care decreases when children and adolescents live in poverty. Additionally, adolescents are more likely to be uninsured than other age groups.

Strengths of school-based clinics relate to reducing barriers to access as well as providing a broad array of affordable services to the students served by the clinics. Another strength is the ability of the staff to uncover the underlying rather than stated reason for the visit to the clinic. Weaknesses include lack of coordination of services, lack of continuity of care

primarily because of limited hours and days of operation, and high staff turnover (Gallagher, 1999).

In a comprehensive review of a number of school-based clinics, Gallagher concludes that school-based clinics are an effective mechanism to deliver health care services to adolescents. The care provided by school-based clinics is comprehensive, available, affordable, acceptable, and confidential. School-based clinics are also more successful in reaching high-risk adolescents as well as providing primary care services to a population that is traditionally underserved. While school-based clinics have shown promise in providing care to a traditionally underserved population, there is inconsistent proof that the clinics reduce high-risk behaviors or reduce pregnancy and birth rates (Gallagher, 1999).

In the New Mexico Department of Health (n.d.-b) 2007 strategic plan, Governor Bill Richardson announced plans to double the number of school-based health centers in New Mexico. The current plan calls for at least one school-based health center in each county of New Mexico. The state prioritized school districts based on economic and health care concerns, including the percentage of children living in poverty. The governor hopes the expansion decreases the incidence of substance abuse, depression, risk of suicide, diabetes, obesity, lack of immunizations, and the effects of early, unprotected sexual activity including pregnancy, as well as poorly controlled asthma and other chronic conditions. Once the planned expansion is complete, school-based clinics will provide primary care and behavioral health services to approximately 40,000 children and adolescents (New Mexico Department of Health, n.d.-b).

Increasing school-based clinics will provide children and adolescents in underserved rural areas access to much needed services. It is important to assess outcomes to ensure the clinics have the desired outcome. The State of New Mexico can use the clinics showing a positive outcome as a model for future clinic implementation. Additionally, as new strategic plans are constructed, new clinics plans need to be included so access to clinics and services are available and accessible for the entire student population of New Mexico.

Telehealth

There has been an explosion of activity in telecommunications providing new and different access to specialty services in a manner that is innovative and relatively inexpensive (Alverson et al., 2004; Touati et al., 2004; Weinert, 2002). With the rapid advance of computer information and computer technology applications, telehealth has shown promise in improving access to services in rural areas. Telehealth makes use of electronic information, imaging, and communication technology to provide health care or support health care services when the distance between providers and areas is large (Alverson et al.; Effertz, n.d).

While there have been successes with telehealth, adaptation of the technology is slow in many rural areas. Telehealth services may provide substantial economic benefits to rural

states. Communication infrastructure and access to specialty services via telehealth may be a way to attract employers to remote rural areas. Additionally, telehealth services may be an important tool in improving access to health services and decreasing disparities (Effertz, n.d.).

The State of New Mexico and the Health Resources and Services Administration provided assistance in developing the New Mexico Telehealth Network. The primary hub site for medical telehealth services in New Mexico is the University of New Mexico Health Sciences Center while the primary hub site for mental health services is the New Mexico Department of Health State Psychiatric Hospital. Rural sites include hospitals, community health clinics, and mental health clinics (Alverson et al., 2004). Initially, requests for telehealth-supported specialty clinics included nephrology, rheumatology, dermatology, oncology, fluoroscopy, physical and occupational therapy, pathology, gastroenterology, pain management, adult psychiatry, admission screening, chemical dependency and substance abuse therapy, and pediatric subspecialties. Of these, the only ongoing requests for clinics were adult psychiatry and fluoroscopy (Alverson, et al.). Perception of need for clinics and actual utilization of telehealth services varied significantly in New Mexico. In many areas, telehealth clinics were unable to sustain enough volume to hold clinics on a monthly basis. Additionally, many patients seen at a telehealth site eventually traveled to Albuquerque for additional follow-up services at the University of New Mexico Health Sciences Center or other Albuquerque facilities that offer specialty services. Another barrier to telehealth is that reimbursement for services is not yet widely available since the provider who is consulting is not in physical contact with the patient (Alverson, et al.).

In March 2005, Governor Bill Richardson signed the New Mexico Telehealth Commission Act. The goal of the commission is to identify barriers to using telehealth, identify how telehealth improves access to health care services, and coordinate public and private sector initiatives to expand services. Richardson believes that increasing telehealth services will improve access to health care throughout the state of New Mexico (New Mexico Telehealth Commission, n.d.). If telehealth infrastructure and services are improved and reimbursement is available to providers, telehealth services may increase access, efficiency, and availability of services in remote locations.

Nursing and Research Implications

Nursing and research implications abound in the area of access to services for children and adolescents in rural areas. While the State of New Mexico has plans to improve services and access for rural residents through the use of telehealth and school-based clinics, gaps in service remain. While outreach services are available in many areas of the state, these services are sporadic at best and are not optimal for urgent or emergent care. Research on gaps and overlap could show areas for improvement in rural New Mexico. Additionally, research on nurse-run clinics could improve access and care for rural residents in New Mexico. A project that includes evaluation of all services available in areas of the state, including those paid for by special funds, grants, federal and state funding, and waivers would help identify overlaps and gaps in services and lead to more

efficient and effective service provision. Further research on the effectiveness and outcomes of telehealth, school-based clinics, and outreach clinics to ensure these services are having the desired results needs to be undertaken.

Children with special health care needs are at higher risk than the general pediatric population. Research identifying available services and gaps for children and adolescents with special health care needs would help determine the unmet needs of rural children and adolescents with special needs. While services for healthy children and adolescents are lacking, there may be even bigger gaps and lapses in services for children and adolescents with special health care needs who live in rural New Mexico.

Conclusions

New Mexico is the fifth largest state in the nation with 122,000 square miles of land. Twenty nine of 33 New Mexico counties are full or partial HCSA (Effertz, n.d.). The rural nature of the state and health care shortages lead to health care disparities and lack of access to services. Introduction of telehealth services and implementation of additional school-based clinics show the state is committed to improving health services for children and adolescents; however, there is still much to do to ensure that services are available to all children and adolescents in New Mexico, regardless of economic status, health status, educational level, race, or ethnicity. Children are our most precious resource; they are our future and we owe them the best care and services so they grow up to be healthy, happy, productive members of society.

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2 New Mexico Farmers' Health and Safety

Keri Black, CFNP, MN

The first farmer was the first man. All historic nobility rests on the possession and use of land.

Ralph Waldo Emerson, 1803-1882

Agriculture is an essential industry in New Mexico that contributes food and fiber to our nation and the world at large. Perhaps no other worker is exposed to so many types of health risks as the farm worker. Agriculture has consistently ranked as one of the most hazardous occupations in New Mexico. This chapter will highlight the major health risks of farmers and their families, with implications for promoting safer and healthier work environments.

New Mexico Helps Feed the World

New Mexico contributes to the world's food supply by serving as one of our nation's foremost producers of dairy products, wool, cotton, wool, pecans, chilies, onions, and a variety of other agricultural products (Table 1 and Figures 1 and 2). Our state boasts of being the nation's top producers of chile pepper and summer onion and ranks seventh in the nation for overall milk production (New Mexico Agricultural Statistics Service, 2005). New Mexico farmers share their cultivation with the world. International orders for our state's agricultural products tripled in 2003 (U.S. Department of Commerce, 2005). Revenues from agriculture contributed an almost record \$643.3 million to the New Mexico economy in 2004, over \$100 million more than previous years (U.S. Department of Agriculture, 2005).

Compared with U.S. workforce averages, New Mexico has a higher percentage of workers employed in agricultural livestock production—1.33% in New Mexico versus 0.87% in the United States—yet fewer people in agricultural crop production—0.65% in New Mexico versus 0.81% in the United States (New Mexico Department of Health, 2003).

Table 1
Prevailing Livestock Raised in New Mexico

| Livestock | Quantity | U.S. Rank |
|-------------------|-----------|-----------|
| Cattle and calves | 1,590,796 | 21 |
| Sheep and lambs | 154,810 | 12 |
| Horses and ponies | 46,686 | 35 |
| All goats | 19,128 | 26 |

(Source: U.S. Department of Agriculture, 2005.)

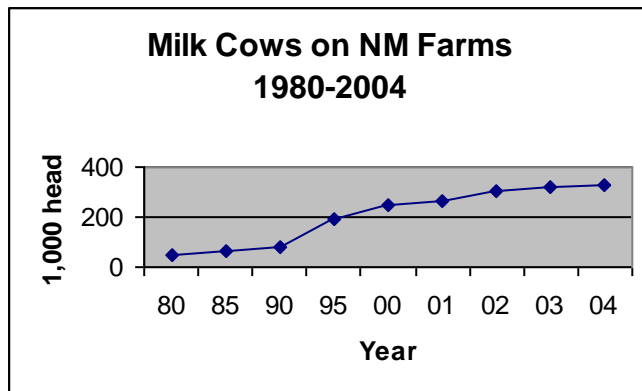


Figure 1. The number of cows on New Mexico farms from 1980 to 2004. (Source: New Mexico Agricultural Statistics Service, 2005.)

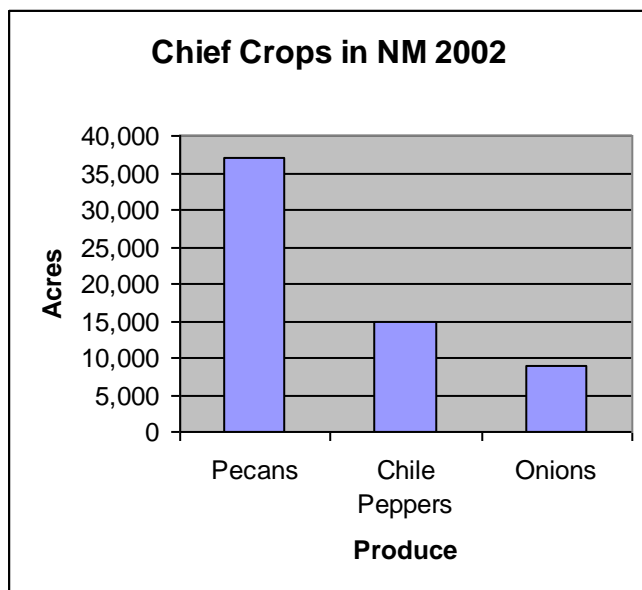


Figure 2. The chief crops in New Mexico in 2002. (Source: U.S. Census of Agriculture, 2002.)

According to the U.S. Census Bureau (2004), there are 6.2 billion people currently in the world, with an estimated 7.5 billion population by the year 2020. Farm owners are called on to grow and deliver increasing amounts of food to feed our hungry world. New Mexico family farmers are meeting the challenge of growing more food with less acreage and less farm help through innovative farming techniques. In 1960, each farmer produced food for 25 other people. Now one farmer feeds around 130 others (Agriculture Council of America, 2005). The number of farms in New Mexico has increased to a current 15,170, with an average size of 2,954 acres. The number of New Mexico farms has been steadily increasing since 1997 (U.S. Census of Agriculture, 2002; see Figure 3).

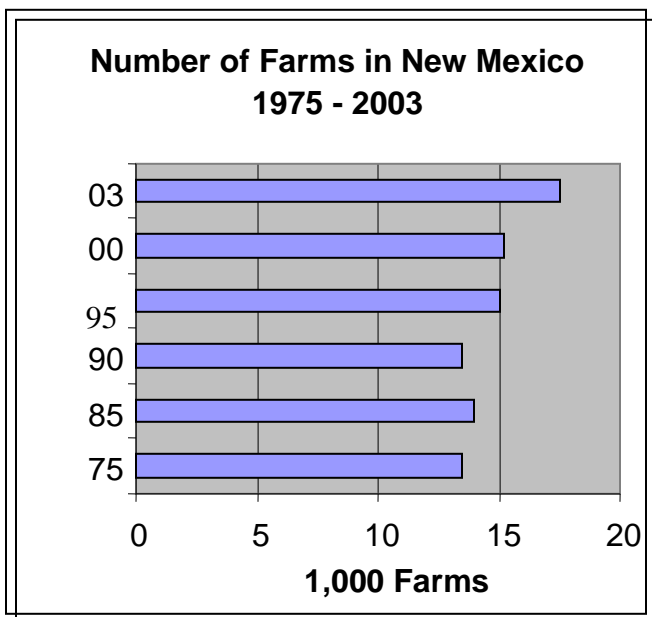


Figure 3. The number of farms in New Mexico from 1975 to 2003. (Source: New Mexico Agricultural Statistics Services.)

Fatalities in Agriculture

Accepted clichés that farmers must be healthy because of good clean air, hard work, and good food are enjoyed each day. On the contrary, the farmer’s job of feeding a hungry world is a job replete with occupational hazards. Nationally, 1.3 million Americans are self-employed farmers and suffer 395 annual deaths from farming injuries (Bureau of Labor Statistics [BLS], 2000).

Work fatalities in agriculture increased 2% in 2002, while the all-industry average declined by 3% according to the U.S. Department of Health and Human Services (2002). New Mexico ranks a dismal 11th in the nation, with a high occupational fatality rate of 5.4/100,000 workers, compared with the national rate of 4.0/100,000 workers (O’Leary-Morgan & Morgan, 2005). The actual rate of occupational injuries, argue Leigh, Marcin, and Miller (2004), is likely double that when correcting for reporting errors and data under representation.

A longitudinal study examining 613 work-related risks in New Mexico from 1980 to 1991 found that 53 (8.6%) deaths were in the farming industry (Figure 4). Agriculture is among the six industries comprising over half of the total number of deaths (n = 318, 51.8%), behind deaths caused from construction and oil/gas, but ahead of military, service, and public service jobs (Crandall, Fullerton, Olson, Sklar, & Zumwalt, 1997).

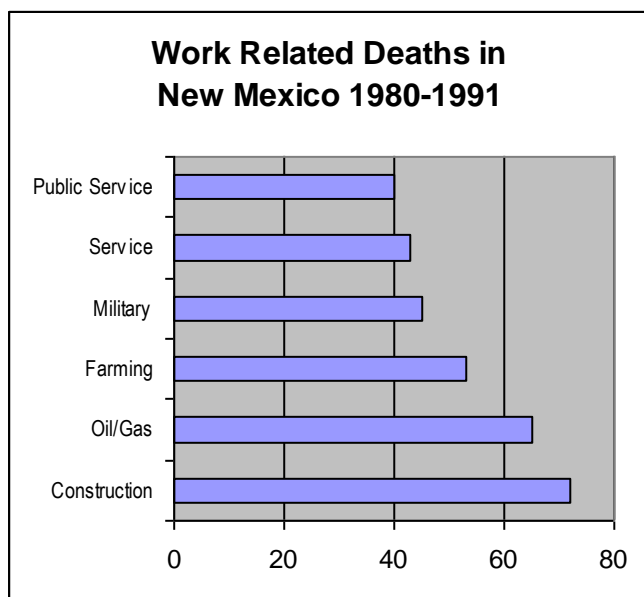


Figure 4. Work-related deaths in New Mexico.
(Source: Crandall, Fullerton, Olson, Sklar, & Zumwalt, 1997.)

This study also revealed that farm deaths were most common in summer (34.0% of deaths) and least frequent in autumn (13.2%), increasing in winter (24.5%) and in spring (28.3%). The number of deaths in the farming industry increased significantly with increasing age of the workers.

These occupational data exclude fatalities among farm children. The BLS (2000) does not include children younger than the age of 16 years in occupational databases. Studies have indicated that each year, 104 children die on farms, and more than 23,000 suffer from farm work injuries (Myers & Hendricks, 2001; Rivara, 1997). Further information on health risks of farm children is included later in this chapter.

Barriers to Health Care Among Farmers

In spite of these facts, the shortage and sometimes absence of health care personnel in these remote rural areas represent a major barrier to occupational health services for agricultural workers. New Mexico suffers from a chronic paucity of health services in rural areas (New Mexico Health Policy Commission, 2002).

Even if health care is available, farmers have been found to be reluctant to utilize services. Rural residents often are stoical, are self-reliant, and have a rather mechanistic attitude to their bodies, believing that if they can work, they are healthy. Farmers tend to delay consulting health care until a condition is serious enough to impede work (Bushy, 2000).

Another health risk lies in the fact that agriculture is often exempt from many safety regulations because of the few numbers of full-time paid workers on most farms. Only farms that employ more than 10 full-time, non-family workers must comply with Occupational Safety and Health Association (OSHA) regulations of recording worker illnesses and injuries (OSHA, 2005). Thus, the majority of farms are not subject to OSHA inspections, and operations may not be in compliance with standards. Self-employed farmer operators are typically responsible for setting their own work conditions and safety practices.

Major New Mexico Agricultural Health Hazards and Risks

Major health risks to the farmer include injuries, hazards from the natural environment, chemical and gaseous exposures, animal risks, and hearing loss. These health concerns are not inclusive of the many potential health hazards within the farmer's environment.

Injuries

Despite advances in technology that have improved the safety of agriculture production, those employed in agriculture continue to suffer one of the highest injury rates of all occupations in New Mexico and North America at large. Nationally, fatal occupational injury rates in the agricultural sector as reported by the BLS (2002) averaged more than five times higher than the rate in the private sector during 1992 to 2003 (Figure 5) and were disproportionately higher for older workers, with the rate of 13.7 deaths per 100,000 workers aged 16 to 24 years and 62.0 deaths per 100,000 workers older than 64 years.

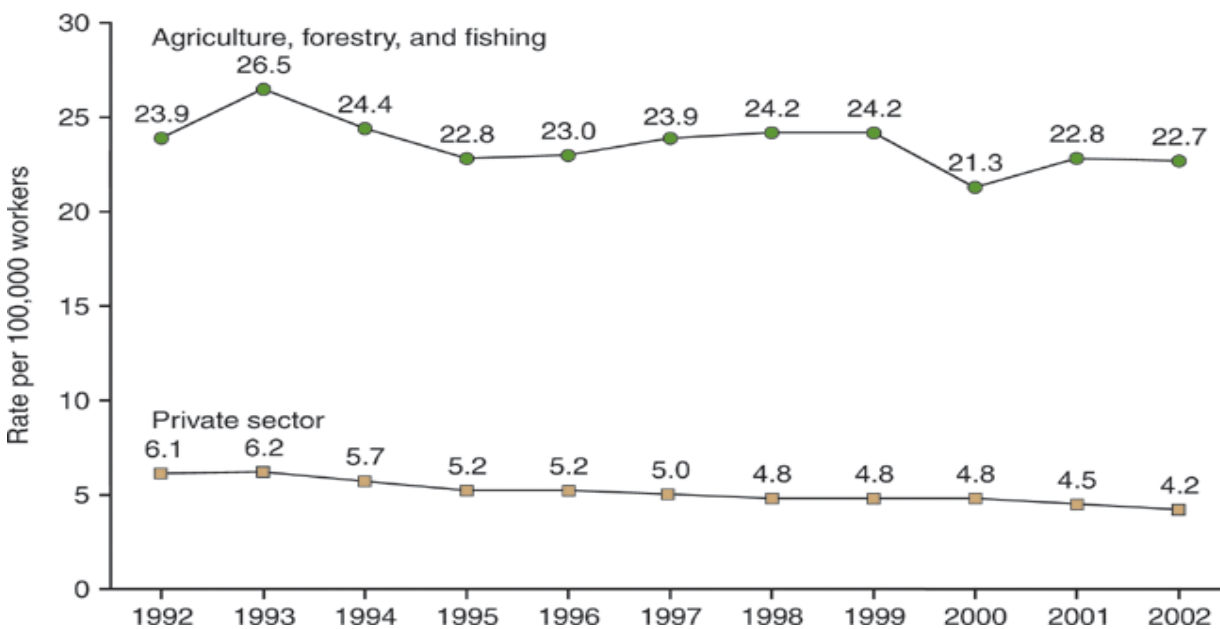


Figure 5. Fatal occupational injuries in agriculture, forestry, and fishing, 1992-2002. (Source: BLS, 2003.)

The primary cause of morbidity and mortality among farm workers is tractor accidents, which accounted for 34% of deaths in the New Mexico farming industry (Crandall et al., 1997). Tractors involved in injuries are often not equipped with a rollover protective structure or seatbelt, which when used together are designed to protect the driver (Pryor, Carruth, & LaCour, 2005).

As depicted in Figure 6, farming deaths have also been found to involve electricity, unintentional falls, animal handling, and other motor vehicles and machinery accidents (Beseler & Stallones, 2003; Crandall et al., 1997).

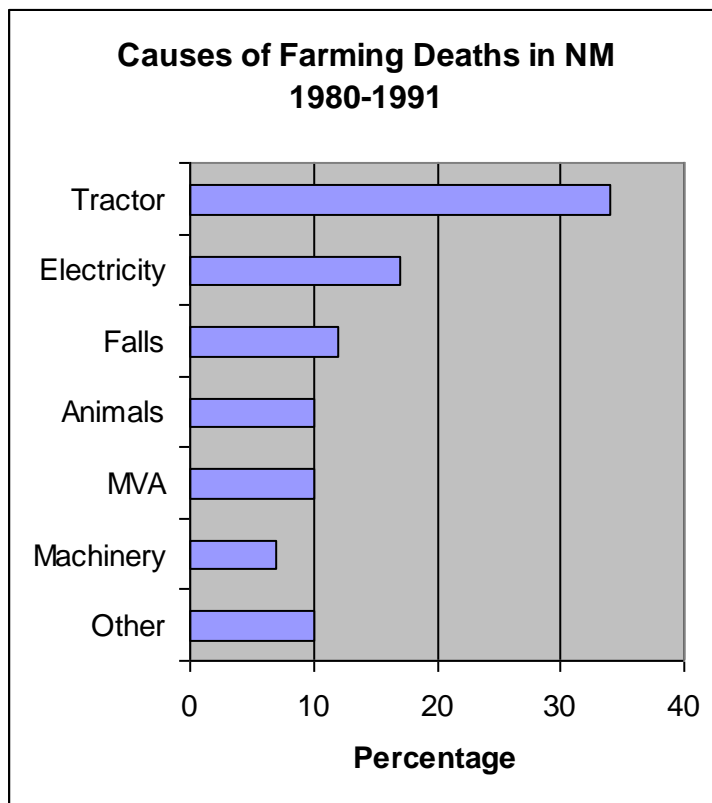


Figure 6. Causes of farming deaths in New Mexico from 1980 to 1991. (Source: Crandall et al., 1997.)

Agricultural workers are also subject to a multitude of musculoskeletal problems, including severed limbs and fingers, fractures, carpal tunnel syndrome, and tenosynovitis syndromes secondary to friction or repetitive movements (National Institute for Occupational Safety and Health, 2004). Farmers were reported by Iorio (1985) to have the highest incidence of osteoarthritis of any occupation in the United States. An estimated 6% of agricultural workers work with some form of disability, higher than any other industry (BLS, 2003).

Natural Environment

Due to the nature of the work, farm workers are exposed to wide extremes of temperatures. Particularly in New Mexico, farmers are at increased risk for heat stroke in the annually escalating heat of the summer. According to the Environment Protection Agency (EPA, 1998), El Niño events and global warming patterns have increased the average temperature in New Mexico by 0.8° Fahrenheit over the past decade. The EPA estimates that by the year 2100, average temperatures in New Mexico could increase by 5° Fahrenheit coupled with decreased precipitation.

Agricultural workers are especially predisposed to heat stress due to long hours outdoors and wearing protective clothing when they apply pesticide. Prolonged heat exposure can increase cardiovascular and respiratory morbidity and mortality (EPA, 1998; Webster, 2004). New Mexico's increased heat further augments the current drought situation in which the diminished availability of water for hygiene can lead to dehydration, diarrhea, and malnutrition. The reduction in water availability for agriculture can severely affect the farmer's livelihood and food availability to its dependent population.

Extreme weather events in New Mexico cannot be prevented, but population vulnerability to these events have been shown to be reduced through both early warnings of extreme weather patterns and public education to brace for weather dangers (Ebi & Schmier, 2005). Webster (2004) recommends that farmers wear a personal heat stress monitor, which alerts workers when their core body temperature is approaching a preset maximum.

Skin Cancer

The considerable time farmers spend outside bathed in the New Mexico sun renders them vulnerable to developing skin cancers. The American Cancer Society recommends that individuals avoid the sun between the hours of 10 am and 3 pm, but this is not a viable option for farmers who earn their livelihood outside. Sayings like "make hay while the sun shines" not only indicate the farmer's dependence on weather, but also that any moment available to do work should be used.

Some of the highest rates of skin cancer in the nation are among the non-Hispanic White population in New Mexico. A longitudinal study from the National Cancer Institute showed that rates of both basal cell and squamous cell carcinoma doubled in New Mexico from 1978 to 1990 (Athas, Hunt, & Key, 2003). The threat of skin cancer poses a significant risk for the non-Hispanic White farmers, who comprise 75% of New Mexico agricultural families.

Although the majority of farm workers acknowledged the possibility of skin cancer, they were found in Marlenga's 1995 study to discount its potential seriousness. The use of sunscreen and protective clothing were often shunned by the farmer, citing summer heat and inconvenience as barriers. Strategies to enhance sunscreen compliance include educational programs and the development of pocket-size spray-on sun block products.

Pesticide Poisoning

The New Mexican farmer's ability to produce large amounts of produce on reduced acreage is owed in part to the use of chemicals. Different insects and weeds strike at different times of the year often necessitating year-round application of pesticides. Pesticides include fungicides, herbicides, rodenticides, and insecticides (Reigart & Roberts, 1999). Exposure may occur while mixing the pesticide, during application, or from misdirected spray and wind. Following application, direct contact may occur from sprayed plant surfaces. Many pesticides are absorbed by inhalation, ingestion, and skin penetration and may result in acute and chronic health impairments. Acute effects of pesticide poisoning may occur during application or within minutes to hours after exposure.

Around 10 % of agricultural workers have experienced a pesticide poisoning (Beseler & Stallones, 2003), yet many cases may be misdiagnosed, as 90% of symptomatic cases involve only minor symptoms mimicking the flu (Reigart & Roberts, 1999). Symptoms of adult pesticide toxicity include nausea, vomiting, abdominal pain, numbness, tremors, fatigue, headaches, diarrhea, generalized weakness, dyspnea, and blurred vision. Acute psychological effects include anxiety, depression, irritability, and restlessness. Additionally, neuropsychological effects, such as memory impairments, reduced concentration and alertness, and word finding problems, may result after acute exposure (Hayes, Wise, & Weir 1980; Reigart & Roberts, 1999).

Long-term exposure to certain pesticides has been shown to have chronic and irreversible neurological effects, such as impaired motor speed and coordination, peripheral neuropathies, anxiety, depression, and spatial disorientation (Beseler & Stallones, 2003; Savage et al., 1988; Steenland et al., 1994). Long-term exposure to pesticides is also suspected of causing sterility in males and females (Greenlee, Arbuckle, & Chyou, 2003), birth defects, and cancers. Controlling for age and smoking, increased risk of lung, prostate, kidney, and hematopoietic cancers have been reported with prolonged exposure to pesticides (Alavanja et al., 2004; Mills & Yang, 2003; Parker, Cerhan, Putman, Cantor, & Lynch, 1999).

Often neglected as sequelae of pesticide toxicity is a reduction in practicing safety measures resulting from either temporary or permanently impaired cognitive functioning. Among 708 agricultural workers studied by Beseler and Stallones (2003), significant reductions of safety measures were employed by those who were pesticide poisoned compared with those who were not. The most predictive factors for failing to practice good safety habits and suffer injuries from machinery and animals were difficulty concentrating, fatigue, and irritability.

Although farmers are required to attend an educational course on chemical application and safety to procure certain chemicals, there appears to be little supervision of use after the chemical is purchased (Runyan, 2003). Farmers may elect to store unused chemicals on premises in unmarked and unsecured containers. The use of personal protective equipment among farmers when mixing and applying pesticides is low. Perry, Marbella,

and Layde (2002) reported knowledge of proper protective equipment was adequate among farmers, but personal preferences as well as being ‘too busy’ reduced compliance.

Studies suggest that proper mixing and careful use with such protective equipment as masks, eyewear, and gloves can prevent potential health hazards (Farr, Cooper, Cal, Savitz, & Sandler, 2005; Henry, 1977; Lusk, 1996). Additional measures to ensure safety with pesticide use include specific mixing and applying instructions, additional farmer education highlighting potential hazards, and routine surveillance if safety practices are being implemented.

Farmer’s Lung

In addition to pesticides, chemical hazards on the New Mexico farm include various aerosols generated during the storage and handling of grains and particulates from livestock confinement operations. The allergic respiratory disease commonly known as farmer’s lung is a hypersensitivity pneumonitis affecting about 10% of all farm workers (Schuyler & Cormier, 1997). Farmer’s lung can be caused by a variety of environmentally airborne particles from moldy hay, barley, composts, animal droppings, and feathers. Acute symptoms typically occur 4 to 8 hours after exposure to the allergen and include dyspnea, dry cough, malaise, fever, chills, and myalgias. If exposure to the allergen continues with the occurrence of many acute episodes, chronic pulmonary fibrosis may ensue.

Animal Hazards

Zoonoses. Zoonoses are infectious diseases transmitted from an animal host to humans. Infection or infestation is usually acquired through direct or indirect contact with infected animals and livestock. Organisms from the diseased host animal’s feces, urine, uterine discharges, and placenta can remain dormant on the ground for months, but can cause infection when inhaled (Haas, 1995). Humans may also become infected when contaminated food, hands, or other objects are placed in the mouth. Approximately 140 such diseases are known (Centers for Disease Control and Prevention [CDC], 2004). The New Mexico livestock worker is particularly at risk for diseases carried by cattle, sheep, pigs, goats, and mice.

According to the CDC (2001), cattle can transmit approximately 40 infectious organisms to humans, such as salmonella and *Escherichia coli* 0157:H7, causing bloody diarrhea in people. Children may develop kidney failure when exposed to *E. coli*. Pigs can carry *Yersinia enterocolitica*, which causes the disease yersiniosis. Chickens may transfer bacteria, such as *Salmonella*, adversely affecting the gastrointestinal, cardiovascular, and central nervous systems of the human receiver (CDC, 2000).

Hand washing is critical to prevent infections following direct or indirect contact with animals. If running water is not readily available, hand sanitizers are recommended by the CDC (2001). Many of the symptoms of zoonotic disease are difficult to decipher from influenza (Werner & Olson, 1993). Additional zoonoses potentially infecting New

Mexico farm workers include bovine spongiform encephalopathy (mad cow disease), brucellosis, cryptococcosis, cryptosporidiosis, giardiasis, Hantavirus, leptospirosis, plague, psittacosis, Q fever, rabies, ringworm, and West Nile virus (CDC, 2004).

Livestock fumes. Some livestock in New Mexico, commonly milk cows and hogs, are raised inside a building with a controlled environment to maximize their growth. To minimize the labor of cleaning out manure, many confinement buildings are constructed with slated floors for the solid and liquid waste to pass into a giant holding tank under the building. As the waste products break down from bacterial action, ammonia, methane, hydrogen sulfide, and carbon dioxide gases are emitted. Toxic gases can accumulate in buildings constructed without a proper or functioning safety device for gases to escape. If not well ventilated, rapidly accumulating fumes may asphyxiate the farmer in seconds (Donham, 1990).

Farmers' attitudes about animals often transcend the livestock status. Farmers have been shown to enjoy a special relationship with their animals and are hesitant to part with them, even in the presence of disease or zoonosis (Convery, Bailey, Mort, & Baxter, 2005). Farm animals are often viewed by the farmer as transcending livestock status as economic, labor, and food units. There appears to be a human–animal dualism relationship between some farmers and their animals. Yarwood and Evans (1998) argue that for some, farm animals are anthropomorphic creatures representing an important aspect of self, local, and rural identity. The sanitization of livestock animals highlighted by Yarwood and Evans, where animals are clean, healthy, and docile and even have pet names, may be contrasted with the violent, industrialized, and anonymous death many farm animals encounter.

Hantavirus remains a New Mexico health concern. Hantavirus was first recognized in New Mexico in 1993 and the state has remained the most active in the nation for confirmed cases. From 1993 to 2004, 60 of 100,000 New Mexico residents have been diagnosed with Hantavirus pulmonary syndrome (HPS), double that of any other state, with a case fatality rate of 40% (Douglass, Calisher, & Bradley, 2005). Rural areas are most prone to Hantavirus where there is an abundance of native wild rodents who carry the disease at a higher frequency than urban rodents. Rural dwellings often have substandard house protection rendering it open to rodent incursion (Hopkins et al., 2002). Nonexpensive rodent proofing was found by Hopkins et al. to decrease rodent intrusion into the home, thereby reducing the risk of HPS among rural residents in New Mexico.

Noise

Cumulative exposure to common and everyday sources of excessive noise inherent in agriculture results in a high rate of hearing loss among farmers. For instance, noise levels in swine confinement buildings can reach 160 decibels (dB), equal to a jet engine. Nearly all farmers use chain saws, which emit noise levels in the 120 to 140 dB range and are typically held close to the ears (Reed & Wachs, 2004). By middle age, hearing loss is evident in over 70% of farmers (Beckett et al., 2000). Tractors commonly exceed the 90

dB noise limit set by OSHA (2005) and often cause an insidious onset of noise-induced hearing loss (Beckett et al., 2000; McBride, Firth, & Herbison, 2003).

Hearing protectors, such as earplugs or earmuffs, are recommended for agricultural workers by OSHA (2005), yet are infrequently worn during agriculture work, as farmers report that they are uncomfortable and cumbersome, and they interfere with communication (McBride, Firth, & Herbison, 2003). Because personal hearing protectors require the user to be motivated to be effective, prevention through noise reduction interventions, such as engine muffling devices, sound barriers, and soundproof tractor cabs, are more likely to be effective in preventing hearing loss (Beckett et al., 2000).

Children on the Farm

Children and adolescents represent a substantial portion of the agricultural workforce and are subject to many of the same dangers as their farming parents. Even if they do not work on the farm, children are exposed to many farming dangers by virtue of living on the farm. On farms in the United States, there are approximately 100 fatal and 32,800 nonfatal injuries annually in children 19 years of age and younger (Adekoya & Pratt, 2001). Up to 40% of nonfatally injured children are left with permanent disabilities (U.S. Department of Labor, 1999).

The leading causes of fatal and nonfatal farm injuries in New Mexico children from 1982 to 1996 were found to be from machinery, firearms, falls, animals, and poisoning (Adekoya & Pratt, 2001). The New Mexico data are consistent with national data of causes of childhood agricultural injuries (Higgins, Tierney, & Hanrahan, 2002; Rivara, 1997; Strueland, Lee, Nordstrom, Layde, & Wittman, 1996).

Children and Pesticides

Farm children are often exposed to pesticides during normal exploration of their environment and by pesticides tracked in by household members, pesticide air drift, and breast milk from their farm worker mother (Eskenazi, Bradman, & Castorina, 1999). Pesticide-poisoned children will often present with a slightly different clinical picture than adults, with seizures, lethargy, and coma being more common symptoms of toxicity. Reigart and Roberts (1999) reported that up to 80% of cases of childhood pesticide poisoning are given a wrong preliminary diagnosis and thereby are medically mistreated. Long-term effects of pesticide exposure in children are unknown, but studies, including data collection in New Mexico, are under way to examine cumulative risks and potential health effects of children (Eskenazi, Bradman, & Castorina, 1999).

Parents and Farm Safety Supervision

Despite parental acknowledgement of the dangers farms impose on their children, many farm parents do not actively reduce the exposure to hazardous farm work or enforce safety and protective measures (Pryor et al., 2005; Zenter, Berg, Pickett, & Marlenga, 2005). The educational efforts of The National Committee for Childhood Agricultural

Injury Prevention (NCCAIP; 1996) have showed success by lowering the rate of childhood farm-related deaths by 39% since 1979. The NCCAIP continues to strive toward establishing a national surveillance system to track injury rates, develop farm safety standards and regulations, and further educational programs on safe farm practices for parents, farm operators, and youth.

Women on the Farm

Within the farming community, women have historically been considered the invisible supporters of their male spouses with accepted designations as “farmer’s wife” or “homemaker” (Keating, 1987). The female role in farming is changing as an increasing number of women now solely manage the farm and perform many of the farm duties alone. Fourteen percent of New Mexico farms are now headed by women (U.S. Census of Agriculture, 2002).

As New Mexico farms follow the national trend with larger farms and smaller families, even daughters have entered into the farming business. Women who work on farms may be at greater risk for injuries and illness than men because they often lack the physical strength and proficiency necessary to perform complex tasks (Keating, 1987; Meeker, Carruth, & Holland, 2002). Women have been found to be even less likely than men to use such safety devices on the farm as tractor seatbelts, breathing masks, hearing or eye protection, gloves, or boots (Meeker et al., 2002).

Women who apply pesticides are at particular risk for spontaneous abortions and reproductive problems (Meeker et al., 2002). After controlling for work-related physical activity, age, body mass, and smoking status, women aged 21 to 40 years old with a lifetime routine use of any pesticide use were frequently found to have gynecological impairments (Farr et al., 2005).

Farmer Stress

Farm men and women have been identified as a population vulnerable to personal strain, termed “farmer stress.” The most commonly cited sources of high stress include government policies and regulations, bad weather, interest rates, changing consumer demands, and machinery breakdown (Alpass et al., 2004). The average income for a New Mexico farm family is only \$19,370, with the majority of New Mexico farmers carrying a high debt load (U.S. Census of Agriculture, 2002). A poor crop yield can threaten a loss of the farm operation and the land. Those who continue to farm may find that there are pressures to work longer and harder with the expectation of more involvement and commitment from other family members.

The fusion of family and farm can create a strain between the older and younger generations. A study of generational differences in farm families indicated the younger generation perceives more stress, less family support, and less satisfaction in the two-generation farm family than does the older generation (Weigel, Weigel, & Blundall, 1987).

Many farm families have negative perceptions of mental health counseling and are less likely to use health professionals as resources (Jurich & Russell, 1987; Keating, 1987). The farm family in crisis is often hesitant to reach out to neighbors and community members for support with the concern that they may be a burden and can not reciprocate extended good will. If they do seek neighborly assistance, some rural community members have been found to shun families in crisis as a way of avoiding their own discomfort and anxiety (Wright & Rosenblatt, 1987).

Keating (1987) recommends that health care providers be attuned to personal resources the farmer may have to develop mastery over their farm stress. He recommends assisting the farmer to view stress as solvable and demands as unfortunate rather than unbearable. The farmer may also be assisted in the development of decision-making skills, time management, and utilization of available community and federal support systems designed to help farmers.

Discussion

New Mexico farmers provide our nation with many important agricultural goods, including dairy products, chile peppers, pecans, and fibers. Growing more produce on less land is a challenge New Mexico farmers have surpassed, but it is not a job without health dangers. The agricultural occupation claims high fatality and injury rates in New Mexico. Tractors and machinery, which are responsible for the majority of farm deaths, are often not equipped with safety devices. The New Mexico sunshine predisposes farmers to heat stroke and skin cancer. Pesticides are a crucial component of farming, yet they may also be viewed as human poisons, with the potential for acute and chronic health impairments. The farmer also inhales potentially toxic fumes through livestock and work-related airborne particles. Continual noise exposure renders most farmers hearing impaired in later life.

Children and women on the farm are exposed either primarily or secondary to the same risks as the primary farm operator. Children have been found to suffer farm-related injuries and deaths from unsupervised work with machinery and accidental pesticide exposure. Women are assuming more responsibilities on the busy farm, with the result of physical injuries and reproductive irregularities.

Due in part to the escalating work requirements, which do not necessarily translate into financial gains, farmers are subject to personal stress. Those in the farming community appear to possess a sense of stoicism and delay treatment or lack readily available health resources.

As a place of work and residence, the farm presents unique challenges for health interventions. Farm-related health problems should be viewed as preventable and not accepted as the cost of a hazardous environment. Nurses in rural areas are called to appreciate the unique roots of agricultural health problems. The farmer is in a quandary over attaining health services; health risks are replete in the work environment, yet health care availability in rural New Mexico is sparse. Parsimonious health care resources are

often coupled with the farmer's typical hesitancy to seek care, which puts farm families at distinctive risk for inadequate health service delivery.

A qualitative research approach toward understanding the New Mexico farmer's perceptions of both current health care choices and that of an ideal health care atmosphere would be a first step in developing insightful health care education and action-based planning. Agriculture nursing is an evolving nursing area that sensitively considers the recommended multidiscipline approach to improving farm health (Bushy, 2000; Werner & Olson, 1993). Education, uniform standards, and intervention programs are recommended avenues to promote safe and consistent farm work practices. The New Mexico farmer provides its state, nation, and the world with an abundance of produce. The work is arduous, hazardous, and often unrecognized by those who reap the benefits. It is time to recognize and care for our farmers who so dutifully care for us.

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3 Latinas of Northern New Mexico and Teen Pregnancy: Uncovering the Cultural and Rural Realities

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*My dreams were instilled within me by you, so that I might go after them with a passion
for you.*

Author unknown

*All labor that uplifts humanity has dignity and importance and should be undertaken with
painstaking excellence.*

Dr. Martin Luther King

New Mexico is a predominantly rural state that currently ranks third in the nation in poverty levels for its residents (New Mexico Department of Health, 2004; U.S. Bureau of the Census, 2004). Rural communities, in general, are known to suffer from disproportionately high levels of poverty and accidental death, are at higher risk of chronic illness, and experience problematic transportation, problematic access to health care, and higher rates of teen births with low levels of prenatal care (Brugha & Pritze-Aliassime, 2003; McManus & Newacheck, 1989; Weinert, 2002). For rural residents of ethnic minority, these health concerns are even more obvious (McManus & Newacheck, 1989). Latinos, the largest minority group in New Mexico, are no exception. Teenaged Latinas of Northern New Mexico suffer from disproportionately higher rates of teenage pregnancy than their non-Latino White and Black counterparts (Alan Guttmacher Institute [AGI], 2004). The reasons for this health issue, although largely unknown, are thought to be related to the high levels of poverty and overall disadvantage (Kirby, 2001).

A general lack of consensus on definitions of rurality and culture add to the confusion among policy makers, nurse researchers, and the public. Conflicting definitions also limit the generalizability of research findings for rural populations (Bushy, 2000). The purpose of this chapter is to define the concepts of rurality and culture in relation to New Mexican teenaged females of Latino ethnicity. Recommendations will be given for nursing professionals who wish to assist in the reduction of adolescent pregnancy rates and improve the overall health of rural populations.

Background

Latinas and Pregnancy

Teen pregnancy is sometimes viewed as a wayward or deviant act of poor and uneducated minorities (Nathanson, 1991). It may also be seen as the impetus for social

problems, such as poverty and domestic violence (Nathanson, 1991). Still others regard teen pregnancy as an issue resulting from poor familial communication or poor contraceptive use, or as a peer norm (AGI, 2004; Kirby, 1999). In contrast, viewing teen pregnancy as a defect in attention from government toward the disparities in the distribution of economics, health care, and opportunities for these youth is more common and acceptable (Nathanson, 1991).

Intervention programs directed at reducing teen pregnancy suffer from similar discrepancies. There is much divergence in reported outcomes of intervention programs related to teenage pregnancy (Ehiri, Meremikwu, & Meremikwu, 2005). The lack of consensus confuses the true antecedents of early sexual behavior as well as the strength of intervention programs for this population (Ehiri, Meremikwu, & Meremikwu, 2005). Thus, the culture of teen pregnancy continues to be somewhat mysterious, especially for those youth of rural communities.

What is well known is that teen parents are at higher risk of living in poverty, being single parents, and having a poor education (McBride & Gineapp, 2000). Their children are also more likely to suffer from poor health and experience behavioral problems, have less supportive and stimulating home environments, and reside in poverty, and are at higher risk of becoming teen parents themselves (AGI, 2004; Kirby 2001). The societal financial burden of teen parenting is also tremendous, with an estimated half a billion dollars spent annually on teen parenting in New Mexico alone (New Mexico Teen Pregnancy Prevention Coalition, 2004). Despite the controversy about the actual causes of teen pregnancy and the magnitude of its social burden, it is generally accepted that teenage pregnancy is undesirable and directly related to negative outcomes for both the mothers and their offspring.

Rates of teenage pregnancies are declining in this country and have been since 1991 (AGI, 2004). However, teen pregnancy rates for Latinas have been decreasing to a much lesser extent than for those females of other ethnicities (AGI, 2004). Approximately 900,000 teenaged females become pregnant in the United States annually (AGI, 2004). Nearly 80% of these pregnancies are unintended (AGI, 2004). Of the 7,440 teen pregnancies in New Mexico, during 2003, 4,450 involved Latinas (AGI, 2004). These figures represent 67% of all teenage pregnancies in New Mexico, whereas Latinas of this age group comprise only 50% of the total New Mexico teenage female population (New Mexico Teen Pregnancy Prevention Coalition, 2004).

The overall population of teenaged females in this country is estimated to rise by nearly 20% between the years 2000 and 2010 (Kirby, 2001). An increase in this population means that even though rates of pregnancy are declining, the overall number of pregnancies will continue to increase. The figures may be even more pronounced for Latinas, as they are the fastest growing ethnic minority in the nation (Kirby, 2001). By the year 2010, it is predicted that Latinos will be the largest ethnic subgroup in the United States (U.S. Department of Health and Human Services, 2004). Over 1 million Latinos reside in rural areas of the United States (McManus & Newacheck, 1989).

Numerous programs are currently aimed at preventing teen pregnancy (AGI, 2004). However, many of these programs do not incorporate teaching methods and materials that are appropriate to the culture of the students (Kirby, 2001). Sociocultural aspects of reproductive-related health behaviors have been largely overlooked in the scientific literature, especially for the Latino population (Kaplan, Erickson, Stewart, & Crane, 2001). It is of great importance that health interventions be geared toward specific populations and be sensitive to culture (McGadney, 1995; Netting, 1992). Interventions based upon culture are critical in order for teens to accept them and incorporate them into their lives. Kirby (2001) notes that pregnancy interventions should be designed to address multiple social, cultural, sexual, and nonsexual antecedents that may be related to the teens and their families, peers, schools, communities, and culture. Understanding of and sensitivity to culture will only be accessible by first uncovering what culture is, in specific homogenous populations.

Culture

There are varying definitions of culture “and all too often, definitions tend to omit salient aspects of culture or be too general to have any real meaning” (Spector, 2003, p. 9). Following are a few definitions from a variety of sources. The Oxford English Dictionary (2005) defines culture as a civilization with its customs, artistic achievement, etc., of a people. This definition pertains to culture, especially at a certain stage of its development or history. Bell, Ragin, and Cohall (1999) add the concepts of “beliefs, values, and institutions of a racial, ethnic, religious, or social group” to this definition (p. 58). Wells (2000) says culture is a way of life or the morals, values, beliefs, and traditions that are passed down from generation to generation. The underlying theme in these definitions is that culture is acquired or learned, it is not simply known.

The concept of culture in adolescent populations is both contextual and multidimensional (Smith & Reynolds, 1992). The multiple contexts where teens live help to create the interactive processes that influence the development of their culture (Bennett & Einstein, 2001; Steinberg, Dornbusch, & Brown, 1992). Culture is thought to be more influential for teens who are more culturally traditional or identify with their parents’ and grandparents’ cultural beliefs than other teens (Bell et al., 1999; Holleran & Waller, 2003; Villarruel, Jemmott, Jemmott, & Ronis, 2004). Culture is therefore viewed as the sum of one’s genetic, environmental, and societal experiences (Neumark-Sztainer, 1999). Culture is different for each individual and is largely unknown, or subconscious, even to the persons experiencing it (Spector, 2003).

Although some view ethnic identity as culture, the role that ethnicity plays in health disparities as related to cultural practices is unclear. The ethnic group of Latinos is comprised of numerous subgroups, such as Chicanos, Hispanics, Mexicans, Puerto Ricans, and Cubans (Martinez-Donate et al., 2004). As these subgroups have differing countries of origin, linguistic variations, and genetics, individual Latinos from the same country and even the same community can reflect great diversity (Martinez & Scrimshaw, 2001). Despite findings, such as those stating, “Hispanic youngsters suffer from a combination of parental authoritarianism and low peer support” (Steinberg,

Dornbusch, & Brown, 1992, p. 727), it is accepted that ethnicity is just a category, not an overarching guide to parenting or other aspects of personal achievement. Therefore, ethnicity is only accepted as a small portion of one's overall culture (Martinez & Scrimshaw, 2001). Ethnicity must be viewed in combination with all other factors that comprise culture.

Acculturation, often measured through language dominance, age at time of immigration, time in residence of the United States, and place of birth do not capture the entire range of cultural experiences and practices of a given population either (Cabassa, 2003). This type of measurement leaves complex cultural phenomena fragmented. The assumption that persons from a particular ethnic background and who report acculturation will behave in a particular manner ignores critical aspects of the culture. Each individual, unique in his or her beliefs, attitudes, and behaviors, assists in defining the specific culture of that community. Only through investigating specific values, beliefs, traditions, and behaviors can a legitimate understanding of a culture be appreciated.

Rural

There are numerous definitions of rural. Many include reference to the geographic location, economics, populations, and persons who live in such areas (Bushy 2000; Weinert, 2002). Some see rurality as a continuum of population, economics, occupation, and access (Bushy, 2000; Weinert, 2002). Many definitions only dichotomize rural and nonrural areas into gross categories and do not account for the tremendous diversity found within these areas (McManus & Newacheck, 1989).

The U.S. Bureau of the Census defines rural areas as the opposite of urban, which they describe as an area with a central city and surrounding territory and a population of 50,000 or more (Bushy, 2000). Areas with fewer residents are rural (Bushy, 2000). The Federal Office of Management and Budget follows in the same manner by only providing specifics of what constitutes a metropolitan area (areas that are economically and socially integrated and with at least 50,000 residents; Bushy, 2000). All other areas are nonmetropolitan (Bushy, 2000). The United States Department of Health and Human Services designates urban areas as those with 100 or more persons per square mile, rural as those with between 7 and 99 persons per square mile, and frontier as those with 6 or fewer persons per square mile (Bushy, 2000). According to these definitions, most areas of Northern New Mexico are both nonmetropolitan and frontier (Bushy, 2000). There are approximately only 15 people per square mile of New Mexico lands (U.S. Bureau of the Census, 2004).

It is widely accepted that despite which definition is used in regards to rural living, residents of such areas are concentrated in the Southeast, Appalachia, the Southwest, and Alaska (Bushy, 2000). These residents are also at higher risk of living in poverty, with median family incomes well below the poverty line, at or around \$11,000 per annum (Bushy, 2000). Close to 20% of rural children are minorities, and more than one in four live in poverty (McManus & Newacheck, 1989). In 2004, 19.3% of New Mexicans lived below the poverty level (U.S. Bureau of the Census, 2004).

Rural residents are at higher risk of experiencing greater distances between places and less access to services (Brugha & Pritze-Alissime, 2003; Bushy, 2000). They are usually engaged in high-risk occupations and suffer from higher proportions of occupation-related injuries compared with their urban counterparts (Bushy, 2000). They have less access to information technology and have fewer industrial choices in their communities (Bushy, 2000). Nonmetropolitan residents live more disabled, shorter, and unhealthier lives than their urban counterparts (Kubzansky et al., 2001). They also experience higher rates of childbirth to teenage mothers (Peck & Alexander 2003). Many of the health problems are relative to the deprivation and poor access to services that are directly related to poverty (Brugha & Pritze-Aliassime, 2003; Kubzansky et al., 2001.).

Negatively influencing health inequities is the overall scarcity of reliable health statistics for rural persons (Weinert, 2002). The confusion in defining what constitutes rural residents, high heterogeneity of such populations, inadequate measurements of health in such communities, and a lack of literature pertaining to the health status of ethnic minorities and adolescents further compromise the attention and services residents receive (McManus & Newacheck, 1989; Weinert, 2002). Lack of scientific literature, pertaining to rural persons serves to heighten the disparities as any attention to need for services is quieted. The rural have a hushed to no voice in relation to their levels of poor health and lack of services.

Defining Rural and Culture in Latinas of New Mexico

Culture in teenaged Latinas of Northern New Mexico is defined by all aspects of their existence and in the context of social influences (school, family, peers, community, and greater society; Smith & Reynolds, 1992). Culture, formed by multiple interactive influences develops across multiple interactive contexts and over time (Bennett & Einstein, 2001; Steinberg et al., 1992). To understand this culture, in efforts to reach cultural competence, teens must be asked what their beliefs, traditions, religious thoughts, social environment, and likes and dislikes are. This is culture. Culture is not based solely upon ethnicity, race, or acculturation status. It is a combination of “socially inherited characteristics of a human group that comprises everything which one generation can tell, convey or hand down to the next...the sum of beliefs, practices, habits, likes, dislikes, norms, customs, rituals, and so forth that we learn.” (Spector, 2003, p. 9). It is the relationship between people, communities, or social groups, and the actions derived from such (Carrithers, 1992).

Rurality, in relation to teens, must be defined as a point or status along a continuum when considering economics, geographic location, population, access to health care, and health status (Weinert, 2002). This is the reality of diversity and disparity in rural settings. With the knowledge that rural living and poverty go hand in hand, rural existence becomes a critical factor in determining opportunities, access to health services, and social aspects of poor health. Many of the features of rurality predispose people to poor health, early mothering, and early mortality (Brugha & Pritze-Aliassime, 2003; Bushy, 2000; Kubzansky et al., 2001; Peck & Alexander, 2003). Health issues such as these must be

viewed along a continuum that either supports or suppresses rural residents' abilities to be healthy.

Living in rural communities is not always a choice (Weinert, 2002). Although living in rural areas can be quite beautiful, the sense of hardiness and resilience it builds in many residents is hard earned (Bushy, 2000). Residing in rural areas, with high levels of poverty, poor health, poor to no transportation, and numerous other disparities, is not always desired (Weinert, 2002). However, the cost of relocation to a more urban area is prohibitive for many residents, making such a move impossible.

The paucity of literature regarding rural residents makes it difficult to truly comprehend health status or lack thereof (Evans et al., 2001). This absence of scientific support limits the strength of arguments for funding research in rural areas (Weinert, 2002). Although a case can be made, based on what is known, such works should be exploratory or descriptive until the true status of health and illness can be defined.

Implications for Research

Nurse researchers play a critical role in uncovering what rurality is in relation to teen health. Such work must be done with an eye for accuracy and clarity if the health issues of this silenced and very vulnerable population are to be known. Research must be conducted with clarity of what rurality is to the research and to the researcher. Such definitions cannot simply be based upon geographic or population figures. Rurality is a continuum, where individuals, and their needs, desires, and social factors of existence are placed. Their health, with its supporting and suppressive factors, must be acknowledged along with personal and societal abilities for health. Only when a focus on what rurality is in a holistic sense is made explicit can such scientific work be considered meaningful. The most vulnerable rural populations, the youth of ethnic minority, must be the focus of such efforts, as they deserve a voice.

Researchers must be astute to the cultural uniqueness of each respondent and in the context of their environment. Findings cannot be written to reflect only the untouched beauty of rural status or the overly gloomy state of health and economics, as neither will be the whole truth of rural health. Uncovering rurality, in all of its diversity, is an immense undertaking. However, the underserved, vulnerable, and silenced populations deserve such focus, accuracy, and depth, to call attention to the many issues so detrimental to their health.

The antecedents and impact of early mothering, poverty, and lack of employment opportunities, all coupled with low to no access to health care must be made explicit. This is the only manner that will allow interventions to reduce the disparities and inequities in rural existences to become reality. It is only through a deeper understanding of what distinctive cultural factors and rural concerns comprise the environments, which promote or support teenage pregnancies in Latinas of rural Northern New Mexico, that the causal, contributing, and protective health factors of this public health problem may

be known. Qualitative works must ensue to understand the realities of teen pregnancy and parenting in Latinas of Northern New Mexico. These works must focus on the culture of pregnancy and parenting, while being astute to the impact of rural existence on such issues. Such scientific discovery will allow for supportive, culturally appropriate, and comprehensive interventions, aimed at the elimination of teen pregnancy, to become reality. Nurse scientists must become involved in the support of such endeavors, now. All nurses must not only support such scientific journeys, but also must advocate loudly and strongly for those members of our society who are marginalized and silenced. Nurses have a voice, a strong voice, and it must be used to advocate for those suffering from inequities in health. Active lobbying to the scientific community as well as to state and national governmental representatives, will fuel the fight toward equity in health. Nurses must act now and at all levels to promote an improvement in the public health of all persons and in all locations.

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4 Realities of Childhood Obesity in Rural New Mexico

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Of U.S. children and adolescents aged 6 to 19 years, 16% (9 million) are overweight (Hedley et al., 2004). Obesity is the most prevalent nutritional disease of children and adolescents in this country (Dietz, 1998; Strauss & Pollack, 2003) and a subject of vital epidemiological, economic, social, and clinical concern. As a public health issue frequently cited in nursing and health care literature, many of the causes, psychological and physiological sequelae, and possible solutions to childhood obesity have been widely explored. Little is known, however, about the particular needs and concerns of rural children and obesity. Childhood obesity as a national and New Mexican issue is described in this chapter, as are special concerns related to rural children and rural children in New Mexico. Interventions aimed at eliminating childhood obesity in New Mexico are explored as are implications for nursing research.

Background and Significance

Epidemic of Obesity

Obesity and overweight are a national crisis of epidemic proportion in the United States (Flegal, 1999) and a serious international problem (Campbell, Waters, O'Meara, & Summerbell, 1999; Lobstein, Baur, & Uauy, 2004) that affects the health of the body, self-esteem, and long-term health of the world. The National Health and Nutrition Examination Survey (NHANES) conducted from 1999 to 2000 established that in the United States, over 30% of adults were obese, 64% were overweight, and 4.7% had extreme obesity (Flegal, Carroll, Ogden, & Johnson, 2002). Data from the Third National Health and Nutrition Examination Survey (NHANES III: 1988-1994) showed that the prevalence of obesity, defined as a body mass index of 30 or higher had increased by approximately 8 percentage points in the U. S. after being relatively stable from 1960 to 1980 (Flegal, Carroll, Kuczmarski, & Johnson, 1998). Annual health care costs for the treatment of obesity related problems in the U.S. range from \$98 billion (Finkelstein, Fiebelkorn, & Wang, 2003) to \$129 billion dollars (Department of Health and Human Services (DHHS), 2001). A subject of vital epidemiological, economic, social and clinical concern, obesity and overweight is seen as a major health issue for the nation and is listed as one of Healthy People 2010 leading health indicators (United States Department of Health and Human Services [USDHHS], 2000). This calamity has not left children unscathed but has carried them along as innocent passengers in its wake.

Childhood Obesity

As the most prevalent nutritional disease of children and adolescents in the United States

(Dietz, 1998; Strauss & Pollock, 2003), obesity is a subject of vital epidemiological, economic, social, and clinical concern. About 31% of children and adolescents are at risk of becoming overweight (Hedley et al., 2004). From 1980 to 2002, the percentage of children and adolescents defined as obese doubled, and those defined as overweight almost tripled (Centers for Disease Control and Prevention [CDC], 2004). The National Health and Nutrition Examination Survey (NHANES) 1999-2000, documented the percentage of overweight children by age group as: 10.4% among 2- to 5-year-olds; 10.4%; 15.3% among 6- to 11-year-olds, and 15.5% among 12- to 19-year-olds compared with 7.2%, 11.3%, and 10.5%, respectively in NHANES 1988-1994 (Ogden, Flegal, Carroll, & Johnson, 2002). All socioeconomic groups, population groups, and both genders have had an increase of overweight and obese children (Troiano & Flegal, 1998), with a profound impact on Mexican American and non-Hispanic Black adolescents (Ogden et al., 2002). Although the nation is struggling to stem the rising tide of the obesity epidemic and has spent countless dollars studying its causes and effects, little is known about rural children and obesity.

The State of New Mexico's 2001 Youth Risk and Resiliency Survey (YRRS; New Mexico Department of Health [NMDH], 2003) noted that 13.4% of adolescents aged 15 to 19 were at risk for being overweight (a body mass index [BMI] $>85^{\text{th}}$ but $<95^{\text{th}}$ percentile for age and gender), and 10.2% were overweight (a BMI $\geq 95^{\text{th}}$ percentile). Ethnicity is an important factor in the percentage of overweight children in New Mexico, with 15.4% of Native American students, 11.6% of Hispanic students, and 7.2% of non-Hispanic White students being overweight (New Mexico Department of Health and Human Services [NMDHHS], 2005).

Obesity is noted as one of New Mexico's Health Status Priorities (NMDH, 2003) but it is surprising that there is no mention of rural communities, since New Mexico is 35% rural dwelling (U.S. Department of Agriculture [USDA], 2005). The national average for body fat percentage of school age children is 15% and New Mexico's children exceed the national average for body fat percentage for all age groups: 17% in elementary school; 52% in middle school; and 43% in high school. The consequences of childhood obesity are widespread. Understanding obesity as a complex, multifactorial problem particularly as it relates to childhood nationally and in rural New Mexico makes it both difficult and essential to assess the entire problem if effective planning and evaluation of interventions is to occur.

Consequences and Causes

Obesity significantly impacts the physical and psychological health of children and adversely affects their future health trajectory as they grow into adolescents and adults (Freedman et al., 2005). Childhood obesity is an ever-increasing economical burden, not easily solved. Wang and Dietz (2002) estimated the direct health care costs of obesity in youth aged 6 to 17 years, from \$35 million in 1981 to \$127 million in 1997-1999. Various biological, behavioral, and environmental correlates that contribute to childhood obesity have been researched and contribute to our current understanding of the problem.

Koplan, Liverman, and Kraak (2005) of the Committee on Prevention of Obesity in Children and Youth present extensive reviews on the broad range of physical illnesses that impact multiple organ systems when a child is obese, and the evidence is overwhelming. Glucose intolerance and insulin resistance, type 2 diabetes, hypertension, dyslipidemia, hepatic steatosis, cholelithiasis, sleep apnea, menstrual abnormalities, impaired balance, orthopedic problems, and an increased risk of illness and death in adulthood are some of the health consequences of obesity. Some experts suggest that for each pound of excess fat carried by an individual between the ages of 45 and 50, life expectancy decreases 1% (Kent, 1997). There is no estimate for the impact of childhood obesity on the life expectancy of children, but it is anticipated to be great.

Children and adolescents who are overweight and obese not only suffer future physical and medical sequelae but also the immediate consequences of social and psychological stigma (Puhl & Brownell, 2003). Children who are obese often suffer the social shame of being different from their peers and unattractive because they are overweight. Morgan et al. (2002) noted in her study of 112 overweight children that comparable with adults, children who are overweight and report loss of control over their eating have more psychological distress and a greater measure of obesity than those with no feelings of loss of control over their eating. Wang and Dietz (2002) found that obese adolescents suffered from social isolation, when peer association and friendship is so critical to this developmental stage. Schwimmer, Burwinkle, & Varni (2003) determined that the Quality of life (QOL) of very obese children and adolescents was low compared with children of normal weight and comparable to the QOL of children who have cancer.

Children have unique antecedents and consequences of obesity that extend into their adult lives, such as early development of sedentary habits; access to heavily processed, highly caloric foods; and reduction in activity levels. Genetics, poor dietary habits of their parents, lack of exercise, watching television, and higher fat and caloric value of fast food are some of the primary contributors to obesity in children (Epstein, 1990; Heitmann et al., 1997; Moran, 1999). Most of these habits develop in the context of living within the family but are also assisted by the physical organization of the community.

The structure of families has changed with changing economic times. Now, one parent cannot afford to stay home during the day to plan and cook healthy meals, adversely affecting the quality of a child's dietary intake. Parenting a child engenders tremendous authority and responsibility to influence the future of the child. Considerable research reveals that parents strongly influence a child's choices of dietary intake (Fisher, & Birch, 1995; Golan, Weizman, Apter, & Fainaru, 1998; Vauthier, Lluich, Lecomte, Artur, & Herbeth, 1996) and physical activity (Hill & Peters, 1998), and can promote a disinhibited eating style (Hood et al., 2000). City planning and organization (Miller, Rosenbloom, & Silverstein, 2004), living in communities where there are no parks or local stores (Earls & Carlson, 2001), societal changes, and the home environment (Strauss & Knight, 1999; Birch & Davison, 2001) have all adversely impacted the problem of obesity, particularly as it pertains to children. Many areas of influence however, continue to elude researchers and some areas of influence are completely uncharted.

Rural America

Definitions of rurality are as diverse as the individuals that live in rural communities. Rural America is found in 2,052 counties on 75% of the land and contains 17% (49 million) of the population (USDA, 2003). Broader estimates place the estimated total population of rural dwellers at 25% (67.1 million; Bushy, 2000). Rural areas are economically defined by the USDA as they relate to economic means: farming-dependent, manufacturing-dependent, services-dependent, retirement destination, federal lands, and persistent poverty (Bushy, 2000). The USDHHS, in an effort to plan health care in rural areas, defines rural as 7 to 99 persons per square mile and further identifies remote regions as *frontier areas* with 6 or fewer persons per square mile (Bushy, 2000).

Rurality, “the state or quality of being rural” (American Heritage Dictionary, n.d.), has a myriad of meanings from public and personal perspectives. The 2000 U.S. Census Bureau’s (n.d.) classification is that a rural area is any territory, population, and housing unit that is outside of Urban Areas or Urban Clusters. Rural is circumscribed here by the *absence* of urban characteristics and not by distinctiveness of the environment. Translated by purely statistical terms, rural is defined as fewer than 1,000 people per square mile and surrounding census blocks of fewer than 500 people per square mile (U.S. Census Bureau, n.d.). According to official U.S. Census Bureau definitions (as cited in USDA, 2003), rural areas comprise open country and settlements with fewer than 2,500 residents. Rural communities are often agricultural but can also have economic bases of mining, logging, tourism, or natural gas (Wikipedia, 2005). The rural lifestyle creates unique economic, health, and environmental needs that may predispose residents to poverty, threat of injury by occupational machinery, or exposure to hazardous chemicals through their work. The variety of definitions may not be mutually exclusive and may actually enhance the understanding of rurality but does little to help create an overall theory regarding rurality (Weinert & Burman, 1999).

Rurality refers to a spectrum of physical and psychological space that may not be specifically situated in one place. Rural is characteristically difficult to describe due to the multiple contexts in which rural communities exist, making it even harder to operationally define and empirically measure. Bushy (2000) describes characteristics inherent to ruralness as: lower population density, geographic remoteness, and distance between services and providers. The impreciseness of definitions about rurality extend to that of childhood obesity. Weinert (2002) states, “The problem of an adequate and consistent definition of rural continues to be a conundrum” (p. 39) and argues that “increasing heterogeneity of the population, disparities in definition, inadequate measurement, and lack of adequate health statistics” (p. 38) make it inherently difficult to obtain a clear picture. However, without an accurate description, the depth and intricacy of the issues that these communities and individuals experience can be misconstrued or distorted.

Weinert and Burman (1999) effectively utilize the sampler quilt as a metaphor for rural communities and discuss the complexities of the health care issues that rural communities face. They stress the need for operationally defining and measuring rural characteristics,

race, education, and marital status. Weinert and Burman (1999) maintain the importance of honoring and respecting differences while also uncovering possible threads of similarities that can be found in all rural settings. The complexity of the population has produced conflicting perspectives regarding this population.

The representation of rural is forever evolving and changing. Weinert and Boik (1995) developed The Montana State University Rurality Index. This index assigned families a degree of rurality along a rural/urban continuum, by examining different population variables. In this manner rural/urban distinctions are more precise and less apt to be distorted when categorizing individuals either as rural or urban. An area of need in the literature pertaining to rurality is the lack of consensus or cohesiveness regarding what rural is and how to best address issues present in rural communities. Conversely, the research and development of theoretical constructs relating only to rural dwellers by Weinert and colleagues at Montana State University are breaking unmarked ground in an area of enormous need.

Childhood Obesity

One of *Healthy People 2010*'s goals is to promote health and reduce chronic disease associated with diet and weight (USDHHS, 2000). Objectives specific to children are to reduce the proportion of children and adolescents who are overweight and obese and to increase the proportion of children and adolescents aged 6 to 19 years whose intake of meals and snacks at school contributes to good overall dietary quality.

The changing nature of rural occupations in rural areas, resulting in less physical activity contributes to this problem. Downtown areas have faced economic decline, and even if people were able to walk downtown, there are rarely streetlights or sidewalks, making it a dangerous proposition. *Rural Healthy People 2010* documents that since 1980 rural dwellers were more likely than urban residents to be obese (Tai-Seale & Chandler, 2003). Rural counties in Louisiana, Mississippi, and Texas had the highest prevalence of obesity. Tei-Seale and Chandler (2003) maintain that obese children and adolescents are poorer in rural areas but are quick to note that although they compared eight studies on the prevalence of obesity and overweight between rural and urban children and adolescents, the rural samples were not nationally representative of rural populations. They also reviewed studies that reported rural girls have a higher fat intake than urban residents, children in rural areas watch more videos and play on the computer more than their urban counterparts, and structurally there may be a lack of nutrition education, access to nutritionists, and limited resources for good nutrition in rural areas.

Further unique contributors to obesity in rural areas are the lack of local health facilities, "dependence on Medicare, lack of knowledge or information, lack of coordination of local providers, socio-economic disadvantage, geographic isolation, provider shortages and lack of transportation." (NACRHHS, 2005, p. 36). Until recently, obesity-related services were not included as a reimbursable service under Medicare coverage, as it was not considered an illness and this has made it difficult for rural health care providers and hospitals to plan and implement obesity-specific programs.

The National Advisory Committee on Rural Health and Human Services (NACRHHS) (2005) recognizes national efforts at reducing obesity in America such as Steps to a Healthier US program, but argues that these efforts do not recognize characteristics that are distinctive to rural dwellers and therefore fall short of the mark. Recommendations by NACRHHS to enhance representation of rural issues when developing policy and programs targeting obesity are: working with the states to review Medicaid policy and remove all wording that obesity is not an illness; encouraging funding programs so rural concerns are included; ensuring that the CDC Chartbook have more rural-specific data and that all governmental publications include rural references; and finally, ensuring that rural residents are seen as a separate and unique segment of the population in funding, research and data collection (NACRHHS, 2005).

Rural New Mexico

As one of the fastest growing states in the U.S., New Mexico is known as ‘The Land of Enchantment’ which characterizes the magnificent diversity of geography, people and cultures. The 5th largest state, New Mexico’s varied ecosystems include semi-desert, plains, dry steppe and shrub, open woodland, coniferous forest and alpine meadows (USDA, 1994) and comprises 121,598 square miles of land. A multilingual state, New Mexico is inhabited by 1,903,289 (US Census Bureau, 2005) Hispanic, Native American, Anglo, Black and Asian people. Seventy one percent are White, 43 percent are Hispanic and 9.3 percent are Native American (U.S. Census Bureau, 2004). Twenty eight percent of the population is under the age of 18. Communities are spread far and wide with only 14.4 people per square mile (Netstate, 2005).

New Mexico is not a small state and the diversity amongst its rural dwellers is as varied as the state’s geography. Rural dwellers comprise 35% or 672, 876 of the population in New Mexico (USDA, 2005). Rural northern New Mexico communities, predominantly Hispanic, are vastly different than the western part of the state where the Navajo Nation is located. Southwestern New Mexico is populated by Anglo ranchers, along the southern border by Mexican nationals and is incomparable to southeastern sections of the state which are primarily African American. Contextually these geographically, ethnically and economically different regions have health care needs and solutions that are uniquely individual to that community and it is no different for childhood obesity. Farming, mining, logging and the tourist industry may be generalizable to all rural communities. However, New Mexico’s rural areas are distinctive as the industries of green chile farming, sheep and cattle ranching, copper and ore mining, logging and tourism are the industries that sustain the inhabitants. Central to examining health care disparities in New Mexico’s rural regions are these distinctively different characteristics. By assessing the needs of these communities individually, specific interventions can be planned to target those rural children who are obese. Rural communities often lack the funding or resources to track obesity and subsequently develop and implement effective programs. Lack of information is exactly the problem that rural children in New Mexico face.

Childhood Obesity

Obesity is recognized by the NMDH as a public health concern and is identified by the New Mexico Comprehensive Strategic Health Plan as one of the five health status priorities (NMDHHS, 2005). However, no information regarding numbers of rural children with obesity could be found for the State of New Mexico, underscoring an urgent health care need for rural areas. Information that is available consists of state-level percentages of overweight and obese from the New Mexico 2003 YRRS of youth aged 15 to 19 (grades 9-12) in 71 of the 89 school districts in New Mexico and is generalizable to most of the state, per the report (NMDH, 2003). Therefore, information from this survey can give us a window into the possible concerns rural adolescents face.

The 2003 New Mexico YRRS is a self-reported survey of health practices, and the results revealed several themes around food, body image, and obesity (NMDH, 2003). Body dissatisfaction was equally prevalent for both adolescent males and females and places them at risk for fasting and purging as unhealthy means of controlling their weight. Eleven percent of males and 9% of females stated they either purged or took laxatives as a way to manage their overweight. Boys were more likely to be overweight than girls, with 13% of both being at risk for overweight and 10% in the overweight range. Dietary habits of New Mexican adolescents are poor, as 83% of the respondents did not eat five or more servings of fruits and vegetables a day and 34% had not eaten green salad in the previous 7 days. Thirty-four percent of the adolescents watched 3 or more hours of television a day.

New Mexico has a high poverty level, which is second highest of the 50 states. Culturally, food plays an important role in the lives of children and their families, but culture may also contribute to the meteoric rise of obesity in the Hispanic population. Growing up in the culture of their family, which may also have an ethnic culture; children learn values, perspectives, and habits. Food insecurity has been associated with obesity and poor nutritional outcomes (Olson, 1999; VanEenwyk, 2003), and poverty contributes to food insecurity. Whether or not children receive adequate food is studied by the U.S. Department of Agriculture, and the Food Security Institute Center on Hunger and Poverty explores whether or not children have enough food. *Food security*, *food insecurity* and *hunger* are three concepts that pertain to understanding the importance of this research. Having access to adequate food at all times to sustain a life that is healthy and active is food security. Limited or uncertain ability to obtain adequate, safe, and nutritious food or the inability to obtain such food in a socially acceptable manner is food insecurity. The persistent or involuntary lack of food that causes an uneasy or painful sensation is a possible but not required result of hunger. The prevalence of food insecurity is three times the national level in homes below 130% of the poverty line. From 1998 to 2000, 15.87% or 105,000 of the households in New Mexico were “food insecure” and ranked first in the nation, as it affected 347,000 people (NMDH, 2003). In Hispanic households, the prevalence of food insecurity was twice that of White, non-Hispanic households (Nord, Andrews, & Carlson, 2005).

Suggestions offered by the Rural Assistance Center (2005) to reduce obesity in the community are: community walking clubs, weight management support groups, and healthy cooking and exercise classes. Phillips and McLeroy (2004) encourage the recognition of strengths related to a rural lifestyle, such as “dense social networks, social ties of long duration, shared life experiences, high quality of life, and norms of neighborliness, self-help and reciprocity.” (p. 1663) and utilizing these to develop effective, rural culture-specific interventions to combat obesity.

Obesity Programs in New Mexico

New Mexico has recognized the need for a comprehensive program for the control and prevention of obesity. In 2003, the NMDH obtained funds from the CDC for a state Obesity, Physical Activity, and Nutrition program. Managed by the Chronic Disease Prevention and Control bureau, its goals are to prevent and control obesity and related chronic diseases, such as diabetes, heart disease, arthritis, and some cancers (NMDH, 2005). Drafted long-term objectives are to: reverse the direction in the proportion of New Mexicans who are obese or overweight; increase the number of New Mexicans who consume five or more servings of fruits and vegetables per day; increase the number of New Mexicans who engage in moderate or vigorous physical activity; and decrease the disparities by 2016 in rates of obesity and overweight, food insecurity and hunger, fruit and vegetable intake, and physical activity in New Mexico (NMDH, 2005). No mention is made to specifically address obesity in rural areas of New Mexico.

Envision New Mexico (2005), a statewide pediatric health care program, was established by a collaboration of New Mexico health care organizations and was created to address issues of quality in pediatric health care. Currently, its focus is childhood obesity. The mission of the initiative includes assisting pediatric health care providers in modifying their systems of care and practice in primary care offices and school-based health programs. The training program they provide includes education on the epidemiology of overweight and obesity, BMI, weight goals, office system tools, facilitating change/motivational interviewing, and brief focused advice communication skills. Additionally, training covers detailed medical assessment, treatment options, and resources within schools and communities. The overarching goal is to “get more energy,” and four simple objectives to achieving that goal are to get up and play hard, cut back on TV and video games, eat five helpings of fruits and vegetables a day, and cut down on sodas and juice drinks (Envision New Mexico, 2005). Nevertheless, neither of these programs address the lack of research in rural areas or the urgent need to develop programs targeting rural children who are obese.

Rural Childhood Obesity Research

Former Surgeon General David Satcher, in his Call to Action to Prevent and Decrease Overweight and Obesity, stated that, in the face of all that we do know about the antecedents and consequences of obesity in children, we still do not know the best interventions for the prevention and treatment of obesity (USDHHS, 2001). Nationally, studies that examine childhood obesity in rural areas are limited, and few long-term

studies make it difficult to confidently recommend programs. The Surgeon General, without being specific to rural needs, recommended targeting family and community, school, health care, media and communications, and worksites as settings in which to research and implement programs to combat obesity (USDHHS, 2001). Despite the evidence of the impact that cultural and environmental factors have on obesity, 75% of obesity research grants to the CDC are funding genetic and metabolic studies, with less than 1% aimed at studies on environmental concerns (Cohen & Farley, 2001). The lack of knowledge contributes to the unique difficulties posed by living in areas that have few resources to encourage and support children in their efforts to achieve and maintain a healthy weight. Although the YRRS (NMDH, 2003) study examined adolescents' self-reported health status, including obesity, no research could be found that has examined rural childhood obesity in New Mexico.

Implications for Nursing Research

Nurses are uniquely qualified to facilitate research, assist with community building coalitions, and help implement programs (Huttlinger, Schaller-Ayers, Kenny, & Ayers, 2004) to combat obesity. The implications for nursing research in the area of childhood obesity, particularly rural childhood obesity in New Mexico, are vast. Initially, obtaining accurate numbers of rural children who are obese by region in the state would provide needed data to give a comprehensive view of the state's needs. The opinions and thoughts of the children who are obese or at risk for being overweight or obese would be central as if they do not believe an intervention will help them; they are not likely to participate. Various aspects of childhood obesity could be studied: cultural; ethnic; socioeconomic; family influence; school influence, and how it is affected by the economic base of the community. Programs aimed at eating disorders that would help both females and males develop better methods of managing their weight would be beneficial. Physical fitness programs and healthy dietary requirements in the schools would also be valuable. Educational events in the schools that would provide fun physical activity combined with nutritional information might be a way to involve the children and adolescents. Participation of the family in any dietary or physical activity intervention would be essential to the success of that program.

Summary

Children are universally viewed as our hope for the future, but the epidemic increase of obesity in children and adolescents is placing that future in a precarious position. If the current situation continues and the rise of obesity is not slowed or halted, this will be the first generation in history to have a shorter life expectancy than that of their parents. Rural children face unique issues in their struggle to maintain or lose weight, and there is little information with which to guide them. Clinically, it is important to understand the nutritional and geographical challenges that rural children have to meet. Well-funded programs targeting the needs of rural children who are obese are needed, and changes in policy are required to help support the goals of these programs. Understanding the programmatic needs of the rural environment would aid in developing effective programs at home, in school, and in the community. No one program could address all of these

areas, but a change at any level has the potential to affect all levels of the environment and enhance rather than hobble the development of children psychosocially and physically.

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5 Mental Health Disparities Among Latinos in Rural New Mexico

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Mental health disparities among racial and ethnic minorities in the United States are greater than for nonminorities (U. S. Department of Health and Human Services [USDHHS], 1999). Minorities have unmet mental health needs and thus suffer a greater loss to their overall health and productivity, have less access to mental health services, and are less likely to receive mental health services than nonminorities (USDHHS, 1999). While mental health disparities among Latinos in urban areas present a challenge in providing culturally and linguistically appropriate mental health services, it is significantly more challenging in rural communities. In 2002, New Mexico's Department of Health (NMDH; 2002) conducted a comprehensive assessment of behavioral health needs, gaps, and system barriers. Significant gaps and disparities in behavioral health services for the Latino population were identified. Strategies were recommended to eliminate mental health disparities and integrate cultural beliefs in the delivery of services to this population. Furthermore, it was suggested that a philosophy and process that reflects cultural competency standards be considered to better meet the needs of the Latino population (NMDH, 2002).

Although mental health disparities among Latinos exist in both rural and urban communities, rural Latinos, like other minorities, face the same barriers to mental health services that affect all segments of rural America. In addition, rural Latinos face the burdens of culture and language differences, poverty, immigration status, and racism at the individual and institutional system levels. These factors complicate access to adequate mental health services and exacerbate the marginalization in rural America (Soto, 2000). There exists a paucity of research in the area of Latinos and mental health in rural or urban settings. The degree to which Latinos receive appropriate diagnoses is unknown because of limited research. Latinos are also less likely to receive evidence-based care in accordance with professional treatment guidelines in a clinical setting (USDHHS, 1999). The purpose of this chapter is to explore the concept of rurality, culture, and mental health disparities among Latinos in rural New Mexico, as well as to offer implications for nursing care and research.

Background

New Mexico is primarily considered a rural and frontier state, with a total population of 1.9 million (NMDH, 2002). The Latino population represents 42.1% of the total population in New Mexico, which is 2.5 times higher than the national average (NMDH, 2002). New Mexico also has the 49th lowest per capita income in the United States, with

one of the highest proportions of uninsured residents who live in poverty (NMDH, 2002). Approximately 400,000 individuals and families are directly or indirectly affected by substance abuse/dependence or mental disorders (NMDH, 2002). There is also a significant number of individuals and families with concomitant mental illness and substance abuse/dependence. Currently, New Mexico's substance abuse rate (6.5%) is significantly higher than the national average (4.5%); only Alaska has a higher prevalence rate, at 7.3% (Substance Abuse and Mental Health Services Administration, 2000). The New Mexico Department of Corrections reported in 2004 that 59% of the total incarcerated population (3,724 individuals) were identified as Latino. It was also reported that approximately 25% of the incarcerations were for drug-related crimes, and 70% of the total population had a substance abuse/dependence problem. New Mexico has a large Latino population that suffers from mental health disparities because of poverty and a lack of insurance, access to health care, and culturally and linguistically appropriate services. The consequence of untreated mental illness or substance abuse/dependence results in needless suffering for individuals and families who reside in rural communities.

Defining Rural, Culture, and the Rural Latino Culture

The term *rural* has many definitions and means different things to different people (Bushy, 2000). There is not a single universal definition in the literature to define rural or *rurality*. The Merriam-Webster Online dictionary defines rural and rurality as: "relating to the country, country people or life, or agriculture" (Merriam-Webster Online, 2005). Historically, rural was first used by the U. S. Census Bureau in 1874 (U.S. Bureau of the Census, 1983). It was defined as a population or county exclusive of any cities or towns with 8,000 or more residents. In 1980, the Census Bureau dropped the definition of rural and defined urban as an area with persons living in an urbanized area with 2,500 or more residents, or located outside of urbanized areas. Those populations not classified as urban were rural populations (U.S. Bureau of the Census, 1983).

Rural has been defined primarily by population density by three federal agencies: the Bureau of the Census, the Office of Management and Budget (OMB), and the USDHHS (Bushy, 2005). The Bureau of the Census defines a rural community as a population with less than 2,500 people and an urban one as a community of 50,000 or more, and this may include several counties. The OMB divides rural into two categories: nonmetro and rural. Urban is also divided into two categories: urban and metro. Urban areas have a population of 50,000 or more, and metro areas have 1,000,000 or more (Bushy, 2005). The U.S. Department of Health and Human Services defines rural, frontier, and urban areas according to population density and hospital beds. Frontier consists of those populations with six or fewer people per square mile and less than or no hospital beds (Bushy, 2000). Rural is defined as 7 to 99 residents with 25 to 100 swing beds. Urban is defined as 100 residents per square mile with 100 or more hospital beds. The U.S. Department of Agriculture divides non-SMSA county types into six categories: farming dependent, manufacturing dependent, services dependent, retirement destination, and persistent poverty (Bushy, 2000).

Researchers have proposed that the definitions of rural and urban should not be viewed as dichotomous, but on a continuum ranging from a very remote farm residence to a highly urbanized core metropolitan area (Bushy, 2000). The use of a continuum that assigns a degree of rurality to each family on a rural/urban continuum avoids artificial categorization and allows for a greater distinction to be made (Weinert, 2002).

Researchers face diverse ways of life, land-use, and beliefs in rural and urban areas. For example, agriculture may be found in every rural area, but every rural area does not have agriculture. While it may be said that urban residents live in the fast lane, this too may be said for rural residents who have to adhere to a strict schedule (Bushy, 2000). For the purpose of this chapter, the term rural is defined on a continuum ranging from remote to highly urbanized and is comprised of populations, access to health care services, and economics.

Culture

The concept of *culture*, like rurality, has a definitional history that tends to be general and fails to capture any real meaning. The Merriam-Webster dictionary defines culture as: “the integrated pattern of human knowledge, belief, and behavior that depends upon man's capacity for learning and transmitting knowledge to succeeding generations: the customary beliefs, social forms, and material traits of a racial, religious, or social group” (Merriam-Webster Online, 2005, 5a). Spector (2003) classically defines culture as the sum “total of socially inherited characteristics, of human groups, which is handed down in words” (p. 9). Culture is also defined as the sum of beliefs, practices, habits, likes, dislikes, norms, customs, rituals, and language, which are learned in the family system. Also known as a “metacommunication system, where everything, not just the spoken word has a meaning; it is how humans see their environment and how they interact with the environment” (Spector, 2003, pp. 9-10). Rural communities have their own culture, which is complex and has many dimensions that tend to vary, change, and reflect much of the United States as a whole. While each rural community is not the same, rural communities share common characteristics that can be similar and still different from urban areas (Bushy, 2000). Although many definitions of culture exist throughout the literature, culture is defined as a group of people who, by relation or location, share common beliefs, customs, values, religions, linguistics, or cultural heritages that have been inherited or have evolved through the course of time.

Latino Culture

Latino is a broad term that encompasses persons with origins or ancestry from Mexico, Central America, South America, Puerto Rico, and Cuba (NMDH, 2002). Persons of Mexican origin comprise the largest proportion of Latinos, at 58.5%, with 68% of Latinos born in the United States. Latinos are heterogeneous in the circumstances of their migration and family subcultures. However, they share the Spanish language and overall cultural influences that form common bonds (USDHHS, 1999). Latinos, while diverse as a group, share cultural values, such as: “strong identification with and loyalty to the nuclear and extended family, respect for elderly people and those in authority, there is a traditional sense of gender role, emphasis on importance of the group over the individual

and avoidance of direct anger and confrontation to ensure relationships flow smoothly” (NMDH, 2002, p. 108). These strengths or patterns may be helpful in developing culturally sensitive assessments and treatments.

Rural Latinos

Latinos share characteristics that are common among all rural segments, such as similar experiences of living in a small town that is characterized by greater spatial distances between people and services, as well as economic orientation associated with the land and nature (agriculture, mining, lumbering, and/or fishing, all of which are classified as high-risk occupations). Work and recreational activities are cyclic and seasonal in nature. Social interactions are informal, face-to-face negotiations are preferred, and most, if not all, residents are either related or acquainted. Churches and schools usually serve as centers for socialization. Mistrust of outsiders and maintaining anonymity is an important issue. The concept of health has been found to be significantly associated with the ability to work, and the sick role is more likely to be rejected. Access to health care may be very limited and providers in rural areas scarce (Bushy, 2000). Rural communities have historically been known to be creative with the use of existing resources and their ability to deal with enormous challenges that confront them. The concept of hardiness and resilience that has been associated with rural communities is a source of strength that warrants inquiry to improve the lives of rural residents. Common themes and belief systems of rural groups, such as self-reliance and the work ethic, are strengths that can establish partnerships that improve the lives of rural residents (Bushy, 2000).

In addition, rural Latinos face the burdens of culture and language differences, poverty, immigration status, and racism at the individual and systemic levels (Soto, 2000). Approximately 40% of Latinos in the 1990 Census reported they did not speak English very well and, as a result, had limited access to ethnically or linguistically similar providers (USDHHS, 1999). Latinos in rural areas are more likely than rural Whites to be poor; 13% of the rural White population is poor, whereas the percentage of Latino poor is 25%. Latinos tend to live in communities with tighter constraints on total economic resources (Samuels, Probst, & Glover, 2004). It is hypothesized that minorities receive fewer mental health services than Whites as a consequence of institutional racism and differences in access to goods, services, and opportunities of society by race. The lack of insurance coverage, lack of providers in minority neighborhoods, inadequate interpreters, and inability of low-status workers to take time off work are hypothesized to undermine the care of minorities (Lasser, Himmelstein, Woolhandler, McCormick, & Bor, 2002). It is imperative that issues such as culture, language differences, constraints on economic resources, access, lack of insurance, and poverty be addressed to eliminate disparities among Latinos.

Prevalence of Mental Illness in Rural America

In the United States, 15 million out of 62 million rural residents struggle with substance abuse or mental disorders, such as bipolar disorder, depression, schizophrenia, and anxiety disorders (Bushy, 1994). Mental illness can be found in 20% of the population in

both urban and rural areas (Bushy, 2000). While the issue of mental illness and access to health care is not new in urban locations, rural communities have greater challenges. This vulnerability places them at risk for poor physical, psychological, or social health. Rural populations also have higher rates of mental illness, such as depression, and alcohol abuse; history of violence, such as domestic violence and incest child abuse; and stress secondary to occupational and economic situations (Bushy, 2000). Failing to meet the needs of the mentally ill in rural America will increase the rates of suicide, depression, and homelessness. The greatest impact of untreated mental illness is suicide. Suicide rates are higher in rural areas among adult males and children (Bushy, 2005). Rural residents are less likely to report unmet treatment needs for serious mental illness than those residing in nonrural areas. Unmet mental health needs for this population result in increased suicide rates, psychological distress, poor health, increased substance abuse rates, and increased violence within families.

Mental Health Providers in Rural Communities

Primary care providers play an even greater role in mental health care in rural areas; this may be attributable to both the scarcity of mental health professionals and the stigma of mental illness in rural areas (USDHHS, 2003). Issues regarding anonymity in treatment and the associated stigma may be more pronounced among rural populations. Rural residents also engage in stressful occupations. The lack of knowledge about mental illness symptoms or treatments may reduce the utilization of mental health care by rural residents. The lack or limited number of mental health practitioners contributes to decreased access to mental health services (Bushy, 2005). Most rural mental health programs provide both substance abuse and mental health counseling in the same clinic with the same staff. Substance abuse treatment is a specialized field, and trained personnel are lacking in rural areas (Rosman & Van Hook, 1998). Rural residents may not want to access service due to issues of anonymity, confidentiality, stigma, or mistrust of outsiders, or because they have a preference for speaking with locals or family members (Bushy, 2000). Rural residents endure needless suffering due to the lack of mental health professionals in their communities.

Rural Latinos and Mental Health Care

In rural America, the mental health system fails to provide services for the majority of Latinos, especially Latino immigrants who least use the mental health system (NMDH, 2002). The prevalence of mental illness is the same for both Latinos and Anglos, and the rates of psychiatric disorders are higher among U.S.-born Latinos. Latinos born in the United States have higher rates of depression and phobias than those born in Mexico (NMDH, 2002). Latinos also experience cultural-bound syndromes that include *susto* (fear), *nervios* (nerves), *mal de ojo* (evil eye), and *ataque de nervios* (attack of nerves). *Ataque de nervios* can include crying, screaming, verbal or physical aggression, and seizure-like symptoms. These cultural-bound syndromes are not a part of Western medicine and do not exist in the *Diagnostic and Statistical Manual of Mental Disorders* used by psychiatrists and other licensed mental health providers (National Institute of Mental Health [NIMH], 2005). To provide culturally responsive treatment to Latinos, it is

important that providers access the world of the patient by integrating cultural and social content of their Latinos patients. Cultural misunderstandings and misconceptions negatively affect diagnosis, treatment and outcomes (USDHHS, 1999).

The U.S. Surgeon General stated that culture does count and affects access to care, availability of care, type of care, approach to care, and the evidence-based guidelines upon which services are designed and delivered (USDHHS, 1999). Behavioral health care providers and systems are discovering that “culture” has a profound impact on how individuals are identified, diagnosed, engaged in treatment, and served. Culture has an effect on testing reliability, perceptions of mental health treatment, and compliance with prescribed treatments (NMDH, 2002). Incorporating culture is detrimental to providing quality care to minorities, in this case, Latinos.

Mental Health Services in New Mexico

Despite the great need for mental health care, New Mexico has significantly limited resources and an inadequate number of licensed providers in the state. Those professionals who provide mental health services are concentrated in Albuquerque and Santa Fe (NMDH, 2002). Only 58% of psychiatrists who practice in New Mexico have an address in the state, and four out of five psychiatrists practice in Albuquerque and Santa Fe. The majority of social workers, counselors, and psychologists also reside in Albuquerque and Santa Fe (NMDH, 2002). The number of mental health providers who are bilingual nationally and in New Mexico is not known, and issues concerning cultural competency are also not known (USDHHS, 1999). This creates a problem with access to culturally and linguistically appropriate mental health care. Those professionals who practice in rural New Mexico are isolated, and substantial responsibilities are placed on generalist providers or on advance practice nurses (Roberts, Battaglia, & Epstein, 1999). In New Mexico, behavioral health needs for Latinos are greatly impacted by poverty, lack of insurance, lack of behavioral health practitioners to provide culturally and linguistically appropriate mental health services, homelessness, incarceration, family relationships, and worker productivity (NMDH, 2002). These barriers have a significant impact on individuals, families, and communities within New Mexico, the negative consequences of unmet mental health needs and services can affect generations of Latinos.

Summary

Historically, rural and racial minorities have been among the most understudied groups in America and thus suffer the greatest disparities (Probst et al., 2004). Recent data suggest that Latinos are less likely than Whites to receive treatment according to evidence-based guidelines established by the psychiatric or psychological communities (Lasser et al., 2002). Cultural competence plays a large part in clinicians trained in traditional Western biomedical psychiatry and their ability to provide care to minority populations (NIMH, 2005). This fact alone demands that our scientific understanding of social and psychological functioning and mental disorders must be based on knowledge of these varied groups (Lasser et al., 2002). Policy, funding, and system development are driven

by research, and it is therefore crucial that research concerning mental health issues and Latinos be conducted.

Implications for Nursing

In progressing toward a culturally competent mental health system for the rural Latino community, understanding and incorporating cultural beliefs, values, and the patient's perspective concerning mental illness and psychological distress are crucial. The development and integration of cultural competence in rural psychiatric nursing is needed to improve knowledge, skills, and abilities to increase appropriate treatment and outcomes for Latinos. Nurses who practice in rural areas are often highly respected leaders in their communities (Bushy, 1994). They are also in a position to provide a bridge between the community and the mental health system. Advanced practice nurses in rural practice often are described as "generalists" because they care for individuals of all ages with a wide variety of health problems. This may be seen as rural mental health nurses taking on multiple roles such as: activist, advocate, educator, partner, expert clinician, and researcher (Bushy, 2000).

Issues concerning Latinos and mental health services are complex and merit continuous attention in the areas of policy development that seriously considers cultural competence requirements in licensing and accreditation for mental health care professionals. Advocating for policies that create equal opportunities for mental health services in rural communities for Latinos is needed. It is important that cross-cultural issues be addressed, such as mistrust based on experience exclusion and mistreatment, language barriers and expectations, awareness of culturally insensitive and biased assessment, testing and intervention modalities, and overcoming conflict in values regarding family, children, and elders (NMDH, 2002). Nursing is challenged with meeting the mental health needs of rural Latino communities and forming partnerships with communities, and together they can address mental health issues. Nursing in collaboration with the community can begin to provide treatment that is effective and improves the lives of Latinos. Nursing can be the voice for those who have no voice and feel powerless through lobbying state legislators, grant writing, and forming partnerships with communities.

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6 Disaster Planning in New Mexico

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We are each of us responsible for the evil we may have prevented.

James Martineau

We live in uncertain times. The U.S. government has developed or is in the process of developing elaborate disaster preparedness plans for a variety of possible catastrophes. These potential perils range from natural disasters, such as earthquakes, floods, tornadoes, and hurricanes; to terrorism, such as bombings and hijackings; to bioterrorism in which organisms, such as anthrax, botulism, smallpox, Ebola, and the hemorrhagic fevers, are deliberately introduced into a population; to naturally occurring epidemics, such as influenza, avian flu, and sudden acute respiratory syndrome (SARS).

Organizational structure to deal with these events should they happen is constructed as a hierarchy. The federal government comprises the top layer, and state, county, city, and local responders reflect increasingly specific focus. Every state, county, and city is required to have in place a general disaster preparedness plan. The recent hurricanes and flooding in the New Orleans and Lake George areas of Louisiana and on the Mississippi Gulf Coast made it apparent that existing plans or the response to the plans currently in place are not effective or efficient. It is unlikely that other states and cities are better prepared. States that are sparsely populated, have a large rural population, and have a high percentage of people living in poverty, where communication is less than instantaneous and where services are limited, may have significantly more difficulty in responding to disasters if they occur.

New Mexico is one such state. Officially classified as a rural state based on the number of persons per square mile, and one of the poorest (U.S. Census Bureau, 2003), New Mexico, especially the more rural areas of New Mexico, faces considerable challenge in disaster preparedness. This chapter discusses the nature of disasters, the history of disaster preparedness, potential disasters facing New Mexico, and the current state of disaster preparedness, with a special focus on rural New Mexico.

Definitions and Types of Disasters

Definitions

What are disasters? How are they defined? When are unfortunate events or occurrences declared to be local, state, or national disasters? *Disaster*, from the Greek and Latin, is roughly translated as “bad star,” meaning that the stars are malpositioned and harbingers

of impending catastrophe. The Latin root, *dis*, meaning something undesirable, and *astrum*, meaning star, eventually came into English as *disaster* from the Italian *disastro* through the French *desastre* (Oxford English Dictionary Online, 1989).

There are various operationalized definitions of disasters. The Federal Emergency Management Agency (FEMA) and the Department of Homeland Security use the broad definition of disaster as set forth in the Robert T. Stafford Relief and Emergency Assistance Act of 2000:

Major Disaster means any natural catastrophe (including any hurricane, tornado, storm, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought), or, regardless of cause, any fire, flood, or explosion, in any part of the United States, which in the determination of the President causes damage of sufficient severity and magnitude to warrant major disaster assistance under this Act to supplement the efforts and available resources of States, local governments and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby. (p. 5)

The earliest definition of disaster in New Mexico statutes appears in 1959. The definition focuses on an enemy attack and provides for a plan of statewide action, including a proscribed order of succession in the event of the deaths of the Governor and other public officials including legislators (Legislative Disaster Act, 1959). There is no other current definition of *disaster*.

Other states, however, have quite specific and current definitions. Louisiana, recently hit by hurricane Katrina, uses the following definition of disaster, which was more than fulfilled:

An event, the effects of which cause loss of life, suffering, property damage, both public and private, and severe economic and social disruption. Disasters can be natural or man-made events; major accidents, or enemy attacks. Disasters are differentiated from those day-to-day emergencies and accidents that are routinely responded to by local emergency organizations, and may be of such magnitude or unusual circumstances as to require response by all levels of government - federal, state and local. (Louisiana State Government, n.d.)

Types of Disasters

More recently, disasters have also been classified as natural and man-made. FEMA, now under the direction of the Department of Homeland Security (DHS) classifies natural disasters as follows: avalanche, cold, disease, drought, earthquake, fire, famine, flood, hail, heat, hurricane, impact event (meteor), limnic event (poisonous gases erupting from fresh water), landslide, sink hole, solar flare, storm surge, thunderstorm, tornado, tsunami, volcanic eruption, waterspout, and winter storm. Man-made disasters consist of arson, civil disorder, crime, data loss, dam failure, hazardous materials, processing interruption, liquidity shortage, nuclear blast, power outage, public relations crisis,

radioactive contamination, telecommunication outage, terrorism, and war (FEMA Library, 2005; Figure 1). All of these events may occur on a large or small scale.

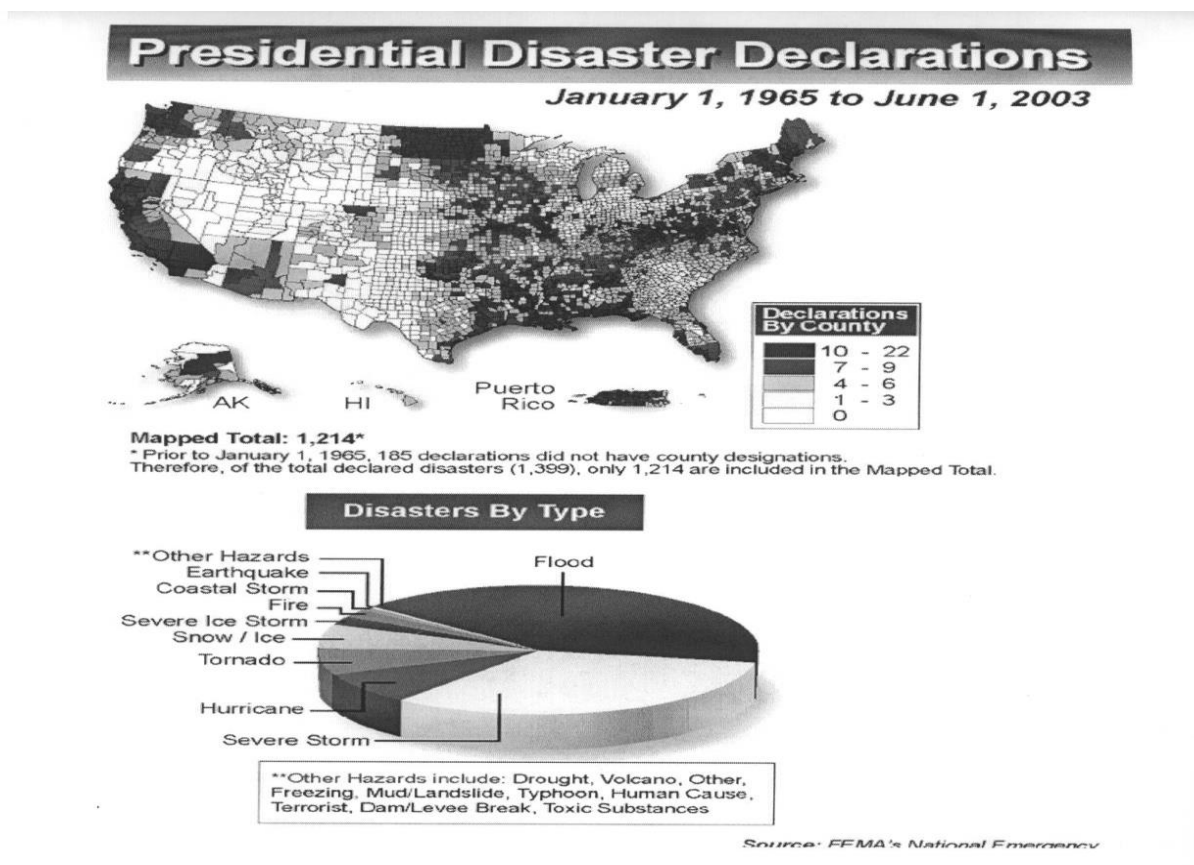


Figure 1. Presidential disaster declarations and disasters by type.

What differentiates an unfortunate event from a disaster? The United Nations (UN) uses the following definition, which focuses on the magnitude of the occurrence:

A disaster is a sudden calamitous event that seriously disrupts the functioning of a community or society and causes human, material, economic or environmental losses that exceed the community's or society's ability to cope using its own

resources. Though often caused by nature, disasters can have human origins. The combination of hazards, vulnerability and inability to reduce the potential negative consequences of risk results in disaster. (UN Office, n.d. I don't have it.)

Additionally, for an event to be classified as a disaster by the UN, one of these conditions must be met: a report of more than 10 people killed, a report of 100 people affected, a declaration of a state of emergency by the relevant government, and a request by a national government for international assistance (UN Office, n.d.).

The United States and the State of New Mexico do not have specific criteria for differentiating an emergency from a disaster. Determinations of severity and magnitude are made by local and state officials and disasters are first declared at those levels. If requested and granted, the President of the United States would declare a national disaster.

A History of Disaster Preparedness

Disaster Preparedness in the United States

Disaster preparedness in the United States began long before September 11, 2001 (9/11). Congressional response to a fire in New Hampshire in 1803 is regarded as the first national response to a disaster. For approximately the next 100 years, disaster relief was allocated on an as-needed basis in response to earthquakes, hurricanes, fires, and floods. In the 1930s, legislation was passed that established a framework for national disaster relief. Various governmental agencies were granted authorization to intervene and provide relief consistent with the mission of the agency. The U.S. Army Corps of Engineers played an important role in flood control and in response to floods (FEMA Library, 2005).

There were a great number of disasters in the 1960s and 1970s: Hurricanes Carla (1962), Betsy (1965), Camille (1969), and Agnes (1972), as well as earthquakes in Alaska (1964) and San Fernando, CA (1971). In response to pressure by the National Governor's Association, President Carter established FEMA in 1979 to better coordinate relief efforts among various federal and state agencies. FEMA was initially under the authority of the Department of Housing and Urban Development (HUD) and had as its mission statement, "the direction, control and warning systems which are common to the full range of emergencies from small isolated events to the ultimate emergency – war" (FEMA Library, n.d.). Early disasters that confronted the new agencies included the contamination of the Love Canal, the accident at Three Mile Island, and later, the Loma Prieta Earthquake (1989), and Hurricane Andrew (1992) (FEMA Library, n.d.).

Hurricane Andrew topped the most costly hurricanes until Kristina. Hurricane Kristina and her sequella is the mostly costly natural disaster event in U. S. history, combining elements of flood, heat, hurricane, tornadoes, and storm surge. Prior to Kristina, the North Ridge earthquake was the most costly, at \$6.961 billion (FEMA Library, 2005).

After 9/11, when the national disaster focus shifted to include terrorism, FEMA was subsumed by the DHS. There were questions about the qualifications of some appointees during the first and second George W. Bush presidential terms. What was widely regarded as an inadequate response to the devastation of Hurricane Kristina by FEMA led to the resignation of the agency's director and public scrutiny about the independence and effectiveness of the agency ("Editorial," 2005).

FEMA continues under the DHS with new leadership. There is particular emphasis on integrating services at the state, local, and tribal levels, coordinating services that include emergency management, law enforcement, firefighting, public works, public health, responder and recovery worker health and safety, emergency medical services, and private sector responses and the Red Cross (Homeland Security, Emergencies and Disasters, n.d.).

Disaster Preparedness in New Mexico

There is not a linear history of disaster preparedness in New Mexico. Like the early United States, disasters were responded to on an ad hoc basis. As previously mentioned, a Legislative Disaster Act was passed in 1959. Additional supplemental legislation was passed in 1978, and sweeping changes were implemented in 2002 and 2003 in response to national directives and the establishment of the Department of Homeland Security ("State of New Mexico," 2004).

Current State of Disaster Preparedness in New Mexico

Disaster Potential

The State of New Mexico All-Hazards Emergency Operations Plan (2004) identifies the following hazards: weather, including high winds, thunderstorms, tornadoes, winter storms, extreme heat, and dust storms; hydrologic, including riverine flood, flash floods, and droughts; wildfire; geologic, including earthquakes, landslides, expansive soils, and volcanic activity; and public health (not specified). Compared with most of the rest of the United States, New Mexico is not particularly disaster prone. It ranks among the states with the lowest patterns of losses from all hazards (Thomas & Mitchell, 2001). From 1954 through 2004, 18 state disasters were declared. Fourteen disasters were declared in New Mexico between 1972 and 2000, compared with 1,037 throughout the United States (FEMA Library, 2005). Most disasters in New Mexico were related to severe storms and flooding.

The most recent declaration occurred in 2005 when Governor Bill Richardson declared a state emergency in the wake of Hurricane Katrina. Although New Mexico was not threatened by the storm, the declaration of disaster enabled the state to apply for Federal funds to assist in caring for hurricane evacuees. Previously, a state disaster was declared in 2004, as a result of severe flooding. In addition to one declared fire disaster in 2000, 23 other fire management assistance declarations were made, 9 of them in 2002 (New Mexico State Disaster History, 2005).

New Mexico has one potentially active volcano, a moderate earthquake risk, and a low risk of mudslides and tornadoes. Extremely high summer temperatures create potential disaster situations, as people, animals, and agriculture may all be affected. New Mexico ties Florida and Wyoming as states having the highest number of lightning strikes with casualties (Thomas & Mitchell, 2001). The high number of lightning strikes combined with the generally dry nature of the state also explains the state's high rate of wildfires. Wildfires are particularly devastating and dangerous in rural settings. Warning systems may not be adequate; there may not be enough firefighters. The ability of people in the area of the fire to evacuate and to evacuate their livestock may be severely limited by lack of resources.

As in all of the United States, bioterrorism and epidemics are potential sources of state and regional disasters. New Mexico is on the flyway for many migrating birds. Avian flu is thought to be introduced into the domestic fowl population by migrating birds. Many rural New Mexicans keep flocks of chickens and cases of infected birds and ill persons may not be immediately recognized because health care resources are limited in many rural areas, and many people are not accustomed to seeking care for what are seen initially as trivial illnesses (Fox, 2005).

Other potential biohazards that would be particularly difficult to recognize in a rural setting where there might be little likelihood of encountering them include Creutzfeldt-Jakob disease, spread by ingesting infected meat (and recently thought to be additionally spread by infected urine), anthrax, and any of the hemorrhagic fevers, such as Marburg, Rift Valley, and Ebola. It is suspected that these extremely fatal diseases have the potential to become transmissible through airborne routes and are possible agents for a terrorist attack (Travelers' Health, 2005; Wolfe, Nolte, & Yoon, 2004).

New Mexico also has the potential for nuclear emergencies. Los Alamos National Laboratory has a program for the development of nuclear weapons. There is a waste isolation pilot plant designed to store nuclear waste, and nuclear waste products are transported via public highways in the state. Sandia National Laboratories stores nuclear weapons and also develops new weapons (Nuclear Watch, 2005; Sandia National Laboratories, 2005).

Disaster Response

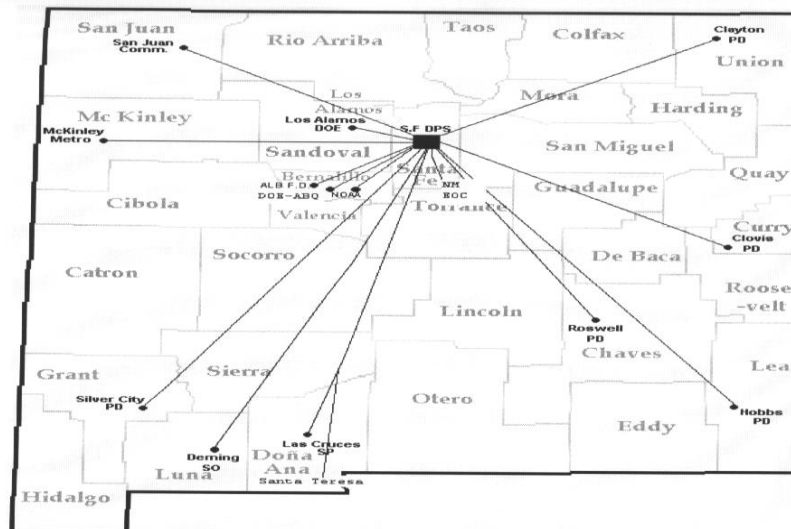
New Mexico's disaster response is modeled on the FEMA guidelines. First-responders are local police, firefighters, and emergency services – usually emergency medical technicians with advanced life-saving certifications, although in some areas of rural New Mexico, first-responders may have only basic first-aid skills. If necessary and so ordered by the Governor after a request from local officials, a disaster is declared, further aid is provided, and resources such as the National Guard are made available. The extent of the damage and the likely recovery needs are then assessed. At the request of the Governor, FEMA may be asked to evaluate the magnitude and severity of the disaster, and based on their assessment and recommendation, the President may declare a national disaster (FEMA, 2005).

The state of New Mexico has assembled a *State of New Mexico All-Hazard Emergency Operations Plan* (2004). The primary emergency operations center (EOC) for the state is located on the grounds of the New Mexico National Guard in Santa Fe. Should that site become inoperable, two alternate sites, one elsewhere in Santa Fe and one in Bernalillo County, have been designated. There is also provision for a mobile location in the event of the unavailability of the other sites. There is an assigned Duty Officer who is responsible to notify the EOC director in case of an emergency. The EOC director is the principal coordinator of initial disaster relief efforts.

The EOC director is responsible for alert and notification, information handling, coordination with field response, coordination with local EOCs, military support to civilian authorities, coordination with other states, coordination with Federal responses, and the transition to recovery. The duties of other key personnel are detailed, including those of the Governor, the Governor's authorized representative, and "all officers and employees of the State of New Mexico" ("State of New Mexico," 2004, p. 13).

Organization and direction for local emergency response is guided by the *Local Government Handbook* (2002), a 22-page publication from the New Mexico Office of Public Safety. Its primary focus is to instruct local governments on how to apply for financial assistance from the Governor's Disaster Relief Fund; however, it does provide information and recommendations on "pre-disaster activities." (p. 3). These are to include the establishment of designated first-responders, lines of reporting, and communication. There is to be a mechanism (not specified) to alert non-English speakers and disabled persons.

The state uses a 24-hour emergency alert system (EAS) to disseminate information regarding statewide disasters. Alerts through the media are the primary mechanism for notification, although participation is voluntary. KKOB radio in Albuquerque is the primary EAS station in New Mexico. Additional resources include the National Weather Service, through which messages can be sent via National Weather Radio, and the National Warning System. The National Warning System network provides two circuits: one to provide state disaster information, the other, national emergency information. Currently, not every county is included in the system (Figure 2). Additional support is provided by the Radio Amateur Civil Emergency Services, a private volunteer group that utilizes amateur radio frequencies ("State of New Mexico," 2004).



New Mexico Emergency Operations Plan

Figure 2. Reception locations of New Mexico Emergency Warning System.

New Mexico is divided into 12 Homeland Security regions that mirror the State Police administrative areas: Region 1, Santa Fe; Region 2, Las Vegas; Region 3, Roswell; Region 4, Las Cruces; Region 5, Albuquerque; Region 6, Gallup; Region 7, Espanola; Region 8, Alamogordo; Region 9, Clovis; Region 10, Farmington; Region 11, Socorro; and Region 12, Deming (New Mexico Police Departments, n. d.; New Mexico State Police, 2002). Each region has an emergency management coordinator and a State Police District Commander designated to assume leadership in the case of disaster. Additionally, New Mexico has a Disaster Medical Assistance Team that is available for deployment both in the state and nationally (“New Mexico Homeland Security,” 2003).

The New Mexico Department of Health also maintains an Office of Health Emergency Management and administers the Bioterrorism Hospital Preparedness Program (BHPP). The BHPP is a federal grant to fund hospitals to provide isolation and decontamination equipment, and to supplement funding for emergency medical service providers. The Department of Health monitors New Mexico health threats that include epidemics, bioterrorism, and disease outbreaks associated with natural disasters in addition to its other functions. In conjunction with the University of New Mexico Center for Disaster Medicine, the Department of Health conducts statewide seminars and training sessions for local and tribal governments and communities. The Department of Health also administers emergency mortuary services (New Mexico Department of Health, 2003).

Disasters in the Rural Setting

Rural New Mexico

New Mexico is the fifth largest state, with a census of fewer than 2 million people (U.S. Census Bureau, 2005). It averages only about 14.4 people per square mile (Netstate, 2005), and it is one of the poorest states (“Report on Poverty,” 2003; U. S. Census Bureau, 2004). Approximately one-quarter of its citizens are under the age of 18 years, although like all of the United States, there is a significantly increasing percentage of older New Mexicans (Magilvy, Congdon, Martinez, Davis, & Averill, 2000). Thirty percent of New Mexicans live in the largest city, Albuquerque, and an additional 32% live in population centers along the Rio Grande (“New Mexico Homeland Security,” 2003). The remainder of the population is sparsely spread throughout the rest of the state, in isolated communities or in individual dwellings. There are areas of the state where residents do not have electricity.

The state is ethnically diverse and multilingual, with 94 languages spoken within its borders. In Bernalillo County alone (which includes the city of Albuquerque), 58 languages are represented, and there are 25 counties in which there are 5 or more languages spoken (“Languages in New Mexico,” 2003). The state is defined as a minority-majority state, with 43% of the population Hispanic, 9% American Indian, 2% African American, and 46% White (“New Mexico Department of Health FY06 Strategic Plan,” 2005). The state is officially bilingual; ballots are printed in Spanish and English, and documents of state business are printed in Spanish and English. State Web sites online are also available in Spanish. Such linguistic diversity makes common understandings challenging (Agar, 1994), and these differences are magnified in times of emergency and disaster.

Although there are different definitions and degrees of “rurality,” rural New Mexico is truly rural, meeting all varied definitions of very low population density, poverty, fragile economies, the necessity of traveling long distances for services, lack of access to health care, and lack of social support services (Bushy, 2000; National Rural Health Association, 2004). Additionally, rural New Mexicans, like other rural Americans experience a higher burden of chronic diseases (“Report on Poverty,” 2003; Weinert, 2002) Of the 33 counties, only Bernalillo and Santa Fe have enough health care resources

to provide adequate care as determined by number of providers (Probst et al., 2002). New Mexico struggles to meet the challenges of providing health care to most of its citizens, as outlined by *Rural Healthy People 2010* (Gamm, Hutchinson, Dubrey, & Dorsey, 2003).

Critical lack of services in times of disaster is almost certain. Although New Mexico has 50 Public Health Offices, only 13 are located in areas with populations of fewer than 2,500 ("Public Health Offices," n.d.) Rural New Mexico is also served by health clinics that are part of the Indian Health Service. Many are able to provide only minimal services and have limited service hours. Of rural health clinics in New Mexico, 37% do not yet have computers (New Mexico Diabetes Prevention and Control Program, 2001). New Mexico has 38 Joint Commission on Accreditation of Healthcare Organizations (JCAHO)-accredited hospitals. Of those, 30 have emergency department accreditation (JCAHO, 2005). Of those, 8 are located in either Albuquerque or Santa Fe. Most have limited resources, and critical patients are usually transported to Albuquerque.

Communication

All New Mexico disaster communication relies on mass media. As previously mentioned, the state has KKOB as its official radio station. All other media participation is expected, although it is voluntary. In the event of a disaster, the State Emergency Operations Plan calls for the dissemination of "the **right information** to the **right people** at the **right time** so they can make the **right decisions** to protect lives, property and the environment" (boldface in original; "State of New Mexico," 2004, p. 3). Additionally, the plans call for notification that the emergency:

reaches special needs groups and populations, such as hearing-impaired, sight-impaired, physically disabled, or those in situations, in a manner that can be understood. Interpreters may be needed to translate for non-English speaking populations. The primary means to disseminate emergency public information is by contact with the news media. All available means of communicating emergency public information will be utilized. (pp. 3-4).

The mechanism for reaching "special needs groups" and "non-English speaking populations" is not specified, nor are there any plans included in the emergency plan to develop such a mechanism. There is no mention of how communication with those without electricity is to be managed. The special communication needs of rural New Mexicans are not addressed.

Response

Response to disasters is to be handled initially by first-responders, to include firefighters and police. Each county has a local planning committee charged with the development of a plan for initial disaster management. It is interesting to note that the chairperson in Guadalupe County does not have e-mail, suggesting that reliance on computer-based communication may not be effective in coordinating information with the state

Emergency Coordinator (New Mexico Local Emergency Planning Committees, 2005). The University of New Mexico has conducted workshops to help prepare local officials and first-responders, and several are scheduled for 2006 (New Mexico Department of Health, 2005). This approach uses a community participatory methodology that may result in disaster responses that use local resources effectively (Minkler & Wallerstein, 2003).

Recovery

New Mexico has comprehensive plans for certain specific areas of financial disaster recovery. The *Local Government Handbook* (2002) provides extensive information regarding applicant eligibility, obtaining damage estimates, payment, deadlines for appeals, as well as the necessary forms. Of note, however, is the following statement:

The State is prohibited by its Constitution from rendering direct financial assistance to the private sector. If the disaster is of sufficient magnitude to result in a Federal disaster declaration, Federal assistance may become available to private individuals and businesses. (p. 2)

There is only a brief mention of recovery in the *State of New Mexico All-Hazard Emergency Operations Plan* (2004); there is no mention of recovery in the *New Mexico Homeland Security Strategic Plan* (2003). In the event of disaster, rural areas will likely have substantial difficulty obtaining both knowledge of available services (if any) and the services themselves.

Readiness and Future Planning

According to a national poll taken in September 2005, most Americans do not know what local plans exist for disasters in their areas and are afraid that they do not have adequate money to evacuate should it be ordered (Hsu, 2005). It is unlikely that rural New Mexicans are better prepared. With limited financial resources, the necessity to travel long distances to obtain services, even under the best of conditions, a higher burden of illness, little opportunity for communication, and isolation, rural New Mexicans will be a very vulnerable population in the event of a disaster.

The entirety of New Mexico seems poorly prepared for disaster. No cities in New Mexico are designated to participate in the Cities Readiness Initiative (CRI). This program was established in 2004, with the goal that each selected city would be able to distribute antibiotics to its entire population within 24 to 48 hours. The nearest CRI cities to New Mexico are Denver and Phoenix, and they have stockpiled antibiotics only for their populations. Although there are extensive plans for disaster preparedness detailed in the *State of New Mexico All-Hazard Emergency Operations Plan* (2004), from the Department of Health and in the *New Mexico Homeland Security Strategic Plan* (2003), there are confusing overlaps between regions and districts, and the responsibilities of various agencies and officials. It is a goal of the *New Mexico Homeland Security*

Strategic Plan (2003) the date is in the same paragraph to “decrease the number of different state plans pertaining to emergency response” (p. 22).

Unrecognized illness is a very serious potential threat. Most emerging illnesses, SARS, avian flu, the hemorrhagic fevers, anthrax, and hanta virus begin with subtle signs of headache and malaise and progress rapidly to potentially fatal conditions. Although practitioners in rural settings may be alert for signs and symptoms of hanta virus, it is unlikely that presentation of an early mild flu-like illness would raise suspicion about other more deadly diseases or bioterrorism (Fox, 2005). Even if recognized, given the difficulty of isolation, transportation to acute care facilities, and lack of resources to promptly treat and immunize large numbers of citizens, a major epidemic would have dire consequences for New Mexico.

Conclusions

Rural New Mexicans have always been significantly disadvantaged. The national preoccupation with potential disaster seeps through the state, with disaster preparedness plans in place in anticipation of man-made and natural disasters. However, the special needs of vulnerable New Mexicans living in rural settings in a rural state have yet to be met. Various plans note the necessity of improved communication with rural areas, but other than acknowledgements, no remedies are suggested or implemented.

The good news is that compared with other states, New Mexico is relatively disaster free. Unfortunately, should a disaster occur, whether natural or man-made, despite plans, a significant percent of the State’s population would not receive optimum services. Should a major disaster occur anytime in the immediately foreseeable future, it is likely that response would be fragmented. And, even if disaster plans in place worked perfectly, which is very unlikely, resources are extremely limited in rural areas.

As the state government works on these problems, we must all work to try to decrease conditions that most disadvantage rural New Mexicans, specifically, improving access to health care. In the meantime, with the rest of the country, we continue to live in uncertain times. It seems prudent to prepare for the worst while hoping for the best.

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