CHAPTER 12. HUMAN HEALTH RISK ASSESSMENT

12.1 IDENTIFYING HAZARDS—DESCRIPTION OF THE HUMAN HEALTH HAZARD

Human health risks include diseases that are communicated by either people or insects. Human health hazards in California may also include exposure to extreme heat either as a result of severe weather or power outage in combination with severely high temperatures. This section discusses the human health hazards that have either been a recent occurrence or are an endemic risk to Roseville.

Communicable Diseases that are discussed in this section are; Severe acute respiratory syndrome (SARS), Flu virus, Small Pox, and diseases carried by insects. Diseases carried by insects are Plague (fleas), Encephalitis, Malaria and West Nile virus (WNV) (mosquitoes) and Lyme disease (ticks). Extreme heat is also addressed in this chapter.

12.1.1 SARS

SARS is a recently recognized, contagious febrile lower respiratory infection cause by a novel corona virus called SARS-CoV, which is usually a potential hazard to a port city (either travelers arriving by ship or aircraft). The worldwide outbreak of SARS between November 2002 and July 2003 began in China and then spread as infected travelers returned to their home countries.

California Health and Safety Code and the CCR list SARS as a communicable disease that must be reported to the appropriate authorities. Placer County is authorized to collect records and data, initiate disease control measures, control property and manage persons (including isolation and quarantine) with respect to communicable diseases.

12.1.2 Influenza (Flu)

Epidemics of influenza typically occur during the winter months and have been responsible for an average of approximately 36,000 deaths per year in the US from 1990 through 1999. Although rates of infection are highest among children, rates of serious illness and death are highest among persons aged 65 and over, and among persons who have medical conditions that place them at an increased risk for complications from influenza.

Influenza vaccination is the primary method for preventing influenza and its severe complications. The ability of the vaccine to protect against flu depends on 1) the match between the strains in the vaccine and the strains in the community, and 2) the ability of the individual's system to use the vaccine to fend off the virus. An influenza pandemic occurs when the virus strain shifts dramatically, making the match and individual's system less effective, leading to more rapid spread and more severe cases, including deaths.

12.1.3 Small Pox

Small pox is another disease that has recurred due to the increase in travelers from countries where the vaccine is not universally used. Small pox can be easily transmitted person to person, results in high mortality rates, and has the potential for major public health impact. Because smallpox had been

"eliminated" for so many years in the US, high priority has been placed on vaccinating first responders, health professionals, and then the general public.

12.1.4 Plague

Plague is a disease caused by *Yersinia pestis* (*Y. pestis*), a bacterium found in rodents and their fleas in many areas around the world. There are two types of plague—bubonic plague and pneumonic plague. Transmission occurs when the bacterium infects the lungs that can occur if someone breathes *Y. pestis* in particles, which could happen in an aerosol release during a bioterrorism attack, or by breathing droplets from a person or animal with pneumonic plague.

The World Health Organization reports 1,000 to 3,000 cases of plague each year. An average of five to 15 cases occur each year in the western United States. These cases are scattered and occur in rural to semi-rural areas. Most cases are the bubonic form of the disease. Treatment includes doses of antibiotics that should be administered within 24 hours of the first symptoms to reduce the risk of death.

12.1.5 Mosquito-Borne Disease

Several of the 48 known species of mosquitoes in California can carry disease under the right conditions. The two mosquito-borne diseases most affecting humans are encephalitis and malaria. Recently, the addition of WNV has been publicized as another potential hazard to human health carried by mosquitoes.

Encephalitis

There are two forms of viral encephalitis transmitted by mosquitoes in California - St. Louis and Western Equine. Both are carried into an area by wild birds that are infected elsewhere. These birds show no symptoms. Local mosquitoes that can pass the virus on to humans through future bites then feed infected birds. Symptoms of encephalitis range from mild flu-like illness to sever brain involvement that can cause death. Western Equine Encephalitis can affect horses and other equine animals as well as humans.

Malaria

Malaria is much less likely to occur in California due to the necessity for human reservoirs of the disease. Anopheles mosquitoes, the vectors of malaria, are found in some areas of California, and there have been isolated instances where human reservoirs from other countries temporarily provided a source of malaria infection to local residents.

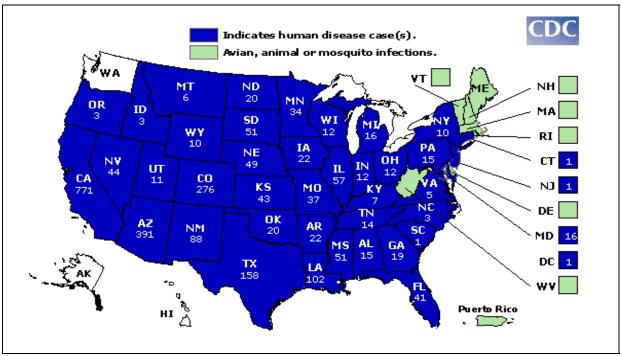
West Nile Virus

A recent natural hazard to affect California is the WNV. Mosquitoes transmit this potentially deadly disease to livestock and humans alike. WNV first struck the northern hemisphere in Queens, N.Y. in 1999 and killed four people. In 2003, all 50 states warned of an outbreak from any of the 30 mosquito species known to carry it. From 62 severe cases in 1999, confirmed human cases of the virus spread to 39 states in 2002, and killed 284 people. Less than one percent of those infected develop severe illness. People over 50 years of age appear to be at high risk for the severe aspects of the disease.

12.1.6 Lyme Disease

Lyme Disease is a bacterial infection. The bacteria that causes Lyme disease is called Borrelia burgdorfer. Lyme disease has been reported in 49 states. Blacklegged ticks transmit the Lyme disease bacteria in the eastern, northeastern, and southern parts of the U.S. The western Blacklegged tick is the vector on the

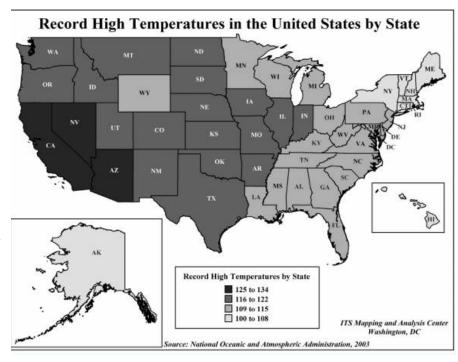
west coast. Lyme Disease may include head and muscle aches, sore throat, nausea, fever, stiff neck, or fatigue. About 50 percent of infected people develop a rash at the bite site, which sometimes resembles a "bull's eye." Later, symptoms may involve the skin, eyes, heart, nervous system, brain or joints. Early detection is important in the treatment of Lyme Disease.



2004 West Nile Virus Activity in the United States (reported to CDC as of January 11, 2005)

12.1.7 Extreme Heat

The western United States is subject to extreme heat in the summer months with record temperatures found in California, Nevada and Arizona. While central air conditioning is the standard in new home construction in the west and southwest, older homes were not built and may not have been retrofitted with air conditioning. In the event of a prolonged power outage, those susceptible to extreme may suffer heat from dehydration, heat stroke and heat exhaustion requiring medical attention.



12.2 HUMAN HEALTH HAZARD PROFILE

12.2.1 Location and Extent

Placer County recognizes the potential for mosquito-borne diseases to occur within the County and has initiated a public outreach campaign. The City of Roseville actively supports this activity. The Placer WNV task force has prepared for the possible arrival of WNV the last two years through focused efforts on reducing the mosquito population and educating the public. In 2004, the voters approved extending the Mosquito Abatement District to cover the entire County.

12.2.2 Human Health Event History

State of California

Communicable Diseases

In California, there were a total of 29 cases of SARS during the worldwide outbreak with a majority of the cases being watched in Los Angeles County. Only two of the cases were confirmed as SARS. Thousands of influenza cases are diagnosed or left untreated each year in California. The flu has caused worldwide pandemics most recently in 1968, but in 1918, killed more Americans in Europe than died in World War I.

West Nile Virus

WNV was detected on a very limited basis in horses and humans in California in 2003. San Diego County reported one veterinary case; Imperial County and Riverside County each reported one human case. According to the California West Nile Virus Surveillance Information Center sponsored by the California Department of Health Services, as of November 2, 2004, a total of 737 human WNV infections have been reported in 23 counties in the State.

Extreme Heat

Extreme heat is a potential any summer in California. Data for the number of deaths due to heat conditions was not readily available.

Regional Issues

By July of 2004, WNV had arrived in Placer County. A dead western scrub jay bird discovered July 22 in Auburn tested positive for the disease. As of November 8, 2004, the California West Nile Virus Surveillance Information Center reported the virus being detected in one human, 47 birds, 26 horses, and three mosquito pools within Placer County. The first human case of WNV in Placer County was diagnosed the week of September 27, 2004. The 56-year old male patient was recovering from meningitis in a local hospital.

12.2.3 Probability of Future Human Health Occurrences

Communicable Disease

Due to the increase in air travel, growing populations, and the country's aging population, the probability of a communicable disease epidemic or pandemic is increasing. The winter 2005 influenza vaccine shortage caused by a flaw in a European manufacturer's supply also raised concerns about the protection

of at-risk populations; a nationwide public outreach campaign was launched to ensure that at-risk populations received vaccines before additional vaccine was made available to the general public.

The impact of SARS on the health workers attempting to diagnose and treat those stricken with the disease also highlighted how vulnerable populations may be if the health care community is one of the first groups in an area to become sick with a communicable disease.

West Nile Virus

To date, across the United States, the incidence rate for WNV has been the worst in its second year with impacts tapering off after that period. In Southern California, 2004 was the second year of exposure with 25 deaths reported. The Placer Mosquito Abatement District is predicting that the 2005 season in Northern California will bring more positive mosquito, equine, and human cases in Placer County and Roseville. If the national pattern holds true, the likelihood of future occurrences will continue to decrease, beginning in 2006.

Extreme Heat

Heat illnesses are a factor of the weather and in some cases technological hazards. Again, with the aging population, heat illnesses will increase with a more susceptible population.

12.3 VULNERABILITY ASSESSMENT

DMA2K requires risk assessments to include a description of the vulnerability to specific hazards and the impact on the community. A vulnerability assessment is an evaluation of the community's susceptibility to a specific hazard. It estimates the impact and describes the effect of the hazard on the community. The following sub-sections present the results of the human-health hazards assessment.

12.3.1 The Human Health Problem

West Nile Virus is spread through mosquito bites. Thus, people and livestock frequenting areas with the greatest concentration of mosquitoes, and during the times of greatest concentration, are most likely to become infected. Areas with standing water are where mosquitoes breed, and therefore are an area of higher risk. Standing water can be found along the river and creek areas of the County as well as in swimming pools, ponds, birdbaths, ditches, and old spare tires—so the risk areas could be in many locations and in differing concentrations

According to the CDC, even though last years outbreak was the largest in the country, fewer people died or had serious brain damage from the virus compared to 2002. The 9006 cases of the virus last year were more than double the 4,156 cases in 2002; however, there were only 220 deaths and 2,695 cases of severe brain damage were reported in 2003, compared to 228 deaths and 2,944 cases of severe neurological disease in 2003. Researchers think that the larger number of confirmed cases in 2003, could be due to an increase in testing and reporting compared to 2002.

Although the potential for exposure exists in Roseville during 2004, the risk should be considered in terms of adverse effects due to exposure. Roseville already has an active control program for mosquitoes due to the past concern with equine encephalitis. Also, protective measures to prevent exposure, such as wearing long sleeved clothing and using bug spray, are relatively simple and cost effective. Thus, the responsibility for protection is considered an individual responsibility. The County Health Department has undertaken a solid public education program that provides the community with the knowledge to effectively counter the risk and impact from WNV.

12.3.2 Impacts

Life, Safety, and Health

The protection of human life is the ultimate goal of the City's multi-hazard mitigation planning effort. A large outbreak or epidemic of a communicable disease or West Nile virus could have devastating effects on the population in Roseville. The city has a large elderly community with a concentration of older residents in areas such as Sun City Roseville. The introduction of a disease such as the plague or influenza could rapidly impact those most at-risk.

West Nile virus is of significant concern in 2005 with the wet winter and strong presence of the disease in local wetlands and to the west of Roseville in the flooded rice fields. The adult mosquitoes of last year will begin feeding during the warm weather in the spring of 2005 and again, a concentrated at-risk population is on the western border of the city limits very near to the rice fields where the mosquitoes breed.

Critical Facilities

Healthcare facilities (and veterinary clinics) have prepared for all of the afore-mentioned health hazards. The acute care hospitals in Roseville collaborated on a local and regional level to be able to provide immediate and comprehensive medical care to citizens of Roseville and the greater western Placer population. Emergency management planning incorporates all disciplines responding to an event, (fire agencies, law enforcement, first responder ground and air ambulance agencies, public health, mental and spiritual health). Planning includes identifying shelters, alternate treatment facilities, isolation capacity, and methods to immediately expand physical and human resources.

Structures

No impact on structures is anticipated from human health hazards.

Economic Impact

The economic impact of a human health hazard could be localized to a single population or could be significant depending on the number of cases and available resources to care for those affected. Other financial impacts are absorbed or managed by the organization affected (i.e., healthcare facilities and veterinary offices train their personnel at their own cost).

Future Trends in Development

The potential for human health hazards is not likely to slow the expected growth in Roseville. Total population including the residents of the recently annexed West Roseville area will exceed 138,000 people with another 8,000 housing units planned for this area alone. Significant non-residential development will occur as well with development of a high-rise hotel and office buildings likely in the near future. The potential for communicable diseases, vector-borne diseases or extreme heat in Roseville is not likely to lessen or prohibit development in Roseville.

12.4 REVIEW OF EXISTING PROGRAMS, PLANS AND ORDINANCES

12.4.1 Hospital Expansions to Care for Growing Populations

Kaiser Permanente Hospital in Roseville is currently planning an expansion of its Emergency Department, Women and Children's wing and Oncology services in Roseville. Sutter Roseville's expansion (nearly 200 percent expansion) will be complete in fall of 2005. The expansions will enhance both the capacity and the services offered to treat illness in Roseville and the surrounding region.

12.4.2 Memorandum of Agreement for Isolation Treatment

In addition, Sutter Roseville has a Memorandum of Agreement with the Department of Quarantine, a division of the CDC, to provide isolation treatment areas in the event of a highly contagious airborne disease (SARS or smallpox).

12.4.3 Integrated Emergency Response

It is the expectation of the Joint Commission for Accreditation of Healthcare Organizations (JCAHO) that all acute care facilities will provide for mass casualties, whether they are naturally occurring or human-caused, biologic, chemical, explosive, nuclear, radiological, or any combination of causes. JCAHO further mandates integrating all emergency response planning with local community response agencies, thereby ensuring that the community will receive the highest level of response and protection available. These planning efforts are supported by regional, state, and federal grant funding.

12.5 REVIEW OF MITIGATION ALTERNATIVES

The organizations charged with protecting human health in the City of Roseville including public safety staff, the medical providers, the Placer County Department of Public Health and the Placer Mosquito Abatement District. Human health mitigation alternatives include preventive, emergency and public information activities. No structural or resource protection activities were identified.

12.5.1 Preventive Activities

The Placer County Department of Public Health monitors trends and provides information to help county residents protect themselves from contracting communicable diseases. Information is provided to the general public via the County website and printed materials; information is also provided to at-risk populations to prevent the spread of disease.

• The City of Roseville will work with the Department of Public Health and Roseville medical providers to quickly disseminate information should a communicable disease be diagnosed in the County to prevent the spread of disease.

The Placer Mosquito Abatement District provides vector control and mosquito abatement throughout the County including the City of Roseville. The District conducts constant surveillance to locate mosquito-breeding sources and eliminate existing sources while preventing new sources. The City of Roseville appoints a Trustee to the Board to participate in policy and program decisions of the District.

• The City of Roseville will enhance its preventive activities through increased citizen and staff awareness and reporting of sources such as creeks, wetlands, and habitat as well as man-made sources. The City reports and facilitates the monitoring of natural and developed sources of for mosquito and vectors in Roseville. The City will promote

- the immediate reporting of areas within the City that may be trouble spots as well as infestations that originate outside the City's borders in nearby agricultural areas.
- The City will support the efforts of the County's West Nile virus Task Force that has planned for surveillance and abatement activities throughout the County; has mapped many of the standing water sources throughout the County and Roseville; has conducted surveillance and abatement services; and has provided public information and conducted public education in the County.

12.5.2 Property

Not applicable to human health hazard.

12.5.3 Resources

The City Community Development staff will work with the Placer Mosquito Abatement District to provide alternatives to both protect habitat and eliminate or reduce sources for mosquito and vermin breeding. This will include forwarding habitat and wetland preserve project proposals to the Placer Mosquito Abatement District staff for review and comment. Their recommendations will be incorporated into the project proposals whenever possible. The recommendations will ultimately enhance the projects and allow Placer Mosquito Abatement staff to have early notification for areas that may need surveillance or treatment.

12.5.4 Emergency Service Activities

Emergency service activities include warning methods and response to events. Program enhancements may include the following projects and programs.

- Continue emergency response training for every type of incident including an epidemic affecting multiple and at-risk populations in the City of Roseville.
- Enhance emergency notification efforts throughout the community by using the On-Line Citizen's Advisory Panel e-mail system, the Teleminder Autodial system, the City's website, Channel 14/73, video news releases, and any means possible to notify at-risk populations. Protocol for immediate notification will be established and included in future editions of the City's Emergency Response Plans.

12.5.5 Structural

Structural solutions have been identified that largely affect private and public property damage and have significant mitigation results in also protecting life and limb.

The City will support the expansion of medical facilities in the city limits to ensure that adequate staff, equipment, clinic, office, and hospital space is provided in the event of a human health emergency. Significant investment by Kaiser Permanente and Sutter Roseville Medical Center operators are under construction and will greatly enhance the health care capacity and availability in Roseville and the entire region. This will be critical should a human health emergency occur in the area.

12.5.6 Public Information Activities

Public information activities include activities that provide information to the public that will aid them in all stages of a disaster. Roseville's public information mitigation alternatives include:

- The City will continue to enhance collaborative efforts with Placer County and the Placer Mosquito Abatement District to raise public awareness of the potential for communicable diseases and West Nile virus.
- The City will enhance the current information via the Roseville website, publications, and Channel 14/73 regarding the human health hazard and ways to reduce the likelihood of an event in Roseville.