



Environmental Health

The first significant efforts to improve the health of populations came from the sanitary movement that stressed, among other things: clean and safe food, beverages, and water; protection from both natural and man-made contamination; and decent housing. Many of the efforts of the sanitary movement resulted in the interruption of communicable and infectious disease transmission. The linkage to protection from disease persists today in programs such as restaurant inspection and drinking water safety. Other efforts sought to make the environment cleaner and safer through the removal and proper disposal of garbage and industrial wastes. Still, other efforts in environmental health are concentrated on safe living and working conditions in the home, in lodging facilities, and on the job. While most of these efforts were the focus of early public health departments, many of them were eventually separated from those agencies and responsibilities were assigned to others, such as departments covering garbage disposal, provision of safe drinking water, and weed control. Today in Kansas City, multiple city agencies have responsibility for environmental programs that protect the health of residents and visitors to the community.

The *2006 Health Assessment Survey* commissioned by the Kansas City Health Department found that 27% of respondents felt that environmental services should receive the most emphasis by the Health Department.

The Centers for Disease Control and Prevention's (CDC) Environmental Public Health Tracking Network website offers information for many environmental hazards and health conditions, such as asthma, cancer, and air and water contaminants. Missouri is a participating state in this network (www.cdc.gov/Features/TrackingNetwork).

Reportable Conditions

The same city ordinances that require the reporting of infectious and communicable diseases also require the reporting of cases of injury, illness,

or death due to both environmental contaminants and weather-related health problems. For the purposes of this report, the only reportable conditions that will be discussed are heat-related illnesses and lead poisoning.

Heat-related Illness

The risk of death from natural hazards such as excessive heat, tornados, earthquakes, and other nature-driven events depend greatly on where in the United States a person lives.¹ In the Midwest, excessive heat can pose a significant risk. During July 1980, Kansas City experienced a heat wave that led to 443 reported cases of heat-related illnesses, including 75 cases of heatstroke.^{2 3} Of these 443 cases, 157 persons (35.4%) died from hyperthermia. Since that time, the Health Department has monitored weather conditions and alerted citizens when the risk of heat-related illnesses could be expected to increase. Between 2000 and 2009, 35 Kansas City residents died from heat-related illnesses (Figure 25.1). The number of persons seeking medical assistance in an emergency department or hospital for heat-related causes varies annually (Figure 25.2). The age distribution of heat-related injuries during 2009 is shown in Figure 25.3. Males accounted for more than 75% of the persons experiencing a heat-related injury.

Slightly more than half of Missouri's heat-related deaths have occurred in the urban, more

Figure 25.1. Heat-related deaths, Kansas City, MO, by year, 2000-2009

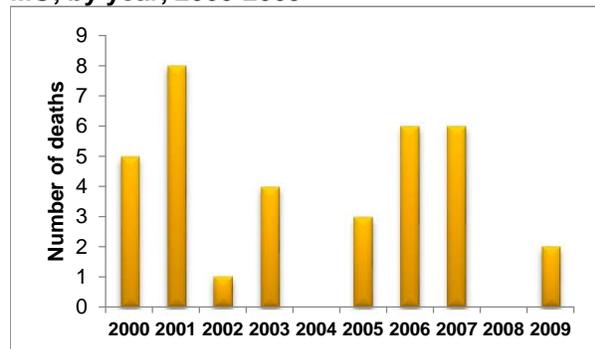


Figure 25.2. Emergency department visits and hospitalization due to hyperthermia, Kansas City, MO, 2000-2009

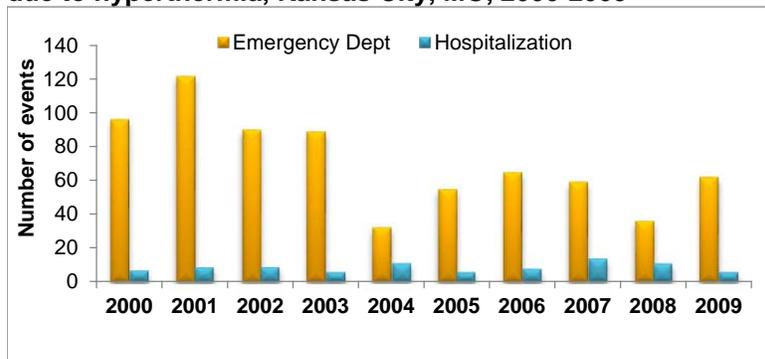
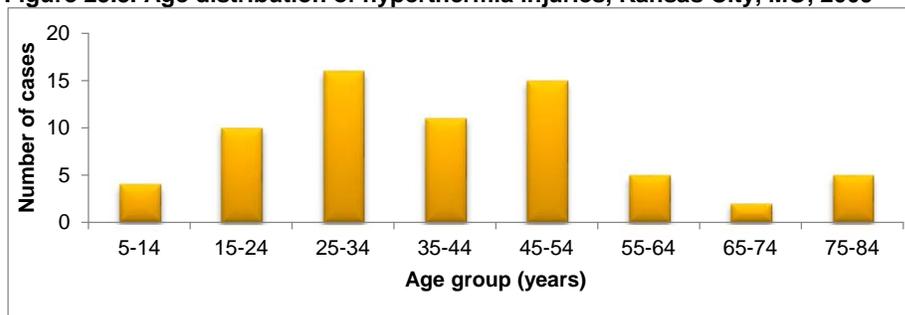


Figure 25.3. Age distribution of hyperthermia injuries, Kansas City, MO, 2009



densely populated, areas of St. Louis City, St Louis County, and Jackson County. During 1999-2003, Missouri had the 3rd highest average annual hyperthermia-related death rate (0.6 deaths per 100,000 population) in the nation behind Arizona (1.7) and Nevada (0.8).⁴ In Missouri, white males are the most frequent victims of heat-related illness resulting in death and the greatest number of deaths occur among people aged at least 65 years. On average, approximately half of the hyperthermia deaths in any given year occur in the month of July.

Lead Poisoning

Increasing amounts of lead in the body can

cause impaired neuro-behavioral development in children as well as increased blood pressure, kidney damage, and anemia among people of all ages. For children, the major sources of exposure to lead are from deteriorated lead-based paint and the resulting dust and soil contamination. In addition, uncommon sources of lead exist, including unglazed low-temperature-fired ceramic pottery, pewter drinking vessels, plumbing systems with lead-soldered joints, old paint removal, indoor gun ranges, jewelry, some imported candy, and nearby mining and smelting operations. In 2009, the prevalence of elevated blood lead levels in Missouri children aged less than 6 years was 1%.⁵

Missouri requires annual lead testing for children 6 months to 6 years of age who live in designated high risk areas and targeted screening in other zip codes. Day care centers in high risk zip codes are required to keep annual records proving that children were tested. The high risk zip codes designated in Kansas City include: 64101, 64102, 64108, 64105, 64106, 64109, 64110, 64111, 64112, 64113, 64114, 64116, 64120, 64123, 64124, 64125, 64126, 64128, 64129, 64131, 64139, 64149, 64161, and 64165. In 2009, zip code 64128 went from universal to targeted screening as the number of children tested increased and the percentage of children identified as having an elevated blood lead level decreased. In August 2009, CDC issued new testing guidance for blood lead screening of Medicaid-eligible children.⁶

The *Healthy People 2010* national objective was that no child have an elevated blood lead level. Data for Kansas City children for the period 2004-2010 are shown in Figure 25.4 and the 2010 age distribution is shown in 25.5. The distribution of children with elevated blood lead levels by zip code and the zip codes with levels exceeding the citywide average are shown in Figure 25.6. In 2007, the Lead Poisoning Prevention Program of the Kansas City Health Department estimated that 52,243 children had not been tested for lead in their blood.

of elevated blood lead levels among employed adults was 7.4 per 100,000 population. Rates are considerably higher among Missouri and Kansas workers: 36.4 per 100,000 population in Missouri and 34.0 per 100,000 population in Kansas. According to the National Institute of Occupational Safety and Health, the average blood lead level among adults in the United States is less than 3 $\mu\text{g}/\text{dL}$.

The Kansas City Health Department uses a

Figure 25.4. Percent of tested children <6 years of age who had elevated blood lead levels ($\geq 10 \mu\text{g}/\text{dL}$), Kansas City, MO, 2004-2010

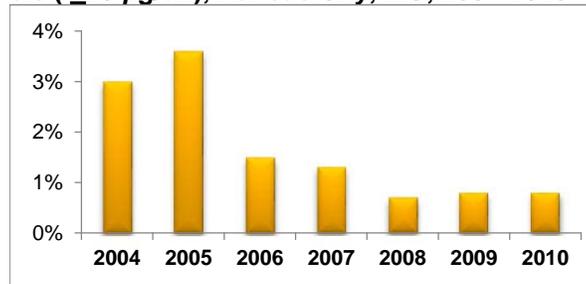


Figure 25.5. Age distribution of children with elevated blood lead levels ($\geq 10 \mu\text{g}/\text{dL}$), Kansas City, MO, 2010

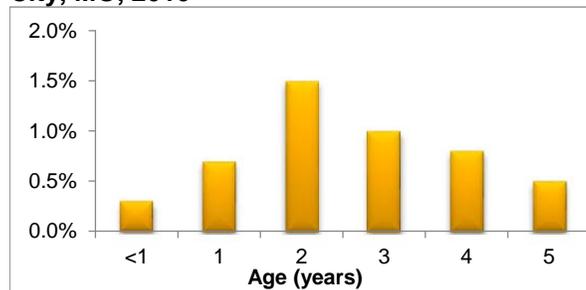
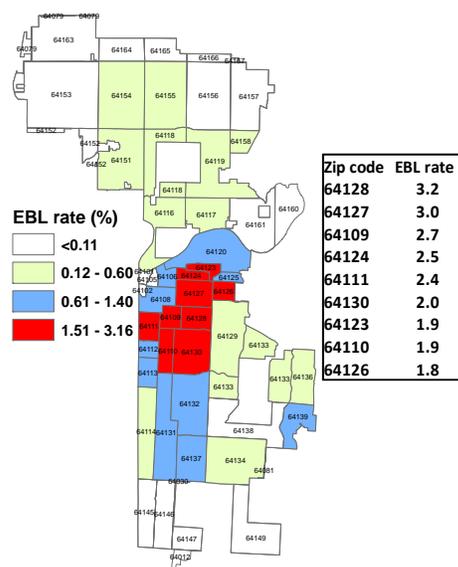
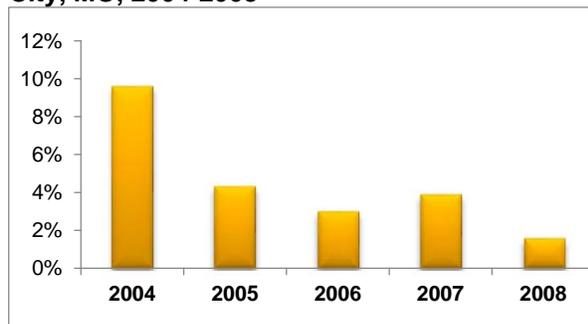


Figure 25.6. Percent of children <6 years of age with elevated blood lead levels by zip code, Kansas City, MO, 2004-2010



EBL=elevated blood lead level

Figure 25.7. Percent of tested adults with elevated blood lead levels ($\geq 10 \mu\text{g}/\text{dL}$), Kansas City, MO, 2004-2008



lower threshold for elevated blood level in adults than the value described above. It follows the recommendations of the Association of Occupational and Environmental Clinics and uses the same ≥ 10 $\mu\text{g/dL}$ standard as for children. Based on that standard, the distribution of adult elevated blood lead level among those tested appears to be declining, as shown in Figure 25.7. Studies have suggested that there is an association between lead levels in adults and memory impairment that is mediated by hypertension.⁸

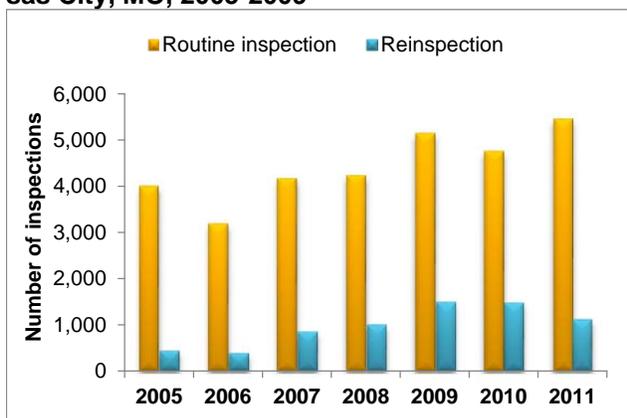
Food Protection

The Food Protection Program of the Kansas City Health Department is responsible for inspecting all food establishments including restaurants, grocery stores, convenience stores, mobile units, push carts, temporary events, school cafeterias, hospital cafeterias, food pantries, and summer food service sites. There are over 2,600 permits issued each year for food service establishments, of which approximately 10% are for temporary events. In addition, annually, there are 70 summer feeding sites.

During 2011, the Food Protection Program conducted 5,465 routine inspections of food establishments and 1,130 re-inspections (Figures 25.8). These inspections resulted in 139 permits being suspended.

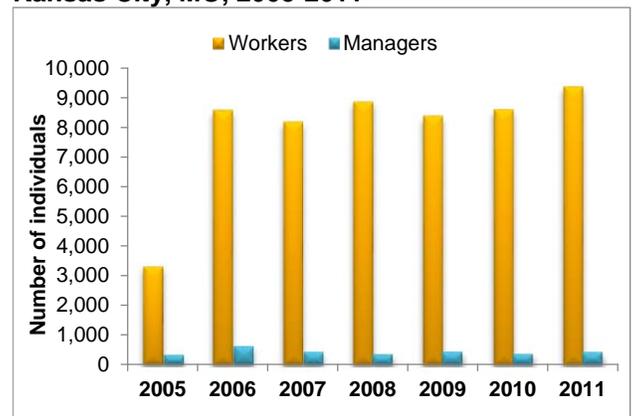
Kansas City requires that food handlers and

Figure 25.8. Food establishment inspections, Kansas City, MO, 2005-2009



food managers are properly trained and knowledgeable about food safety, foodborne illness, and food handling. They also must have a food handler card. In 2011, 9,392 food handlers and 458 food managers underwent training (Figure 25.9).

Figure 25.9. Food handler training by job category, Kansas City, MO, 2005-2011



Air Quality

The Missouri Department of Natural Resources operates the air quality monitors in the Kansas City area. The Air Quality Program of the Kansas City Health Department permits and inspects two hundred sources that emit a variety of pollutants into the metropolitan area airshed to ensure that pollution levels are kept as low as possible. In 2009, 139 notices of violation were issued.

The priority air pollutant is ozone, which has been linked to premature deaths.⁹ The EPA changed the ground level ozone standard from 84 parts per billion (ppb) averaged over eight hours to a new standard of 75 ppb averaged over eight hours. This change is expected to result in the Kansas City region losing its clean air status. The EPA is expected to classify areas that do not meet the new standard in late 2010. States will then have three years to develop regulatory plans for those areas. In response to the new standard, the State of Missouri has also placed a requirement that gasoline contain bioetha-



nol. Burning such fuel will hamper ozone reduction more than burning fuel without bioethanol.

The American Lung Association's *State of the Air: 2010* report claimed that 60% of Americans live in areas with unhealthy air pollution levels. Cass, Clay, and Jackson counties were included in the Cleanest Counties for Short-term Particle Pollution (24-hour PM_{2.5}) (www.lungusa.org). The report also estimated the number of persons at risk from air pollutants (Table 25.1).

Table 25.1 Estimated numbers of persons in Kansas City area at risk from air pollutants

Groups at risk	Clay County	Jackson County
Pediatric asthma	5,248	16,040
Adult asthma	13,378	41,929
Chronic bronchitis	6,920	21,906
Emphysema	2,548	8,517
Cardiovascular disease	56,442	183,273
Diabetes	14,045	45,483

(source: American Lung Association, *State of the Air: 2010 report*)

Data on Platte County not available.

In June 2009, the EPA released its 3rd national assessment of 181 toxic air pollutants.¹⁰ According to that report, most people in the United States have an average cancer risk of 36 in 1 million if exposed to 2002 emission levels over the course of their lifetime. In addition, 2 million people (less than 1% of U.S. population) have an increased cancer risk of greater than 100 in 1 million. The Kansas City region had a below average cancer risk. Benzene was the largest contributor to the increased cancer risks in the area.

The Air Quality Program also regulates the removal of asbestos from commercial structures and facilities. Indoor air quality issues, including enforcement of Kansas City's prohibitions on smoking, and noise complaints are handled by the Health Department's Industrial Hygiene and Safety Program.

Rat Control

The Health Department operates a Rat Control program that provides rat extermination to residents living in single family homes and duplexes as well for vacant houses, vacant lots, construction

sites, areas around blocks, and in sewers. Of the 1,039 rat complaints in 2009, 980 (94.3%) resulted in service.

Industrial Hygiene & Safety

Indoor air and noise issues are handled by the Kansas City Health Department's Industrial Hygiene and Safety program. In 2009, the program issued 150 noise permits in accordance with City's noise ordinance as well as 38 warning letters for possible violations of that ordinance. Most complaints regarding indoor air were mold-related. In addition, the program is responsible for enforcement of the smoke-free ordinance. In 2009, 9 General Ordinance Summons were issued for knowingly possessing lighted tobacco products in an enclosed public place.

Childcare & Lodging Facilities

Childcare and lodging facilities are both regulated and permitted by the State of Missouri. Under a contract from the Missouri Department of Health and Senior Services, the Community Environmental Health Program of the Kansas City Health Department inspects 379 childcare establishments and 105 lodging facilities. A total of 759 inspections of these regulated facilities were conducted in 2009.

Water Recreational Facilities

Water recreational facilities that are open to the public are permitted and inspected by the Community Environmental Health Program of the Kansas City Health Department. There are approximately 150 facilities that operate year round and 425 that operate during the spring and summer. Staff conducted 3,514 inspections of pools and spas in 2009. Water quality at swimming beaches of lakes and ponds within the city is not monitored.

Water

The Kansas City Water Services Depart-

ment is responsible for drinking water, wastewater, industrial waste, and storm water. The primary source of drinking water is the Missouri River (94%), with the balance from wells in the Missouri River aquifer. The Water Services Department processes and delivers 115 million gallons of high-quality water that exceeds all federal and state water quality standards. The Environmental Protection Agency (EPA) requires testing for more than 180 regulated compounds, yet the Kansas City Water Services Department tests for more than 300 compounds. This results in performing more than 25,000 tests monthly. There never has been a violation of contamination levels or other water quality regulations. The Water Services Department functions as a regional water provider selling water to a number of communities in both Missouri and Kansas. Thus, the quality of the water produced for the city has regional implications.

The City is served by 8 wastewater treatment plants, 5 staffed and 3 automated. These plants serve the city and some neighboring communities. The only interconnected plants are the main facility (70 million gallons per day capacity) and two smaller staffed facilities (20 million gallons per day capacity, each). The reclaimed water is purified and returned to local waterways. Some sewage sludge (biosolids) is applied to crop lands that are then leased to local farmers. This sludge meets the EPA's standards for protecting the public's health. In addition to the municipal waste water system, approximately 6,000 private septic systems exist in Kansas City.

Environmental management

Environmental issues such as garbage, trash, recycling, hazardous materials, and property abatement are handled by various city departments. The Office of Environmental Quality in the City Manager's Office ensures all city government actions are performed in an environmentally responsible manner; promoting city policies that encourage the private sector to preserve and enhancing the environment; and collaborating with public and private part-

ners on projects that preserve and enhance the environment.

Septic waste haulers are permitted and inspected annually by the Community Environmental Health Programs of the Kansas City Health Department. There were 34 septic waste haulers regulated during 2009.

Literature cited

- ¹ Borden KA, Cutter SL. Spatial patterns of natural hazards mortality in the United States. *Int J Health Geographics* 2008;7:64.
- ² Donnell HD et al. Heatstroke – United States, 1980. *MMWR Morb Mort Wkly Rep* 1981;30:277-279.
- ³ Jones TS et al. Morbidity and mortality associated with the July 1980 heat wave in St Louis and Kansas City, Mo. *J Am Med Ass* 1982;247:3327-3331.
- ⁴ Luber GE, Sanchez CA. Heat-related deaths – United States, 1999-2003. *MMWR Morb Mortal Wkly Rep* 2006;55:796-798.
- ⁵ Missouri Department of Health and Senior Services. Missouri Childhood Lead Poisoning Prevention Annual Report Fiscal Year 2009. www.dhss.mo.gov
- ⁶ Wengrovitz AM, Brown MJ. Recommendations for blood lead screening of Medicaid-eligible children aged 1-5 years: an updated approach to targeting a group at high risk. *MMWR Recomm Rep* 2009;58:RR-9.
- ⁷ Alarcon WA et al. Adult Blood Lead Epidemiology and Surveillance --- United States, 2005—2007. *MMWR Morb Mortal Wkly Rep* 2009;58:365-369.
- ⁸ Van Wijngaarden E et al. Bone lead levels are associated with measures of memory impairment in older adults. *NeuroToxicology* 2009; 4:572-580.
- ⁹ Committee on Estimating Mortality Risk Reduction Benefits from Decreasing Tropospheric Ozone Exposure, Natural Research Council. *Estimating mortality risk reduction and economic benefits from controlling ozone air pollution*. Washington: National Academies Press, 2008, 206.p.
- ¹⁰ Environmental Protection Agency. 2002 National-Scale Air Toxics Assessment. June 24, 2009. www.epa.gov/nata2002