Disabilities

Disabilities may be developmental or may result from life experiences and, in turn, may be permanent or temporary. Developmental disabilities are chronic conditions that initially manifest in persons ≤18 years old and result in impairment of physical health, mental health, cognition, speech, language, or self-care. It is estimated that the average lifetime economic costs per person are $1,014,000 for mental retardation, $921,000 for cerebral palsy, $417,000 for hearing loss, and $566,000 for vision impairment.[428]

In the United States, almost 30% of the non-institutionalized adult population had basic actions difficulty, as indicated by repearting at least some difficulty with basic movement (>20%) or sensory (13%), cognitive (3%) or emotional difficulties (3%).[429] In Missouri it is estimated that 21.4% of the adult population suffers from at least one disability with the prevalence higher among males (20.7%) being less than among females (22.0%).[430] The prevalence of disability rises with age. In the Kansas City metropolitan area, it is estimated that 20.3% of adults have at least one disability.[431] Census 2000 identified 85,046 non-institutionalized Kansas City residents ≥ 5 years of age (21.0%) who had a disability (Table 149). Of those 16-64 years of age who had a disability, 56.7% were employed.

Table 149 Disabilities by age group and employment, Kansas City, Mo, Census 2000 data

Age Group			Employment		
Age-Group	Disability	No Disability	Disability	Number	Employed 16-64 y
5-15 y	3,837	65,009	Sensory	14,025	3,525
16-20 y	4,875	22,525	Physical	35,017	7,071
21-64 y	54,899	204,125	Mental	20,072	3,855
65-74 y	9,496	17,552	Self-care	11,347	1,291
75+ y	11,939	10,477	Go-outside-home	31,379	9,403
Total	**85,046**	**319,688**	Employment	38,847	24,837

Functional limitations among Americans 55 to 84 years of age have been found to be inversely related to social class across the full spectrum of the socioeconomic gradient.[432] This did not extend

[428] Honeycutt A et al. Economic costs associated with mental retardation, cerebral palsy, hearing loss, and vision impairment – United States, 2003. *MMWR Morb Mortal Wkly Rep* 2004;53:57-59.

[429] Altman B, Berstein B. Disability and health in the United States, 2001-2005. National Center for Health Statistics, 2008. www.cdc.gov/nchs

[430] Missouri Department of Health and Senior Services. *2007 Behavioral Risk Factor Surveillance System*. www.dhss.mo.gov/BRFSS

[431] Kilmer G et al. Surveillance of certan health behaviors and conditions among states and selected local areas – Behavioral Risk Factor Surveillance System (BRFSS), United States, 2006. *MMWR Surv Summ* 2008;57:SS-7.

[432] Minkler M et al. Gradient of disability across the socioeconomic spectrum in the United States. *N Engl J Med* 2006;355:695-703.

beyond 85 years of age. Females are more likely than males to experience functional difficulties and these increase with age.[433] Obese individuals report more difficulties than overweight individuals.

Arthritis

Arthritis is the leading cause of disability in the United States.[434] There are approximately 150 conditions defined by the National Arthritis Data Work Group that are thought to represent arthritis and other rheumatic conditions.[435] The prevalence of arthritis is expected to increase (as a result of the aging population) to an estimated 67 million adults by 2030.[436] In Missouri, it is estimated there will be nearly 1.6 million persons with arthritis (or a 14% increase from the prevalence in 2005) and 631,000 persons with arthritis-attributable activity limitations in 2030.[437]

Approximately 21% of adults report having been diagnosed with arthritis[438] and 8.3% report activity limitations.[439] Women are more likely to be diagnosed with arthritis or to have chronic joint symptoms than men. Age is also important with 51% of adults ≥75 years old have been diagnosed with arthritis and 44% report chronic joint pain compared to 7% and 15%, respectively, for adults 18-44 years of age. Racial/ethnic differences have been documented in the prevalence of arthritis with Asians having the lowest prevalence. When sex and ethnicity are considered, Hispanic men and women, and non-Hispanic black men are less likely to have chronic joint symptoms than are non-Hispanic white men and women and non-Hispanic black women.

Economic impact

Arthritis accounts for 6.2% of all hospital admissions in the country and for 7.4% of admissions of persons who are overweight.[440] In addition, arthritis is the 3rd leading cause of work limitation.[441]

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[433] Ervin RB. Prevalence of functional limitations among adults 60 years of age and over: United States, 1999-2002. *Adv Data Vital Health Stat* 2006;375 (Aug 23rd). www.cdc.gov/nchs

[434] McNeil JM, Binette J. Prevalence of disabilities and associated health conditions among adults – United States, 1999. *MMWR Morb Mortal Wkly Rep* 2001;50:120-125.

[435] Centers for Disease Control and Prevention. Arthritis prevalence and activity limitations – United States, 1990. *MMWR Morb Mortal Wkly Rep* 1994;43:433-438.

[436] Hootman JM, Helmick CG. Projections of US prevelance of arthritis and associated activity limitation. *Arthritis Rheum* 2006;54:226-229.

[437] Freedman M et al. Projected state-specific increases in self-reported doctor-diagnosed arthritis and arthritis-attributable activity limitations – United States, 2005-2030. *MMWR Morb Mortal Wkly Rep* 2007;56:423-425.

[438] Pleis JR, Lethbridge-Cejku M. Summary health statistics for US adults: National Health Interview Survey 2006. *Vital Health Stat* 2007;10(235). www.cdc.gov/nchs

[439] Hootman J et al. Prevalence of doctor diagnosed arthritis and arthritis-attributable activity limitations – United States 2003-2005. *MMWR Morb Mortal Wkly Rep* 2006;55:1089-1092.

[440] Harris DM, Russell LB. Hospitalizations attributable to arthritis, smoking, and hypertension: a comparison based on NHEFS and NHANES III. *Arthritis Care Res* 2005;53:543-548.

Racial/ethnic differences have been documented in the prevalence of limitations caused by arthritis, eg non-Hispanic blacks with rheumatoid arthritis report more severe disease and more disability than non-Hispanic whites. [442] [443] Arthritis, coupled with obesity, has been proposed as the major reason for the increasing trend in total knee replacements.[444] Nearly half of US adults will develop osteoarthritis of the knee during their lifetime, 35% of those of normal weight, 44% of those overweight, and 65% of obese individuals.[445] Persons with arthritis and activity limitations are more likely to have less than a high school education or to be obese or physically inactive. Arthritis is a potential barrier to physical activity among adults with diabetes.[446]

Updated national estimates of the costs of arthritis and other rheumatic conditions are $80.8 billion in direct costs and $47 billion in indirect costs.[447] Between 1987 and 2000, medical costs in the US for arthritis rose from $5.4 to $17.9 billion.[448] Forty-four percent of the increase was attributed to increased cost per treated case, 32% to the rise in the number of treated cases, and 24% to the increasing numbers of people in the population. It is estimated that arthritis and other rheumatic conditions cost Missourians $2.8 billion annually in direct and indirect costs.[449]

Despite the increased medical costs associated with arthritis, there has been no progress nationwide towards the *Healthy People 2010* objectives related to arthritis management.[450] The three objectives focused on weight counseling, physical activity counseling, and arthritis education.

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[441] Stoddard S et al. Chartbook on work and disability in the United States, 1998. Washington DC: US National Institute on Disability and Rehabilitation Research. 1999. www.ed.gov

[442] Bolen J et al. Racial/ethnic differences in the prevalence and impact of doctor-diagnosed arthritis – United States, 2002. *MMWR Morb Mortal Wkly Rep* 2005;54:119-123.

[443] Iren Ut et al. A pilot study to determine whether disability and disease activity are different in African Americans and Caucasian patients with rheumatoid arthritis. *J Rheumatol* 2005;32:602-608.

[444] Mehrotra C et al. Trends in total knee replacement surgeries and implications for public health, 1990-2000. *Public Health Reports* 2005;120:278-282.

[445] Murphy L et al. Lifetime risk of symptomatic knee osteoarthritis. *Arthritis Care Res* 2008;59:1207-1213.

[446] Bolen J et al. Arthritis as a potential barrier to physical activity among adults with diabetes – United States, 2005 and 2007. *MMWR Morb Mortal Wkly Rep* 2008;57:486-489.

[447] Yelin E et al. National and state medical expenditures and lost earnings attributable to arthritis and other rheumatic conditions, United States 2003. *MMWR Morb Mortal Wkly Rep* 2007;56:4-7.

[448] Thorpe KE et al. Which medical conditions account for the rise in health care spending? *Health Aff* 2004;W4:437-445.

[449] Cisternas M et al. Direct and indirect costs of arthritis and other rheumatic conditions – United States, 1997. *MMWR Morb Mortal Wkly Rep* 2003;52:1124-1127.

[450] Hootman JM et al. Monitoring progress in arthritis management – United States and 25 states, 2003. *MMWR Morb Mortal Wkly Rep* 2005;54:484-488.

Missouri and Kansas City

Behavioral Risk Factor Surveillance System (BRFSS) data for Missouri found that 31.9% of respondents (28.6% of males; 34.9% of females) said they had doctor-diagnosed arthritis.Among working age adults 18-64 years of age, 10.0% reported that they had arthritis-attributable work limitations; 5.8% for those 18-44 years old and 16.7% for those 45-64 years of age.[451] Among those workers with arthritis, 41.8% claimed to have arthritis-attributable work limitations. Nationally, the state median percent of workers with arthritis who claimed arthritis-attributable work limitations was 33.0%.

In Missouri, individuals with arthritis had a higher prevalence of other chronic diseases, including cardiovascular disease, diabetes, and osteoporosis, as well as having a higher prevalence of risk factors associated with serious chronic diseases, including high blood pressure, high blood cholesterol, obesity, and physical inactivity. As a result, they perceived their physical and mental health to be poorer than those without an activity limitation.

In 1999, The Missouri Department of Health and Senior Services conducted a survey of residents in 10 core city zip codes of Kansas City (www.dhss.state.mo.us/maop). That survey found that nearly 46% of residents >45 years of age had arthritis and 29% had limitation of their regular activities. These rates were higher than the statewide prevalence for these conditions. Non-Hispanic blacks had slightly higher rates than other racial and ethnic groups in the same zip codes.

There are 7 regional arthritis centers across the state to help Missourians cope with the effect of rheumatoid illnesses. The Kansas City center is at St Luke's Hospital.

Arthritis in children

While the above discussion focused primarily on adults with arthritis, there also is the issue of arthritis in children. Estimates of arthritis in children have varied widely because it is an umbrella term for which there are many definitions and because it is a relatively uncommon condition. Recently, the Centers for Disease Control and Prevention (CDC) published on the prevalence of pediatric arthritis and the number of annual ambulatory health care visits for pediatric arthritis and other rheumatologic conditions in the US.[452] CDC estimated that 294,000 children have significant pediatric arthritis and other rheumatologic conditions (SPARC). Further, it was estimated there were 827,000 ambulatory visits each year because of SPARC, including 83,000 emergency department visits. This study and other evidence suggest that between 50,000 and 100,000 children suffer from juvenile rheumatoid arthritis, which if untreated can destroy the cartilaginous tissue that protects the joints. Without timely diagnosis, permanent joint damage can ensue.

Further, the study estimated that 5,700 children in Missouri and 2,800 in Kansas are living with

[451] Thies KA et al. State-specific prevalence of arthritis-attributable work limitation – United States, 2003. *MMWR Morb Mortal Wkly Rep* 2007;56:1045-1049.

[452] Sacks JJ et al. Prevalence of and annual ambulatory health care visits for pediatric arthritis and other rheumatologic conditions in the United States I 2001-2004. *Arthritis Care Res* 2007;57:1439-1445.

some form of arthritis. In one sense, these children are lucky because pediatric rheumatologists practice in these states, although significant distances may need to be traveled to see the physicians. According to the study, about 15,000 children with SPARC live in 11 states that do not have any pediatric rheumatologists.

A prior analysis by the Kansas City Health Department,[453] found that, between 2001 and 2005, children (0-19 years of age) living in Kansas City made 456 emergency department visits for arthritis. Non-Hispanic white children made 165 visits (36.2% of the total) while non-Hispanic black children had 218 visits (47.8% of the total). Of the 456 visits, 238 (52.2%) were made by females and 218 (47.8%) by males.

Unfortunately, the data available to the Kansas City Health Department does not permit identification of multiple visits by a single individual. Therefore, the actual number of children who made the 456 visits cannot be determined. The children making the visits came from 39 different zip codes across the City.

Hearing

The prevalence of speech-frequency hearing loss among US adults is 16.1% which is higher than prior estimates.[454] Among persons 20-29 years old, the prevalence of hearing loss was 8.5% and seems to be increasing in this age group. Odds of hearing loss were 5.5 times higher in men than women and 70% lower among blacks than whites. Increases in hearing loss prevalence occurred earlier among persons with smoking, noise exposure, and cardiovascular risks.

The National Health Interview Surveys have shown that the prevalence of fair or poor health status, difficulties with physical functioning, and serious psychological distress increased with the degree of hearing loss experienced by an individual.[455] Adults who are deaf or have a lot of trouble hearing are about 3 times as likely as adults with good hearing to be in fair or poor health and to have difficulty with physical functioning. These adults are more than 4 times as likely to experience serious psychological distress. Adults who have a little trouble hearing also have higher rates of these health problems compared with adults who considered their hearing to be good.

Diabetes and high blood pressure are more prevalent among adults who are deaf or have a lot of trouble hearing, compared with adults with good hearing.[456] These disparities are greatest among adults

[453] Office of Epidemiology & Community Health Monitoring . Arthritis in children. *Community & Hospital Letter* 2008;28:6. www.kcmo.org/health

[454] Agrawal Y et al. Prevalence of hearing loss and differences by demographic characteristics among US adults. *Arch Intern Med* 2008;168:1522-1530.

[455] Schoenborn CA, Heyman K. Health disparities among adults with hearing loss: United States, 2000-2006. *NCHS Health E-Stats* 2008. www.cdc.gov/nchs/products/pbus/pubd/hestats/hearing00-06/hearing00-06.htm

[456] Bainbridge KE et al. Diabetes and hearing impairment in the United States: audiometric evidence from the National Heath and Nutrition Examination Survey, 1999 to 2004. *Ann Intern Med* 2008;149:July

<65 years old. In addition, adults who are deaf or have a lot of trouble hearing and those who have a little trouble hearing are more likely than adults with good hearing to: (a) currently smoke cigarettes; (b) have had five or more drinks in 1 day in the past year (a proxy for at-risk drinking); (c) have engaged in no leisure-time physical activity (a measure of sedentary behavior); (d) be obese; and (e) usually sleep 6 hours or less. Analysis of differences by age reveals that disparities in health risk behavior prevalence between adults with and without hearing loss are largely concentrated among adults under age 65. Among adults aged 18-44 years, more than 40% of those who are deaf or have a lot of trouble hearing currently smoke cigarettes compared with 24% of those with good hearing. Disparities in smoking prevalence persist among middle aged adults but are not found for adults ≥65 years old.

There a many causes of hearing loss with some being genetic and others being environmental causes such as infections, head trauma, subarachnoid hemorrhage, drug toxicity, and exposure to sounds. In the United States, 17% of adults ≥18 years old have some difficulty hearing without a hearing aid.[457] Non-Hispanic white men are more likely to experience hearing problems compared to other men and women. Problems increase with age and Asian and black adults are less likely to have some form of hearing difficulty than white or Native American adults. Nineteen percent of non-Hispanic white adults have difficulties compared to 11% of non-Hispanic blacks and 10% of Hispanics.

Missouri newborn hearing screening

Genetic causes account for 50-60% of childhood hearing loss in developed countries.[458] Five of every 1,000 babies born in the US have some degree of hearing loss. Congenital hearing loss is more common than cleft lip or Downs Syndrome. Early identification of hearing loss and enrollment in appropriate intervention services during the first 6 months of life provides infants with a greater chance of developing speech and language consistent with their hearing peers. However, among children with bilateral permanent hearing loss, early detection of hearing impairment is associated only with higher scores for language and not speech in mid-childhood.[459]

With the advent of national newborn screening, the average age at which hearing loss is confirmed has dropped from 24-36 months to 2-3 months.[460] Infants in whom remediation is begun within 6 months are able to maintain language and social and emotional development that is appropriate for their physical development, in striking contrast with those whose hearing loss is first detected after 6

[457] Pleis JR, Lethbridge-Çejku M. Summary health statistics for U.S. adults: National Health Interview Survey, 2006. *NCHS Vital Health Stat* 10(235). 2007. www.cdc.gov/nchs

[458] Morton CC, Nance WE. Newborn hearing screening – a silent revolution. *N Engl J Med* 2006;354:2151-2164.

[459] Kennedy CR et al. Language ability after early detection of permanent childhood hearing impairment. *N Engl J Med* 2006;352:2131-2141.

[460] Harrison M et al. Trends in age of identification and intervention in infants with hearing loss. *Ear Hear* 2003;24:89-95.

months of age.[461]

As a result of legislation passed in 1999 (RSMo 191.925 through 191.937), beginning on the 1st of January 2002, every infant born in Missouri was required to have their hearing screened prior to discharge from an ambulatory surgical center or hospital. Follow-up of infants who missed or did not pass a final hearing screening is the responsibility of the Missouri Department of Health and Senior Services' Bureau of Genetics and Healthy Childhood.

In 2006, 79,906 newborns had their hearing screened and 3,919 (3.8%) did not pass.[462] Of 635 infants evaluated by audiologists, 44 (6.9%) were identified with a permanent hearing loss. Both the percent of newborns that did not pass their screening test and the percent identified with a hearing loss were higher than the estimated nationwide rates of 2.2% and 5.8%, respectively.[463] Newborn hearing screening data specific for Kansas City is not available.

The Newborn Hearing Screening Service Coordination Project was initiated in 2006 between the Missouri Department of Health and Senior Services and the Missouri Department of Elementary and Secondary Education. This project was implemented in the Kansas City area and links an audiologist, an educator of the deaf and hard-of-hearing or a speech language pathologist with experience with deaf or hard-of-hearing children, with the First Steps service coordinator for family interactions and service planning related to an infant diagnosed with severe to profound permanent hearing loss.

Score 1 for Health hearing screening

Children need to have their hearing periodically assessed. About 10% of children fail hearing screening tests at well-child visits, but providers neither recheck nor refer more than half of these children.[464] This is important because high school students, according to 2006 survey by the American Speech-Language Hearing Association, are more likely than adults to say they have experienced 3 of the 4 symptoms of hearing loss, namely, turning up the television or radio volume, asking people to repeat what they say during conversations, and ringing in the ears (www.zogby.com). Only 49% of high school students report not experiencing any of these symptoms compared to 63% of adults. Hearing loss was attributed to the use of personal electronic devices and head phones.

Score 1 for Health is a health promotion and disease prevention program for elementary aged children and is cosponsored by the Kansas City University of Medicine and Biosciences and the Deron Cherry Foundation. For the 2005-2006 school year the frequency of hearing referrals by grade among

[461] Yoshinaga-Itano C. Early intervention after universal neonatal hearing screening: impact on outcomes. *Mental Retard Dev Disabil Res Rev* 2003;9:79-88.

[462] Missouri Department of Health and Senior Services. *Missouri Newborn Screening. 2006 Annual Report*. 2/19/08. www.dhss.mo.gov/newbornscreeningreport2006.pdf

[463] Centers for Disease Control and Prevention. Preliminary Summary of Estimated 2006 National EHDI Data *(Version 1).* February 2008. www.cdc.gov/ncbddd/ehdi/documents/EHDI_Summ_2006_Web.pdf

[464] Halloran DR et al. Hearing screening at well-child visits. *Arch Pediatr Adolesc Med* 2005;159:949-955.

Score 1 for Health participants was highest in the lower grades: 5.3% and 5.5% in kindergarten and 1st grade, respectively, and relatively constant in grades 2 through 5, between 2.6% and 3.0%.[465]

Vision

According to the American Academy of Ophthalmology, more than 43 million Americans will develop age-related eye diseases by 2020, and the majority of those at risk are unaware (www.geteyesmart.org). The Academy's Eye-Smart campaign recommends that all adults be screened for eye disease starting at age 40 years, when symptoms and vision changes typically occur. The campaign focuses on five major eye diseases: age-related macular degeneration, cataracts, diabetic retinopathy, dry eye, and glaucoma. The Academy estimated that eye diseases cost the nation $51.4 billion annually; Medicare costs for indirect eye disease expenses were estimated at $2 billion.

The National Health Interview surveys found an estimated 19.1 million American adults ≥18 years old (9.3% of adults) have impaired vision (defined as distance visual acuity of 20/50 or worse), including 0.7 million (0.3%) with blindness.[466] Approximately 80% of these individuals could have their vision improved to 20/40 or better with refractive correction.[467] And, 3.3 million Americans ≥40 years of age (1 in 28 individuals) are blind or have low vision - a non-correctable impairment that interferes with the ability to perform everyday tasks. According to the National Eye Institute, this number is expected to rise to 5.5 million by 2020 as the baby boomer generation ages.[468] This of major concern since poor vision may speed mental decline in the elderly.[469] In addition, cataract surgery may prevent falls and fractures among the elderly.[470]

From the National Health Interview surveys, that 10% of the adult population in the US experience vision problems (defined as trouble seeing, even with glasses or contact lenses). Women are more likely than men to have vision problems and the prevalence of vision problems increases with age. Seven percent of Asian adults have some form of vision problem compared with 10% of white, 10% of black, and 17% of Native American adults. Sixteen percent of adults in poor families experienced vision problems compared with 9% of adults in families that were not poor.

The lifetime prevalence of diagnosed vision diseases is as follows: cataract, 8.6% (17 million);

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[465] Campbell A, Stering TK. *Score 1 for Health. 2007 Community Report*. www.kcumb.edu/Score1CommunityReport/

[466] Ryskulova A et al. Self-reported age-related eye diseases and visual impairment in the United States: results of the 2002 National Health Interview Survey. *Am J Public Health* 2008;98:454-461.

[467] Vitale S et al. Prevalence of visual impairment in the United States. *J Am Med Ass* 2006;295:2158-2163.

[468] The Eye Disease Prevalence Research Group. Causes and prevention of visual impairment among adults in the United States. *Arch Ophthalmol* 2004;122:477-485.

[469] Reyes-Ortiz CA et al. Near vision impairment predicts cognitive decline: data from the Hispanic Established Populations for Epidemiologic Studies of the Elderly. *J Am Geriatr Soc* 2005;53:681-686.

[470] Harwood RH et al. Falls and health status in elderly women following first eye cataract surgery: a randomized controlled trial. *Br J Ophthalmol*. 2005;89(1):53-9.

glaucoma, 2.0% (4 million), macular degeneration (1.1% (2 million); and diabetic retinopathy 0.7% (1.3 million). The prevalence of diabetic retinopathy among persons diagnosed with diabetes is 9.9%.

According to the American Optometric Association's InfantSEE Program, 1 out of every 20 infants may be at risk from abnormal vision (www.infantsee.org). CDC established 3 vision related *Healthy People 2010* objectives for children: 1) reducing visual impairment and blindness, 2) increasing the proportion of preschool children who receive vision screening, and 3) increasing the use of protective eyewear in recreational activities and hazardous situations around the home.[471]

The American Optometric Association recommendations for eye examinations for children and adults are presented in Table 150. In a health assessment survey commissioned by the Kansas City Health Department, a quarter of respondents reported not receiving routine eye care.[472] Forty-five percent of respondents received routine eye care from optometrists, 21% from ophthalmologists, 7% from community health centers, and 2% from other sources. Sixty-percent had their eyes examined within the preceding two years and 80.5% within the preceding 5 years.

Table 150 American Optometric Association recommendations for eye examinations

	Age	Frequency
Infant/Toddler	0 to 24 months	By 6 months of age
Preschooler	2 to 5 years	At 3 years of age
School age	6 to 18 years	Before 1st grade and every 2 years thereafter
Adults	19 to 40 years	Every 2 to 3 years
Adults	41 to 60 years	Every 2 years
Adults	≥61 years	Every year

Score 1 for Health vision screening

Overall 15% of *Score 1 for Health* participants had a referral for one or more uncorrected vision problems: 9% for far vision, 5% for near vision, 4% for hyperopia (plus lens), and 4% for random dot E. The frequency of vision referrals increased in the higher grade levels and the frequency by school increased with decreasing school socioeconomic status.

[471] Cotch MF, Janiszewski R. Visual impairment and use of eye-care services and protective eyewear among children – United States, 2002. *MMWR Morb Mortal Wkly Rep* 2005;54:425-429.

[472] Kansas City Health Department. 2004. *2004 Health Assessment Survey*. www.kcmo.org.