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LIFECOURSE EPIDEMIOLOGY OF ADIPOSITY & DIABETES CENTER

High Impact Journal Recognition: Diabetes Care (Impact Factor 19.112)

Increase in Prevalence of Diabetic Ketoacidosis at Diagnosis Among Youth With Type 1 Diabetes: The SEARCH for Diabetes in Youth Study

Jensen, ET; Stafford, JM; Saydah, S; D'Agostino, RB; Dolan, LM; Lawrence, JM; Marcovina, S; Mayer-Davis, EJ; Pihoker, C; Rewers, A; Dabelea, D
Diabetes Care

This research team previously reported a high (similar to 30%) but stable prevalence of diabetic ketoacidosis (DKA) at youth-onset diagnosis of type 1 diabetes (2002 and 2010). Given the changing demographics of youth-onset type 1 diabetes, the team sought to evaluate temporal trends in the prevalence of DKA at diagnosis of type 1 diabetes from 2010 to 2016 among youth. The researchers calculated prevalence of DKA within 1 month of type 1 diabetes diagnosis by year and evaluated trends over time (2010-2016) (n = 7,612 incident diabetes cases; mean [SD] age 10.1 [4.5] at diagnosis). To assess whether trends observed were attributable to the changing distribution of sociodemographic factors among youth with incident type 1 diabetes, the researchers estimated an adjusted relative risk (RR) of DKA in relation to calendar year, adjusting for age, sex, race/ethnicity, income, education, health insurance status, language, season of diagnosis, and SEARCH for Diabetes in Youth Study site. DKA prevalence increased from 35.3% (95% CI 32.2, 38.4) in 2010 to 40.6% (95% CI 37.8, 43.4) in 2016 (P-trend = 0.01). Adjustment for sociodemographic factors did not substantively change the observed trends. The researchers observed a 2% annual increase in prevalence of DKA at or near diagnosis of type 1 diabetes (crude RR 1.02 [95% CI 1.01, 1.04] and adjusted RR 1.02 [95% CI 1.01, 1.04]; P = 0.01 for both). Prevalence of DKA at or near type 1 diabetes diagnosis has increased from 2010 to 2016, following the high but stable prevalence observed from 2002 to 2010. This increase does not seem to be attributable to the changes in distribution of sociodemographic factors over time.

CENTER FOR GLOBAL HEALTH

Mortality From Respiratory Syncytial Virus in Children Under 2 Years of Age: A Prospective Community Cohort Study in Rural Maharashtra, India

Simoes, EAF; Dani, V; Potdar, V; Crow, R; Satav, S; Chadha, MS; Hessong, D; Carosone-Link, P; Palaskar, S; Satav, A
Clinical Infectious Diseases

Although respiratory syncytial virus (RSV) is the most important viral cause of lower respiratory tract infection deaths in infants, there are few data on infant community deaths caused by RSV. This was an active surveillance of children younger than 2 years of age in 93 villages, 5 primary health centers, and 3 hospitals serving these villages. Village health workers and counselors at the health facilities monitored all lower respiratory tract infections (LRTIs) in consented subjects. Children with severe, or very severe LRTIs and all who died, had nasopharyngeal swabs collected for detection of RSV by molecular methods. In the 12,134 subjects, there were 2064 episodes of severe LRTIs and 1732 of very severe LRTIs, of which 271 and 195, respectively, had RSV. Fifteen of 16 (94%) children with RSV died of LRTIs, 14 in the community and 1 in the hospital. The case fatality ratios for severe RSV LRTIs in the first 6 months of life were 3/52 (7.1%) and 1/36 (2.8%) in the community and hospital, respectively. Of those with very severe LRTIs in the community, 17.6% died. There were no very severe RSV LRTI hospital deaths. The adjusted RSV LRTI mortality rates ranged from 1.0 to 3.0/1000 child-years (CY) overall, and 2.0 to 6.1/1000 CY, accounting for 20% of the LRTI deaths and 10% of the postneonatal infant mortality. Community deaths from RSV account for the majority of RSV LRTI deaths, and efforts at prevention should be preferentially directed at populations where access to care is limited.

UNIVERSITY OF COLORADO CANCER CENTER

Association between employment status change and depression and anxiety in allogeneic stem cell transplant caregivers

Natvig, C; Mikulich-Gilbertson, SK; Laudenslager, ML; Bradley, CJ
Journal of Cancer Survivorship

Allogeneic hematopoietic stem cell transplantation (Allo-HSCT) is a demanding treatment that requires caregiver support during the first 100 days post-transplant. Little is known about the association between caregivers' employment changes and their well-being during this lengthy and challenging time when caregivers may be balancing work with caregiving responsibilities. The research team used data from employed caregivers of Allo-HSCT patients who participated in two randomized clinical trials (N = 187) of an intervention for caregivers. Caregiver depression and anxiety were assessed using the Center for Epidemiologic Studies Depression and the Spielberger State-Trait Anxiety Inventory. ANCOVA was used to measure the associations between reducing work with depression and anxiety. Caregiver's demographics and baseline employment status were controlled in the analysis along with the patient's transplant conditioning intensity. Approximately 45% of caregivers reduced hours worked following the resumption of their caregiving duties. These caregivers, on average, had 3.49 points higher depression scores than caregivers who did not report a reduction in work (p < 0.01). Similarly, these caregivers also reported, on average, 3.56 higher anxiety scores (p < 0.10). Caregivers who reduced hours worked while caregiving reported greater distress. The underlying cause of this distress deserves further investigation. Implications for Cancer Survivors Caregivers of patients diagnosed with cancer may experience considerable stress related to work discontinuation and caregiving. Interventions are needed to support caregivers who are trying to balance work and caregiving responsibilities.

Diabetes and health-related quality of life among American Indians: the role of psychosocial factors

Scarton, L; Hebert, LE; Goins, RT; Umans, JG; Jiang, LH; Comiford, A; Chen, SX; White, A; Ritter, T; Manson, SM
Quality of Life Research

Little is known about the association of psychosocial factors with health-related quality of life (HRQoL) among American Indians with type 2 diabetes (T2D). This study described functional social support, emotional support, coping, resilience, post-traumatic stress disorder, and HRQoL, among American Indians by diabetes status and, among those with diabetes, examined the association of these factors with HRQoL. Using data from the Cherokee Nation Health Survey collected between 2017 and 2019, the researchers evaluated differences in each measure of interest according to diabetes status, using t-test and Chi-squared tests of association. The research team used weighted multiple logistic regression to examine associations between multiple psychosocial factors and HRQoL among those with diabetes. Compared to individuals without diabetes, participants with diabetes rated their functional social support (4.62 vs. 4.56, respectively) and coping (2.65 vs. 2.61, respectively) slightly lower and were more likely to report ≥ 15 days of poor physical (14% vs. 26%, respectively) and mental health (14% vs. 17%, respectively) in the past month. Odds of reporting poor overall health increased more than sixfold for those who were dissatisfied/very dissatisfied with life (AOR = 6.70). Resilience scores reduced odds of reporting ≥ 15 days with poor physical health, while experiences of post-traumatic stress doubled these odds. Our study yielded insights into the risk as well as protective factors associated with diabetes outcomes in a large sample of American Indians with T2D. Researchers should design pragmatic trials that deepen understanding of preventive as well as treatment leverage through greater attention to experiences that compromise HRQoL.

Sugarcane Workweek Study: Risk Factors for Daily Changes in Creatinine

Butler-Dawson, J; Krisher, L; Dally, M; James, KA; Johnson, RJ; Jaramillo, D; Yoder, H; Johnson, EC; Pilloni, D; Asensio, C; Cruz, A; Newman, LS
Kidney International Reports

Agricultural workers laboring in thermally stressful environments are at increased risk for kidney injury and chronic kidney disease of unknown origin (CKDu), and their environmental and occupational exposures have been considered to be important risk factors. This study examined the effects of repeated kidney stress from the simultaneous strain of work and other factors experienced by workers in Guatemala during a typical workweek. The researchers collected data from 107 sugarcane workers across 7 consecutive work shifts. Data included information on daily occupational, meteorological, environmental, and lifestyle factors. The research team used multivariable linear mixed models to evaluate associations of these factors with percent change in creatinine. The team observed that increasing wet bulb globe temperature (beta = 2.5%, 95% confidence interval [CI] = 0.3%, 4.7%) and increasing diastolic blood pressure (beta = 6.2%, 95% CI = 0.9%, 11.6%) were associated with increases in creatinine across the shift, whereas consumption of water from chlorinated dormitory tanks as compared to artesian well water (beta = -17.5%, 95% CI = -29.6%, -5.4%) and increasing number of rest breaks (beta = -5.8%, 95% CI = -9.0%, -2.6%) were found to be protective against increases in creatinine. Workers reporting drinking tank water had lower concentrations of urine creatinine-corrected arsenic, lead, uranium, and glyphosate compared to workers reporting the use of well water or municipal water. These results reinforce the need to focus on preventive actions that reduce kidney injury among this worker population, including strategies to reduce heat stress, managing blood pressure, and examining water sources of workers for nephrotoxic contaminants.

Recipient of the University of Colorado Inter-Institutional Pilot Project Grant

Arsenic speciation in rice bran: Agronomic practices, postharvest fermentation, and human health risk assessment across the lifespan

Weber, AM; Baxter, BA; McClung, A; Lamb, MM; Becker-Dreps,S; Vilchez, S; Koita, O; Wieringa, F; Ryan, EP
Environmental Pollution

Arsenic (As) exposure is a global public health concern affecting millions worldwide and stems from drinking water and foods containing As. Here, the research team assessed how agronomic practices and postharvest fermentation techniques influence As concentrations in rice bran, and calculated health risks from consumption. A global suite of 53 rice brans were tested for total As and speciation. Targeted quantification of inorganic As (iAs) concentrations in rice bran were used to calculate Target Hazard Quotient (THQ) and Lifetime Cancer Risk (LCR) across the lifespan. Mean iAs was highest in Thailand rice bran samples (0.619 mg kg-1) and lowest in Guatemala (0.017 mg kg-1) rice bran samples. When comparing monosodium-methanearsonate (MSMA) treated and the Native-soil counterpart under the irrigation technique Alternate Wetting and Drying (AWD) management, the MSMA treatment had significantly higher total As (p = 0.022), and iAs (p = 0.016). No significant differences in As concentrations were found between conventional and organic production, nor between fermented and non-fermented rice bran. Health risk assessment calculations for the highest iAs-rice bran dosage scenario for adults, children and infants exceeded THQ and LCR thresholds, and LCR was above threshold for median iAs-rice bran. This environmental exposure investigation into rice bran provides novel information with food safety guidance for an emerging global ingredient.

Association Between COVID-19 Exposure and Self-reported Compliance With Public Health Guidelines Among Essential Employees at an Institution of Higher Education in the US

Nelson, TL; Fosdick, BK; Biela, LM; Schoenberg, H; Mast, S; McGinnis, E; Young, MC; Lynn, L; Fahrner, S; Nolt, L; Dihle, T; Quicke, K; Gallichotte, EN; Fitzmeyer, E; Ebel, GD; Pabilonia, K; Ehrhart, N; VandeWoude, S
JAMA Network Open

Detailed analysis of infection rates paired with behavioral and employee-reported risk factors is vital to understanding how transmission of SARS-CoV-2 infection may be exacerbated or mitigated in the workplace. Institutions of higher education are heterogeneous work units that supported continued in-person employment during the COVID-19 pandemic, providing a test site for occupational health evaluation. To evaluate the association between self-reported protective behaviors and prevalence of SARS-CoV-2 infection among essential in-person employees during the first 6 months of the COVID-19 pandemic in the US. This cross-sectional study was conducted from July 13 to September 2, 2020, at an institution of higher education in Fort Collins, Colorado. Employees 18 years or older without symptoms of COVID-19 who identified as essential in-person workers during the first 6 months of the pandemic were included. Participants completed a survey, and blood and nasal swab samples were collected to assess active SARS-CoV-2 infection via quantitative reverse transcriptase-polymerase chain reaction (qRT-PCR) and past infection by serologic testing. Self-reported practice of protective behaviors against COVID-19 according to public health guidelines provided to employees. Prevalence of current SARS-CoV-2 infection detected by qRT-PCR or previous SARS-CoV-2 infection detected by an IgG SARS-CoV-2 testing platform. The frequency of protective behavior practices and essential workers' concerns regarding contracting COVID-19 and exposing others were measured based on survey responses. Among 508 participants (305 [60.0%] women, 451 [88.8%] non-Hispanic White individuals; mean [SD] age, 41.1 [12.5] years), there were no qRT-PCR positive test results, and only 2 participants (0.4%) had seroreactive IgG antibodies. Handwashing and maskwearingwere reported frequently both atwork (480 [94.7%] and 496 [97.8%] participants, respectively) and outsidework (465 [91.5%] and 481 [94.7%] participants, respectively). Social distancing was reported less frequently at work (403 [79.5%]) than outside work (465 [91.5%]) (P <.001). Participants were more highly motivated to avoid exposures because of concern about spreading the infection to others (419 [83.0%]) than for personal protection (319 [63.2%]) (P <.001). In this cross-sectional study of essential workers at an institution of higher education, when employees reported compliance with public health practices both at and outside work, they were able to operate safely in their work environment during the COVID-19 pandemic.

COMMUNITY & BEHAVIORAL HEALTH

A cross-sectional national survey to explore the relationship between smoking and political abstention: Evidence of social mistrust as a mediator

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SSM Population Health

Smoking prevalence is well known to vary socioeconomically but has been less studied in relation to political participation. Growing evidence suggests that health disparities and political nonparticipation are intertwined, but the underlying mechanism is unclear. These researchers investigated the relationship between smoking and voter registration, testing various forms of trust as possible mediators, in U.S. national survey data collected around the 2012 presidential election. A random half (n = 9757) of adults who completed The Attitudes and Behaviors Survey on Health (TABS) in 2012 (response rate was 58.4% for landline and 24.3% for cell phone) also answered a section on voter registration, voting behavior, and trust in people and selected institutions. Multivariable logistic regression was used to examine the association between smoking and registering to vote and potential mediation by trust in people and various institutions, adjusted for covariates known to be associated with both. Analyses used design-based methods with weights to account for sampling probabilities, nonresponse, and calibration to the U.S. adult population in 2012. Compared with nonsmokers, daily smokers had significantly lower adjusted odds of being registered to vote (aOR: 0.33, 95% CI: 0.21-0.52) and higher adjusted odds of having low trust in people (aOR: 2.50, 95% CI: 1.29-4.83). Low trust in people predicted lower odds of registering to vote (aOR: 0.55, 95% CI: 0.36 to 0.84) and partially mediated the smoking-registration relationship. Lower electoral participation among daily smokers is partly attributable to lower trust in people, a factor that could also affect willingness to use cessation support resources such as quitlines. Low trust and low political participation among daily smokers may have important political and public health consequences.

EPIDEMIOLOGY

Individuals aged 1-64 years with documented congenital heart defects at healthcare encounters, five US surveillance sites, 2011-2013

Glidewell, MJ; Farr, SL; Book, WM; Botto, L; Li, JS; Soim, AS; Downing, KF; Riehle-Colarusso, T; D'Ottavio, AA; Feldkamp, ML; Khanna, AD; Raskind-Hood, CL; Sommerhalter, KM; Crume, TL
American Heart Journal

Many individuals born with congenital heart defects (CHD) survive to adulthood. However, population estimates of CHD beyond early childhood are limited in the U.S. To estimate the percentage of individuals aged 1-to-64 years at five U.S. sites with CHD documented at a healthcare encounter during a three-year period and describe their characteristics. Sites conducted population-based surveillance of CHD among 1 to 10-year-olds (three sites) and 11 to 64-year-olds (all five sites) by linking healthcare data. Eligible cases resided in the population catchment areas and had one or more healthcare encounters during the surveillance period (January 1, 2011-December 31, 2013) with a CHD-related ICD-9-CM code. Site-specific population census estimates from the same age groups and time period were used to assess percentage of individuals in the catchment area with a CHD-related ICD-9-CM code documented at a healthcare encounter (hereafter referred to as CHD cases). Severe and non-severe CHD were based on an established mutually exclusive anatomic hierarchy. Among 42,646 CHD cases, 23.7% had severe CHD and 51.5% were male. Percentage of CHD cases among 1 to 10-year-olds, was 6.36/1,000 (range: 4.33-9.96/1,000) but varied by CHD severity [severe: 1.56/1,000 (range: 1.04-2.64/1,000); non-severe: 4.80/1,000 (range: 3.28-7.32/1,000)]. Percentage of cases across all sites in 11 to 64-year-olds was 1.47/1,000 (range: 1.02-2.18/1,000) and varied by CHD severity [severe: 0.34/1,000 (range: 0.26-0.49/1,000); non-severe: 1.13/1,000 (range: 0.76-1.69/1,000)]. Percentage of CHD cases decreased with age until 20 to 44 years and, for non-severe CHD only, increased slightly for ages 45 to 64 years. CHD cases varied by site, CHD severity, and age. These findings will inform planning for the needs of this growing population.

ENVIRONMENTAL & OCCUPATIONAL HEALTH

Urine tungsten and chronic kidney disease in rural Colorado

Fox, J; Macaluso, F; Moore, C; Mesenbring, E; Johnson, RJ; Hamman, RF; James, KA

Chronic kidney disease (CKD) is a cause of global morbidity and mortality in agricultural communities. The San Luis Valley (SLV) is a rural agricultural community in southern Colorado with geographic and sociodemographic risk factors for CKD, including a water supply contaminated by heavy metals. The research team obtained pre-existing sociodemographic, clinical, and urine trace metal data for 1659 subjects from the San Luis Valley Diabetes Study, a prospective cohort study. The researchers assessed prospective associations between urine tungsten (W) and time-to-CKD using accelerated failure time models (n = 1659). Additionally, logistic models were used to assess relationships between urine W and renal injury markers (NGAL, KIM1) using Tobit regression (n = 816), as well as epidemiologically-defined CKD of unknown origin (CKDu) using multiple logistic regression (n = 620). Elevated urine W was strongly associated with decreased time-to-CKD, even after controlling for hypertension and diabetes. Depending on how CKD was defined, a doubling of urine W was associated with a 27% (95% CI 11%, 46%) to 31% (14%, 51%) higher odds of developing CKD within 5 years. The relationship between urine W and select renal injury markers was not significant, although urine NGAL was modified by diabetes status. Elevated (>95%ile) urinary W was significantly associated with CKDu (OR 5.93, 1.83, 19.21) while adjusting for known CKD risk factors. Our data suggest that increased exposure to W is associated with decreased time-to-CKD and may be associated with CKDu. Given persistence of associations after controlling for diabetes and hypertension, W may exert a primary effect on the kidney, although this needs to be evaluated further in future studies.

HEALTH SYSTEMS, MANAGEMENT & POLICY

Predicting success of resuscitative endovascular occlusion of the aorta: Timing supersedes variable techniques in predicting patient survival

Cralley, AL; Moore, EE; Scalea, TM; Inaba, K; Bulger, EM; Meyer, DE; Fox, CJ; Sauaia, A

Resuscitative endovascular occlusion of the aorta (REBOA) is used for temporary aortic occlusion of trauma patients in the management of noncompressible hemorrhage. Previous studies have focused on how to properly perform REBOA in the trauma environment to improve survival rates, but high-grade evidence defining the ideal patient population does not yet exist. This post hoc analysis of the Emergent Truncal Hemorrhage Control Study seeks to identify the most important clinical factors for physicians to consider when selecting for REBOA candidates and their potential survival following REBOA. Post hoc analysis of a large, multicenter, prospective observational study conducted at six level 1 trauma centers, 2017 to 2018, was performed. An onsite data collector documented all time points for REBOA patients since admission. Candidate predictors were demographics; injury severity; physiology preprocedure, during procedure, and postprocedure; cardiopulmonary resuscitation; and REBOA-specific variables (time to procedure, procedure-related time intervals, access site, technique, sheath size, catheter length, balloon volume, deployment zone). Predictive models for survival at three different time points along the trauma triage and REBOA process timeline (Admission, REBOA Initiation, and Postaortic Occlusion) were devised by logistic regression. Eighty-eight patients had REBOA placement. The Admission model selected age, Glasgow Coma Scale, and admission systolic blood pressure as significant predictors of survival (area under the receiver operating characteristic curve [AUROC], 0.86; 95% CI, 0.77-0.94). The REBOA Initiation and Postaortic Occlusion models selected age, Glasgow Coma Scale, and the systolic blood pressure measured just before balloon inflation as predictors for survival (AUROC, 0.87 [95% CI, 0.78-0.97] and AUROC, 0.90 [95% CI, 0.81-0.99], respectively). No REBOA procedural variables were identified as predictors of patient survival. Only patient-specific criteria of age, neurologic status, and severity of shock predicted survival. The hemodynamic stability of the patient at the time REBOA is initiated is more important than how REBOA is initiated. These findings suggest that earlier preparation for REBOA placement may be a key to improved survival.