Office of Research
colorado school of public health

MAY 2021

Publications Review 2020

2020 YEAR IN RESEARCH

In 2020, the faculty at the Colorado School of Public Health published close to 500 journal articles, covering a wide breadth of research areas. These publications reflect the broad reach and innovative spirit of the investigators that make up the research community at our school. The discoveries made through the work of our faculty promote the physical, mental, social, and environmental health of people and communities in the Rocky Mountain Region, across our nation, and globally.

This report highlights some of the many publications in 2020 from our faculty. For more information on research resources at the school, visit the Office of Research webpage.

Cathy J. Bradley, PhD
Associate Dean for Research

AREAS OF RESEARCH

- *COVID-19*

- *AMERICAN INDIAN & ALASKA NATIVE HEALTH*

- *COMMUNITY ENGAGED RESEARCH AND INTERVENTIONS*

- *ENVIRONMENTAL EPIDEMIOLOGY*

- *OCCUPATIONAL HEALTH, SAFETY & WELLNESS*

- *DATA SCIENCES*

- *CHRONIC DISEASE*

- *HEALTH POLICY*

COVID-19

Using Telehealth for Hospice Reauthorization Visits: Results of a Quality Improvement Analysis

Moore, SL; Portz, JD; Santodomingo, M; Elsbernd, K; McHale, M; Massone, J
Journal of Pain and Symptom Management
Department of Community & Behavioral Health

Increasing hospice need, a growing shortage of hospice providers, and concerns about in-person services because of coronavirus disease 2019 (COVID-19) require hospices to innovate care delivery. This project compared outcomes between hospice reauthorization visits conducted via telehealth and in person. After each visit, providers, patients, and caregivers completed telehealth acceptance surveys, and providers recorded reauthorization recommendations. Providers conducted 88 concurrent in-person and telehealth visits between June and November 2019. No statistically significant differences in reauthorization recommendations were found between telehealth and in-person visits. Satisfaction with telehealth was high; 88% of patients/caregivers and 78% of providers found telehealth services as effective as in-person visits. Results indicate that telehealth can successfully support clinical decision making for hospice reauthorization. These findings show telehealth to be reliable and acceptable for certain types of hospice care even before COVID-19, which emphasizes its importance both during and after the current public health emergency.

AMERICAN INDIAN & ALASKA NATIVE HEALTH

Promising Practices for Promoting Health Equity Through Rigorous Intervention Science with Indigenous Communities

Whitesell, NR; Mousseau, A; Parker, M; Rasmus, S; Allen, J
Prevention Science
Centers for American Indian and Alaska Native Health

Research in indigenous communities is at the forefront of innovation currently influencing several new perspectives in engaged intervention science. This is innovation born of necessity, involving efforts to create health equity complicated by a history of distrust of research. Immense diversity across indigenous cultures, accompanied by variation in associated explanatory models, health beliefs, and health behaviors, along with divergent structural inequities add further complexity to this challenge. The aim of this Supplemental Issue on Promoting Health Equity through Rigorous, Culturally Informed Intervention Science: Innovations with Indigenous Populations in the United States is to highlight the promising new approaches and perspectives implemented by a group of engaged researchers and their community partners, as they seek to move intervention research forward within indigenous communities. Case studies presented are from projects led by members of the National Institutes of Health Intervention Research to Improve Native American Health (IRINAH) consortioum, investigators who conduct health promotion and disease prevention research among American Indians, Alaska Natives, and Native Hawaiians. The promising practices profiled include new strategies in (a) community partnerships, engagement, and capacity building; (b) integration of indigenous and academic perspectives; (c) alignment of interventions with indigenous cultural values and practices; and (d) implementation and evaluation of multilevel interventions responsive to complex cultural contexts. The IRINAH projects illustrate the evolution of an intervention science responsive to the needs, realities, and promise of indigenous communities, with application to health research among other culturally distinct health inequity groups.

Association of Marijuana, Mental Health, and Tobacco in Colorado
Stewart, SB; Bhatia, D; Burns, EK; Sakai, JT; Martin, LF; Levinson, AH; Vaughn, AM; Li, YQ; James, KA
Journal of Addiction Medicine
Department of Environmental & Occupational Health

Marijuana's evolving legality may change marijuana use patterns in adults. Co-use of marijuana and tobacco are strongly associated, and populations with mental health disorders are disproportionately likely to use either substance, but neither association has been assessed in the context of legal recreational marijuana. We assessed the associations of tobacco smoking with marijuana use and with mental health disorders in Colorado in 2015. Data came from a population-based survey of adults (n = 8023). Multiple logistic regressions were used with current tobacco smoking as the primary outcome. Past 30-day marijuana use and mental health status were the independent variables of interest. Covariates included age, sex, ethnicity, poverty level, and education. Adults who used marijuana in the past 30 days had 3.4 (95% confidence interval [CI] 2.7, 4.2) greater odds of currently smoking tobacco compared to adults who had not recently used marijuana, after adjusting for sociodemographic and economic factors. A mental health disorder was independently associated with tobacco smoking (adjusted odds ratio [OR] 1.7, 95% CI 1.4, 2.1). Prevalence of co-use among adults self-reporting a mental health disorder was significantly higher compared those without a mental health disorder (11.1% vs 4.3%; P < 0.0001). This study examined the associations between mental health, marijuana use, and tobacco smoking after the legalization of recreational marijuana in Colorado. Adults using marijuana and/or self-reporting a mental health disorder were more likely to smoke tobacco and should be targeted for cessation interventions.

Self-Reported and Diagnosed Depression in Rural Colorado: Findings from the San Luis Valley Community Health Survey
Bergling, E; Leiferman, J; Garcia, R; Puma, JE
Journal of Healthcare for the Poor and Underserved
Department of Community & Behavioral Health

To gain a better understanding of depression in a rural community, survey results were used to compare differences in self-reported depressive symptoms and medical professional diagnosed depression among demographic groups. A chi-square test of independence was performed to examine relationships among the depression-related variables. Logistic regression analyses were also performed to ascertain the effects of demographic characteristics and social support on depression. A statistically significant association was found between the two depression-related variables (X-2 =145.17, P <.001). Income was significantly associated with both depression-related variables. Hispanic ethnicity, higher income, and some high school education were associated with decreased odds of self-reported medically diagnosed depression. Those reporting no or some social support had increased odds of both depression-related variables compared with those who reported always having social support. These findings provide a better understanding of depression in a rural community and may inform future public health interventions

ENVIRONMENTAL EPIDEMIOLOGY

Prenatal Exposure to Per- and Polyfluoroalkyl Substances, Umbilical Cord Blood DNA Methylation, and Cardio-Metabolic Indicators in Newborns: The Healthy Start Study

Starling, AP; Liu, CN; Shen, GN; Yang, IV; Kechris, K; Borengasser, SJ; Boyle, KE; Zhang, WM; Smith, HA; Calafat, AM; Hamman, RF; Adgate, JL; Dabelea, D
Environmental Health Perspectives
Department of Epidemiology, Lifecourse Epidemiology of Adiposity & Diabetes Center

Per- and polyfluoroalkyl substances (PFAS) are environmentally persistent chemicals widely detected in women of reproductive age. Prenatal PFAS exposure is associated with adverse health outcomes in children. We hypothesized that DNA methylation changes may result from prenatal PFAS exposure and may be linked to offspring cardio-metabolic phenotype. We estimated associations of prenatal PFAS with DNA methylation in umbilical cord blood. We evaluated associations of methylation at selected sites with neonatal cardio-metabolic indicators. Among 583 mother-infant pairs in a prospective cohort, five PFAS were quantified in maternal serum (median 27 wk of gestation). Umbilical cord blood DNA methylation was evaluated using the Illumina HumanMethylation450 array. Differentially methylated positions (DMPs) were evaluated at a false discovery rate oFDRthorn <0.05 and differentially methylated regions (DMRs) were identified using comb-p (Sidak-adjusted $p < 0.05$). We estimated associations between methylation at candidate DMPs and DMR sites and the following outcomes: newborn weight, adiposity, and cord blood glucose, insulin, lipids, and leptin. Maternal serum PFAS concentrations were below the median for females in the U.S. general population. Moderate to high pairwise correlations were observed between PFAS concentrations (rho = 0.28 - 0.76). Methylation at one DMP (cg18587484), annotated to the gene TJAP1, was associated with perfluorooctanoate (PFOA) at FDR < 0.05. Comb-p detected between 4 and 15 DMRs for each PFAS. Associated genes, some common across multiple PFAS, were implicated in growth (RPTOR), lipid homeostasis (PON1, PON3, CIDEB, NR1H2), inflammation and immune activity (RASL11B, RNF39), among other functions. There was suggestive evidence that two PFAS-associated loci (cg09093485, cg09637273) were associated with cord blood triglycerides and birth weight, respectively (FDR < 0.1). DNA methylation in umbilical cord blood was associated with maternal serum PFAS concentrations during pregnancy, suggesting potential associations with offspring growth, metabolism, and immune function. Future research should explore whether DNA methylation changes mediate associations between prenatal PFAS exposures and child health outcomes.

Creatinine Fluctuations Forecast Cross-Harvest Kidney Function Decline Among Sugarcane Workers in Guatemala

Dally, M; Butler-Dawson, J; Johnson, RJ; Krisher, L; Jaramillo, D; Newman, KL; Newman, LS
Kidney International Reports
Center for Health, Work & Environment

Chronic kidney disease of unknown origin (CKDu) is an epidemic that disproportionately affects young agriculture workers in hot regions. It has been hypothesized that repeated acute kidney injury (AKI) may play a role in the development of disease. Latent class mixed models were used to identify groups of Guatemalan sugarcane harvesters based on their daily changes in creatinine over 6 consecutive days in 2018. Exponential smoothing state space models were used to forecast end-of-season creatinine between the identified groups. Percent change in estimated glomerular filtration rate (eGFR) across the harvest was compared between groups. Twenty-nine percent (n = 30) of the 103 workers experienced repeated severe fluctuations in creatinine across shift. The model with multiplicative error, multiplicative trend, and multiplicative seasonality was able to accurately forecast end-of-season creatinine in the severe group (mean percentage error [MPE]: -4.7%). eGFR of workers in the severe group on average decreased 20% across season compared to 11% decline for those in the moderate group (95% confidence interval for difference: -17% to 0%). Daily fluctuations in creatinine can be used to forecast end-of-season creatinine in sugarcane harvesters. Workers who experience repeat severe daily fluctuations in creatinine, on average, experience a greater reduction in kidney function across the season.

Change in frontline supervisors' safety leadership practices after participating in a leadership training program: Does company size matter?

Schwatka, NV; Goldenhar, LM; Johnson, SK
Journal of Safety Research
Department of Environmental & Occupational Health

The majority of construction companies are small businesses and small business often lack the resources needed to ensure that their supervisors have the safety leadership skills to build and maintain a strong jobsite safety climate. The Foundations for Safety Leadership (FSL) training program was designed to provide frontline leaders in all sized companies with safety leadership skills. This paper examines the impact of the FSL training by size of business. Leaders, defined as foremen or other frontline supervisors, from small, medium, and large construction companies were recruited to participate in a study to evaluate the degree to which the FSL changed their understanding and use of the leadership skills, safety practices and crew reporting of safety-related conditions. We used linear mixed modeling methods to analyze pre-post training survey data. Prior to the training, leaders from small and medium sized companies reported using safety leadership skills less frequently than those from large ones. After the training, regardless of business size, we observed that the FSL training improved leaders understanding of safety leadership skills from immediately before to immediately after the training. Additionally, leaders reported greater use of safety leadership skills, safety practices, and crew reporting of safety-related conditions from before to two-weeks after the training. However, those from small and medium sized companies reported the greatest improvement in their use of safety leadership skills. The FSL training improves safety leadership outcomes regardless of the size company for which the leader worked. However, the FSL may be even more effective at improving the safety leadership skills of leaders working for smaller sized construction companies or those with lower baseline levels of safety leadership skills.

DATA SCIENCES

A hybrid approach to record linkage using a combination of deterministic and probabilistic methodology

Ong, TC; Duca, LM; Kahn, MG; Crume, TL
Journal of the American Medical Informatics Association
Department of Epidemiology

The disjointed healthcare system and the nonexistence of a universal patient identifier across systems necessitates accurate record linkage (RL). We aim to describe the implementation and evaluation of a hybrid record linkage method in a statewide surveillance system for congenital heart disease. Clear-text personally identifiable information on individuals in the Colorado Congenital Heart Disease surveillance system was obtained from 5 electronic health record and medical claims data sources. Two deterministic methods and 1 probabilistic RL method using first name, last name, social security number, date of birth, and house number were initially implemented independently and then sequentially in a hybrid approach to assess RL performance. 16 480 nonunique individuals with congenital heart disease were ascertained. Deterministic linkage methods, when performed independently, yielded 4505 linked pairs (consisting of 2 records linked together within or across data sources). Probabilistic RL, using 3 initial characters of last name and gender for blocking, yielded 6294 linked pairs when executed independently. Using a hybrid linkage routine resulted in 6451 linkages and an additional 18%-24% correct linked pairs as compared to the independent methods. A hybrid linkage routine resulted in higher recall and F-measure scores compared to probabilistic and deterministic methods performed independently. The hybrid approach resulted in increased linkage accuracy and identified pairs of linked record that would have otherwise been missed when using any independent linkage technique. When performing RL within and across disparate data sources, the hybrid RL routine outperformed independent deterministic and probabilistic methods.

CHRONIC DISEASE

Financial Presentation of Alzheimer Disease and Related Dementias

Nicholas, LH; Langa, KM; Bynum, JPW; Hsu, JW
JAMA Internal Medicine
Department of Health Systems, Management & Policy

Deteriorating financial capabilities are among the earliest signs of cognitive decline, but the frequency and extent of adverse financial events before and after diagnosis have not been characterized. The objective of this study is to describe the financial presentation of ADRD using administrative credit data. This retrospective secondary data analysis of consumer credit report outcomes from 1999 to 2018 linked to Medicare claims data included 81 364 Medicare beneficiaries living in single-person households. The exposures in this study were the occurrence of adverse financial events in those with vs without ADRD diagnosis and time of adverse financial event from ADRD diagnosis. The main outcomes and measures were missed payments on credit accounts (30 or more days late) and subprime credit scores. Overall, 54 062 (17 890 [33.1%] men; mean [SD] age, 74 [7.3] years) were never diagnosed with ADRD during the sample period and 27 302 had ADRD for at least 1 quarter of observation (8573 [31.4%] men; mean [SD] age, 79.4 [7.5] years). Single Medicare beneficiaries diagnosed with ADRD were more likely to miss payments on credit accounts as early as 6 years prior to diagnosis compared with demographically similar beneficiaries without ADRD (7.7% vs 7.3%; absolute difference, 0.4 percentage points [pp]; 95% CI, 0.07-0.70:) and to develop subprime credit scores 2.5 years prior to diagnosis (8.5% vs 8.1%; absolute difference, 0.38 pp; 95% CI, 0.04-0.72). By the quarter after diagnosis, patients with ADRD remained more likely to miss payments than similar beneficiaries who did not develop ADRD (7.9% vs 6.9%; absolute difference, 1.0 pp; 95% CI, 0.67-1.40) and more likely to have subprime credit scores than those without ADRD (8.2% vs 7.5%; absolute difference, 0.70 pp; 95% CI, 0.34-1.1). Adverse financial events were more common among patients with ADRD in lower-education census tracts. The patterns of adverse events associated with ADRD were unique compared with other medical conditions (eg, glaucoma, hip fracture). Alzheimer disease and related dementias were associated with adverse financial events years prior to clinical diagnosis that become more prevalent after diagnosis and were most common in lower-education census tracts. This cohort study examines the financial presentation of Alzheimer disease and related dementia using administrative credit data.

Cannabis Use Is Associated With Increased Risk for Diabetic Ketoacidosis in Adults With Type 1 Diabetes: Findings From the T1D Exchange Clinic Registry

Kinney, GL; Akturk, HK; Taylor, DD; Foster, NC; Shah, VN
Diabetes Care
Department of Epidemiology

We examined the frequency of diabetic ketoacidosis (DKA) in cannabis users compared with nonusers in the T1D Exchange clinic registry (T1DX). The association between cannabis use by total substance score for cannabis (TSC) and DKA in the past 12 months was examined using a logistic regression model adjusted for potential confounders among adults in the T1DX. Of 932 adults with type 1 diabetes, 61 had a TSC >4, which classified them as moderate cannabis users. Adjusting for sex, age at study visit, and HbA(1c), cannabis use was associated with a twofold increase in risk for DKA among adults with type 1 diabetes (odds ratio 2.5 [95% CI 1.0-5.9]). Cannabis use was associated with an increased risk for DKA among adults in the T1DX. Providers should inform their patients of the potential risk of DKA with cannabis use.

Dalcetrapib Reduces Risk of New-Onset Diabetes in Patients With Coronary Heart Disease

Schwartz, GG; Leiter, LA; Ballantyne, CM; Barter, PJ; Black, DM; Kallend, D; Laghrissi-Thode, F; Leitersdorf, E; McMurray, JJV; Nicholls, SJ; Olsson, AG; Preiss, D; Shah, PK; Tardif, JC; Kittelson, J
Diabetes Care
Department of Biostatistics & Informatics

Incident type 2 diabetes is common among patients with recent acute coronary syndrome and is associated with an adverse prognosis. Some data suggest that cholesteryl ester transfer protein (CETP) inhibitors reduce incident type 2 diabetes. We compared the effect of treatment with the CETP inhibitor dalcetrapib or placebo on incident diabetes in patients with recent acute coronary syndrome. In the dal-OUTCOMES trial, 15,871 patients were randomly assigned to treatment with dalcetrapib 600 mg daily or placebo, beginning 4-12 weeks after an acute coronary syndrome. Absence of diabetes at baseline was based on medical history, no use of antihyperglycemic medication, and hemoglobin A(1c) and serum glucose levels below diagnostic thresholds. Among these patients, incident diabetes after randomization was defined by any diabetes-related adverse event, new use of antihyperglycemic medication, hemoglobin A(1c) >= 6.5%, or a combination of at least two measurements of serum glucose >= 7.0 mmol/L (fasting) or >= 11.1 mmol/L (random). At baseline, 10,645 patients (67% of the trial cohort) did not have diabetes. During a median follow-up of 30 months, incident diabetes was identified in 403 of 5,326 patients (7.6%) assigned to dalcetrapib and in 516 of 5,319 (9.7%) assigned to placebo, corresponding to absolute risk reduction of 2.1%, hazard ratio of 0.77 (95% CI 0.68-0.88; P < 0.001), and a need to treat 40 patients for 3 years to prevent 1 incident case of diabetes. Considering only those with prediabetes at baseline, the number needed to treat for 3 years to prevent 1 incident case of diabetes was 25. Dalcetrapib also decreased the number of patients who progressed from normoglycemia to prediabetes and increased the number who regressed from diabetes to no diabetes. In patients with a recent acute coronary syndrome, incident diabetes is common and is reduced substantially by treatment with dalcetrapib.

CHRONIC DISEASE: OBESITY

Sex-Specific Metabolite Biomarkers of NAFLD in Youth: A Prospective Study in the EPOCH Cohort

Perng, W; Francis, EC; Smith, HA; Carey, J; Wang, DQ; Kechris, KM; Dabelea, D
Journal of Clinical Endocrinology & Metabolism
Department of Epidemiology, Lifecourse Epidemiology of Adiposity & Diabetes Center

Nonalcoholic fatty liver disease (NAFLD) is the leading cause of chronic liver disease in developed nations. There are currently no accurate biomarkers of NAFLD risk in youth. Our objective was to identify sex-specific metabolomics biomarkers of NAFLD in a healthy cohort of youth. This prospective study included 395 participants of the EPOCH cohort in Colorado, who were recruited 2006-2009 (T1 visit) and followed for 5 years (T2 visit). We entered 767 metabolites measured at T1 into a reduced rank regression model to identify the strongest determinants of hepatic fat fraction (HFF) at T2, separately for boys and girls. We compared the capacity of metabolites versus conventional risk factors (overweight/obesity, insulin, alanine transaminase, aspartate transaminase) to predict NAFLD (HFF >= 5%) and high HFF (fourth vs first quartile) using area under the receiver operating characteristic curve (AUC). Prevalence of NAFLD was 7.9% (8.5% of boys, 7.1% of girls). Mean +/- SD HFF was 2.5 +/- 3.1%. We identified 13 metabolites in girls and 10 metabolites in boys. Metabolites were in lipid, amino acid, and carbohydrate metabolism pathways. At T1, the metabolites outperformed conventional risk factors in prediction of high HFF but not NAFLD. At T2, the metabolites were superior to conventional risk factors as predictors of high HFF (AUC for metabolites vs conventional risk factors for boys: 0.9565 vs 0.8851, P = 0.02; for girls: 0.9450 vs 0.8469, P = 0.02) with similar trends for NAFLD, although the differences were not significant. The metabolite profiles identified herein are superior predictors of high HFF when assessed 5 years prior and concurrently in a general-risk setting.

CHRONIC DISEASE: CANCER

Factors Associated With Use of High-Cost Agents for the Treatment of Metastatic Non-Small Cell Lung Cancer

Bradley, CJ; Eguchi, M; Perraillon, MC
Journal of the National Cancer Institute
Department of Health Systems, Management & Policy, University of Colorado Cancer Center

Antineoplastic agents approved in recent decades are a marked advancement in cancer treatment, but they come at considerable cost. These drugs may widen survival disparities between patients who receive these agents and those who do not. We examine factors associated with the use of high-cost antineoplastic agents for the treatment of metastatic non-small cell lung cancer. We conducted a retrospective observational study using 2007-2015 Surveillance, Epidemiology, and End-Results-Medicare data supplemented with the Area Health Resource File. Patients were aged 66 years and older, were enrolled in fee-for-service Medicare Part D, were diagnosed with a first primary diagnosis of metastatic non-small cell lung cancer, and had received an antineoplastic agent. High-cost agents were defined as agents costing $5000 or more per month. Independent variables include race/ethnicity, urban or rural residency, census tract poverty, and treatment facility type (eg, National Cancer Institute designation). Patients who lived in areas of high poverty were 4 percentage points less likely to receive high-cost agents (two-sided P < .001). Patients who were not treated at a National Cancer Institute-designated center were 10 percentage points less likely to receive these agents (two-sided P < .001). A 27 percentage-point increase in the likelihood of receiving a high-cost agent was observed in 2015, as compared to 2007, highlighting the rapid change in practice patterns (two-sided P < .001). Potential policy and care delivery solutions involve outreach and support to community physicians who treat patients in remote areas. We estimate that widespread use of these agents conservatively cost approximately $3 billion per year for the treatment of metastatic non-small cell lung cancer alone.

CHRONIC DISEASE: CARDIOVASCULAR

Population-level surveillance of congenital heart defects among adolescents and adults in Colorado: Implications of record linkage

Crume, TL; Duca, LM; Ong, T; Kraus, E; Scott, K; Khanna, A; Kao, D; Rausch, CM; McKenzie, L; Daley, MF; Coleman, S; Kahn, MG; Costa, E; Davidson, AJ
American Heart Journal
Department of Epidemiology

The objective was to describe the design of a population-level electronic health record (EHR) and insurance claims-based surveillance system of adolescents and adults with congenital heart defects (CHDs) in Colorado and to evaluate the bias introduced by duplicate cases across data sources. The Colorado CHD Surveillance System ascertained individuals aged 11-64 years with a CHD based on International Classification of Diseases, Ninth Revision, Clinical Modification diagnostic coding between 2011 and 2013 from a diverse network of health care systems and an All Payer Claims Database (APCD). A probability-based identity reconciliation algorithm identified duplicate cases. Logistic regression was conducted to investigate bias introduced by duplicate cases on the relationship between CHD severity (severe compared to moderate/mild) and adverse outcomes including all-cause mortality, inpatient hospitalization, and major adverse cardiac events (myocardial infarction, congestive heart failure, or cerebrovascular event). Sensitivity analyses were conducted to investigate bias introduced by the sole use or exclusion of APCD data. A total of 12,293 unique cases were identified, of which 3,476 had a within or between data source duplicate. Duplicate cases were more likely to be in the youngest age group and have private health insurance, a severe heart defect, a CHD comorbidity, and higher health care utilization. We found that failure to resolve duplicate cases between data sources would inflate the relationship between CHD severity and both morbidity and mortality outcomes by -15%. Sensitivity analyses indicate that scenarios in which APCD was excluded from case finding or relied upon as the sole source of case finding would also result in an overestimation of the relationship between a CHD severity and major adverse outcomes. Aggregated EHR- and claims-based surveillance systems of adolescents and adults with CHD that fail to account for duplicate records will introduce considerable bias into research findings. Population-level surveillance systems for rare chronic conditions, such as congenital heart disease, based on aggregation of EHR and claims data require sophisticated identity reconciliation methods to prevent bias introduced by duplicate cases.

Public Health Systems and Social Services: Breadth and Depth of Cross-Sector Collaboration

Hamer, MK; Mays, GP
American Journal of Public Health
Department of Health Systems, Management & Policy

The objective of this study was to examine the extent to which social service organizations participate in the organizational networks that implement public health activities in US communities, consistent with recent national recommendations. Using data from a national sample of US communities, we measured the breadth and depth of engagement in public health activities among specific types of social and community service organizations. Engagement was most prevalent (breadth) among organizations providing housing and food assistance, with engagement present in more than 70% of communities. Engagement was least prevalent among economic development, environmental protection, and law and justice organizations (less than 33% of communities). Depth of engagement was shallow and focused on a narrow range of public health activities. Cross-sector relationships between public health and the housing and food sectors are now widespread across the United States, giving most communities viable avenues for addressing selected social determinants of health. Relationships with many other social and community service organizations are more limited. Public health leaders should prioritize opportunities for engagement with low-connectivity social sectors in their communities such as law, justice, and economic development.

Water lead exposure risk in Flint, Michigan after switchback in water source: Implications for lead service line replacement policy

Zahran, S; Mushinski, D; McElmurry, SP; Keyes, C
Journal of Clinical Endocrinology & Metabolism
Colorado State University, Department of Economics

In February of 2016, the City of Flint, Michigan commenced the FAST start initiative with the aim to get the lead out of Flint by replacing lead and galvanized steel service lines throughout the city. An estimated 29,100 parcels are scheduled for service line replacement (SLR) at an expected cost of $172 million. The lead exposure benefits of SLR are evaluated by analyzing Sentinel data on hundreds of repeatedly sampled homes in Flint from February 16, 2016 to July 21, 2017, comparing water lead (WL) in homes with and without lead service lines. Samples taken from homes with lead service lines were significantly more likely to exceed specified thresholds of WL than homes without lead service lines. Second, regardless of service line material type, sampled homes experienced significant reductions in WL with elapsed time from Flint's switchback to water provided by the Detroit Water and Sewage Department. Third, the risk of exceedance of WL > 15 mu g/L was uncorrelated with service line material type. These results are robust to sample restrictions, period stratification, time operations, reference group definitions, and statistical modeling procedures. On the question of what is gained from SLR over optimal corrosion control techniques, we simulated age-specific lead uptake (mu g/day) and blood lead levels (mu g/dL) for children in Flint at 16 and 90 weeks of elapsed time from Flint's switchback to Detroit water. At 90 weeks from the switchback in water source, the quantity of water lead consumed by children in homes with lead service lines decreased 93%, as compared to 16 weeks. Lead exposure benefits of SLR have declined in time, with modest differences in lead uptake across homes with different service lines. In light of results, policy considerations for Flint and nationwide are discussed.