Office of Research
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Publication Highlights

CENTERS FOR AMERICAN INDIAN & ALASKA NATIVE HEALTH

High Impact Journal Recognition: JAMA Psychiatry (Impact Factor: 25.8)

Rural-Urban Disparities in Video Telehealth Use During Rapid Mental Health Care Virtualization Among American Indian/Alaska Native Veterans

Kusters, Isabelle S.; Amspoker, Amber B.; Frosio, Kristen; Day, Stephanie C.; Day, Giselle; Ecker, Anthony; Hogan, Julianna; Lindsay, Jan A.; Shore, Jay
JAMA Psychiatry

American Indian/Alaska Native (AI/AN) veterans experience a high risk for health inequities, including mental health (MH) care access. Rapid virtualization of MH care in response to the COVID-19 pandemic facilitated care continuity across the Veterans Health Administration (VHA), but the association between virtualization of care and health inequities among AI/AN veterans is unknown. To examine differences in video telehealth (VTH) use for MH care between AI/AN and non-AI/AN veterans by rurality and urbanicity. In this cohort study, VHA administrative data on VTH use among a veteran cohort that received MH care from October 1, 2019, to February 29, 2020 (prepandemic), and April 1 to December 31, 2020 (early pandemic), were examined. At least 1 outpatient MH encounter during the study period. The main outcome was use of VTH among all study groups (ie, AI/AN, non-AI/AN, rural, or urban) before and during the early pandemic. AI/AN veteran status and rurality were examined as factors associated with VTH utilization through mixed models.

Of 1754 311 veterans (mean [SD] age, 54.89 [16.23] years; 85.21% male), 0.48% were rural AI/AN; 29.04%, rural non-AI/AN; 0.77%, urban AI/AN; and 69.71%, urban non-AI/AN. Before the pandemic, a lower percentage of urban and non-AI/AN veterans used VTH. During the early pandemic period, a greater percentage of urban and non-AI/AN veterans used VTH. There was a significant interaction between rurality and AI/AN status during the early pandemic. Urban veterans used VTH more than rural veterans, especially AI/AN veterans.

In this cohort study, although rapid virtualization of MH care was associated with greater VTH use in all veteran groups studied, a significant difference in VTH use was seen between rural and urban populations, especially among AI/AN veterans. The findings suggest that AI/AK veterans in rural areas may be at risk for VTH access disparities.

COLORADO STATE UNIVERSITY

Health Benefits of Open Streets Programmes in Latin America: A Quantitative Health Impact Assessment

Kaspar, R; Wahl, HW; Diehl, M
Lancet Planetary Health

To improve physical activity in Latin American cities, several interventions have been promoted, such as Open Streets programmes. Our study aims to quantify the health and economic effects of Open Streets-related physical activity in 15 Latin American cities. We used a quantitative health impact assessment approach to estimate annual premature deaths and disease incidence (ischaemic heart disease, ischaemic stroke, type 2 diabetes, colon cancer, breast cancer, and dementia) avoided, the disability-adjusted life-years (DALYs) gained, and the cost saving (from reduced premature mortality) related to increased physical activity from Open Streets programmes in 15 Latin American cities. Input data were obtained from scientific publications, reports, and open street city surveys spanning 2017 to 2019. Physical activity data were converted to metabolic equivalent of the task. Exposure-response relationship functions were applied to estimate relative risk and population-attributable fraction, enabling the assessment of premature deaths and disease incidence. The percentage of male users of the Open Streets programmes ranged from 55% in Guatemala to 75% in El Alto, Bolivia, and female users ranged from 25% (El Alto) to 45% (Guatemala). We estimated that the current Open Streets programmes in the 15 Latin American cities studied could prevent 363 annual premature deaths due to increased physical activity, with an annual economic impact of US$194·1 million saved and an annual reduction of 1036·7 DALYs. If one Open Streets event is added per week in each of those cities, the potential benefit could increase to 496 premature deaths prevented each year. Open Streets programmes in Latin America can provide health and economic benefits related to increased physical activity and can be used as a health promotion and disease prevention tool.

UNIVERSITY OF NORTHERN COLORADO

'I don't feel that we are a burden': Latinx Immigrants and Deservingness During the COVID-19 Pandemic

Duncan, Whitney L.; Vazquez, Lupita Nabor
Social Science & Medicine

In this paper, we explore the material and symbolic effects of "deservingness projects" (Kline, 2019) for Latinx immigrants as they have played out over the COVID-19 pandemic. On a material level, exclusionary policies have exacerbated Latinx immigrants' disenfranchisement and contributed to disproportionate sickness and economic strife during the pandemic. On a symbolic level, they have contributed to subjective experiences of fear, distress, and desperation, and have eroded many immigrants' trust in institutions and support systems. Crucially, though, the pandemic's injustices have also crystallized a sense of outrage and indignation among some Latinx immigrants, provoking assertions of self-worth and sociopolitical projects of belonging and mutual care. Our findings thus challenge the notion that subjective self-understandings as 'undeserving' are fundamental to the undocumented experience and show that the pandemic's fallout has strengthened some immigrants' ability and willingness to "make claims for inclusion" (Abrego, 2011) and sociopolitical change.

BIOSTATISTICS & INFORMATICS

Interpretable Physiological Forecasting in the ICU Using Constrained Data Assimilation and Electronic Health Record Data

Albers, David; Sirlanci, Melike; Levine, Matthew; Claassen, Jan; Nigoghossian, Caroline Der; Hripcsak, George

Journal of Biomedical Informatics

Prediction of physiological mechanics are important in medical practice because interventions are guided by predicted impacts of interventions. But prediction is difficult in medicine because medicine is complex and difficult to understand from data alone, and the data are sparse relative to the complexity of the generating processes. Computational methods can increase prediction accuracy, but prediction with clinical data is difficult because the data are sparse, noisy and nonstationary. This paper focuses on predicting physiological processes given sparse, non-stationary, electronic health record data in the intensive care unit using data assimilation (DA), a broad collection of methods that pair mechanistic models with inference methods. A methodological pipeline embedding a glucose-insulin model into a new DA framework, the constrained ensemble Kalman filter (CEnKF) to forecast blood glucose was developed. The data include tube-fed patients whose nutrition, blood glucose, administered insulins and medications were extracted by hand due to their complexity and to ensure accuracy. The model was estimated using an individual's data as if they arrived in real-time, and the estimated model was run forward producing a forecast. Both constrained and unconstrained ensemble Kalman filters were estimated to compare the impact of constraints. Constraint boundaries, model parameter sets estimated, and data used to estimate the models were varied to investigate their influence on forecasting accuracy. Forecasting accuracy was evaluated according to mean squared error between the model-forecasted glucose and the measurements and by comparing distributions of measured glucose and forecast ensemble means. The novel CEnKF produced substantial gains in robustness and accuracy while minimizing the data requirements compared to the unconstrained ensemble Kalman filters. Administered insulin and tube-nutrition were important for accurate forecasting, but including glucose in IV medication delivery did not increase forecast accuracy. Model flexibility, controlled by constraint boundaries and estimated parameters, did influence forecasting accuracy. Accurate and robust physiological forecasting with sparse clinical data is possible with DA. Introducing constrained inference, particularly on unmeasured states and parameters, reduced forecast error and data requirements. The results are not particularly sensitive to model flexibility such as constraint boundaries, but over or under constraining increased forecasting errors.

EPIDEMIOLOGY

Mycobacterium Abscessus Meningitis Associated with Stem Cell Treatment During Medical Tourism

Wolf, Andrew B.; Money, Kelli M.; Chandnani, Arun; Daley, Charles L.; Griffith, David E.; Chauhan, Lakshmi; Coffman, Nathan; Piquet, Amanda L.; Tyler, Kenneth L.; Zimmer, Shanta M.; Montague, Brian T.; Mann, Sarah; Pastula, Daniel M.

Emerging Infectious Diseases

Mycobacterium abscessus infections have been reported as adverse events related to medical tourism. We report M. abscessus meningitis in a patient who traveled from Colorado, USA, to Mexico to receive intrathecal stem cell injections as treatment for multiple sclerosis. We also review the management of this challenging central nervous system infection.

Influence of Mental Health on Information Seeking, Risk Perception and Mask Wearing Self-Efficacy During the Early Months of the COVID-19 Pandemic: A Longitudinal Panel Study Across 6 US States

Welton-Mitchell, Courtney; Dally, Miranda; Dickinson, Katherine L.; Morris-Neuberger, Lindsay; Roberts, Jennifer D.; Blanch-Hartigan, Danielle

BMC Psychology

Understanding factors that influence information seeking, assessment of risk and mitigation behaviors is critical during a public health crises. This longitudinal study examined the influence of self-reported mental health during the early months of the COVID-19 pandemic on information seeking, risk perception and perceived mask wearing ability. Mental health screener items included fear, anger, and hopelessness in addition to avoidance, diminished functional ability and global distress. Theoretical models inform hypotheses linking mental health items and outcomes. The research employed a longitudinal 6-state 3-wave online panel survey, with an initial sample of 3,059 participants (2,232 included in longitudinal analyses). Participants roughly represented the states' age, race, ethnicity, and income demographics. Women, those who identified as Hispanic/Latinx, Black Americans and lower income participants reported higher overall rates of distress than others. Information seeking was more common among older persons, Democrats, retirees, those with higher education, and those who knew people who had died of COVID-19. Controlling for such demographic variables, in multivariable longitudinal models that included baseline mental health measures, distress and fear were associated with increased information seeking. Distress and fear were also associated with increased risk perception, and feelings of hopelessness were associated with lower reported mask-wearing ability. Results advance understanding of the role mental health can play in information seeking, risk perception and mask wearing with implications for clinicians, public health practitioners and policy makers.

The Relationship Between Stress and Sleep Sufficiency in the Context of Varied Workplace Social Support

Kunz, James J.; Fisher, Gwenith G.; Ganster, Daniel C.; Gibbons, Alyssa M.; Graham, Daniel J.; Schwatka, Natalie V.; Dally, Miranda J.; Shore, Erin; Brown, Carol E.; Tenney, Liliana; Newman, Lee S.

Journal of Occupational and Environmental Medicine

Sufficient sleep is essential for well-being. We examined the relationship between work-related social support, work stress, and sleep sufficiency, predicting that workers with higher social support would report higher sleep sufficiency across varying levels of work stress. The data set analyzed in the present study included 2213 workers from approximately 200 small (<500 employees) businesses in high, medium, and low hazard industries across Colorado. Perceived social support variables moderated the relationship between work stress and sleep sufficiency such that employees reporting higher levels of social support reported higher sleep sufficiency when work stress was low or moderate but not high. Although preventing work stress is optimal, in cases where employers cannot apply primary interventions to prevent stress (eg, eliminating/reducing night shifts), employers should attempt to increase social support or other more relevant resources for employees.

COMMUNITY & BEHAVIORAL HEALTH

Adherence to Behavioral Recommendations of Cognitive Behavioral Therapy for Insomnia Predicts Medication Use After A Structured Medication Taper

Edinger, Jack D.; Wamboldt, Frederick S.; Johnson, Rachel L.; Simmons, Bryan; Tsai, Sheila; Morin, Charles M.; Holm, Kristen E.
Journal of Clinical Sleep Medicine

Cognitive behavioral therapy for insomnia (CBTI) has been paired with supervised medication tapering to help hypnotic-dependent individuals discontinue their hypnotics. This study examined the hypothesis that higher participant adherence to behavioral recommendations of CBTI will predict lower odds of using sleep medications 3 months after completion of a combined CBTI/sleep medication tapering protocol. Fifty-eight individuals who used sedative hypnotics completed four CBTI sessions followed by sleep medication tapering. Logistic regression was used to examine the association of stability of time in bed and stability of rise time (measured as the within-person standard deviation) at completion of CBTI with two outcomes at 3-month follow-up: use of sedative hypnotics and use of any medication/substance for sleep. Participants with more stability in their rise time after CBTI than at baseline (ie, a decrease in their within-person standard deviation) had 69.5% lower odds of using sedative hypnotics at follow-up (odds ratio = 0.305, 95% confidence interval = 0.095-0.979, P = .046) than individuals who had no change or a decrease in the stability of their rise time. Results were similar for time in bed: participants with more stability in their time in bed after CBTI than at baseline had 83.2% lower odds of using sedative hypnotics (odds ratio = 0.168, 95% confidence interval = 0.049-0.580, P = .005). Increase in stability of rise time and stability of time in bed was also associated with reduced odds of using any medication/substance for sleep at follow-up.
Conclusions: Participants who implement behavioral recommendations of CBTI appear to have more success with discontinuing use of sleep medications.

ROCKY MOUNTAIN PREVENTION RESEARCH CENTER

Associations Between the Well-Being of The Early Childhood Education Workforce and Caregiver-Child Relationships in Centre- and Home-Based Settings

Farewell, Charlotte V.; Gonzales, Lisa D.; Privett, Alicia; Maiurro, Emily; Puma, Jini E.
Health Affairs

The purpose of this study was to (1) explore demands and resources among centre-based and Family, Friend and Neighbor(FFN) early childhood education (ECE) caregivers, and (2) investigate how these factorsareassociatedwiththequalityofcaregiver-childrelationships. ECE caregivers (n=257) completed a survey that assessed demands, resources, and the quality of caregiver-child relationships. Analyses included univariate and bivariate analyses and hierarchical linear regression modelling. Centre-based caregivers(n=173) reported higher stress, less knowledge related to wellness, and lower confidence related to self-care practices compared to FFN caregivers (n=84) (all p<.05). Mindfulness was associated with higher reported closeness with children in their care (p<.05).Centre-based caregivers may experience more demands and less resources compared to FFN caregivers which could impact the quality of care. Mindfulness strategies may help to mitigate demands and bolster the well-being of ECE caregivers and health yearly childhood development.

Cumulative Febrile, Respiratory, and Gastrointestinal Illness Among Infants in Rural Guatemala and Association With Neurodevelopmental and Growth Outcomes

Olson, Daniel; Lamb, Molly M.; Connery, Amy K.; Colbert, Alison M.; Calvimontes, Diva M.; Bauer, Desiree; Paniagua-Avila, M. Alejandra; Martinez, Maria Alejandra; Arroyave, Paola; Hernandez, Sara; Colborn, Kathryn L.; Roell, Yannik; Waggoner, Jesse J.; Natrajan, Muktha S.; Anderson, Evan J.; Bolanos, Guillermo A.; El Sahly, Hana M.; Munoz, Flor M.; Asturias, Edwin J.
Pediatric Infectious Disease Journal

Infectious disease exposures in early life are increasingly recognized as a risk factor for poor subsequent growth and neurodevelopment. We aimed to evaluate the association between cumulative illness with neurodevelopment and growth outcomes in a birth cohort of Guatemalan infants. From June 2017 to July 2018, infants 0-3 months of age living in a resource-limited region of rural southwest Guatemala were enrolled and underwent weekly at-home surveillance for caregiver-reported cough, fever, and vomiting/diarrhea. They also underwent anthropometric assessments and neurodevelopmental testing with the Mullen Scales of Early Learning (MSEL) at enrollment, 6 months, and 1 year. Of 499 enrolled infants, 430 (86.2%) completed all study procedures and were included in the analysis. At 12-15 months of age, 140 (32.6%) infants had stunting and 72 had microcephaly. In multivariable analysis, greater cumulative instances of reported cough illness and febrile illness were marginally or significantly associated with lower MSEL Early Learning Composite (ELC) Score at 12-15 months, respectively; there was no association with any illness (cough, fever, and/or vomiting/diarrhea) or with cumulative instances of diarrheal/vomiting illness alone. No association was shown between cumulative instances of illness and stunting or microcephaly at 12-15 months. These findings highlight the negative cumulative consequences of frequent febrile and respiratory illness on neurodevelopment during infancy. Future studies should explore pathogen-specific illnesses, host response associated with these syndromic illnesses, and their association with neurodevelopment.

Stepped-Care to Improve Mental Health Outcomes Among Underserved Patients with Lung And Head And Neck Cancer

Borrayo, Evelinn A.; Juarez-Colunga, Elizabeth; Kilbourn, Kristin; Waxmonsky, Jeanette; Jacobson, Marty; Okuyama, Sonia; Swaney, Robert; Wamboldt, Frederick S.; Karam, Sana; Alvarez, Samantha Lopez; Jin, Xin; Nguyen, Jennifer
Psycho-oncology

The comparative effectiveness study (ClinicalTrials.gov, NCT03016403) assessed the effects of a stepped-care intervention versus usual care on mental health outcomes, including anxiety, depression, coping self-efficacy, emotional distress (anxiety and depression combined), health-related quality of life (HRQoL), and perceived stress among underserved patients (i.e., low-income, uninsured, underinsured) with lung cancer (LC) and head-and-neck cancer (HNC). In a randomized controlled trial, we investigated if 147 patients who received the stepped-care intervention had better mental health outcomes compared to 139 patients who received usual care. Using an intent-to-treat approach, we analyzed outcomes with linear mixed models.

For the primary outcomes estimated mean differences (denoted by "Δ"), depression (Δ = 1.75, 95% CI = 0.52, 2.98, p = 0.01) and coping self-efficacy (Δ = -15.24, 95% CI = -26.12, -4.36, p = 0.01) were better for patients who received the intervention compared to patients who received usual care, but anxiety outcomes were not different. For secondary outcomes, emotional distress (Δ = 1.97, 95% CI: 0.68, 3.54, p =< 0.01) and HRQoL (Δ = -4.16 95% CI: -7.45, -0.87, p = 0.01) were better for patients who received the intervention compared to usual care patients, while perceived stress was not different across groups. The stepped-care intervention influenced depression and coping self-efficacy, important outcomes for patients with acute illnesses like LC and HNC. Although differences in emotional distress met the minimally important differences (MID) previously reported, depression and HRQoL were not above the MID threshold. Our study is among a few to report differences in mental health outcomes for underserved LC and HNC patients after receiving a psychological intervention.

FOOD SAFETY CENTER FOR EXCELLENCE

Competencies for Public Health Professionals and Epidemiologists Who Detect and Investigate Enteric Disease Outbreaks
White, Alice E.; Torok, Michelle R.; Smith, Kirk E.; Booth, Hillary; Scallan Walter, Elaine
Public Health Reports

Food safety progress depends on the ability of public health agencies to detect and investigate foodborne disease outbreaks. The Integrated Food Safety Centers of Excellence identify and implement best practices and serve as resources for public health professionals who investigate enteric disease outbreaks. To target the needs of this diverse workforce, the Integrated Food Safety Centers of Excellence developed and assessed a professional tier framework and competencies. We described the characteristics of public health professionals who investigate enteric disease outbreaks in the epidemiology role in a conceptual tiered framework. We mapped core competencies to each tier and disseminated a survey to practitioners at local (June 2019) and state (August 2018) US public health agencies to evaluate the importance and frequency of each competency. We developed 15 competencies on surveillance, outbreak detection, interview skills, investigation team, specimen testing, data analysis, hypothesis generation, study design, communication, enteric disease biology, control measures, legal authority, quality improvement, environmental health, and reporting to surveillance. The 286 survey respondents selected interview skills, surveillance, control measures, and hypothesis generation as the competencies most important to their work and most frequently performed. The Integrated Food Safety Centers of Excellence created the first published workforce framework and competencies for public health professionals who detect and investigate enteric disease outbreaks in the epidemiology role, in collaboration with local, state, and federal public health agencies and national organizations. These tools have been integrated into existing programs and can be used to develop training curricula, assess workforce competency over time, and identify priorities for continuing education and training.

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HEALTH SYSTEMS, MANAGEMENT & POLICY

The Influence of Hospital Leadership Support on Burnout, Psychological Safety, and Safety Climate for US Infection Preventionists During the Coronavirus Disease 2019 (COVID-19) Pandemic

Gilmartin, Heather M.; Saint, Sanjay; Ratz, David; Chrouser, Kristin; Fowler, Karen E.; Greene, M. Todd
Infection Control and Hospital Epidemiology

To explore infection preventionists' perceptions of hospital leadership support for infection prevention and control programs during the coronavirus disease 2019 (COVID-19) pandemic and relationships with individual perceptions of burnout, psychological safety, and safety climate. This was a cross-sectional surve for lead infection preventionists, which was administered in April through December 2021 to a random sample of non-federal acute-care hospitals in the United States. We received responses from 415 of 881 infection preventionists, representing a response rate of 47%. Among respondents, 64% reported very good to excellent hospital leadership support for their infection prevention and control program. However, 49% reported feeling burned out from their work. Also,   30% responded positively for all 7 psychological safety questions and were deemed to have "high psychological safety," and 76% responded positively to the 2 safety climate questions and were deemed to have a "high safety climate." Our results indicate an association between strong hospital leadership support and lower burnout (IRR, 0.61; 95% CI, 0.50-0.74), higher perceptions of psychological safety (IRR, 3.20; 95% CI, 2.00-5.10), and a corresponding 1.2 increase in safety climate on an ascending Likert scale from 1 to 10 (β, 1.21; 95% CI, 0.93-1.49). Our national survey provides evidence that hospital leadership support may have helped infection preventionists avoid burnout and increase perceptions of psychological safety and safety climate during the COVID-19 pandemic. These findings aid in identifying factors that promote the well-being of infection preventionists and enhance the quality and safety of patient care.

INJURY, VIOLENCE & PREVENTION CENTER

Views of Voluntary, Temporary Out-of-Home Firearm Storage Among Individuals Living in A Firearm-Owning Home: Results From A Qualitative Study in Two States

Barnard, Leslie M.; Knoepke, Christopher E.; McCarthy, Megan; Rowhani-Rahbar, Ali; Siry-Bove, Bonnie J.; Betz, Marian E.
Injury Prevention

Firearms account for the majority of suicide deaths in the USA. A recommended approach for suicide prevention is reducing access to firearms by temporarily removing them from the home. We sought to understand how firearm owners and those who reside with them view and might use voluntary, temporary out-of-home firearm storage. From July to November 2021, we interviewed English-speaking adults in Colorado and Washington who own firearms or reside with them, using semistructured interviews. We used a team-based mixed deductive and inductive approach to code transcripts and identify themes. Half of the 38 interviewees were men (53%) aged 35–54 years (40%); 92% identified as white. The average age that participants reported first having a firearm was 20.4 years; 16% reported never owning a firearm themselves, only living in homes with firearms.

Qualitative findings fell into broad themes: (1) storage with family members/friends, (2) concerns/challenges with storing a firearm with a business/organization, (3) importance of trust (4) outreach methods for out-of-home storage programmes. Programmes for voluntary, temporary out-of-home firearm storage will not be impactful unless such storage is desired and used. Understanding views of potential storage users can help support development of acceptable and feasible programmes.

LIFECOURSE EPIDEMIOLOGY OF ADIPOSITY & DIABETES CENTER

Mother's Age At Menarche Is Associated with Odds of Preterm Delivery: A Case-Control Study
Chen, Yingan; Zhang, Mingyu; Wang, Guoying; Hong, Xiumei; Wang, Xiaobin; Mueller, Noel T.
BJOG-AN International Journal of Obstetrics and Gynaecology

There is a secular trend towards earlier age of menarche in the US and globally. Earlier age at menarche (AAM) has been associated with metabolic disorders that increase risk for preterm delivery (PTD), yet no studies in the US have investigated whether AAM influences risk of PTD. This study tested the hypothesis that AAM is associated with PTD using a case–control study design at the Boston Medical Center (BMC) in Boston, Massachusetts. Study's population was 8264 mother-newborn dyads enrolled at birth at BMC between 1998 and 2019, of which 2242 mothers had PTD (cases) and 6022 did not have PTD (controls). Analysis was conducted using a multivariable-adjusted logistic regression models and restricted cubic splines were used to examine the association between AAM and risk of PTD. The combined impact of AAM and age at delivery on the risk of PTD was also examined. The main outcome measures were preterm delivery and gestational age (GA) which were defined by maternal last menstrual period and early ultrasound documented in medical records. Maternal age at delivery was 28.1 ± 6.5 years and AAM was 12.85 ± 1.86 years. Multivariable-adjusted cubic spline suggested an inverse dose–response association of AAM with odds of PTD and, consistently, a positive association with GA. A 1-year earlier AAM was associated with 5% (95% CI 2%–8%) higher odds of PTD, after adjustment for maternal year of birth, parity, maternal place of birth, education, smoking status and Mediterranean-style diet score. The association between AAM and PTD was stronger among older mothers whose age at delivery was ≥35 years. Earlier AAM is associated with higher odds for PTD, and this association is stronger among women at advanced reproductive age.