Publication Highlights

DEPARTMENT OF HEALTH SYSTEMS, MANAGEMENT, AND POLICIES & CANCER CENTER

High Impact Journal Recognition: A Cancer Journal for Clinicians (Impact Factor: 286.13)

Cancer Diagnosis and Treatment in Working-Age Adults: Implications for Employment, Health Insurance Coverage, and Financial Hardship in the United States

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ABSTRACT:
The rising costs of cancer care and subsequent medical financial hardship for cancer survivors and families are well documented in the United States. Less attention has been paid to employment disruptions and loss of household income after a cancer diagnosis and during treatment, potentially resulting in lasting financial hardship, particularly for working-age adults not yet age-eligible for Medicare coverage and their families. In this article, the authors use a composite patient case to illustrate the adverse consequences of cancer diagnosis and treatment for employment, health insurance coverage, household income, and other aspects of financial hardship. They summarize existing research and provide nationally representative estimates of multiple aspects of financial hardship and health insurance coverage, benefit design, and employee benefits, such as paid sick leave, among working-age adults with a history of cancer and compare them with estimates among working-age adults without a history of cancer from the most recently available years of the National Health Interview Survey (2019–2021). Then, the authors identify opportunities for addressing employment and health insurance coverage challenges at multiple levels, including federal, state, and local policies; employers; cancer care delivery organizations; and nonprofit organizations. These efforts, when informed by research to identify best practices, can potentially help mitigate the financial hardship associated with cancer

Quantifying the Effect of Consent for High-Kidney Donor Profile Index Deceased Donor Transplants in the United States

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Journal of the American Society of Nephrology

Background: Despite known benefits of kidney transplantation, including transplantation from donors with increased risk factors, many waitlisted candidates die before transplantation. Consent to receive donor kidneys with lower expected survival (e.g., Kidney Donor Profile Index [KDPI] >85%) is typically obtained at waitlist placement. The presumed benefit of consent to receive high-KDPI donor kidneys is higher likelihood and timeliness of donor offers for transplantation. However, the specific effect of consent on access to transplantation is unclear. Our aims were to evaluate the characteristics of candidates consenting to high-KDPI donor kidneys and the likelihood of receiving a deceased donor transplant over time on the basis of consent. **Methods:** We used national Scientific Registry of Transplant Recipients data between 2015 and 2022 (n=213,364). We evaluated the likelihood of consent using multivariable logistic models and time to deceased donor transplant with cumulative incidence plots accounting for competing risks and multivariable Cox models. **Results:** Overall, high-KDPI consent was 41%, which was higher among candidates who were older, were Black or Hispanic, had higher body mass index, had diabetes, had vascular disease, and had 12–48 months prelisting dialysis time, with significant center-level variation. High-KDPI consent was associated with higher rates of deceased donor transplant (adjusted hazard ratio=1.15; 95% confidence interval, 1.13 to 1.17) with no difference in likelihood of deceased donor transplant from donors with KDPI <85%. The effect of high-KDPI consent on higher rates of deceased donor transplantation was higher among candidates older than 60 years and candidates with diabetes and variable on the basis of center characteristics. **Conclusions:** There is significant variation of consent for high-KDPI donor kidneys and higher likelihood of transplantation associated with consent.

Vision Problems As a Contributor to Lower Engagement in Care Among Aging Men Living with HIV

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Ophthalmic Epidemiology

Purpose: To investigate vision impairment as a barrier to engagement in medical care among aging persons living with HIV (PLWH) who experience multimorbidity and complex care needs. **Setting:** Multicenter AIDS Cohort Study (MACS), a prospective observational cohort of aging PLWH men. **Methods:** We examined relationships of self-reported vision difficulty with indicators of care engagement: 1) adherence to HIV antiretroviral therapy (ART; defined as taking ≥95% of medications); 2) self-reported avoidance of medical care; 3) self-reported tendency to ask a doctor questions about care (>2 questions at a medical visit), as well as with quality of life. A modified version of the National Eye Institute Vision Function Questionnaire was administered at three semi-annual visits (from October 2017 to March 2019) to assess difficulty performing vision-dependent tasks. **Results:** We included 1063 PLWH (median age 57 years, 31% Black). Data on care engagement outcomes were analyzed using repeated measures logistic regression with generalized estimating equations adjusted for race, and at visit values for age, education level, depressive symptoms, alcohol use, and smoking status. Compared to no vision difficulty, those reporting moderate to extreme vision difficulty on at least one task had 2.2 times higher odds (95% CI: 1.4, 3.4) of having less than optimal ART adherence, 1.9 times higher odds (95% CI: 1.1, 3.4) of avoiding necessary medical care and median quality of life scores 8 points lower. **Conclusion:** These findings suggest vision impairment decreases medical care engagement including HIV care and quality of life among aging PLWH.

Respiratory Syncytial Virus Hospital-Based Burden of Disease in Children Younger Than 5 Years, 2015-2022
Suss, Robert J.; Simoes, Eric A. F.
JAMA Network Open

Importance: Respiratory syncytial virus (RSV) resurgences have been noted following the COVID-19 pandemic in many countries. Recent findings suggest that the 2021 and 2022 RSV seasons were more severe than in past seasons, and age distribution may have shifted toward older children in the younger than 5 years age group. **Objectives:** To estimate age-specific changes in RSV hospital-based burden of disease before and after the COVID-19 pandemic and to compare incidence by Medicaid use. **Design, Setting, and Participants:** This retrospective cohort study included children younger than 5 years diagnosed with RSV and bronchiolitis at 50 US children's hospitals in 10 US geographic regions. The included participants had an encounter in intensive care, inpatient, emergency, or observational units, between June 1, 2015, and March 31, 2023. **Exposures:** Diagnosis of RSV, bronchiolitis, or both at encounter. **Main Outcome and Measures:** Incidence rate ratio of hospital use within each care unit before vs after the COVID-19 pandemic. It was hypothesized a priori that incidence of hospital use would increase overall in 2021 and 2022 compared with 2015 to 2019 and that the increase would be greater among children 12 months and older. **Results:** Of 924 061 study participants (median [IQR] age, 8 (5-16) months; 535 619 [58.0%] male), 348 077 (37.7%) were diagnosed with RSV. Of these, 187 850 (54.0%) were hospitalized. Incidence rate ratios of hospitalization increased for all ages in 2021 and 2022 compared with 2015 to 2019. Children aged 24 to 59 months were 4.86 (95% CI, 4.75-4.98) times as likely to be hospitalized in 2022 compared with 2015 to 2019, whereas infants aged 0 to 5 months were 1.77 (95% CI, 1.74-1.80) times as likely. Medicaid patients were more likely to be hospitalized than non-Medicaid patients regardless of year. **Conclusions and Relevance:** Hospitalizations for RSV and bronchiolitis demonstrated atypical seasonality in 2021 and 2022, with an overall increase in RSV encounters. Postpandemic RSV hospitalization increased for all ages, but especially among older children, whereas bronchiolitis hospitalization was decreased or unchanged compared with earlier seasons. These findings suggest some of the observed increase in RSV hospital use may be due to increased testing.

Addressing Health Equity in the Context of Carbon Capture, Utilization, and Sequestration Technologies
Rojas-Rueda, David; McAuliffe, Kelly; Morales-Zamora, Emily
Current Environmental Health Reports

Purpose of Review: To describe the role of health equity in the context of carbon capture, utilization, and sequestration (CCUS) technologies. **Recent Findings:** CCUS technologies have the potential to both improve and worsen health equity. They could help reduce greenhouse gas emissions, a major contributor to climate change, but they could also have negative health impacts like air and noise pollution. More research is needed to fully understand the health equity implications of CCUS technologies. CCUS technologies have both health equity risks and benefits. Implementing misguided CCUS projects in vulnerable communities could exacerbate environmental injustice and health disparities and have the potential to increase carbon emissions. However, well-conceived projects could benefit communities through economic development. Governments, industry, and society should prioritize and expedite the reduction of CO_2 emissions before considering carbon reductions via CCUS. Furthermore, CCUS projects must be thoroughly evaluated and should only proceed if they have demonstrated a net reduction in CO_2 emissions and provide more benefits than risks to local communities. This underscores the importance of prioritizing health equity in the planning of CCUS projects.

Unraveling the Complexity of the Senescence-Associated Secretory Phenotype in Adamantinomatous Craniopharyngioma Using Multimodal Machine Learning Analysis

Prince, Eric W.; Apps, John R.; Jeang, John; Chee, Keanu; Medlin, Stephen; Jackson, Eric M.; Dudley, Roy; Limbrick, David; Naftel, Robert; Johnston, James; Feldstein, Neil; Prolo, Laura M.; Ginn, Kevin; Niazi, Toba; Smith, Amy; Kilburn, Lindsay; Chern, Joshua; Leonard, Jeffrey; Lam, Sandi; Hersh, David S.; Gonzalez-Meljem, Jose Mario; Amani, Vladimir; Donson, Andrew M.; Mitra, Siddhartha S.; Bandopadhayay, Pratiti; Martinez-Barbera, Juan Pedro; Hankinson, Todd C.
Neuro-Oncology

Background: Cellular senescence can have positive and negative effects on the body, including aiding in damage repair and facilitating tumor growth. Adamantinomatous craniopharyngioma (ACP), the most common pediatric sellar/suprasellar brain tumor, poses significant treatment challenges. Recent studies suggest that senescent cells in ACP tumors may contribute to tumor growth and invasion by releasing a senesecence-associated secretory phenotype. However, a detailed analysis of these characteristics has yet to be completed. **Methods:** We analyzed primary tissue samples from ACP patients using single-cell, single-nuclei, and spatial RNA sequencing. We performed various analyses, including gene expression clustering, inferred senescence cells from gene expression, and conducted cytokine signaling inference. We utilized LASSO to select essential gene expression pathways associated with senescence. Finally, we validated our findings through immunostaining. **Results:** We observed significant diversity in gene expression and tissue structure. Key factors such as NFKB, RELA, and SP1 are essential in regulating gene expression, while senescence markers are present throughout the tissue. SPP1 is the most significant cytokine signaling network among ACP cells, while the Wnt signaling pathway predominantly occurs between epithelial and glial cells. Our research has identified links between senescence-associated features and pathways, such as PI3K/Akt/mTOR, MYC, FZD, and Hedgehog, with increased P53 expression associated with senescence in these cells. **Conclusions:** A complex interplay between cellular senescence, cytokine signaling, and gene expression pathways underlies ACP development. Further research is crucial to understand how these elements interact to create novel therapeutic approaches for patients with ACP.

Invited Perspective: Climate Changes the Effectiveness of Water, Sanitation, and Hygiene Interventions

Carlton, Elizabeth J.
Environmental Health Perspectives

There is growing evidence that climate change is reshaping the global distribution of infectious diseases, including diarrheal diseases,[1] a leading killer of young children.[2] Interventions are urgently needed that can reduce diarrheal diseases in a changing climate. However, changing climate conditions can also alter the effectiveness of key water, sanitation, and hygiene (WASH) interventions commonly used to prevent diarrheal diseases. For example, drought can reduce the availability of safe drinking water, heavy rainfall can flood latrines and mobilize pathogens, and extreme weather events can destroy water and sanitation infrastructure.[3–5] Climate change may also alter safe drinking water use and handwashing behaviors in low resource settings.[6,7] There remain large gaps in our understanding of how well current WASH interventions will prevent diarrheal diseases under future climate conditions. The science here is challenging—it involves interactions between multiple climate conditions that may affect the survival and spread of enteric pathogens, and an intervention (or set of interventions) designed to reduce exposure and, ultimately, disease outcomes. In many cases, risk varies over time, owing, in part, to variability in climate, adding further complexity and creating the potential for intervention impacts to vary temporally. Ideally, interventions can dampen risk generally and provide protection during windows of peak risk.

Independent and Joint Effects of Neighborhood-Level Environmental and Socioeconomic Exposures on Body Mass Index in Early Childhood: The Environmental Influences on Child Health Outcomes (ECHO) Cohort

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Environmental Research

Past studies support the hypothesis that the prenatal period influences childhood growth. However, few studies explore the joint effects of exposures that occur simultaneously during pregnancy. To explore the feasibility of using mixtures methods with neighborhood-level environmental exposures, we assessed the effects of multiple prenatal exposures on body mass index (BMI) from birth to age 24 months. We used data from two cohorts: Healthy Start (n = 977) and Maternal and Developmental Risks from Environmental and Social Stressors (MADRES; n = 303). BMI was measured at delivery and 6, 12, and 24 months and standardized as z-scores. We included variables for air pollutants, built and natural environments, food access, and neighborhood socioeconomic status (SES). We used two complementary statistical approaches: single-exposure linear regression and quantile-based g-computation. Models were fit separately for each cohort and time point and were adjusted for relevant covariates. Single-exposure models identified negative associations between NO_2 and distance to parks and positive associations between low neighborhood SES and BMI z-scores for Healthy Start participants; for MADRES participants, we observed negative associations between O_3 and distance to parks and BMI z-scores. G-computations models produced comparable results for each cohort: higher exposures were generally associated with lower BMI, although results were not significant. Results from the g-computation models, which do not require a priori knowledge of the direction of associations, indicated that the direction of associations between mixture components and BMI varied by cohort and time point. Our study highlights challenges in assessing mixtures effects at the neighborhood level and in harmonizing exposure data across cohorts. For example, geospatial data of neighborhood-level exposures may not fully capture the qualities that might influence health behavior. Studies aiming to harmonize geospatial data from different geographical regions should consider contextual factors when operationalizing exposure variables.

COLORADO INTEGRATED FOOD SAFETY CENTER OF EXCELLENCE

Exploring the Association of Weather Variability on Campylobacter - A Systematic Review

Austhof, Erika; Warner, Shaylee; Helfrich, Kathryn; Pogreba-Brown, Kristen; Brown, Heidi E.; Klimentidis, Yann C.; Walter, Elaine Scallan; Jervis, Rachel H.; White, Alice E.

Background: Previous work has found climate change-induced weather variability is suspected to increase the transmission of enteric pathogens, including Campylobacter, a leading cause of bacterial gastroenteritis. While the relationship between extreme weather events and diarrheal diseases has been documented, the specific impact on Campylobacter infections remains underexplored. **Objective:** To synthesize the peer-reviewed literature exploring the effect of weather variability on Campylobacter infections in humans. **Methods:** The review included English language, peer-reviewed articles, published up to September 1, 2022 in PubMed, Embase, GEOBASE, Agriculture and Environmental Science Database, and CABI Global Health exploring the effect of an antecedent weather event on human enteric illness caused by Campylobacter (PROSPERO Protocol # 351884). We extracted study information including data sources, methods, summary measures, and effect sizes. Quality and weight of evidence reported was summarized and bias assessed for each article. **Results:** After screening 278 articles, 47 articles (34 studies, 13 outbreak reports) were included in the evidence synthesis. Antecedent weather events included precipitation (n = 35), temperature (n = 30), relative humidity (n = 7), sunshine (n = 6), and El Niño and La Niña (n = 3). Reviewed studies demonstrated that increases in precipitation and temperature were correlated with Campylobacter infections under specific conditions, whereas low relative humidity and sunshine were negatively correlated. Articles estimating the effect of animal operations (n = 15) found presence and density of animal operations were significantly associated with infections. However, most of the included articles did not assess confounding by seasonality, presence of animal operations, or describe estimates of risk. **Discussion:** This review explores what is known about the influence of weather events on Campylobacter and identifies previously underreported negative associations between low relative humidity and sunshine on Campylobacter infections. Future research should explore pathogen-specific estimates of risk, which can be used to influence public health strategies, improve source attribution and causal pathways, and project disease burden due to climate change.

LATINO RESEARCH AND POLICY CENTER

Evolution of HIV Health Care Workforce Needs in the U.S. Mountain West During the COVID-19 Pandemic: A Mixed Method Study

Amura, Claudia R.; Thorne, Julia; Bean, Meagan; Avery, Lisa Krug; Sylla, Laurie N.; Liss, Hillary K.; Cook, Paul F.

The COVID-19 pandemic drastically affected health care delivery for vulnerable populations. Many facilities shifted services to telemedicine, and people with HIV or at risk of acquiring HIV experienced interruptions in care. Simultaneously, traditional training approaches to help providers adapt were disrupted. Using a mixed method approach to examine changes over time, we integrated data on trainee needs collected by the Mountain West AIDS Education and Training Center (AETC): a 10-state needs assessment survey in 2020; feedback from a 2020 community of practice; aggregate training data from 2000 to 2022; and a second survey in 2022. HIV care providers' training needs evolved from wanting support on telemedicine and COVID-19 patient care issues, to a later focus on mental health and substance use, social determinants of health, and care coordination. This integrative analysis demonstrates the vital role that AETCs can play in addressing evolving and emergent public health challenges for the HIV workforce.

COLORADO INTEGRATED FOOD SAFETY CENTER OF EXCELLENCE

Improving Occupational Health Surveillance for Enteric Disease

White, Alice E.; Jervis, Rachel H.; Wilson, Elisha; Walter, Elaine Scallan
Zoonoses Public Health

Aims: Enteric pathogens with a livestock reservoir pose a unique risk to people in occupations with regular contact with animals. However, public health surveillance of occupational exposures is inadequate, with surveillance for occupation typically focusing on the risk of transmission and the need for worker exclusion, rather than workplace exposures. To improve surveillance for occupational zoonoses, the Colorado Integrated Food Safety Center of Excellence convened a group of subject matter experts who developed a set of variables on occupation, industry, and exposures, which were integrated into Colorado's surveillance system in 2017. We evaluated the quality and completeness of these new occupational fields for interviewed cases with laboratory-confirmed zoonotic infections and compared occupations to cases with a non-zoonotic infection (Shigella) and to employment data from the Bureau of Labor Statistics. **Methods and Results:** From March 2017 through December 2019, 3668 domestically acquired, laboratory-confirmed sporadic infections of Campylobacter, Cryptosporidium, Shiga toxin-producing Escherichia coli, and non-typhoidal Salmonella among individuals ≥14 years of age were interviewed by public health. We found asking explicitly about occupational exposure risks and focusing on animal exposures, improved data quality and accuracy. Of the cases who stated that they were employed, 262 (13%) reported working in an occupation with regular animal exposure, and 254 (14%) reported an industry with regular animal exposure. Cases with an animal exposure occupation were more likely to be male and live in a rural or frontier county compared to other occupations. All occupations with regular animal contact were reported at a higher frequency than among Shigella cases or the general population. **Conclusions:** Public health efforts, both in occupational health and communicable disease sectors, should be made to improve surveillance for enteric zoonoses and identify opportunities for prevention strategies.

DEPARTMENT OF HEALTH SYSTEMS, MANAGEMENT, & POLICY

Exploring the Roles, Functions, and Work Experiences of Nurse Scientists in the Veterans Health Administration

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The Journal of Nursing Administration

Objective: The aim of this project was to describe nurse scientists' roles, functions, and work experiences in the Veterans Health Administration (VHA). **Background:** Nurse scientists play a critical role in shaping the culture of clinical inquiry and closing the gap between knowledge and practice. **Methods:** A cross-sectional survey was used to collect information on sociodemographics, workload, research, clinical practice, education, and time/effort. Data were examined using descriptive statistics and χ^2 analyses. **Results:** One hundred forty-four nurse scientists completed the survey. These nurse scientists serve dynamic and critical roles in conducting research, implementing evidence-based practice, and reforming policy. Research effort was limited due to workload and infrastructure constraints. Better research infrastructure was associated with higher research productivity and funding. **Conclusions:** This survey highlights the needs and challenges nurse scientists experience in conducting research and advancing VHA's mission. Given the national shortage of PhD-prepared nurses, long-term strategies are needed to attract, hire, and retain nurse scientists in healthcare systems.

Association of Duration of Embryo Culture with Risk of Large for Gestational Age Delivery in Cryopreserved Embryo Transfer Cycles

Pier, Bruce D.; Roshong, Anne; Santoro, Nanette; Sammel, Mary D.

Fertility and Sterility

Objective: To examine the relationship between the day of embryo cryopreservation and large for gestational age (LGA) infants in women undergoing frozen embryo transfers (FETs) after cryopreservation on days 2-7 after fertilization and to compare the risk of the day of embryo cryopreservation to other possible risk factors of LGA after FET cycles.

Design: Retrospective cohort study. **Setting:** Society of Assisted Reproduction Clinical Outcomes Reporting System. **Patients:** Women undergoing FET cycles. **Intervention:** Day of cryopreservation. **Main outcome measure:** Singleton LGA infant.

Results: A total of 33,030 (18.2%) FET cycles in the study group (n = 181,592) resulted in LGA infants during the study period of 2014-2019. There was an increase in LGA risk when cryopreservation was performed from day 2 (13.7%) to days 3-7 (14.4%, 15.0%, 18.2%, 18.5%, and 18.9%). In the log-binomial model, the risk increased compared with days 2-3 combined when cryopreservation was performed on days 5-7 (adjusted relative risk [aRR] 1.32, 95% confidence interval [CI] 1.22-1.44 for day 5, aRR 1.34, 95% CI 1.23-1.46 for day 6, and aRR 1.42, 95% CI 1.25-1.61 for day 7). Other factors most associated with LGA risk in the log-binomial model were preterm parity of >3 compared with 0 (aRR 1.82, 95% CI 1.24-2.69) and body mass index (BMI) of >35 kg/m2 compared with normal weight (aRR 1.94, 95% CI 1.88-2.01). Increasing gravity, parity, BMI, number of oocytes, and embryo grade were also associated with LGA in this model. Asian, Black, Hispanic, and combined Hawaiian and Pacific Islander were protective factors in the model compared with White patients. Low BMI (<18.5 kg/m2) was also considered a protective factor in the model compared with normal BMI.

Conclusion: Duration of embryo culture was associated with an increased risk of LGA in this study cohort when controlling for known confounders such as maternal BMI and parity. This study sheds new light on the possible link between FET and LGA infants.

Reduction of Environmental Pollutants and Travel Burden Through an Academic Medical Center-based Electronic Consultation Program

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Telemedicine and E-Health

Background: We evaluated the impact of electronic consultation (eConsult) in reducing the environmental pollutants associated with health care delivery. **Methods:** A retrospective analysis of the eConsult data between July 2018 and December 2022 was extracted from the electronic health record (Epic). Travel time and mileage from the patient home to the academic medical center (AMC) were calculated along with fuel expenditure and greenhouses gas savings. Projected savings through the end of the decade were forecast using a random walk model. **Results:** A total of 15,499 eConsults were submitted to AMC specialist providers from community primary care providers. Completed eConsults (n = 11,590) eliminated the need for a face-to-face visit with a specialist provider, eliminating mileage, fuel, time, and pollutants associated with face to face visits. In-state travel distance saved was 310,858 miles, travel time saved was 5,491 h, with an associated fuel reduction of 13,575 gallons and $56,893 savings. This reduced greenhouse gas emissions by 128 metric tons of carbon dioxide, 0.022 tons of nitrogen oxide, 0.005 tons of methane, and 0.001 tons of nitrous oxide. Out of state travel distance saved was 188,346 miles with 2,842 h reduced travel time, and associated fuel reduction of 8,225 gallons and of $34,118. Reduced greenhouse gas emissions were equivalent to 77 metric tons of carbon dioxide, 0.0132 tons of nitrogen oxide, 0.0033 tons of methane, and 0.0007 tons of nitrous oxide. **Conclusion:** This study indicates that medical care provided through telehealth modalities reduces the environmental impact of pollutants associated with face to face visits.