Office of Research
colorado school of public health

JAN - MAR 2025

Publication Highlights

DEPARTMENT OF EPIDEMIOLOGY

Dust Storms and Emergency Department Visits in 3 Southwestern States Using NWS Storm Reports
Xiaping Zheng, Howard H. Chang, Stefanie T. Ebelt, Rohan D'Souza, Kirk Hohsfield, James L. Crooks
JAMA Network Open

ABSTRACT:

Importance: Dust storms are projected to increase with climate change. The short-term health outcomes associated with dust storms in the US are not well characterized, especially for morbidity outcomes.
Objective To estimate associations between dust storms and diagnosis-specific emergency department (ED) visits during 2005 to 2018.
Design, Setting, and Participants: In this cross-sectional study using a time-stratified case-crossover design, short-term associations between dust storms and ED visits were estimated at the zip code level using conditional Poisson analysis with adjustment for meteorology and within-month trends. Same-day dust storm events and storm events within a lag period of up to 7 days were considered. State-wide patient-level ED visit records acquired from 3 state health departments (Arizona, California, and Utah) were analyzed. Data were analyzed between April 21 and November 12, 2024.
Exposures: Dust storm events were reported by the US National Weather Service and assigned to each patient zip code that had at least a 5% areal overlap with the National Weather Service forecast zone.
Main Outcomes and Measures: Patient-level ED visits for asthma, chronic obstructive pulmonary disease, culture-negative pneumonia, congestive heart failure (CHF), cerebrovascular disease, ischemic heart disease, and visits due to motor vehicle accidents.
Results: The analysis included 33 500 ED visits among the outcomes of interest (5717 children aged 0-17 years [17.1%] and 11 150 adults aged >65 years [33.3%]; 17 394 male [51.9%] and 16 104 female [48.1%]; 2829 Black [8.4%] and 22 537 White [67.2%]; 9256 Hispanic [27.6%]) and 206 dust-impacted zip codes. The strongest associations between dust storms and ED visits were found for asthma (lag 0-2 relative risk [RR], 1.06; 95% CI, 1.01-1.11; P = .03), culture-negative pneumonia (lag 0-7 RR, 1.06; 95% CI, 1.02-1.10; P = .002), CHF (lag 0-7 RR, 1.06; 95% CI, 1.01-1.10; P = .01), and motor vehicle accidents (lag 0 RR, 1.13; 95% CI, 1.04-1.23; P = .003). Associations of dust storm exposure with ischemic heart disease were mostly protective (eg, lag 0-2 RR, 0.89; 95% CI, 0.84-0.95; P < .001). Associations of dust storm exposure with risk of ED visits for CHF and motor vehicle accidents were robust against adjustment for ambient ozone (eg, CHF: RR, 1.08; 95% CI, 1.03-1.13; P = .003) and nitrogen dioxide (eg, CHF: RR, 1.08; 95% CI, 1.03-1.13; P = .003) air pollution.
Conclusions and Relevance: In this study, dust storms were positively associated with ED visits for asthma, pneumonia, heart failure, and motor vehicle accidents. These findings contribute to our understanding of the association of dust storms with morbidity in the US and potential outcomes under a changing climate.

High-Cost Cancer Drug Use in Medicare Advantage and Traditional Medicare

Cathy J. Bradley, Rifei Liang, Richard C. Lindrooth, Lindsay M. Sabik, Marcelo C. Perraillon

JAMA Health Forum

Abstract

I**mportance:** Medicare Advantage (MA) plans are designed to incentivize the use of less expensive drugs through capitated payments, formulary control, and preauthorizations for certain drugs. These conditions may reduce spending on high-cost therapies for conditions such as cancer, a condition that is among the most expensive to treat.

Objective: To determine whether patients insured by MA plans receive less high-cost drugs than those insured by traditional Medicare (TM).

Design, Setting, and Participants: This cohort study used data from the linked Colorado All Payer Claims Database and Colorado Central Cancer Registry. This population-based cohort included adults 65 years and older insured by Medicare with prescription coverage who reside in Colorado and were diagnosed with colorectal (CRC) or non–small cell lung cancer (NSCLC) between January 2012 and December 2021. The data were analyzed between December 2023 and August 2024.

Exposure: Enrollment in TM or MA insurance plans.

Main Outcomes and Measures: Claims for chemotherapy and oral targeted agents were identified. Thresholds for high-cost drugs were based on the distribution of drug costs. Inverse probability weighted logistic regression for receiving any cancer drug and for receiving a high-cost cancer drug was estimated, controlling for patient and ecological characteristics. The sample was stratified by cancer site and local/regional and distant stage.

Results: Of 4240 patients included in the analysis (mean [SD] age, 75 [7] years; 2327 [54.9%] female), 1991 were diagnosed with CRC and 2249 with NSCLC. A total of 1647 patients had local or regional CRC, and 344 had distant CRC; 1351 patients had local or regional NSCLC, and 898 had distant NSCLC. In the covariate-adjusted analysis, patients diagnosed with local or regional CRC who were insured by MA were 6.0 percentage points less likely to receive a cancer drug than similar patients insured by TM. Patients diagnosed with distant NSCLC were 10.0 percentage points less likely to receive a cancer drug if insured by MA. Among patients who received a cancer drug, patients insured by MA were less likely to receive a high-cost drug for local or regional CRC (by 10.0 percentage points) and distant CRC (by 9.0 percentage points).

Conclusions and Relevance: In this cohort study, high-cost drugs were more commonly prescribed among patients enrolled in TM and diagnosed with CRC. A similar pattern was not observed for patients with NSCLC, perhaps because clinical evidence suggests survival benefits to be associated only with certain drugs, all of which are expensive. Nonetheless, MA was modestly associated with reduced high-cost drug utilization and may reduce overall treatment costs.

Environmental Justice Mapping Tools in the United States: A Review of National and State Tools

Hannah Besse, David Rojas-Rueda

Science of The Total Environment

Abstract

Environmental justice (EJ) mapping tools are geographic information system (GIS)-based digital maps that integrate environmental, socioeconomic, health, and demographic data to identify areas experiencing environmental injustices. These tools are increasingly used to guide investments toward disadvantaged communities. This review examines 25 EJ tools, describing their functionalities, coverage, and indicator types, ranging from biological susceptibilities to socioeconomic and environmental factors. We discuss the tools' resolutions, update frequencies, and data breadth, emphasizing their role in informing EJ interventions. However, gaps exist, particularly in the underrepresentation of U.S. territories and the limited inclusion of communicable diseases and climate impacts. This underscores the need for more comprehensive tools that consider diverse health risks and socio-environmental factors. Cumulative impact assessments should be integrated into EJ tools, incorporating a broad spectrum of indicators to capture the multifaceted nature of environmental injustices. Community engagement is also crucial in developing and updating EJ tools to ensure they accurately reflect community needs and conditions. By addressing these recommendations, EJ tools can better serve as effective instruments for highlighting and mitigating environmental disparities, supporting broader environmental justice and health equity goals.

Comparative Analysis of Ambient, In-Home, and Personal Exposures Reveals Associations Between Breathing Zone Pollutant Levels and Asthma Exacerbations in High-Risk Children

Camille M. Moore, Jonathan Thornburg, Elizabeth A. Secor, Katharine L. Hamlington, Allison M. Schiltz, Kristy L. Freeman, Jamie L. Everman, Tasha E. Fingerlin, Andrew H. Liu, & Max A. Seibold

Respiratory Research

Abstract

Background: Air pollution is associated with poor asthma outcomes in children. However, most studies focus on ambient or indoor monitor pollution levels. Few studies evaluate breathing zone exposures, which may be more consequential for asthma outcomes.

Methods: We measured personal exposures to NO_2, O_3, PM_{10} and PM_{10} constituents, including black carbon (BC), brown carbon (BrC), environmental tobacco smoke (ETS), endotoxins, and β-glucan, in a cohort of children with exacerbation-prone asthma for 72 h using wearable monitors. Personal exposures were compared to concentrations from in-home monitors in the child's bedroom and ambient EPA air quality monitoring using correlation analyses. Personal exposures were tested for association with lung function and compared between participants with and without well-controlled asthma and signs of exacerbation in the prior 60 days using censored regression with robust standard errors.

Results: 81 children completed 219 monitoring sessions. Personal NO_2, O_3, and PM_{10} exposures ranged from < 2 to 99.1 parts per billion (ppb), < 1.5 to 23.3 ppb, and < 1 to 141.9 $\mu g/m_3$, respectively. Personal endotoxin ranged from 0.04 to 101.3 EU/m_3, β-glucan from 18.5 to 1,162 pg/m_3, BC from < 0.3 to 46.9 $\mu g/m_3$, BrC from < 0.3 to 6.1 $\mu g/m_3$, and ETS from < 0.3 to 56.6 $\mu g/m_3$. Correlations between personal and ambient PM_{10}, NO_2, and O_3 concentrations were poor, whereas personal PM_{10} and NO_2 correlated with in-home concentrations. In-home monitoring less frequently detected BrC (Personal:79% > lower limit of detection, Home:36.8%) and ETS (Personal:83.7%, Home:4.1%) than personal exposures, and detected BC in participants without personal exposure (Personal: 26.5%, Home: 96%). Personal exposures were not significantly associated with lung function or daily asthma control. Children requiring corticosteroid treatment for asthma exacerbation within 60 days of exposure monitoring had 1.98, 2.21 and 2.04 times higher personal exposures to BrC ($p < 0.001$; 95% CI: 1.43–2.37), ETS ($p = 0.007$; 95% CI: 1.25–3.91), and endotoxin ($p = 0.012$; 95% CI: 1.14–3.68), respectively.

Conclusions: Although in-home monitoring was correlated with personal exposure to PM_{10} and NO_2, in-home detection of ETS and BrC was not associated with personal exposures. Personal PM_{10} exposures in general, as well as BrC, ETS, and endotoxin levels were associated with recent childhood asthma exacerbations.

Are You Understanding What I Am Saying? The Critical Importance of Communication Competency in Epidemiology

Alison G. Abraham, WayWay M. Hlaing

Frontiers in Public Health

Abstract

There are myriad examples of poor communication by public health scientists and researchers that have resulted in lasting harm to individuals, communities, the field of epidemiology, and the broader field of public health. These examples underscore that science messages hinge not only on their merit alone but also on how effectively we communicate them. Here, we highlight the strong consensus in the epidemiology educational literature that epidemiology students should be trained to communicate effectively, specifically with the general public. This allows the public access to critical information that could affect their well-being. Most epidemiology programs in academia do not focus on the skills needed to translate scientific evidence and its uncertainty into a comprehensible and culturally appropriate message to the diverse public composed of varying race/ethnicities as well as varying health and numerical literacy levels. We provide guidance on which specific communication skills may be most important for epidemiologists facing the growing health misinformation and disinformation epidemic. We also describe what a communication-focused curriculum might look like, given that communication skills cannot be learned solely through traditional coursework. Lastly, we address barriers that have prevented communication skills from being meaningfully incorporated in epidemiology curricula.

Short-Chain Fatty Acids and Preeclampsia: A Scoping Review

Heather J Zhao, Yingan Chen, Tiange Liu, Kristen McArthur, Noel T Mueller

Frontiers in Public Health

Abstract

Background: Preeclampsia (PE) is a pregnancy-associated hypertension disorder with high morbidity and mortality. Short-chain fatty acids (SCFAs)-molecules produced by gut microbes-have been associated with hypertension, yet their relation to PE remains uncertain.

Objectives: The aim was to review existing human studies that examined associations of the major SCFAs (acetate, propionate, butyrate) in pregnancy with PE development.

Methods: Two reviewers independently searched online databases (EMBASE, PubMed, Web of Science, and Cochrane Database of Systematic Reviews) in January 2024 using the following terms: "short-chain fatty acids," "acetic acid," "butyric acid," "propionic acid," and "preeclampsia." The final set of included studies had to report associations of SCFAs with PE, be peer-reviewed, be written in English, and be conducted in humans.

Results: The abstracts of 907 studies were screened; 43 underwent full-text screening and 11 (1318 total participants, 352 with PE) were included in the final review. All studies used a case-control design. SCFAs were measured in a range of biospecimens (eg, serum, plasma, feces, placentas, and amniotic fluid) that were collected at distinct time points in pregnancy. All 7 studies that investigated butyrate found that it was lower in PE cases than in controls, with 6 of these showing statistical significance ($P < .05$). Five studies showed that acetate was significantly lower in individuals with PE compared with healthy individuals, while 1 study found that acetate was significantly higher in PE cases. One study reported significantly higher propionate among PE cases vs controls, while 2 studies reported significantly lower propionate levels in PE cases. The nuance in results for acetate and propionate may owe to reasons such as differences in distributions of population characteristics associated with SCFA level and PE or type of PE (early vs late).

Conclusion: Current epidemiologic evidence, which derives only from case-control studies, suggests that SCFAs, particularly butyrate (protective), in pregnancy are related to the development of PE. Large-cohort studies are warranted to investigate the temporality and potential causality of these associations.

Strengths and Limitations of Non-Survey-Based Data Sources for Assessing Adult Vaccination Coverage in the United States

Matthew F. Daley, Kamonthip J. Homdayjanakul, Laura P. Hurley, Peng-Jun Lu, Yuping Tsai, Carla L. Black, Suchita Patel, James A. Singleton, & Lori A. Crane

Expert Review of Vaccines

Abstract

Introduction: Non-survey-based data sources (e.g. electronic health records, administrative claims) have been used to estimate vaccination coverage among US adults. However, these data sources were not collected for research or surveillance purposes and may have substantial limitations. The objectives of this narrative review were to: 1) identify published studies that used non-survey-based data sources to estimate adult vaccination coverage for one or more routinely recommended vaccines; and 2) summarize the strengths and limitations of these data sources for coverage assessments.

Areas Covered: Thirty-four publications derived from 9 data sources were reviewed: 16 publications were in a general population (i.e. defined by age), 12 were among pregnant women, and 6 were among individuals with chronic health conditions. While several data sources used continuous health insurance enrollment to define the study population, doing so limited generalizability to stably insured populations. Methods for obtaining race and ethnicity data were complex and potentially subject to bias. None of the reviewed studies presented any formal assessment of vaccine data validity.

Expert Opinion: While multiple non-survey-based data sources have been used to assess adult vaccination coverage in the United States, important limitations exist, including related to generalizability, data validity, and risk of bias.

DisCo P-ad: Distance-Correlation-Based p-Value Adjustment Enhances Multiple Testing Corrections for Metabolomics

Debmalya Nandy, Debashis Ghosh, and Katerina Kechris

Metabolites

Abstract

Background: Due to scientific advancements in high-throughput data production technologies, omics studies, such as genomics and metabolomics, often give rise to numerous measurements per sample/subject containing several noisy variables that potentially cloud the true signals relevant to the desired study outcome(s). Therefore, correcting for multiple testing is critical while performing any statistical test of significance to minimize the chances of false or missed discoveries. Such correction practice is commonplace in genome-wide association studies (GWAS) but is also becoming increasingly relevant to metabolome-wide association studies (MWAS). However, many existing procedures may be too conservative or too lenient, only assume a linear association between the features, or have not been evaluated on metabolomics data.

Methods: One such multiple testing correction strategy is to estimate the number of statistically independent tests, called the effective number of tests, based on the eigen-analysis of the correlation matrix between the features. This effective number is then used for a subsequent single-step adjustment to obtain the pointwise significance level. We propose a modification to the p-value adjustment based on a more general measure of association between two predictors, the distance correlation, with a specific focus on MWAS.

Results: We assessed common GWAS p-value adjustment procedures and one tailored for MWAS, which rely on eigen-analysis of the Pearson's correlation matrix. Our study, including varying sample size-to-feature ratios, response types, and metabolite groupings, highlights the superior performance of the distance correlation.

Conclusion: We propose the distance-correlation-based p-value adjustment (DisCo P-ad) as a novel modification that can enhance existing eigen-analysis-based multiple testing correction procedures by increasing power or reducing false positives. While our focus is on metabolomics, DisCo P-ad can also readily be applied to other high-dimensional omics studies.

Prevalence and Correlates of Diadnosed and Probable Polycystic Ovary Syndrome (PCOS) in A Cohort of Parous Women

Wei Perng, Victoria W Fitz, Kyle Salmon, Marie-France Hivert, Maryam Kazemi, Sheryl L Rifas-Shiman, Jan Shifren, Emily Oken, Jorge E Chavarro

American Journal of Epidemiology

Abstract

Correlates of diagnosed and probable polycystic ovary syndrome (PCOS) among parous women were assessed in this study. A total of 557 women were recruited from multi-specialty clinics in eastern Massachusetts. The women were categorized as being diagnosed with PCOS based on medical records and self-reported clinician-diagnoses. A category of "probable PCOS" was created for women without a diagnosis but with ≥ 2 of the following: ovulatory dysfunction (cycle length < 21 or ≥ 35 days), hyperandrogenism (free testosterone concentration > 75th percentile), or elevated anti-Müllerian hormone (AMH) concentration (> 75th percentile). The remaining participants were placed in the "no PCOS" category, and characteristics were compared across groups. Of the total cohort, 9.7% had diagnosed and 9.2% had probable PCOS. The frequency of irregular cycles was similar for diagnosed and probable PCOS. Free testosterone and AMH levels were higher in women with probable than with diagnosed PCOS. Frequency of irregular cycles and both hormones were higher for the 2 PCOS groups vs the no PCOS group. Obesity prevalence for diagnosed PCOS was twice that of probable PCOS (43.9% vs 19.6%), yet the 2 groups had similar HbA1c and adiponectin values. Women with probable PCOS are leaner but have comparable glycemic traits to those with a formal diagnosis, highlighting the importance of assessing biochemical profiles among women with irregular cycles, even in the absence of overweight/obesity.

A Work and Off-Work Evaluation of Female Workers' Heat and Particulate Matter Exposures and Kidney Health in Guatemala

Jaime Butler-Dawson, Diana Jaramillo, Lyndsay Krisher, Karely Villarreal Hernandez, Laura Calvimontes, Miranda Dally, Yaqiang Li, Katherine A. James, Richard J. Johnson, Daniel Pilloni, Alex Cruz, Joshua Schaeffer, John Adgate, & Lee S. Newman

Journal of Climate Change and Health

Abstract

Background: An increasing number of women are performing farm labor in agrarian societies due to the out-migration of men impacted by the effects of climate change. Thus, it is important to understand how changing climatic conditions affect women's risk of occupational heat stress and other health issues.

Methods: For this longitudinal pilot study, we characterized repeat individual-level particulate matter (PM_5, aerodynamic diameter of ≤ 5 micrometers) and heat exposures and measured kidney function markers during workdays and rest days among female sugarcane workers in Guatemala. We used logistic mixed models with repeated measures to evaluate associations between kidney function and exposures.

Results: We observed that 45 % of the workers had reduced kidney function (estimated glomerular filtration rate [eGFR] < 90 mL/min/1.73 m_2) during the study. Levels of dehydration based on a urinary specific gravity >1.020 (28 %), acidic urine (30 %), and low potassium levels (31 %) were common. Environmental exposures (PM_5 and heat index) were significantly higher on workdays compared to rest days. Reduced kidney function was associated with increasing median heat index (odds ratio [OR]: 1.63, 95 % confidence interval [CI]: 1.29–2.08), low urine pH (OR: 4.21, 95 % CI: 1.08–16.40), and municipal drinking water source (OR: 6.52, 95 % CI: 1.23–34.57).

Discussion: The results from this study suggest that repeated occupational exposure to high levels of heat contributes to a reduction in renal function among these workers.

Conclusions: These findings can inform preventive strategies to better address women's health in the workplace, such as reducing heat stress and dehydration.

Associations of Food Group Intakes with Serum Carbon Isotope Ratio Values in Youth: Results from 2 Prospective Pediatric Cohort Studies

Catherine C Cohen, Mia Q Peng, Brenda M Davy, Wei Perng, Kartik Shankar, Dana Dabelea

Nutritional *Epidemiology*

Abstract

Background: The carbon isotope ratio (CIR) is a candidate biomarker for sugar-sweetened beverage (SSB) intake in the United States. However, research specific to youth, who differ in their physiology and dietary patterns compared with adults, is lacking.

Objectives: We evaluated longitudinal associations of SSB intakes across childhood/adolescence with serum CIR. We also explored the relationship between other dietary intakes and serum CIR.

Methods: Data were from participants in two longitudinal, pediatric cohorts in Colorado: Exploring Perinatal Outcomes among CHildren (EPOCH) study (visits at median 10 and 16 y, n = 150) and Healthy Start Study (visits at median 5 and 9 y, n = 166). Serum CIR was measured using isotope ratio mass spectrometry. Diet was assessed by food-frequency questionnaires (EPOCH) or 24-h diet recalls (Healthy Start). We assessed associations of longitudinal dietary intakes (log2-transformed, standardized) with serum CIR using linear mixed models adjusted for age, sex, and energy intake, and associations of change values between visits using linear regression models.

Results: In linear mixed models, higher SSB intake across visits was associated with higher serum CIR in both cohorts [β (95% confidence interval (CI)): 0.11 (0.06, 0.15) in EPOCH and 0.14 (0.07, 0.21) in Healthy Start]. Higher meat intake and a higher dietary animal protein ratio were also positively associated with serum CIR in both cohorts [β (95% CI): 0.08 (0.05, 0.12) and 0.18 (0.13, 0.23) in EPOCH; 0.08 (0.01, 0.16) and 0.28 (0.21, 0.35) in Healthy Start]. In change analyses, there were positive associations for changes in the dietary animal protein ratio between visits with changes in serum CIR in both cohorts, but not for changes in SSB intake.

Conclusions: Our findings support serum CIR as a potential biomarker of SSB intake in youth cross-sectionally; however, there was not a strong link between change values over longer-term follow-up. Meat/animal protein intake was also consistently and, at times, more strongly associated with serum CIR.

Healthcare Utilization Patterns Before and After A Long COVID Diagnosis: A Case-Control Study

Rick DeVoss, Elizabeth J. Carlton, Sarah E. Jolley, Marcelo C. Perraillon

BMC Public Health

Abstract

Background: Documenting Long COVID cases has been challenging partly due to the lack of population-level data and uncertain diagnostic criteria, hindering the ability to ascertain healthcare utilization patterns over time. The objective of this study is to examine the characteristics and healthcare utilization patterns of Long COVID patients in Colorado pre- and post-diagnosis compared to controls.

Methods: Retrospective, longitudinal case-control study using a 100% sample of Colorado's All-Payer Claims Database. The sample includes individuals 18 or older diagnosed with Long COVID between October 1, 2021, and August 1, 2022, with patients followed until August 2023. Long COVID was identified using the International Classification of Diseases, 10th Revision, U09.9 code in medical insurance claims. Analysis of healthcare utilization required one year of continuous enrollment before and after diagnosis. Controls were matched 2:1 on age group, sex, payer, and index month to account for contemporaneous trends in utilization.

Results: 26,358 individuals were ever diagnosed with Long COVID, resulting in a claims-based prevalence of 674 per 100,000 during the study period (population 3,906,402 individuals). Of these, 12,698 individuals had continuous enrollment and a Long COVID diagnosis: mean (SD) age, 59.0 (17.1); 65.3% female; 60.1% white; 83.0% residing in urban areas. The Long COVID sample was matched with 25,376 controls. Before diagnosis, 17% of Long COVID patients were hospitalized at least once, and 40% visited an emergency department on at least one occasion. Within the year following diagnosis, utilization of acute healthcare services significantly decreased relative to controls: hospitalizations, -6.1percentage points (p.p.), emergency department visits, -7.7 p.p., whereas outpatient services and medications increased: office visits, 3.6 p.p.; specialist office visits, 4.7 p.p.; and 5.2 new medications, (controls: 2.8). Changes in diagnoses of some conditions (e.g., metastatic carcinomas and lung cancer) were similar between groups.

Conclusions and Relevance: Long COVID patients increased outpatient healthcare utilization following a diagnosis, switching from acute care settings. The change in service settings among this population suggests that diagnosis could lead to better patient management. Healthcare utilization among these patients is high, underscoring the need to understand the Long COVID burden on healthcare systems with population-level data.

Mast Cells are Key Mediators in the Pulmonary Inflammatory Response to Formaldehyde Exposure

Matthew Gibb, Angela N Reinert, Troy Schedin, Daniel T Merrick, Jared M Brown, Alison K Bauer

Toxicological Sciences

Abstract

Formaldehyde (FA) is a common chemical linked to respiratory problems such as airway hyperresponsiveness and pulmonary inflammation. Due to its toxicological effects and ease of mass production, FA is also recognized as a significant chemical threat by the U.S. Department of Homeland Security. This study investigates the role of mast cells in the pulmonary inflammatory response to acute high-dose FA exposure. Using wild-type (C57BL/6J) and mast cell-deficient ($Kit^{W\text{-}sh}$) mouse models, we assessed the impact of oropharyngeal aspiration of FA on lung pathology. Our findings reveal that C57BL/6J mice experienced significant increases in cellular infiltration, altered immune cell populations, and changes in lipid mediator profiles. In contrast, $Kit^{W\text{-}sh}$ mice exhibited significantly reduced inflammatory responses. Notably, the presence of mast cells was associated with enhanced dendritic cell migration and differential production of bioactive lipid mediators, such as specialized pro-resolving mediators and pro-inflammatory leukotrienes in C57BL/6J mice. These results highlight the crucial role of mast cells in the immune response to FA and suggest they could be therapeutic targets for treating FA-induced lung inflammation.