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Assembly on Environmental, Occupational, and Population Health Newsletter

Volume 5 | Issue 6
July 2019

EOPH **Web Editorial** **Committee**

Tara Nordgren, PhD
Anna Nolan, MD
Christopher Rider, PhD
Nuria Camina Garcia, PhD



TID Section **Web Editorial** **Committee**

Satya Achanta, DVM, PhD



Dear EOPH members,

We hope everyone is enjoying their summer! In this July issue of the EOPH newsletter, we include some of our members' recent "epub ahead of print" articles. Do you have a recent publication and want to make sure it makes it in the monthly EOPH Newsletter? Please send the citation or link to tara.nordgren@medsch.ucr.edu.

As a reminder, the deadline to submit ATS Project Applications is **July 31st**. Included in this newsletter is additional information from Dr. Chris Carlsten regarding how to apply.

Are you interested in getting more involved with ATS and the EOPH assembly? Register [HERE](#) to indicate your interest!

Do you have a topic you would like to hear more about or a journal article that you would like to hear discussed? Send all ideas/announcements to tara.nordgren@medsch.ucr.edu.

Sincerely,

Your EOPH and TID Web Editorial Committees



Recent publications

This section highlights some of our assembly members' exciting research that was recently 'e-published.' It is possible that our search may miss your best work, so please send your recent publications to tara.nordgren@medsch.ucr.edu.

Air Pollution and Environmental Exposures

[Ambient Air Pollution, Asthma Drug Response and Telomere Length in African American Youth.](#) Lee EY, Oh SS, White MJ, Eng CS, Elhawary JR, Borrell LN, Nuckton TJ, Zeiger AM, Keys KL, Mak ACY, Hu D, Huntsman S, Contreras MG, Samedy LA, Goddard PC, Salazar SL, Brigino-Buenaventura EN, Davis A, Meade KE, LeNoir MA, Lurmann FW, Burchard EG, Eisen EA, Balmes JR. *J Allergy Clin Immunol.* 2019 Jun 24. pii: S0091-6749(19)30820-6. doi: 10.1016/j.jaci.2019.06.009. [Epub ahead of print] PMID: 31247265

[Exposure to Traffic-Related Air Pollution, Supplemental Folate Intake, and Live Birth Among Women Undergoing Assisted Reproduction.](#) Gaskins AJ, Mínguez-Alarcón L, Fong KC, Awad YA, Di Q, Chavarro JE, Ford JB, Coull BA, Schwartz J, Kloog I, Attaman J, Hauser R, Laden F. *Am J Epidemiol.* 2019 Jun 26. pii: kwz151. doi: 10.1093/aje/kwz151. [Epub ahead of print] PMID: 31241127

[Near-roadway air pollution exposure and altered fatty acid oxidation among adolescents and young adults - The interplay with obesity.](#) Chen Z, Newgard CB, Kim JS, Ilkayeva O, Alderete TL, Thomas DC, Berhane K, Breton C, Chatzi L, Bastain TM, McConnell R, Avol E, Lurmann F, Muehlbauer MJ, Hauser ER, Gilliland FD. *Environ Int.* 2019 Jun 22;130:104935. doi: 10.1016/j.envint.2019.104935. [Epub ahead of print] PMID: 31238265

[Associations of gestational diabetes mellitus with residential air pollution exposure in a large Southern California pregnancy cohort.](#) Jo H, Eckel SP, Chen JC, Cockburn M, Martinez MP, Chow T, Lurmann F, Funk WE, McConnell R, Xiang AH. *Environ Int.* 2019 Jun 21;130:104933. doi: 10.1016/j.envint.2019.104933. [Epub ahead of print] PMID: 31234004

[Associations between ambient particle radioactivity and lung function.](#) Nyhan MM, Rice M, Blomberg A, Coull BA, Garshick E, Vokonas P, Schwartz J, Gold DR, Koutrakis P. *Environ Int.* 2019 Jun 11;130:104795. doi: 10.1016/j.envint.2019.04.066. [Epub ahead of print] PMID: 31200155

[County-level radon exposure and all-cause mortality risk among Medicare beneficiaries.](#) Yitshak-Sade M, Blomberg AJ, Zanobetti A, Schwartz JD, Coull BA, Kloog I, Dominici F, Koutrakis P. *Environ Int.* 2019 Jun 11;130:104865. doi: 10.1016/j.envint.2019.05.059. [Epub ahead of print] PMID: 31200153

[Long-term Exposure to Ozone and Cardiopulmonary Mortality: Epidemiology Strikes Again.](#) Balmes JR. *Am J Respir Crit Care Med.* 2019 Jun 11. doi: 10.1164/rccm.201906-1105ED. [Epub ahead of print] No abstract available. PMID: 31185178

Asthma and Allergy

[Racial, ethnic, and socioeconomic differences in adolescent food allergy.](#) Coulson E, Rifas-Shiman SL, Sordillo J, Bunyavanich S, Camargo CA Jr, Platts-Mills TAE, Coull BA, Luttmann-Gibson H, Oken E, Gold DR, Rice MB. *J Allergy Clin Immunol Pract.* 2019 Jun 22. pii: S2213-2198(19)30557-4. doi: 10.1016/j.jaip.2019.06.006. [Epub ahead of print] No abstract available. PMID: 31233938

[Sleep Duration, Current Asthma, and Lung Function in a Nationwide Study of U.S. Adults.](#) Yang G, Han YY, Sun T, Li L, Rosser F, Forno E, Patel SR, Chen W, Celedón JC. *Am J Respir Crit Care Med.* 2019 Jun 21. doi: 10.1164/rccm.201905-1004LE. [Epub ahead of print] No abstract available. PMID: 31225970

[Racial/ethnic-specific differences in the effects of inhaled corticosteroid use on bronchodilator response in patients with asthma.](#) Samedy-Bates LA, Oh SS, Nuckton TJ, Elhawary JR, White M, Elliot T, Zeiger AM, Eng C, Salazar S, LeNoir MA, Meade K, Farber HJ, Serebrisky D, Brigino-Buenaventura E, Rodriguez-Cintron W, Bibbins-Domingo K, Kumar R, Thyne S, Borrell LN, Rodriguez-Santana JR, Pino-Yanes M, Burchard EG. *Clin Pharmacol Ther.* 2019 Jun 18. doi: 10.1002/cpt.1555. [Epub ahead of print] PMID: 31209858

[Distinct Nasal Airway Bacterial Microbiota Differentially Relate to Exacerbation in Pediatric Asthma.](#) McCauley K, Durack J, Valladares R, Fadrosch DW, Lin DL, Calatroni A, LeBeau PK, Tran HT, Fujimura KE, LaMere B, Merana G, Lynch K, Cohen RT, Pongracic J, Khurana Hershey GK, Kercksmar CM, Gill M, Liu AH, Kim H, Kattan M, Teach SJ, Togias A, Boushey HA, Gern JE, Jackson DJ, Lynch SV; NIAID-sponsored Inner-City Asthma Consortium. *J Allergy Clin Immunol.* 2019 Jun 12. pii: S0091-6749(19)30758-4. doi: 10.1016/j.jaci.2019.05.035. [Epub ahead of print] PMID: 31201890

[DNA methylation is associated with inhaled corticosteroid response in persistent childhood asthmatics.](#) Wang AL, Gruziova O, Qiu W, Merid SK, Celedón JC, Raby BA, Söderhäll C, DeMeo DL, Weiss ST, Melén E, Tantisira KG. *Clin Exp Allergy.* 2019 Jun 12. doi: 10.1111/cea.13447. [Epub ahead of print] PMID: 31187518

COPD

[Serotonin system gene variants and regional brain volume differences in pediatric OCD.](#) Sinopoli VM, Erdman L, Burton CL, Easter P, Rajendram R, Baldwin G, Peterman K, Coste J, Shaheen SM, Hanna GL, Rosenberg DR, Arnold PD. *Brain Imaging Behav.* 2019 Jun 11. doi: 10.1007/s11682-019-00092-w. [Epub ahead of print] PMID: 31187473

Cellular Mechanisms

[Epigenome-wide effects of vitamin D on asthma bronchial epithelial cells.](#) Boutaoui N, Puranik S, Zhang R, Wang T, Hui DH, Brehm J, Forno E, Chen W, Celedón JC. *Epigenetics.* 2019 Jun 3:1-6. doi: 10.1080/15592294.2019.1622993. [Epub ahead of print] PMID: 31122150

[Binding host proteins to the M protein contributes to the mortality associated with influenza-Streptococcus pyogenes superinfections.](#) Herrera AL, Suso K, Allison S, Simon A, Schlenker E, Huber VC, Chaussee MS. *Microbiology.* 2017 Sep 25. doi: 10.1099/mic.0.000532. [Epub ahead of print] PMID: 28942759

Occupational Exposures

[Association of Obesity with Quantitative Chest CT Measured Airway Wall Thickness in WTC Workers with Lower Airway Disease.](#) de la Hoz RE, Liu X, Celedón JC, Doucette JT, Jeon Y, Reeves AP, San José Estépar R. *Lung.* 2019 Aug;197(4):517-522. doi: 10.1007/s00408-019-00246-z. Epub 2019 Jun 28. PMID:31254057

Research Methods, Therapeutics, and Clinical Strategies

[Designing and executing a functional exercise to test a novel informatics tool for mass casualty triage.](#) Donevant SB, Svendsen ER, Richter JV, Tavakoli AS, Craig JBR, Boltin ND, Valafar H, DiNardi SR, Culley JM. *J Am Med Inform Assoc.* 2019 Jun 27. pii: ocz087. doi: 10.1093/jamia/ocz087. [Epub ahead of print] PMID: 31246255

[Multimodality Treatment of Advanced Endobronchial Disease - Photodynamic Therapy with Curative Intent.](#) Glisinski K, Moulton N, Giovacchini C, Wahidi M, Cheng G. *Am J Respir Crit Care Med.* 2019 Jun 25. doi: 10.1164/rccm.201901-0123IM. [Epub ahead of print] No abstract available. PMID: 31237778

[Diagnostic value of spirometry vs impulse oscillometry: A comparative study in children with sickle cell disease.](#) Mondal P, Yirinec A, Midya V, Sankoorikal BJ, Smink G, Khokhar A, Abu-Hasan M, Bascom R. *Pediatr Pulmonol.* 2019 Jun 18. doi: 10.1002/ppul.24382. [Epub ahead of print] PMID: 31211524

Training and Outcomes

[Global Health-related Training Opportunities: A National Survey of Pulmonary and Critical Care Medicine Fellowship Programs.](#) North CM, Attia EF, Rudd KE, Siddharthan T, Papali A, Çoruh B, Carter EJ, Christiani DC, Richards JB, Huang L, Engelberg R, Checkley W, West TE. *Ann Am Thorac Soc.* 2019 Jun 14. doi: 10.1513/AnnalsATS.201812-856OC. [Epub ahead of print] PMID: 31199665

[Primary adrenal insufficiency in the United States: diagnostic error and patient satisfaction with treatment.](#) Regan EA, Vaidya A, Margulies PL, Make BJ, Lowe KE, Crapo JD. *Diagnosis (Berl).* 2019 Jun 29. pii: /j/dx.ahead-of-print/dx-2019-0013/dx-2019-0013.xml. doi: 10.1515/dx-2019-0013. [Epub ahead of print] PMID:31256064

[Perceived Adequacy of Tangible Social Support and Associations with Health Outcomes Among Older Primary Care Patients.](#) O'Connor R, Benavente JY, Arvanitis M, Curtis LM, Eldeirawi K, Hasnain-Wynia R, Federman AD, Hebert-Beirne J, Wolf MS. *J Gen Intern Med.* 2019 Jun 26. doi: 10.1007/s11606-019-05110-7. [Epub ahead of print] PMID: 31243708

Sarcoidosis

[Radiomic Measures from Chest HRCT Associated with Lung Function in Sarcoidosis.](#) Ryan SM, Fingerlin TE, Mroz M, Barks B, Hamzeh N, Maier LA, Carlson NE. *Eur Respir J.* 2019 Jun 13. pii: 1900371. doi: 10.1183/13993003.00371-2019. [Epub ahead of print] PMID:31196947

[Electrophysiologic Testing for Diagnostic Evaluation and Risk Stratification in Patients with Suspected Cardiac Sarcoidosis with Preserved Left and Right Ventricular Systolic Function.](#) Zipse MM, Tzou WS, Schuller JL, Aleong RG, Varosy PD, Tompkins C, Borne RT, Tumolo AZ, Sandhu A, Kim D, Freeman AM, Weinberger HD, Maier LA, Sung RK, Nguyen DT, Sauer WH. *J Cardiovasc Electrophysiol.* 2019 Jun 30. doi: 10.1111/jce.14058. [Epub ahead of print] PMID:31257683

Nutrition and Health

[Belief in the Need for Sodium Supplementation During Ultramarathons Remains Strong: Findings from the Ultrarunners Longitudinal TRacking \(ULTRA\) Study.](#) Hoffman MD, White MD. *Appl Physiol Nutr Metab.* 2019 Jun 4. doi: 10.1139/apnm-2019-0238. [Epub ahead of print] PMID: 31163112

Cardiovascular Disease

[Carotid artery displacement and cardiovascular disease risk in the Multi-Ethnic Study of Atherosclerosis.](#) Gepner AD, McClelland RL, Korcarz CE, Young R, Kaufman JD, Mitchell CC, Stein JH. *Vasc Med.* 2019 Jun 13:1358863X19853362. doi: 10.1177/1358863X19853362. [Epub ahead of print] PMID: 31195916

Cancer

[Serum levels of 25-Hydroxyvitamin D at diagnosis are not associated with overall survival in esophageal adenocarcinoma.](#) Loehrer E, Betensky RA, Giovannucci EL, Su L, Shafer A, Hollis BW, Christiani DC. *Cancer Epidemiol Biomarkers Prev.* 2019 Jun 11. pii: cebp.1190.2018. doi: 10.1158/1055-9965.EPI-18-1190. [Epub ahead of print] PMID: 31186263

[Body Mass Index \(BMI\), BMI Change, and Overall Survival in Patients With SCLC and NSCLC: A Pooled Analysis of the International Lung Cancer Consortium.](#) Shepshelovich D, Xu W, Lu L, Fares A, Yang P, Christiani D, Zhang J, Shiraishi K, Ryan BM, Chen C, Schwartz AG, Tardon A, Wu X, Schabath MB, Teare MD, Le Marchand L, Zhang ZF, Field JK, Brenner H, Diao N, Xie J, Kohno T, Harris CC, Wenzlaff AS, Fernandez-Tardon G, Ye Y, Taylor F, Wilkens LR, Davies M, Liu Y, Barnett

MJ, Goodman GE, Morgenstern H, Holleczeck B, Brown MC, Liu G, Hung R. J Thorac Oncol. 2019 Jun 1. pii: S1556-0864(19)30416-2. doi: 10.1016/j.jtho.2019.05.031. [Epub ahead of print] PMID: 31163278

[Depression, Anxiety, and Stress in Parents of Patients with Retinoblastoma.](#) Collins MLZ, Bregman J, Ford JS, Shields CL. Am J Ophthalmol. 2019 Jun 1. pii: S0002-9394(19)30252-1. doi: 10.1016/j.ajo.2019.05.020. [Epub ahead of print] PMID: 31163135

Interstitial Lung Disease

[Teleradiology: An opportunity to improve outcomes in pulmonary fibrosis.](#) Bertolini A, Capaccione K, Austin JHM, Blum A, Padilla M, DSouza B, Yankelevitz D, Henschke CI, Salvatore MM. Clin Imaging. 2019 Jun 13. pii: S0899-7071(19)30099-3. doi: 10.1016/j.clinimag.2019.05.011. [Epub ahead of print] No abstract available. PMID:31324434

[Pneumoproteins KL-6 and CCL-18 Predict Progression of Interstitial Lung Disease in Systemic Sclerosis.](#) Volkman ER, Tashkin DP, Kuwana M, Li N, Roth MD, Charles J, Hant FN, Bogatkevich GS, Akter T, Kim G, Goldin J, Khanna D, Clements PJ, Furst DE, Elashoff RM, Silver RM, Assassi S. Arthritis Rheumatol. 2019 Jun 24. doi: 10.1002/art.41020. [Epub ahead of print] PMID: 31233287

Terrorism and Inhalational Disasters Section Updates



Know your current officers of ATS-TID section

Chair: [Erik R. Svendsen, PhD](#). Dr. Svendsen is the Director of the Division of Environmental Health Science and Practice at the National Center for Environmental Health, a part of the Centers for Disease Control and Prevention (CDC).



Co-Chair: [Rakesh Patel, PhD](#). Dr. Patel is currently working as Professor and Interim Vice Chair for Research, Department of Pathology (Molecular and Cellular Division) at the University of Alabama at Birmingham. Please find his [research interests and accomplishments](#) here.



Nominating committee Chair: [Sven-Eric Jordt, PhD](#). Dr. Jordt served as Chair of TID section in 2018-2019. He has been very active in keeping the TID section, particularly through social media. Dr. Jordt made seminal contributions to the field of medical countermeasures. His work has largely involved TRP channel biology and their role in chemical threat agents-induced pulmonary injuries. His extensive investigation of sensory TRP ion channels and their role in responding to physical and chemical signals resulted in the identification of the sensory ion channel TRPA1 as the major receptor for reactive environmental toxicants and inflammatory agents in sensory neurons innervating the airways.



Nominating committee Member: [Matthew D. McGraw, MD](#). Dr. McGraw's clinical interests include Childhood Interstitial Lung Diseases, bronchiolitis Obliterans, Chronic Lung Disease of Prematurity, Asthma, and Cystic Fibrosis. Dr. McGraw's research involves understanding the mechanisms of aberrant airway epithelial repair after inhalation injuries. The primary pediatric lung disease studied is bronchiolitis obliterans (BO), a devastating and often progressive fibrotic lung disease characterized by progressive luminal narrowing and obliteration of the small airways, or bronchioles. Despite BO's high morbidity and mortality, very little is known about its pathogenesis, and even less is available in terms of prevention, intervention and treatment.



Inhalation agents used to study the mechanisms of aberrant airway epithelial repair include sulfur mustard (SM), a chemical warfare inhalation agent, and diacetyl, a volatile chemical in many flavorings. Both of these inhalation agents can cause bronchiolitis obliterans in children.

Nominating committee Member: [Sky Vanderburg, MD](#). Dr. Vanderburg is currently working as a fellow at University of California, San Francisco in Pulmonary and Critical Care Medicine.

He was a Global Health Fellow with the Ruhuna-Duke Partnership in Galle, Sri Lanka. He characterized the epidemiology of severe acute respiratory infections (SARI) in tropical climates and explored the role of host-based diagnostics in reducing unnecessary antimicrobial use.



EOPH planning committee Rep: [Matthew D. McGraw, MD](#), University of Rochester

EOPH program committee Rep: [Shama Ahmad, PhD](#). Dr. Ahmad is Associate Professor at The University of Alabama, Birmingham. Dr. Shama Ahmad's laboratory is focused on investigating mechanisms of toxic inhaled environmental or industrial chemical-induced pulmonary and/or cardiac toxicity, with the aim to establish agents/methods to mitigate the harmful effects of these agents.



Chair appointee: [Rafael de la Hoz](#), MD, MPH, MSc. Dr. Hoz is professor of Environmental Medicine and Public Health. He also serves as professor of general internal medicine at Mount Sinai. He is a board certified pulmonologist, occupational medicine specialist, and internist.



He has had a career of research and clinical interest in occupational respiratory toxicology and occupational obstructive lung diseases. Since joining Mount Sinai in late 2002, he has followed and characterized the types of bronchial disease associated with occupational toxicant exposures at the WTC disaster site. From his initial clinical descriptions, he moved to the investigation, as the principal investigator of a [federally funded research project](#), of the correlation of symptoms, functional, and qualitative and quantitative chest CT scan findings in the WTC occupational cohort followed at Mount Sinai. Dr. de la Hoz consults as an impartial pulmonary and occupational medicine specialist to the New York State Workers' Compensation Board.

Web Director: [Satya Achanta](#), DVM, PhD. Dr. Achanta is working as a junior faculty in the department of anesthesiology under the direction of Dr. Sven-Eric Jordt at Duke University School of Medicine. Dr. Achanta is a North Carolina state-licensed and the United States Department of Agriculture (USDA) accredited category II veterinarian. In Dr. Jordt's laboratory, he discovered transient receptor potential (TRP) ion channels as mediators of inflammation caused by several chemical threat agents, including chlorine gas, sulfur mustard, and tear gas agents. He is an expert in rodent and large animal inhalational injury models.



TID section is on  [twitter](#)
Follow TID section on [@ATSTIDSection](#)



TID section is soliciting ideas for putting together **podcasts, webinars, and journal clubs**. Please contact Satya Achanta, DVM, PhD (satya.achanta@duke.edu), Web Director of TID section, if you are interested to lead any of these activities. Also, please email your publications, news articles, or presentations pertinent to TID section to include in the future EOPH newsletters.

Call for ATS 2020 Project Applications, DUE JULY 31st

Dear EOPH assembly members,

ATS-sponsored projects may not be familiar to all, but they are a vital and powerful lever for our mission.

Here is a site that explains them, for those unfamiliar.

<http://www.thoracic.org/members/assemblies/about/assembly-project-application-resource-center.php>

In that site, there are links to actual examples (successful) and attached to this email is also an example of success from EOPH specifically, for workshops (the most common type of projects, though the link above shows other types of projects). This is for your guidance (though you should avoid 'cookbook' approach because each proposal needs be tailored).

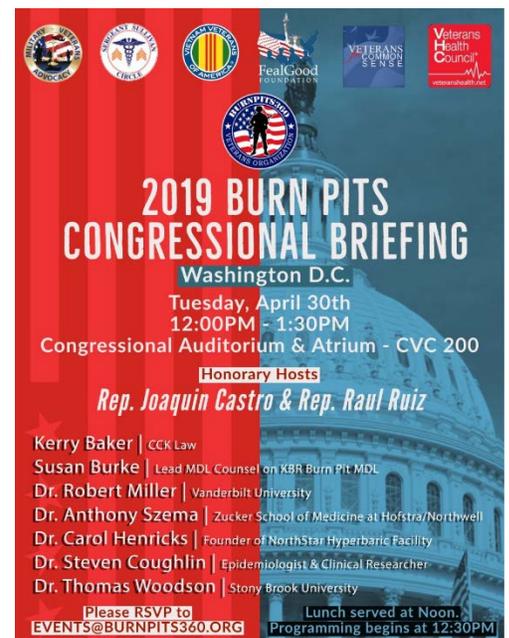
My advice is to 'hop on' <http://www.thoracic.org/assemblies/project-application.php> and start filling it out – once you do so, the momentum will carry you through (and be aware that it need not be perfect – ATS has the prerogative after the July 31 deadline to take those that are conceptually attractive at high level and give feedback to allow improvement before they are truly finalized).

Please let me know if you have questions – it can be confusing and I am happy to help.

Thanks
Chris Carlsten

2019 Burn Pits Congressional Briefing, April 30th, 2019

Drs. Anthony Szema and Robert Miller from the ATS gave a Congressional Briefing on Capitol Hill April 30, 2019 before Congresspersons Joaquin Castro, Raul Ruiz, MD, MPH, Tulsi Gabbard and Senator Tom Udall at the 2019 Burn Pits Congressional Briefing. Szema and Miller highlighted the ongoing health hazards of burning trash and the long-term consequences deployed soldiers incur.



The poster features logos for the Department of Defense, Department of Health and Human Services, Environmental Protection Agency, and Veterans Health Council. The main text reads: "2019 BURN PITS CONGRESSIONAL BRIEFING Washington D.C. Tuesday, April 30th 12:00PM - 1:30PM Congressional Auditorium & Atrium - CVC 200 Honorary Hosts Rep. Joaquin Castro & Rep. Raul Ruiz". A list of speakers includes Kerry Baker (CCK Law), Susan Burke (Lead MDL Counsel on KBR Burn Pit MDL), Dr. Robert Miller (Vanderbilt University), Dr. Anthony Szema (Zucker School of Medicine at Hofstra/Northwell), Dr. Carol Henricks (Founder of NorthStar Hyperbaric Facility), Dr. Steven Coughlin (Epidemiologist & Clinical Researcher), and Dr. Thomas Woodson (Stony Brook University). It also includes the RSVP email EVENTS@BURNPITS360.ORG and notes that lunch is served at noon and programming begins at 12:30PM.

New York Times published Op-Ed “PM2.5 kills people” by Dr. John Balms



“PM 2.5 kills people”. So begins a recent op-ed piece by Dr. John Balms in the New York Times. Balms’ piece is one of two recent articles in the popular press that expertly highlight the science and public policies surrounding outdoor and indoor air pollution. In the New York Times article, “Don’t Let a Killer Pollutant Loose”, Dr. Balms draws attention to recent changes at the Environmental Protection Agency, and the Clean Air Scientific Advisory Committee specifically, that have the potential to discredit clean air quality standards- standards that are based on decades of peer-reviewed scientific evidence. Dr. Balms was also quoted in the recent

New Yorker article “The Hidden Air Pollution in Our Homes”, that explored dangerous

emissions from common domestic activities (such as cooking Thanksgiving dinner!) “Is inhaling particles from diesel engines worse than inhaling particles from fried foods?” (Balmes) said. “The research hasn’t been done.” Check out these insightful articles online and pass them on to friends and colleagues!

Don’t Let a Killer Pollutant Loose, by Dr. John Balmes

<https://www.nytimes.com/2019/04/14/opinion/air-pollution-trump.html>

The Hidden Air Pollution in Our Homes

<https://www.newyorker.com/magazine/2019/04/08/the-hidden-air-pollution-in-our-homes>

Interesting Clinical Cases?

The web committee is currently calling for “Quick Hit” clinical cases, which will be posted on the website and highlighted in this newsletter. This is an excellent peer-reviewed writing opportunity for trainees. Submit clinical cases to tara.nordgren@medsch.ucr.edu.