

**CURRICULUM VITAE**  
**University of Colorado**  
**School of Medicine**

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**BIOGRAPHICAL**

**Name:** Fernando Holguin, MD, MPH    **Birth Date:** 8/29/1967  
**E-mail address:** fernando.holguin@cuanschutz.edu  
**Business Address:** Pulmonary Sciences  
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**EDUCATION AND TRAINING**

**GRADUATE:**

1986 - 1991            La Salle University School of Medicine            MD 1991  
Mexico City, Mexico

**POST GRADUATE:**

1992 - 1995            Emory University School of Medicine            Residency in Internal Medicine  
Atlanta, GA

1995 - 1996            Emory University School of Medicine            Chief Medical Resident  
Atlanta, GA

1996 - 1999            Emory University School of Medicine            Pulmonary & CC Fellowship  
Atlanta, GA

2003 - 2007            Rollins School of Public Health, Emory            MPH (Epidemiology)  
Atlanta, GA

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**APPOINTMENTS AND POSITIONS**

**ACADEMIC:**

2001 - 2008            Emory University                                    Assistant Professor of Medicine  
Atlanta, GA

2001 - 2008            Centers for Disease Control and Prevention    Medical Epidemiologist  
Atlanta, GA

2005 - 2008	Emory University Atlanta, GA	Assistant Professor of Occupational and Environmental Health
10/2008 – 1/2009	University of Pittsburgh PA	Visiting Assistant Professor of Pittsburgh, Medicine
2/2009 – 2/2013	University of Pittsburgh Pittsburgh, PA	Assistant Professor of Medicine
2/2009 - 2/2013	University of Pittsburgh Pittsburgh, PA	Assistant Professor of Pediatrics Secondary Appointment
2/2009 – 3/2013	University of Pittsburgh Pittsburgh, PA	Assistant Professor of Environmental and Occupational Health Secondary Appointment
2010 – 3/2013	University of Pittsburgh Pittsburgh, PA	Assistant Professor Clinical & Translational Research Secondary Appointment
3/2013 – 7/2016	University of Pittsburgh Pittsburgh, PA	Associate Professor of Medicine
3/2013 – 7/2016	University of Pittsburgh Pittsburgh, PA	Associate Professor of Pediatrics Secondary Appointment
3/2013 – 7/2016	University of Pittsburgh Pittsburgh, PA	Associate professor Occupational and Environmental Health Secondary Appointment
7/2014 - 7/2016	University of Pittsburgh Pittsburgh, PA	Program Director, Clinical Translational Research Center at UPMC Montefiore
8/2016 – 6/2018	University of Colorado Denver, CO	Associate Professor Medicine
8/2016 – 6/2018	University of Colorado Denver, CO	Associate Professor of Pediatrics Secondary Appointment
7/2018 – Present	University of Colorado Denver, CO	Professor Medicine
7/2018 – Present	University of Colorado Denver, CO	Professor of Pediatrics Secondary Appointment

**NON-ACADEMIC:**

1999 - 2001	National Institute of Public Health, Mexico	Associate Researcher
2004 - 2006	Emory University School of Medicine	Scientific Committee, Student

		Summer Research Program
2001 - 2008	Center for Disease Control	Researcher, Respiratory and Air Pollution Branch
2002 - 2007	Grady Memorial Hospital	Director, Adult Asthma & Allergy Clinic
2006 - 2008	Asthma Translational Research Program	Director
2007 - 2008	Crawford Long Hospital	Director, Asthma Clinic
2008 - 2011	University of Pittsburgh, Children's Hospital	Medical Director Pediatric Environmental Medicine Research Center
2008 – 07/2016	Asthma Institute, University of Pittsburgh	Assistant Director
8/2016 - Present	University of Colorado	Director, Asthma Clinical and Research Program, Centers for Lungs and Breathing
8/2016 – Present	University of Colorado	Director, Latino Research and Policy Center
2017 – Present	University of Colorado	Director, University of Colorado's Pulmonary Translational Research Core

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## CERTIFICATION AND LICENSURE

### SPECIALTY CERTIFICATION:

American Board of Internal Medicine:	Internal Medicine	1997
	Pulmonary Medicine	2011
	Critical Care Medicine	2012

### MEDICAL LICENSURE:

Pennsylvania	2008
Georgia	1995
Colorado	2016

## MEMBERSHIPS IN PROFESSIONAL AND SCIENTIFIC SOCIETIES

American Thoracic Society	1996 – Present
European Respiratory Society	1999 – Present
Southern Society of Clinical Investigation	2006 – Present
ACCP Fellow (FCCP)	2012 – Present
AAAAI, member	2012 – Present
National Academy of Sciences, acute exposure Guidelines committee, elected member	2009 – 2011
American Heart Association, Expert committee On Cardiovascular effects of Particulate Matter Chair, EOH Program Committee, American Thoracic Society	2009 – 2010
Member, International Lung Health Committee American Thoracic Society	2009 – 2010
Member, International Conference Committee American Thoracic Society	2008 – 2010
Program Chair Allergy, Immunology & Inflammation Chair, American Thoracic Society	2009 – 2010
Health Equity & Diversity Member	2019 – 2021
American Thoracic Society Health Equity & Diversity Member	2018 – 2019
American Thoracic Publications Committee	2020 – Present
Member, Federal Drug Administration (FDA) Pulmonary/Allergy Drugs Advisory Committee	2021 – Present

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## HONORS AND AWARDS

Alpha Omega Alpha	1994
Best Resident in Internal Medicine, Emory University	1994
Golden Apple Award (Outstanding Teacher in Medicine), Emory University	2004, 2006
Elected, Southern Society of Clinical Investigation	2006
National EPA Children's Environmental Excellence Award	2006
Dean's Faculty Teaching Award, Emory University	2007
Fellow's Faculty Teaching Award, Emory University	2007
Award of Excellence for establishing the Asthma Translational Research Program within the Emory Respiratory Health Center	2007
American Thoracic Society Who's Who ( <a href="https://news.thoracic.org/community/whos-who/fernando-holguin-md-mph.php">https://news.thoracic.org/community/whos-who/fernando-holguin-md-mph.php</a> )	2020
James C. Campbell Endowed Chair in Pulmonary Medicine. Pulmonary Sciences and Critical Care, University of Colorado Department of Medicine, University of Colorado	2021

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## PUBLICATIONS

### Published or in press articles in peer-reviewed journals:

1. **Holguin F**, Moss I, Brown LA, Guidot DM. Chronic ethanol ingestion impairs alveolar type II cell glutathione homeostasis and function and predisposes to endotoxin-mediated acute edematous lung injury in rats. *J Clin Invest* 101(4):761-768, Feb 1998.
2. Guidot D, Moss M, **Holguin F**, Lois M, Brown L. Ethanol ingestion impairs alveolar epithelial glutathione homeostasis and function, and predisposes to endotoxin-mediated acute lung injury. *Chest*. 116(1 Suppl):82S, Jul 1999.
3. **Holguin F**, Tellez-Rojo MM, Hernandez M, et al. Air pollution and heart rate variability among the elderly in Mexico City. *Epidemiology*. 14(5):521-527, Sep 2003.
4. Marlene Cortez-Lugo, Ing, **Fernando Holguín-Molina**, MD, Silvia Flores-Luévano, MD, M en C, Isabelle Romieu, MD, MPH, DSc. Niveles ambientales de las PM2.5 y distancia a una vía de alto tránsito en Ciudad Juárez, Chihuahua, México. *Salud Pública de México* (46), noviembre-diciembre, 2004.
5. King ME, Mannino DM, **Holguin F**. Risk factors for asthma incidence. A review of recent prospective evidence. *Panminerva Med*. 46(2):97-110, Jun 2004.
6. Mannino DM, **Holguin F**, Greves HM, Savage-Brown A, Stock AL, Jones RL. Urinary cadmium levels predict lower lung function in current and former smokers: data from the Third National Health and Nutrition Examination Survey. *Thorax*. 59(3):194-198, 2004.
7. **Holguin F**, Folch E, Redd SC, Mannino DM. Comorbidity and mortality in COPD-related hospitalizations in the United States, 1979 to 2001. *Chest*. 128(4):2005-2011, Oct 2005.
8. **Holguin F**, Mannino DM, Anto J, et al. Country of birth as a risk factor for asthma among Mexican Americans. *Am J Respir Crit Care Med*. 171(2):103-108, Jan 2005.
9. **Holguin F**, Tellez-Rojo MM, Lazo M, et al. Cardiac autonomic changes associated with fish oil vs. soy oil supplementation in the elderly. *Chest*. 127(4):1102-1107, Apr 2005.
10. Kelley CF, Mannino DM, Homa DM, Savage-Brown A, **Holguin F**. Asthma phenotypes, risk factors, and measures of severity in a national sample of US children. *Pediatrics*. 115(3):726-731, Mar 2005.
11. Mannino DM, **Holguin F**, Pavlin BI, Ferdinands JM. Risk factors for prevalence of and mortality related to restriction on spirometry: findings from the First National Health and Nutrition Examination

- Survey and follow-up. *Int J Tuberc Lung Dis.* 9(6):613-621, Jun 2005.
12. Romieu I, Tellez-Rojo MM, Lazo M, **Holguin, F.** Omega-3 fatty acid prevents heart rate variability reductions associated with particulate matter. *Am J Respir Crit Care Med.* 172(12):1534-1540, Dec 2005.
  13. Riojas-Rodriguez H, **Holguin F,** Gonzalez-Hermosillo A, Romieu I. [Use of heartrate variability as a marker of cardiovascular effects associated with air pollution]. *Salud Publica Mex.* 48(4):348-357, Jul-Aug 2006. Spanish.
  14. Nurmagambetov T, Atherly A, Williams S, **Holguin F,** Mannino DM, Redd SC. What is the cost to employers of direct medical care for chronic obstructive pulmonary disease? *COPD.* 3(4):203-9, Dec 2006.
  15. Khatri S, Mermis J, Savill S, Haque S, Rojas M, Brown LA, Teague GW and **Holguin F.** Body mass index is associated with reduced exhaled nitric oxide and higher exhaled 8-isoprostanes in asthmatics. *Respiratory Research.* 8:32, 2007. PMID: 17437645 [PubMed - indexed for MEDLINE] PMCID: PMC1855924
  16. Boulet LP, Q, Komakula A, **Holguin F.** Airway adipokines in asthmatic and control obese adults. Proceedings from the McGill Symposium on Obesity and Asthma, *Canadian Respiratory Journal.* Vol 14 (4):201-8, May-Jun 2007.
  17. **Holguin, F,** Flores S, Ross Z, Molina M, Molina L, Granados A, Rincon C, Cortez M, Bernhave K, Jerret M, Romieu I. Traffic-related exposures, airway function, inflammation and respiratory symptoms in children. *Am J Respir Crit Care Med.* 176: 1236-1242, Dec 2007.
  18. **Holguin F,** Rojas M, and C. Hart M. The peroxisome proliferator activated receptor gamma (PPAR $\gamma$ ) ligand, rosiglitazone, modulates bronchoalveolar lavage levels of leptin, adiponectin and inflammatory cytokines in lean and obese mice. *Lung.* 185; 367-372, Dec 2007.
  19. Taylor B, Mannino D, Brown C, Crocker D, Twum-Baah N, **Holguin F.** Body mass index and asthma severity in the National Asthma Survey. *Thorax.* 63(1):14-20, 2008. PMID: 18156567
  20. Cortez-Lugo M, Moreno-Macias H, **Holguin-Molina F,** Chow JC, Watson JG, Gutierrez- Avedoy V, Mandujano F, Hernandez-Avila M, Romieu I. Relationship between indoor, outdoor, and personal fine particle concentrations for individuals with COPD and predictors of indoor-outdoor ratio in Mexico city. *J Expo Sci Environ Epidemiol.* 18; 109-115, 2008.
  21. Onufrak SJ, Abramson JL, Austin HD, **Holguin F,** McClellan WM and Vaccarino LV. Relation of Adult-Onset Asthma to Coronary Heart Disease and Stroke. *Am J Cardiol.* 101:1247–1252, May 1 2008. PMID: 18560490, PMCID: PMC2396340

22. **Holguin F.** Traffic, outdoor air pollution, and asthma. *Immunol Allergy Clin North Am.* 2008 Aug;28(3):577-88. PMID: 18572108
23. Schneider A, Neas L, Herbst MC, Case M, Williams RW, Cascio W, Hinderliter A, **Holguin F**, Buse JB, Dungan K, Styner M, Peters A, and Devlin RB. Endothelial Dysfunction: Associations with Exposure to Ambient Fine Particles in Diabetic Individuals. *Environ Health Perspect.* 2008 Dec;116(12):1666-74. PMID: 19079718 PMID: PMC2599761
24. **Holguin F**, Ramadan B, Roman J, Gal T. Prognostic factors for hospital mortality and ICU admission in patients with ANCA-related pulmonary vasculitis. *Am. J Med Sci,* 336(4):321-6. Oct 2008. PMID: 18854674
25. Mannino DM, Swensen Adri, Thorn D, **Holguin, F.** Prevalence and outcomes of diabetes, hypertension and cardiovascular disease in COPD. *Eur Respir J.* 32(4):962-9. Jun 2008 Epub. PMID: 18579551
26. Barraza-Villarreal A, Sunyer J, Hernandez-Cadena L, Escamilla-Nuñez MC, Sienna-Monge JJ, Ramírez-Aguilar M, Cortes-Lugo M, **Holguin F**, Diaz-Sánchez D, Olin AC, and Romieu I. Air Pollution, Airway Inflammation and Lung Function in a cohort study of Mexico City Schoolchildren. *Environ Health Perspect.* 116(6):832-8. Jun 2008 PMID: 18560490, PMID: PMC2430242
27. Romieu, I, Garcia-Esteban R, Sunyer J, Rios, C, Alcaraz-Zubeldia M, **Holguin, F.** The effect of supplementation with omega-3 polyunsaturated fatty acids on markers of oxidative stress in elderly exposed to PM2.5. *Environ Health Perspect.* 2008 Sep; 116(9):1237-42. PMID: 18795169, PMID: PMC2535628
28. Van Sickle D, **Holguin, F.** Acute health effects after exposure to chlorine gas released following a train derailment. *Am Journal of Emergency Medicine.* *Am J Emerg Med.* 27 (1): 1-7. Jan 2009. PMID: 19041527
29. Fitzpatrick A, **Holguin F**, Teague WG, Brown LA. Alveolar Macrophage Phagocytosis is Impaired in Children with Poorly Controlled Asthma. *J Allergy Clin Immunol.* 123(1):146-152.e8. 2009. PMID: 19130935, PMID: 2442216
30. Kelley CF, Checkley W, Mannino DM, Franco-Paredes C, Carlos Del Rio C and **Holguin F.** Trends in hospitalizations for AIDS-associated *Pneumocystis jirovecii* pneumonia in the United States (1986-2005). *Chest.* 2009 Jul; 136(1):190-7. Epub 2009 Mar 2. PMID: 19255292
31. Hernandez CL, **Holguin F**, Barraza A, Monge S, Romieu, I. Increased levels of outdoor air pollutants are associated with reduced bronchodilation in children with asthma. *Chest.* 2009 Dec; 136(6):1529-36. PMID: 19318670
32. Crocker, D, Brown, C, Moolenaar R, Moorman, J, Baily, C, Mannino, D, **Holguin, F.** Racial and Ethnic

- Disparities in Asthma Medication Usage and Health Care Utilization: Data from the National Asthma Survey. *Chest*. 2009 Oct; 136(4):1063-71. PMID: 19567492
33. Khatri SB, **Holguin F**, Ryan PB, Mannino D, Erzurum SC, Teague WG. Association of ambient ozone exposure with airway inflammation and allergy in asthmatics. *J Asthma*. 2009 Oct; 46(8):777-85. PMID: 19863280, PMCID: PMC2837943
34. Fitzpatrick AM, Lou Ann S, **Holguin F**, Teague WG. Levels of Nitric Oxide Oxidation Products are Increased in the Epithelial Lining Fluid of Children with Persistent Asthma. *J Allergy Clin Immunol*. 2009 Nov; 124(5):990-6.e1-9. PMID: 19895987, PMCID: PMC2776730
35. **Holguin F**, Cribbs S, Fitzpatrick A, Ingram RH Jr, Jackson AC. A deep breath bronchoconstricts obese asthmatics. *J Asthma*. 2010 Feb; 47(1):55-60. PMID: 20100022
36. Ryan PH, **Holguin F**. Traffic pollution as a risk factor for developing asthma: Are the issues resolved? *Am J Respir Crit Care Med*. 2010 Mar 15; 181(6):530-1. PMID: 20235346
37. Fitzpatrick AM, Higgins M, **Holguin F**, Brown LA, Teague WG; National Institutes of Health/National Heart, Lung, and Blood Institute's Severe Asthma Research Program. The molecular phenotype of severe asthma in children. *J Allergy Clin Immunol*. 2010 Apr;125(4):851-857.e18. PMID: 20371397, PMC 2851636
38. Brook RD, Rajagopalan S, Pope CA 3rd, Brook JR, Bhatnagar A, Diez-Roux AV, **Holguin F**, Hong Y, Luepker RV, Mittleman MA, Peters A, Siscovick D, Smith SC Jr, Whitsel L, Kaufman JD; American Heart Association Council on Epidemiology and Prevention, Council on the Kidney in Cardiovascular Disease, and Council on Nutrition, Physical Activity and Metabolism. Particulate matter air pollution and cardiovascular disease: An update to the scientific statement from the American Heart Association. *Circulation*. 2010 Jun 1;121(21):2331-78. PMID: 20458016
39. Dixon AE, **Holguin F**, Sood A, Salome CM, Pratley RE, Beuther DA, Celedón JC, Shore SA; American Thoracic Society Ad Hoc Subcommittee on Obesity and Lung Disease. An official American Thoracic Society Workshop report: obesity and asthma. *Proc Am Thorac Soc*. 2010 Sep;7(5):325-35. PMID: 20844291
40. **Holguin F**, Fitzpatrick A. Obesity, asthma, and oxidative stress. *J Appl Physiol*. 2010 Mar;108(3):754-9. PMID: 19926826
41. Gamble C, Talbott E, Youk A, **Holguin F**, Pitt B, Silveira L, Bleecker E, Busse W, Calhoun W, Castro M, Chung KF, Erzurum S, Israel E, Wenzel SE. Racial differences in biologic predictors of severe asthma: data from the Severe Asthma Research Program. *J Allergy Clin Immunol*. 2010 December; 126(6): 1149–56. PMID: 21051082, PMCID: PMC3021754, NIHMSID: NIHMS251547



42. **Holguin F**, Rojas M, Brown LA, Fitzpatrick AM. Airway and Plasma Leptin and Adiponectin in Lean and Obese Asthmatics and Controls. *J Asthma*. 2011Apr;48(3):217-23 Feb 21. PMID: 21332421, PMCID: PMC3085138
43. Fitzpatrick AM, Teague WG, Burwell L, Brown MS, **Holguin F**, Brown LA; NIH/NHLBI Severe Asthma Research Program. Glutathione oxidation is associated with airway macrophage functional impairment in children with severe asthma. *Pediatr Res*. 2011 Feb;69(2):154-9. PMID: 20975618
44. **Holguin F**, Bleecker ER, Busse WW, Calhoun WJ, Castro M, Erzurum SC, Fitzpatrick AM, Gaston B, Israel E, Jarjour NN, Moore WC, Peters SP, Yonas M, Teague WG, Wenzel SE. Obesity and asthma: An association modified by age of asthma onset. *J Allergy Clin Immunol* 2011Jun;127(6):1486-1493.e2. PMID: 21624618, PMCID: PMC3128802, NIHMSID: NIHMS294006
45. Raysoni AU, Sarnat JA, Sarnat SE, Garcia JH, **Holguin F**, Luèvano SF, Li W-F. Binational school-based monitoring of traffic-related air pollutants in El Paso, Texas (USA) and Ciudad Juárez, Chihuahua (México). *Environmental Pollution*, June 2011. 2011 Oct;159(10):2476-86 PMID: 21778001
46. Sarnat SE, Raysoni AU, Li WW, **Holguin F**, Johnson B, Flores-Luevano S, Garcia JH, Sarnat JA. Air pollution and Acute Respiratory Response in a Panel of Asthmatic Children along the US-Mexico Border. *Environ Health Perspect* 2012 Mar;120(3):437-44. Epub 2011 Sep 6. PMID: 21896396, PMCID: PMC3295334
47. Chandra D, Stamm J, Ramos RM, Taylor B, Satterwhite L, Mannino DM, Scieurba F. **Holguin F**. Outcomes of Non-invasive Ventilation for Acute Exacerbations of COPD in the United States, 1998-2008. *Am. J. Respir. Crit. Care Med*. 2012; 185: 152-159 PMID: 22016446, PMCID: PMC3297087
48. Tunno BJ, Shields KN, Lioy P, Chu N, Kadane JB, Parmanto B, Pramana G, Zora J, Davidson C, **Holguin F**, Clougherty JE. Understanding intra-neighborhood patterns in PM2.5 and PM10 using mobile monitoring in Braddock, PA. *Environ Health*. 2012 Oct 10;11(1):76. PMID: 23051204, PMCID: PMC3639095
49. Coleman JM, Naik C, **Holguin F**, Ray A, Ray P, Trudeau JB, Wenzel SE. Epithelial eotaxin-2 and eotaxin-3 expression: relation to asthma severity, luminal eosinophilia and age at onset. *Thorax*. 2012 Dec;67(12):1061-6. PMID: 23015684, PMCID: PMC3652589
50. Yamamoto M, Tochino Y, Chibana K, Trudeau JB, **Holguin F**, Wenzel SE. Nitric oxide and related enzymes in asthma: relation to severity, enzyme function and inflammation. *Clin Exp Allergy*. 2012 May; 42(5):760-8. PMID: 22092728, PMCID: PMC3650251

51. Jarjour NN, Erzurum SC, Bleecker ER, Calhoun WJ, Castro M, Comhair SA, Chung KF, Curran-Everett D, Dweik RA, Fain SB, Fitzpatrick AM, Gaston BM, Israel E, Hastie A, Hoffman EA, **Holguin F**, Levy BD, Meyers DA, Moore WC, Peters SP, Sorkness RL, Teague WG, Wenzel SE, Busse WW. NHLBI Severe Asthma Research Program (SARP). Severe Asthma: Lessons Learned from the NHLBI Severe Asthma Research Program. *Am J Respir Crit Care Med*. 2012 Feb 15;185(4):356-62. PMID: 22095547, PMCID: PMC3297096
52. **Holguin F**, Comhair SA, Hazen SL, Powers RJ, Khatri SS, Bleecker ER, Busse WW, Calhoun WJ, Castro M, Fitzpatrick AM, Gaston B, Israel E, Jarjour NN, Moore WC, Peters SP, Teague WG, Chung KF, Erzurum SC, Wenzel SE. An association between L-arginine/ADMA balance, obesity and the age of asthma onset phenotype. *Am J Respir Crit Care Med*. 2013 Jan 15;187(2):153-9. PMID: 23204252, PMCID: PMC 3570651
53. Shields KN, Cavallari JM, Hunt MJ, Lazo M, Molina M, Molina L, **Holguin F**. Traffic-related air pollution exposures and changes in heart rate variability in Mexico City: A panel study. *Environ Health*. 2013 Jan 18;12(1):7. PMID:23327098, PMCID:PMC3639920
54. Zora JE, Sarnat SE, Raysoni AU, Johnson BA, Li WW, Greenwald R, **Holguin F**, Stock TH, Sarnat JA. Associations between urban air pollution and pediatric asthma control in El Paso, Texas. *Sci Total Environ*. 2013 Mar 15;448:56-65. PMID:23312496
55. Yonas MA, Marsland AL, Emeremni CA, Moore CG, **Holguin F**, Wenzel S. Depressive Symptomatology and Disease Control among Individuals with Well-Characterized Severe Asthma. *J Asthma*. 2013 Oct;50(8):884-90 PMID:23725317 PMCID: PMC4029326
56. Fajt ML, Gelhaus SL, Freeman B, Uvalle C, Trudeau JB, **Holguin F**, Wenzel SE. Prostaglandin D2 pathway upregulation: Relation to asthma severity, control and Th2 inflammation. *J Allergy Clin Immunol* 2013 Jun;131(6):1504-1512. PMCID: PMC3889167 PMID: 23506843.
57. Raysoni AU, Stock TH, Sarnat JA, Montoya Sosa T, Ebel Sarnat S, **Holguin F**, Greenwald R, Johnson B, Li W-W. Characterization of traffic-related air pollutant metrics at four schools in El Paso, Texas, USA: Implications for exposure assessment and siting schools in urban areas, *Atmospheric Environment* 2013; doi: 10.1016/j.atmosenv.2013.07.056.
58. **Holguin F**. Weight loss in children with asthma improves asthma control and quality of life. *Clin Exp Allergy*. 2013 Jul;43(7):703-4. PMID:23786276
59. Wendell SG, Baffi C, **Holguin F**. Fatty acids, inflammation, and asthma. *J Allergy Clin Immunol*. 2014 May;133(5):1255-64. PMID:4021317
60. Shmool JL, Michanowicz DR, Cambal L, Tunno B, Howell J, Gillooly S, Roper C, Tripathy S, Chubb

- LG, Eisl HM, Gorczynski JE, **Holguin FE**, Shields KN, Clougherty JE. Saturation sampling for spatial variation in multiple air pollutants across an inversion-prone metropolitan area of complex terrain. *Environ Health*. 2014 Apr 16;13(1):28. PMID:24735818, PMCID: 4021317
61. **Holguin F**, McCormack MC. Right from wrong: the effect of traffic-related pollution on the right heart. *Am J Respir Crit Care Med*. 2014 May 1;189(9):1018-9. PMID:24787063
62. Castro M, King TS, Kunselman SJ, Cabana MD, Denlinger L, **Holguin F**, Kazani SD, Moore WC, Moy J, Sorkness CA, Avila P, Bacharier LB, Bleecker E, Boushey HA, Chmiel J, Fitzpatrick AM, Gentile D, Hundal M, Israel E, Kraft M, Krishnan JA, LaForce C, Lazarus SC, Lemanske R, Lugogo N, Martin RJ, Mauger DT, Naureckas E, Peters SP, Phipatanakul W, Que LG, Sheshadri A, Smith L, Solway J, Sullivan-Vedder L, Sumino K, Wechsler ME, Wenzel S, White SR, Sutherland ER; National Heart, Lung, and Blood Institute's AsthmaNet. Effect of vitamin D3 on asthma treatment failures in adults with symptomatic asthma and lower vitamin D levels: the VIDA randomized clinical trial. *JAMA*. 2014 May 28;311(20):2083-91. PMID:24838406
63. Xie M, Mustovich AT, Jiang Y, Trudeau JB, Ray A, Ray P, Hu H, **Holguin F**, Freeman B, and Wenzel SE. IL-27 and type 2 immunity in asthmatic patients: Association with severity, CXCL9, and signal transducer and activator of transcription signaling. *J Allergy Clin Immunol* 2014 Oct 10. pii: S0091-6749(14)01196-8 . PMCID: PMC 4324337, PMID: 25312760
64. Thalanayar P M and **Holguin F**. Follicular bronchiolitis in primary ciliary dyskinesia. *Australas Med J* 2014 7(7): 294-297. PMID: 25157269 PMCID: PMC4127960
65. Wendell SG, Golin-Bisello F, Wenzel S, Sobol RW, **Holguin F**, Freeman BA. 15-hydroxyprostaglandin dehydrogenase generation of electrophilic lipid signaling mediators from hydroxy omega-3 fatty acids. *J Biol Chem*. 2015 Feb 27;290(9):5868-80. PMID: 25586183, PMCID: PMC342494
66. Mirabelli MC<sup>1</sup>, Golan R, Greenwald R, Raysoni AU, **Holguin F**, Kewada P, Winquist A, Flanders WD, Sarnat JA. Modification of Traffic-related Respiratory Response by Asthma Control in a Population of Car Commuters. *Epidemiology*. 2015 Apr 21. PMID: 25901844
67. Watanabe T, Fajt ML, Trudeau JB, Voraphani N, Hu H, Zhou X, **Holguin F**, Wenzel SE. Brain Derived Neurotrophic Factor (BDNF) Expression in Asthma: Association with Severity and Type-2 Inflammatory Processes. *Am J Respir Cell Mol Biol*. 2015 May 6. PMID: 25945802
68. Raundhal M, Morse C, Khare A, Oriss TB, Milosevic J, Trudeau J, Huff R, Pilewski J, **Holguin F**, Kolls J, Wenzel S, Ray P, Ray A. High IFN- $\gamma$  and low SLPI mark severe asthma in mice and humans. *J Clin Invest*. 2015 Jun 29. PMID: 26121748 [PubMed - as supplied by publisher]

69. Tunno BJ, Naumoff Shields K, Cambal L, Tripathy S, **Holguin F**, Liroy P, Clougherty JE. Indoor air sampling for fine particulate matter and black carbon in industrial communities in Pittsburgh. *Sci Total Environ*. 2015 Jul 20;536:108-115. PMID: 26204046 [PubMed - as supplied by publisher]
70. Thalanayar PM, **Holguin F**. Rash, disseminated intravascular coagulation and legionella: Episode 10 and a rewind into the past. *Respir Med Case Rep*. 2015 May 8;15:95-100. doi: 10.1016/j.rmcr.2015.04.001. eCollection 2015. PMID: 26236615 [PubMed] PMCID: PMC4501505
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### Invited reviews and editorials:

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63. Doberer D, Trejo Bittar HE, Vitari C, Nouraie SM, **Holguin F**, Yousem SA, Wenzel SE. Histologic Patterns in Distal Lung Tissue from Treatment-Resistant Severe Asthma Patients. A31. ASTHMA THERAPY: GLUCOCORTICOIDS AND BEYOND, 2016: A1298, 10.1164/ajrccm-conference.2016.193.1\_MeetingAbstracts.A1298
64. Zhang P, Nouraie SM, **Holguin F**. Metabolic Syndrome Limits the Bariatrically-Induced Weight Loss Benefit on Asthma Control. A36. CLINICAL PROBLEMS IN ASTHMA AND ALLERGY, 2016: A1388, 10.1164/ajrccm-conference.2016.193.1\_MeetingAbstracts.A1388
65. Gaston B, Myers RE, Phillips B, Mauger D., Bacharier LB, Ross K, Chmiel JF, Marozkina N, Fitzpatrick AM, Bleecker E, Castro M, Fahy JV, Ly N, Jarjour NN, Ramratnam S, Zein JG, Irani A-M, Levy BD, Wanda Phipatanakul W, **Holguin F**, Aujla S, Wenzel SE, Serpil C, Erzurum SC, Teague WG, DeBoer MD. Pubertal Changes Associated with Estrogen and Not Androgens Are More Strongly Associated with Lower Lung Function and Fixed Airflow Obstruction: A Cross-Sectional Analysis of Children and Adolescents in SARP III. A64. TRANSLATIONAL RESEARCH IN PEDIATRIC ASTHMA, 2016: A2176, 10.1164/ajrccm-conference.2016.193.1\_MeetingAbstracts.A2176
66. Luyster FS, Strollo PJ, **Holguin F**, Bleecker E, Castro M, Fahy JV, Gaston B, Israel E, Jarjour NN, Mauger D, Wenzel SE. Impact of Comorbid Insomnia on Asthma Control and Asthma-Related Healthcare Utilization. D14. IMPROVING CARE AND REDUCING DISPARITIES IN ASTHMA AND SLEEP, 2016: A6429, 10.1164/ajrccm-conference.2016.193.1\_MeetingAbstracts.A6429



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## PROFESSIONAL ACTIVITIES

### TEACHING:

#### Graduate Program Instructor

Invited Faculty; Chronic Disease Epidemiology. Epidemiology Master Program, Graduate School of Public Health. Lectures 1 / year on Asthma Epidemiology. University of Pittsburgh

Faculty Introduction to Becoming a Physician course given to incoming medical students, 2011 – current. University of Pittsburgh

Standing Medical ICU faculty lecturer for medical residents. Twice a month lectures to 5 – 10 residents. University of Pittsburgh

Faculty advisor in Medical Decision Making and Methods and Logic in Medicine, 2008 – present. University of Pittsburgh

Course Director, Pulmonary Physiology and Introduction to biostatistics and clinical research for pulmonary fellows, Emory University 2006 – 2008. Emory University

**CDC: Preventative Medicine Residency Program** Seminars on Perspectives of Occupational and Environmental Medicine 2006 – 2008

**Director** Pulmonary Fellows workshop on introduction to clinical research and epidemiology. Emory University. 20067 – 2008

#### Mentoring

Dr. Holguin has mentored the following students, residents, pulmonary fellows, faculty and staff at Emory and University of Pittsburgh:

**Colleen Kelly** (Emory Medical Student & MPH 2005 – 2006). Performed an analysis of the National Hospital Discharge Survey (NHDS) on the Pneumocistiis Jeroveci Pneumonia - related outcomes. This work was published in *Chest* 2009

**Brian Taylor** (Emory, 2006 – 2007): Showed an association between BMI and asthma severity, using the National Asthma Survey. This work was subsequently published in *Thorax*.

**Joel Mermis** (2005, Emory Resident): Participated in clinical research on a physiology study

evaluating the impact of BMI on the post-deep inhalation bronchodilation response. This study was published in the *Journal of Asthma*.

**Sushma Komakula** (2005 – 2006, Emory Resident): Performed a clinical study evaluating the role of BMI, plasma adipokines, on exhaled nitric oxide and measures of airway oxidative stress in asthma. This work was published in *Respiratory research*. Dr. Komakula is an Assistant Professor in Medicine and a current KL-2 Scholar at Emory University School of Medicine.

**Lewis Satterwhite** (2006, Emory Resident): Participated in an analysis evaluating the use of NIPPV in COPD patients, using nationally representative data from the Health Care Utilization Project (HCUP). This work is published in the *American Journal of Respiratory and Critical Care Medicine*.

**Michael Yonas** (Assistant Professor Family Medicine 2009 – 2012). Part of his KL12 mentorship committee Dr. Yonas project is a community aimed at understanding asthma stress factors.

**Brett Tunno** (2009 – 2012 Dr PH student in Environmental Health). Dr. Holguin serves on his thesis committee. He has mentored Brett in developing a sampling field study to measure PM10 and PM2.5 in Braddock PA. This work will be published in *Atmospheric Science*.

**Jason Stamm & Divay Chandra** (University of Pittsburgh 2010- 2011) Developed an analysis with HCUP data to evaluate trends of NIPPV use for COPD-related hospitalizations. This work is published in the *American Journal of Respiratory and Critical Care Medicine*, with an accompanying editorial.

**Shavitri Mahendiran** (2011, University of Pittsburgh, Resident); developing a multivariable logistic regression analysis to determine risk factors that determine airway thickening in asthma. She also submitted a pulmonary case for publication.

**Kim Weinhold** (ICU Nurse, 2010 – 2011, University of Pittsburgh). Analyzed trends of NIPPV use for acute asthma exacerbations. Her work has been accepted in the *British Medical Journal*, *Open access*.

**Sabrina Malik** (2010 -2012, MPH student University of Pittsburgh). Dr. Holguin was her thesis advisor on work evaluating the role in FEF % values in asthma outcomes.

**Jennifer Zora** (2010, Emory Medical Student, summer research at University of Pittsburgh). Jennifer worked on the PEMC and on a study evaluating the role of vocal cord dysfunction in asthma, and co-authored a chapter on asthma management for hospitalists.

**Jill Zaputti** (2012-2014, Medical student University of Pittsburgh) Currently developing a project to determine whether depression/ anxiety, mediates adverse outcomes associated with obesity and asthma.

**Arvind Dabass** (2012-2015, University of Pittsburgh, Graduate School of Public Health) Association between Particulate Pollution and Cardiovascular Diseases.

**Jessica Carr** (2012-2016, PhD candidate, University of Pittsburgh Graduate School of Public

Health) Exposure Assessment Methods for Examining the Role on Non-chemical Stressors in Environmental Health Disparities.

**Cynthia Baffi** (2013-2015), Pulmonary Fellow in Training, University of Pittsburgh) Asthma, metabolic syndrome, and obesity mechanisms. Paper published in Chest 2016

**Aditya Mohanty** (2013-2016), Medical student, University of Pittsburgh), Severe Asthma Research Program database.

**Jinny Ye** (2013-2016, Medical student, University of Pittsburgh) Vocal Cord Dysfunction (VCD) screening questionnaire study-identify subjects with asthma at high risk for VCD. *Published her work in J Voice 2016*

**Craig Riley** (2014-2016, Internal Medicine Resident, University of Pittsburgh). Clinical implications of having reduced FEF25-75 in severe asthma. Severe Asthma Research Program.

**Prashanth Thalanayer** (2013-2015 Internal Medicine Resident, University of Pittsburgh). Zileuton and severe asthma.

**Peng Zhang** (2013-2016, Internal Medicine Resident, University of Pittsburgh). Longitudinal assesment of bariatric surgery. NIH multicenter study. Looked at the role of weight loss and metabolic syndrome on asthma control.

**Faiza Khalid** (2015-2016, Internal Medicine Resident, University of Pittsburgh). Asthma and obesity

**Anthony Monzon** (University of Colorado School of medicine) Pre – medicine student. 2017-19. Evaluated the protective effect of PON2-3 in aprimary human airway epithelial cells, exposed to diesel particles.

**Meghan Althoff** (Pulmonary Sciences and Critical Care Fellow). Understanding the role of L-arginine metabolism across clinical asthma phenotypes.

**Andi Hudler** (Pulmonary Sciences and Critical Care Fellow). Understanding the role of succinate metabolism in the airway epithelium of obese asthmatics.

### **Lectureships, Seminar Invitations, and Visiting Professorships:**

1. Invited speaker: University of New Mexico. Environmental Health: Cardiovascular effects of air pollutants, 2002
2. Invited speaker: Channing Laboratory at Harvard. The use of Omega-3 fatty acids to increase cardiac autonomic function, 2003
3. Invited keynote speaker: Paso del Norte EPA Meeting. Advancements on the project “EVA” (Vehicular Emissions and Asthma), 2004
4. Invited speaker: Atlanta’s Clean Air Campaign. Health Effects of Particulates in Pollution, 2004
5. Invited speaker: Channing Laboratory Harvard. The use of Omega-3 fatty acids to prevent the cardiac autonomic effects of PM<sub>2.5</sub>, 2004
6. Invited speaker: 6<sup>th</sup> Southern Hospitalist Medicine Update. Managing difficult ventilator cases in the ICU, 2005

7. Invited speaker: University of Southern California. Department of Preventive Medicine Seminar: Use of Omega-3 fatty acids to prevent cardiovascular effects of air pollution. Pulmonary grand rounds: Asthma and obesity, 2006
8. Invited speaker: Binghamton, NY. Tobacco coalition, Asthma day. Epidemiology of asthma and obesity, 2007
9. Invited speaker: University of Pittsburgh Medical Center. Pulmonary Grand Rounds: Obesity and Asthma, from Association to Causation, 2008
10. Invited speaker: Environmental Protection Agency, Human Exposure Research Laboratories. Obesity and susceptibility to air pollution, 2008
11. Invited speaker: Air Toxics, Transcending Boundaries, University of Michigan. Asthma in the US-Mexico Border
12. Visiting professor: Cleveland Clinic. Airway NO metabolism in obesity and asthma. 2011
13. Visiting Professor, Thomas Jefferson, Pulmonary Ground Rounds. Obesity and Asthma, from Epidemiology, to phenotype, to potential mechanisms, 2013
14. Visiting Professor, invited speaker: The Obese Asthma Phenotype, Mt. Sinai School of Medicine. 2013.
15. Invited speaker, Asthma Lecture series, University of Pittsburgh General Internal Medicine 2013
16. Invited speaker, Medical Grand Rounds, University of Pittsburgh School of Medicine, 2014
17. Invited speaker, Acute Management series, mechanical ventilator talk, UPMC-Montefiore, 2014
18. Invited speaker, Acute Management series, mechanical ventilator talk, Pittsburgh Veterans Administration Hospital, 2014
19. Invited speaker, University of Pittsburgh Graduate School of Public Health Course on Chronic Diseases -Epidemiology of asthma (pathophysiology, causes, descriptive epidemiology/trends, and prevention and control), 2014.
20. Invited speaker, University of Pittsburgh Graduate School of Public Health Course on Chronic Diseases -Epidemiology of asthma (pathophysiology, causes, descriptive epidemiology/trends, and prevention and control), 2015.
21. Invited speaker, Duquesne University Department of Physical Therapy 4<sup>th</sup> year student Cardiopulmonary Course, 2014.
22. Invited speaker, Duquesne University Department of Physical Therapy 4<sup>th</sup> year student Cardiopulmonary Course, 2015.
23. Gilbert Friday Memorial Lecture. Reduced FEF<sub>25-75</sub> in asthma. What does it mean and what are the clinical implications. 11<sup>th</sup> Annual Nemaclin International Asthma Conference.
24. Keynote speaker: Metabolic dysregulation and asthma; an overlooked pathway to airway dysfunction. 21<sup>st</sup> Asthma, Allergy and Pulmonary Update. University of Rochester Medical Center
25. Invited Professor Sickkids Hospital in Toronto. Chest rounds: Asthma across the lifespan, challenges and opportunities.
26. Research seminar, SickKids Toronto, L-arginine/Nitric oxide metabolism in obese asthma; from clinical observations to potential treatments.
27. Metabolic dysregulation in asthma, pathophysiological implications for asthma and potential new therapeutic strategies. Emory University, Pulmonary Grand Rounds.
28. Precision based asthma management in asthma. Emory University Medical Grand Rounds.
29. Webinar: American Thoracic Society: COVID-19, Latin American Perspective
30. Webinar: Airway Diseases and COVID-19: Colegio Mexicano de Medicina Interna
31. Webinar: What has happened to airway diseases during COVID-19 pandemic? : Ecuatorian Respiratory Society
32. UCD Health Lung Center - Carroll Cross Distinguished Professorship Webinar Series: Dr. Fernando Holguin, "Metabolism and airway dysfunction in obese asthma. Time for a paradigm

shift?"

### **Invitations to National or International Conferences:**

1. Invited speaker: Fine particulate matter pm 2.5 in air pollution is associated with cardiac autonomic dysfunction in an elderly cohort in Mexico City. American Thoracic Society, San Francisco, CA, 2000
2. Invited speaker: Air pollution and heart rate variability in susceptible populations exposed to different regional atmospheric air pollution. International Society for Environmental Epidemiology ISEE in Garmish, Germany. September 2001
3. Invited speaker: Health Effects of Air Pollution in The Mexico City Metropolitan Area; What Have We Learned, Where Do We Go from Here? Presented at the MIT- Mexico V International Workshop in Ixtapan de la Sal, Mexico, January 2002
4. Invited speaker: University Of New Mexico School Of Medicine , Regional Issues in Occupational and Environmental Health for the Primary Care Provider, November 2002
5. Invited speaker: Cardiovascular effects associated with exposure to particulates and gaseous air pollutants during the Mexico City field campaign study. January 2003
6. Invited speaker: Respiratory Effects of Particulates, American Lung Association, Expert Lung Health and Air Pollution panel, Atlanta, Georgia, February 2003
7. Invited speaker: The Cardiovascular Effects Associated with Particulate Air Pollution: What Does it Mean? American Thoracic Society International Conference, Seattle, WA, 2003
8. Invited speaker: How Can We Improve the Respiratory Health of Latino-Migrants? American Thoracic Society International Conference, Seattle, WA, 2003
9. Invited speaker: 6th MIT workshop on Mexico City Air Quality for the Integrated Program on Urban, Regional and Global Air Pollution, 2003
10. Invited speaker: Cardiovascular Health Effects Associated with Particulate Air Pollution in the Mexico City Metropolitan Area. What Have We Learned So Far? 2004
11. Invited speaker: Can Omega-3 Fatty Acids Protect Against the Cardiovascular Effects of Particulates In Air Pollution? Presented At Channing Harvard, March 2004
12. Invited speaker: Health effects Institute Annual Conference, Effects of traffic related emissions on airway inflammation in asthmatic children along the US-Mexico border, San Francisco, 2006
13. Invited key note speaker: Southern Lung Club, American Federation of Medical Research and Southern Society of Clinical Investigation Meetings, Atlanta, 2006
14. Invited speaker: Georgia Summit Air Meeting, Exposure to vehicular traffic and airway inflammation in children with asthma, Savannah, GA, 2006
15. Invited speaker: Health effects of traffic-related exposures in Mexico. International Society of Environmental Epidemiology, Mexico City 2007.
16. Invited speaker: Pulmonary teaching day. United Health Service, Binghamton NY. The convergence of two epidemics, asthma and obesity. November 2007.
17. Invited speaker: Obese asthmatics, differing phenotype and response to treatment. American Academy of Asthma Allergy and Immunology. March 2008
18. Invited speaker: Use of Antioxidants to prevent the adverse health effects associated with ambient air pollution exposure. 4<sup>th</sup> International Symposium on Oxidative and Nitrosative Stress, New York Academy of Sciences, October 2009
19. Invited speaker: The role of poverty on the global prevalence of COPD. The International Union for Tuberculosis and lung Diseases. International meeting in Cancun, Mexico December 2009
20. Speaker: Postgraduate Symposium. The respiratory health effects associated with biomass

- exposure. ATS, New Orleans 2010.
21. Speaker: Scientific symposium. Immigration and asthma. ATS, New Orleans 2010
  22. Invited speaker: Asthma in the US-Mexico Border, Transcending Boundaries, University of Michigan 2010.
  23. Invited speaker: Obesity and asthma, one size does not fit all. Northwestern University Medical Grand Rounds, October 2010.
  24. Invited speaker: How do Dietary Factors & Obesity Influence Lung Disease, American Thoracic Society International Conference, San Francisco, May 2012
  25. Invited speaker: Emerging Insights into Obstructive Lung Disease, American Thoracic Society International Conference, San Francisco, May 2012
  26. Invited speaker: Asthma Obesity Relationship, Cleveland Clinic Pulmonary Day, August, 2012
  27. California Asthma Summit, invited speaker on Asthma and Obesity, from Research to Practice 2013
  28. Transatlantic Airway Conference, Lucerne Switzerland. Airway oxidative stress, heterogeneity across asthma phenotypes. January 2013
  29. World Congress of Asthma, Mexico City, Mexico *Definiciones de asma severa de la de OMS a ATS/ERS*, March, 2014
  30. World Congress of Asthma, Mexico City, Mexico *Asthma and obesity: What is the relationship?* March 2014
  31. World Congress of Asthma, Mexico City, Mexico *Lessons from the NHLBI, severe asthma research program*, March 2014
  32. World Congress of Asthma, Mexico City, Mexico *Severe asthma phenotypes*, March 2014
  33. American Thoracic Society, *Methods in Epidemiologic, Clinical and Operations Research (MECOR)*, China, January 2015
  34. American Thoracic Society International Conference 2015, Denver CO *Clinical Year in Review: Asthma*
  35. COMPEDIA: Mexican Colleague of Allergy , Asthma and Immunology. *From clinical asthma phenotype to molecular endotypes*, July 2015
  36. COMPEDIA: Mexican Colleague of Allergy , Asthma and Immunology. *Anti-IgE for severe asthma in children*, July 2015
  37. COMPEDIA: Mexican Colleague of Allergy, Asthma and Immunology. *New anti Th2 biological therapies for asthma*, July 2015
  38. Munich-Pittsburgh International Lung Conference, Invited session chair: *Asthma Phenotypes*, October 2015.
  39. Vermont Lung Health Conference, *Metabolic Mechanisms of Asthma and Obesity*, October 2015
  40. Invited speaker, Nemaquin Asthma Conference. *Understanding obesity & asthma severity through metabolic dysregulation not increased inflammation*, October, 2015.
  41. American Thoracic Society, *Methods in Epidemiologic, Clinical and Operations Research (MECOR)*, China, January 2016
  42. Invited speaker, National Association for Medical Direction of Respiratory Care, *Asthma Update: Emphasis on Biologics and Phenotypes*. Palm Springs, CA, March 2016
  43. Invited speaker, Pediatric Basic Science Research Seminar, *Potential metabolic pathways that explain the link between obesity, metabolic syndrome and airway dysfunction in asthma*, Case Western Reserve University, Cleveland, OH, April 2016
  44. Invited speaker/facilitator American Thoracic Society Conference 2016. **A50 ASTHMA: OBSERVATIONAL STUDIES** Facilitator: F. Holguin, MD, MPH, Pittsburgh, PA
  45. Invited speaker/chair, American Thoracic Society Conference 2016 **A106 EPIDEMIOLOGY AND RISK FACTORS OF ASTHMA: FROM THE CRIB TO ADULTHOOD**

Chairing: F. Holguin, MD, MPH, Pittsburgh, PA, S. Sharma, MD, MPH, Aurora, CO, C. Lemiere, MD, Montreal, Canada

46. Invited speaker, American Thoracic Society Conference 2016. D90 RESPIRATORY HEALTH IN MIGRANT POPULATIONS. *Asthma in Migrants: A Route to Health or More Triggers?*
47. Invited speaker: Asociación Latinoamericana del Tórax, Conferencia Internacional, Ciudad de México 2017, “obesidad y asma severa”
48. Invited speaker. Effect of obesity on response to asthma treatments. Chest conference New Orleans 2019
49. Invited Speaker New therapeutic approaches for non T2 asthma. Chest conference New Orleans 2019
50. James E. Parker Symposium on Sleep and Pulmonary Medicine. West Virginia University. “Personalizing Asthma Care”.

## RESEARCH:

### Current Research Grant Support:

#### PENDING

R61 HL157069-01A1 (Holguin/Freeman/Gelhaus) **LIMA: Lipid Anti-Inflammatory Mediators in Asthma to reduce airway hyperresponsiveness in obese asthmatics.** (01/01/22 – 02/01/27). (Impact score: 26 – zone of funding consideration < 30). This is a cross over, randomized clinical trial of obese asthmatics, treated with CLX-10 (nitrated FA) to improve FEV1, asthma control and reduce bronchial hyperresponsiveness.

#### ACTIVE

PR203496 **Department of Defense U.S. Army Medical Research and Development Command Congressionally Directed Medical Research Programs** Study to improve dEployment related Asthma by using L-citrulline Supplementation (SEALS) (PI: Holguin) (02/01/21 – 02/01/26). Study is a RCT of L-citrulline supplementation for military personnel diagnosed with deployment related asthma.

1 R01 AI152504-01A1 (Holguin/Chu/Seibold) (percentile 3.0) 09/01/2020 - 08/31/2025

**Project Title: Parkin in mitochondrial dysfunction and airway inflammation of obese asthma**

1 R01 HL146542-01 (Holguin/Que) (Percentile 1.0, 04/01/2021 - 03/31/2026)

**SANDIA: Supplementing L-citrulline to overweight late Asthma onset phenotypes to increase airway L-arginine/ADMA ratio and Improve Asthma control**

Double blind, multi-center study (University of Colorado and Duke), POC Phase II study to demonstrate the efficacy and safety of L-citrulline to increase eNO and improve asthma control in obese, late onset asthmatics.

1UG1HL139123 (Weschler)

11/01/2017 – 11/01/2022 0 0.12 cal/yr 1/1.2 cal yrs 2-6  
\$29,000 annual direct costs

**Clinical Centers for the NHLBI's Precision Interventions for Severe and/or Exacerbation Prone Asthma (PrecISE)**

The purpose of the NHLBI's Precision Interventions for Severe and Exacerbation Prone Asthma (PrecISE) Network is to conduct sequential, adaptive, clinical trials with precision interventions in stratified patient populations, utilizing patient phenotypes and/or endotypes, predictive, and monitoring biomarkers/profiles in sequential adaptive trials to evaluate the most effective precision intervention strategies for this hard to treat patient population.

1R01 HL13255-01 (Holguin/Freeman) 08/05/16 – 06/30/2020 3.0 calendar  
**Anti-Inflammatory Lipid Mediators in Asthma** \$56,273 annual direct costs  
 This is a cross over, randomized clinical trial of obese asthmatics, treated with CLX-10 (nitrated FA) to Improve asthma control and reduce bronchial hyperresponsiveness.

1 R01 HL129198-01A1 (Holguin/Wisnivesky/Federman) 04/01/16 - 03/31/21 2.4 calendar  
 NIH, NHLBI \$157,672 annual direct costs  
**Obesity and Asthma: Unveiling Metabolic and Behavioral Pathways**  
 The main goal of this project is to access metabolic pathways of obesity and asthma.

5 U10 HL098177-06 (Wenzel) 09/30/09 - 06/30/18 1.86 calendar  
 NHLBI \$10,860 annual direct costs  
**AsthmaNet: Phenotypic Influences on Asthma Treatments (Core)**  
 Multicenter clinical trials network. This project should contribute to understanding asthma phenotypes in relation to mechanisms and specific treatment, particularly in relation to health disparities and contributions from race, socioeconomic status, and asthma severity.

### Industry Sponsored Clinical Trials

Each of these individual projects has a varying need of effort depending on the type of activity currently in progress: protocol development, start-up, patient recruitment, enrollment, follow-up, monitoring, data analysis, publication, and closeout. PI determines each project's need and adjust their effort between projects within the total aggregated effort assigned to the clinical projects.

AstraZeneca/NOVELTY	08/23/2017 – 08/23/2022 \$1,876 per completed subject
AstraZeneca/ANDHI	08/01/2017 – 08/01/2020 \$12,926 per completed subject
GSK/CAPTAIN	02/15/18 – 01/31/2020 \$13,056 per completed subject

### PREVIOUS GRANT SUPPORT:

1 P01AI106684-01A1 (Ray/Wenzel ) 06/01/15 - 05/31/20 1.2 calendar  
 NIH \$263,027 annual direct costs  
**Immune Airway-Epithelial Interactions in Steroid-Refractory Severe Asthma-Core B**  
 The overall hypothesis for this P01 application is that the pathophysiology of steroid refractory severe asthma involved cooperatively between heightened IL-27 and Th1 (IFN- $\gamma$ ) immune responses often



accompanied by Th17 and residual Th2 responses plus a deficient IL-10 response. This atypical immune response, not appreciated heretofore, induces specific downstream effects on airway epithelial cells, which perpetuate the inflammatory response resulting in chronic disease.

5 R01 HL114536-03 (Holguin) 08/01/12 - 07/31/17 1.56 calendar  
NHLBI \$33,265 annual direct costs

**Validating GIS-based Methods to Address Spatial Uncertainty in Clinical Trials**

Through collaboration with AsthmaNet, an ongoing multi-site investigation of clinical asthma interventions, we will develop and analyze a multi-region database of GIS-based information on social and environmental exposures associated with asthma exacerbation, and quantify the impact multiple sources of spatial error on results of AsthmaNet clinical trials.

5 U10 HL109152-04 (Wenzel) 08/09/11 - 05/31/17 0.66 calendar  
NHLBI \$453,944 annual direct costs

**Implications and Stability of Clinical and Molecular Phenotypes of Severe Asthma**

The proposed studies will identify new/novel molecular pathways, link them to baseline and longitudinal clinical, physiologic and radiologic outcomes and assess their stability over time leading to new molecular targets for therapy for severe asthma patients.

5UL1TR000005-09 ( Holguin/Wendell) 09/01/15 - 08/31/17 1.2 calendar  
University of Pittsburgh Pilot Award \$22,509

**The Effects of Nitrate/Nitrite and Conjugated Linoleic Acid Supplementation on the Obese Asthmatic Pathology**

Pilot study of treatment for obese asthmatics with citrates and CLA.

1 R56 HL128134-01A1 ( Gingo ) 09/02/15 - 08/31/16 1.2 calendar  
NHLBI

**Synergism of HIV and Obesity in the Pathogenesis of Asthma** \$446,365

The main goal of this project is to assess obesity and asthma in HIV patients.

5 UL1 TR000005-09 (Holguin) 07/01/14 - 06/30/16 2.64 calendar  
NCATS \$56,273 annual direct costs

**University of Pittsburgh Clinical and Translational Science Institute (MUH-CTRC)**

The mission of the Clinical and Translational Science Institute (CTSI) at the University of Pittsburgh is to improve the efficiency with which biomedical advances translate to improvements in the health of the community. CTSI is transforming the process of clinical and translational research through the provision of research and educational resources, thus training and enabling scientists to generate and translate new biomedical knowledge. CTSI helps researchers to conduct visionary and relevant clinical and translational research and to move actionable research findings into practice and prevention settings. CTSI offers assistance and services to researchers in all stages of the research spectrum, ranging from basic biomedical investigations to outcomes and community based research.

R01 HL064937-13 (Holguin) 06/01/11 - 03/31/16 0.66 calendar  
NHLBI \$78,369 annual direct costs

**Redox-Derived Pulmonary Anti-Inflammatory Mediators**

The main goal of this study provide pulmonary samples from asthmatic subjects to analyze the presence of redox derived anti-inflammatory mediators.

5 R24 MD008046-02 (Holguin) 01/01/13 - 11/30/15 1.38 calendar  
NIMHD \$27,327 annual direct costs

**Healthy Learning, Healthy Living, Healthy Lives**

Aim 1: To strengthen and expand an existing community-based participatory research (CBPR) partnership. Aim 2: To refine the social determinants of health conceptual framework to design, implement and evaluate a multi-level (individual, family, school, neighborhood, policy) community assessment plan. Aim 3: To design a multi-level CBPR intervention plan. Aim 4: To pilot and evaluate a multilevel community based asthma programs.

NHLBI5 U01 HL098115-05 ( Wenzel ) 07/01/13 - 06/30/15 0.12 calendar  
**AsthmaNet: Phenotypic Influences on Asthma Treatment (BARD Protocol)** \$452,568

5 U10 HL109086-02 (Wenzel) 07/01/12 - 05/31/15 0.12 calendar  
**NHLBI Severe Asthma Research Program** \$452,500  
To establish an account to begin the Longitudinal Protocol for SARP Penn State.

CDC 9/15/2010 - 9/14/2013 0.6 calendar months  
\$9,244 Annual Direct Costs

**Linkage Study of Air Quality PM2.5 and Cardiovascular Effects Data from the Tracking Network**

This project will develop recommendations on which health effect measures are most appropriate for characterizing cardiovascular effects as a result of PM2.5 within the framework of the EPHT network.  
PI: Talbot

Heinz Foundation/CHP Foundation  
**Funding to Develop the Pediatric Environmental Medicine Center**  
\$730,729 Annual Direct Costs  
P.I.: Fernando Holguin, M.D., M.P.H.

National American Lung Association.  
**A randomized, placebo-controlled study of pioglitazone to treat poorly controlled obese asthmatics.**  
P.I.: Fernando Holguin, M.D., M.P.H.  
Amount: \$80,000

Emory Global Health Fund.  
**Effect of a dietary weight loss intervention on airway oxidative stress, asthma control and lung function in a cohort of asthmatic children in Mexico City.**  
P.I.: Fernando Holguin, M.D., M.P.H.  
Amount: \$40,000.

University Research Committee (Emory URC).  
**Airway adipokines and alveolar macrophage PPAR $\gamma$  expression. A link between obesity and airway oxidative stress in asthma**  
P.I.: Fernando Holguin, M.D., M.P.H.  
Amount: \$30,000.

Emory Carlile-Fraser Heart Center 2007 – 2009.

**A randomized pilot study to evaluate the effects of pioglitazone and standard therapy vs. placebo and standard therapy to treat obese, uncontrolled asthmatics**

P.I.: Fernando Holguin, M.D., M.P.H.

Amount: \$100,000

National Institutes of Health (UL1 RR024153) 09/30/06 – 06/30/11.

**University of Pittsburgh Clinical and Translational Science Institute – CORE C: Research Education, Training, and Career Development**

Amount: \$990,643 Annual Direct Costs

PI: Reis

Co-Investigator

National Institutes of Health (NIH/NCRR K12 RR017643) August 2006 – 2008

**Effects of weight loss on airway inflammation and oxidation in asthmatic subjects undergoing bariatric surgery**

P.I.: Fernando Holguin, M.D., M.P.H.

National Institute of Drug Abuse (NIDA), NIH

**Virtual reality skills training: nicotine dependence**

Co-Investigator

Amount funded: \$871,049

5% effort

Critical Therapeutics

**The role of leukotrienes in the asthma obesity phenotype**

P.I.: Fernando Holguin, M.D., M.P.H.

Amount: \$30,000

Centers for Disease Control

**Effects of air pollution on the respiratory health of children with Sickle Cell Disease in Atlanta**

P.I.: Fernando Holguin, M.D., M.P.H.

Amount: \$250,000

NIH. Alcohol & Lung Biology Center (P50).

**The role of chronic alcohol consumption in airway oxidative stress in patients with and without asthma.**

P.I.: Fernando Holguin, M.D., M.P.H.

PAHO.

**A bi-national study of asthma and air pollution in children in the US-Mexico border**

Co-P.I.: Fernando Holguin, M.D., M.P.H.

5% effort.

US Environmental Protection Agency/US-Mexico Border Project 2012

**Effects of diesel exposure and traffic-related air pollution on asthmatic children in Ciudad Juarez, Chihuahua**

P.I.: Fernando Holguin, M.D., M.P.H.

Amount funded: \$126,000

10% effort  
October 2004 – November 2005

Emory Medical Grant Foundation  
**Association of BMI with systemic and biomarkers of inflammation in African-American Asthmatics**  
P.I.: Fernando Holguin, M.D., M.P.H.  
Amount funded: \$25,000  
October 2005 – 2006

Critical Therapeutics  
**Association between BMI and Leukotriene production in African Americans with Asthma**  
P.I.: Fernando Holguin, M.D., M.P.H.  
Amount funded: \$30,000  
October 2005 - 2006

Centers for Disease Control (CDC)  
**Interpersonal Agreement (IPA) to Develop Air Pollution and Asthma Research Programs Support**  
62% salary support  
2002 – 2006

Oak Ridge Institute for Science and Education (ORISE)  
**Recipient of the fellowship for faculty members**  
Support: 60% salary  
2006 - 2007

CONACYT (National Commission of Science and Technology, Mexico)  
**Use of Antioxidants to Prevent the Cardiovascular Effects of Air Pollutants**  
P.I.: Fernando Holguin, M.D., M.P.H.  
Amount funded: \$150,000  
1999 – 2001

CONSERVA (Grants from the Department of Environmental Health of Mexico City)  
**Cardiovascular Effects of Particulates in the Elderly**  
P.I.: Fernando Holguin, M.D., M.P.H.  
Amount funded: 50,000 USD  
2000 - 2001

US-Mexico Foundation for Science  
**Effects of Air Pollution on the Health of Asthmatic Children in the US-Mexico Border**  
P.I.: Fernando Holguin, M.D., M.P.H.  
Amount: \$68,000  
2001

## **REVIEW AND REFEREE ACTIVITIES:**

### **Reviewer**

American Journal Respiratory Critical Care  
Chest  
Revista da Salud Publica de México  
Circulation  
Pediatrics  
European Respiratory Journal  
Thorax  
Environmental Health Perspectives  
Lancet  
Lung  
Journal of Applied Physiology  
Respiration  
Journal of Asthma  
JAMA  
New England Journal of Medicine

### **Editorial Board**

Faculty of Medicine F1000 (2007 – 2009)  
International Journal of Tuberculosis and Lung Diseases (2006 – 2008)  
Thorax (2010 – current)  
American Journal of Respiratory and Critical Care Medicine (2011 – present)  
Journal of Asthma

### **Associate Editor**

American Journal of Respiratory and Critical Care Medicine (2021 - )  
Annals of the American Thoracic Society (2017 – 2019)  
Journal of Tuberculosis and Lung Diseases (2007 – 2011)

### **SERVICE:**

2002 – 2005	American Thoracic Society	Elected Program Committee Member, Environmental and Occupational Health Assembly
2002 – 2004	MIT	Consultant, Mexico City Project on Air Pollution
2003	American Thoracic Society	Co-Chair, New methods in epidemiological research to assess the cardiovascular effects of air pollution, Seattle, WA
2005	Institute of Medicine	Consultant, Alternative Approaches for Estimating Health-Related Quality of Life Impacts
2005	American Thoracic Society	Chair, Strategies to prevent cardiovascular effects of Air pollution, San Diego, CA
2006	American Thoracic Society	Chair, Obesity and asthma: association or causation?

San Diego, CA

2006	Center for Disease Control, ATSDR	Chair, Asbestos Biomarkers Expert Panel Meeting
2007	International Society for Environmental Epidemiology	Scientific Advisory Committee
2007 – 2008	EPA Human Research Facility at Chapel Hill	Consultant, Human Air Pollution Exposure studies
2008	American Thoracic Society	Chair-elect, Environmental and Occupational Health Program Committee
2008	American Thoracic Society	Member, International Lung Health Committee
2008	American Thoracic Society	Member, Behavioral Sciences Program Committee
2008	American Thoracic Society	Co-chair, Interactions between obesity and lung Diseases, Toronto, 2008
2008	American Heart Association	Member, Expert Panel and Writing Group for “Air Pollution and Cardiovascular Disease”
2009	National Institutes of Health	NIEHS, ZES1 LKB, PO1 and UO1
2012, 2013	National Institutes of Health	<i>Ad Hoc</i> reviewer NIH Respiratory Integrative and Biology & Translation, study section (RIBT)
2013	National Institute of Environmental Health Sciences Special Emphasis Panel	<i>Ad Hoc</i> reviewer Transition to Independence (Careers) Development ZES1 LWJ-D (K99)
2013-2016	University of Pittsburgh	PACCM Fellowship Committee
2014-2016	Primary Care Health Service of Pittsburgh	Alma Illery Free Asthma Clinic
2016	National Institutes of Health	Ad Hoc Reviewer NIH Grant Applications And R&D Contract Proposals
2016	American Thoracic Society & European Respiratory Society	Co-chair, ERS-ATS Task Force on Severe Asthma
2019.	Steering committee National Asthma Education & Prevention. EPR-4 NIH	Steering Committee Member .
2016-19.	ERS/ATS Severe asthma	Co-chair.

guidelines

2020	NIH NIAID <i>Ad hoc</i> reviewer	Childhood Asthma in Urban Settings -Clinical Research Centers
2020	NIH NIAID <i>Ad hoc</i> reviewer	NIAID Clinical Trial Implementation Cooperative Agreement (U01 Clinical Trial Required)