

CURRICULUM VITAE

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EDUCATION:

1990	San Francisco State University, CA.	BS	Cellular & Molecular Biology
1995	Stanford University School of Medicine, CA	MD	Medicine
1997	Harvard School of Public Health, MA.	Certificate	Program in Clinical Effectiveness
1995-1998	Brigham and Women's Hospital, MA.	Resident	Internal Medicine
1998-2001	University of California, San Francisco	Fellow	Medicine (Pulmonary & Critical Care Medicine)
2001-2002	Stanford University		Genetic Epidemiology
2005-2006	University of California, Berkeley	MPH	Epidemiology

LICENSES, CERTIFICATIONS:

1997 - DEA Certification – BB5352632
 1998 - California Medical License – A065084
 1999 - Board Certified, Internal Medicine
 2000 - Board Certified, Pulmonary Medicine
 2001 - Board Eligible, Critical Care Medicine

PRINCIPAL POSITIONS HELD:

2001-04	University of California San Francisco	Asst. Adjunct Professor	Pulmonary & Critical Care
2004-08	University of California, San Francisco	Asst. Professor	Biopharmaceutical Sciences

2008 -2011	University of California San Francisco	Assoc. Professor	Biopharmaceutical Sciences
2010-present	University of California San Francisco	Vice Chair	Bioengineering and Therapeutic Sciences
2011-present	University of California San Francisco	Professor	Bioengineering and Therapeutic Sciences

OTHER POSITIONS HELD CONCURRENTLY:

2001-present	UCSF	Director, Pulmonary Genetics Core Facility
2001-2010	UCSF	Director, DNA Bank Core Facility
2004- 2008	UCSF	Associate Director, Clinical Pharmacology Training Program
2007-present	Kaiser Permanente	Adjunct Investigator, Division of Research
2008-present	UCSF	Director, Clinical Pharmacology Training Program
2008-present	UCSF	Director, Center for Genes, Environments & Health

HONORS AND AWARDS:

1988, 1989	National Collegiate Athletic Association (NCAA) Div II Academic All-American Honors, Wrestling
1990	Stanford Medical Scholar
1991	Pfeiffer Research Scholar
1992-93	National Hispanic Scholarship Fund
1992-93	National Medical Association Fellowship
2005-10	Robert Wood Johnson Amos Medical Faculty Development Scholar
2009	American Society of Clinical Investigators
2009	Guest Speaker, Tavis Smiley Show
2010	Guest Speaker, NPR's Science Friday, hosted by Ira Flatow
2011	Athletic Hall of Fame, San Francisco State University
2013	American Museum of Natural History (AMNH) Documentary on Esteban Burchard and his research. This documentary will be exhibited at the AMNH for two years and distributed to all U.S. public high schools.
2013:	Guest Speaker, Smithsonian Institution National Museum of Natural History (NMNH)

KEYWORDS/ AREAS OF INTEREST:

Asthma, Pharmacogenetics, Admixture, Population Genetics, Race/Ethnicity and Genetics, Pulmonary & Critical Care Medicine, Underserved Populations, Minority recruitment

PROFESSIONAL ACTIVITIES

SUMMARY OF CLINICAL ACTIVITIES

Attending Physician, Pulmonary Consult service, San Francisco General Hospital.

PROFESSIONAL ORGANIZATIONS:

Memberships

American Society of Human Genetics
National Medical Association
California Thoracic Society
American Thoracic Society
American College of Chest Physicians
American College of Physicians
American Society for Clinical Pharmacology and Therapeutics

SERVICE TO PROFESSIONAL PUBLICATIONS:

Reviewer: *New England Journal of Medicine, Journal of the American Medical Association, American Journal of Human Genetics, Nature Genetics, Pediatrics, American Journal of Respiratory and Critical Care Medicine, Genes and Immunity, European Respiratory Journal, Human Genetics, Journal of Allergy and Clinical Immunology, Chest, Journal of the National Medical Association*

INVITED PRESENTATIONS (last 12 months):

INTERNATIONAL

- 2010 Puerto Rico - U.S. Food and Drug Administration. First Latin American Conference on Pharmacogenetics, Invited Speaker
- 2010 Taiwan - Academia Sinica, Invited Speaker

NATIONAL

- 2010 American Society of Human Genetics, Invited Speaker
- 2011 University of Pennsylvania, Pulmonary Grand Rounds
- 2011 University of Puerto Rico, Medical Grand Rounds
- 2011 American Thoracic Society
- 2011 Key Note Speaker, UCLA Department of Genetics Retreat
- 2011 Society for the Advancement of Chicanos and Native Americans (SACNAS), Invited Speaker
- 2012 University of Miami, Invited Speaker
- 2012 Pharmacogenetic Research Network
- 2012 California Asthma Summit
- 2013 Harvard's Brigham and Women's Hospital, Asthma Grand Rounds

REGIONAL AND OTHER INVITED PRESENTATIONS

- 2009 University of California, Department of Biostatistics, Invited Speaker
- 2009 Ethnic Health Institute, Oakland, CA, Keynote Speaker
- 2009 San Francisco State University, SF, CA, Keynote Speaker
- 2010 Grand Opening, Department of Bioengineering and Therapeutic Sciences, Invited Speaker
- 2010 Stanford University Department of Medicine Retreat, Keynote Speaker

2010 San Francisco State University Alumni Day, Invited Speaker
2011 Medical Grand Rounds, UCSF, Invited Speaker
2011 Genentech

GOVERNMENT AND OTHER PROFESSIONAL SERVICE:

2004	NIH	Ad Hoc Advisor: NIH/NIGMS: Committee on Race & Genetics
2004	NIH	Ad Hoc Advisor: NIH/NCI/NIGMS/NHGRI Latino Genetics Community Consultation Network
2004-05	Amer. Thoracic Society	Advisor: Environment and Occupational Health Assembly
2004-present	NIH	Ad Hoc Reviewer, NIH/NCI
2004-present	NIH	Ad Hoc Reviewer, NIH/NHLBI
2005	NIH	Ad Hoc Advisor: NIH/NCI: Committee on Admixture and Latino Populations
2007	NIH	Observational Study Monitoring Board (OSMB) for the Hispanic Community Health Study - Study of Latinos (HCHS-SOL)
2009-present	NIH	Study Section Member, Genetics of Health and Disease

UNIVERSITY AND PUBLIC SERVICE

UNIVERSITY SERVICE:

CAMPUS-WIDE:

2003-05 Chancellor's Advisory Committee on Diversity

SCHOOL OF PHARMACY:

2005-Now School of Pharmacy Diversity Task Force

DEPARTMENTAL SERVICE:

2006-present Member, Selection Committee for UCSF Pharmaceutical Sciences and Pharmacogenetics (PSPG) Graduate Student Program
2009 Faculty Search Committee, UCSF Cardiovascular Research Institute (CVRI)
2009 Faculty Search Committee, UCSF Department of Epidemiology & Biostatistics
2009 Chair, Faculty Search Committee, Bioengineering & Therapeutic Sciences (BTS)
2014 Chair, Faculty Council, School of Pharmacy

PUBLIC SERVICE:

1991-1993 Minority Student Recruiter, Stanford University School of Medicine.
1991-1993 Graduate student council member, El Centro Chicano de Stanford.
1991-1993 President and Vice President, Stanford Raza Medical Association '92-'93 and '91-'92, respectively.
1992-1993 Founder, Stanford Raza Medical Association High School Tutorial Program.
1992-1995 Committee on Admissions, Stanford University School of Medicine, Minority Admission's Advisory Panel, Member
1993-1995 Assistant Team Physician, Stanford University Wrestling Team.
1994-1995 Instructor - Student Rounds
1995-1997 Founder: Jamaica Plain Scholars, Jamaica Plain, MA

- 1995-1998 Host Family - house minority undergraduate students, medical students, and physicians at Stanford University Medical Center, Stanford University School of Medicine and Brigham and Women's Hospital, Boston.
- 1995-1998 Medical Student Advisor - Harvard Medical School.
- 1995-1998 House Staff Selection Committee, Brigham and Women's Hospital, Member
- 1995-1998 Presidential Oversight Committee on Diversity, Brigham and Women's Hospital, Member
- 1998-2000 UCSF Department of Medicine Diversity Task Force, Member
- 1999-Present SF Unified School District, Volunteer Speaker
- 2000-Present Housestaff Selection Committee – UCSF Department of Medicine Residency Program, Member
- 2002-Present Fellowship selection Committee – UCSF Division of Pulmonary and Critical Care Fellowship, Member
- 2009-Present Wrestling Coach (Volunteer), Athenian High School

SUMMARY OF SERVICE ACTIVITIES

I have been very active in promoting our scientific research. I have been invited to speak on the National Public Radio (NPR) show, Science Friday with Ira Flatow and on the Tavis Smiley show. I was also invited as a speaker for the American Society of Human Genetics in 2008 and 2010. I have been very active in meeting with underrepresented students in schools of Nursing, Medicine and Pharmacy.

TEACHING AND MENTORING

FORMAL SCHEDULED CLASSES FOR UCSF STUDENTS:

Qtr	Academic Year	Course No. Title	Teaching Contribution	Units	Class Size
Winter	1999-2012	IDS 102AB Organ Block	Lecturer	10	142
Spring	2004-Present	PSPG245C/BPS 135 Principles of Pharmacogenomics	Lecturer	2	20
Spring	2004-Present	BPS 134 Study Designs	Lecturer	2	8
Spring	2004-Present	BPS 115 Genetics & Pharmacogenetics	Lecturer	10	122
Fall	2006-Present	Med 140.22 Therapeutics	Lecturer	2	20
Fall	2011-present	Genetics	Lecturer	2	122

FEATURED SCHEDULED CLASSES FOR UC BERKELEY STUDENTS:

Winter	2004-2008	PH295 Special Topics in Human Genetics and Genetic Epidemiology	Lecturer	2	25
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PRE AND POST DOCTORAL FELLOWS SUPERVISED OR MENTORED

Table 1. Primary research mentees, current positions, and main mentored research projects. Individuals with the (†) were faculty members prior to joining my laboratory

UCSF Clinical Research Post-doctoral Fellows		
<i>Name (years mentored)</i>	<i>Current Position, Institution</i>	<i>Main Research</i>
Meghan McGarry (2013-present)	Pulmonary & Critical Care Fellow, UCSF	Drug response and asthma
Neeta Thakur (2011-present)	Pulmonary & Critical Care Fellow, UCSF	Health Disparities in Lung Disease
Joshua Galanter (2007-present)	Assistant Professor, Bioengineering & Therapeutic Sciences and Pulmonary & Critical Care, UCSF	Gene-Environment Studies of Asthma in Latino Populations ^{8, 11-12}
Harriet Corvol (2007-2008) [†]	Assistant Professor, Pediatric Pulmonology and Critical Care, Hôpital Trousseau, Paris, France	Asthma Pharmacogenetics ¹³⁻¹⁴
Shannon Thyne (2002-2007) [†]	Professor, Pediatrics, UCSF	Clinical Asthma Research ¹⁴⁻¹⁷
Yuhjung J. Tsai (2005-2006)	Post-doctoral fellow, Johns Hopkins Medical Center	Genetics, Admixture and Asthma ¹⁸
UCSF Ph.D. Post-doctoral Fellows		
<i>Name (years mentored)</i>	<i>Current Position, Institution</i>	<i>Main Research</i>
Maria del Mar del Pino (2012-present)	Post-doctoral Fellow	Asthma Genetics
Sam Oh (2010-present)	Post-doctoral fellow	Asthma Epidemiology
Dara Torgerson (2010-present)	Assistant Professor, UCSF	Genetics, Admixture and Asthma
Melinda Aldrich (2007-2010)	Assistant Professor, Vanderbilt University	Genetic Admixture and Lung Function in African Americans
Marc Via (2007-2010)	Assistant Professor, University of Barcelona	Genetics, Admixture and Asthma ^{16, 19-20}
Shweta Choudhry (2003-2009)	Assistant Professor, UCSF	Genetics, Admixture and Asthma ^{15, 17, 21-25}
Clarence Gillett (2006-2008)	Research Scientist, DOW Chemical	Genetics, Admixture and Asthma
Hui Ju Tsai (2003-2006)	Assistant Professor, Northwestern University	Genetics, Admixture and Asthma ²⁶⁻²⁸
Natasha Coyle (2003-2004)	Research Scientist, Applied Bio Systems	Genetics, Admixture and Asthma
Undergraduate/Pre-doctoral Students		
<i>Name (years mentored)</i>	<i>Current Position, Institution</i>	<i>Main Research</i>
Katherine Nishimura (2011-present)	Graduate Student, UCSF	Asthma Genetics and Epidemiology
Chris Gignoux (2009-present)	Graduate student, UCSF	Genetics, Admixture and Asthma ¹⁹
Katherine Drake (2006-2012)	Graduate student, UCSF	Genetics, Admixture and Asthma ¹¹
Vanessa Aguilera (2009)	Graduate Student, UCSF	Genetics, Admixture and Asthma
Anthony De Giacomo (2006-2008)	Orthopedic Surgery, Boston University	Genetics, Admixture and Asthma ¹⁴
Max Seibold (2004-2008)	Assistant Professor, National Jewish Health Center	Genetics of Lung Disease ^{9-10, 23, 29-39}
Natalie Battle (2004-2006)	Medical Resident, Washington University	Asthma Pharmacogenetics ¹⁵

Mariam Naqvi (2004-2006)	OB-Gyn Fellow, Stanford University	Asthma Pharmacogenetics ⁴⁰⁻⁴²
Keyan Salari (2003-2005)	MD/PhD Student, Stanford	Genetics, Admixture and Asthma ⁴³
Stacy Ly (2001-2003)	Physician, University California, Davis	Genetics, Admixture and Asthma

INFORMAL CLINICAL TEACHING:

2001-10/2006: Chest Clinic: 5 hours per week, 7 fellows
2001-2006: Intensive Care Unit: clinical teaching hours = 80 hrs.
2001-2013: Pulmonary Consult Service: clinical teaching hours = 80 hrs.
2004-present: Clinical Pharmacology: 2 hours per week, 7 fellows

SUMMARY OF TEACHING HOURS:

2009 -10: 1000 total hours of teaching (including preparation)
Formal class or course teaching hours: 30 hours
Informal teaching hours: 100 hours
Mentoring hours: 400 hours

2010-11 1000 total hours of teaching (including preparation)
Formal class or course teaching hours: 30 hours
Informal teaching hours: 100 hours
Mentoring hours: 400 hours

present (anticipated) 1000 total hours of teaching

TEACHING NARRATIVE

School of Pharmacy: I teach two courses: a core genetics course to 122 first year Pharm.D. students and I direct a clinical pharmacology fellowship program for postdoctoral fellows. In the Pharm.D. course I focus on basic topics in genetics, pharmacogenetics, and clinical applications. I also teach novel topics such as the importance of race/ethnicity in biomedical research and clinical practice. I discuss how racial background could confound genetic studies. Finally, I discuss how racial background could modify response to pharmacologic therapies as well as genetic risk factors. We discuss possible causes for racial and ethnic specific differences in drug response.

School of Medicine:

- 1) I teach pulmonary physiology and clinical pathophysiology. We use clinical vignettes to teach in small group settings of approximately 20-25 students. Each class is 2 hours and I teach four classes. I also teach clinical pharmacology.
- 2) I direct the Clinical Pharmacology Training Program. We have weekly didactic teaching sessions, which I either direct or supervise.

RESEARCH AND CREATIVE ACTIVITIES

RESEARCH AWARDS AND GRANTS:

CURRENT

1R01 HL104608-01A1 (PI: Barnes) 09/28/2011-6/30/2015 0.6 cal mo (5%)
Johns Hopkins University-Subcontract \$100,000
Role: Subcontractor
Project title: New Approaches for Empowering Studies of Asthma in Populations of African Descent
The major goal of this project is to identify genetic variants specific to African populations. We will sequence Latino and African American samples to design a custom GeneChip for populations with African ancestry.

1P60 MD006902 (PI: Bibbins-Domingo) 08/27/2012-02/28/17 1.2 cal mo (10%)
NIH \$198,000
Role: Project PI
Program title: Addressing Disparities in Chronic Disease with a Teen and Young Adult Focus
Project title: The Genetics of Asthma and Obesity Using Admixture Mapping in Latinos
The major goal of this proposal is to identify novel genetic variants associated with both asthma and obesity by deep resequencing of candidate regions identified through admixture mapping.

R01 HL 117004 (PI: Burchard) 09/01/2013-08/31/2018 1.8 cal mos (15%)
NIH/NHLBI \$478,999
Pharmacogenomics of Bronchodilator Response in Minority Children with Asthma
The major goals of this project are: 1) To perform "Exome Plus" DNA sequencing on the extremes of bronchodilator response among minority children with asthma. 2) To identify genetic variation associated with bronchodilator response. 3) To determine whether promoter variants associated with bronchodilator response modulate gene expression in primary airway smooth muscle cells.

1K12 HL119997-01 (PI: Erle/Burchard) 09/01/2013-5/31/2018 0.60 calendar
NIH/NHLBI \$115,000
Roles: Co-PI
UCSF Career Development Program in Omics of Lung Diseases
Overall project goal is to launch the careers of an outstanding group of next generation scientists equipped to use omics approaches to help transform lung research and pulmonary medicine.

R01 HL088133 (PI: Burchard) 03/01/08-02/28/14 3.6 cal mos
(30%)
NIH/NHLBI \$477,675
Whole Genome Analyses for Asthma in Latino Populations
The major goal of this project is to perform genome-wide association analyses to identify genetic factors associated with asthma and related phenotypes in Puerto Ricans and Mexicans.

R01 ES015794 (PI: Burchard) 09/1/08-05/31/14 2.4 cal mos (20%)
NIH/NIEHS \$1,186,919
Gene-environments and Admixture in Latino Asthmatics (GALA 2)
The major goal of this project is to investigate interactions between individual ancestry, genetic factors and environment risk factors with asthma and asthma-related phenotypes among several Latino ethnic groups.

PENDING

R21 and RO1

PAST

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|---|---|
| 1. Robert Wood Johnson, Harold Amos Medical Faculty Development Award (PI) | 7/1/05-6/30/10
\$365,400 |
| 2. U01 GM63190 (PI)
NIH
Pharmacogenetics of Membrane Transporters,
Program Principal Investigator: Kathleen Giacomini.
Project title: Study of Pharmacogenetics in Ethically Diverse Groups | 7/1/05-6/30/10
\$115,000 |
| 3. RO1, HL078885 (PI)
NIH
Genetic Confounding in Racially Admixed Populations | 7/1/05/6/30/10
\$1,250,000 |
| 4. U01 GM61390 (PI: Giacomini), Co-Investigator
Program title: Pharmacogenetics of Membrane Transporters
Project title: Study of Pharmacogenetics in Ethically Diverse Groups | 7/20/05-6/30/10 |
| 5. 1RC2 HL101651-01 –Subcontractor
(Co-PIs: Ober, Nicolae),
The EVE Asthma Genetics Consortium:
Building Upon GWAS | 9/30/09-09/29/11
\$150,819 |
| 6. U19 AI077439 (Program PI: Sheppard)
NIH/NIAID
Role on project: Project 3 PI
Program: Mechanisms of Initiation and Persistence of Allergic Asthma
Project 3: Chitinases and TGF β in Human Asthma
The major goals of this project are: 1) To determine the independent and dependent effects of genetic variants in chitinases (AMCase/CHIT1) on sensitization to fungal aeroallergens and other asthma outcomes. 2) To examine the autonomous and interactive effects of genetic variants in TGF β pathway genes on asthma and asthma-related phenotypes. 3) To determine how the expression or function of CHIT1, AMCase, and TGF β pathway genes in the asthmatic airway is affected by genetic variation in these genes. | 04/01/2008-03/31/2013 1.8 cal mos (15%)
Program: \$1,033,456
Project 3: \$274,366 |

PEER REVIEWED PUBLICATIONS:

Journal articles

1. Whitehead B, Stoehler C, Wu C, Patterson G, **Burchard E**, Theodore J, Clayberger C, and Starnes V. Cytokine Gene Expression in Human Lung Transplant Recipients, *Transplantation* 1993 Oct;56(4):956-61. PMID: 7692639.
2. Wu C, Kurbegov D, Lattin B, **Burchard E**, Finkle C, Valantine H, Billingham M, Starnes V, and Clayberger C. Cytokine Gene Expression in Human Cardiac Allograft Recipients, *Transplant Immunology*, September 1994; 2(3):199-207. PMID: 8000848.
3. **Burchard EG**, Silverman EK, Rosenwasser LJ, Borrish L, Yandava C, Pillari A, Weiss ST, Lilly CM, Ford J, Hasday J, Drazen JM. Association Between a Sequence Variant in the IL-4 Gene Promoter and FEV1 in Asthma. *American J Respiratory Critical Care Medicine*. 1999 Sep;160(3):919-22. PMID: 10471619.

4. **Burchard EG**, Avila PC, Nazario S, Casal J, Torres A, Rodriguez-Santana JR, Toscano M, Senter-Sylvia J, Alioto ME, Salazar M, Gomez I, Fagan JK, Salas J, Lilly C, Matallana H, Ziv E, Castro R, Selman M, Chapela R, Sheppard D, Weiss ST, Ford JG, Boushey HA, Rodriguez-Cintron W, Drazen JM and Silverman EK, from the Genetics of Asthma in Latino Americans (GALA) Study. Lower Bronchodilator Responsiveness in Puerto Rican than in Mexican Asthmatic Subjects. *Am J Respiratory Critical Care Medicine*. 2004 February 1;169(3):386-92. PMID: 14617512.
5. Lind DL, Choudhry S, Ziv E, Ung N, Salari K, Coyle NE, Nazario S, Casal J, Torres T, Avila PC, Salas J, Selman M, Weiss ST, Ford JF, Boushey HA, Drazen JM, Silverman EK, Chapela R, Rodriguez-Cintron W, Sheppard D, Kwok PY and **Burchard, EG** from the Genetics of Asthma in Latino Americans (GALA) Study. ADAM33 is not associated with asthma in Puerto Rican or Mexican populations. *American J Respiratory Critical Care Medicine*. 2003 December 1;168(11):1312-6. PMID: 12958057.
6. Salari K, Choudhry S, Tang H, Naqvi M, Lind D, Avila PC, Coyle NE, Ung N, Nazario S, Casal J, Torres-Palacios A, Clark S, Phong A, Gomez I, Matallana H, Perez-Stable EJ, Shriver MD, Kwok PY, Sheppard D, Rodriguez-Cintron W, Risch NJ, Ziv E, **Burchard EG**. Genetic admixture and asthma-related phenotypes in Mexican American and Puerto Rican asthmatics. *Genetic Epidemiology*. 2005 July;29(1):76-86. PMID: 15918156.
7. Choudhry S, Ung N, Avila PC, Ziv E, Nazario S, Casal, J Torres A, Gorman JD, Salari K, Rodriguez-Santana JR, Toscano M, Senter-Sylvia J, Alioto ME, Salazar M, Gomez I, Fagan JK, Salas J, Clark S, Lilly C, Matallana H, Selman M, Chapela R, Sheppard D, Weiss ST, Ford JG, Boushey HA, Drazen JM, Rodriguez-Cintron W, Silverman EK and **Burchard EG** from the Genetics of Asthma in Latino Americans (GALA) Study. Pharmacogenetic Differences in Response to Bronchodilators Between Puerto Rican and Mexican Asthmatics. *Am J Respiratory and Critical Care Medicine*. 2005 March 15;171(6):563-70. PMID: 15557128.
8. Pawlikowska L, Tran MN, Achrol AS, Ha C, **Burchard E**, Choudhry S, Zaroff J, Lawton MT, Castro R, McCulloch CE, Marchuk D, Kwok PY, Young WL; UCSF BAVM Study Project. Polymorphisms in transforming growth factor-beta-related genes ALK1 and ENG are associated with sporadic brain arteriovenous malformations. *Stroke* 2005 October; 36(10):2278-80. PMID: 16179574.
9. Choudhry S, Coyle, NE, Lind, D, Tang, H, Salari, K, Clark SL, Ung, N, Matallana, H, Avila, PC, Nazario, S, Casal J, Torres, A, Toscano, M, Castro, R, Rodriguez-Cintron, W, Shriver, MD, Kwok, Sheppard, D, Pui-Yan, Risch, N, Ziv, E and **Burchard, EG**. Population stratification confounds genetic association studies among Latinos. *Human Genetics* 2006 January; 118(5):652-64. PMID: 16283388.
10. Tsai HJ, Kho JY, Shaikh N, Choudhry S, Naqvi M, Navarro D, Matallana H, Castro R, Lilly CM, Watson HG, Meade K, Le Noir M, Thyne S, Ziv E, **González Burchard E**, from the Study of African American, Asthma, Genes and Environments (SAGE). Admixture-Matched Case-Control Study: A Practical Approach for Genetic Association Studies in Admixed Populations. *Human Genetics*. 2006 January; 118(5):626-39. PMID: 16273390. PMCID: PMC3478103.
11. Tsai HJ, Choudhry S, Naqvi M, Rodriguez-Cintron W, **Burchard EG** and Ziv E. Comparison of three statistical methods to estimate genetic ancestry and control for stratification in genetic association studies among admixed populations. *Human Genetics*. 2005 December;118(3-4):424-33. PMID: 16208514.
12. Choudhry, S, Avila, PC, Nazario, S, Ung, N, Rodriguez-Santana, JR, Casal, J, Tsai HJ, Torres, A, Ziv, E, Toscano, M, Senter-Sylvia, J, Alioto, ME, Salazar, M, Gomez I, Fagan, JK, Salas, J, Lilly, C, Matallana, Castro R, H, Selman, M, Sheppard, D, Weiss, ST, Ford, JG, Drazen, JM, Rodriguez-Cintron, W, Chapela, R, Silverman, EK and **Burchard, EG** from the Genetics of Asthma in Latino Americans (GALA) Study. CD14 tobacco gene-environment interaction modifies asthma severity and immunoglobulin E levels in Latinos

with asthma. *American J Respiratory and Critical Care Medicine*. 2005 July 15;172(2):173-82. PMID: 15879416.

13. Reiner AP, Ziv E, Lind DL, Nievergelt CM, Schork NJ, Cummings SR, Phong A, **Burchard EG**, Harris TB, Psaty BM, Kwok PY. Population Structure, Admixture, and Aging-Related Phenotypes in African American Adults: The Cardiovascular Health Study. *American J Human Genetics*. 2005 January 19;76(3). PMID: 15660291. PMCID: PMC1196398.
14. Badagnani I, Chan W, Castro RA, Brett CM, Huang CC, Stryke D, Kawamoto M, Johns SJ, Ferrin TE, Carlson EJ, **Burchard EG**, Giacomini KM. Functional analysis of genetic variants in the human concentrative nucleoside transporter 3 (CNT3; SLC28A3). *Pharmacogenomics J*. 2005;5(3):157-65. PMID: 15738947.
15. Fujita T, Brown C, Carlson EJ, Taylor T, de la Cruz M, Johns SJ, Stryke D, Kawamoto M, Fujita K, Castro R, Chen CW, Lin ET, Brett CM, **Burchard EG**, Ferrin TE, Huang CC, Leabman MK, Giacomini KM. Functional analysis of polymorphisms in the organic anion transporter, SLC22A6 (OAT1). *Pharmacogenetic Genomics*. 2005 April;15(4):201-9. PMID: 15864112.
16. Erdman AR, Mangravite LM, Urban TJ, Lagpacan LL, Castro RA, de la Cruz M, Chan W, Huang CC, Johns SJ, Kawamoto M, Stryke D, Taylor TR, Carlson EJ, Ferrin TE, Brett CM, **Burchard EG**, Giacomini KM. The human organic anion transporter 3 (OAT3; SLC22A8): genetic variation and functional genomics. *Am J Physiology Renal Physiology*. 2006 April;290(4):F905-12. PMID: 16291576.
17. Tsai HJ, Kho JY, Shaikh N, Kho JY, Battle N, Naqvi M, Navarro D, Matallana H, Lilly CM, Eng C, Kumar G, Thyne S, Watson HG, Meade K, Le Noir M, Choudhry S, **González Burchard E**, from the Study of African American, Asthma, Genes and Environments (SAGE). Beta-2 Adrenergic receptor polymorphisms: Pharmacogenetic response to bronchodilator among African American asthmatics. *Human Genetics*. 2006 January; 118(5):626-39. PMID: 16596417.
18. Shu Y, Urban TJ, Leabman MK, Fujita T, Erdman AR, Lagpacan LL, Brown C, Castro RA, Huang CC, Stryke D, Kawamoto M, Johns SJ, Taylor TR, Chan W, De La Cruz M, Carlson EJ, Ferrin TE, Brett CM, **Burchard EG**, Herskowitz I, Kroetz DL, Giacomini KM. PharmGKB submission update: V. PMT submissions of genetic variation in SLC22 family transporters. *Pharmacology Reviews*. 2006 March;58(1):3-4. PMID: 16507878. PMCID: PMC1857259.
19. Badagnani I, Sorani M, Edwards RH, Brown C, Castro RA, Huang CC, Stryke D, Kawamoto M, Johns SJ, Carlson EJ, Taylor T, Chan W, De La Cruz M, Ferrin TE, **Burchard EG**, Herskowitz I, Kroetz DL, Giacomini KM. PharmGKB submission update: VI. PMT submissions of genetic variations in neurotransmitter transporters (SLC6, SLC17, and SLC18) to the PharmGKB network. *Pharmacological Reviews*. 2006 March;58(1):5-6. PMID: 16507879.
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RESEARCH SUMMARY

Asthma varies widely among different racial and ethnic groups. In the U.S., asthma prevalence, morbidity and mortality are highest in Puerto Ricans, intermediate in Dominicans and Cubans, and lowest in Mexicans and Central Americans. Socioeconomic and environmental differences do not fully explain this observation. One potential explanation is that there may be gene-environment interactions which can differentially modify risk for asthma in different racial/ethnic groups. These gene-environment interactions can be tested using genetic ancestry as a surrogate for genetic risk factors. Although the relative ancestral contributions to the contemporary Latino gene pool make each Latino ethnic group unique, there is substantial overlap in ancestry. Therefore, individuals with similar ancestral proportions may still belong to different Latino subgroups. Furthermore, most Latinos are unaware of their precise ancestry and report their ancestry based on the national origin of their family and their physical appearance. The unavailability of precise ancestry and the genetic complexity among Latinos may complicate asthma research studies in this population. On the other hand, precisely because of this complexity, Latinos present a unique opportunity to disentangle the clinical, social, environmental, and genetic underpinnings of population differences in asthma prevalence, severity and bronchodilator drug responsiveness.

My research interests center on determining why there are significant disparities in asthma prevalence, asthma severity and even drug responsiveness to common asthma medications among racial/ethnic populations in the U.S. Specifically, we are investigating the complex interaction of social, genetic and environmental factors and their impact on asthma and asthma-related traits. To this end, we initiated the Genetics of Asthma in Latino Americans (GALA) Study, which was designed to compare genetic, environmental and clinical characteristics

between Puerto Rican and Mexican asthmatics. We are now replicating our results in GALA 2 (Genes-environments & Admixture in Latino Asthmatics).

The GALA Studies are ongoing multicenter international collaborative efforts, designed to identify and directly compare clinical and genetic risk factors associated with asthma and asthma severity among Latino children. In addition, we initiated SAGE (Study of African Americans, Asthma, Genes & Environments). The goal of SAGE is to identify ethnic specific, pharmacogenetic, and asthma associated genetic risk factors among African Americans.

Five representative publications and description of role in project:

1. Lower Bronchodilator Responsiveness in Puerto Rican than in Mexican Asthmatic Subjects. *AJRCCM* e-pub Nov 14, 2003.

We demonstrated that Puerto Rican children have lower drug response to albuterol than Mexican children. I conceived the study, I recruited the patients, did the analyses and wrote the manuscript.

2. Pharmacogenetic Differences in Response to Bronchodilators Between Puerto Rican and Mexican Asthmatics. *AJRCCM* May 5, 2005.

We demonstrated ethnic-specific differences in pharmacogenetic associations of bronchodilator drug responsiveness between Puerto Rican and Mexican children with asthma. I conceived idea to test the beta 2 adrenergic receptor (b2AR) gene as part of the candidate gene list in the original GALA proposal.

3. Differential enzymatic activity of common haplotypic versions of the human acidic mammalian chitinase protein. *J Biol Chem.* 2009 Jul 17;284(29):19650-8.

We identified genetic variants in the asthma candidate gene, human acidic mammalian chitinase, which resulted in a gain of enzymatic function. I conceived the idea and oversaw the graduate student who performed the experiments.

4. Ancestry-related Assortative Mating in Latino Populations. *Genome Biology.* 2009 Nov 20;10(11):R132.

We used 'ancestry informative markers' (AIMs) to demonstrate ancestry-related assortative mating in contemporary human populations. We find that ancestral make-up is positively correlated with spouse choice within both populations studied (Puerto Ricans and Mexicans), but find no correlation with socioeconomic or geographic origins that might explain the correlation. I developed the study populations, my lab did the genotyping and assisted with the analyses.

5. Genetic ancestry and lung function predictions. *New England Journal of Medicine.* 2010 Jul 22;363(4):321-30

We identified a significant inverse relationship between African ancestry and forced expiratory volume at one second (FEV₁) and forced vital capacity (FVC) in CARDIA participants. These relationships were also observed among African American subjects in HABC and CHS. In predicting lung function, the ancestry-based model demonstrated a better fit of the observed data compared with standard models. Ancestry-based models reclassified asthma severity

(based on percent predicted FEV₁) in 4-5% of African American participants. Current predictive equations, which rely on self-identified race alone, may misestimate lung function among African American subjects. Incorporating ancestry into normative equations may improve lung function estimates and more accurately categorize disease severity. I conceived the idea to test genetic ancestry and lung function. Students, fellow and staff from my lab did the analyses.