Department of Medicine

Epidemiology
&
Population Science

Annual Report, Fiscal Year 2019

Baylor College of Medicine

EPIDEMIOLOGY AND POPULATION SCIENCES

[Typically section chief's introductory statement]

HIGHLIGHTS

Dr. Bondy is a leading force in glioma epidemiology, having established two international glioma consortia of 14 sites that collected both glioma families (Gliogene) and sporadic cases and control (GICC). **Dr's Bondy**, Huse (MDACC), and **Amos** have an inter-institutional project in the MDACC Brain Tumor SPORE entitled "Somatic and germline distinctions arising in Black and Hispanics". **Dr. Bondy** and colleagues from the GICC Consortium have multiple publications using Mendelian randomization. Her group is collaborating with the quantitative modeling group to develop novel methods such as LD Score Regression to determine novel phenotypes associated with glioma and lung cancer using UK Biobank Data.

Dr. Amos received a CPRIT Established Investigator grant to evaluate predictors of recurrence in early-stage lung cancer patients undergoing surgical resection. **Dr's Amos and Cheng**, showed that baseline or post-diagnostic exposure to simvastatin and atorvastatin was associated with extended survival in non-small-cell lung cancer. **Dr's Amos and Cheng** applied a biological model to characterize outcomes following immunotherapy for renal cancer. **Dr. Amos** serves as PI of the Coordinating Center for the Molecular Characterization of Screen-Detected Lesions Network (U01) that includes the design of new studies. **Dr's Amos and Cheng** developed a computational immune profiling model for early-stage lung cancer. This algorithm can infer immune cell infiltration in tumor tissues based on gene expression data.

Dr. Badr is currently conducting a multi-site randomized controlled trial of CareSTEPS, a psychosocial intervention for the informal caregivers of advanced lung cancer patients. **Dr. Badr** received a discovery award from the NCI to participate in the Speeding Research Interventions into Practice (SPRINT) program and develop an implementation plan for moving CareSTEPS into clinical practice settings.

Dr's Thrift and El-Serag have an active research program in Barrett's Esophagus (BE), a precursor to esophageal adenocarcinoma (EAC). EAC is a rapidly advancing cancer in white males in our catchment area. **Dr's Thrift** and El-Serag have published >25 relevant papers during the funding period and identified risk factors associated with BE and EAC.
Prostate cancer in African-American (AA) men is one of the high-risk cancers in our catchment area. There are several initiatives underway to address this problem. **Dr's Bondy and Thrift** are the Texas PIs for the RESPOND African American Prostate Cancer Study, the largest study to date of prostate cancer in AAs.

An inter-programmatic collaboration among **Dr's Liu, Amos, and Spitz** led to the discovery of rare variants in the lymphotoxin beta gene, prolyl 3-hydroxylase gene, and disheveled associated activator of morphogenesis 2 gene that strongly associated with increased risk of lung cancer among carriers. **Dr. Li** used data from the Oncoarray project to identify novel gene-gene interactions that affect lung cancer risk, which led to her successful R21 application.

FACULTY

Epidemiology & Population Science
- Melissa Bondy, PhD
- Yanhong Liu, PhD, MS
- Margaret Spitz, MD
- Aaron Thrift, PhD

Postdoctoral Fellows
- Jeremy Schraw, PhD
- Jing Dong, PhD
- Quinn Ostrom, PhD, MPH
- Xiaotao Zhang, PhD

Institute for Clinical & Translational Research
- Chris Amos, PhD
- Younghun Han, PhD
- Yafang Li, PhD
- Jinyoung Byun, PhD
- Chao Cheng, PhD
- Charles Minard, PhD

PRESS

Bondy: #BrainCancerAwarenessMonth on Better Together with Maria Menounos. In this interview with host and glioma survivor Maria Menounos, Dr. Bondy discusses Gliogene, the largest study of familial brain cancer.
https://podcasts.apple.com/us/podcast/braintumorawarenessmonth/id1320060107?i=1000439848455

Bondy: Did Harvey make us sick? Still more questions than answers. Baylor College of Medicine has three Harvey health-related projects under way. Each of these studies is examining contaminates, their sources and possible toxicity.
https://www.houstonchronicle.com/news/houston-texas/houston/article/Did-Harvey-make-us-sick-Still-more-questions-13207791.php

Dong, Thrift: Less surgery among blacks linked to worse esophageal cancer survival. An article by Jing Dong, Ph.D., and Aaron Thrift, Ph.D., discussing racial disparities in esophageal cancer treatment is featured in *Healio Gastroenterology*.
https://www.healio.com/gastroenterology/oncology/news/online/%7B138eb088-62c6-47b9-bfd4-07763dc485fa%7D/less-surgery-among-blacks-linked-to-worse-esophageal-cancer-survival

TEACHING ACTIVITIES

Badr
- Translational Research & Population Health (TRAP), Baylor College of Medicine
- Mentorship of Post-doctoral Fellows, Graduate and Undergraduate Students, Baylor College of Medicine

Byun
- Bioinformatics and Genome Analysis, Baylor College of Medicine

Dong
- Genetic Epidemiology & Population Genetics, Baylor College of Medicine

Ostrom
- Fundamentals of Epidemiology, Baylor College of Medicine

Schraw

- Introductory Data Analysis in R, Baylor College of Medicine
- Fundamentals of Epidemiology, Baylor College of Medicine

Zhang
- Fundamentals of Epidemiology, Baylor College of Medicine
- Overview of Epidemiology Study Designs, Texas Children's Hospital

HONORS AND AWARDS

Cheng
- Rising Stars Award funded by CPRIT (Cancer Prevention and Research Institute of Texas)

Ostrom
- Enrico Anglesio Prize, International Association of Cancer Registries

Schraw
- Young Investigator Talent Award, International Society of Pediatric Oncology (SIOP)

Thrift
- American Gastroenterological Association (AGA) Institute Clinical Guidelines Committee

RESEARCH ACTIVITIES

Amos

1U01CA230997-01 (Kanwal)   NIH/NCI $505,467   09/01/2018 – 08/31/2023
Risk Stratification for and Early Detection of Liver Cancer
The Translational Research Center (TRC) includes a multidisciplinary team of clinical and translational researchers that has a strong record of accomplishment of collaborative work, with the collective mission of reducing the burden of HCC.

1P30ES030285-01 (Walker)   NIH/NIEHS $1,000,000   04/01/2019 – 03/31/2024
Gulf Coast Center for Precision Environmental Health
The GC-CEPH will be the focal point and catalyst for impactful EHS research, bi-directional communication with local communities and stakeholders, and the engine driving translation of precision environmental health research advances to improve human health.

1R01CA239342-01(Wang)   NIH/NCI $9,282 (sub only)   04/01/2019 – 03/31/2023
Statistical methods and tools for cancer risk prediction in families with germline mutations in TP53
To improve the clinical management of individuals with a family history of early-onset cancers by developing mathematical models to assess 1) germline mutation carrier probability prior to TP53 testing and 2) the absolute lifetime risk of developing cancers in individuals with TP53 mutations.

1R21CA235464-01A1 (Li, Y)   NIH/NCI $151,409   06/01/2019 – 05/30/2021
Genetic interaction analysis involving oncogenesis-related genes in lung cancer
This grant identifies the genetic interactions involving important oncogenesis-related genes in lung cancer development using an integrative filtered epistasis and functional annotation analysis

Bondy

1U19CA214254-01-A1   NIH/NCI $217,776 (sub only)   07/01/2018 – 06/30/2023
Research on Prostate Cancer in African American Men
The overall goal of this proposal is to better understand and define the roles of genetics, immunity, and access to care among African American men with prostate cancer.

51R01CA232754-01   NIH/NCI $954,904   05/09/2019 – 04/30/2023
(MPI) Characterizing germline and somatic alterations by glioma subtypes and clinical outcome
The overall goal of this proposal is to identify interactions between germline risk SNPs, somatic mutations, and clinical outcomes in glioma patients.

Cheng
1R21CA227996   NIH/NCI   04/01/2019 – 03/31/2021
Computational Identification of new candidate drugs for lung cancer treatment
The major goal of this project is to integrate genomic data and population-based longitudinal healthcare data to identify new candidate drugs for the treatment of lung cancer from FDA approved drugs.

PUBLICATIONS

1. Amirian ES, Ostrom QT, Armstrong GN, Lai RK, Gu X, Jacobs DI, Jalali A, Claus EB, Barnholtz-Sloan JS, …, **Bondy ML**. Aspirin, NSAIDs, and Glioma Risk: Original Data from the Glioma International Case-Control Study and a Meta-analysis. Cancer Epidemiol Biomarkers Prev. 2019 Mar;28(3):555-562. doi: 10.1158/1055-9965.EPI-18-0702. Epub 2018 Nov 27. PubMed PMID: 30482874; PubMed Central PMCID: PMC6401283.

2. **Byun J**, Schwartz AG, Lusk C, Wenzlaff AS, de Andrade M, Mandal D, Gaba C, Yang P, You M, Kupert EY, Anderson MW, Han Y, Li Y, Qian D, Stilp A, Laurie C, Nelson S, Zheng W, Hung RJ, Gaborieau V, Mckay J, Brennan P, Caporaso NE, Landi MT, Wu X, McLaughlin JR, Brhane Y, Bossé Y, Pinney SM, Bailey-Wilson JE, **Amos CI**. Genome-wide association study of familial lung cancer. Carcinogenesis. 2018 Sep 21;39(9):1135-1140. doi: 10.1093/carcin/bgy080.

3. **Dong J**, Gharahkhani P, Chow WH, Gammon MD, Liu G, Caldas C, Wu AH, Ye W, Onstad L, Anderson LA, Bernstein L, Pharoah PD, Risch HA, Corley DA, Fitzgerald RC; Stomach and Esophageal Cancer Study (SOCS) Consortium, Iyer PG, Reid BJ, Lagergren J, Shaheen NJ, Vaughan TL, MacGregor S, Love S, Palles C, Tomlinson I, Gockel I, May A, Gerges C, Anders M, Böhmer AC, Becker J, Kreuser N, Thieme R, Noder T, Venerito M, Veits L, Schmidt T, Schmidt C, Izbicki JR, Hölscher AH, Lang H, Lorenz D, Schumacher B, Mayershofer R, Vashist Y, Ott K, Vieth M, Weismüller J, Nöthen MM, Moebus S, Knapp M, Peters WHM, Neuhaus H, Rösch T, Ell C, Jankowski J, Schumacher J, Neale RE, Whiteman DC, Thrift AP. No Association Between Vitamin D Status and Risk of Barrett's Esophagus or Esophageal Adenocarcinoma-a Mendelian Randomization Study. *Clin Gastroenterol Hepatol*. 2019 Feb 1. pii: S1542-3565(19)30088-6. doi: 10.1016/j.cgh.2019.01.041. [Epub ahead of print]

4. **Dong J**, Gu X, El-Serag HB, **Thrift AP**. Underuse of Surgery Accounts for Racial Disparities in Esophageal Cancer Survival Times: A Matched Cohort Study. *Clin Gastroenterol Hepatol.* 2019 Mar;17(4):657-665.e13.

5. **Dong J**, Levine DM, Buas MF, Zhang R, Onstad L, Fitzgerald RC; Stomach and Oesophageal Cancer Study (SOCS) consortium, Corley DA, Shaheen NJ, Lagergren J, Hardie LJ, Reid BJ, Iyer PG, Risch HA, Caldas C, Caldas I, Pharoah PD, Liu G, Gammon MD, Chow WH, Bernstein L, Bird NC, Ye W, Wu AH, Anderson LA, MacGregor S, Whiteman DC, Vaughan TL, Thrift AP. Interactions Between Genetic Variants and Environmental Factors Affect Risk of Esophageal Adenocarcinoma and Barrett's Esophagus. *Clin Gastroenterol Hepatol*. 2018 Oct; 16(10): 1598-1606.e4.

6. **Dong J**, Wong LJ, Mims MP. Mitochondrial inheritance and cancer. *Transl Res.* 2018 Dec; 202: 24-34. Review.

7. Gorlov I, Orlow I, Ringelberg C, Hernando E, Ernstoff MS, Cheng C, Her S, Parker JS, Thompson CL, Gerstenblith MR, Berwick M, **Amos C**. Identification of gene expression levels in primary melanoma associated with clinically meaningful characteristics. Melanoma Res. 2018 Oct;28(5):380-389. doi: 10.1097/CMR.0000000000000473. PubMed PMID: 29975213; PubMed Central PMCID: PMC6448582.

8. Gorlov IP, Gorlova OY, **Amos CI**. Untouchable genes in the human genome: Identifying ideal targets for cancer treatment. Cancer Genet. 2019 Feb;231-232:67-79. doi: 10.1016/j.cancergen.2019.01.005. Epub 2019 Jan 24. PubMed PMID: 30803560; PubMed Central PMCID: PMC6727980.

9. Gorlov IP, Pikielny CW, Frost HR, Her SC, Cole MD, Strohbehn SD, Wallace-Bradley D, Kimmel M, Gorlova OY, **Amos CI**. Gene characteristics predicting missense, nonsense and frameshift mutations in tumor samples. BMC Bioinformatics. 2018 Nov 19;19(1):430. doi: 10.1186/s12859-018-2455-0. PubMed PMID: 30453881;PubMed Central PMCID: PMC6245819.

10. Frost HR, **Amos CI**. A multi-omics approach for identifying important pathways and genes in human cancer. BMC Bioinformatics. 2018 Dec 12;19(1):479. doi: 10.1186/s12859-018-2476-8. PubMed PMID: 30541428; PubMed Central PMCID: PMC6292115

11. Ji X, Bossé Y, Landi MT, Gui J, Xiao X, …, **Amos CI**. Identification of susceptibility pathways for the role of chromosome 15q25.1 in modifying lung cancer risk. Nat Commun. 2018 Aug 13;9(1):3221. doi: 10.1038/s41467-018-05074-y. PubMed PMID: 30104567; PubMed Central PMCID: PMC6089967.

12. Kamal Y, Cheng C, Frost HR, **Amos CI**. Predictors of disease aggressiveness influence outcome from immunotherapy treatment in renal clear cell carcinoma. Oncoimmunology. 2018 Oct 16;8(1):e1500106. doi: 10.1080/2162402X.2018.1500106. eCollection 2019. PubMed PMID: 30546942; PubMed Central PMCID: PMC6287778.

13. Jacobs DI, Fukumura K, Bainbridge MN, Armstrong GN, Tsavachidis S, Gu X, Doddapaneni HV, Hu J, Jayaseelan JC, Muzny DM, Huse JT, **Bondy ML**. Elucidating the molecular pathogenesis of glioma: integrated germline and somatic profiling of a familial glioma case series. Neuro Oncol. 2018 Nov 12;20(12):1625-1633. doi: 10.1093/neuonc/noy119. PubMed PMID: 30165405; PubMed Central PMCID: PMC6231201.

14. **Li Y**, Xiao X, Bosse Y, Gorlova O, Forlov I, …, **Amos C**. Genetic interaction analysis among oncogenesis-realted genes revealed novel genes and networks in lung cancer development. Oncotarget, 2019, March 5; 10(19): 1760-1774. PMID: 30956756.

15. **Liu Y**, Ajami N, Hutchinson D, *et al*. Dietary quality and the colonic-associated gut microbiome in humans. *American Journal of Gastroenterology*, PMID:31291462.

16. **Ostrom QT**, Egan KM, Nabors LB, Gerke T, Thompson RC, Olson JJ, LaRocca R, Chowdhary S, Eckel-Passow JE, Armstrong G, Wiencke JK, Bernstein JL, Claus EB, Il'yasova D, Johansen C, Lachance DH, Lai RK, Merrell RT, Olson SH, Sadetzki S, Schildkraut JM, Shete S, Houlston RS, Jenkins RB, Wrensch MR, Melin B, **Amos CI**, Huse JT, Barnholtz-Sloan JS, **Bondy ML.** Glioma risk associated with extent of

estimated European genetic ancestry in African Americans and Hispanics. Int J Cancer. 2019 Apr 9. doi: 10.1002/ijc.32318. [Epub ahead of print] PubMed PMID: 30963577.

17. **Ostrom QT**, Coleman W, Huang W, Rubin JB, Lathia JD, Berens ME, Speyer G, Liao P, Wrensch MR, Eckel-Passow JE, Armstrong G, Rice T, Wiencke JK, McCoy LS, Hansen HM, **Amos CI,** Bernstein JL, Claus EB, Houlston RS, Il'yasova D, Jenkins RB, Johansen C, Lachance DH, Lai RK, Merrell RT, Olson SH, Sadetzki S, Schildkraut JM, Shete S, Andersson U, Rajaraman P, Chanock SJ, Linet MS, Wang Z, Yeager M; GliomaScan consortium , Melin B, **Bondy ML**, Barnholtz-Sloan JS. Sex-specific gene and pathway modeling of inherited glioma risk. Neuro Oncol. 2019 Jan 1;21(1):71-82. doi: 10.1093/neuonc/noy135. PubMed PMID: 30124908; PubMed Central PMCID: PMC6303471.

18. **Thrift AP**, **Liu Y**, Tsavachidis S, *et al.* Ancestry and risk of hepatic fibrosis and inflammation in patients with HCV infection. *Clin Gastroenterol Hepatol* 2018. PMID: 30342914.

19. **Thrift AP**, Natarajan Y, Liu Y, El-Serag HB. Statin Use After Diagnosis of Hepatocellular Carcinoma Is Associated With Decreased Mortality. ClinGastroenterol Hepatol. 2019 Sep;17(10):2117-2125.e3. doi: 10.1016/j.cgh.2018.12.046. Epub 2019 Jan 6. PubMed PMID: 30625400; PubMed Central PMCID: PMC6612541

20. **Thrift AP,** Kunzmann AT. Time to Tailor Surveillance Intervals of Nondysplastic Barrett's Esophagus According to Segment Length and Persistence Over Multiple Endoscopies. Clin Gastroenterol Hepatol. 2019 Apr;17(5):832-834. doi: 10.1016/j.cgh.2018.09.025. Epub 2018 Sep 26. PubMed PMID: 30267865.

21. **Thrift AP**. Barrett's Esophagus and Esophageal Adenocarcinoma: How Common Are They Really? Dig Dis Sci. 2018 Aug;63(8):1988-1996. doi: 10.1007/s10620-018-5068-6. Review. PubMed PMID: 29671158.

22. **Liu Y**, O'Brien JL, Ajami N J, *et al.* Lung tissue microbial profile in lung cancer is distinct from emphysema. *Am J Cancer Res* 2018. PMID: 30323970.

23. **Liu Y**, Lusk CM, Cho MH, *et al.* Rare variants in known susceptibility loci and their contribution to risk of lung cancer**. *J Thorac Oncol*** 2018. PMID: 29981437.

24. **Zhang X**, Pang L, Sharma VS, Li R, Nyitray AG, Edwards BJ. Prevalence and factors associated with malnutrition in older patients with cancer. *Journal of Geriatric Oncology*, In press. PMID: 30982752.

25. **Zhang X,** Tang T, Pang L, Sharma VS, Li R, Nyitray AG, Edwards BJ. Malnutrition and overall survival in patients with cancer: a systematic review and meta-analysis. Journal of Geriatric Oncology. In press. PMID: 30917937

26. **Zhang X**, Pang L, Sharma VS, Li R, Nyitray AG, Edwards BJ. The validity of three malnutrition-screening markers among older patients with cancer. BMJ Supportive & Palliative Care. PMID: 31239256. DOI: 10.1136/bmjspcare-2018-001706

PRESENTATIONS

1. **Byun J**, **Han Y**, **Amos CI**. Genetic Architecture of Lung Cancer using Machine-Learning Approaches in Genome-Wide Association Studies. 2019 ACTS Annual Meeting, Washington, DC. **Oral Presentation**.

2. **Byun J, Han Y, Amos CI**. Genetic interactions in lung cancer using machine-learning approaches in genome-wide association studies [abstract]. In: Proceedings of the 110th Annual Meeting of the American Association for Cancer Research; 2019 March 29 – April 3; Atlanta, GA. Philadelphia (PA): AACR; 2019. Abstract nr 1593. **Poster Presentation**.

3. **Li Y, Han Y, Amos CI.** Genetic interaction analysis among oncogenesis-related genes revealed novel genes and gene networks in lung cancer development. 2018 American Society of Human Genetics (ASHG) conference. **Poster presentation.**

4. **Liu, Y.** Transcriptome analysis links immune genes allelic expression imbalances to lung cancer. 2019 America Association for Cancer Research (AACR) Annual Meeting. **Poster presentation.**

5. **Zhang X.** Malnutrition and overall survival in older adults in US, findings from National Health and Nutrition Examination Survey (NHANES). APHA's 2018 Annual Meeting & Expo (Nov. 10 - Nov. 14), San Diego, CA. **Poster presentation.**

6. **Zhang X.** Trends in major depression in older adults in United States: National Health and Nutrition Examination Survey (NHANES), 2007-2016. APHA's 2018 Annual Meeting & Expo (Nov. 10 - Nov. 14), San Diego, CA. **Poster presentation.**

7. **Zhang X.** Physical activity and overall survival in older adults in US, findings from National Health and Nutrition Examination Survey (NHANES), 2007-2011. APHA's 2018 Annual Meeting & Expo (Nov. 10 - Nov. 14), San Diego, CA. **Oral presentation.**

8. Edwards BJ, **Zhang X**. Effect of fractures on overall survival in cancer patients: The NHANES database. 2019 MASCC/ISOO annual meeting, San Francisco, June 21-23, 2019. **Oral Presentation.**

9. Edwards BJ, **Zhang X**. Effect of fractures on overall survival in cancer patients: The NHANES database. 2019 ASCO Annual Meeting, Chicago, Illinois, May 31-June 4, 2019. **Publication only.**

10. **Thrift, A.** Esophageal and gastric cancer risk in HIV-infected individuals. CNIHR Workshop, Bethesda, Maryland, August 2018.

11. **Thrift, A.** The global epidemic of oesophageal cancer. Cancer Research UK International Symposium Oesophageal Cancer, London, England, April 2019.