

BIOGRAPHICAL SKETCH

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NAME: Harpole, David

eRA COMMONS USER NAME (credential, e.g., agency login): HARPO002

POSITION TITLE: Professor of Surgery with Tenure

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Washington & Lee University, Lexington, VA	BS	05/1980	Chemistry; Biology
University of Virginia, Charlottesville, VA	MD	05/1984	Medicine
Duke University, Durham, NC	Resident	06/1988	General Surgery
Duke University, Durham, NC	Fellow	06/1991	Research

A. Personal Statement

As a thoracic surgical oncology investigator, my primary focus over the last 3 decades has been the incremental improvement in outcomes for patients with limited stages of thoracic cancers. It is paramount to understand the metastatic potential of all cancers, even when it appears localized at presentation or after resection. A major resource for formulating/answering the key questions has been utilization of biomaterials linked to an outcomes database from an extremely large IRB-approved / patient consented biorepository that I developed at Duke in 1996. Each level of refinement has improved the fidelity of our models, with the ultimate goal as an adjunct for decision-making in patient care. These efforts have been supported for the past three decades by numerous grants from the NIH, VA Merit Review and Industry that I have led and have been utilized in 3 NCI-sponsored multi-center clinical trials. Key questions include: 1) Why do some histologically-similar early tumors spread, while others do not; and 2) Are there potential biomarkers that define these differences and allow selection of subgroups that could benefit from specific therapies for their tumors? Unfortunately, a 12-month mandatory lab shut down due to the COVID-19 pandemic negatively impacted research productivity and timely completion of ongoing funded investigations. Multiple delayed applications have been and are being submitted during this time (NOT-OD-22-046).

I have a long history as a mentor of surgical trainees, both within my own research laboratory and as Director of the Duke Surgical Research Fellowship, a required two-year dedicated research experience that all Duke Surgery medical residents participate in during R3 and R4 years of training. In this role, I direct a 12-month F32-NRSA grant writing workshop for the Duke School of Medicine and serve as co-PI on three NIH-funded training grants: NCI T32, NHLBI R38 and NIAID R38. In addition, I developed a training program in Clinical Trials Education for the American Association for Thoracic Surgery that is in its 7th year. With this experience, I was selected as the Surgery Representative on the AAMC Physician Scientist Training Program Governance Committee.

Citations:

1. Onaitis M, D'Amico TA, Clark CP, Guinney J, Harpole DH, Rawlins EL. A 10-gene progenitor cell signature predicts poor prognosis in lung adenocarcinoma. *Ann Thorac Surg.* 2011 Apr;91(4):1046-50; discussion 1050. PubMed Central PMCID: PMC3376444.

2. Aloia TA, Harpole DH Jr, Reed CE, Allegra C, Moore MB, Herndon JE 2nd, D'Amico TA. Tumor marker expression is predictive of survival in patients with esophageal cancer. *Ann Thorac Surg.* 2001 Sep;72(3):859-66. PubMed PMID: 11565671.
3. D'Amico TA, Massey M, Herndon JE 2nd, Moore MB, Harpole DH Jr. A biologic risk model for stage I lung cancer: immunohistochemical analysis of 408 patients with the use of ten molecular markers. *J Thorac Cardiovasc Surg.* 1999 Apr;117(4):736-43. PubMed PMID: 10096969.
4. Kwiatkowski DJ, Harpole DH Jr, Godleski J, Herndon JE 2nd, Shieh DB, Richards W, Blanco R, Xu HJ, Strauss GM, Sugarbaker DJ. Molecular pathologic substaging in 244 stage I non-small-cell lung cancer patients: clinical implications. *J Clin Oncol.* 1998 Jul;16(7):2468-77. PubMed PMID: 9667266.

Ongoing and recently completed projects and evidence of my funding history includes:

W81XWH-17-1-0372-CA160891 Harpole (PI) 07/01/2017 – 09/30/2022

Military Exposure-Related Pleural Mesothelioma: An Innovative Translational Approach to Inform Novel Molecular-Targeted Treatment Development

The purpose of this study is to refine the classification of MPM into biologically and prognostically distinct subgroups, relate these sub-groups to the military-exposed veterans and rationally design potential biomarkerselected targeted therapies for the military/veteran population for future human trials.

Role: PI

2R01CA120528-11 Bueno (PI) 11/01/2017 – 10/31/2021

Prospective Validation of Prognostic and Predictive Molecular tests in Mesothelioma. Utilize annotated samples form the Duke Mesothelioma biorepository to validate the Brigham mesothelioma outcome predictor

Role: Consortium PI

Myriad Genetics, Inc. Harpole (PI) 03/06/2016 – 03/02/2021

myPlan Lung Cancer Test and Prediction of Chemotherapy Benefit

The purpose of this study is to examine the ability of the CCP score to predict platinum-based chemotherapy benefit in early stage lung ADC patients.

Role: PI

B. Positions, Scientific Appointments and Honors

Positions and Scientific Appointments

- 2020 - Surgery Representative, AAMC Physician Scientist Training Program Governance Committee
- 2018 - Professor of Pathology, Duke University School of Medicine, Durham, NC
- 2017 - Professor of Pathology, Duke University School of Medicine, Durham, NC
- 2016 - Faculty Co-Director, Biobank & Translational Research Core, Duke University School of Medicine, Durham, NC
- 2016 - Faculty Director, Substrate Services Core & Research Support Services, Department of Surgery, Duke University School of Medicine, Durham, NC
- 2015 - Director, Duke Surgical Research Fellowship, Department of Surgery, Duke University Medical Center, Durham, NC
- 2015 - Associate Chief of Surgery, Durham Veterans Affairs Medical Center, Durham, NC
- 2013 - 2015 Vice-Chair for Research, Department of Surgery, Duke University School of Medicine, Durham, NC
- 2010 - 2016 Vice-Chief, Division of Surgical Sciences, Department of Surgery, Duke University School of Medicine, Durham, NC
- 2006 - 2010 Vice-Chair for Faculty Affairs, Department of Surgery, Duke University School of Medicine, Durham, NC
- 2006 - 2008 Vice-Chair for Education, Department of Surgery, Duke University School of Medicine, Durham, NC
- 2005 - 2018 Associate Professor of Pathology, Duke University School of Medicine, Durham, NC
- 2003 - Professor of Surgery with Tenure, Division of Thoracic Surgery, Department of Surgery, Duke University School of Medicine, Durham, NC

2003 - Staff Physician, Durham Regional Hospital, Duke University Health System, Durham, NC
2001 - Faculty, Duke Clinical Research Institute (DCRI), Durham, NC
2000 - 2003 Associate Professor of Surgery with Tenure, Division of Thoracic Surgery, Department of Surgery, Duke University School of Medicine, Durham, NC
1999 - 2013 Director, Biorepository, Department of Surgery, Duke University School of Medicine, Durham, NC
1997 - 2005 Assistant Professor of Pathology, Duke University Medical Center, Durham, NC
1996 - Director, Lung Cancer Prognostic Research Laboratory and Biorepository, Duke University Medical Center, Durham, NC
1996 - Chief, Cardiothoracic Surgery, Durham VA Medical Center, Durham, NC
1996 - Thoracic Surgeon, Private Diagnostic Clinic (PDC), Duke Health, NC
1996 - 2010 Director, Duke General Thoracic Surgery Services, Duke University Medical Center, Durham, NC
1996 - 1999 Associate Professor of Surgery, Department of Surgery, Duke University, Durham, NC
1994 - 1995 Staff Thoracic Surgeon, Carney Hospital, Boston, MA
1993 - Primary Investigator, Oncogene Expression in Lung Cancer, Surgical Oncology Research Laboratory, Duke University Medical Center, Durham, NC
1993 - 1996 Associate in Thoracic Surgery, Brigham and Women's Hospital, Boston, MA
1993 - 1996 Member, Thoracic Oncology Program, Dana Farber Cancer Institute, Boston, MA
1993 - 1996 Instructor in Surgery, Harvard Medical School, Cambridge, MA
1993 - 1996 Staff Thoracic Surgeon, VA Medical Center, West Roxbury, MA
1993 - 1996 Director, Lung Cancer Research Laboratory, Brigham and Women's Hospital, Dana Farber Cancer Hospital, Boston, MA
1993 - 1996 Director, Clinical Research, Division of Thoracic Surgery, Brigham and Women's Hospital, Boston, MA
1984 - 1993 General Surgery Residency & Thoracic Surgery Fellowship, Divisions of General and Thoracic Surgery, Duke University Medical Center (DUMC), Durham, NC

Honors

2015 - 2021 Board of Directors, International Association for the Study of Lung Cancer (IASLC)
2006 - 2020 America's Top Surgeons, Consumers' Research Council of America
2004 - 2020 America's Top Cancer Doctors, Newsweek Magazine
2009 - 2017 Co-Chair, Thoracic Malignancies Steering Committee, National Cancer Institute (National Committee)
2005 - 2012 Director, American Board of Thoracic Surgery (National Committee)
2005 - 2011 Director, American Board of Thoracic Surgery (National Committee)
2004 - 2010 Who's Who in Medical Sciences Education, Marquis Who's Who
2003 - 2010 Co-chair, Thoracic Tumor Committee, National Cancer Database (National Committee)
1997 - 2007 Chair, General Thoracic Surgery Database, Society of Thoracic Surgery (National Committee)
2001 - 2005 Vice-chair, Oncology Group, American College of Surgeons (National Committee)
1998 - 2001 Chair, Thoracic Surgery Sub-committee, CALGB (National Committee)
1996 - 2001 Surgical Coordinator, Duke University Medical Center, Cancer and Leukemia Group B (National Committee)
1996 - 1998 Who's Who in Medicine and Healthcare, Marquis Who's Who
1986 - 1988 Raymond W. Postlethwait Fellow in Thoracic Surgical Research, Duke University
2017 NIH Director's Distinguished Service Award, National Institutes of Health
2013 Alpha Omega Alpha, Duke University
2005 International Health Professional of the Year, ()
2005 Maxwell Chamberlain Award, Society of Thoracic Surgery
2003 Guide to America's Top Surgeons, Consumers' Research Council of America
2002 Maxwell Chamberlain Award, Society of Thoracic Surgery
2000 Who's Who in Medicine and Healthcare, Marquis Who's Who

2000 President's Award, Southern Thoracic Surgical Association
1999 Nationally Recognized, Good Housekeeping Magazine

Outside Interests

AstraZeneca, Scientific Advisory Board
Medtronic (Covidien), Scientific Advisory Board

C. Contribution to Science

1. **Tumor Prognostic Biomarkers in NSCLC.** Our prognostic models of survival in patients with early stage NSCLC after complete resection have evolved with technology from ones based on simple multivariate demographics and H/E histology, to protein expression with IHC, to single gene expression with rt-PCR, and most recently to multiplex genomic and genetic arrays. Most recently the Squamous Lung Cancer Consortium U10 has linked the key leaders in lung cancer genomics to validate and refine our and others models of prognosis in the very common orphan disease of squamous lung cancer that has seen no advance in care over the last 20 years.
 - a. Onaitis M, D'Amico TA, Clark CP, Guinney J, Harpole DH, Rawlins EL. A 10-gene progenitor cell signature predicts poor prognosis in lung adenocarcinoma. *Ann Thorac Surg.* 2011 Apr;91(4):1046-50; discussion 1050. PubMed Central PMCID: PMC3376444.
 - b. Aloia TA, Harpole DH Jr, Reed CE, Allegra C, Moore MB, Herndon JE 2nd, D'Amico TA. Tumor marker expression is predictive of survival in patients with esophageal cancer. *Ann Thorac Surg.* 2001 Sep;72(3):859-66. PubMed PMID: 11565671.
 - c. D'Amico TA, Massey M, Herndon JE 2nd, Moore MB, Harpole DH Jr. A biologic risk model for stage I lung cancer: immunohistochemical analysis of 408 patients with the use of ten molecular markers. *J Thorac Cardiovasc Surg.* 1999 Apr;117(4):736-43. PubMed PMID: 10096969.
 - d. Kwiatkowski DJ, Harpole DH Jr, Godleski J, Herndon JE 2nd, Shieh DB, Richards W, Blanco R, Xu HJ, Strauss GM, Sugarbaker DJ. Molecular pathologic substaging in 244 stage I non-small-cell lung cancer patients: clinical implications. *J Clin Oncol.* 1998 Jul;16(7):2468-77. PubMed PMID: 9667266.
2. **Blood-based Biomarkers.** Although tumor tissue is available from resections or biopsies, creation of bio-predictors from patient blood and its derivatives are a desired next step for universal implementation. Our biorepository has serially-collected blood and its derivatives that are paired to tumor tissue and non-cancerous adjacent lung from each participant. These efforts have also evolved from recurrence models based on multiplex ELISA, to SELDI and MALDI proteomics and most recently array-based plasma free DNA and RNA.
 - a. Boylan AM, Wang XF, Ko R, Watson PM, Gu L, Harpole D, Bueno R, Kelly R, Kohman L, Kratzke R. Detection of human telomerase reverse transcriptase mRNA in cells obtained by lavage of the pleura is not associated with worse outcome in patients with stage I/II non-small cell lung cancer: results from Cancer and Leukemia Group B 159902. *J Thorac Cardiovasc Surg.* 2013 Jul;146(1):206-11. PubMed Central PMCID: PMC3537860.
 - b. D'Amico TA, Brooks KR, Joshi MB, Conlon D, Herndon J 2nd, Petersen RP, Harpole DH Jr. Serum protein expression predicts recurrence in patients with early-stage lung cancer after resection. *Ann Thorac Surg.* 2006 Jun;81(6):1982-7; discussion 1987. PubMed PMID: 16731117.
 - c. Salgia R, Harpole D, Herndon JE 2nd, Pisick E, Elias A, Skarin AT. Role of serum tumor markers CA 125 and CEA in non-small cell lung cancer. *Anticancer Res.* 2001 Mar-Apr;21(2B):1241-6. PubMed PMID: 11396194.
3. **Treatment Response Biomarkers.** Selecting the proper therapy for a particular malignancy needs to be refined to the level of the individual, thereby maximizing response and minimizing toxicity. As above, our efforts have developed from qualitative protein expression to complex array-based genomic profiles over time.
 - a. Bild AH, Yao G, Chang JT, Wang Q, Potti A, Chasse D, Joshi MB, Harpole D, Lancaster JM, Berchuck A, Olson JA Jr, Marks JR, Dressman HK, West M, Nevins JR. Oncogenic pathway signatures in human

cancers as a guide to targeted therapies. *Nature*. 2006 Jan 19;439(7074):353-7. PubMed PMID: 16273092.

- b. Brooks KR, To K, Joshi MB, Conlon DH, Herndon JE 2nd, D'Amico TA, Harpole DH Jr. Measurement of chemoresistance markers in patients with stage III non-small cell lung cancer: a novel approach for patient selection. *Ann Thorac Surg*. 2003 Jul;76(1):187-93; discussion 193. PubMed PMID: 12842538.
 - c. Harpole DH Jr, Moore MB, Herndon JE 2nd, Aloia T, D'Amico TA, Sporn T, Parr A, Linoila I, Allegra C. The prognostic value of molecular marker analysis in patients treated with trimodality therapy for esophageal cancer. *Clin Cancer Res*. 2001 Mar;7(3):562-9. PubMed PMID: 11297249.
 - d. Joshi MB, Shirota Y, Danenberg KD, Conlon DH, Salonga DS, Herndon JE 2nd, Danenberg PV, Harpole DH Jr. High gene expression of TS1, GSTP1, and ERCC1 are risk factors for survival in patients treated with trimodality therapy for esophageal cancer. *Clin Cancer Res*. 2005 Mar 15;11(6):2215-21. PubMed PMID: 15788669.
4. **Health Outcomes Research in Thoracic Oncology.** Our group has extensive experience in evaluating current practice for patients thoracic cancers based on investigations from analyses of large multi-institutional databases of outcomes, including healthcare disparities.
- a. Erhunmwunsee L, Joshi MB, Conlon DH, Harpole DH Jr. Neighborhood-level socioeconomic determinants impact outcomes in nonsmall cell lung cancer patients in the Southeastern United States. *Cancer*. 2012 Oct 15;118(20):5117-23. PubMed PMID: 22392287.
 - b. Fishman A, Martinez F, Naunheim K, Piantadosi S, Wise R, Ries A, Weinmann G, Wood DE. A randomized trial comparing lung-volume-reduction surgery with medical therapy for severe emphysema. *N Engl J Med*. 2003 May 22;348(21):2059-73. PubMed PMID: 12759479.
 - c. Harpole DH Jr, DeCamp MM Jr, Daley J, Hur K, Oprian CA, Henderson WG, Khuri SF. Prognostic models of thirty-day mortality and morbidity after major pulmonary resection. *J Thorac Cardiovasc Surg*. 1999 May;117(5):969-79. PubMed PMID: 10220692.
 - d. Strauss GM, Herndon JE 2nd, Maddaus MA, Johnstone DW, Johnson EA, Harpole DH, Gillenwater HH, Watson DM, Sugarbaker DJ, Schilsky RL, Vokes EE, Green MR. Adjuvant paclitaxel plus carboplatin compared with observation in stage IB non-small-cell lung cancer: CALGB 9633 with the Cancer and Leukemia Group B, Radiation Therapy Oncology Group, and North Central Cancer Treatment Group Study Groups. *J Clin Oncol*. 2008 Nov 1;26(31):5043-51. PubMed Central PMCID: PMC2652093.

Complete List of Published Work in My Bibliography:

<https://www.ncbi.nlm.nih.gov/myncbi/1dkdbbn8lxkg/bibliography/public/>

