

**University of California, San Francisco**  
**CURRICULUM VITAE**

**Name:** Elizabeth M St. Lezin, MD

**Position:** HS Clinical Professor, Step 5  
Laboratory Medicine  
School of Medicine

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**EDUCATION**

1977 - 1981	Stanford University, Stanford, CA	B.S.	Biological Science
1983 - 1987	University of California, Los Angeles	M.D.	Medicine
1987 - 1988	University of California, San Francisco	Intern	Pediatrics
1988 - 1989	University of California, San Francisco	Resident	Laboratory Medicine
1989 - 1990	University of California, San Francisco	Chief Resident	Laboratory Medicine
1990 - 1993	University of California, San Francisco	Fellow	Laboratory Medicine

**LICENSES, CERTIFICATION**

1988	Medical License (G65472), California
1992	Certified (Clinical Pathology), American Board of Pathology

**PRINCIPAL POSITIONS HELD**

1993 - 2000	University of California, San Francisco	Asst Prof in Residence	Laboratory Medicine
2000 - 2002	University of California, San Francisco	Assoc Prof in Residence	Laboratory Medicine
2002 - 2006	University of California, San Francisco	Assoc Clinical Prof	Laboratory Medicine
2006 - present	University of California, San Francisco	HS Clinical Prof	Laboratory Medicine

**OTHER POSITIONS HELD CONCURRENTLY**

1990 - 1993	University of California, San Francisco	Postdoctoral Research Fellow	Laboratory Medicine
1993 - 2000	UCSF/Mt. Zion Clinical Laboratory	Director, Blood Bank & Clinical Chemistry	Laboratory Medicine
1998 - 2002	University of California, San Francisco	NIH Mentored Clinical Scientist (K08 Award)	Laboratory Medicine
2000 - present	San Francisco VA HCS Laboratory Medicine	Staff Pathologist & Director, Transfusion Service	Laboratory Medicine
2017 - present	San Francisco VA HCS Laboratory Medicine	Assistant Chief	Laboratory Medicine

**HONORS AND AWARDS**

1987	Alpha Omega Alpha	UCLA School of Medicine
1987	American Medical Women's Association Award	UCLA School of Medicine
1990	Laboratory Medicine Research Fellowship	UCSF Laboratory Medicine
1991	Merck Sharp and Dohme Travel Award	American Heart Association, Council for High Blood Pressure Research
1991	Clinical Research Trainee Award	American Federation for Clinical Research
1991	Research Fellowship Award	American Heart Association, California Affiliate
1995	American Association of Medical Colleges Professional Development Seminar for Junior Women Faculty	UCSF Dean selected
1997	Scientist Development Grant Recipient	American Heart Association
1998	Mentored Clinical Scientist Development Award Recipient	NIH/NHLBI
1998	Sudikow Award for Quality Improvement	UCSF/Mt. Zion Medical Center
2016	Laboratory Medicine Faculty Department Teaching Award	UCSF Laboratory Medicine

2018

UCSF Center for Faculty Educators      UCSF  
Certificate in Clinical Teaching

## **KEYWORDS/AREAS OF INTEREST**

Transfusion medicine, patient blood management, epidemiology of transfusion, quality of life outcomes and red cell transfusion, laboratory management, quality improvement, genetics of cardiovascular disease

## **CLINICAL ACTIVITIES**

### **CLINICAL ACTIVITIES SUMMARY**

Medical Director, Transfusion Service, San Francisco VA Health Care System (HCS) and Chair, Transfusion Committee SFVA: My responsibility is to provide medical support to the transfusion service and consultation to attending and house staff in transfusion medicine and general laboratory medicine. I oversee all activities of the transfusion service including medical direction, setting policies, writing procedures, and implementing the transfusion service quality plan. I supervise laboratory medicine residents in transfusion medicine for 12 months per year and share after hours and weekend call coverage with one other attending. My responsibilities to the general clinical laboratory include all aspects of quality improvement.

Recent clinical contributions:

- Successful external SFVA laboratory inspections by College of American Pathologists and AABB (2017).
- Successful SFVA Transfusion Service FDA inspection (2017) and inspection by VA Regional Commissioner and Office of Inspector General with no deficiencies (2016).
- Validated and implemented new Veterans Administration Blood Bank computer system (VBECS) as national test site and continue to serve as national test site for upgrades and modifications.
- With colleagues in SFVA clinical informatics created customized computerized physician order entry system for blood product orders. The system includes prompts for informed consent, indications for transfusion, risks of transfusion, information about pre-medication, nursing orders, and guidelines and criteria for use of special blood products.
- With colleagues in ICU and clinical informatics, wrote and implemented massive transfusion protocol (MTP) including specialized electronic order set. I also extended the MTP system to the operating room with modifications for that setting.
- With colleagues in ICU, planned and implemented a series of MTP simulations and drills to improve turnaround time for issuing blood products and to improve overall transfusion service performance.
- Implemented a comprehensive document control system (MediaLab) first in blood bank, now also used in other SFVA laboratory sections.
- With surgery and nursing, improved pre-operative workflow for blood orders for elective surgery, leading to a reduction in the percentage of new patients undergoing Type and Screen testing on the same day of surgery. Streamlined automatic blood order system for surgery patients.
- Updated blood use guidelines and procedure for blood use review at SFVAHCS.
- Reduced RBC waste and improved crossmatch to transfusion ratio in transfusion service.
- Implemented transfusion service policy for patients receiving the drug daratumumab (which interferes with routine blood bank testing), including adding a flag system to print a report from pharmacy in blood bank when patients start the drug.

- Implemented a new SFVA Transfusion Committee Transfusion Associated Circulatory Overload (TACO) policy to raise awareness of prevention, reporting, and treatment of TACO.
- Improved process to prevent delayed hemolytic transfusion reactions in patients by accessing their VA-wide data on history of anti-RBC antibodies.
- Implemented specimen labeling improvement project to reduce errors in blood bank specimen labeling.
- With Heme/Oncology service, wrote a simplified, evidence-based policy on the use of irradiated blood products at SFVA tailored to the needs of our patients, including outpatients.
- Implemented SFVA participation in CDC Hemovigilance/Biovigilance program for transfusion reaction and incident reporting.
- Led clinical laboratory team and coordinated with Medicine service to switch outpatient colorectal cancer screening to the fecal immunochemical test method.

## **CLINICAL SERVICES**

2000 - present	Transfusion Service Director	12 months per year
2000 - present	Assistant Chief, Laboratory Medicine	12 months per year
2000 - present	Clinical Laboratory after-hours call coverage	6 months per year

## **PROFESSIONAL ACTIVITIES**

### **MEMBERSHIPS**

1995 - present	American Association of Blood Banks
1997 - present	California Blood Bank Society
2009 - present	College of American Pathologists
2010 - present	American Association of Clinical Chemistry
2010 - present	Society for the Advancement of Blood Management
2015 - present	American Medical Writers Association
2016 - present	American Society for Hematology

### **SERVICE TO PROFESSIONAL ORGANIZATIONS**

2011 - 2017	California Blood Bank Society	Associate Editor, CBBS e-Network Forum
2014 - 2017	California Blood Bank Society	Chair, CBBS Website Committee

### **SERVICE TO PROFESSIONAL PUBLICATIONS**

1993 - 2002	Ad hoc referee for Hypertension
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### **INVITED PRESENTATIONS - NATIONAL**

- 1994 American Society of Hypertension; New York, 1994 (slide presentation)
- 1994 American Heart Association Council for High Blood Pressure Research; Chicago, 1994 (poster)
- 1996 American Heart Association Council for High Blood Pressure Research; Chicago, 1996 (slide presentation)
- 1997 American Heart Association Council for High Blood Pressure Research; Washington, D.C. 1997 (slide presentation)
- 1997 American Heart Association Council for High Blood Pressure Research; Washington, D.C. 1997 (poster)
- 1998 American Heart Association Council for High Blood Pressure Research; Philadelphia, 1998 (poster)
- 1999 American Heart Association Council for High Blood Pressure Research; Orlando, FL 1999 (poster)

### **INVITED PRESENTATIONS - REGIONAL AND OTHER INVITED PRESENTATIONS**

- 1995 California Medical Laboratory Technologists Annual Meeting; "Perplexing Cases in Blood Banking"
- 1995 UCSF/Mt. Zion Surgery Grand Rounds; "Guidelines for Use of Blood Products"
- 1995 Laguna Honda Hospital Medicine Grand Rounds; "Transfusion Reactions"
- 1996 UCSF/Mt. Zion Medicine Grand Rounds; "Delayed Hemolytic Transfusion Reactions: Clinical Presentation and Significance"
- 1996 UCSF/Mt. Zion Pediatric Conference; "Pediatric Transfusion Medicine"
- 1996 UCSF Laboratory Medicine Grand Rounds; "Blood Pressure and Genetic Variation in Renin-Angiotensin System Genes"
- 1996 UCSF Nursing Department Continuous Quality Improvement Workshop; "Blood Availability Performance Improvement Project"
- 1997 UCSF/Mt. Zion Research Seminar; "Genes and Blood Pressure"
- 1997 UCSF CME Program Warrack Hospital Santa Rosa; "Blood Utilization Review for Community Hospitals"

1998 UCSF Preeclampsia Program Project Seminar; "Genes and Blood Pressure in the SHR"

2001 SFVA Medicine M&M; "Hemolytic Transfusion Reactions"

2004 SFVA Medicine M&M; "Transfusion Associated Acute Lung Injury"

2005 SFVA Nursing Conference; "Transfusion Reactions"

2006 SFVA Medicine Teaching Conference; "Warm Autoimmune Hemolytic Anemia"

2009 SFVA Medicine Teaching Conference; "Transfusion Associated Lung Injury"

2013 SFVA Medicine Teaching Conference; "Transfusion Reactions"

2013 UCSF Orthopedic Surgery Teaching Conference; "Patient Blood Management in Orthopedic Surgery"

2014 UCSF/Stanford Transfusion Medicine Journal Club; "Iron and Patient Blood Management"

2014 SFVA Medicine Teaching Conference; "Transfusion Medicine and Transfusion Reactions"

2014 Blood Systems/Blood Center of the Pacific; "RBC Transfusion in the Elderly"

2014 UCSF Informatics Day; "Use of Clinical Databases in Transfusion Research: NHLBI REDS-III"

2015 SFVAMC Medicine Teaching Conference; "Orientation to Transfusion Medicine"

2015 UCSF/Stanford Transfusion Medicine Journal Club; "Epidemiology of RBC Transfusion"

2015 UCSF Orthopedic Surgery Core Conference; "Patient Blood Management"

2015 SFVA Anesthesia Quality Improvement Rounds; "Use of Emergency Release RBCs & Massive Transfusion Protocols"

2016 SFVA Medicine Teaching Conference; "Transfusion Medicine: A Practical Guide"

2016 UCSF/Stanford Transfusion Medicine Journal Club; "Platelet Transfusion and Acute Hemorrhagic Stroke"

2017 SFVA Medicine Teaching Conference; "Transfusion Reactions"

2018 SFVA Medicine Noon Conference: "Transfusion Medicine: A Practical Guide"

- 2018 UCSF (SFVA) Medicine QI Rounds: "Septic Transfusion Reactions"
- 2019 UCSF/Stanford Transfusion Medicine Journal Club: "Randomized Trial of Platelet-Transfusion Thresholds in Neonates"
- 2019 SFVA Medicine Grand Rounds: "From Blood Donor to Bedside: RBC Transfusion in the Era of Restrictive Transfusion Practice"

**CONTINUING EDUCATION AND PROFESSIONAL DEVELOPMENT ACTIVITIES**

- 2011 AABB Annual Meeting (12 hours)
- 2012 AABB Annual Meeting (9 hours)
- 2013 UCSF Teaching Faculty Development Sessions (12 hours): Challenging Learner Workshop, Using Tech for Effective Teaching, Curriculum Development, Implementing Interprofessional Education Workshop
- 2013 California Blood Bank Society (12 hours)
- 2014 California Blood Bank Society (12 hours)
- 2015 AABB (13.5 hours)
- 2016 California Blood Bank Society (10 hours)
- 2017 AABB Annual Meeting (13.5 hours)
- 2018 AABB Annual Meeting (13.5 hours)
- 2018 UCSF Clinical Teaching Certificate Completed (20 hours)

**GOVERNMENT AND OTHER PROFESSIONAL SERVICE**

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|----------------|--|----------------------|
| 1999 - 1999    | NIH/NHLBI Cardiovascular & Renal Study Section                 | Ad hoc reviewer (1)  |
| 1999 - 2002    | Grant Agency of the Czech Republic                             | Ad hoc reviewer (4)  |
| 2001 - 2001    | NIH/NHLBI Experimental Cardiovascular Sciences                 | Study Section member |
| 2016 - present | Veterans Blood Establishment Computer System User Group (VBUG) | Subgroup leader      |

**UNIVERSITY AND PUBLIC SERVICE**

**SERVICE ACTIVITIES SUMMARY**

Transfusion Committee: As Chair of the SFVAHCS Transfusion Committee I am responsible for coordinating peer review of blood utilization, tracking all issues related to transfusion practice, and maintaining compliance with Joint Commission, VHA, AABB, and CAP standards. Recent accomplishments include improved manual emergency blood release system and

massive transfusion protocols and implementation of Joint Commission voluntary patient blood management performance measures.

Associate Editor California Blood Bank Society E-Network Forum and Chair CBBS Website Committee (cbbsweb.org): I am the primary editor for the Forum on the site. Members of the blood bank community submit questions or topics, which with my co-editors I edit, develop with additional discussion, outside expert comment, or references, and post. I edited > 60 posts on a variety of topics in 2013-14, then in 2015-16 led the CBBS input into a re-vamp of the new organization website and re-launch of the E-Network Forum in April 2016.

Veterans Blood Establishment Computer System (VBECS) User Group (VBUG): I joined this recently-formed user group for the VA national blood bank software package to help lead efforts to streamline the computerized physician order entry (CPOE) piece of the system. As one of the few physicians in the group, my role is to focus on the way VBECS interacts with the VA EHR (CPRS) and how VBECS affects clinical users.

### **UCSF CAMPUSWIDE**

1995 - 1997	UCSF Committee on Animal Research	Member
1999 -	Ad Hoc University Grievance Hearing Committee	Member
2000 - 2005	SFVAMC Committee on Animal Research (IACUC)	Member, Vice Chair

### **SCHOOL OF MEDICINE**

1998 - 1999	Ophthalmology Department Review Committee UCSF/Mt. Zion	Chair
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### **DEPARTMENTAL SERVICE**

1995 - 1995	Department Laboratory Medicine Committee on Parental Leave Policy	Member
2001 - 2001	Department Laboratory Medicine Faculty Search Committee, Hematopathologist	Member
2002 - 2002	Department Laboratory Medicine Faculty Search Committee, Hematopathology VAMC	Chair
2006 - 2006	Department Laboratory Medicine Faculty Search Committee, Chief Clinical Laboratories SFGH	Member
2007 - 2007	Department Laboratory Medicine Faculty Search Committee, Hematopathology SFGH	Member
1993 - 2000	Blood Utilization and Transfusion Committee UCSF/Mt. Zion Medical Center	Vice Chair
2000 - present	Transfusion Committee, SFVAHCS	Chair
2001 - present	SFVAHCS Root Cause Analysis team (3)	Member
2001 - present	SFVAHCS Patient Action team (2)	Member



2003 - present	SFVA Laboratory Quality Improvement Committee	Member/ Leader
2019 - 2019	Department of Laboratory Medicine Faculty Search Committee, Hematopathology SFVA	Chair

## COMMUNITY AND PUBLIC SERVICE

1998 - present	Blood Centers of the Pacific Medical & Scientific Advisory Committee	Member
2008 - 2011	Blood Drive Coordinator SFVA	Coordinator
2007 - 2011	Miramonte High School Booster Club & Baseball Teams	Varsity Team Parent

## TEACHING AND MENTORING

### TEACHING SUMMARY

Site Director, SFVA/UCSF Laboratory Medicine residency (2017-present).

I teach and directly supervise two laboratory medicine residents in two separate but simultaneous rotations at the VA: Transfusion Medicine/Hematology and Laboratory Management. In transfusion medicine, teaching is tailored to the experience of the resident. I focus on practical applications including the approach to complex immunohematology work-ups and transfusion emergencies. I meet daily with the resident to discuss current cases, transfusion reactions, and product requests and weekly for a more structured teaching lecture.

The Laboratory Management rotation was developed at the VA as a new rotation for UCSF laboratory medicine residents in 2008 and runs concurrently with the VA Microbiology rotation. I co-wrote the original Goals and Objectives for the rotation and recently increased significantly my teaching responsibilities for the rotation. The expanded lecture topics in Lab Management include: CLIA and compliance, proficiency testing, quality improvement, error management, human resources, financial management, method validation and quality control systems. I coordinate the resident schedule during the rotation and include sessions in Informatics with Dr. Rick Rodgers and lectures with Dr. Ed Thornborrow, the laboratory director at UCSF. Residents perform a mock CAP inspection (or participate in an actual inspection if possible) and depending on interest level, attend teaching sessions with the SFVA laboratory Point of Care Testing Coordinator, the Chemistry QA specialist and the Chief Technologist.

To improve my teaching skills, I completed all training requirements and was awarded the UCSF Teaching Certificate in Clinical Teaching in 2018. This certificate involves participating in a series of 9+ workshops over a 2-4 year period sponsored by the Teach for UCSF Clinical Teaching Certificate Program.

I actively participate in the SFVA Clinical laboratory science student (CLS) training program (based at SF State). SFVA has two CLS students per year who train in all laboratory departments. On their transfusion service rotation, I provide didactic and informal teaching sessions in transfusion reactions, perinatal transfusions, and transfusion emergencies.

In 2016 I was awarded the Laboratory Medicine Department Faculty teaching award in recognition of my teaching efforts.

**FORMAL TEACHING**

	Academic Yr	Course No. & Title	Teaching Contribution	School	Class Size
	2000 - 2014	Laboratory Medicine Core Lecture Series: Transfusion Reactions	Speaker		12
	2014 - 2019	Laboratory Medicine Core Lecture Series: Blood Bank Regulatory Issues	Speaker		12
	2016 - 2019	Laboratory Medicine Core Lecture Series: Red Blood Cell Transfusion	Speaker		12

**INFORMAL TEACHING**

- 2010 - present Weekly Departmental call conference (one hour) with all laboratory medicine residents
- 2000 - present Transfusion Medicine Lectures - SFVAMC Laboratory Medicine Residents (weekly 1 hr)
- 2008 - present Laboratory Management Lectures - SFVAMC Laboratory Medicine Residents (weekly 1 hr)
- 2014 - present UCSF Transfusion Medicine Case Conference - faculty participant, commitment to lead 2-3 sessions per year ( ABO discrepancies, Delayed hemolytic transfusion reactions, Error management in transfusion medicine)
- 2000 - present Supervision of residents in laboratory medicine during their rotation, discussion of cases and informal clinical laboratory-based teaching. (2 residents at a time, 12 months per year)

**MENTORING SUMMARY**

As site director and teaching faculty member, I supervise laboratory medicine residents during their rotations in laboratory management and transfusion medicine at SFVA. In addition to supervising the residents, my duties include mentoring residents in their choice of specialty/career path, strategies for beginning or building a research career, and pathology board preparation.

I am the Laboratory Medicine-designated faculty mentor for Dr. Morvarid Moayeri in Laboratory Medicine. I meet with Dr. Moayeri on a regular basis to discuss career goals and strategies for academic advancement at UCSF.

As a UCSF site co-PI for the NHLBI Recipient Epidemiology and Donor Evaluation (REDS-III) program, I am an informal faculty mentor for REDS-III program clinical research junior faculty including Matthew Karafin, MD, MS at Blood Center of Wisconsin and Roberta Bruhn, PhD at

Blood Systems Research Institute. I am also an informal mentor to UCSF Transfusion Medicine Fellows including Cyril Jacquot, MD, PhD.

### **PREDOCTORAL STUDENTS SUPERVISED OR MENTORED**

Dates	Name	Program or School	Mentor Type	Role	Current Position
1992 - 1994	Tuere Merriouns	UCSF Lab Med	Research/Scholarly Mentor	Summer student, supervised	M.D. Psychiatry
2009 - 2010	Maggie Chu	SFVA	Project Mentor	Summer intern, supervised	UCLA Pre-med, UCLA research
2015 - 2018	Gillian Torres	SFVA	Project Mentor, Career Mentor	Summer intern, supervised	High school student, pre-Clinical Lab Scientist

### **POSTDOCTORAL FELLOWS AND RESIDENTS MENTORED**

Dates	Name	Fellow	Mentor Role	Faculty Role	Current Position
1994 - 2002	Weizhong Liu, MD	Post-Doc Researcher	Research/Scholarly Mentor	Research Supervision	Research associate UCSF
2008 - 2008	Walden Browne, MD, PhD	Lab Medicine Resident	Career Mentor	Supervisor	Director Clinical Laboratories, Kaiser Permanente, Oakland, CA
2010 - 2011	Mori Moayeri, MD, PhD	Lab Medicine Resident	Career Mentor	Supervisor	Faculty, Transfusion Service UCSF
2011 - 2016	Cyril Jacquot, MD, PhD	Lab Medicine Resident	Career Mentor	Supervisor, informal career advisor	Faculty, Children's National Health System Washington, DC

Dates	Name	Fellow	Mentor Role	Faculty Role	Current Position
2011 - 2015	Geoffrey Wool, MD, PhD	Lab Medicine Resident	Career Mentor	Supervisor, informal career advisor	Faculty, Pathology, University of Chicago
2012 - 2013	Jonathan Esensten, MD, PhD	Lab Medicine Resident	Career Mentor	Supervisor, informal career advisor	Faculty, UCSF Laboratory Medicine
2015 - 2017	Nancy Greenland, MD, PhD	Lab Medicine Resident	Co-Mentor/Clinical Mentor	Supervisor, informal career advisor	Fellow, Pathology UCSF
2015 - 2017	Arash Eslami, MD	Lab Medicine Resident	Co-Mentor/Clinical Mentor	Supervisor, informal career advisor	Fellow, Pathology UCSF
2016 - 2019	Daniel Martig, MD	Lab Medicine Resident	Co-Mentor/Clinical Mentor	Supervisor, informal mentor	UCSF, Hemepath fellow Mayo Clinic

**FACULTY MENTORING**

Dates	Name	Position while Mentored	Mentor Type	Mentoring Role	Current Position
2003 - 2008	C. Mark Lu, MD, PhD	Asst. Prof. Clin. Lab Med	Career Mentor	Recruited to SFVA/UCSF	Faculty Lab Med UCSF
2001 - 2008	Endi Wang, MD, PhD	Asst. Clin. Prof. Lab Med	Career Mentor	Career Advisor	Faculty Hemepath Duke Univ Med Center
2015 - 2019	Morvarid Moayeri, MD, PhD	Asst. Clin. Prof. Lab Med	Career Mentor	Dept Mentor	Faculty Lab Med UCSF
2014 - 2019	Matthew Karafin, MD, MS	Assistant Professor Pathology	Research/Scholarly Mentor, Career Mentor	Career Advisor, REDS-III research trainee	Faculty, Blood Center of Wisconsin
2014 - 2019	Roberta Bruhn, PhD	Scientist, Blood Systems Research Institute	Research/Scholarly Mentor, Career Mentor	Career Advisor, REDS-III research trainee	Scientist, Blood Systems Research Institute

## RESEARCH AND CREATIVE ACTIVITIES

### RESEARCH AND CREATIVE ACTIVITIES SUMMARY

My research program includes participation as a UCSF Co-Investigator and since 2015, Co-Principal Investigator for the NIH/NHLBI REDS-III Recipient Epidemiology and Donor Evaluation Study (REDS-III). My effort is 10% on this project. REDS-III is a seven-year multicenter research program focused on assessing transfusion practice with the goal of improving transfusion benefits and reducing its risk. REDS-III consists of several database projects as well as observational clinical studies in Phase 2. The Recipient Database component of REDS-III includes data from SFVAHCS as well as SFGH, UCSF and 9 other hospitals at three additional hub sites across the US. The Recipient Database and linked Donor Database projects involve developing detailed databases containing blood donor information as well as clinical outcome data for transfused patients and non-transfused controls. The data will allow us to explore transfusion issues such as blood component utilization in a variety of clinical settings and patient populations and the risks and benefits of transfusion. My contribution as SFVA site co-Investigator is to work with VA programmers to extract clinical data from the VA electronic health record and blood bank package. As Co-PI I assist the other UCSF sites with overall data QC.

I am also the PI and Project Leader for RETRO (Red Cells in Outpatients Transfusion Outcomes), one of the REDS-III phase-2 clinical studies. In February 2017 RETRO completed enrolling patients at UCSF Cancer Center and three other sites: Yale, ITXM (Univ Pittsburgh) and Blood Center of Wisconsin (Medical College of Wisconsin). RETRO is an observational cohort study designed to determine the effect of RBC transfusion in 200 patients 50 years or older receiving RBC transfusion in the outpatient clinic setting. The primary outcomes are functional status (change 6-minute walk test distance) and quality of life measures (fatigue and dyspnea score scales). My role as PI is to coordinate development of the protocol, lead the protocol working group and study analysis, and provide oversight of the study as is implemented at multiple sites.

### RESEARCH AWARDS - CURRENT

1. NHLBI HB 11-03	Co-Principal Investigator	10% % effort	Murphy (PI)
NIH/NHLBI		03/15/2011	9/30/2019
Recipient Epidemiology and Donor Evaluation Study-III (REDS-III)			

REDS-III is a UCSF/BSRI proposal to build a unique and comprehensive database linking blood donors with blood recipients including patient demographic information and clinical characteristics. This database includes all transfusion recipients at SFVA as well as UCSF and SFGH and is part of a multi-site national consortium. The purpose of the database is to answer questions about blood transfusion safety and outcomes.

Co-PI for UCSF hub, responsible for data extraction at SFVA PI/Project leader for RETRO (Phase 2 REDS-III), a two-year observational study of transfusion outcomes in patients age 50 or older receiving RBC transfusion in the outpatient setting.

### RESEARCH AWARDS - PAST

1. 1. K08 HL02992-02	Principal Investigator	75 % effort	St Lezin (PI)
NIH/NHLBI		1998-04-01	2003-03-31

The Genetics of Hypertension in the Rat		\$ 102,750 direct/yr 1	\$ 500,000 total
2. 2. 9950681Y AHA Affiliate Genetics of Hypertension-Induced Renal Damage in the Rat	Principal Investigator	50 % effort 1999-07-01 \$ 53,989 direct/yr 1	St Lezin (PI) 2001-06-30 \$ 105,000 total
3. 3. R01 HL63709-01 NIH/NHLBI Why Do Metabolic Risk Factors Cluster With Hypertension?	Principal Investigator	20 % effort 2000-10-01 \$ 150,000 direct/yr 1	St Lezin (PI) 2004-09-30 \$ 600,000 total

## PEER REVIEWED PUBLICATIONS

1. Simonet L, St Lezin E, Kurtz TW. Sequence analysis of the alpha 1 Na<sup>+</sup>,K<sup>(+)</sup>-ATPase gene in the Dahl salt-sensitive rat. *Hypertension*. 1991 Nov; 18(5):689-93. PMID: 1657773
2. Pravenec M, Simonet L, Kren V, St Lezin E, Levan G, Szpirer J, Szpirer C, Kurtz T. Assignment of rat linkage group V to chromosome 19 by single-strand conformation polymorphism analysis of somatic cell hybrids. *Genomics*. 1992 Feb; 12(2):350-6. PMID: 1740344
3. St Lezin E, Simonet L, Pravenec M, Kurtz TW. Hypertensive strains and normotensive 'control' strains. How closely are they related? *Hypertension*. 1992 May; 19(5):419-24. PMID: 1568758
4. Fenoy FJ, St Lezin E, Kurtz TW, Roman RJ. Genetic heterogeneity and differences in glomerular hemodynamics between inbred colonies of Munich-Wistar rats. *J Am Soc Nephrol*. 1992 Jul; 3(1):66-72. PMID: 1391710
5. Kurtz TW, St Lezin EM. Gene mapping in experimental hypertension. *J Am Soc Nephrol*. 1992 Jul; 3(1):28-34. PMID: 1327257
6. Cicila GT, Rapp JP, Wang JM, St Lezin E, Ng SC, Kurtz TW. Linkage of 11 beta-hydroxylase mutations with altered steroid biosynthesis and blood pressure in the Dahl rat. *Nat Genet*. 1993 Apr; 3(4):346-53. PMID: 7981756
7. St. Lezin EM, Pravenec M, Kurtz TW. New genetic models for hypertension research. *Trends in Cardiovascular Medicine*, 3:119-123, 1993.
8. Kren V, Pravenec M, Bila V, Svobodova D, St Lezin E, Kurtz TW. Linkage between the RT8 alloantigen and interleukin 6 loci on the rat chromosome 4. *Transplant Proc*. 1993 Oct; 25(5):2777. PMID: 8105577

9. St Lezin EM, Kurtz TW. The renin gene and hypertension. *Semin Nephrol.* 1993 Nov; 13(6):581-5. PMID: 8278692
10. Pravenec M, St Lezin EM, Kren V, Wang JM, Kurtz TW. Linkage mapping of alkaline phosphatase 1, inhibin alpha subunit, and gamma-crystallin 1 on rat chromosome 9 and Na<sup>+</sup>, K<sup>(+)</sup>-ATPase alpha 2 subunit, renin, and leukocyte common antigen on rat chromosome 13. *Genomics.* 1994 Jan 1; 19(1):190-1. PMID: 8188231
11. St Lezin EM, Pravenec M, Wong A, Wang JM, Merriouns T, Newton S, Stec DE, Roman RJ, Lau D, Morris RC. Genetic contamination of Dahl SS/Jr rats. Impact on studies of salt-sensitive hypertension. *Hypertension.* 1994 Jun; 23(6 Pt 1):786-90. PMID: 8206578
12. Cover CM, Wang JM, St Lezin E, Kurtz TW, Mellon SH. Molecular variants in the P450c11AS gene as determinants of aldosterone synthase activity in the Dahl rat model of hypertension. *J Biol Chem.* 1995 Jul 14; 270(28):16555-60. PMID: 7622461
13. Pravenec M, Gauguier D, Schott J, Buard J, Kren V, Bila V, Szpirer C, Szpirer J, Wang JM, Huang H, St. Lezin EM, Spence MA, Flodman P, Printz M, Lathrop GM, Vergnaud G, Kurtz TW. Mapping of quantitative trait loci for blood pressure and cardiac mass in the rat by genome scanning of recombinant inbred strains. *J Clin Invest* 96:1973-1978, 1995.
14. Huang H, Pravenec M, Wang JM, Kren V, St Lezin E, Szpirer C, Szpirer J, Kurtz TW. Mapping and sequence analysis of the gene encoding the beta subunit of the epithelial sodium channel in experimental models of hypertension. *J Hypertens.* 1995 Nov; 13(11):1247-51. PMID: 8984121
15. St Lezin EM, Pravenec M, Wong AL, Liu W, Wang N, Lu S, Jacob HJ, Roman RJ, Stec DE, Wang JM, Reid IA, Kurtz TW. Effects of renin gene transfer on blood pressure and renin gene expression in a congenic strain of Dahl salt-resistant rats. *J Clin Invest.* 1996 Jan 15; 97(2):522-7. PMID: 8567976. PMCID: PMC507046
16. Pravenec M, Gauguier D, Schott JJ, Buard J, Kren V, Bílá V, Szpirer C, Szpirer J, Wang JM, Huang H, St Lezin E, Spence MA, Flodman P, Printz M, Lathrop GM, Vergnaud G, Kurtz TW. A genetic linkage map of the rat derived from recombinant inbred strains. *Mamm Genome.* 1996 Feb; 7(2):117-27. PMID: 8835528
17. Kren V, Pravenec M, Lu S, Krenova D, Wang JM, Wang N, Merriouns T, Wong A, St Lezin E, Lau D, Szpirer C, Szpirer J, Kurtz TW. Genetic isolation of a region of chromosome 8 that exerts major effects on blood pressure and cardiac mass in the spontaneously hypertensive rat. *J Clin Invest.* 1997 Feb 15; 99(4):577-81. PMID: 9045857. PMCID: PMC507837
18. Pravenec M, Zidek V, Zdobinska M, Kren V, Krenova D, Bottger A, van Zutphen LF, Wang J, St Lezin E. Mapping genes controlling hematocrit in the spontaneously hypertensive rat. *Mamm Genome.* 1997 Jun; 8(6):387-9. PMID: 9166579
19. Pravenec M, Wang J, Kren V, St Lezin E. Linkage mapping of the mixed-lineage leukemia (Mll) gene to rat chromosome 8. *Mamm Genome.* 1997 Aug; 8(8):625-6. PMID: 9250881
20. Pravenec M, Kren V, Wang J-M, Liu W, Szpirer C, Szpirer J, Stahl F, Dene H. St. Lezin, E. Report on rat chromosome 1. *Rat Genome* 3:15-45, 1997.
21. Churchill PC, Churchill MC, Bidani AK, Griffin KA, Picken M, Pravenec M, Kren V, St Lezin E, Wang JM, Wang N, Kurtz TW. Genetic susceptibility to hypertension-induced renal damage in the rat. Evidence based on kidney-specific genome transfer. *J Clin Invest.* 1997 Sep 15; 100(6):1373-82. PMID: 9294102. PMCID: PMC508315

22. Kren V, Pravenec M, Moisan M-P, Courvoisier H, Krenova D, St. Lezin E, Wang J-M, Szpirer C, Szpirer J, Stahl F, Kurtz TW. Report on rat chromosome 8. *Rat Genome*, 3:76-96,1997.
23. St Lezin E, Liu W, Wang JM, Wang N, Kren V, Krenova D, Musilova A, Zdobinska M, Zidek V, Lau D, Pravenec M. Genetic isolation of a chromosome 1 region affecting blood pressure in the spontaneously hypertensive rat. *Hypertension*. 1997 Oct; 30(4):854-9. PMID: 9336384
24. Pravenec M, Kren V, Hope M, Wang JM, St Lezin E. Linkage mapping of the interleukin 1beta converting enzyme (II1bc) and the glutamate receptor subunit KA1 (Grik4) genes to rat chromosome 8. *Folia Biol (Praha)*. 1998; 44(3):107-9. PMID: 10730851
25. St Lezin E, Liu W, Wang N, Wang JM, Kren V, Zidek V, Zdobinska M, Krenova D, Bottger A, van Zutphen BF, Pravenec M. Effect of renin gene transfer on blood pressure in the spontaneously hypertensive rat. *Hypertension*. 1998 Jan; 31(1 Pt 2):373-7. PMID: 9453331
26. Aitman TJ, Glazier AM, Wallace CA, Cooper LD, Norsworthy PJ, Wahid FN, Al-Majali KM, Trembling PM, Mann CJ, Shoulders CC, Graf D, St Lezin E, Kurtz TW, Kren V, Pravenec M, Ibrahim A, Abumrad NA, Stanton LW, Scott J. Identification of Cd36 (Fat) as an insulin-resistance gene causing defective fatty acid and glucose metabolism in hypertensive rats. *Nat Genet*. 1999 Jan; 21(1):76-83. PMID: 9916795
27. St Lezin E, Zhang L, Yang Y, Wang JM, Wang N, Qi N, Steadman JS, Liu W, Kren V, Zidek V, Krenova D, Churchill PC, Churchill MC, Pravenec M. Effect of chromosome 19 transfer on blood pressure in the spontaneously hypertensive rat. *Hypertension*. 1999 Jan; 33(1 Pt 2):256-60. PMID: 9931113
28. Pravenec M, Krenová D, Kren V, Zidek V, Simáková M, Musilová A, Bottger A, van Zutphen BF, St Lezin E, Kurtz TW. Congenic strains for genetic analysis of hypertension and dyslipidemia in the spontaneously hypertensive rat. *Transplant Proc*. 1999 May; 31(3):1555-6. PMID: 10330997
29. Pravenec M, Zidek V, Simakova M, Kren V, Krenova D, Horky K, Jachymova M, Mikova B, Kazdova L, Aitman TJ, Churchill PC, Webb RC, Hingarh NH, Yang Y, Wang J, St. Lezin EM, Kurtz TW. Genetics of Cd36 and the clustering of multiple cardiovascular risk factors in spontaneous hypertension. *J Clin Invest* 103: 1651-1657, 1999.
30. St Lezin E, Griffin KA, Picken M, Churchill MC, Churchill PC, Kurtz TW, Liu W, Wang N, Kren V, Zidek V, Pravenec M, Bidani AK. Genetic isolation of a chromosome 1 region affecting susceptibility to hypertension-induced renal damage in the spontaneously hypertensive rat. *Hypertension*. 1999 Aug; 34(2):187-91. PMID: 10454439
31. St Lezin E, Liu W, Wang JM, Yang Y, Qi N, Kren V, Zidek V, Kurtz TW, Pravenec M. Genetic analysis of rat chromosome 1 and the Sa gene in spontaneous hypertension. *Hypertension*. 2000 Jan; 35(1 Pt 2):225-30. PMID: 10642302
32. Taylor BK, Roderick RE, St. Lezin E, Basbaum AI. Hypoalgesia and hyperalgesia with inherited hypertension in the rat. *Am J Physiol Regulatory Integrative Comp Physiol* 280:R345-R354, 2001.
33. Bidani AK, Griffin KA, Churchill PC, Churchill MC, St Lezin E, Kurtz TW. Genetic susceptibility to renal injury in hypertension. *Exp Nephrol*. 2001; 9(6):360-5. PMID: 11701994



34. Kren V, Qi Nianning, Krenova D, Zidek V, Sladka M, Jachymova M, Mikova B, Horky K, Bonne A, Van Lith HA, Van Zutphen BFM, Lau Y-FC, Pravenec M, St. Lezin E. Transfer of chromosome Y from the brown Norway rat into the spontaneously hypertensive rat induces significant changes in blood pressure and blood lipids. *Hypertension* 37: 1147-1152, 2001.
35. Pravenec M, Zídek V, Musilová A, Vorlíček J, Kren V, St Lezin E, Kurtz TW. Genetic isolation of a blood pressure quantitative trait locus on chromosome 2 in the spontaneously hypertensive rat. *J Hypertens.* 2001 Jun; 19(6):1061-4. PMID: 11403354
36. Pravenec M, Zidek V, Musilova A, Simakova M, Kostka V, Mlejnek P, Kren V Krenova D, Bila V, Mikoa B, Jachymova M, Horky K, Kazdova L, St. Lezin E, Kurtz TW. Genetic analysis of metabolic defects in the spontaneously hypertensive rat. *Mamm Genome* 13:253-8, 2002.
37. Qi N, Kazdova L, Zidek V, Landa V, Kren V, Pershadsingh HA, St. Lezin E, Abumrad NA, Pravenec M, Kurtz TW. Pharmacogenetic evidence that Cd36 is a key determinant of the metabolic effects of pioglitazone. *J Biol Chem* 277:48501-48507, 2002.
38. Pravenec M, Landa V, Zídek V, Musilová A, Kazdová L, Qi N, Wang J, St Lezin E, Kurtz TW. Transgenic expression of CD36 in the spontaneously hypertensive rat is associated with amelioration of metabolic disturbances but has no effect on hypertension. *Physiol Res.* 2003; 52(6):681-8. PMID: 14640889
39. Pravenec M, Kren V, Krenova D, Zidek V, Simakova M, Musilova A, Vorliceck J, St. Lezin E, Kurtz TW. Genetic isolation of quantitative trait loci for blood pressure development and renal mass on chromosome 5 in the spontaneously hypertensive rat. *Physiol Res* 52:285-9, 2003.
40. St. Lezin E, Karafin MS, Bruhn R, Chowdhury D, Qu L, Bialkowski W, Merenda S, D'Andrea P, McCalla AL, Anderson L, Keating SM, Stone M, Snyder EL, Brambilla D, Murphy EL, Norris PJ, Hilton JF, Spencer BR, Kleinman S, Carson JL. Therapeutic impact of red blood cell transfusion on anemic outpatients: the RETRO study. *Transfusion* 59: 1934-1943, 2019.
41. Karafin MS, Bruhn R, Roubinian NH, Chowdhury D, Qu L, Snyder E, Murphy EL, Brambilla D, Cable R, Hilton JF, St. Lezin E. The impact of recipient factors on the lower than expected hemoglobin increment in transfused outpatients with hematologic diseases. *Transfusion* 2019 (in press).

## REVIEW ARTICLES

1. Churchill PC, Churchill MC, Bidani AK, Griffin KA, Picken M, Pravenec M, Kren V, St. Lezin E, Kurtz TW. Mapping nephropathy susceptibility genes using kidney specific chromosome transfer. *Exerpta Medical International Congress Series Volume 1181*, 1999

## BOOKS AND CHAPTERS

1. Kurtz TW, St. Lezin EM, Pravenec M. Development of Hypertension Strains. In: *Textbook of Hypertension.* JD Swales (Ed). Blackwell Scientific Publications, Oxford, 1994. p441-446.
2. Pravenec M, Kren V, St. Lezin E. Recombinant Inbred and Congenic Strains for Genetic Analysis of Spontaneous Hypertension and Other Risk Factors of Cardiovascular Disease. In: *Handbook of Hypertension (WH Birkenhager, JL Reid, series Ed), Development of the*

Hypertensive Phenotype: Basic and Clinical Studies (R McCarty, DA Blizard, RL Chevalier, Ed). Elsevier Science B.V. 1998

3. Kurtz TW, Pravenec M, St. Lezin EM, Mellon SH. Molecular Genetics of Steroid Biosynthesis in Dahl Salt-Sensitive and Salt-Resistant Rats: Linkage to the Control of Blood Pressure. In: Molecular Genetics of Hypertension. AF Dominiczak, JMC Connell, F Sourbrier, Ed). Bios Scientific Publishers, Oxford, 1999.

## OTHER PUBLICATIONS

1. St. Lezin EM, Esensten J. To irradiate or not to irradiate: what is the role of the transfusion service in preventing TA-GVHD? CBBS Today Fall 2013 Vol XXXI, No 2

## SIGNIFICANT PUBLICATIONS

1. Kren V, Qi Nianning, Krenova D, Zidek V, Sladka M, Jachymova M, Mikova B, Horky K, Bonne A, Van Lith HA, Van Zutphen BFM, Lau Y-FC, Pravenec M, St. Lezin E. Transfer of chromosome Y from the brown Norway rat into the spontaneously hypertensive rat induces significant changes in blood pressure and blood lipids. Hypertension 37: 1147-1152, 2001.

Senior author

2. St. Lezin E, Griffin KA, Picken M, Churchill MC, Churchill PC, Kurtz TW, Liu W, Wang N, Kren V, Zidek V, Pravenec M, Bidani AK. Genetic isolation of a chromosome 1 region affecting susceptibility to hypertension-induced renal damage in the spontaneously hypertensive rat. Hypertension 34:187-191, 1999.

First author

3. Aitman T, Glazier A, Wallace C, Cooper L, Norsworthy P, Wahid F, Al-Majali K, Trembling P, Mann C, Shoulders C, Graf D, St. Lezin E, Kurtz TW, Kren V, Pravenec M, Ibrahimi A, Abumrad N, Stanton L, Scott J. Identification of Cd36 (fat) as an insulin-resistance gene causing defective fatty acid and glucose metabolism in hypertensive rats. Nature Genetics 21: 76-83, 1999.

Contributor

4. St. Lezin E, Karafin MS, Bruhn R, Chowdhury D, Qu L, Bialkowski W, Merenda S, D'Andrea P, McCalla AL, Anderson L, Keating SM, Stone M, Snyder EL, Brambilla D, Murphy EL, Norris PJ, Hilton JF, Spencer BR, Kleinman S, Carson JL. Therapeutic impact of red blood cell transfusion on anemic outpatients: the RETRO study. Transfusion 59: 1934-1943, 2019.

First author, study PI

5. Karafin MS, Bruhn R, Roubinian NH, Chowdhury D, Qu L, Snyder E, Murphy EL, Brambilla D, Cable R, Hilton JF, St. Lezin E. The impact of recipient factors on the lower than expected hemoglobin increment in transfused outpatients with hematologic diseases. Transfusion 2019 (in press).

Senior author, study PI

6. Young S, Bridges M, Johnson M, **St. Lezin E**. Using drills to improve transfusion service response time in massive transfusion. Transfusion 57 (Supplement 3): AP28, 2017.

## CONFERENCE ABSTRACTS

1. Young S, Bridges M, Johnson M, **St. Lezin E**. Using drills to improve transfusion service response time in massive transfusion. *Transfusion* 57 (Supplement 3): AP28, 2017.
2. **St. Lezin E**, Karafin M, Bruhn R, Chowdhury D, Qu L, Bialkowski W, Merenda S, Anderson L, D'Andrea P, McCalla A, Snyder E, Murphy E, Brambilla D, Norris P, Spencer B, Kleinman S, Carson JL. Effect of RBC Transfusion on Six Minute Walk Test Performance and Quality of Life in Outpatients. *Blood* 130:2400, 2017.
3. Karafin M, Bruhn R, Chowdhury D, Qu L, Snyder E, Murphy E, Roubinian N, Brambilla D, Cable R, **St. Lezin E**. The impact of recipient factors on hemoglobin increment in transfused outpatients with hematologic disease. *Transfusion* 58: HC4, 2018.
4. Edgren G, Murphy E, Brambilla D, Ullum H, Lee C, Westlake M, Kleinman S, Triulzi D, Cable RG, **St. Lezin E**, Bruhn R, Hjalgrim H, Glynn S, Roubinian N. No effect of blood donor sex and pregnancy history on the survival of transfused patients: a joint analysis of three retrospective cohorts. *Transfusion* 58: P1-MN1-6, 2018.