

UNIVERSITY OF PENNSYLVANIA – SCHOOL OF MEDICINE

Curriculum Vitae

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Date of birth July 25, 1943

Education: 1965 A.B. Cornell University, Ithaca, NY (Chemistry)
1969 M.D. Cornell University Medical College, New York, NY

Postgraduate Training and Fellowship Appointments:

1968-69 Predoctoral fellow in Pharmacology, Cornell University Medical College, New York, NY
1969-70 Intern in Medicine, Yale New Haven Hospital, New Haven CT
1970-71 Resident in Medicine, Yale New Haven Hospital, New Haven CT
1971-73 NIH Research Fellow, Cardiology Branch, National Heart Lung and Blood Institute, Bethesda, MD
1973-74 Fellow in Cardiovascular Disease, Duke University Medical Center, Durham, NC

Military Service: None

Faculty Appointments:

1969-71 Instructor in Medicine, Department of Medicine, Yale University School of Medicine

1973-74	Instructor in Medicine, Department of Medicine, Duke University School of Medicine
1974-78	Samuel Bellet Assistant Professor of Cardiology, Department of Medicine, University of Pennsylvania School of Medicine
1978-81	Assistant Professor of Medicine, University of Pennsylvania School of Medicine
1981-88	Associate Professor of Medicine at the Hospital of the University of Pennsylvania, University of Pennsylvania, School of Medicine
1988 -	Professor of Medicine at the Hospital of the University of Pennsylvania, University of Pennsylvania, School of Medicine

Hospital and Administrative Appointments:

1974-76	Assistant Director, Cardiac Catheterization Laboratory, Hospital of the University of Pennsylvania
1976-2003	Director, Cardiac Catheterization Laboratory, Hospital of the University of Pennsylvania
2000 - 2011	Training Program Director, Interventional Cardiology Training Program University of Pennsylvania Medical Center
2003 -	Director of Cardiovascular Education, Cardiovascular Division, University of Pennsylvania School of Medicine

Specialty Certification:

1970	Diplomate, National Board of Medical Examiners
1973	Internal Medicine, American Board of Internal Medicine -043631
1975	Cardiovascular Disease, American Board of Internal Medicine - 043631
1999	Interventional Cardiology, American Board of Internal Medicine - 043631

Licensure:

Pennsylvania MD-015654-E

Awards, Honors and Memberships in Honorary Societies:

1968	Alpha Omega Alpha
1969	Sigma XI
1969	The Harold G. Wolff Memorial Prize for Research Cornell University Medical College
1983	University of Pennsylvania Medical Student Government Faculty Honor Role for Excellence in Teaching
1990	University of Pennsylvania Lindback Award for Distinguished Teaching
1990,91,92,93,98, 99 02, 04	University of Pennsylvania Medical Students' Commendation for Outstanding Teaching
1999	Penn Pearls Award for medical student teaching
2004	University of Pennsylvania Cardiovascular Division Fellows' award for outstanding teaching

2005	Penn Pearls Award for Medical student teaching
2006	Distinguished Fellow Award – American College of Cardiology
2007	Best Course Director – University of Pennsylvania School of Medicine
2008	Best Lecturer in Cardiology Course – University of Pennsylvania School of Medicine
2009	Edward Cooper Award – American Heart Association
2011	University of Pennsylvania Dean’s Award for Outstanding Teaching

Memberships in Professional and Scientific Societies: (Include offices held)

National Societies:

American Heart Association

1976 Fellow of Council on Clinical Cardiology

American Board of Internal Medicine

1997 – 03 Member Interventional Cardiology Test Writing Committee

American College of Cardiology

1980 Fellow

1992 - 95 Member, Allied Health Professionals Committee

1995 - 97 President - Pennsylvania Chapter

1995 - 98 Governor - Eastern Pennsylvania Region

1995 - 98 Member - Board of Governors Working Group on Academic Issues

1996 - 02 Chair - Cardiac Catheterization Committee

1996 - 98 Member - Nominating Committee

1997 - 01 Member - Board of Governors Steering Committee

1997 - 00 Member - Executive Committee

1998 - 03 Member, ACC/AHA/ACP Task Force on Clinical Competence

1998 - 01 Member, Bethesda Conferences Committee

1998 - 99 Chair - Board of Governors

2000 - 05 Member, Board of Trustees

2000 - 02 Chair, Task Force to Develop a Cardiac Catheterization Laboratory CQI Tool

2003 – 05 Member, Nominating Committee

2003 – 05 Member Annual Scientific Session Program Committee

2004 - 07 Member Writing Committee – Adult Cardiovascular Medicine Core Training Committee (COCATS)

2004 - 08 Member Writing Committee – Guidelines for Percutaneous Coronary Intervention

2006	Distinguished Fellow
2007 - 10	Member, Awards Committee
2009 -	Member Inovations in Interventions Program Executive Committee
2012 -2018	Co-Chair Writing Committee to write patient radiation protection document

Society for Cardiac Angiography and Interventions

1990 - 93	Trustee
1994 - 99	Chair - Certificate of Proficiency Committee
1995 -	Governor - Pennsylvania
1997 - 00	Trustee

Local Societies:

1985	Fellow - The College of Physicians of Philadelphia
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National Scientific Committees:

1990 - 93	Member - Thrombolysis in Myocardial Ischemia Morbidity and Mortality Classification Committee
1990 - 92	Executive Committee - NHLBI Critical Issues in Intravascular Contrast Agents Workshop
1994 - 5	Ad Hoc Reviewer NHLBI Clinical Trials Review Committee
1993 - 00	Member Working Group 1, American College of Cardiology, American College of Radiology, National Electrical Manufacturers Association Digital Imaging and Communications in Medicine Standards Committee
1997 - 03	Member, American Board of Internal Medicine Interventional Cardiology Test Writing Committee
1998 - 00	Member HALT-MI Data Safety and Monitoring Board
1998 - 01	Member Beta-Cath Data Safety and Monitoring Board
1999 - 01	Member, American Council on Graduate Medical Education Interventional Cardiology Committee
2000 - 01	Chair Data and Safety Monitoring Board Hepacoat Stent Study
2003 - 06	Consultant, Food and Drug Administration Circulatory Devices Panel.
2006 - 2009	Member Food and Drug Administration Circulatory Devices Panel
2009 - 2011	Chair Food and Drug Administration Circulatory Devices Panel
2009 -	Member ATTRACT Data Safety and Monitoring Board

Editorial Positions:

1980-84	Editorial Board - International Journal of Cardiology
1987-	Editorial Board - Catheterization and Cardiovascular Diagnosis -
1999 - 2016	Editorial Board - ACCEL (The American College of Cardiology audio journal)
2015 -	Guest Editor Journal of the American College of Cardiology Interventions.

Academic Committees at the University of Pennsylvania and Affiliated Hospitals:

1977 - 92	Member, Committee on Studies Involving Human Beings
1982 - 83	Member, Bridge Curriculum Planning Task Force
1983 - 98	Member, Bridge Curriculum Committee-Cardiovascular System Chairman
1983 -	Department of Medicine, Housestaff Selection Committee
1985 - 87	Member, Student Recommendation Committee for the Class of 1989
1986 - 87	Member, Committee to Review Department of Surgery
1987 - 88	Task Force to Plan Patient Services for the Department of Medicine
1987 -	Member, Council on Undergraduate Medical Education (Also member Curriculum Evaluation subcommittee)
1987 - 90	Member, Faculty Senate Executive Committee
1988 - 91	Member, Interviewing Panel for Selection of Winner of Spencer Morris Prize
1988 - 90	Member, Search Committee for Chief of Pulmonary Medicine
1989 - 96	Member, Department of Medicine Committee on Appointments and Promotions
1989 - 91	Member, Medical Board Hospital of the University of Pennsylvania
1990 - 93	Member, Continuing Education Council, University of Pennsylvania School of Medicine
1992 -	Member, Student Standards Committee
1995 - 97	Chair - Student Standards Committee
1995	Member, Committee to review Physiology course and curriculum
1996 - 98	Member, Medical Board Hospital of the University of Pennsylvania
1996 - 98	Member Medical Faculty Senate Executive Committee
1996 - 98	Curriculum 2000 Planning Committee - Module 2 Coordinator
1997 - 00	Member, Medical School Committee on Appointments and Promotions
1997 - 04	Member, School of Medicine Teaching Awards Selection Committee.
1998 - 10	Module 2 Coordinator – Curriculum 2000
1998 - 11	Cardiovascular Organ System Block Leader – Curriculum 2000
2000 -	Member Academic Performance Review Committee – University of Pennsylvania School of Medicine
2013 -	Member Admissions Committee Screening Panel Perelman School of Medicine, University of Pennsylvania

Major Teaching and Clinical Responsibilities at the University of Pennsylvania and Affiliated Hospitals:

1. Attending - Cardiac Catheterization Laboratory at HUP, 2 1/2 days per week. Includes responsibility for training all Cardiology Fellows in the techniques of cardiac catheterization and data interpretation and Interventional

Cardiology fellows in coronary angioplasty and related techniques. At any time there are 3-5 postdoctoral fellows assigned to the laboratory.

2. Cardiac Catheterization - Interventional Cardiology Conference - Twice weekly
3. Course Director ME-314a (Cardiovascular Diagnostic Techniques elective)
4. Attending Rounds on CCU - 4 weeks per year

Lectures by Invitation: (Since 1995)

- 2/12/95 "Optimal use of low and high osmolality contrast agents in cardiac angiography." Presented at The American College of Cardiology Seventh annual Advances in Diagnostic and Therapeutic Cardiac Catheterization, Orlando, FL.
- 5/13/95 "The role of the Palmaz-Schatz Stent in interventional cardiology" Mercy Hospital, Wilkes Barre, PA
- 6/7/95 "Restenosis in Palmaz-Schatz stents" Presented at the 4th annual symposium of the Japanese Society for Interventional Cardiology, Nagoya, Japan.
- 10/18/95 "Applied hemodynamics in valvular disease" Presented at the 5th Cardiology Board Review Course. Philadelphia, PA
- 2/2/96 "Stenting is the preferred method for performing coronary angioplasty" Presented at The American College of Cardiology eighth annual Advances in Diagnostic and Therapeutic Cardiac Catheterization, Orlando, FL.
- 3/27/96 "Issues in preparing the cardiac catheterization laboratory for filmless operation" Presented at the American College of Cardiology Annual Scientific Sessions, Orlando, FL
- 4/8/96 "Optimal use of low and high osmolality contrast agents in cardiac angiography." Cardiac Catheterization Conference at University of Vermont College of Medicine, Burlington, VT
- 4/9/96 "The role of the Palmaz-Schatz Stent in interventional cardiology" Cardiology Grand Rounds at University of Vermont College of Medicine, Burlington, VT
- 12/3/97 "The Value of a Cardiologist" Presented at the Massachusetts Chapter of the American College of Cardiology Annual Meeting, Boston, MA.
- 1/8/98 "The Role of New Interventional Devices in Interventional Cardiology" Presented at Chestnut Hill Hospital, Chestnut Hill, PA
- 2/13/98 "The Role of Catheterization Data in the Evaluation of Cardiac Valve Disease" Presented at The American College of Cardiology tenth annual Advances in Diagnostic and Therapeutic Cardiac Catheterization, Orlando, FL.
- 2/14/98 "Credentialing for Cardiovascular Interventions" Presented at The American College of Cardiology tenth annual Advances in Diagnostic and Therapeutic Cardiac Catheterization, Orlando, FL.
- 3//29/98 "Digital Imaging in Cardiac Angiography" Presented at the American College of Cardiology Scientific Sessions, Atlanta, GA
- 4/30/98 "Volume Standards for Competence in Coronary Interventional Procedures" Presented at the Virginia Chapter of the American College of Cardiology annual Meeting.
- 5/13/98 "How to Migrate a Cardiac Catheterization Laboratory to Filmless Operation" Presented at the Society for Cardiac Angiography annual Meeting, Montreal, Canada
- 5/21/98 "The Choice of Contrast Agents for Cardiac Angiography" Presented at Cardiology Grand Rounds, Allegheny University of the Health Sciences, Philadelphia, PA
- 6/16/98 "Physics as Preparation for the Study of the Biomedical Sciences" Presented at the Harvard University Department of Physics, Boston, MA
- 12/5/98 "Coronary Angioplasty Volume-Outcome Relationships" Presented at the Louisiana Chapter Meeting of the American College of Cardiology, New Orleans, LA

- 4/9/99 "The Role of Coronary Stents in Interventional Cardiology" Presented at the Wharton School New Ventures in Health Care Conference, Philadelphia, PA
- 4/15/99 "The Importance of Physics in the Understanding of Biomedical Sciences" Presented at the Department of Physics, Boston College, Boston, MA
- 5/14/99 "How to Migrate a Cardiac Catheterization Laboratory to Filmless Operation" Presented at the Society for Cardiac Angiography annual Meeting, Monterey CA
- 2/2/00 "The Potential Importance of Post-Market Surveillance for Cardiovascular Devices" Presented at the Joint American College of Cardiology / U.S. Food and Drug Administration Conference on post-market surveillance of cardiovascular devices.
- 3/11/00 "New Developments in Interventional Cardiology" Presented at the American College of Cardiology Science Writers' Symposium, Anaheim, CA
- 10/14/00 "Cardiac Catheterization Laboratory Licensing and Accreditation. What is the ACC doing?" Presented at the Annual Meeting of the Ohio Chapter of the American College of Cardiology, Cleveland, OH
- 10/19/00 "The use of Registries for Post-Market Surveillance of Cardiovascular Devices. Presented at FDA "Town Hall Meeting" at the 10th Annual TransCatheter Cardiovascular Therapeutics Meeting, Washington, D.C.
- 10/20/00 "Training the Next Generation of Interventional Cardiologists. The Impact of Accreditation and Certification Standards." Presented at the 10th Annual TransCatheter Cardiovascular Therapeutics meeting, Washington, D.C.
- 2/26/01 "Interventional Cardiology as a Cognitive Discipline". Presented at Cardiovascular Grand Rounds, The University of Colorado, Denver, CO.
- 11/13/01 "How to select a Database for Interventional Cardiology. Presented at the American Heart Association Annual Scientific Session, Anaheim, CA.
- 3/17/02 "Training in Interventional Cardiology – A Cognitive Discipline" Presented to the American College of Cardiology Training Directors' Symposium during the American College of Cardiology Annual Scientific Session, Atlanta, GA.
- 3/19/02 "Quality Issues in Coronary Intervention – Database management issues" Presented at the American College of Cardiology Annual Scientific Session, Atlanta, GA.
- 3/20/02 "Controversies in Primary PCI: Time to Treat, Volume Requirements, Surgical Back-Up Presented at the American College of Cardiology Annual Scientific Session, Atlanta, GA.
- 4/18/02 "Interventional Cardiology as a Cognitive Discipline" Presented at Cardiovascular Grand Rounds, Medical College of Virginia, Richmond, VA
- 5/15/02 "How Should a Contemporary Cardiac Catheterization Laboratory be Configured?" Presented at the Society for Cardiovascular Angiography and Interventions Annual Scientific Session. Seattle, Washington.
- 11/8/02 "How Can A Coronary Interventionalist Acquire Cognitive Knowledge About Peripheral Arterial Disease?" Presented at the American Heart Association Scientific Sessions, Chicago, IL.
- 4/1/03 "Quality Assurance and Improvement in the Cardiac Catheterization Laboratory" Presented at the American College of Cardiology Annual Scientific Sessions, Chicago, IL.

- 10/16/03 “Potential Solutions to the Impending Cardiovascular Workforce Shortage” Presented at the American College of Cardiology Bethesda Conference #35, Bethesda, MD.
- 11/9/03 “Contrast Agent Nephropathy Can be Prevented” Presented at Symposium “Interventional Cardiology – Bench to Bedside and Beyond” at the American Heart Association Annual Scientific Sessions, Orlando, FL.
- 11/11/03 “How to Perform Quality Assurance in the Cardiac Catheterization Laboratory” Presented at the American Heart Association Annual Scientific Sessions, Orlando, FL
- 3/9/04 “Strategies to Prevent Contrast Agent Nephropathy” Presented at the American College of Cardiology Annual Scientific Sessions, New Orleans, LA.
- 3/9/04 “Complex Coronary Interventions” Presented at the American College of Cardiology Annual Scientific Sessions, New Orleans, LA.
- 10/14/04 “Prevention of Contrast Agent Nephropathy”. Presented at Cardiovascular Grand Rounds, The Medical College of Virginia, Richmond, VA
- 11/9/04 “How to Perform Percutaneous Coronary Intervention in Complex Lesion Subsets”. Presented at the American Heart Association Annual Scientific Sessions, New Orleans, LA.
- 3/7/05 “The Role of Registries in Interventional Cardiology” Presented at the American College of Cardiology Scientific Sessions, Orlando, FL.
- 4/5/05 “Cardiovascular Manpower Issues – The Impending Shortage of Cardiologists” Presented at the Pennsylvania Chapter Meeting of the American College of Cardiology, Harrisburg, PA.
- 5/4/05 “Interventional Cardiology Training Programs – Lessons Learned” Presented at the Society of Cardiovascular Angiography and Interventions meeting, Ponte Vedra Beach, FL
- 7/13/05 “Radiographic Contrast Agents – What the Interventionalist Needs to Know” Duke University Clinical Catheterization Conference Series
- 10/18/05 “Adjunctive Pharmacologic Therapy in PCI - Antithrombin and Antiplatelet Controversies” Presented at the Transcatheter Cardiovascular Therapeutics Scientific Sessions, Washington, DC
- 10/18/05 “Contrast Nephropathy Risk” Presented at the Transcatheter Cardiovascular Therapeutics Scientific Sessions, Washington, DC
- 10/19/05 “Radiation Principles and Safety” Presented at the Transcatheter Cardiovascular Therapeutics Scientific Sessions, Washington, DC
- 11/14/05 “Assessing Quality: Volume and Outcomes in Percutaneous Coronary Intervention, Where do we Stand?” Presented at the American Heart Association Annual Scientific Sessions, Dallas, TX.
- 5/10/06 “A Gallery of Angiograms – Movies with Morals” Presented at the Society for Cardiovascular Angiography and Interventions Scientific Sessions, Chicago, IL
- 5/10/06 “Measuring Hemodynamics in the Cath Lab – The Common Way and the Right Way” Presented at the Society for Cardiovascular Angiography and Interventions Scientific Sessions, Chicago, IL
- 5/12/06 “Assessing and Assuring Quality in PCI – Operator Volumes, Onsite Surgery. Where do we stand in 2006?” Presented at the Society for Cardiovascular Angiography and Interventions Scientific Sessions, Chicago, IL

- 10/22/06 “The Hemodynamics of Hypertrophic Obstructive Cardiomyopathy” Presented at the Transcatheter Cardiovascular Therapeutics Scientific Sessions, Washington, DC
- 10/23/06 “Implications of Chronic Kidney Disease and Contrast Nephropathy – Preventative Approaches. Presented at the Transcatheter Cardiovascular Therapeutics Scientific Sessions, Washington, DC
- 10/25/06 “Radiation Principles and Safety” Presented at the Transcatheter Cardiovascular Therapeutics Scientific Sessions, Washington, DC
- 3/27/07 “Who Benefits for Pre-Operative Coronary Revascularization and How Should it be Done?” Presented at the American College of Cardiology Scientific Sessions, New Orleans, LA.
- 10/7/07 “Contrast Nephropathy, Pathogenesis and Prevention” Presented at the Robert Wood Johnson Cardiovascular Symposium, New Brunswick, NJ
- 10/20/07 “Optimizing Hemodynamic Interpretation in the Cardiac Catheterization Laboratory” Presented at the Transcatheter Cardiovascular Therapeutics Scientific Sessions, Washington, DC
- 10/23/07 “Perspectives on the Relative Impact of a Severe Low Frequency Event – Contrast Nephropathy” Presented at the Transcatheter Cardiovascular Therapeutics Scientific Sessions, Washington, DC
- 3/29/07 “Optimizing Hemodynamic Interpretation in the Cardiac Catheterization Laboratory” Presented at the American College of Cardiology Scientific Sessions, Chicago, IL.
- 5/29/09 “The ACC/AHA/SCAI Guidelines for Percutaneous Coronary Intervention
How do we apply them in 2009? The Joseph R. Calder Memorial Lecture, Williamsport Hospital and Medical Center, Williamsport PA
- 3/11/11 “Interpreting Complex Hemodynamics in the Cardiac Catheterization Laboratory” Presented at Cardiology Grand Rounds, Geisinger Medical Center, Danville, PA
- 3/11/11 “Current Management of Coronary Heart Disease” Charles Laubach Visiting Professorship Geisinger Medical Center, Danville, PA
- 5/9/12 “Cardiac Shunt and Resistance Calculations” Presented at the Society for Cardiac Angiography and interventions Annual Scientific Sessions, Las Vegas, NV
- 5/9/12 “Constriction, Restriction, Tamponade and HOCM” Presented at the Society for Cardiac Angiography and interventions Annual Scientific Sessions, Las Vegas, NV

Organizing Roles in Scientific Meetings:

- 2/2-3/00 Joint American College of Cardiology / U.S. Food and Drug Administration conference on post-market surveillance of cardiovascular devices.

Bibliography:

Research Publications, peer-reviewed (print or other media):

1. Hirshfeld JW, Fell C: Changes in regional blood content during hemorrhagic shock in dogs. *American Journal of Physiology* 216:380, 1969
2. Levitt B, Raines A, Sohn YJ, Standaert FG, Hirshfeld JW: The nervous system as a site of action for Digitalis and antiarrhythmic drugs. *Mount Sinai Journal of Medicine* 37:227, 1970
3. Hirshfeld JW, Sohn YJ, Raines, A, Levitt B: Action of Propranolol on atrioventricular conduction in the Digitalis-intoxicated heart. *Archives Internationales de Pharmacodynamie* 192:338, 1971
4. Maron BJ, Redwood DR, Hirshfeld JW, Goldstein RE, Morrow AG, Epstein SE: Post-operative assessment of patients with ventricular septal defect and pulmonary hypertension: Response to intense exercise. *Circulation* 48:864, 1973
5. Hirshfeld JW, Borer JS, Barrett MJ, Goldstein RE, Epstein SE: Reduction in severity of myocardial infarction when nitroglycerin and Methoxamine are administered during acute coronary occlusion in the dog. *Circulation* 49:291, 1974
6. Kramer RJ, Goldstein RE, Hirshfeld JW, Roberts WC, Johnson GD: Accumulation of Gallium-67 in regions of acute myocardial infarction. *American Journal of Cardiology* 33:861, 1974
7. Bailey JJ, Itscoitz SB, Hirshfeld JW, Grauer LE, Horton MR: A method for evaluating computer programs for electrocardiographic interpretation: I. Application to the experimental IBM program of 1971. *Circulation* 50:73, 1974
8. Bailey JJ, Itscoitz SB, Hirshfeld JW, Grauer LE, Horton MR: A method for evaluating computer programs for electrocardiographic interpretation: II. Application to Version D of the PHS program and the Mayo Clinic program of 1968. *Circulation* 50:80, 1974
9. Hirshfeld JW, Epstein SE, Roberts AJ, Glancy DL, Morrow AG: Indices predicting long-term survival after valve replacement in patients with aortic regurgitation and patients with aortic stenosis. *Circulation* 50:190, 1974
10. Kastor JA, Goldreyer BN, Josephson ME, Perloff JK, Scharf DL, Manchester JH, Shelburne JC, Hirshfeld JW: Electrophysiologic characteristics of Epstein's anomaly of the tricuspid valve. *Circulation* 52:987, 1975
11. Margolis JR, Hirshfeld JW, McNeer JF, Starmer CF, Rosati RA, Peter RH, Behar VS, Kong Y: Sudden death to coronary artery disease: A clinical, hemodynamic, and angiographic profile. *Circulation* 52:111-180, 1975

12. Stark RM, Perloff JK, Glick JH, Hirshfeld JW: Clinical recognition and management of cardiac metastatic disease. Observations in a unique case of alveolar soft-part sarcoma. *American Journal of Medicine* 63:653, 1977
13. Wilson JR, Martin JL, Untereker WJ, Laskey WK, Hirshfeld JW: Sequential changes in regional coronary flow during pacing-induced angina pectoris: Coronary flow limitation precedes angina. *American Heart Journal* 107:269, 1977
14. Goldberg S, Lam W, Mudge G, Green LH, Kushner F, Hirshfeld JW, Kastor JA: Coronary hemodynamic and myocardial metabolic alterations accompanying coronary spasm. *American Journal of Cardiology* 43:481, 1979
15. Goldberg S, Reichek N, Wilson JR, Hirshfeld JW, Muller J, Kastor JA: Nifedipine in the treatment of Prinzmetal's (variant) angina. *American Journal of Cardiology* 44:804, 1979
16. Redwood DR, Goldstein RE, Hirshfeld JW, Borer JS, Morganroth J, Morrow AG, Epstein SE: Exercise performance after septal myotomy and myectomy in patients with obstructive hypertrophic cardiomyopathy. *American Journal of Cardiology* 44:215, 1979
17. Cogen FC, Norman ME, Dunsky E, Hirshfeld JW, Zweiman B: Histamine release and complement changes following injection of contrast media in humans. *The Journal of Allergy and Clinical Immunology* 64:299, 1979
18. Buxton AE, Goldberg S, Hirshfeld JW, Wilson J, Mann T, Williams DO, Oliva P: Refractory Ergonovine induced coronary vasospasm: Importance of intracoronary nitroglycerin. *American College of Cardiology* 46:329, 1980
19. Wilson JR, Reichek N, Hirshfeld JW: Noninvasive assessment of load reduction in patients with asymptomatic aortic regurgitation. *American Journal of Medicine* 68:664, 1980
20. Buxton AE, Goldberg S, Harken A, Hirshfeld JW, Kastor JA: Coronary-artery spasm immediately after myocardial revascularization: Recognition and management. *New England Journal of Medicine* 304:1249, 1981
21. Hirshfeld JW, Untereker WJ, Goldberg S, Diemel NH, Drew T, Lozner E: A new lack of twist for the Judkins left coronary catheter. *Catheterization and Cardiovascular Diagnosis* 7:331, 1981
22. Wilson JR, Goldberg S, Hirshfeld JW, Harken AH: Effects of respiratory alkalosis on coronary vascular dynamics and myocardial energetics in patients with coronary artery disease. *American Heart Journal* 102:202, 1981
23. Wilson JR, Untereker W, Hirshfeld JW, Ferraro N: Effects of Isosorbide Dinitrate and Hydralazine on regional metabolic responses to arm exercise in patients with heart failure. *The American Journal of Cardiology* 48:934, 1981
24. London RL, Ouyang A, Snape WJ Jr., Goldberg S, Hirshfeld JW Jr., Cohen S: Provocation of esophageal pain by ergonovine or edrophonium. *Gastroenterology* 81:10, 1981

25. Reichek N, Wilson J, St. John Sutton M, Plappert T, Goldberg S, Hirshfeld JW: Noninvasive determination of left ventricular end-systolic stress: Validation of the method and initial application. *Circulation* 65:99, 1982
26. Laskey WK, Hirshfeld JW, Untereker WJ, Kusiak V, Martin JL, Groh WC: A safe and rapid technique for retrograde catheterization of the left ventricle in aortic stenosis. *Catheterization and Cardiovascular Diagnosis* 8:429, 1982
27. Laskey WK, Kusiak V, Untereker WJ, Hirshfeld JW: Transseptal left heart catheterization: Utility of a sheath technique. *Catheterization and Cardiovascular Diagnosis* 8:535, 1982
28. Buxton AE, Hirshfeld JW, Untereker WJ, Goldberg S, Harken AH, Stephenson LW, Edie RN: Perioperative coronary artery spasm long-term follow up. *American Journal of Cardiology* 50:444, 1982
29. Wilson JR, Martin JL, Untereker WJ, Hirshfeld JW: Regional coronary anatomy in rest angina. Comparison of patients with rest and exertional angina using quantitative coronary angiography. *Chest* 82:416, 1982
30. Hirshfeld JW, Laskey WK, Martin JL, Groh WC, Untereker W, Wolf GL: Hemodynamic changes induced by cardiac angiography with Ioxaglate: A comparison with Diatrizoate. *Journal of the American College of Cardiology* 2:954, 1983
31. Martin JL, Wilson JR, Burch JW, Untereker WJ, Laskey W, Ferraro N, Hirshfeld JW: Effect of atrial pacing on intracoronary thromboxane production in coronary artery disease. *Journal of the American College of Cardiology* 1:1194, 1983
32. Laskey WK, Reichek N, St. John Sutton M, Untereker W, Hirshfeld JW: Myocardial oxygen consumption in left ventricular hypertrophy and its relation to left ventricular mechanics. *American Journal of Cardiology* 52:852, 1983
33. Laskey WK, St. John Sutton M, Untereker WJ, Martin JL, Hirshfeld JW, Reichek N: Mechanics of pulsus alternans in aortic valve stenosis. *American Journal of Cardiology* 52:809, 1983
34. Wolf GL, Hirshfeld JW Jr.: Changes in QTc interval induced with Renografin-76 and Hypaque 76 during coronary arteriography. *J Am Coll Cardiol* 1:1489, 1983
35. Martin JL, Likoff MJ, Janicki JS, Laskey WK, Hirshfeld JW, Weber KT: Myocardial energetics and clinical response to the cardiotonic agent MDL 17,043 in advanced heart failure. *J Am Coll Cardiol* 4:875, 1984
36. Martin JL, Wilson JR, Ferraro N, Laskey WK, Kleaveland JP, Hirshfeld JW: Acute coronary vasoconstrictive effects of cigarette smoking in coronary heart disease. *American Journal of Cardiology* 54:56, 1984
37. Laskey WK, Reichek N, St. John Sutton M, Untereker WJ, Hirshfeld JW: Matching of myocardial oxygen consumption to mechanical load in human left ventricular hypertrophy and dysfunction. *Journal of the American College of Cardiology* 3:291, 1984

38. St. John Sutton MG, Plappert TA, Hirshfeld JW, Reichek N: Assessment of left ventricular mechanics in patients with asymptomatic aortic regurgitation: A two-dimensional echocardiographic study. *Circulation* 69:259, 1984
39. Laskey WK, St. John Sutton M, Zeevi G, Hirshfeld JW, Reichek N: Left ventricular mechanics in dilated cardiomyopathy. *American Journal of Cardiology* 54:620, 1984
40. Laskey WK, Schroff SG, Kussmaul W, Martin JL, Kleaveland JP, Hirshfeld JW: Arterial pressure/flow relationships in heart failure due to congestive cardiomyopathy. Cardiovascular Systems Dynamics Society. Sixth International Conference Workshop. pp. 324-327, 1984, Philadelphia, PA, University of Pennsylvania
41. Martin JL, Fisher CA, Untereker WJ, Laskey WK, Hirshfeld JW, Harken AH, Addonizio VP: Effect of high dose aspirin on coronary hemodynamics during pacing-induced myocardial ischemia. *J Am Coll Cardiol* 5:210, 1985
42. Laskey WK, Kussmaul WG, Martin JL, Kleaveland JP, Hirshfeld JW, Shroff S: Characteristics of vascular hydraulic load in patients with heart failure. *Circulation* 72:61, 1985
43. Douglas PS, Hirshfeld JW Jr., Edmunds LH Jr.: Clinical correlates of atrial tachyarrhythmias after valve replacement for aortic stenosis. *Circulation* 72:III59, 1985
44. Douglas PS, Hirshfeld JW Jr., Edie RN, Harken AH, Stephenson LW, Edmunds LH Jr.: Clinical comparison of St. Jude and porcine aortic valve prostheses. *Circulation* 72:II35, 1985
45. Laskey WK, Zeevi GR, Sutton MS, Martin JL, Hirshfeld JW Jr., Reichek N: Effects of nitroglycerin in patients with angina, normal coronary arteries, and left ventricular hypertrophy. *Am Heart J* 112:953, 1986
46. Kleaveland JP, Reichek N, McCarthy DM, Chandler T, Priest C, Muhammed A, Makler PT Jr., Hirshfeld JW Jr.: Effects of six-month afterload reduction therapy with hydralazine in chronic aortic regurgitation. *Am J Cardiol* 57:1109, 1986
47. Kussmaul WG, Kleaveland JP, Martin JL, Hirshfeld JW, Laskey WK: Effects of exercise and nitroprusside on left ventricular ejection dynamics in dilated cardiomyopathy. *Am J Cardiol* 59:647, 1987
48. Barnathan ES, Schwartz JS, Taylor L, Laskey WK, Kleaveland JP, Kussmaul WG, Hirshfeld JW: Aspirin and dipyridamole in the prevention of acute coronary thrombosis complicating coronary angioplasty. *Circulation* 76:125, 1987
49. Kussmaul WG, Kleaveland JP, Zeevi GR, Hirshfeld JW: Sources of subjective variability in the assessment of left ventricular regional wall motion from contrast ventriculograms. *Am J Cardiol* 60:153-7, 1987.

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None