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# Donald Patterson, Ph.D.

Principal Scientist | Environmental and Earth Sciences
Atlanta
+1-770-932-3710 | dpatterson@exponent.com


## Professional Profile

Dr. Patterson's technical expertise includes analytical chemistry, data quality, human biomonitoring, and chemical exposure assessment. He is world renowned for his research in the detection and quantification of persistent and non-persistent organic pollutants and their assessment in the human body.

Dr. Patterson was a member of the Senior Biomedical Research Service in the Organic Analytical Toxicology Branch, National Center for Environmental Health at the Centers for Disease Control and Prevention (CDC).

Dr. Patterson specializes in human exposure assessment and internal dose measurements of environmental pollutants using state-of-the-art analytical techniques. Prior to joining Exponent, Dr. Patterson led a group of research scientists for 29 years at CDC, developing state-of-the-art analytical methods for measuring environmental chemicals and their metabolites in human tissues. These methods were then applied in large-scale epidemiologic studies such as the U.S. Air Force operation Ranch Hand Vietnam Veteran Agent Orange Study; Seveso, Italy, dioxin exposure study; NIOSH worker dioxin exposure study; and the biannual National Health and Nutrition Examination Survey (NHANES) studies that were designed to establish U.S. population reference ranges for many environmental chemicals.

Dr. Patterson serves as an expert witness in cases involving potential human exposure to environmental chemicals. He has expertise in environmental and biological forensics; environmental chemistry; and human body burdens of dioxins and furans, PCBs, pesticides, brominated flame-retarding chemicals, and other persistent organic pollutants (POPs), as well as PAHs and new and emerging environmental contaminants.

Dr. Patterson is the author or co-author of 399 papers and 18 book chapters in the area of human exposure to environmental chemicals. He has done numerous scientific presentations and keynote and plenary lectures, and he serves on numerous scientific boards. In addition to his Ph.D. in Organic Chemistry, Dr. Patterson was awarded an honorary Ph.D. ("honoris causa") for his body of work in the field of environmental chemistry by Stockholm University in Stockholm, Sweden. He is also an Adjunct Professor of Environmental Forensics at Penn State University.

## Academic Credentials & Professional Honors

Ph.D., Chemistry, Organic Chemistry, Arizona State University, 1975

B.A., Chemistry/Biochemistry, University of Northern Colorado, 1974

Received the inaugural lifetime achievement award in Comprehensive Two Dimensional Gas Chromatography (GCxGC) at the 35th International Symposium on Capillary Chromatography, San Diego, CA, May 2011

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U.S. Secretary of Health and Human Services Award for Distinguished Service for the World Trade Center and Anthrax Investigation Emergency Response Team, Presented June 12, 2002

Recipient of the 2001 Harvey W. Wiley Award for "Significant Contributions to Analytical Science Through your Work in Developing State-of-the-Art Methods for Determining Ultra-race Concentrations of Toxic Environmental Contaminants," 2001

U.S. Department of Health and Human Services Secretary's Award for Distinguished Service to the National Center for Environmental Health/ Environmental Health Laboratory Team: "For Outstanding Service in Developing and Applying State-of- the-Art Biomonitoring to an Environmental Emergency Affecting More than 15,000 People Where Methyl Parathion Was Illicitly Sprayed," 1999

CDC's National Center for Environmental Health Directors Award for Scientific Leadership "For Outstanding Accomplishments in Cultivation of a Cohesive, Highly Diverse Work Group for Achieving Scientific Excellence in Innovation, Method Development, and Analysis of Environmental Toxicants," 1999

U.S. Secretary of Health and Human Services Distinguished Services Team Award for "Outstanding Scientific and Technical Response to a Life Threatening Public Health Emergency in Haiti," presented May 1998

Appointed to the Senior Biomedical Research Service at the Centers for Disease Control and Prevention "For Outstanding Scientific Contributions in Public Health," presented February 2, 1998.

Honorary Doctorate of Philosophy (honoris causa) in Environmental Chemistry, presented by the Faculty of Chemistry September 26, 1997, at Stockholm University, Stockholm, Sweden. This is the first honorary doctorate in environmental chemistry in Sweden.

CDC and ATSDR Honor Award Research — Epidemiology and Laboratory "For Outstanding Scientific and Technical Response to an Epidemic of Acute Renal Failure from Diethylene Glycol Poisoning in Haiti," presented June 4, 1997

CDC and ATSDR Group Honor Award Statistical Research and Services "For Outstanding Service in Developing and Applying State-Of-The-Art Laboratory Methodology to Define the Health Status of the U.S. Population during NHANES III," presented June 4, 1997

Recipient of the Division of Environmental Health Laboratory Sciences Award for the Research Paper of the Year (Co-author 1992). "A Method for Determination of Volatile Organic Compounds in Human Blood from a Large Sample Population Using Purge and Trap Gas Chromatography/Mass Spectrometry."

Recipient of the Division of Environmental Health Laboratory Sciences Award for the Research Paper of the Year (Co-author 1989). "Estimates of the Half-Life of 2,3,7,8-TCDD in Ranch Hand Veterans."

Recipient of the U.S. Public Health Services Superior Service Award for "Outstanding Scientific Research, Which Substantially Contributed to a National Public Health Policy for Dioxin Exposure" (1988).

U.S. Secretary of Health and Human Services Special Recognition Award to CDC/NCEH Dioxin Serum/Adipose Study Group (1987). "In Recognition of a Significant Public Health Accomplishment and an Extraordinary Group Effort in the Development of a Viable Method for Measuring 2,3,7,8-Tetrachlorodibenzo-p-dioxin in Human Serum as an Alternative to Human Adipose."

## Prior Experience

Business Development Manager, Axys Analytical Services, Sidney, BC, Canada, 2008-present

Senior Consulting Expert, Trium Environmental Solutions Inc., Calgary, AB, 2008-2010

Appointed to Senior Biomedical Research Service, Organic Analytical Toxicology Branch, Division of Laboratory Sciences (DLS), National Center for Environmental Health (NCEH), Centers for Disease Control and Prevention, 1996-2008

Chief, Dioxin and Related Persistent Organic Pollutant (POPs) Compounds Laboratory, GM-14 to GM-15 Laboratory for Synthesis and Analysis of Ultra Toxic Compounds, Toxicology Branch, Division of Environmental Health and Laboratory Sciences (EHLS), National Center for Environmental Health (NCEH), Centers for Disease, Control and Prevention (CDC), 1983-1996

Research Chemist, Mass Spectroscopy Laboratory, Toxicology Branch, Division of Environmental Health Laboratory Sciences, Center for Environmental Health, Centers for Disease Control, 1979-1983

Post Doctorate, Laboratory of Professor C. Djerassi, Stanford University, 1975-1983

Teaching Associate, Arizona State University, 1971-1975

## Professional Affiliations

The International Society for Polycyclic Aromatic Compounds, ISPAC (Member of Advisory Board)

The International Society of Exposure Science, 2010-present

Royal Society of Chemistry, 2010-present

## Publications

Megson D, Kalin R, Worsfold PJ, Gauchotte-Lindsay C, Patterson DG Jr, Lohan MC, Comber S, O'Sullivan G. Fingerprinting PCBs in environmental samples using comprehensive two-dimensional gas chromatography with time-of-flight mass spectrometry. Journal of Chromatography A 2013, in press. doi.org/10.1016/j.chroma.2013.10.1016

Pavuk M, Patterson DG Jr, Turner WE. Levels of TCDD and other dioxin-like compounds in US Air Force veterans of Operation Ranch Hand. Accepted for publication in Chemoshere October 2013.

Schantz MM, Gauthier E, Focant J-F, Hamilton C, Heckert NA, Heltsley RM, Hoover D, Keller JM, Leigh SD, Patterson DG Jr, Pintar AL, Sharpless KE, Sjodin A, Turner WE, Vander Pol SS, Wise SA. Milk and serum standard reference materials for monitoring organic contaminants in human samples. Analytical and Bioanalytical Chemistry 2013; 405:1203−1211.

Megson D, O'Sullivan G, Comber S, Worsfold PJ, Lohan MC, Edwards MR, Shields WJ, Sandau CD, Patterson DG Jr. Elucidating the structural properties that influence the persistence of PCBs in humans using the National Health and Nutrition Examination Survey (NHANES) dataset. Science of the Total Environment 2013; (461-462):99-107.

Warner M, Mocarelli P, Brambilla P, Wesselink A, Patterson DG Jr, Turner WE and Eskenazi B. Serum TCDD and TEQ concentrations among Seveso women, 20 years after the explosion. Journal of Exposure Science and Environmental Epidemiology; advance online publication, 23 October 2013; doi:10.1038/jes.2013.70.

Mahalingaiah S, Hauser R, Patterson DG Jr, Woudneh M, Racowsky C. Bisphenol A is not detectable in media or selected contact materials used in IVF. Reproductive Biomedicine Online 2012; 25:608−611.

Humblet O., Korrick SA, Williams PL, Sergeyev O, Emond C., Birnbaum L.S., Burns JS, Altshul L, Patterson DG Jr., Turner WE, Lee MM, Revich B, and Hauser R. Genetic modification of the association between peripubertal dioxin exposure and pubertal onset in a cohort of Russian boys. Environmental Health Perspectives 2013; 121:111−117.

Burns JS, Williams PL, Sergeyev O, Korrick SA, Lee MM, Revich B, Altshul L, Del Prato JT, Humblet O, Patterson DG Jr., Turner WE, Starovoytov M, Hauser R. Serum concentrations of organochlorine pesticides and growth among Russian boys. Environmental Health Perspectives 2012; 120:303-308.

Patterson DG Jr., Welch SM, Turner WE, Sjödin A, Focant J-F. Cryogenic zone compression for the measurement of dioxins in human serum by isotope dilution at the attogram level using modulated gas chromatography coupled to high resolution magnetic sector mass spectrometry. Journal of Chromatography A 2011; 1218:3274-3281.

Needham LL, Grandjean P, Heinzow B, Jorgensen PJ, Nielsen F, Patterson DG Jr., Sjodin A, Turner WE, Weihe P. Partition of environmental chemicals between maternal and fetal blood and tissues. ES&T 2011; 45:1121-1126.

Humblet O, Williams PL, Korrick SA, Sergeyev O, Emond C, Birnbaum LS, Burns JS, Altshul L, Patterson DG Jr., Turner WE, Lee MM, Revich B, Hauser R. Dioxin and polychlorinated biphenyl concentrations in mother's serum and the timing of pubertal onset in sons. Epidemiology 2011; 22:827-835.

Paolo M, Gerthoux PM, Needham LL, Patterson DG Jr., Limonta G, Falbo R, Signorini S, Bertona M, Crespi C, Sarto C, Scott PK, Turner WE, Brambilla P. Perinatal exposure to low doses of dioxin can permanently impair human semen quality. Environmental Health Perspectives 2011; 119:713-718.

Burns JS, Williams PL, Sergeyev O, Korrick S, Lee MM, Reich B, Altshul L, Del Brato JT, Humblet O, Patterson DG Jr., Turner WE, Needham LL, Starooytov M, Hauser R. Associations of serum dioxins and PCBs with growth among Russian boys. Pediactrics 2011; 127:e59-e68.

Korrick SA, Lee MM, Williams PL, Sergeyev O, Burns JS, Patterson DG Jr., Turner WE, Needham LL, Altshul L, Revich B, Hauser R. Dioxin exposure and age of pubertal onset among Russian boys. Environmental Health Perspectives 2011; 119:1339-1344.

Qixuan C, Garabrant DH, Hedgeman E, Little RJA, Elliott MR, Gillespie B, Hong B Lee, James S-Y, Lepkowski M, Franzblau A, Adriaens P, Demond AH, Patterson DG, Jr. Estimation of background serum 2,3,7,8-TCDD concentrations by using quantile regression in the UMDES and NHANES populations. Epidemiology 2010; 21(4):S51-S57.

Humblet O, Williams PL, Korrick SA, Sergeyev O, Emond C, Birnbaum LS, Burns JS, Altshul L, Patterson DG Jr., Turner WE, Lee MM, Revich B, Hauser R. Predictors of serum dioxin, furan, and PCB concentrations among women from Chapaevsk, Russia. Environ Sci Technol 2010; 44:5633-5640.

Burns JS, Williams PL, Sergeyev O, Korrick S, Lee MM, Revich B, Altshul L, Patterson DG, Turner WE, Needham LL, Saharov I, Hauser R Predictors of serum dioxins and PCBs among peripubertal Russian boys, Environ Health Perspect 2009; 117(10):1593-1599.

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lactation? Chemical concentrations during lactation and milk/serum partitioning. Environ Health Perspect 2009; 117(10):1625-1631.

Li Z, Romanoff LC, Lewin MD, Porter EN, Trinidad DA, Needham LL, Patterson DG, Sjodin A. Variability of urinary concentrations of polycyclic aromatic hydrocarbon metabolite in general population and comparison of spot, first-morning, and 24-h void sampling. J Exposure Sci Environ Epidemiol 2010; 20:526-535.

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Baccarelli A, Giacomini SM, Corbetta C, Landi MT, Bonzini M, Consonni D, Grillo P, Patterson DG Jr, Pesatori AC, Bertazzi PA. Neonatal thyroid function in Seveso 25 years after maternal exposure to dioxin. PLoS Medicine 2008; 5(7):1133-1142.

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RY, Needham LL, Lorber MN, Sjodin A. Lifestyle and polybrominated diphenyl ethers in human milk in the United States: A pilot study. Toxicol Environ Chem 2008; 90(6):1047-1054.

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Ragin AD, Crawford KE, Etheredge AA, Grainger J, Patterson DG. A gas chromatography-isotope dilution high-resolution mass spectrometry method for quantification of isomeric benzo[a]pyrene diol epoxide hemoglobin adducts in humans. J Anal Toxicol 2008; 39(9):728-736.

Schantz MM, Keller JM, Kucklick JR, Patterson DG Jr, Sharpless KE, Sjodin A, Turner WE, Vander Pol SS, Wise SA. SRMS for monitoring human exposure to organic contaminants, Organohalogen Compd 2008; 70:1874-1877.

Sjodin A, Papke O, McGahee E, Focant JF, Jones RS, Pless-Mulloli T, Leontjew Toms LM, Herrmann T, Muller J, Needham LL, Patterson DG. Concentration of polybrominated diphenyl ethers (PBDEs) in household dust from various countries, Chemosphere 2008; 73(1):S131-S136.

Sjodin A, Wong L-Y, Jones RS, Park A, Zhang Y, Hodge C, DiPietro E, McClure C, Turner W, Needham L, Patterson DG. Serum concentrations of polybrominated diphenyl ethers (PBDEs) and polybrominated biphenyl (PBB) in the United States population: 2003-2004. Environ Sci Technol 2008; 42(4):1377-1384.

Stapleton HM, Sjodin A, Jones RS, Niehnser S, Zhang Y, Patterson DG. Serum levels of polybrominated diphenyl ethers (PBDEs) in foam recyclers and carpet installers working in the United States. Environ Sci Technol 2008; 42(9):3453-3458.

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levels in the blood of pregnant women living in an agricultural community in California. Environ Health Perspect 2007; 115(1):71-74.

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Caudill SP, Turner WE, Patterson DG Jr. Geometric mean estimation from pooled samples. Chemosphere 2007; 69(3):371-380.

Chen Q, Hedgeman E, Little RJA, Elliott MR, Gillespie BW, Lee, S-Y, Hong B, Chang C-W Olson K, Knutson K, Zwica L, Adriaens P, Demond A, Lepkowski J, Franzblau A, Patterson D, Garabrant D. Serum 2,3,7,8-TCDD concentration in a Michigan, USA population with no unusual sources of exposure. Organohalogen Compd 2007; 67:210-213.

Eskenazi B, Warner M, Samuels S, Young J, Gerthoux PM, Needham L, Patterson D, Olive D, Gavoni N, Vercellini P, Mocarelli P. Serum dioxin concentrations and risk of uterine leiomyoma in the Seveso Women's Health Study. Am J Epidemiol 2007; 166(1):79-87.

Focant J-F, Cash TP, Turner WE, Shirkan H, Sadeghi K, Patterson DG Jr. Investigation on the capabilities of a new parallel pressurized liquid extraction (PLE) system for dioxins and PCBs in biological samples. Organohalogen Compd 2007; 69:481-484.

Herbstman JB, Sjodin A, Apelberg BJ, Witter FR, Patterson DG Jr, Halden RU, Jones RS, Park A, Zhang Y, Heidler J, Needham LL, Goldman LR. Determinants of prenatal exposure to polychlorinated biphenyls (PCBs) and polybrominated diphenyl ethers (PBDEs) in an urban population. Environ Health Perspect 2007; 115(12):1794-1800.

Patterson DG, Lorber MN, Turner WE, Needham LL. A comparison of the PCDD/PCDF TEQ for the us population in 2001-2002 and a pharmacokinetic model for estimating exposure. Organohalogen Compd 2007; 69:2054-2057.

Patterson DG, Pavuk M, Turner WE, Robinson JN, Needham LL. PCDDs, PCDFs, and PCBs in the participants of the air force health study in 2002. Organohalogen Compd 2007; 69:782-784.

Pavuk M, Turner WE, Patterson DG, Lee R, Sjodin A, DiPietro E, Needham LL, Olson J, Lane JB, Biasini FJ, Percy AK. Polychlorinated biphenyls (PCBs) in serum of children living in the vicinity of the former PCB production facility in Anniston, Alabama. Organohalogen Compd 2007; 69:758-761.

Pavuk M Patterson DG, Turner WE, Needham LL, Ketchum NS. Polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), and dioxin-like polychlorinated biphenyls (PCBs) in the serum of US Air Force veterans in 2002. Chemosphere 2007; 68(1):62-68.

Schantz MM, Keller JM, Leigh S, Patterson DG, Sharpless KE, Sjodin A, Stapleton HM, Swarthout S, Turner WE, Wise SA. Certification of SRM 1589a PCBs, pesticides, PBDEs, and dioxins/furans in human serum. Anal Bioanal Chem 2007; 389(4):1201-1208.

Sjodin A, Wong L-Y, Jones RS, Park A, Zhang Y, Hodge C, DiPietro EMcClure C, Turner W, Needham LL, Patterson DG. Concentrations of polybrominated diphenyl ethers (PBDEs) and polybrominated biphenyl (PBB) in the civilian, non-institutionalized population of the United States: 2003-2004. Organohalogen Compd 2007; 69:766-769.

Tsuchiya M, Tsukino H, Iwasaki M, Sasaki H, Tanaka T, Katoh T, Patterson DG, Turner W, Needham L, Tsugane S. Interaction between cytochrome P450 gene polymorphisms and serum organochlorine TEQ levels in the risk of endometriosis. Mol Hum Reprod 2007; 13(6):399-404.

Warner M, Eskenazi B, Olive DL, Samuels S, Quick-Miles S, Vercellini P, Gerthoux PM, Needham L,

Patterson DG Jr, Mocarelli P. Serum dioxin concentrations and quality of ovarian function in women of Seveso. Environ Health Perspect 2007; 115(3):336-340.

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Baccarelli AN, Hirt C, Pesatori AC, Consonni D, Patterson DG Jr, Bertazzi PA, Dolken G, Landi MT. t(14;18) translocations in lymphocytes of healthy dioxin-exposed individuals from Seveso, Italy. Carcinogenesis 2006; 27(10):2001-2007.

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Patterson DG Jr, Isaacs SG, Alexander LR, Turner WE, Hampton L, Bernert JT, Needham LL. Determination of specific polychlorinated dibenzo-p-dioxins and dibenzofurans in blood and adipose tissue by isotope-dilution high resolution mass spectrometry. Method 6, pp. 229-342. In: Environmental Carcinogens—Methods of Analysis and Exposure Measurement, Volume 11, Polychlorinated Dibenzo-p-dioxins, Dibenzofurans, and Biphenyls. Rappe C, Buser HR (eds), WHO, International Association for Research on Cancer, Lyon, France, 1991.

Turner WE, Isaacs SG, Patterson DG Jr, Needham LL. Semiautomated Smith, Stalling, and Johnson enrichment method for biological samples: Human serum and adipose tissue. Method 7, pp. 343-355. In

Environmental Carcinogens - Methods of Analysis and Exposure Measurement, Volume 11- Polychlorinated Dibenzo-p-dioxins, Dibenzofurans, and Biphenyls. Rappe C, Buser HR (eds), WHO, International Association for Research on Cancer, Lyon, France, 1991.

Needham LL, Ashley DL, Hill RH, Turner WE, Patterson DG Jr, Holler JS, Pirkle JL. A program for assessing background levels of 52 organic toxicants in the U.S. population. The 5th International Conference on Indoor Air Quality and Climate, Toronto, Canada, July 29-August 3, 1990.

Patterson DG Jr, Andrews JS Jr, Needham LL. Polychlorinated dibenzo-p-dioxins (dioxin). Chapter 26D, pp. 528-537. In: Clinical Management of Poisoning and Drug Overdose, Second Edition. Haddad LM, Winchester JT (eds), W.B. Saunders Co., Philadelphia, PA, 1990.

Barnhart ER, Patterson DG Jr, MacBride JAH, Alexander LR, Alley CA, Turner WE. Polychlorinated biphenylene production for qualitative reference material. Chapter 33, pp. 501-510. In: Chlorinated Dioxins and Dibenzofurans in Perspective. Choudhary G, Kieth LH, Rappe C (eds), John Lewis Publishers, 1986.

Gelbaum LT, Patterson DG Jr, Groce DF. Preparation of dioxin standards for chemical analysis. Chapter 31, pp. 479-483. In: Chlorinated Dioxins and Dibenzofurans in Perspective. Choudhary G, Kieth LH, Rappe C (eds), John Lewis Publishers, 1986.

Patterson DG Jr. Synthesis of 3,4,-13C2-17a-d1-testosterone and 17a-d1-testosterone; Synthesis of 16,16,17-d3-estradiol. Procedures for the Synthesis of Isotopically Labeled Intermediates, an adjunct publication to the proceedings of the International Symposium on the Synthesis and Application of Isotopically Labeled Compounds, Kansas City, MO, June 6-11, 1982.

**Invited Presentations**

Plenary Speaker for the International Environmental Forensics Conference 2008, Quindao, China, May 27-30, 2008.

Two Keynote addresses for EnviroAnalysis 2008, Toronto, Canada, June 2008.

Plenary Speaker for the 21st International Symposium for Polycyclic Aromatic Compounds, Trondheim, Norway, August 5-10, 2007.

Plenary Speaker for the Enviro Analysis-2007, Wellington, NZ, February 7-9, 2007.

Invited Speaker at the 2006 Harvery W. Wiley Award Symposium of the International Association of Official Analytical Chemists (AOAC), Session entitled: "Human Biomonitoring: Reference Materials Are Essential," Minneapolis, MN, September 17-21, 2006.

Opening Plenary speaker at the 10th International Symposium on Biological and Environmental Reference Materials (BERM-10), "Reference Materials used in National Exposure Measurements for Decisions to Protect Public Health from Environmental Exposure," Charleston, SC, April 30- May 4, 2006.

Session Organizer and Chair for the invited session, "Discovery Through GCXGC Separations" at Pittcon-2006, Orlando, FL, March 12-17, 2006.

Invited Speaker at the International Environmental Specimen Bank Symposium (IESB). "The Application of Environmental Specimen Banking Projects to Assessing Human Exposure to Dioxins, PCBs, Persistent Pesticides, and Polybrominated Flame retardant Chemicals," Charleston, SC, 2006.

Invited to be the Opening Plenary Speaker for the joint meeting of the 25th International Symposium of Halogenated Environmental Organic Pollutants and POPs and the International Society for Polycyclic Aromatic Compounds in Toronto, Canada, August 21-26, 2005. Presentation entitled: "Analytical

Measurement Advances over 25 Years: POPs and PAHs." In addition, chairing and organizing two Special Sessions.

Session Chair and invited presentation at the 2nd International Symposium on comprehensive Multidimensional Gas Chromatography, Atlanta, GA, August 31-September 3, 2004.

Session Chair,"Human Exposure-Health Effects and Characteristic congener Profiles" at the 3rd PCB Workshop, Champaign/Urbrana IL, June 12-15, 2004.

The 24th International Symposium on Halogenated Environmental Organic Pollutants and POPs, Berlin, Germany August 2004: Invited Lunch-n-Learn Speaker: "Centers for Disease Control and Prevention, Division of Laboratory Sciences Internet Databases and Information Available," Session Chair and two presentations and 10 co-authored presentations.

Invited Roundtable Speaker "New Venues for Industrial Hygienists: Using Biological Monitoring to Uncover the Health Effects of Environmental Toxicants," at the American Industrial Hygiene Conference, Atlanta, GA, May 8-13, 2004.

Invited Colloquium Speaker at the Chemical Science and Technology Laboratory at the National Institute of Standards and Technology (NIST) for Presentations entitled: "Assessment of Human Exposure to Environmental Chemicals: Biomonitoring," and "History and Current Status of Fast and Sensitive Analytical Methods for Measuring Compounds of Environmental Concern at the CDC," Gaithersburg, MD February 11, 2004.

Invited Participant at the U.S. EPA Brominated Flame Retardants Science Meeting, September 10, 2002, Research Triangle Park NC. Presentation entitled "Human Levels of Brominated Flame Retardants: CDC's Program and Future Directions."

Invited to summarize all of the Analytical methods Papers in a presentation in the Highlights Session at Dioxin- 2002, Barcelona, Spain, August 17, 2002.

Analytical Session Chairman and Keynote presenter at Dioxin-2002, Barcelona, Spain, August 12, 2002.

Plenary Speaker at the Southeast Section of Association of Official Analytical Chemists International Meeting in Atlanta, Georgia, April 2002.

Invited Presentation before the Food and Nutrition Board and the committee on the Implications of Dioxin in the Food Supply entitled "Assays for Dioxin in Human Tissues and an update on Dioxin Assays in NHANES Survey Participants," Presented at The National academies of Sciences, Washington, DC, February 19, 2002.

Symposium Organizer and Presenter at the American Society for Mass Spectrometry (ASMS) Meeting Symposium entitled "Strategies for Analysis of Complex Mixtures," presentation entitled "Comprehensive Two-Dimensional GC-TOF MS for Enhanced Analysis of Environmentally Significant Mixtures," Long Beach, CA, June 11-16, 2000.

Plenary Speaker on "Comprehensive Three-Dimensional GCxGC/TOF MS of Endocrine Disruptors" at the 23rd International Symposium on Capillary Chromatography, Riva del Garda, Italy, June 5-10, 2000.

Keynote Address at Enviroanalysis-2000 in GC/MS Session, presentation entitled: "New Advances in High Throughput GC/MS," Ottawa, Canada, May 10, 2000.

Plenary Speaker at Enviroanalysis-2000, presentation entitled: "Comprehensive Multidimensional Analytical Techniques for Complex Mixture Analysis," Ottawa, Canada, May 8, 2000.

Invited Speaker at Pittcon-2000 in Session on "Endocrine Disrupting Compounds," New Orleans, LA,

March 12-16, 2000. Presentation entitled "High Throughput GC/MS for Characterization of Endocrine Disruptors".

Analytical Sessions Chairman and Presenter for Dioxin-99, Venice, Italy, August 1999.

Symposium Organizer and Invited Speaker for Pittcon-99," High Speed Characterization of Environmental Toxicants," Orlando, FL, March 7-12, 1999.

Invited Speaker at the U.S. Department of Agriculture in Fargo, ND on the topic "New Developments in Human Biomonitoring" in December, 1998.

Invited Speaker at the American Chemical Society National Meeting in Boston, MA, August 24-28, 1998.

Chairman of the Analytical Sessions for Dioxin-98 in Stockholm, Sweden, August 17-21, 1998.

International Advisory Committee Member and Symposium Organizer and Presenter for Enviroanalysis-'98, Carleton University, Ottawa, Canada, May 11-14, 1998.

Symposium Organizer and Speaker for Pittcon-98 entitled "Fast GC/MS: A New Era of High Speed Analysis for Environmental Toxicants," New Orleans, March 1-5, 1998.

Invited Symposium Speaker at the American Society for Mass Spectrometry entitled: "The Impact of New Analytical Capabilities on Assessment of Human Exposure to Environmental Toxicants," Palm Springs, CA, June 1-5, 1997.

Invited Symposium Speaker at the Wintergreen Conference on Capillary Techniques entitled: "Use of High Speed Gas Chromatography/High Resolution Mass Spectrometry for Assessing Human Exposure to Environmental Endocrine-disrupting Chemicals," Wintergreen, VA, May 19-22 1997.

Keynote Speaker at the 1997 Environmental Analytical Chemistry Symposium and consultant to the Taiwan EPA, Taipei, Taiwan, May 11-17,1997.

Plenary Speaker and Symposium Speaker at the Canadian Spectroscopy Society Spring Meeting, Ontario, Canada, May 2,1997.

Spectroscopy Society of Pittsburgh Invited Speaker, "Analytical Advances in Biological monitoring: Endocrine-Disrupting and Other Environmental Toxins," Duquesne University, Pittsburgh, Pennsylvania, April 16, 1997.

Recipient of the 1997 Varian Lecture Endowed at Carleton University entitled " The Application of New Analytical Techniques to Human Biomonitoring and Environmental Analysis," Ottawa, Canada, April 14, 1997.

Invited Speaker at the 20th Anniversary of the Seveso, Italy TCDD Incident entitled "Evolution of Analytical Methods to Measure 2,3,7,8-TCDD," Milan, Italy, October 1996.

Keynote Address at the International Symposium on Biological Monitoring in Occupational and Environmental Health entitled "Analytical Advances in Biological Monitoring," Helsinki, Finland, September 11-13, 1996.

Dioxin ‘96 Symposium Organizer and Speaker "New Fast and Ultra-Sensitive Analytical Methods for Monitoring Human Exposure to Endocrine-Disrupting Chemicals," The Netherlands, August, 1996.

American Chemical Society Symposium Invited Speaker: "Dioxins in the Environment." NORM '96; 51st Northwest ACS Regional Meeting, Corvallis, Oregon, June 19-22, 1996.

Keynote Address at the International Conference on Chemical Measurement and Monitoring of the environment entitled "Mass Spectrometry in Environmental Health Risk Factor Evaluation: Dioxin and Other Hazardous Chemicals," Ottawa, Canada, May 13-16, 1996.

International Advisory Committee Member, Plenary and Keynote Lectures at TOCOEN ‘96 (Toxic Organic Compounds in the Environment), Brno, Czech Republic, April 28 - May 3, 1996.

Spectroscopy Society of Pittsburgh, "Mass Spectrometry in the Bio-Organic and Health Related Fields." Invited Speaker, Pittsburgh, PA, April 13, 1996.

Scientific Committee Member and Symposium Organizer and Speaker for Electrophoresis ‘96 Meeting in Atlanta, GA, March 24-27, 1996.

American Society for Mass Spectrometry invited symposium speaker (Organohalogens Revisited: New Issues and New Analytical Methods), Presentation entitled "Ultrasensitive and Very Fast Analysis of Halogenated Toxicants," Atlanta, Georgia, May 25, 1995.

Joint Meeting Midwest Mass Spectrometry and St. Louis Chromatography Discussion Groups invited speaker. Presentation entitled "Use of Comprehensive Two-Dimensional Gas Chromatography/High-Resolution Mass Spectrometry and Capillary Electrophoresis for the Rapid, Ultrasensitive Detection of Environmental Toxicants," Calgon Vestal Labs, St. Louis, MO, March 21, 1995.

Pittsburgh Conference invited symposium speaker. Presentation entitled "The Use of Comprehensive Two-Dimensional Gas Chromatography/High-Resolution Mass Spectrometry for the Rapid, Ultra-Sensitive Detection of Environmental Toxicants," New Orleans, LA, March 6-10, 1995.

Keynote Address at Dioxin-94 (13th International Conference on Organohalogen Compounds) in Kyoto, Japan) Presentation entitled "Multidimensional and Hyphenated Analytical Techniques: A New Era of Speed, Sensitivity, and Specificity." November 20-25, 1994.

24th International Conference on Environmental and Analytical Chemistry invited speaker. Presentation entitled "New Analytical Methods for Measuring PCDDs, PCDFs, and cPCBs in Biological Samples," Ottawa, Ontario, Canada, May 16-20, 1994.

American Chemical Society Western Carolina Section invited speaker. Presentation entitled "The Centers for Disease Control and Prevention Programs in Human Biomonitoring to Improve Public Health, Western Carolina University, Cullowhee, North Carolina, April 14, 1994.

American Association of Osteopathic Specialists invited speaker. Presentation entitled "Human Exposure Assessment for Dioxin, Buckhead, Georgia, January 7, 1994.

Environmental Studies Forum: Human and Natural Ecology Program invited speaker. Presentation entitled "Concentrations of PCDDs, PCDFs, and cPCBs [Dioxins] in Humans and Factors That Influence These Levels," Emory University, Atlanta, Georgia, December 2, 1993.

Dioxin-93, invited Symposium speaker Presentation entitled "New Analytical Methods and a Summary of Future CDC Collaborative Studies," Vienna, Austria, September 23, 1993.

Plenary Lecture at Dioxin-93 (12th International Conference on Organohalogen Compounds) in Vienna, Austria entitled "Concentrations of PCDDS, PCDFS, and cPCBs in Humans and Factors that Influence These Levels," September 22, 1993.

Plenary Lecture at Dioxin-92 (12th International Conference on Organohalogen Compounds) in Helsinki, Finland entitled "New Methods and New Challenges for Monitoring Human Exposure to Environmental Toxicants," August 24, 1992.

Federation of Analytical Chemistry and Spectroscopy Societies invited symposium speaker, Presentation entitled "Determination of Environmental Toxicants by Using Cyclodextrin-Modified Micellar Electrokinetic Chromatography (CD/MEKC)," Anaheim, CA, October 6-11, 1991.

Dioxin 91 (11th International Conference on Organohalogen Compounds), Two invited symposium presentations entitled "Coplanar PCB Levels in Humans," and "The Use of Cyclodextrin ¬Modified/Micellar Electrokinetic Chromatography for the Separation of Polychlorinated Dibenzo-p-¬dioxins, Dibenzofurans, and Related Environmental Toxicants," Research Triangle Park, NC, September 22-27, 1991.

Keynote Address at Dioxin-90 (10th International Conference on Organohalogen Compounds) in Bayreuth, Germany entitled "Major Challenges in Setting-up a Dioxin Laboratory," September 11, 1990.

Chairman for setting up all of the Analytical Sessions for Dioxin-90 in Bayreuth, Germany, September 10 14, 1990.

New York State Department of Health, Invited Presentation in the Wadsworth Seminar Series entitled "Polychlorinated Dibenzo-p-dioxin and Dibenzofurans in Humans," Albany, New York, December 12, 1989.

Fourth National Environmental Health Conference, Invited Presentation Entitled "Summary of the Agent Orange Validation Study," San Antonio, Texas, June 20-23, 1989.

Association of State and Territorial Public Health Laboratory Directors 32nd Annual Planning Conference. Invited Presentation entitled "Determination of Volatile Organic Compounds (VOCS) in Human Whole Blood," Vail, Colorado, April 5, 1989.

**Presentations**

Grainger J, Dimandja J-MD, Smith CJ, Walcott CJ, Clouden G, Huang W, Patterson DG Jr. Analysis of biomarkers of human exposure to polycyclic aromatic hydrocarbons using emerging chromatographic separation techniques. Presented at the 18th International Society of Polycyclic Aromatic Compounds, Cincinnati, OH, September 9-14, 2001.

Patterson DG Jr, Dimandja J-MD, Smith CJ, Barr JR, Turner WE, March GJ. New advances in high throughput GC/MS. Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Pittsburgh, PA, 2001.

Patterson DG Jr, Dimandja JM, March GJ. GCxGC: Biological applications. Presented at PITTCON-2001, New Orleans, LA, 2001.

Dimandja J-MD, Grainger J, Patterson DG Jr. 2D or not 2D. That is the question. Presented at PITTCON-2001, New Orleans, LA, March 2001.

Colon I, Clouden GC, Grainger J, Patterson DG Jr, Dimandja J-MD. Development of a SPME fast GC/Isotope dilution MS method for high throughput analysis of phthalate esters in human serum. Presented at PITTCON-2001, New Orleans, LA, March 2001.

Grainger J, Smith CJ, Dimandja J-MD, Walcott C, Huang W, Clouden GC, Patterson DG Jr. Analysis of biomarkers of human exposure to polyaromatic hydrocarbons using standard and emerging technologies. Presented at PITTCON-2001, New Orleans, LA, March 2001.

Focant J-F, DePauw E, Grainger J, Patterson DG Jr, Dimandja J-MD. Presented at PITTCON-2001, New Orleans, LA, March 2001.

Sandau CD, Patterson DG Jr. High-resolution electron impact mass spectrometry of halogenated

phenolic compounds (including hydroxylated metabolites of PCBs) and their determination in, plasma. Presented at Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, March 2001.

Falk C, Hanrahan L, Anderson HA, Kanarek MS, Needham LL, Patterson DG Jr, Great Lakes Consortium. Dioxin, furans, and PCB serum levels among infrequent and frequent consumers of Great Lakes sport fish. Presented at American Public Health Association Meeting, Boston, MA, November 2000.

Falk C, Hanrahan L, Anderson H, Kavarek M, Needham L, Patterson DG Jr. Dioxin, furans and PCB serum levels among infrequent and frequent consumers of Great Lakes sport fish. Presented at ISEE Meeting, Buffalo, NY, September 2000.

Schantz M, Sharpless K, Sniegoski L, Wise S, Patterson DG Jr, Turner WE. Certification of SRM 1589a, PCBs, pesticides, and dioxins/furans in human serum. Presented at Biological and Environmental Reference Material Meeting, Bethesda, MD, September 2000.

Falk C, Hanrahan L, Anderson HA, Kanarek MS, Needham LL, Patterson DG Jr, Great Lakes Consortium. Dioxin, furans, and PCB serum levels among infrequent and frequent consumers of Great Lakes Sport Fish. Presented at the International Society of Exposure Assessment Meeting, Buffalo, NY, August 2000.

Patterson DG Jr, Dimandja J-MD, Grainger J. New fast analysis for PCDDs, PCDFs, cPCBs, PCB congeners and pesticides from a single human serum sample, Dioxin 2000. 20th Symposium on Halogenated Environmental Organic Pollutants and POPs, Monterey, CA, August 2000.

Smith CJ, Huang W, Walcott C, Grainger J, Patterson DG Jr. Assessment of human exposure to PAH using GC with high resolution mass spectrometry to detect urinary PAH metabolites. Presented at the 42nd Rocky Mountain Conference on Analytical Chemistry, Broomfield, CO, July 31, 2000.

Dimandja J-MD, Grainger J, Patterson DG Jr. Comprehensive two-dimensional GC/TOF MS for enhanced analysis of environmentally significant mixtures. ASMS, Long Beach, CA, June 2000.

Dimandja J-MD, Patterson DG Jr. Comprehensive three-dimensional GCxGC-TOFMS of endocrine disruptors. 22nd International Symposium on Capillary Chromatography and Electrophoresis, Riva del Garda, Italy, June 2000.

Dimandja J-MD, Colon I, Clouden GC, Grainger J, Patterson DG Jr. Multi-analyte profiling by comprehensive two-dimensional gas chromatography/time-of-flight mass spectrometry. 14th Meeting of the Southeast-USA Section of AOAC International, Atlanta, GA, April 2000.

Grainger J, Smith CJ, Dimandja J-MD, Walcott CJ, Clouden GC, Patterson DG Jr. Analysis of polyaromatic hydrocarbon metabolites in humans using standard and emerging technologies. 27th Annual NOBCChE Conference, Miami, FL, April 2000.

Dimandja J-MD, Clouden GC, Colon I, Grainger J, Patterson DG Jr. High throughput GC-MS for characterization of endocrine disruptors. Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Pittsburgh, PA, March 2000.

Dimandja J-MD, Clouden GC, Colon I, Grainger J, Patterson DG Jr. High-throughput GC-MS for characterization of endocrine disruptors. Presented at Pittsburgh Conference-2000, New Orleans, LA, March 12-16, 2000.

Dimandja J-MD, Grainger J, Patterson DG Jr. Comprehensive three-dimensional gas chromatography. Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Pittsburgh, PA, March 2000.

Dimandja J-MD, Colon I, Clouden GC, Grainger J, Patterson DG Jr. Multi analyte profiling by

comprehensive two-dimensional gas chromatography/time-of-flight mass spectrometry. CDC Symposium on Analytical Methods Related to Bioterrorism, April 2000.

Patterson DG Jr, Dimandja J-MD, Grainger J, Turner WE. High speed quantification of endocrine disrupting environmental toxicants in human samples. Conference on Analytical Chemistry and Applied Spectroscopy, Orlando, FL, March 1999.

Grainger J, Smith CJ, Moffett DB, Dimandja J-MD, Patterson DG Jr. Structural definition of methyleuenol metabolites resulting from human exposure. NOBCChE National Conference, San Diego, CA, April 1999.

Dimandja J-MD, Stanfill SB, Grainger J, Patterson DG Jr. Qualitative analysis of essential oils by comprehensive two-dimensional gas chromatography. 21st International Symposium on Capillary Chromatography and Electrophoresis, Park City, UT, June 1999.

Dimandja J-MD, Clouden GC, Grainger J, Patterson DG Jr. Determination of urinary polycyclic aromatic hydrocarbon metabolites by fast gas chromatography/time-of-flight mass spectrometry and comprehensive two-dimensional gas chromatography. 21st International Symposium on Capillary Chromatography and Electrophoresis, Park City, UT, June 1999.

Patterson DG Jr, Dimandja J-MD, Grainger J. Fast chromatography/time-of-flight mass spectrometry for assessing human exposure to endocrine disrupting chemicals. 21st International Symposium on Capillary Chromatography and Electrophoresis, Park City, UT, June 1999.

Dimandja J-MD, Stanfill SB, Ashley DL, Grainger J, Patterson DG Jr. Analysis of mint essential oils by comprehensive two-dimensional gas chromatography. 214th American Chemical Society National Meeting, New Orleans, LA, August 1999.

Dimandja J-MD, Patterson DG Jr, Grainger J, Turner WE, Needham LL. Measurements for assessing environmental exposures to children using small amounts of serum and urine: State-of-the-art. 214th American Chemical Society National Meeting, New Orleans, LA, August 1999.

Dimandja J-MD, Grainger J, Patterson DG Jr. New fast single and multidimensional gas chromatographic separations coupled with high resolution mass spectrometry and time-of-flight mass spectrometry for assessing human exposure to environmental toxicants. 19th Symposium on Halogenated Environmental Organic Pollutants, Venice, Italy, September 1999.

Grainger J, Smith CJ, Walcott C, Mofett DB, Colon I, Clouden GC, Dimandja J-MD, Patterson DG Jr. Analysis of polyaromatic hydrocarbon metabolites in humans using standard and emerging technologies. 17th International Symposium on Polycyclic Aromatic Compounds, Bordeaux, France, October 1999.

J-M.D. Dimandja, Grainger J, Patterson DG Jr, Smith CJ, Lovingood J, Donkoh N. Time-compressed analysis of polycyclic aromatic hydrocarbon metabolites by comprehensive two-dimensional gas chromatography. Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, New Orleans, LA, March 1998.

Patterson DG Jr, Barr JR, Dimandja J-MD, Grainger J, Turner W. The use of high-speed single and multidimensional GC coupled with high-resolution mass spectrometry for assessing human exposure to environmental toxicants. Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, New Orleans, LA, March 1998.

Dimandja J-MD, Grainger J, Patterson DG Jr, Smith CJ, Lovingood J, Donkoh N. Time-compressed analysis of polycyclic aromatic hydrocarbon metabolites by comprehensive two-dimensional gas chromatography. 12th Meeting of the Southeast-USA Section of AOAC International, Atlanta, GA, April 1998.

Grainger J, Dimandja J-MD, Green V, Liu Z, Patterson DG Jr. Fast gas chromatography/high resolution

mass spectrometry and comprehensive two-dimensional gas chromatography/high resolution mass spectrometry analysis of chlorinated PCDDs, PCBs and PCDFs as multigroup analytes. 18th Symposium on Halogenated Environmental Organic Pollutants, Stockholm, Sweden, August 1998.

Grainger J, Smith CJ, Dimandja J-MD, Moffett DB, Lovingood J, Patterson DG Jr, Donkoh N, Gillyard C. A theoretical/empirical model ring approach to approximating molecular structure and structure-activity relationships for chlorinated dibenzo-p-dioxins by cyclodextrin modified micellar elecrokinetic chromatography and orthogonal spectroscopic techniques. 18th Symposium on Halogenated Environmental Organic Pollutants, Stockholm, Sweden, August 1998.

Patterson DG Jr, Dimandja J-MD, Grainger J, Barr JR, Turner WE. The use of fast single and multidimensional GC coupled with high resolution and TOF mass spectrometry for assessing human exposure to environmental toxicants. 216th American Chemical Society National Meeting, Boston, MA, August 1998.

Hill RH Jr, Barr J, Driskell W, Patterson DG Jr, Needham LL. Biological monitoring for pesticide residues among farm families: Atrazine exposure. Presented at the American Chemical Society, National Meeting, New Orleans, LA, March 1996.

Patterson DG Jr. Mass spectrometry in environmental health: human exposure assessment of dioxin and other hazardous chemicals. Presented at the CDC 50th Anniversary Celebration, Atlanta, GA, Apri 10, 1996.

Patterson DG Jr, Grainger J, McClure C, Kukoyi S, Lovingood J, Sirimanne S, Barr JR. Use of micellar electrokinetic chromatography for assessing human exposure to environmental toxicants. Presented at Electrophoiresis '96, Atlanta, GA, March 1996.

Patterson DG Jr. Plenary Address: Mass spectrometry in environmental health risk factor evaluation: Dioxin and other hazardous chemicals. Presented at Enviro Analysis '96, Ottawa, Canada, May 13-16, 1996.

Patterson DG Jr, Green VE, Grainger J, Barr JR, Liu Z. The use of comprehensive two-dimensional gas chromatography/high-resolution mass spectrometry for the rapid, ultra-sensitive detection of dioxin. Presented at Analytica '96, Munich, Germany, April 22, 1996.

Patterson DG Jr. Plenary Lecture: Levels of Polychlorinated Dibenzo-p-Dioxins (PCDDs), Dibenzofurans (PCDFs), and dioxin-like compounds in humans. Presented at TOCOEN '96, Brno, Czech Republic, April 28-May 3, 1996.

Patterson DG Jr, Barr JR, Dipietro E, Grainger J, Green V, Lapeza CR, Maggio V, McClure PC, Sirimanne S, Turner WE. Analytical methods for analysis of organic pollutants in biological samples. Presented at TOCOEN '96, Brno, Czech Republic, April 28-May 3, 1996.

Patterson DG Jr, Green V, Grainger J, Barr JR. The use of ultra-fast single and multidimensional GC/HRMS for assessing human exposure to PCDDs, PCDFs, PCBs, and halogenated pesticides. Presented at Dioxin '96, The Netherlands, August 1996.

Patterson DG Jr. Invited Speaker: Evolution of analytical methods to measure 2,3,7,8-Tetrachlorodibenzo-p-Dioxin. Presented at the 20th Anniversary Meeting of the Seveso, Italy Incident, Milan, Italy, June 1996.

Patterson DG Jr. Keynote Speaker: Analytical advances in biological monitoring. Presented at the International Symposium on Biological Monitoring in Occupational and Environmental Health, Helsinki, Finland, September 11-13, 1996.

Patterson DG Jr. Invited Presentation: Mass spectrometry in environmental health risk factor evaluation.

Dioxin and Other Hazardous Chemicals, Spectroscopy, Society of Pittsburgh, Pittsburgh, PA, April 13, 1996.

Patterson DG Jr. Invited Presentation: mass spectrometry in environmental health risk factor evaluation: Dioxin. Presented at NORM '96, 51st Northwest Regional Meeting Symposium "Dioxins in the Environment," Corvallis, OR, June 19-22, 1996.

Li Ma, Justice JB Jr, Sirimanne SR, Patterson DG Jr. Cloud-point extraction and high-performance liquid chromatographic analysis of polycyclic aromatic hydrocarbons in human serum with fluorescence detection. Presented at the National ACS Meeting, Orlando, FL, August 25-29, 1996.

Jimenez B, Patterson DG Jr, Liu Z, Gonzalez MJ, Marina ML. Separation of polycyclic aromatic hydrocarbons using mixed cyclodextrin modified MEKC. Presented at Society of Environmental Toxicology and Chemistry, 6th SETAC-Europe Annual Meeting, Giardini Naxos Taormina, Sicily, Italy, May 19-22, 1996.

Patterson DG Jr, Liu Z, Green VE, Barr JR. The use of comprehensive two-dimensional gas chromatographic/high resolution mass spectrometry for the rapid, ultra-sensitive detection of environmental toxicants. Presented at the Pittsburgh Conference (Pittcon '95), New Orleans, LA, March 6-10, 1995.

Patterson DG Jr, Liu Z, Barr JR, Green VE. Ultrasensitive and very fast analysis of halogenated toxicants. Presented at the 43rd American Society for Mass Spectrometry Conference Atlanta, GA, 1995.

Barr JR, Patterson DG Jr, Maggio VL, McClure PC, Turner WE, Newman CM, Needham LL. Quantification of non-persistent pesticides in human serum. Presented at the 43rd American Society for Mass Spectrometry Conference Atlanta, GA, 1995.

Sirimanne SR, Ma L, McClure PC, Barr JR, Patterson DG Jr. Analysis of PAHs in human serum using cloud point extraction and LC/MS. Presented at the 43rd American Society for Mass Spectrometry Conference, Atlanta, GA, 1995.

McClure PC, Barr JR, Maggio VL, Sirimanne SR, Ma L, Patterson DG Jr. Analysis of serum PAHs and PAH adducts by LC/MS. Presented at the 43rd American Society for Mass Spectrometry Conference, Atlanta, GA, 1995.

Patterson DG Jr. New analytical methods for assessing human exposure to environmental toxicants: A new era of speed. Sensitivity and specificity. Presented at Conference on Xenobiotics in Foodstuffs, Tatranska Strba, Slovakia, May 9-11, 1995.

Brambilla P, Lambert GH, Cazzaniga M, Needham LL, Ferrari E, Patterson DG Jr, Gerthoux P, Signorini S, Mocarelli P. 2,3,7,8-TCDD contamination and human health effects measured by cytochrome CYP1a2 induction. Presented at the Beckman Conference, Niece, France, June 1-3, 1995.

Patterson DG Jr, Liu Z, Green VE, Barr JR. New, fast, ultra-sensitive analytical methods for assessing human exposure to toxicants. Presented at the International Congress on Hazardous Waste; Impact on Human and Ecological Health, Atlanta, GA, 1995.

Sirimanne SA, Ma L, Barr JR, Patterson DG Jr. Use of cloud point extraction of dioxins and PAHs from human serum for assessing human exposure to environmental toxins. Presented at the International Congress on Hazardous Waste: Impact on human and ecological health, Atlanta GA, 1995.

McClure PC, Dipietro E, Smarr B, Driskell W, Bailey SL, Head SL, Turner WE, Barr JR, Patterson DG Jr, Hill RH Jr, Needham LL. Determination of p-Nitrophenol in urine using liquid chromatography combined with atmospheric pressure ionization tandem mass spectrometry. Presented at The International Congress on Hazardous Waste: Impact on Human and Ecological Health, Atlanta GA, 1995.

Patterson DG Jr, Liu Z, Green VE, Barr JR. New, fast, ultra sensitive analytic methods for assessing human exposure to toxicants. Presented at The International Congress on Hazardous Waste: Impact on Human and Ecological Health, Atlanta GA, 1995.

Barr JR, Patterson DG Jr, Maggio VL, McClure PC. Measurement of Non Persistent Pesticides by Isotope Dilution, High Resolution Mass Spectrometry. Presented at the International Congress on Hazardous Waste: Impact on Human and Ecological Health, Atlanta GA, 1995.

McClure PC, E.S. DiPietro, B.J. Smarr, Turner WE, Barr JR, Patterson DG Jr, Hill RH Jr, Needham LL. Determination of p nitrophenol in urine using liquid chromatography combined with atmospheric pressure chemical ionization tandem mass spectrometry. Presented at the 12th LC/MS Montreux Liquid Chromatography Mass Spectrometry Symposium, Hilton Head Island, SC, 1995.

Patterson DG Jr, Barr JR, Shealy DB, Ashley DL. Quantification of nonpersistent pesticides in human samples using isotope dilution mass spectrometry: Applications of new analytical techniques. Dioxin 95, Alberta, Canada, 1995.

Barr JR, Patterson DG Jr, Maggio VL, McClure PC, Newman CM, Needham LL. Quantification of selected non-persistent pesticides in human serum by high-resolution, isotope-dilution mass spectrometry. 10th Symposium of the Measurement of Toxic and Related Air Pollutants, Research Triangle Park, NC, 1995.

Liu Z, Patterson DG Jr. Comprehensive two-dimensional gas chromatography for the fast analysis of polycyclic aromatic hydrocarbons and other environmental toxicants. Presented at Pittcon '94, Chicago, IL, March 1, 1994.

Grainger J, Nomura G, Patterson DG Jr, Wilson T, Gillyard C. Determination of phthalate esters by isotope dilution gas chromatography/fourier transform infrared spectroscopy. ACS National Meeting, San Diego, CA, March 13-18, 1994.

Patterson DG Jr. Concentrations of PCDDS, PCDFS, and CPCBs [Dioxins] in humans and factors that influence these levels. Presented at the Environmental Studies Forum: Human and Natural Ecology Program, Emory University, Atlanta, GA, December 2, 1993.

Barr JR, Patterson DG Jr, Maggio V, Sirimanne S, McClure PC. A Comparison of various mass spectral and sample preparation techniques for the quantification of pesticides in human serum. Presented at the 42nd American Society for Mass Spectrometry Conference, Chicago, IL, May 28-June 2, 1994.

Patterson DG Jr, Liu Z, Barr JR, Green VE, Grove I, Ledford E. Comprehensive two-dimensional gas chromatographic/high-resolution mass spectrometric analysis for 2,3,7,8-Tetrachlorodibenzo-p-dioxin, non-persistent pesticides, and PAHs in biological samples. Presented at the 42nd American Society for Mass Spectrometry Conference, Chicago, IL, May 28 - June 2, 1994.

Patterson DG Jr. New analytical methods for measuring PCDDS, PCDFS, and CPCBs in biological samples. Presented at 24th International Conference on Environmental and Analytical Chemistry, Ottawa, Ontario, Canada, May 16-20, 1994.

Patterson DG Jr. The Centers for Disease Control and preventive programs in human biomonitoring to improve public health. Presented at Western Carolina Section American Chemical Society Meeting, Western Carolina University, Cullowhee, NC, April 14, 1994.

Grainger J, Liu Z, Francis V, Wang J, Sirimanne S, Patterson DG Jr. Isomer differentiation of chlorinated dibenzo-p-dioxins by carbon-13 nuclear magnetic resonance spectroscopy. Presented at the 21st Annual National Conference of the National Organization of Black Chemists and Chemical Engineers, Atlantic City, NJ, 1994.

Rosenberg C, Kontsas H, Tornaeus J, Mutanen P, Jappinen P, Patterson DG Jr, Needham LL, Vainio H. PCDD/PCDF levels in the blood of workers in a pulp and paper mill. Presented at the 14th International Symposium on Chlorinated Dioxins and Related Compounds, Dioxin '94, Kyoto, Japan, November 20-25, 1994.

Patterson DG Jr. Keynote Address: Multidimensional and hyphenated analytical techniques; a new era of speed. Sensitivity and specificity. Presented at the 14th International Symposium on Chlorinated Dioxins and Related Compounds, Dioxin '94, Kyoto, Japan, November 20-25, 1994.

Clark GC, McCoy Z, Landi MT, Bertazzi PA, Mocarelli P, Brambilla P, Caporaso N, Needham LL, Patterson DG Jr, Lucier GW. Molecular epidemiology study in Seveso: Ah receptor and CYPlAl-dependent enzymatic activity in individuals from dioxin exposed and control areas. Presented at the 14th International Symposium on Chlorinated Dioxins and Related Compounds, Dioxin '94, Kyoto, Japan, November 20-25, 1994.

Turner WE, Dipietro E, Cash T, McClure PC, Patterson DG Jr. An improved SPE extraction and automated sample cleanup method for PCDDS, PCDFS, and CPCBS. Presented at the 14th International Symposium on Chlorinated Dioxins and Related Compounds, Dioxin '94, Kyoto, Japan, November 20-25, 1994.

Patterson DG Jr, Liu Z, Grainger J, McClure PC, Botero B. The use of cyclodextrin modified micellar electrokinetic chromatography for monitoring human exposure to environmental toxicants. Presented at the 14th International Symposium on Chlorinated Dioxins and Related Compounds, Dioxin '94, Kyoto, Japan, November 20-25, 1994.

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Grainger J, Sewer M, Sirimanne S, McClure PC, Gillyard C, Patterson DG Jr. Isomer identification of non-laterally tetrachlorinated dibenzo-pdioxin isomer groups by gas chromatography/fourier transform infrared spectroscopy. Presented at the 14th International Symposium on Chlorinated Dioxins and Related Compounds, Dioxin '94, Kyoto, Japan, November 20-25, 1994.

Grainger J, McClure PC, Botero B, Sirimanne S, Liu Z, Sewer M, Gillyard C, Patterson DG Jr, Tanaka N, Kimata K, Hosoya K, Araki T, Terabe S. Isomer identification of all chlorinated dibenzo-p-dioxins by orthogonal spectroscopic and chromatographic techniques. Presented at the 14th International Symposium on Chlorinated Dioxins and Related Compounds, Dioxin '94, Kyoto, Japan, November 20-25, 1994.

Tanaka N, Kimata K, Hosoya K, Araki T, Barnhart ER, Alexander LR, Sirimanne S, McClure PC, Grainger J, Patterson DG Jr. Separation and isomer identification of PCDDs by reversed-phase liquid chromatography using electron-donor and electron-acceptor bonded silicas, Presented at the 14th International Symposium on Chlorinated Dioxins and Related Compounds, Dioxin '94, Kyoto, Japan, November 20-25, 1994.

Patterson DG Jr. Human exposure assessment for dioxin. Presented at the Annual Mid-Winter Meeting of the American Association of Osteopathic Specialists, Ritz-Carlton Hotel, Buckhead, GA, January 7, 1994.

Grove IS, Patterson DG Jr, Alexander LR, Barr JR, Maggio V.L. An automated processing and quantification system for FAB mass spectral data. Presented at the 41st American Society for Mass Spectrometry Conference, San Francisco, CA, May 30-June 4, 1993.

Barr JR, Maggio VL, Alexander LR, Patterson DG Jr, Henderson LO, Needham LL, Cooper GR. Quantification of Apolipoprotein A-1 by Isotope dilution FAB-MS. Presented at the 41st American Society

for Mass Spectrometry Conference, San Francisco, CA, May 30-June 4, 1993.

Hart JR, Patterson DG Jr. The analysis of TCDD in human serum using very high resolution SIR. Presented at the 41st American Society for Mass Spectrometry Conference, San Francisco, CA, May 30-June 4, 1993.

Sirimanne SR, Patterson DG Jr. Quantification of polycyclic aromatic hydrocarbons (PAHS) in human serum by SFE/GC-MS. Presented at the International Congress on the Health Effects of Hazardous Waste, Atlanta, GA, May 3-6, 1993.

McClure PC, Grainger J, Sirimanne S, Patterson DG Jr. Separation of organic environmental toxicants (PCDDS, PAHS, PCBS, PCNS) by cyclodextrin/micellar electrokinetic chromatography. Presented at the International Congress on the Health Effects of Hazardous Waste, Atlanta, GA, May 3-6, 1993.

Liu Z, Patterson DG Jr. High-speed, comprehensive two-dimensional gas chromatography applied to the separations of polycyclic aromatic hydrocarbons. Presented at the Pittsburgh Conference (PittCon '94), Chicago, IL, February 1994.

McClure PC, Grainger J, Patterson DG Jr. Isomer specific isolation of 2,3,7,8-TCDD from spiked human serum by cyclodextrin/micellar capillary electrophoresis. Presented at the Frederick Conference on Capillary Electrophoresis, Frederick, MD, October 19-20, 1993.

Barr JR, Maggio VL, Alexander LR, Patterson DG Jr, Henderson LO, Mei JV, McGuffey J, Cooper GR. Definitive quantification of apolipoprotein A-1 by isotope dilution FAB mass spectrometry. Presented at the Frontiers in Lipid and Lipoprotein Research, Atlanta, GA, September 19-21, 1993.

McClure PC, Grainger J, Patterson DG Jr. Isomer specific isolation of 2,3,7,8-TCDD from the apolipoproteins of spiked human serum by cyclodextrin/micellar capillary electrophoresis. Presented at the Frontiers in Lipid and Lipoprotein Research, Atlanta, GA, September 19-21, 1993.

Patterson DG Jr. (Plenary Lecture). Concentrations of PCDDS, PCDFS, and CPCBs in humans and factors that influence these levels. Presented at the 13th International Symposium on Chlorinated Dioxins and Related Compounds, Dioxin '93, Vienna, Austria, September 20-24, 1993.

Patterson DG Jr. (Invited). New analytical methods and a summary of future CDC collaborative studies. Presented at the 13th International Symposium on Chlorinated Dioxins and Related Compounds, Dioxin '93, Vienna, Austria, September 20-24, 1993.

Grainger J, Liu Z, Sirimanne S, Francis VL, Patterson DG Jr. Isomer differentiation of chlorinated dibenzo-p-dioxins by carbon-13 nuclear magnetic resonance. Presented at the 13th International Symposium on Chlorinated Dioxins and Related Compounds, Dioxin '93, Vienna, Austria, September 20-24, 1993.

Luotamo M, Patterson DG Jr, Needham LL, Aitio A. Concentrations of PCDDS, PCDFS, and PCBs in sera from workers with past and present exposure. Presented at the 13th International Symposium on Chlorinated Dioxins and Related Compounds, Dioxin '93, Vienna, Austria, September 20-24, 1993

Lambert GH, Mocarelli P, Hsu CC, Needham LL, Ryan JJ, Guo L, Brambilla P, Signorini S, Patterson DG, Lai TJ, Garcia F, Ferrari E, Schoeller DA. Cyctochrome P45OIA2 activity in dioxin exposed Seveso subjects as compared to polychlorinated biphenyl and polychlorinated dibenzofuran exposed Yucheng subjects. Presented at the 13th International Symposium on Chlorinated Dioxins and Related Compounds, Dioxin '93, Vienna, Austria, September 20-24, 1993.

Hosoya K, Kimata K, Fukunishi K, Araki T, Tanaka N, Barnhart ER, Alexander LR, Lapeza CR, Patterson DG Jr. Recovery and photodecomposition of TCDD existing in aqueous environment. Presented at the Annual Meeting of Japan Chemical Society, March 1993.

Barnhart ER, Maggio VL, Alexander LR, Barr JR, Patterson DG Jr, Needham LL. Detection of masses of bacitracin peptides by FAB/MS of HPLC fractions of L-Tryptophan extracts. Presented at Kyoto '92, International Conference on Biological Mass Spectrometry, Kyoto, Japan, September 20-24, 1992.

Barnhart ER, Alexander LR, Tanaka N, Kimata K, Olson RJ, Patterson DG Jr. Chlorinated aromatics, GC/MS reference compounds purification of synthesis products by HPLC on octadecyl-, pyrenylethyl- and nitrated phenylethyl-silylated stationary phases. Presented at Kyoto '92, International Conference on Biological Mass Spectrometry, Kyoto, Japan, September 20-24, 1992.

Lapeza CR, Green VE, Alexander LR, Gill JB, Parsons L, Zhang W, Patterson DG Jr. Analytical determination of 2,3,7,8-substituted PCDDS, PCDFS, and PCBs by high resolution GC/MS in a single extract of human serum. Presented at Kyoto '92, International Conference on Biological Mass Spectrometry, Kyoto, Japan, September 20-24, 1992

Patterson DG Jr, Turner WE, Alexander LR, Grainger J, Needham LL. The use of HRGC/HRMS, 2DGC; SFE; CD/MEKC: and SHRP-LC to measure parts-per-quadrillion levels of PCDDS, PCDFS, PCBS, and PAHs on human serum. Presented at Kyoto '92, International Conference on Biological Mass Spectrometry, Kyoto, Japan, September 20-24, 1992.

Wille KK, Sweeney MH, Piacitelli LA, Halperin WE, Fingerhut MA, Patterson DG Jr, Pirkle JL. Predictors and artifacts related to serum 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) Levels. Presented at the National American Statistical Association Meeting, Boston, MA, August 1992.

Wolfe W, Michalek J, Miner J, Rahe A, Needham LL, Patterson DG Jr. Reproductive outcome versus paternal dioxin body burden in veterans of Operation Ranch Hand. Presented at the 12th International Meeting on Organohalogen Compounds, Dioxin-92, Helsinki, Finland, August 23-28, 1992.

Wolfe W, Michalek J, Miner J, Pirkle J, Caudill S, Needham LL, Patterson DG Jr. Dioxin half-life in veterans of Operation Ranch Hand. Presented at the 12th International Meeting on Organohalogen Compounds, Dioxin-92, Helsinki, Finland, August 23-28, 1992.

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Patterson DG Jr. Plenary Lecture: New methods and new challenges for measuring environmental toxicants in humans. Presented at the 12th International Meeting on Organohalogen Compounds, Dioxin-92, Helsinki, Finland, August 23-28, 1992.

Grainger J, McClure PC, Patterson DG Jr. Separation of organic environmental toxins by cyclodextrin/micellar electrokinetic chromatography. Presented at the 19th annual National Organization for the Professional Advancement of Black Chemists and Chemical Engineers, New Orleans, LA, April 20-24, 1992.

Grainger J, Patterson DG Jr, Sewer M, Gillyard C. Isomer differentiation of environmental toxins by gas chromatography/fourier transform infrared spectroscopy. Presented at the 19th Annual National Organization for the Professional Advancement of Black Chemists and Chemical Engineers, New Orleans, LA, April 20-24, 1992.

Grainger J, McClure PC, Patterson DG Jr. Separation of chlorinated dibenzodioxins by cyclodextrin/micellar electrokinetic chromatography. High Performance Capillary Electrophoresis Society Meeting, Research Triangle Park, NC, June 22-24, 1992.

Luotamo M, Patterson DG Jr, Needham LL, Aitio A. Concentration of non- mono-, and diortho-chlorobiphenyls (PCBS) in sera from workers with past and present exposure. Presented at the 12th International Meeting on Organohalogen Compounds, Dioxin-92, Helsinki, Finland, August 23-28, 1992.

Turner WE, Cash TP, Patterson DG Jr, Shirkhan H. An evaluation of the FMS dioxin prep system for automated sample cleanup adapted to human serum. Presented at the 12th International Meeting on Organohalogen Compounds, Dioxin-92, Helsinki, Finland, August 23-28, 1992.

Needham LL, Mocarelli P, Patterson DG Jr, Marocchi A, Brambilla P, Gerthoux PM, Meazza L, Carreri V. Findings from our Seveso study and comparisons with other exposed populations. Presented at the 12th International Meeting on Organohalogen Compounds, Dioxin 92, Helsinki, Finland, August 23-28, 1992.

Todd GD, Patterson DG Jr. The role of mass spectrometry in environmental health investigations. Presented at the U.S. Public Health Service Meeting, Atlanta, GA, May 26-29, 1991

Patterson DG Jr. Overview of analytical studies: measuring parts-per-quadrillion levels of dioxins in humans. Presented at the Pittsburgh Conference (invited speaker) Chicago, IL, March 4, 1991.

Piacitelli L, Haring M, Sweeney, Wild D, Fingerhut M, Patterson DG Jr, Turner WE, Connally LB, Tompkins B, Schoettelkotte J. Serum levels of 2,3,7,8-substituted PCDDs and PCDFs among workers exposed to 2,3,7,8-TCDD contaminated chemicals. Presented at the 11th International Meeting on Organohalogen Compounds, Dioxin 91, Research Triangle Park, NC, September 22-27, 1991.

Johnson ES, Parsons W, Weinberg C, Matthews J, Patterson DG Jr, Needham LL. Serum levels of TCDD in phenoxy herbicide sprayers/applicators. Presented at the 11th International Meeting on Organohalogen Compounds, Dioxin 91, Research Triangle Park, NC, September 22-27, 1991.

Patterson DG Jr, Grainger J, Terabe S. The use of cyclodextrin-modified/micellar electrokinetic chromatography for the separation of polychlorinated dibenzo-p-dioxins (PCDDs), dibenzofurans (PCDFS) and related environmental toxicants. Presented at the 11th International Meeting on Organohalogen Compounds, Dioxin 91, Research Triangle Park, NC, September 22-27, 1991.

Patterson DG Jr, Todd GD, Turner WE, Maggio V, Lapeza CR Jr, Alexander LR, Needham LL. Co-planar PCB levels in humans. Presented at the 11th International Meeting on Organohalogen Compounds, Dioxin 91, Research Triangle Park, NC, September 22-27, 1991.

Mocarelli P, Marocchi A, Brambilla P, Gerthoux PM, Meazza L, Carreri V, Patterson DG Jr, Needham LL. Dioxin exposure and health effects on people at Seveso, Italy. Presented at the 11th International Meeting on Organohalogen Compounds, Dioxin 91, Research Triangle Park, NC, September 22-27, 1991.

Todd GD, Burse VW, Patterson DG Jr, Korver MP, Barnhart ER, McClure PC, Needham LL. Candidate quality control materials to monitor method performance and pattern comparability in the determination of polychlorinated biphenyls in human serum. Presented at the 11th International Meeting on Organohalogen Compounds, Dioxin 91, Research Triangle Park, NC, September 22-27, 1991.

Patterson DG Jr, Terabe S, Grainger J. Determination of environmental toxicants by using Cyclodextrin-Modified Micellar Electrokinetic Chromatography (CD/MEKC). Presented at the Federation of Analytical Chemistry and Spectroscopy Societies and Pacific Conference on Chemistry and Spectroscopy, Anaheim, CA, October 6-11, 1991.

Patterson DG Jr, Grainger J, Terabe S. A new method for evaluating levels of polynuclear aromatic hydrocarbons in environmental and biological samples: Cyclodextrin—Modified Micellar Electrokinetic Chromatography. Presented at the 13th International Symposium on Polynuclear Aromatic Hydrocarbons, Bordeaux, France, October 1-4, 1991.

Smith SF Jr, Todd GD, Burse VW, Patterson DG Jr, Korver MP, Needham LL. Confirmation of aroclor patterns as a function of exposure source by using isotope dilution mass spectrometry. Presented at the 11th International Meeting on Organohalogen Compounds, Dioxin 91, Research Triangle Park, NC,

September 22-27, 1991.

Turner WE Patterson DG Jr. Assessing human exposure to polychlorinated dibenzo-p-dioxins (PCDDs), dibenzofurans (PCDFs), and biphenyls (PCBs): Factors to consider in converting a laboratory measurement into a body burden. Presented at the 1st International Society of Exposure Analysis Meeting, Atlanta, GA, November 18-21, 1991.

Grainger J, McClure PC, Patterson DG Jr. Isomer differentiation of chlorinated dibenzofurans by gas chromatography/fourier transform infrared spectroscopy. Presented at the 13th Annual Conference on Contemporary Topics and the Practice of Chromatography Atlanta, GA, October 7-10, 1991

Smith BF, Todd GD, Burse VW, Patterson DG Jr, Korver MP. Application of isotope dilution mass spectrometry to the determination of polychlorinated biphenyl residues. Presented at the 13th Annual Conference on Contemporary Topics and The Practice of Chromatography Atlanta, GA, October 7-10, 1991.

Barnhart ER, Tanaka N, Kimata K, Hosoya K, Alexander LR, Terabe S, Patterson DG Jr. Differences in retention behavior of congeners of chlorinated dibenzothiophenes by reversed phase LC with different stationary phases. Presented at HPLC '90, 14th International Symposium on Column Liquid Chromatography, Boston, MA, May 20-25, 1990.

Grainger J, Reddy VV, Patterson DG Jr. Hexachlorodibenzo-pdioxin isomer differentiation by capillary gas chromatography/Fourier transform infrared spectroscopy. 17th Annual National Organization for the Professional Advancement of Black Chemists and Chemical Engineers, San Diego, CA, April 9-14, 1990.

Patterson DG Jr, Turner WE, Bernert JT, Alexander LR, Spierto FW, Hill RH Jr. A program to quantitatively assess the amount of passive exposure to cigarette smoke in the U.S. population. Presented at the 38th ASMS Conference on Mass Spectrometry and Allied Topics, Tucson, AZ, June 3-8, 1990.

Bonin MA, Ashley DL, Cardinali FL, McCraw JM, Patterson DG Jr, Needham LL. Application of magnetic sector mass spectrometer to analysis of volatile organic compounds in human blood. Presented at the 38th ASMS Conference on Mass Spectrometry and Allied Topics, Tucson, AZ, June 3-8, 1990.

Needham LL, Patterson DG Jr. Tissue levels of PCDDs and PCDFs (basis for measurement). Presented at the Toxicology Forum Health Effects and Safety Assessment of Dioxins and Furans, Karlsruhe, Germany, January 15-17, 1990.

Needham LL, Ashley DL, Hill RH Jr., Turner WE, Patterson DG Jr, Holler JS, Pirkle JL, Sampson EJ. A program for assessing background levels of 52 organic toxicants in the U.S. population. Presented at the 5th International Conference on Indoor Air Quality and Climate, Toronto, Canada, July 29-August 3, 1990.

Ashley DL, Bonin MA, Cardinali FL, McCraw JM, Patterson DG, Needham LL. Determination of 38 volatile organic compounds in human blood by using purge and trap GC/MS. Presented at the 4th Annual Meeting of the Southeast Regional Section of the Association of Official Analytical Chemists, Atlanta, GA, June 4, 1990.

Alexander LR, Maggio VL, Gill JB, Green VE, Turner WE, Patterson DG Jr. Comparison of 2,3,7,8-tetrachlorodibenzo-p-dioxin chlorine isotope ratio measurements using electron multiplier and photomultiplier detectors. Presented at the 10th International Meeting on Organohalogen Compounds, Dioxin 90, Bayreuth, Germany, September 10-14, 1990.

Barnhart ER, Tanaka N, Kimata K, Hosoya K, Terabe S, Alexander LR, Patterson DG Jr. HPLC elution order of polychlorinated biphenyl congeners with octadecyl-, pyrenylethyl- and, nitrated naphthethyl-silylated silica gel. Presented at the 10th International Meeting on Organohalogen Compounds, Dioxin 90, Bayreuth, Germany, September 10-14, 1990.

Isaacs SG, Turner WE, Patterson DG Jr. An automated sample cleanup apparatus used in the procedure for polychlorinated dibenzo-p-dioxins (PCDDs), dibenzofurans (PCDFS), ortho-substituted (non-planar) and ortho-unsubstituted (planar) biphenyls (PCBS) in serum and adipose tissue. Presented at the 10th International Meeting on Organohalogen Compounds, Dioxin 90, Bayreuth, Germany, September 10-14, 1990.

Terabe S, Miyashita Y, Shibata O, Patterson DG Jr, Barnhart ER, Alexander LR, Karger BL, Hosoya K, Tanaka N. Neutral Cyclodextrin Modified/Micellar Electrokinetic Chromatographic (CD/MEKC) separation of Polychlorinated Dibenzo-p-dioxins (PCDDS) and Polychlorinated Biphenyls (PCBs). Presented at the 10th International Meeting on Organohalogen Compounds, Dioxin 90, Bayreuth, Germany, September 10-14, 1990.

Turner WE, Patterson DG Jr, Isaacs SG, Alexander LR. Laboratory quality assessment procedures for serum dioxin/furan measurements: U.S. Air Force Vietnam Veteran Ranch Hand, NIOSH Chemical Workers, and Seveso, Italy Studies. Presented at the 10th International Meeting on Organohalogen Compounds, Dioxin 90, Bayreuth, Germany, September 10-14, 1990.

Needham LL, Allen KM, Patterson DG Jr, Andrews JS Jr. Human levels of 2,3,7,8-tetrachlorodibenzo-p-dioxin in Missouri. Presented at the 10th International Meeting on Organohalogen Compounds, Dioxin 90, Bayreuth, Germany, September 10-14, 1990.

Patterson DG Jr, Todd GD, Turner WE, Needham LL. The distribution of non-ortho substituted polychlorinated biphenyl (PCB) and PCDD/PCDF levels among various lipid stores in whole blood and adipose tissue: The toxic equivalent contribution of the non-ortho-substituted PCBS. Presented at the 10th International Meeting on Organohalogen Compounds, Dioxin 90, Bayreuth, Germany, September 10-14, 1990.

Patterson DG Jr. Keynote Lecture: Major challenges in setting-up a dioxin laboratory. Presented at the 10th International Conference on Organohalogen Compounds, Dioxin 90, Bayreuth, Germany, September 10-14, 1990.

Terabe S, Miyashita Y, Barnhart ER, Alexander LR, Patterson DG Jr, Karger BL, Hosoya K, Tanaka N. Separation of highly hydrophobic compounds by cyclodextrin modified micellar electrokinetic chromatography. Presented at the 2nd International Symposium on High Performance Capillary Electrophoresis (HPCE '90), San Francisco, CA, January 29-31, 1990.

Nomura GS, Barnhart ER, Patterson DG Jr, Hill RH Jr. Synthesis of 13 C-labelled herbicide metabolites for use as GC/MS standards in isotope dilution measurements. Presented before the Division of Agrochemicals, National ACS Meeting, Boston, MA, April, 1990.

Turner WE, Shirkhan H, Isaacs SG, Patterson DG Jr. Automated apparatus (FMS System 2378) for the extraction and enrichment of polychlorinated dibenzo-p-dioxins and dibenzofurans in human serum and adipose tissue. Presented at the 7th International Symposium for Laboratory Robotics, Boston, MA, October 15-17, 1989.

Patterson DG Jr. Polychlorinated dibenzo-p-dioxins and dibenzofurans in human. Presented in the Wadsworth Seminar Series, New York Department of Health, Albany, NY, December 12, 1989.

Barnhart ER, Patterson DG Jr. Chlorinated derivatives of dibenzothiophene and naphthalene: Interference with analyses of chlorinated dibenzo-pdioxins. Presented at the Pittsburgh Conference, Atlanta, GA, March 6-10, 1989.

Nomura GS, Ashley DL, Pendergrast AH, Bernert JT Jr, Patterson DG Jr, Grainger J, Van Derveer D. The structural identification of a heterocyclic compound implicated in Spanish toxic oil syndrome. Presented at the Pittsburgh Conference, Atlanta, GA, March 6, 1989.

Patterson DG Jr, Alexander LR, Turner WE, Needham LL, Pirkle JL, Sampson EJ. Polychlorinated dibenzo-p-dioxin (PCDD) and dibenzofuran (PCDF) levels in humans: Vietnam Veterans: Occupational (production) and environmentally exposed (residential and recreational) individuals. Presented at the 37th ASMS Conference on Mass Spectrometry and Allied Topics, Miami Beach, FL, May 21-26, 1989.

Patterson DG Jr, Mocarelli P, Needham LL, Andrews JS Jr, Pirkle JL, Sampson EJ. Pilot Study (Phase 11) for determining PCDD and PCDF Levels in serum of Seveso, Italy Residents Collected at the Time of Exposure. Presented at Dioxin '89, 9th International Symposium on Chlorinated Dioxins and Related Compounds, Toronto, Ontario, Canada, September 16-22, 1989.

Needham LL, Patterson DG Jr, Andrews JS Jr. Pilot Study (Phase 1) for determining 2,3,7,8-TCDD levels in serum of Seveso residents. Presented at Dioxin '89, 9th International Symposium on Chlorinated Dioxins and Related Compounds, Toronto, Ontario, Canada, September 16-22, 1989.

Andrews JS Jr, Schramm WF, Knutsen AP, Evans RG, Webb KB, Needham LL, Roberts DW, Patterson DG Jr, Edmonds LD, Falk H. Missouri dioxin studies: An update on long-term health effects. Presented at Dioxin '89, 9th International Symposium on Chlorinated Dioxins and Related Compounds, Toronto, Ontario, Canada, September 16-22, 1989.

Haring M-Sweeney, Fingerhut MA, Patterson DG Jr, Connally LB, Piacitelli LA, Morris JA, Hornung RW, Cameron LW, Marlow DA, Dugle JE. Serum levels of 2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) in New Jersey and Missouri chemical workers exposed to dioxin-contaminated process: Interim report. Presented at Dioxin '89, 9th International Symposium on Chlorinated Dioxins and Related Compounds, Toronto, Ontario, Canada, September 16-22, 1989.

Patterson DG Jr, Turner WE, Isaacs SG, Alexander LR. Method performance evaluation and lessons learned after analyzing more than 4,000 serum and adipose tissue samples for PCDDs and PCDFS. Presented at Dioxin '89, 9th International Symposium on Chlorinated Dioxins and Related Compounds, Toronto, Ontario, Canada, September 16-22, 1989.

Holler JS, Burse VW, Patterson DG Jr, Needham LL. Assessing human exposure to toxic chemicals-analytical toxicology at CDC past, present, and future. Presented at Southeast Regional Section of AOAC, 3rd Annual Meeting, Athens, GA, June 13, 1989.

Tanaka N, Araki M, Barnhart ER, Patterson DG Jr. Isomer separation of TCDDS. Presented to the 56th Annual Meeting of the Chemical Society of Japan, April 1988.

Alley CC, Groce DF, Patterson DG Jr. Characterization of PCB pyrolysis mixtures. Presented at the 36th American Association of Mass Spectrometry Conference, San Francisco, CA, June 5-10, 1988.

Patterson DG Jr, Alexander LR, Turner WE, Needham LL. Development and application of a high resolution mass spectrometric method for measuring 2,3,7,8-TCDD in serum. Presented at the 195th ACS National Meeting and 3rd Chemical Congress of North America, Toronto, Canada, June 5-10, 1988.

Patterson DG Jr, Alexander LR, Turner WE, Needham LL, Andrews JS Jr, Pirkle JL, Sampson EJ. The application of a high-resolution mass spectrometric method for measuring 2,3,7,8-TCDD in human adipose tissue and serum: The Vietnam Veteran Agent Orange and Ranch Hand validation studies: 2,3,7,8-TCDD.

Human half-life study: Missouri residents case/control study, and occupationally exposed workers. Presented at the 36th American Association of Mass Spectrometry Conference, San Francisco, CA, June 5-10, 1988.

Fingerhut M, Sweeney M, Patterson DG Jr, Marlow D, Hornung R, Halperin W. Levels of 2,3,7,8-tetrachlorodibenzo-p-dioxin in the serum of U.S. chemical workers exposed to dioxin-contaminated

products. Presented at DIOXIN '88, 8th International Symposium on Chlorinated Dioxins and Related Compounds, Umea, Sweden, August 21-26, 1988.

Devine OJ, Karon JM, Flanders WD, Needham LL, Patterson DG Jr. Association of serum 2,3,7,8-tetrachlorodibenzo-p- dioxin levels with personal characteristics of U.S. Army Vietnam Veterans. Presented at DIOXIN '88, 8th International Symposium on Chlorinated Dioxins and Related Compounds, Umea, Sweden, August 21-26, 1988

Andrews JS Jr, Webb KB, Evans RG, Knutsen AP, Roberts DW, Roodman ST, Schramm WF, Gibson BB, Patterson DG Jr, Needham LL. Medical evaluation of subjects with known body levels of 2,3,7,8-tetrachlorodibenzo-p-dioxin. Presented at DIOXIN '88, 8th International Symposium on Chlorinated Dioxins and Related Compounds, Umea, Sweden, August 21-26, 1988.

Patterson DG Jr, Furst P, Henderson LO, Needham LL, Alexander LR, Isaacs SL, Hannon H. Partitioning of in-vivo bound 2,3,7,8-substituted PCDDs and PCDFs among the various lipid and non-lipid compartments in serum and whole blood: A comparison of three extraction methods. Presented at DIOXIN '88, 8th International Symposium on Chlorinated Dioxins and Related Compounds, Umea, Sweden, August 21-26, 1988.

Patterson DG Jr, Burse VW, Barnhart ER, Lapeza CR Jr., Groce DG, Needham LL. Comparison of polychlorinated biphenyl levels in human samples by electron capture gas chromatography and isotope dilution mass spectrometry. Presented at DIOXIN '88, 8th International Symposium on Chlorinated Dioxins and Related Compounds, Umea, Sweden, August 21-26, 1988.

Patterson DG Jr, Reddy VV, Alexander LR, Ashley DL, Grainger J, Lapeza CR Jr. The synthesis and analytical characteristics of all tetra- to octachlorodibenzo-p-dioxins. Presented at DIOXIN '88, 8th International Symposium on Chlorinated Dioxins and Related Compounds, Umea, Sweden, August 21-26, 1988.

Ashley DL, Reddy VV, Patterson DG Jr. Substituent effects in the proton nuclear magnetic resonance spectra of chlorinated dibenzo-p-dioxins and dibenzofurans. Presented at DIOXIN '88, 8th International Symposium on Chlorinated Dioxins and Related Compounds, Umea, Sweden, August 21-26, 1988

Alexander LR, Maggio VL, Gill JB, Green VE, Patterson DG Jr. Performance of the high sensitivity ion source for PCDD/PCDF analyses in human serum and adipose tissue. Presented at DIOXIN '88, 8th International Symposium on Chlorinated Dioxins and Related Compounds, Umea, Sweden, August 21-26, 1988.

Alexander LR, Maggio VL, Gill JB, Green VE, Isaacs S, Patterson DG Jr. Automated processing of high resolution mass spectrometry selected ion recording data for multiple group analyses. Presented at DIOXIN '88, 8th International Symposium on Chlorinated Dioxins and Related Compounds, Umea, Sweden, August 21-26, 1988.

Needham LL, Burse VW, Patterson DG Jr, Groce DF, McClure PC, Korver MP, Henderson LO, Hannon H. Distribution of polychlorinated biphenyls and organochlorine hydrocarbon pesticides in whole blood. Presented at DIOXIN '88, 8th International Symposium on Chlorinated Dioxins and Related Compounds, Umea, Sweden, August 21-26, 1988.

Grainger J, Reddy VV, Patterson DG Jr. Analysis of tetrathrough octachlorinated dibenzo-p-dioxins by gas chromatography/Fourier transform infrared spectroscopy. Presented at DIOXIN '88, 8th International Symposium on Chlorinated Dioxins and Related Compounds, Umea, Sweden, August 21-26, 1988.

Groce DF, Alley CC, Patterson DG Jr. Quantitative characterization of PCB pyrolysis mixtures. Presented at DIOXIN '88, 8th International Symposium on Chlorinated Dioxins and Related Compounds, Umea, Sweden, August 21-26, 1988.

Barnhart ER, Patterson DG Jr. Potential interferences in the analysis for PCDDs/PCDFs/PCBs by chlorinated congeners and addition products of biphenylenes, pyrenes, naphthalenes, and fluoranthene. Presented at DIOXIN '88, 8th International Symposium on Chlorinated Dioxins and Related Compounds, Umea, Sweden, August 21-26, 1988.

Reddy VV, Bowen JP, Patterson DG Jr. The 3-dimensional structures of all tetra- to octachlorodibenzo-p-dioxin congeners: The relationship of structure to toxicity. Presented at DIOXIN '88, 8th International Symposium on Chlorinated Dioxins and Related Compounds, Umea, Sweden, August 21-26, 1988

Needham LL, Patterson DG Jr, Bernert JT Jr, Kilbourne EM, Posada M, Abaitua I. Levels of polychlorinated dibenzo-p-dioxins and dibenzofurans in Spanish toxic oil. Presented at DIOXIN '88, 8th International Symposium on Chlorinated Dioxins and Related Compounds, Umea, Sweden, August 21-26, 1988.

Wolfe WH, Michalek JE, Patterson DG Jr, Needham LL, Miner JC, Pirkle JL. Correlation between serum dioxin levels and calculated exposure in military personnel exposed to Agent Orange. Presented at DIOXIN '88, 8th International Symposium on Chlorinated Dioxins and Related Compounds, Umea, Sweden, August 21-26, 1988.

Barnhart ER, Patterson DG Jr, Alexander LR, Ashley DL. Comparison of reversed-phase liquid chromatography of polychlorinated aromatic compounds with C-18 and pyrene columns. Presented at 193rd ACS National Meeting, Denver, CO, April 5-10, 1987.

Ashley DL, Barnhart ER, Patterson DG Jr, Hill RH Jr. Use of proton nuclear magnetic resonance in determination of substitution an addition products of chlorinated aromatic hydrocarbons, Presented at 193rd ACS National Meeting, Denver, CO, April 5-10, 1987.

Myers GL, Patterson DG Jr, Spierto FW. Comparison of dry versus wet wipe tests for monitoring dioxin surface contamination in laboratories. Presented at 193rd ACS National Meeting, Denver, CO, April 5-10, 1987.

Grainger J, Reddy VV, Patterson DG Jr. Molecular geometry approximations for chlorinated dibenzodioxins by Fourier transform infrared spectroscopy. Presented at 193rd National ACS Meeting, Denver, CO, April 5-10, 1987.

Alley CC, Patterson DG Jr, Isaacs SG. NCI mass spectrometric analysis of human adipose tissue for PCDDs and PCDFS. Presented at the 35th American Association for Mass Spectrometry Conference, Denver, CO, May 24-29, 1987.

Alexander LR, Maggio VL, Gill JB, Green VE, Nicolaysen LC, Patterson DG Jr. Performance of the high sensitivity ion source for dioxin/furan analysis of human serum and adipose tissue. Presented at the VG Users Meeting, ASMS Meeting, Denver, CO, May 23, 1987.

Alexander LA, Maggio VL, Green VE, Gill JB, Patterson DG Jr. An innovative cleaning method for mass spectrometry ion sources. Presented at the VG Users Meeting, ASMS Meeting in Denver, CO, May 23, 1987.

Patterson DG Jr, Turner WE, Alexander LR, Isaacs S, Needham LL. The analytical methodology for the determination of 2378-TCDD in serum for the Agent Orange Validation Study, the Ranch Hand Study and selected NIOSH studies. Presented at DIOXIN '87, 7th International Symposium on Chlorinated Dioxins and Related Compounds, Las Vegas, NV, October 4-9, 1987.

Patterson DG Jr, Turner WE, Isaacs S, Alexander LR, Needham LL. A quality assurance program for measuring 2378-TCDD in a large number of serum samples. Presented at DIOXIN '87, 7th International Symposium on Chlorinated Dioxins and Related Compounds, Las Vegas, NV, October 4-9, 1987.

Patterson DG Jr, Reddy VV, Grainger J, Bowen P. Calculated molecular geometries and energies of all chlorinated dibenzo-p-dioxins using MMP2. Presented at DIOXIN '87, 7th International Symposium on Chlorinated Dioxins and Related Compounds, Las Vegas, NV, October 4-9, 1987.

Patterson DG Jr, Barnhart ER, Turner WE, Tanaka N, Araki M. Reversed phase chromatographic separations and retention properties of TCDD on pyrene and Ods column. Presented at DIOXIN '87, 7th International Symposium on Chlorinated Dioxins and Related Compounds, Las Vegas, NV, October 4-9, 1987.

Grainger J, Reddy V, Patterson DG Jr. Molecular geometry approximations for chlorinated dibenzodioxin by Fourier transform infrared spectroscopy. Presented at DIOXIN '87, 7th International Symposium on Chlorinated Dioxins and Related Compounds, Las Vegas, NV, October 4-9, 1987.

Patterson DG Jr, Fingerhut MA, Roberts DR, Needham LL, Marlow DA, Haring M-Sweeney, Andrews JS Jr., Halperin WE. Levels of 2378-TCDD in occupationally exposed workers. Presented at DIOXIN '87, 7th International Symposium on Chlorinated Dioxins and Related Compounds, Las Vegas, NV, October 4-9, 1987.

Needham LL, Patterson DG Jr, Pirkle JL, Henderson LO, Burse VW. Is serum a valid matrix for measuring 2378-TCDD. Presented at DIOXIN '87, 7th International Symposium on Chlorinated Dioxins and Related Compounds, Las Vegas, NV, October 4-9, 1987.

Karon JM, Flanders WD, Devine OJ, Needham LL, Patterson DG Jr. Serum dioxin levels in U.S. Army Vietnam and non-Vietnam Veterans. Presented at DIOXIN '87, 7th International Symposium on Chlorinated Dioxins and Related Compounds, Las Vegas, NV, October 4-9, 1987.

Andrews JS Jr, Garrett WA Jr, Patterson DG Jr, Needham LL, Anderson JE, Roberts DW, Bagby JR, Paletta TK Sr, Paletta TK Jr. 2378-TCDD Levels in Adipose Tissue of Exposed and Control Persons in Missouri, Presented at DIOXIN '87, 7th International Symposium on Chlorinated Dioxins and Related Compounds, Las Vegas, NV, October 4-9, 1987.

Pirkle JL, Wolfe WH, Patterson DG Jr, Needham LL, Michalek JE, Miner JC, Peterson MR. Estimates of the half-life of 2378-TCDD in Ranch Hand Veterans. Presented at DIOXIN '87, 7th International Symposium on Chlorinated Dioxins and Related Compounds, Las Vegas, NV, October 4-9, 1987.

Needham LL, Patterson DG Jr, Burse VW. The determination of dioxins and related compounds in humans specimens at the U.S. centers for disease control: Past, present and future. Presented at DIOXIN '87, 7th International Symposium on Chlorinated Dioxins and Related Compounds, Las Vegas, NV, October 4-9, 1987.

Holler JS, Patterson DG Jr, Smith SJ. Quantification of toxic chemicals in selected human populations. Presented at Symposium on Accuracy in Trace Analysis—Accomplishments, Goals, Challenges, Gaithersburg, MD, October 1, 1987.

Patterson DG Jr. Measuring body burdens of PCDDs and PCDFs in Vietnam Veterans and occupationally exposed workers. Presented to the Local Section of the American Association of Clinical Chemists, November 24, 1987.

Patterson DG Jr, Needham LL, Sampson EJ. Various laboratory studies at CDC involving dioxin. Presented at the 34th Annual Conference on Mass Spectrometry and Allied Topics, Cincinnati, OH, June 8-13, 1986.

Alley CC, Barnhart ER, Patterson DG Jr, Maggio V, Ashley D. Gas chromatography/mass spectrometry studies in support of synthesis of standard reference material for determination of chlorinated pyrene content of biological specimens. Presented at the 34th Annual Conference on Mass Spectrometry and Allied Topics, Cincinnati, OH, June 8-13, 1986.

Patterson DG Jr, Alley CC, Barnhart ER. Analysis for polychlorinated biphenylenes in human adipose tissue by negative chemical ionization. Presented at the 34th Annual Conference on Mass Spectrometry and Allied Topics, Cincinnati, OH, June 8-13, 1986.

Alley CC, Isaacs S, Patterson DG Jr. Analysis of human adipose tissue for polychlorinated dioxins and furans by gas chromatography/mass spectrometry. Presented at the 8th Annual Chromatography Symposium of the Atlanta Chromatography Discussion Group, May 1986.

Isaacs S, Lapeza C, Patterson DG Jr. Multi-column, semiautomated sample preparation for dioxin and furan analysis on a whole-weight and percent lipid basis. Presented at the 8th Annual Chromatography Symposium of the Atlanta Chromatography Discussion Group, May 1986.

Andrews JS Jr, Stehr-Gree PA, Patterson DG Jr, Evans RG, Hoffman RE, Roberts DW, Bagby JR, Needham LL, Garrett WA, Falk H, Pirkle JL, Webb K, Sampson EJ. Missouri dioxin studies: Some thoughts on their implications. Presented at the 7th Superfund Conference, Washington, D.C., December, 1986.

Ashley DL, Barnhart ER, Patterson DG Jr, Hill RH Jr. Proton nuclear magnetic resonance longitudinal relaxation times in identification of polychlorinated aromatic compounds. Southeastern ACS, Louisville, KY, November 3-5, 1986.

Barnhart ER, Patterson DG Jr, Ashley DL, Maggio VL, MacBride JAH, Alley CC. A convenient way to chlorinate aromatic compounds for use as reference standards in analysis for environmental contaminants. Presented at the Eastern Analytical Symposium ACS, Denver, CO, October 6-10, 1986.

Barnhart ER, Patterson DG Jr, Ashley DL, Grainger J. The synthesis and characterization of polychlorinated dioxins, furans, biphenylenes, and pyrenes for use as analytical reference standards. Presented at Dioxin 86, 6th International Symposium on Chlorinated Dioxins and Related Compounds, Fukuoka, Japan, September 16, 1986.

Patterson DG Jr, Alexander LR, Alley CC, Maggio VL, Nicolaysen LC, Needham LL. Multiple group analysis for dioxins/furans in human adipose. Presented at Dioxin 86, 6th International Symposium on Chlorinated Dioxins and Related Compounds, Fukuoka, Japan, September 18, 1986.

Patterson DG Jr, Belser WT, Hampton L, Lapeza CR Jr, Green VE, Needham LL. Analytical method for the analysis of human serum for tetrachlorodibenzo-p-dioxins. Presented at Dioxin 86, 6th International Symposium on Chlorinated Dioxins and Related Compounds, Fukuoka, Japan, September 18, 1986.

Needham LL, Patterson DG Jr, Isaacs S, Maggio V, Alexander LR, Smith SJ, Ross W, Pirkle JL. Distribution of dioxins and furans in various human adipose tissues taken at autopsy. Presented at Dioxin 86, 6th International Symposium on Chlorinated Dioxins and Related Compounds, Fukuoka, Japan, September 18, 1986.

Patterson DG Jr, Needham LL, Pirkle JL, Sampson EJ, Roberts DW, Andrews J, Garrett W. Levels of 2,3,7,8-tetrachlorodibenzo-p-dioxin in paired human serum and adipose tissue. Presented at Dioxin 86, 6th International Symposium on Chlorinated Dioxins and Related Compounds, Fukuoka, Japan, September 18, 1986.

Patterson DG Jr, Hoffman RE, Needham LL, Bagby JR, Roberts DW, Pirkle JL, Falk H, Sampson EJ, Houk VN. Levels of 2,3,7,8-tetrachlorodibenzop-dioxin in adipose tissue of exposed and control persons in Missouri. Presented at Dioxin 86, 6th International Symposium on Chlorinated Dioxins and Related Compounds, Fukuoka, Japan, September 18, 1986.

Sampson EJ, Patterson DG Jr, Alley CC, Isaacs S, Bagby JR, Hoffman RE, and Needham LL. Polychlorinated dibenzo-p-dioxins and dibenzofuran levels in persons with high levels and normal levels

of 2,3,7,8-tetrachlorodibenzo-p-dioxin. Presented at Dioxin 86, 6th International Symposium on Chlorinated Dioxins and Related Compounds, Fukuoka, Japan, September 18, 1986.

Hoffman RE, Belser WT, Patterson DG Jr, Bagby JR Needham LL. Assessment of human exposure to 2,3,7,8-TCDD through biological monitoring: A case study. Presented at Dioxin 86, 6th International Symposium on Chlorinated Dioxins and Related Compounds, Fukuoka, Japan, September 18, 1986.

Gelbaum LT, Patterson DG Jr, Groce DF. Preparation of dioxin standards for chemical analysis. ACS, Miami, FL, April, 1985.

Myers GL, Liddle JA, Patterson DG Jr, Hill RH. Safe handling of chemical toxicants: wipe tests for monitoring contamination. Presented before the Division of Environmental Chemistry, American Chemical Society, Miami, FL, April 1985.

Lapeza CR, Patterson DG Jr, Liddle JA. An automated apparatus for the extraction and enrichment of 2,3,7,8-TCDD in human adipose tissue. Presented at the Scientific Computing and Automation Conference, Atlantic City, NJ, May 1-3, 1985.

Holler JS, Patterson DG Jr, Alexander LR, Groce DF, O'Connor RC, Lapeza CR. Control of artifacts and contamination in the development of a dioxin analytical program. Presented at the 33rd Annual Conference on Mass Spectrometry and Allied Topics, San Diego, CA, June 1985.

Needham LL, Patterson DG Jr. Centers for Disease Control's analytical program in chlorinated dibenzodioxins. Presented at 15th Annual Symposium on the Analytical Chemistry of Pollutants, Jekyll Island, GA, May 20-23, 1985.

Gelbaum LT, Patterson DG Jr, Groce DF. Synthesis and high resolution GC/MS of the 22-tetrachlorinated dibenzodioxins. Presented at the 7th Annual Chromatography Symposium of the Atlanta Chromatography Discussion Group, May 15, 1985.

Gelbaum LT, Patterson DG Jr, Groce DF, Needham LL. Preparation of polychlorinated dibenzo-p-dioxin standards for quantitative analysis. Presented at Dioxin 85, 5th International Symposium on Chlorinated Dioxins and Related Compounds, Bayreuth, Germany, September 16-19, 1985.

Patterson DG Jr, Holler JS, Alexander LR, Needham LL. A high-resolution gas chromatography analysis of 2,3,7,8-TCDD in human adipose tissue. Presented at Dioxin 85, 5th International Symposium on Chlorinated Dioxins and Related Compounds, Bayreuth, Germany, September 16-19, 1985.

Patterson DG Jr, Holler JS, Smith SJ, Liddle JA, Needham LL. Human tissue data in certain U.S. populations. Presented at Dioxin 85, 5th International Symposium on Chlorinated Dioxins and Related Compounds, Bayreuth, Germany, September 16-19, 1985.

Patterson DG Jr, Barnhart ER, MacBride JAH, Turner WE. Polychlorinated biphenylene production for qualitative reference material. Presented before the Division of Environmental Chemistry, American Chemical Society, Miami, FL, April, 1985.

Patterson DG Jr, Holler JS, Lapeza CR, Alexander LR, Groce DF, O'Connor RC, Smith SJ, Liddle JA. A high-resolution gas chromatographic/high-resolution mass spectroscopic method for the analysis of 2,3,7,8-TCDD in human adipose tissue. Presented at the 1985 Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, New Orleans, LA, February 25-March 1, 1985.

Patterson DG Jr, Barnhart ER. Chromatographic separation of photodegradation products and polyhalogenated environmental toxicants. Presented at the 6th Atlanta Chromatography Symposium Atlanta, GA. May 16, 1984.

Patterson DG Jr. Measuring body burdens of dioxins and furans. Presented at the Conference on

Hazardous Substances, Exposure Monitoring, and Health Effects Evaluation for Public Health Scientists, Atlanta, GA, October, 15-19, 1984.

Patterson DG Jr, Fast DM, Baird MA, Culbreth PH, Holler JS, Sampson EJ, Bayse DD. Multiple-steroid pool with a definitive cortisol concentration. Presented at the 34th National American Association for Clinical Chemistry Meeting, Anaheim, CA, August 8-13, 1982; Clin Chem 1982; 28(7):1653.

Patterson DG Jr, Culbreth PH, Baird MA , Holler JS, Sampson EJ, Bayse DD. Development of isotope dilution mass spectrometric methods for steroid hormones in a multisteroid human serum pool. Presented at the International Symposium on the Synthesis and Applications of Isotopically Labeled Compounds, Kansas City, MO, June 6-11, 1982.

Patterson DG Jr, Holler JS, Baird MA. Maximizing precision and accuracy in quantitation of serum testosterone. Presented at the 30th Annual Conf. on Mass Spectrometry and Allied Topics, Honolulu, HI, June 6-11, 1982.

Yert LW, Holler JS, Patterson DG Jr. Conformation of chromatographic methods by using GC/MS techniques. Presented before the Division of Analytical Chemistry, ACS, Atlanta, GA, March 29-April 3, 1982.

Holler JS, Patterson DG Jr, Yert LW. Characterization of reference materials for use in quantitative GC/MS Analyses. Presented before the Division of Analytical Chemistry, ACS, Atlanta, GA, March 29-April 3, 1981.

Patterson DG Jr, Holler JS, Sampson EJ, Bayse DD. Development of isotope dilution mass spectrometric methods for steroid hormones in a multianalyte human serum pool. Presented before the Division of Analytical Chemistry, ACS, Atlanta, GA, March 29-April 3, 1981.

Patterson DG Jr, Hill RH, Needham LL, Orti DL, Kimbrough RD, Liddle JA. Hyperkeratotic activity from the photolysis products of the inactive 2,2',4,4',5,5'-hexabromobiphenyl. Presented before the Division of Environmental Chemistry, ACS, Atlanta, GA, March 29-April 3, 1981.

Hill RH Jr., Patterson DG Jr, Orti DL, Holler JS, Needham LL, Sirmans SL, Liddle JA. Evidence of degradation of polybrominated biphenyls in soil samples from the state of Michigan. Presented at the 11th Symposium on the Anal. Chem. of Pollutants, Jekyll Island, GA, May 18-20, 1981.

Patterson DG Jr, Sampson EJ, Culbreth PH, Holler JS, Bayse DD. Cortisol degradation products examined by HPLC and GC/MS. Presented at the American Association for Clinical Chemistry, Kansas City, MO, July 19-24, 1981; Clin Chem 1981; 27(6):1054.

Patterson DG Jr, Orti DL, Yert LW, Hill RH Jr, Lee J, Holler JS, Needham LL. The characterization and environmental impact of compounds formed in the photodegradation of polybrominated biphenvi congeners. Presented at the 29th Annual Conference on Mass Spectrometry and Allied Topics, Minneapolis, MN, May 24-29, 1981.

Holler JS, Patterson DG Jr, Yert LW. The characterization of cortisol and related steroid derivatives by electron impact and negative ion chemical ionization mass spectrometry. Presented at the 29th Annual Conf. on Mass Spectrometry and Allied Topics, Minneapolis, MN, May 24-29, 1981.

Patterson DG Jr, Yert LW, Orti DL, Holler JS. Sunlight photodegradation of purified polybrominated bipheny(s (PBB) congeners studies by GC/MS. Presented at 28th Annual Conf. on Mass Spectrometry and Allied Topics, New York, NY, May 25-30, 1980.

Yert LW, Reiss E, Patterson DG Jr, Ibrahim BT, Holler JS. Gas chromatography/mass spectrometry characterization of mannans derived from medically significant yeast. Presented at 28th Annual Conf. on Mass Spectrometry and Allied Topics, New York, NY, May 25-30, 1980.

Holler JS, Patterson DG Jr, Yert LW. Development of precise quantitative methods for use in clinical chemistry. Presented at 28th Annual Conf. on Mass Spectrometry and Allied Topics, New York, NY, May 25-30, 1980.

Patterson DG Jr, Yert LW, Orti DL, Holler JS. Sunlight photodegradation of purified polybrominated bipheny (PBB) congeners studied by GC/MS. Presented before the Division of Organic Chemistry, American Chemical Society, Las Vegas, NV, August 24-29, 1980.

Needham LL, Hill RH Jr, Orti DL, Patterson DG Jr, Kimbrough RD, Groce DL, Liddle JA. Identification of compounds (polybrominated biphenys) in Firemaster FF-1 that Possess hyperkeratotic activity. Presented before the Division of Environmental Chemistry, ACS, Las Vegas, NV, August 24-29, 1980.

Holler JS, Patterson DG Jr, Yert LW, Sampson EJ, Culbreth PH, Hearn TL, Bayse DD. Development of a candidate definitive method for serum cortisol. Clin Chem 1980; 26:1016.

Holler JS, Patterson DG Jr, Scott RB, Monk ME, Brown P. Field ionization kinetics studies of stereoisomers. Presented at the 24th Annual Conf. on Mass Spectrometry and Allied Topics, San Diego, CA, 1976.

Ashley DL, Reddy VV, Patterson DG Jr. Substituent effects in the proton nuclear magnetic resonance spectra of chlorinated dibenzo-p-dioxins and dibenzofurans. Presented before the Division of Analytical Chemistry.

Ashley DL, Bonin MA, Cardinali FL, McCraw JM, Patterson DG Jr, Needham LL. Determination of 38 volatile organic compounds in human blood by using purge and trap gas chromatography/mass spectrometry. Presented at the American Industrial Hygiene Conference.

## Project Experience

Identified, prioritized, planned, and conducted studies involving human exposure to environmental organic toxicants that are of the utmost national need in environmental public health. These exposure assessments are paramount for assessing human exposure for purposes of risk assessment and risk management, and for relating human exposure to adverse health outcomes; thus, they often serve as the scientific basis for policy decisions in environmental public health.

These exposure assessments were conducted as part of a large biomonitoring program within the Division of Laboratory Sciences (DLS), which measures the human internal dose of various toxicants of public health concern. These biomedical analyses may involve measuring the toxicant of concern in serum, plasma, whole blood, adipose/organ tissue, breast milk, or their metabolites in urine. In addition, many reactive compounds can be measured as hemoglobin, or DNA adducts. To ensure that the needed analytical laboratory technology for measuring biomarkers of exposure was developed, validated, and utilized, gave both technical and administrative direction to a staff of approximately 36 professionals. The technology was frequently unique within not only the Public Health Service but also the scientific arena.

As part of the aforementioned exposure assessments, ensured the quality of the data through the implementation of a quality assurance plan. Contacted and worked in close collaboration with other federal, state, and international scientists and administrators from inception to completion of the studies, to ensure that human exposure to organic toxicants was assessed and thereby improved the diagnosis, treatment, and prevention of toxicant exposures and any potential resulting adverse health effects. On completion of these studies, worked closely with officials, scientists, and senior management within CDC to ensure that the data were used to address public health issues and shape national environmental health policy. Served as a team member or as the spokesperson for these studies before White House Committees, staffs of Congress, scientific delegations, peer-review panels, and international officials, and

as a consultant to domestic and international delegations on environmental health concerns. Responsibilities were to formulate and guide programs that were of great interest to the Public Health Service and that required the state-of-the-art analytical methods. These methods were of such complexity that the work was subdivided into three areas (organic synthesis, sample preparation, and analytical analyses). These state-of-the-art methods were used when needed, such as in the various dioxin-related studies (e.g., Vietnam Air Force Ranch Hand Study; Agent Orange Validation Study; etc.) Served as the principal spokesman for the National Center for Environmental Health (NCEH) regarding analytical aspects of the related projects and their national and international applications.

Principal spokesman for NCEH concerning all aspects of the methodology of study results in presentations before committees and Staff of Congress, Office of Technology Assessment Advisory Panels, Institute of Medicine Advisory Committees, Department of Defense Armed Forces Epidemiological Board: Veterans Administration's Advisory Committee on Environmental Hazards; as well as other interested governmental agencies. Prepared and presented the results of research protocols through talks and lectures to senior management, as well as to the general scientific community, at various national and international scientific meetings.

Served as the Agency's expert and spokesman in the laboratory measurement of ultratrace levels of dioxin and related toxicants in human specimens. Directed major research and development programs that featured state-of-the-art analytical methods, which were then applied to issues of great importance to the Agency; an example of this was the measurement of 2,3,7,8-TCDD in the serum of U.S. Army Vietnam Veterans (the Agent Orange Validation Study). In addition to the Agent Orange Validation Study, the dioxin method was applied to the NIOSH occupational studies and the U.S. Air Force Ranch Hand study, and international studies such as the Seveso, Italy, study. This responsibility also included the development and application of methods for the analysis of pesticides, polycyclic aromatic hydrocarbons (PAHs), and PCBs in blood samples. These methods were applied in studies that assessed the exposure of farmers and their families to pesticides and assessed the extent of residential exposure to PAHs from around waste disposal sites.

Developed reference and definitive methods for analytes of clinical interest (steroid hormones, etc.) through overall design of the methodology, conduct of the laboratory work, and appropriate statistical analysis of the results, and publication of the work in the appropriate forum.

Developed a program for the synthesis of region-specific isotopically labeled steroids and other internal standards for use in the development of definitive methods using isotope dilution-mass spectrometry.

Developed and applied mass spectral techniques to provide rapid answers in cases of environmental incidents endangering human health. This responsibility also included development of screening methods to look for new and emerging environmental toxicants in the tissue stores of the U.S. population, and to measure the targeted environmental chemicals in a statistically designed sample of the U.S. population using the National Health and Nutrition Examination Survey (NHANES).

Instrumentation was developed for high-speed and high-sensitivity screening for new and targeted chemicals, such as comprehensive two-dimensional (GCxGC) coupled with time-of-flight mass spectrometry (GCxGC-TOFMS) and high-resolution mass spectrometry (GCxGC-HRMS).

## Advisory Appointments

Elected Advisor to the Board of International Society for Polycyclic Aromatic Compounds (ISPAC), January 2008-2011

Member of the International Science Advisory Board for the International Environmental Forensics Conference (INEF), Calgary, AB, August 31-September 2, 2009

Member of the International Scientific Committee for the 22nd International Symposium for Polycyclic

Aromatic Compounds (ISPAC-22), Charleston, SC, September 20-24, 2009

Member of the International Science Advisory Board and Plenary Speaker for the International Environmental Forensics Conference 2008, Quindao, China, May 27-30, 2008

Member of the Scientific Committee for BFR-2008 Workshop, Victoria, BC, Canada, June 3-4, 2008

Member of the International Organizing Committee for the 6th Biennial Conference on Monitoring and Measurement of the Environment, Toronto, Canada, May 2006

Member of the International Scientific Committee for the Annual International Symposium on Biological and Environmental Reference Materials (BERM)

2005-present

Member of the Advisory Committee for the Ph.D. Thesis of Jane Li at the Georgia Institute of Technology, School of Environmental and Civil Engineering, Atlanta, GA., 2005-present

Invited to participate at the University of Michigan Dioxin Exposure Study Scientific Advisory Board Meetings Ann Arbor, MI, October 20, 2004-present

Member of International Organizing Committee for 5th Biennial conference on Monitoring and Measurement of the Environment, Toronto, Canada, May 17-21, 2004;

Organized and chaired Special Session entitled: "Homeland Security and Emergency Response"; presented two invited presentations on Polycyclic Aromatic Compounds and Brominated Flame Retarding Chemicals

International Advisory Board Member for the International Brominated Flame Retardants in the Environment's Annual Workshop, 2003-present

Planning Committee Member for the National Center for Environmental Health 6th National Public Health Conference, Atlanta, GA, December 2003

Organizer for the 2003 5th Annual International Workshop on Brominated Flame-Retardants in the Environment, Boston, MA, August 2003

Member of Ph.D. Thesis advisory committee for Jean-Francois Alain Focant, University of Liege, Liege, Belgium; thesis advisor is Professor E. DePauw; thesis titled, "Analytical Methods for Micropollutants Trace Level Analysis, Especially Dioxins and Related Compounds," October 2002

Member, National Toxicology Program Executive Committee Inter-Agency Working Group for the Congressional Report on Carcinogens (RG2), NIEHS, NIH, HHS, 2000-2002

Ph.D. Degree Opponent at the University of Stockholm, Andreas Sjodin, titled: "Occupational and Dietary Exposure to Organohalogen Substances, with Special Emphasis on Polybrominated Diphenyl Ethers," Stockholm, Sweden, May 26, 2000

Advisory Board Member for Enviroanalysis-2000; Symposium Organizer for Endocrine Disrupting Chemicals, Ottawa, Canada, May 11-14, 2000

Member of International Scientific Advisory Committee for study titled: "Early Childhood Development and PCB Exposure in Slovakia," 2000-2005

Consultant to the National Center for Toxicological Research (NCTR) in Jefferson, AK, September 10-11, 1998, on matters related to human body burdens of persistent organic compounds

Member of two committees during 1998 on the Workforce Diversity Implementation Plan (Employee Development Subcommittee and the Tracking and Evaluation Subcommittee)

Principal Investigator for the CDC/Japanese Collaborative International Research Project designed to enhance our understanding of separation mechanisms for environmental toxicants; this joint project is designed to develop and then apply new separation technologies to human biomonitoring

Ph.D. Advisory Committee Member: Li Ma, Emory University, Department of Chemistry, Atlanta, GA thesis, "The Use of Cloud-point Extraction in Analysis of Environmental and Biological Samples for Toxic Chemicals," 1998

Member of the Project Advisory Committee (PAC) for The American Water Works Association (AWWA) Research Foundation, 1997-2002

Appointed Member of American Chemical Society Analytical Chemistry Division Awards Panel for 1997-2000

PhD Advisory Committee Member: Umesh Akki, Georgia Institute of Technology, Environmental Engineering, Atlanta, GA: Thesis "Gas-Phase Formation Pathways of Chlorinated Dibenzo-p-dioxins and Dibenzofurans from Chlorophenols: A Pyrolysis Study," 1997

Organizing Committee Member for the 1997 International Society for Exposure Analysis (ISEA) Meeting in Research Triangle Park, NC, November 2-5, 1997

National Advisory Committee Member and Symposium organizer and speaker for Dioxin-97 (16th International Conference on Organohalogen Compounds) in Indianapolis, IN, August 1997

International Advisory Committee Member for the Symposium on Biological Monitoring in Occupational and Environmental Health, Espoo, Finland, September 11-13, 1996

International Advisory Committee Member for EnviroAnalysis - 96 (Biennial Int. Conference on Chemical Measurement and Monitoring of the Environment), Ottawa, Canada, May 13-16, 1996

International Advisory Committee Member for Dioxin-95 (14th Int. Conf. on Organohalogen Compounds) in Edmonton, Alberta, Canada, August 1995

Veterans Administration's Office of Environmental Epidemiology in Washington, DC. Member of VA Panel Reviewing the VA/EPA Joint Study of Dioxin in Adipose Tissue Among Vietnam Veterans, November 16-17, 1988

Veterans Administration's Advisory Committee on Environmental Hazards in Washington, DC. Presentation titled, "Laboratory Methodology, Literature Overview, and Results from the Dioxin Half-Life Study," October 15, 1988

Department of Defense Armed Forces Epidemiological Board at Parson's Island, Maryland. Presentation titled, "The Laboratory Methodology and Results from the Agent Orange Validation Study, the Ranch Hand Validation and Half-Life Studies for 2,3,7,8-Tetrachlorodibenzo-p-dioxin," September 17-18, 1988

Office of Technology Assessment Agent Orange Advisory Panel in Washington, DC. Technical support for presentation of the results from the Agent Orange Validation Study, August 27, 1988

Agent Orange Working Group Science Panel in Washington, DC. Presentation titled, "The Laboratory Methodology and an Overview of Dioxin Levels and Ranges in Humans," August 6, 1988

Congressional Committee Staff Members, Veterans Service Organizations, and VA Advisory Committee

on Health-Related Effects of Herbicides in Washington, DC. Technical support for the briefing of these organizations on the results of Agent Orange Validation Studies, July 24, 1988

Institute of Medicine Advisory Committee to the National Academy of Science in Washington, DC, presentation titled, "The Laboratory Methodology, an Overview of Normal and Elevated Dioxin levels, and the Half-Life of Dioxin in Humans," June 24, 1988

## Editorships & Editorial Review Boards

Appointed to the Advisory Board of the Journal of Microcolumn Separations for a three-year term 2000-2003

Appointed to the International Editorial Board for the Fresenius' Journal of Analytical Chemistry, Springer-Verlag, Postfach 31 1340, D-10643, Berlin, Germany, 1999-2003

Appointed to the Advisory Board of the Journal of Analytical Chemistry, 1996-1999

## Deposition & Trial Testimony

Prepared expert report (2012) and designated as expert witness regarding the claims of Cynthia General in the matter entitled Cynthia Paige, et al. vs Dura-Wood, et al., Alexandria, Louisiana.

PCDDs and PCDFs.

Prepared expert reports (2011), designated as expert witness (was deposed March 29-30 and April 26, 2011) in the case of Bibb, et al. vs Monsanto, et al. Nitro, WV. PCDDs and PCDFs,

Prepared expert report (2010) and designated as expert witness in the case of Willie Buard et al. v. Colfax Treating Company, et al. (case no. 214,915 F, 9th Judicial District Court Parish of Rapides, Louisiana). PCDDs and PCDFs; PCP.

Prepared expert report (2010) and designated as expert witness in the case of Jimmy Thompson et al. v. Kuhlman Electric Corp. et al. PCBs; Pesticides; Metals.

Prepared expert report (2009) and was designated as expert witness on the human blood levels of PCDDs and PCDFs at a wood treatment site in Grenada, Mississippi (case no. 3:03 CV-60-P-D, US District Court for Northern District of Mississippi, Western Division). PCDDs and PCDFs; PCBs; PAHs.

Prepared expert report, served as expert witness, was deposed (January 13, 2009), and testified at trial (May 2009) in the case of Dennis & Gail Davis v. BNSF Railway Company in the District Court Burleson County, Texas 21st Judicial District (no. 25,151). PCDDs and PCDFs; PCBs; PCP; PAHs.

Designated as expert witness (2009) in the case of Stephen and Sandra Maldonado v. BNSF Railway Company (case no. 96-208077-04) in 96th Judicial District Court of Tarrant County, TX. PCDDs and PCDFs.

Prepared expert report (2009) and designated as expert witness in the case of Barbara and John Lewis v. BNSF Railway Company, Fort Worth, Tarrin County, TX. PCDDs and PCDFs; PAHs.

Prepared expert report (2009) and designated as expert witness in the case no. 3:07cv756 HTW-LRA of James Alford et al. v. Kuhlman Electric Corp. et al., U.S. District Court, Southern District of Mississippi. PCBs.