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*Non-academic Work Experience:*

President and Principal Consultant, **HLN Consulting, LLC**, San Diego, CA, 1997 - present

I created HLN in 1997, responding to a need for technology specialists with content experience who are able to bring independent judgment to bear on technology projects. Focusing on the health care market, and public health in particular, we specialize in a wide variety of technology planning, consulting, and research.

HLN views a successful effort as one that can balance technology, organization/politics, and resource allocation; projects are approached with an eye to creating this balance. HLN Consulting, LLC utilizes a structured and document-driven development methodology that engages the client in thoughtful dialogue from requirements definition, to specification preparation, to ultimate execution. Clients include state and local government, and non-profit organizations.

Interim Vice President for Health Information Exchange Services, **Vermont Information Technology Leaders, Inc.**, Montpelier, VT, 2008 – present

Responsible for the design, development, delivery, and support of technical services for Vermont's statewide Regional Health Information Organization.

Consultant, **Center for Applied Research**, Philadelphia, PA, 1997 - 2002

Actively involved in research projects for the Center, mostly focusing on technology-assisted collaboration and organizational design.

**University of Pennsylvania**, Philadelphia, PA, 1983 - 2002

*Final Position:* Senior Fellow

Over fifteen years progressive experience in general university administration and management of technology. Seven years were spent with the Office of the Dean of the Wharton School (through August 1990); the remainder with the central Division of Information Systems and Computing where responsibilities included strategic planning for technology, management of network services for the campus (including electronic mail, world wide web, authentication systems), and technical architecture development. Final position was senior technology advisor to the Vice Provost for Computing (Penn's Chief Information Officer).

*Academic Work Experience:*

Senior Fellow, **Leonard Davis Institute for Health Economics**, 1994 - 2005

Research Associate, **Leonard Davis Institute for Health Economics**, 1994 - June 1997

Principal investigator on New Jersey Comprehensive Immunization Program sub-contract from the University of Medicine and Dentistry of New Jersey on a Robert Wood Johnson Foundation grant. Technical advisor on other Institute projects.

Research Fellow, **Institute for Research on Higher Education**, 1988 - 1993

Perform financial modeling and policy analysis on a variety of student aid and finance projects. Actively involved in research agenda of the Institute.

Lecturer, **Department of Decision Sciences, The Wharton School**, 1984 - 1987

Teach introductory laboratory course in computer science for undergraduates using Apple Macintosh personal computer.

*Sponsored Research:*

Senior investigator and technical director on the Philadelphia Interactive Business Network, a \$600,000 matching grant program funded by the National Telecommunications and Information Administration (NTIA) to The Enterprise Center, Phila., PA.

Senior investigator on the Remote Dental Consultation Project, sponsored by the National Library of Medicine, to develop and prototype a remote clinical consultation system (School of Dental Medicine, University of Pennsylvania).

Principal investigator on New Jersey Comprehensive Immunization Program, a \$1.28 million sub-contract from the University of Medicine and Dentistry of New Jersey on a Robert Wood Johnson Foundation grant.

Principal investigator on Statewide Immunization Information System, a \$335,000 continuation of the above contract funded by the Jersey Department of Health and Senior Services and the Centers for Disease Control and Prevention.

*Award:*

**Commissioner's Award, New Jersey Department of Health and Senior Services**, "in recognition of creativity, perseverance, and foresight in the development of a Nationally Recognized Statewide Immunization Information System." Awarded at the Annual Conference of State and Local Health Officers of New Jersey, Princeton, NJ, October 9, 1996.

*Book:*

*The Business of Higher Education: The American University and Its Banking Function*. New York: Garland, (1995).

*Articles:*

with Christopher Shull and Daniel Updegrave, *Blood and Guts on the Trail to Distributed Computing*, CAUSE/EFFECT, 18(3), Fall 1995.

with Susan M. Salkowitz, *Technology Strategies for a State Immunization Information System*, American Journal of Preventive Medicine supplement on All Kids Count, 13(2), April, 1997.

with Daryl Chertcoff, *Web Security Solutions: Central Authentication for Locally Developed Applications*, CAUSE/EFFECT, 22(3), Fall 1999.

*Rising to the Challenge: Strategies for the New Healthcare Enterprise*, Journal of Healthcare Information Management, 17(3), Summer 2003.

*Information Security Strategies for Healthcare: Part 1*, Journal of Healthcare Information Management, 18(2), Spring 2004.

*Information Security Strategies for Healthcare: Part II*, Journal of Healthcare Information Management, 18(3), Summer 2004.

*Information Security Strategies for Healthcare – Defining the Roadmap: Part 3*, Journal of Healthcare Information Management, 18(4), Fall 2004.

with Vikki Papadouka, et al, *Integrating the New York Citywide Immunization Registry and the Childhood Blood Lead Registry*, Journal of Public Health Management and Practice, Nov 2004 Supplement.

*The New Alphabet Soup*, Journal of Healthcare Information Management, 19(3), Summer 2005.

*The New Alphabet Soup: Models of Data Integration, Part 1*, Journal of Healthcare Information Management, 20(1), Winter 2005.

*The New Alphabet Soup: Models of Data Integration, Part 2*, Journal of Healthcare Information Management, 20(2), Spring 2006.

*The New Alphabet Soup: Models of Application Integration*, Journal of Healthcare Information Management, 20(3), Summer 2006.

*Strategies for Person Data Matching and De-duplication*, Journal of Healthcare Information Management, 21(3), Summer 2007.

with Michael Berry, *Privacy Consents and HIE: How IHE's Basic Patient Privacy Consents Profile Helps Manage Privacy in HIE*, Journal of AHIMA, (79)4, April 2008.

*Book Review:*

with Daniel Updegrave, *Five Books on Computer Security*, CAUSE/EFFECT, 14(4), Winter 1991.

*White Papers:*

with contributions by Susan M. Salkowitz, *Evolution of Public Health Information Systems: Enterprise-wide Approaches*, July 2007.

*Guide to Immunization-related Electronic Data Exchange*, May 2008.

*Effective On-line Collaboration*, May 2008.

*Conference Papers:*

with M. Katie McGee, *Desktop Technology Frontier: Deploying an Office of NeXT Workstations as the Administrator's Workstation of the Future*, **Proceedings of the 1992 CAUSE Annual Conference**, Dallas, Texas, December 1992.

with Robin Beck, Janet Gordon, and Linda May, *Architecture and Reengineering: A Partnership for Change at the University of Pennsylvania*, **Proceedings of the 1993 CAUSE Annual Conference**, San Diego, CA, December 1993.

with Ira Winston, *Designing and Implementing a Network Architecture Before it Becomes Obsolete*, **Proceedings of the 1994 CAUSE Annual Conference**, Orlando, FL, December 1994.

with Robin Beck, Janet Gordon, and Linda May, *Chasing the Boulder Down the Hill: Reengineering and Architecture at the University of Pennsylvania*, **Proceedings of the 1994 CAUSE Annual Conference**, Orlando, FL, December 1994.

with Dan Updegrave, *Looking to the Year 2000: Alternatives in Campus Data Networking*, **Proceedings of the 1995 CAUSE Annual Conference**, New Orleans, LA, November 1995.

with David Millar and Bill Ramirez, *Assessing Risk: Developing a Client/Server Security Architecture*, **Proceedings of the 1995 CAUSE Annual Conference**, New Orleans, LA, December 1995.

with Linda May, *Managing Collaborative Efforts on the Web*, **Proceedings of the 1996 CAUSE Annual Conference**, San Francisco, CA, December 1996.

With Linda May, Mario Moussa, and Lynn Oppenheim, *Tasting as You Cook: Penn Restructures Computing Services*, **Proceedings of the 1996 CAUSE Annual Conference**, San Francisco, CA, December 1996.

*Web Security Solutions: Implementing a Web Security Module to Support Secure, Authenticated Applications*, **Proceedings of the 1998 CAUSE Annual Conference**, Seattle, Washington, December 1998.

*Other Presentations:*

*Penn's Project Cornerstone: Building a Principles-based Systems Architecture in Conjunction with Business Reengineering*, IngresWorld 93, Santa Clara, CA, May 1993.

with Chris Shull and Dan Updegrove, *Distributed Computing at Penn: Observations from the Not-so-bleeding Edge*, CAUSE Northeast Regional Conference, Philadelphia, PA, June 1995.

*State Immunization Information System (SIIS) Developer's Workshop: System Security Functions Presentation*, Centers for Disease Control and Prevention, Atlanta, GA, August, 1995.

*Electronic Laboratory Surveillance: System Security Functions Presentation*, Centers for Disease Control and Prevention, Atlanta, GA, February, 1996.

*Internet 101: An Overview of Internet Resources and Functionality*, Delaware Valley Healthcare Information and Management Systems Society (DVHIMSS), Philadelphia, PA, April, 1996.

*Campus Data Networking Architecture: A Process As Well as a Product*, QUESTnet 96, Townsville, Australia, July 1996.

*ResNet: Student Residence Networking at the University of Pennsylvania*, QUESTnet 96, Townsville, Australia, July 1996.

*INPHO On the Internet: A Wide-area Network Solution?*, 2<sup>nd</sup> National CDC INPHO Conference, Atlanta, GA, September, 1996.

with Susan M. Salkowitz, *Promoting the Internet in Public Health: New Jersey's Experience*, American Public Health Association (APHA) 124<sup>th</sup> Annual Meeting, New York City, November 18, 1996.

*Security and Deployment Challenges of Hospital Access to Registries Through the Internet*, "All Kids Count" Annual Meeting, San Diego, California, April 3, 1997.

with Susan M. Salkowitz, Poster Session entitled *Lessons Learned About Data Standards and Quality Assurance From Pilot Immunization Registry*, 31<sup>st</sup> National Immunization Conference, Detroit, MI, May 21, 1997.

with Susan M. Salkowitz, Participation in *Developer's Demonstrations of Advances in Registry Technology*, 31<sup>st</sup> National Immunization Conference, Detroit, MI, May 21, 1997.

*The Current State of Web Privacy, Confidentiality, and Security*, American Public Health Association (APHA) 125<sup>th</sup> Annual Meeting, Indianapolis, IN, November 12, 1997.

*Standards for Web Browser Security*, "All Kids Count" Annual Meeting, New Orleans, LA, April 8, 1998.

with Susan M. Salkowitz, *The Final Chapter: Managing the Technical, Financial and Political Complexities of Immunization Registry Deployment and Sustainability*, 32<sup>nd</sup> National Immunization Conference, Atlanta, GA, July 21, 1998.

with Susan M. Salkowitz and Ruth Gubernick, *A Collaborative Approach to Systems Design for a Community-based Maternal/Child Agency Operating in a Managed Care Environment*,

American Public Health Association (APHA) 126<sup>th</sup> Annual Meeting, Washington, DC, November 17, 1998.

with Susan M. Salkowitz, *Reassessing Your Registry Direction: Strategies for Moving Forward with Registry Projects*, "All Kids Count" Annual Meeting, St. Paul, MN, April 28, 1999.

*Web Security Solutions*, CUMREC99, San Antonio, TX, May 11, 1999.

with Susan M. Salkowitz, *Registry Project Assessment Cookbook*, 33<sup>rd</sup> National Immunization Conference, Atlanta, GA, June 23, 1999.

with Ruth Gubernick and Amy Wishner, *Web-based Immunization Education*, 33<sup>rd</sup> National Immunization Conference, Atlanta, GA, June 23, 1999.

with Ruth Gubernick, Susan M. Salkowitz, and JoAnne Fischer, *Successfully Using Technology to Help Community Health Advocates Ensure Quality Care in a Changing Health Care Environment*, Healthy Mothers/Health Babies National Conference, Seattle, WA, August 3, 1999.

with Ruth Gubernick, Susan M. Salkowitz, and JoAnne Fischer, *A Case Study in Addressing Maternal and Child Health Data Quality Assurance, Reporting, and Research Requirements in a Changing Health Care Environment*, American Public Health Association (APHA) 127<sup>th</sup> Annual Meeting, Chicago, IL, November 9, 1999.

*Web Architectures and Security*, All Kids Count World Wide Web and Immunization Registries Conference, Ontario, CA, February 24, 2000.

with Susan M. Salkowitz, *Registry Crystal Ball: Challenges for the Future*, 2000 Immunization Registry Conference, Newport, RI, March 28, 2000.

with Denise Stewart and M. Katie McGee, *Remote Dental Consultation System*, American Association of Dental Schools Annual Meeting "TechniFair 2000," Washington, DC, April 2, 2000.

*Bridging the Digital Divide: Building Organizational Capacity*, Bridging the Digital Divide Conference, The Enterprise Center, Philadelphia, PA, April 19, 2000.

with Amy Metroka and Susan Salkowitz, *The New York City CIR: A Registry in the Process of Re-inventing Itself*, 34<sup>th</sup> National Immunization Conference, Washington, DC, July 7, 2000.

with Vikki Papadouka and Deborah Walker, *The Development of a New Tool for Data Quality Improvement and Use of an Immunization Registry in the 21st Century*, 34<sup>th</sup> National Immunization Conference, Washington, DC, July 7, 2000.

with Susan Salkowitz, *To Web or Not to Web: Technical and Policy Considerations for the Web as an Application Deployment Environment*, Public Health Informatics and Distance Learning Conference, New Orleans, LA, August 10, 2000.

with Martha Rome and Ruth Gubernick, *New Software Tools for Recall in an Immunization Registry*, Public Health Informatics and Distance Learning Conference, New Orleans, LA, August 10, 2000.

with Susan Salkowitz, *Internet Technology in Public Health: Enhancing Practice, Enabling Achievement*, Pennsylvania Public Health Association Annual Meeting, Harrisburg, PA, October 10, 2000.

with Ruth Gubernick, Susan M. Salkowitz, and JoAnne Fischer, *Use of an Information System at a Community-based Maternal Care Agency to Help Pregnant Women Successfully Manage the Impacts of Social Policy Change*, American Public Health Association (APHA) 128th Annual Meeting, Boston, MA, November 13, 2000.

with Ayesha Gill and Susan M. Salkowitz, *Challenges and Responses in Immunization Programs: California Strategies to Extend Registries to All Communities in the State*, American Public Health Association (APHA) 128<sup>th</sup> Annual Meeting, Boston, MA, November 13, 2000.

with Martha Rome, *Using Immunization Registry Data to Support Medicaid Managed Care Services*, The 5th Annual Congress on Managed Medicaid and Medicare (NMHCC), Washington, DC, January 22, 2001.

with Diane Fraiter, *Extending the Life of a Registry: Connecticut's ICES Reporting System*, 35th National Immunization Conference, Atlanta, GA, June 1, 2001.

*Web Enablement: Considerations and Issues for Immunization Registries*, Pre-conference Workshop, 2001 Immunization Registry Conference, Little Rock, AK, July 8, 2001.

with Diane Fraiter, *Connecticut's Immunization Registry Reporting System*, 2001 Immunization Registry Conference, Little Rock, AK, July 9, 2001.

with Deborah Walker, *Challenges in System Integration in Public Health*, American Public Health Association (APHA) 129th Annual Meeting, Atlanta, GA, October 24, 2001.

with Deborah Walker, *Disaster Recovery of the New York Citywide Immunization Registry After the World Trade Center Tragedy*, 36th National Immunization Conference, Denver, CO, April 30, 2002.

*Low-bandwidth Registry Communications*, 16<sup>th</sup> CA SIIS Statewide Meeting, San Diego, CA, October 15, 2002.

with Amy Zimmerman, *Technology Assessment: Moving Rhode Island's KIDSNET Forward*, 2002 Immunization Registry Conference, Philadelphia, PA, October 28, 2002.

with John Schaaf, et al, *Developing Regional Registry Software: Lessons from California*, 2002 Immunization Registry Conference, Philadelphia, PA, October 28, 2002.

with Robyn Davis, *Immunization Registry Support for Bio-terrorism Preparedness: Los Angeles*, American Immunization Registry Association Annual Meeting, Philadelphia, PA, October 28, 2002.

with Amy Metroka, *Implementing a HIPAA Compliant Electronic File Transfer Application for Reporting to the NY Citywide Immunization Registry*, 2002 Immunization Registry Conference, Philadelphia, PA, October 29, 2002.

with Angel Aponte, *Internet Interfaces: Provider Access to Confidential Patient Information - A Survey of 11 Jurisdictions*, 2002 Immunization Registry Conference, Philadelphia, PA, October 29, 2002.

with Amy Zimmerman, *Planning for Change: Technology Assessment of Rhode Island's KIDSNET*, 37<sup>th</sup> National Immunization Conference, Chicago, IL, March 17, 2003.

with Susan Salkowitz, *Registry Assessment Methodologies: Experience Across Three Projects*, 37<sup>th</sup> National Immunization Conference, Chicago, IL, March 17, 2003.

*Role of Alternative Networks in Registry Telecommunications*, 37<sup>th</sup> National Immunization Conference, Chicago, IL, March 17, 2003.

with Susan Salkowitz, *Electronic Medical Records and Registries: Challenges and Opportunities*, 18th CA SIIS Statewide Meeting, Oakland, CA, October 15, 2003.

*Conceptual Data Flow Model Between PHIN Systems*, 38<sup>th</sup> National Immunization Conference, Nashville, TN, May 13, 2004.

with Susan Salkowitz, *Registry Integration with Electronic Medical Records*, 38<sup>th</sup> National Immunization Conference, Nashville, TN, May 13, 2004.

with Michael Berry, *Expanding the Options for Immunization Data Collection with Personal Digital Assistants*, 38<sup>th</sup> National Immunization Conference, Nashville, TN, May 13, 2004.

with Susan Salkowitz, *EHR Update: Integrating Immunization Registries with Electronic Medical Records*, 2004 Immunization Registry Conference, Atlanta, GA, October 18, 2004.

*Positioning IIS Within EHR: Ask Not What EHR Can Do for You, Ask What You can Do for EHR*, 2004 Immunization Registry Conference, Atlanta, GA, October 19, 2004.

with Susan Salkowitz, *Public Health Systems Integration in Support of Emergency Preparedness*, American Public Health Association (APHA) 132nd Annual Meeting, Washington, DC, November 8, 2004.

with Angel Aponte, et al, *Evolution of Data Exchange with New York Citywide Immunization Registry: From Paper to Electronic Messaging*, 39th National Immunization Conference, Washington, DC, March 24, 2005.

*Using Electronic Medical Records: National and Local Perspectives*, 3rd Annual Awards of Excellence in Immunization Practices & Conference, Pasadena, CA, May 12, 2005.

*Frameworks and Models for Integration, Connecting Communities for Better Health* Conference, Washington, DC, May 26, 2005.

with Michael Berry, *Models for Regional Health Information Organization (RHIO) Systems: Ensuring Public Health's Role*, American Public Health Association (APHA) 133rd Annual Meeting, Philadelphia, PA, December 13, 2005.

with Michael Berry, *RHIO Models and Public Health: How Do You Determine the Best Approach?*, American Public Health Association (APHA) 134th Annual Meeting, Boston, MA, November 8, 2006.

*How Can IIS Remain Relevant in the New World of Health Information Exchange?* 41st National Immunization Conference, Kansas City, Mo, March 6, 2007.

*Revitalizing Public Health Data Systems in the New World of Health Information Exchange*, Fourth Health Information Technology Summit, Washington, DC, March 30, 2007.

*Immunization Information System Interoperability*, 42<sup>nd</sup> National Immunization Conference, American Immunization Registry Association Pre-conference Workshop, Atlanta, GA, March 16, 2008.

*Public Health Systems Interoperability*, 2008 American Medical Informatics Association Spring Congress, Phoenix, AZ, May 29, 2008.

with Michael Berry, *Planning for PHIN Certification: A Small State's Experience*, 2008 Public Health Information Network (PHIN) Conference, Atlanta, GA, August 26, 2008.

*From Integration to Interoperability: The Role of Public Health Systems in the Emerging World of Health Information Exchange*, American Public Health Association (APHA) 136th Annual Meeting, San Diego, CA, October 27, 2008.

*Architecture for Person Matching and De-duplication*, American Public Health Association (APHA) 136th Annual Meeting, San Diego, CA, October 29, 2008.

#### *Government Testimony:*

Expert Testimony, National Vaccine Advisory Committee and National Immunization Program, Centers for Disease Control and Prevention *Initiative on Immunization Registries*, Public Meeting on Resource Issues Related to State and Community-based Immunization Registries, Washington, D.C., May 13, 1998.

Response to Request for Information, "Development and Adoption of a National Health Information Network," Department of Health and Human Services, Office of the National Coordinator for Health Information Technology, January 18, 2005.

#### *Advisory/Professional Committees:*

Computer Technology Advisory Committee, Ben Franklin Technology Partners of Southeastern Pennsylvania, Fall 1996 – Fall 2001.

American Immunization Registry Association (AIRA) Technical Committee, Spring 2002 - Spring 2003

American Immunization Registry Association (AIRA) Emergency Preparedness and Response Committee, Fall 2002 – Summer 2005

American Immunization Registry Association (AIRA) Urban/Cities Committee, Winter 2004 – Fall 2005

Electronic Health Record (EHR) Deployment Task Force, Healthcare Information and Management Systems Society (HIMSS), Summer 2004 - Spring 2005

Healthcare Information Technology Standards Panel (HITSP) Use Case Committee, Fall 2005.

Committee on Immunization Registry Standards for Electronic Transactions (CIRSET), now the American Immunization Registry Association (AIRA) Messaging Work Group, Spring 2000 - present

*Connections* Community of Practice, Winter 2001 - present

Pediatric Data Standards Special Interest Group, Health Level 7 (HL7), Spring 2005 - present

Electronic Health Record Technical Committee (EHR TC) Subcommittee on Interoperability, Health Level 7 (HL7), Spring 2005 - present

American Immunization Registry Association (AIRA) Transport Layer Work Group, Spring 2005 – present

American Immunization Registry Association (AIRA) Data Definitions Work Group, Spring 2005 – present

Healthcare Information Technology Standards Panel (HITSP) Technical Committees, Winter 2006 – present

Co-Chairperson, Public Health Data Standards Consortium Communication and Outreach Committee, Fall 2006 – present

Healthcare Information Technology Standards Panel (HITSP), March 2007 – present

Pediatric Health Informatics & Technology Special Interest Group, Health Care Information and Management Systems Society (HIMSS), Spring 2007 - present

Small & Independent Consultant Special Interest Group, Health Care Information and Management Systems Society (HIMSS), Spring 2007 – present

Treasurer, Public Health Data Standards Consortium (PHDSC), Fall 2007 – present

*Professional Affiliations:*

Member, American Public Health Association

Member, American Medical Informatics Association

Member, Health Record Banking Alliance

Member, Healthcare Information and Management Systems Society

Member, National Association for Public Health Information Technology

Member, Southern California Public Health Association

Pioneer Member, The Internet Society

Peer Reviewer and Contributing Author, *Journal of Healthcare Information Management*

*Education:*

**UNIVERSITY OF PENNSYLVANIA**, Ph.D. in Higher Education Administration, August 1993.

Course work includes study in higher education at the Graduate School of Education, and organization and strategy at the Wharton School.

Dissertation title: *Financial Frontier: The American University and its Banking Function*

**GRADUATE SCHOOL OF EDUCATION**, University of Pennsylvania, Master of Science in Education, August 1987.

Course work Includes: Strategic Planning in Higher Education, Methods of Institutional Research, Introduction to American Higher Education, Academic Information Systems, Managing People, Instructional Processes in Higher Education, Power and the Educational Process

**THE WHARTON SCHOOL**, University of Pennsylvania, Bachelor of Science in Economics, May 1983.

Concentrations in Management Information Systems, and Personnel Administration and Labor Relations. Record of high academic achievement. Dean's List 1982-83.

Course work Includes: Management Information Systems, Advanced Seminar in Personal Computing, Management Systems; Personnel Management, Labor History, Labor Law, Labor-Management Relations