THE ENCYCLOPEDIA
OF AGING

Fourth Edition

Volume I • A-K

Richard Schulz
Editor-in-Chief

Linda S. Noelker
Kenneth Rockwood
Richard L. Sprott

Associate Editors
CONTENTS

The Editors vii

Foreword to the Fourth Edition ix

Contributors xi

List of Entries xxvii

VOLUME I Entries A – K 1

Subject Index I-1

Contributor Index I-61

VOLUME II Entries L – Z 633

Subject Index I-1

Contributor Index I-61
Richard Schulz, PhD, is Professor of Psychiatry, Psychology, Epidemiology, Sociology, and Health and Rehabilitation Sciences, and Director of the University Center for Social and Urban Research at the University of Pittsburgh. He is also Associate Director of the Institute on Aging at the University of Pittsburgh. He received his AB in Psychology from Dartmouth College and his PhD in Social Psychology from Duke University. He is the recipient of several honors, including the Kleemeier Award for Research on Aging from the Gerontological Society of America and the Developmental Health Award for Research on Health in Later Life from the American Psychological Association. He also served as Editor of the *Journal of Gerontology: Psychological Sciences*. He has spent his entire career doing research and writing on adult development and aging. Funded by numerous NIH institutes for more than two decades, his research has focused on the social-psychological aspects of aging, including the role of control as a construct for characterizing life-course development and the impact of disabling late life disease on patients and their families. This body of work is reflected in publications, which have appeared in major medical (*JAMA, NEJM*), psychology (*Psychological Review, Psychological Bulletin, JPSP*), and aging (*Journal of Gerontology, Psychology and Aging, JAGS, AJGS*) journals.

Linda S. Noelker, PhD, joined Benjamin Rose in 1974 as an applied aging researcher and is currently the Senior Vice President for Planning and Organizational Resources. In that capacity, she oversees the Research Institute and the Institutional Advancement and the Advocacy and Public Policy Departments. She received her MA and PhD from Case Western Reserve, where she is an Adjunct Professor of Sociology. She also is the Editor-in-Chief of *The Gerontologist*, the leading journal in applied aging research, practice, and policy. Dr. Noelker holds leadership positions in the American Society on Aging and the Gerontological Society of America and recently received the 2005 American Society on Aging Award for exemplary contributions to the field of aging. Throughout her career, she has conducted research on the nature and effects of family care for frail aged, patterns of service use by older adults and their family caregivers, and sources of stress and job satisfaction among the direct care workforce. She has published widely on the support networks of older adults, quality of life, the well-being of family caregivers, predictors of service use, and the nature of social relationships in nursing homes.

Kenneth Rockwood, MD, FRCPC, Professor of Medicine (Geriatric Medicine & Neurology) and Kathryn Allen Weldon Professor of Alzheimer Disease Research, is the Director of the Geriatric Medicine Research Unit at Dalhousie University. He is a Canadian Institute of Health Research (CIHR) Investigator and a member of the CIHR Institute of Aging Advisory Board. He has a long-standing interest in delirium, dementia, and frailty.

Professor Rockwood is author of more than 200 peer-reviewed scientific publications, and five books. He is a staff physician in the Department of Medicine at the Queen Elizabeth II Health Sciences Centre, Halifax, Nova Scotia, Canada

Currently, he is the principal investigator in the Video Imaging Synthesis of Treating Alzheimer’s disease (VISTA) study, an investigator-initiated national, multicenter project to identify and track novel treatment
effects in patients with mild to moderate Alzheimer’s disease who are treated with galantamine, an antidementia medication.

Kenneth Rockwood is a native of Newfoundland and became a Doctor of Medicine at Memorial University in 1985. He is married to an internationally recognized scientist in the Faculty of Medicine—Susan Howlett, Professor of Pharmacology, and together they have two teenage sons, Michael and James.

**Richard L. Sprott, PhD**, Executive Director of the Ellison Medical Foundation, began his undergraduate studies at Franklin and Marshall College in Lancaster, Pennsylvania. He completed them at the University of North Carolina at Chapel Hill, earning a BA with honors in Psychology. After receiving his PhD in Experimental Psychology (Behavior Genetics) at the University of North Carolina, he went on to a postdoctoral fellowship in Behavior Genetics at the Jackson Laboratory in Bar Harbor, Maine. Following two years of teaching at Oakland University, Dr. Sprott returned to the Jackson Laboratory where he conducted a research program on single gene influences on behavior and the interaction of aging variables with those genes. After a decade in Maine, Dr. Sprott moved to the National Institute on Aging where he directed the Institute’s programs on the Biology of Aging. A major focus of his career has been the development of animal models for aging research. He developed a nationwide research program on biomarkers of aging and the effects of dietary restriction on longevity. He is the author of a large number of books and articles. He is an internationally recognized expert on animal model development and plays an active role in model development in countries around the world. He is the Past President of the International Biogerontological Resource Institute (IBRI) in Friuli, Italy.

Dr. Sprott left the National Institute on Aging in 1998 to become the first Executive Director of the Ellison Medical Foundation, created to support basic biological and biomedical research on aging and recently expanded to provide similar support for basic research on infectious diseases of importance in the developed and developing worlds. The Ellison Medical Foundation is the largest private foundation source of funding for research on the biology of aging, providing about $28,000,000 per year in grant funds for aging research, and $12,000,000 for infectious disease research.
FOREWORD
TO THE FOURTH EDITION

The Fourth Edition of the Encyclopedia of Aging marks the 20th anniversary of what has become the authoritative, comprehensive, and multidisciplinary introduction to gerontology and geriatrics. Originally proposed by Ursula Springer, PhD, and edited by George L. Maddox, PhD, the Encyclopedia serves as the gateway to the world of aging and the aged. The vision and hard work of these pioneers have established the Encyclopedia as a leading resource in the field. With the Fourth Edition of the Encyclopedia, we hope to continue this tradition by providing the most up-to-date and comprehensive introduction to gerontology and geriatrics currently available.

Knowledge about adult development and aging is advancing at an incredibly rapid pace. This is particularly true in the medical, biological, and social sciences, where new information becomes available almost daily. Keeping abreast of new developments in multiple disciplines requires expertise that far exceeds the capabilities of any one individual. Thus, the team of associate editors assembled for this project represents cutting edge expertise in biology (Richard Sprott), medicine and health (Ken Rockwood), and sociology (Linda Noelker). Advances in psychological aspects of aging were covered by the editor-in-chief. Together we commissioned, reviewed, and edited well more than 400 entries, and while previous editions of the Encyclopedia provided a firm foundation for this one, almost every entry has been updated and many new ones have been added. As with previous editions, our goal has been to explain complex issues in plain English that can be understood by educated laypersons.

The structure of the Encyclopedia remains the same. A comprehensive index is provided in both volumes, and extensive cross-referencing within the text provides readers with links among entries, enabling a comprehensive, in-depth view of topics. Sheri W. Sussman, the veteran Managing Editor of previous editions of the Encyclopedia, and her assistant, Alana Stein, provided the logistic support, guidance, and encouragement to keep this project on track. My able assistant at the University of Pittsburgh, Anna Aivaliotis, stepped in when needed to solve emerging problems and more importantly keep me on track throughout this project.

Of course, the most essential ingredients to the success of this volume are the several hundred authors who contributed their expertise to write the entries for this edition. The quality of their work is outstanding. Without them, this Encyclopedia would not be possible.

Richard Schulz, PhD
Editor-in-Chief
CONTRIBUTORS

W. Andrew Achenbaum, PhD
College of Humanities, Fine Arts, and Communication
University of Houston
Houston, Texas

Jonathan D. Adachi, MD
McMaster University
Hamilton, Ontario, Canada

Ronald H. Aday, PhD
Middle Tennessee State University
Murfreesboro, Tennessee

George J. Agich, PhD
The Cleveland Clinic
Cleveland, Ohio

Judd M. Aiken, BS, MS, PhD
Department of Animal Health and Biomedical Sciences
University of Wisconsin, Madison
Madison, Wisconsin

Marilyn Albert, PhD
Gerontology Research Unit
Harvard Medical School
Charlestown, Massachusetts

Steven M. Albert, PhD, MSc
Department of Sociomedical Science
Columbia University
New York, New York

James E. Allen, PhD, MSPH
School of Public Health
University of North Carolina at Chapel Hill
Chapel Hill, North Carolina

Philip A. Allen, PhD
Department of Psychology
University of Akron
Akron, Ohio

Rebecca S. Allen, PhD
Department of Psychology
Center for Mental Health and Aging
University of Alabama
Tuscaloosa, Alabama

Robert G. Allen, PhD
Lankenau Institute for Medical Research
Wynnewood, Pennsylvania

Susan Allen, PhD
Center for Gerontology and Health Care Research
Brown University
Providence, Rhode Island

Keith A. Anderson, MSW
Graduate Center in Gerontology
College of Public Health
The University of Kentucky
Lexington, Kentucky

Melissa Andrew, MD, MSc (Public Health), BSc
Division of Geriatric Medicine
Dalhousie University
Halifax, Nova Scotia, Canada

Jacqueline Angel, PhD
School of Public Affairs
University of Texas at Austin
Austin, Texas

Joaquin A. Anguera, PhD (c)
Division of Kinesiology
University of Michigan
Ann Arbor, Michigan

Toni C. Antonucci, PhD
Department of Psychology
University of Michigan
Ann Arbor, Michigan

Robert A. Applebaum, PhD
Scripps Foundation Gerontology Center
Miami University
Oxford, Ohio

Patricia A. Areán, PhD
Department of Psychiatry
University of California, San Francisco
San Francisco, California

Robert Arking, PhD
Department of Biological Sciences
Wayne State University
Detroit, Michigan

Wilbert S. Aronow, MD
Divisions of Cardiology and Geriatrics
New York Medical College
Valhalla, New York

Robert C. Atchley, PhD
Department of Gerontology
The Naropa Institute
Boulder, Colorado

Alejandro R. Ayala, MD
Clinical Endocrinology Branch
NIDDK/NIH
Bethesda, Maryland

Lodovico Balducci, MD
Department of Interdisciplinary Oncology
University of South Florida College of Medicine
Tampa, Florida

Beverly A. Baldwin, PhD (deceased)
School of Nursing
University of Maryland
Baltimore, Maryland
Contributors

Arthur K. Balin, MD, PhD, FACP
Medical Director
The Sally Balin Medical Center
Media, Pennsylvania

Ashley S. Bangert, PhD (c)
Department of Psychology
University of Michigan
Ann Arbor, Michigan

John C. Barefoot, PhD
Duke University Medical Center
Durham, North Carolina

Jane Barratt, PhD
Secretary General
International Federation on Ageing
Montreal, Quebec, Canada

Nir Barzilai, MD
Albert Einstein College of Medicine
Bronx, New York

Scott A. Bass, PhD
Dean of the Graduate School
Vice Provost for Research and Planning
University of Maryland
Baltimore, Maryland

John W. Baynes, PhD
University of South Carolina
Columbia, South Carolina

William Bechill, MSW
Former U.S. Commissioner on Aging
Current Chair of the Board for the Center on Global Aging at Catholic University
Washington, DC

Nigel Beckett, MB, ChB, MRCP
Imperial College Faculty of Medicine
Hammersmith Campus
London, UK

François Béland, PhD
Co-Director, Solidage Research Group
Department of Health
University of Montreal
Montreal, Quebec, Canada

Ann Benbow, PhD
SPRY Foundation
Washington, DC

Vern L. Bengtson, PhD
Ethel Percy Andrus Gerontology Center
Social and Behavioral Sciences Division
University of Southern California
Los Angeles, California

Karen McNally Bensing, MSLS
The Benjamin Rose Institute
Cleveland, Ohio

Edit Beregi, MD, DMSci
Retired Director of the Gerontology Center
Budapest, Hungary

Howard Bergman, MD
Department of Geriatric Medicine
McGill University
Montreal, Quebec, Canada

David E. Biegel, PhD
Mandel School of Applied Social Sciences
Case Western Reserve University
Cleveland, Ohio

Robert H. Binstock, PhD
Department of Epidemiology and Biostatistics
Case Western Reserve University
Cleveland, Ohio

Kira S. Birditt, PhD
Institute for Social Research
University of Michigan
Ann Arbor, Michigan

Fredda Blanchard-Fields, PhD
Georgia Institute of Technology
Atlanta, Georgia

Dan G. Blazer, MD, PhD
Department of Psychiatry
Duke University Medical Center
Durham, North Carolina

Avrum Z. Bluming, MD, MACP
Department of Medicine
University of Southern California
Los Angeles, California

Cory R. Balkan, MS, PhD (c)
Human Development and Family Sciences
Oregon State University
Corvallis, Oregon

Enid A. Borden, BA, MA
CEO, Meals on Wheels Association of America
Alexandria, Virginia

Kevin Borders, PhD
Kent School of Social Work
University of Louisville
Louisville, Kentucky

Hayden B. Bosworth, PhD
Senior Health Scientist
Duke University Medical Center
Durham, North Carolina

Meg Bourbonniere, PhD, RN
Yale University School of Nursing
New Haven, Connecticut

Susan K. Bowles, PharmD
College of Pharmacy
Centre for Health Care of the Elderly
Capital District Health Authority
Halifax, Nova Scotia, Canada

Dana Burr Bradley, PhD
University of North Carolina at Charlotte
Charlotte, North Carolina

Lawrence G. Branch, PhD
College of Public Health University of South Florida
Tampa, Florida

Joshua R. Bringle, MS
University of Massachusetts at Amherst
Amherst, Massachusetts

Harold Brody, MD, PhD
Department of Anatomy
State University of New York School of Medicine
Buffalo, New York

G.A. Broe, AM, BA, MBBS, FRACP
Prince of Wales Medical Research Institute and
University of New South Wales
Randwick, NSW, Australia

Susan V. Brooks, PhD
The University of Michigan
Ann Arbor, Michigan
W. Ted Brown, MD, PhD
Chairman, Department of Human Genetics
NYS Institute for Basic Research in Developmental Disabilities
Staten Island, New York

Winifred Brownell, PhD
College of Arts and Sciences
University of Rhode Island
Kingston, Rhode Island

Entela Bua, MD, PhD
Department of Animal Health and Biomedical Sciences
University of Wisconsin, Madison
Madison, Wisconsin

Barbara Bucur, PhD
Center for the Study of Aging and Human Development
Duke University Medical Center
Durham, North Carolina

Elisabeth O. Burgess, PhD
Department of Sociology
Georgia State University
Atlanta, Georgia

Louis D. Burgio, PhD
Department of Psychology
Center for Mental Health and Aging
University of Alabama
Tuscaloosa, Alabama

Robert N. Butler, MD
President and CEO
International Longevity Center USA, Ltd.
New York, New York

Kevin E. Cahill, PhD
Tinari Economics, Inc.
Livingston, New Jersey

Margaret P. Calkins, PhD
IDEAS Institute
Kirtland, Ohio

Richard T. Campbell, PhD
Department of Sociology
University of Illinois at Chicago
Chicago, Illinois

Elizabeth Capezuti, RN
New York University
New York, New York

Gregory D. Cartee, PhD
Department of Kinesiology
University of Wisconsin, Madison
Madison, Wisconsin

Neil Charness, PhD
Department of Psychology
Florida State University
Tallahassee, Florida

Yung-Ping Chen, PhD
Gerontology Institute
University of Massachusetts
Boston, Massachusetts

Judith G. Chipperfield, PhD
Health, Leisure, and Human Performance Research Institute
Winnipeg, Manitoba, Canada

Victor G. Cicirelli, PhD
Department of Psychological Sciences
Purdue University
West Lafayette, Indiana

Giovanni Cizza, MD, PhD
Clinical Endocrinology Branch
NIDDK/NIH
Bethesda, Maryland

A. Mark Clarfield, MD, FRCPC
Ben-Gurion University of the Negev
Beersheva, Israel and Division of Geriatric Medicine
McGill University
Montreal, Quebec, Canada

Robert L. Clark, PhD
Department of Business Management
North Carolina State University
Raleigh, North Carolina

Carl I. Cohen, MD
Division of Geriatric Psychiatry
State University of New York
Brooklyn, New York

Harvey Jay Cohen, MD
Department of Medicine
Duke University Medical Center
Durham, North Carolina

Nathan S. Consedine, PhD
Department of Psychology
Long Island University
Brooklyn, New York

Constance L. Google, PhD
Virginia Center on Aging and Department of Gerontology
Virginia Commonwealth University Medical Center
Richmond, Virginia

Fay Lomax Cook, PhD
School of Education and Social Policy
Northwestern University
Evanston, Illinois

Susan G. Cooley, PhD
U.S. Department of Veterans Affairs
West Palm Beach, Florida

Germaine Cornélisssen, PhD
Halberg Chronobiology Center
University of Minnesota
Minneapolis, Minnesota

Joseph E. Coughlin, PhD
MIT Age Lab
Massachusetts Institute of Technology
Cambridge, Massachusetts

Vincent J. Cristofalo, PhD
Lankenau Institute for Medical Research
Wynnewood, Pennsylvania

Stephen Crystal, PhD
Institute for Health, Health Care Policy, and Aging Research
New Brunswick, New Jersey

Ana Maria Cuervo, MD, PhD
Albert Einstein College of Medicine
Bronx, New York

Leslie Curry, PhD, MPH
University of Connecticut Health Center
Farmington, Connecticut

Stephen J. Cutler, PhD
Departments of Sociology and Gerontology
University of Vermont
Burlington, Vermont

Sara J. Czaja, PhD
Department of Psychiatry and Behavioral Sciences
University of Miami School of Medicine
Miami, Florida
Elizabeth M. Dax, MD, PhD  
National Institute on Aging and The Johns Hopkins School of Medicine  
Baltimore, Maryland

Howard B. Degenholtz, PhD  
Center for Bioethics and Health Law  
University of Pittsburgh  
Pittsburgh, Pennsylvania

Sharon A. DeVaney, PhD  
Purdue University  
West Lafayette, Indiana

Samantha Devaraju-Backhaus, MA  
Center for Psychological Studies  
Nova Southeastern University  
Fort Lauderdale, Florida

Roger A. Dixon, PhD  
Department of Psychology  
University of Alberta  
Edmonton, Alberta, Canada

Elizabeth B. Douglas, MA  
Executive Director  
Association for Gerontology in Higher Education  
Washington, DC

Elizabeth Dugan, PhD  
Division of Geriatric Medicine  
University of Massachusetts Medical School  
Worcester, Massachusetts

David Dupere, MD, FRCPC  
Division of Palliative Medicine  
Queen Elizabeth II Health Sciences Center  
Dartmouth University  
Halifax, Nova Scotia, Canada

Tzvi Dwolatzky, MD, MBBCh  
Beersheva Mental Health Center and Ben-Gurion University of the Negev  
Beersheva, Israel

Rita B. Effros, PhD  
Department of Pathology and Laboratory Medicine  
University of California  
Los Angeles, California

David J. Ekerdt, PhD  
Gerontology Center  
University of Kansas  
Lawrence, Kansas

Glen H. Elder, Jr., PhD  
University of North Carolina at Chapel Hill  
Chapel Hill, North Carolina

Bernard T. Engel, PhD  
School of Medicine  
Johns Hopkins University  
Baltimore, Maryland

Joan T. Erber, PhD  
Department of Psychology  
Florida State University  
Tallahassee, Florida

Carroll L. Estes, PhD  
Institute for Health and Aging  
University of California, San Francisco  
San Francisco, California

J. Grimley Evans, MD  
Division of Clinical Gerontology  
University of Oxford  
Oxford, UK

Lois K. Evans, DNSc, RN, FAAN  
School of Nursing  
University of Pennsylvania  
Philadelphia, Pennsylvania

John A. Faulkner, PhD  
University of Michigan  
Ann Arbor, Michigan

John Feightner, MD, MSc, FCPC  
University of Western Ontario  
London, Ontario, Canada

Patrick J. G. Feltmate, MD  
Dalhousie University  
Halifax, Nova Scotia, Canada

Christine Ferri, PhD  
Center for Aging  
UMDNJ-School of Osteopathic Medicine  
Stratford, New Jersey

Luigi Ferrucci, MD  
Division of Epidemiology and Clinical Applications  
National Heart, Lung, and Blood Institute  
Baltimore, Maryland

Gerda G. Fillenbaum, PhD  
Center for the Study of Aging and Human Development  
Duke University Medical Center  
Durham, North Carolina

David B. Finkelstein, PhD  
Director, Pathobiology Program  
National Institute on Aging  
Bethesda, Maryland

Joseph H. Flaherty, MD  
Geriatric Research, Education and Clinical Center  
St. Louis VA Medical Center  
Division of Geriatrics  
St. Louis, Missouri

Jerome L. Fleg, MD  
Division of Epidemiology and Clinical Applications  
National Heart, Lung, and Blood Institute  
Baltimore, Maryland

Leon Flicker, MB, BS, PhD, FRACP  
Geriatric Medicine Unit at Royal Perth Hospital  
The University of Western Australia  
Perth, Australia

Anne Foner, PhD  
Department of Sociology  
Rutgers University  
New Brunswick, New Jersey

Barry Fortner, PhD  
Rush-Presbyterian-St. Luke’s Medical Center  
Chicago, Illinois

Susan Freter, MD, FRCP  
Department of Medicine  
Dalhousie University  
Halifax, Nova Scotia, Canada

Alexandra M. Freund, PhD  
Departments of Human Development and Social Policy and Psychology  
Northwestern University  
Evanston, Illinois

Robert B. Friedland, PhD  
Center on Aging Society  
Georgetown University  
Washington, DC

Brant E. Fries, PhD  
University of Michigan and Ann Arbor VA Medical Center  
Ann Arbor, Michigan
Alan A. Hartley, PhD  
Department of Psychology  
Scripps College  
Claremont, California

Lynn Hasher, PhD  
University of Toronto  
Toronto, Ontario, Canada

Betty Havens, DLitt (deceased)  
University of Manitoba  
Brandon, Manitoba, Canada

Robert J. Havighurst, PhD  
Department of Education  
University of Chicago  
Chicago, Illinois

Catherine Hawes, PhD  
Department of Health Policy and Management  
School of Rural Public Health  
Texas A&M University System Health Science Center  
College Station, Texas

Lara Hazelton, MD, FRCPC  
(Psychiatry)  
Department of Psychiatry  
Dalhousie University  
Nova Scotia Hospital  
Dartmouth, Nova Scotia, Canada

Robert P. Heaney, MD  
Creighton University  
Omaha, Nebraska

Randy S. Hebert, MD, MPH  
Division of General Medicine  
University of Pittsburgh Medical Center  
Pittsburgh, Pennsylvania

Jutta Heckhausen, PhD  
University of California, Irvine  
Irvine, California

Franz Hefti, PhD  
Vice President  
Merck Sharp & Dohme  
Essex, United Kingdom

Jennifer Heidorn, MA, PhD (c)  
Purdue University  
West Lafayette, Indiana

Margaret L. Heidrick, PhD  
College of Medicine  
University of Nebraska  
Omaha, Nebraska

L. Carson Henderson, PhD, MPH  
College of Public Health  
Department of Health Promotion Sciences  
University of Oklahoma  
Oklahoma City, Oklahoma

Jon G. Hendricks, PhD  
University Honors College  
Oregon State University  
Corvallis, Oregon

John G. Hennon, EdD  
University of Pittsburgh  
Pittsburgh, Pennsylvania

Christopher Hertzog, PhD  
School of Psychology  
Georgia Institute of Technology  
Atlanta, Georgia

Thomas M. Hess, PhD  
Department of Psychology  
North Carolina State University  
Raleigh, North Carolina

Nancy Hikoyeda, MPH  
Stanford Geriatric Education Center  
University of California, Los Angeles  
San Jose, California

Franklin G. Hines, PhD (c)  
Department of Psychology  
Florida State University  
Tallahassee, Florida

Gregory A. Hinrichsen, PhD  
Director of Psychology Training  
The Zucker Hillside Hospital and Professor of Psychiatry  
Albert Einstein College of Medicine  
Glen Oaks, New York

David Hogan, MD  
Department of Geriatric Medicine  
University of Calgary  
Calgary, Alberta, Canada

Heidi H. Holmes, PhD (c)  
Graduate Center for Gerontology  
University of Kentucky  
Lexington, Kentucky

Karen Hooker, PhD  
Director, Program on Gerontology  
Human Development and Family Sciences  
Oregon State University  
Corvallis, Oregon

Michelle Horhota, MS  
Georgia Institute of Technology  
Atlanta, Georgia

Darlene V. Howard, PhD  
Georgetown University  
Washington, DC

Shafter Cristina Howard  
Institute for Health and Department of Psychology  
Rutgers University  
New Brunswick, New Jersey

Susan E. Howlett, PhD  
Department of Pharmacology  
Faculty of Medicine  
Dalhousie University  
Halifax, Nova Scotia, Canada

William J. Hoyer, PhD  
Department of Psychology  
Syracuse University  
Syracuse, New York

Ruth Huber, PhD  
Kent School of Social Work  
University of Louisville  
Louisville, Kentucky

Robert B. Hudson, PhD  
School of Social Work  
Boston University  
Boston, Massachusetts

Mary Elizabeth Hughes, PhD  
Department of Sociology  
Duke University  
Durham, North Carolina

Linnae L. Hutchison, MBA  
Department of Health Policy and Management  
School of Rural Public Health  
Texas A&M University System Health Science Center  
College Station, Texas

Bradley T. Hyman, PhD  
Department of Neurology Research  
Massachusetts General Hospital  
Boston, Massachusetts
Margaret B. Ingraham, BA, MA  
Director of Policy and Legislation  
Meals on Wheels  
Association of America  
Alexandria, Virginia

Donald K. Ingram, PhD  
Gerontology Research Center  
National Institutes of Health  
Baltimore, Maryland

James S. Jackson, PhD  
Institute for Social Research  
University of Michigan  
Ann Arbor, Michigan

Susan T. Jackson, PhD, CCC-SLP  
Department of Hearing and Speech  
University of Kansas Medical Center  
Kansas City, Kansas

Cynthia R. Jasper, PhD  
Department of Consumer Science  
University of Wisconsin, Madison  
Madison, Wisconsin

Tiffany Jastrzembski, PhD (c)  
Department of Psychology  
Florida State University  
Tallahassee, Florida

S. Michal Jazwinski, PhD  
Department of Biochemistry and Molecular Biology  
Louisiana State University Health Science Center  
New Orleans, Louisiana

Nancy S. Jecker, PhD  
Department of Medical History and Ethics  
University of Washington  
Seattle, Washington

Susan J. Jelonek, MBA  
Andrus Gerontology Center  
University of Southern California  
Los Angeles, California

Lori Jervis, PhD  
University of Colorado at Denver  
Health Sciences Center  
Denver, Colorado

Megan M. Johnson, PhD (c)  
Department of Sociology  
University of Vermont  
Burlington, Vermont

Shanthi Johnson, PhD, PDT  
School of Nutrition and Dietetics  
Acadia University  
Wolfville, Nova Scotia, Canada

Thomas E. Johnson, PhD  
Department of Integrative Physiology  
Institute for Behavioral Genetics  
University of Colorado  
Boulder, Colorado

Steven Jonas, MD, MPH, MS, FNYAS  
Department of Preventive Medicine  
Stony Brook University School of Medicine  
Stony Brook, New York

Lyndon J. O. Joseph, PhD  
Division of Gerontology  
Baltimore VA Medical Center  
Baltimore, Maryland

Boaz Kahana, PhD  
Department of Psychology  
Case Western Reserve University  
Cleveland, Ohio

Eva Kahana, PhD  
Director, Elderly Care Research Center  
Department of Sociology  
Case Western Reserve University  
Cleveland, Ohio

Arnold Kahn, PhD  
Department of Cell and Tissue Biology  
University of California, San Francisco  
San Francisco, California

Rosalie A. Kane, DSW  
Division for Health Services, Research and Policy  
School of Public Health  
University of Minnesota  
Minneapolis, Minnesota

Marshall B. Kapp, JD, MPH  
Office of Geriatric Medicine and Gerontology  
Wright State University School of Medicine  
Dayton, Ohio

Cary S. Kart, PhD  
Scripps Gerontology Center  
Miami University  
Oxford, Ohio

Sathy Karunananthan, MS (c)  
Canadian Initiative on Frailty and Aging Solidage Research Group  
Lady Davis Institute  
Montreal, Quebec, Canada

Julia Kasl-Godley, PhD  
VA Hospice Care Center  
VA Palo Alto Health Care System  
Palo Alto, California

Robert J. Kastenbaum, PhD  
Department of Communication  
Arizona State University  
Tempe, Arizona

Sharon R. Kaufman, PhD  
Institute for Health and Aging  
University of California, San Francisco  
San Francisco, California

Melanie E. M. Kelly, PhD  
Department of Pharmacology  
Dalhousie University  
Halifax, Nova Scotia, Canada

Joseph W. Kemnitz, PhD  
Director, National Primate Research Center  
University of Wisconsin, Madison  
Madison, Wisconsin

Susan J. Kemper, PhD  
University of Kansas  
Lawrence, Kansas

Gary M. Kenyon, PhD  
Gerontology Program  
St. Thomas University  
Fredericton, New Brunswick, Canada

Leslie Dubin Kerr, MD  
Department of Medicine and Geriatrics  
Mount Sinai Medical Center  
New York, New York

Anne-Marie Kimbell, PhD  
Texas A&M University System Health Science Center  
College Station, Texas
Douglas C. Kimmel, PhD  
Professor Emeritus, Department of Psychology  
City College, City University of New York  
New York, New York

Thomas B. L. Kirkwood, PhD  
Co-Director, Institute for Ageing and Health  
University of Newcastle  
Newcastle upon Tyne, UK

Paul Kleyman  
Aging Today, American Society on Aging  
San Francisco, California

Donald Kline, PhD  
Departments of Psychology and Surgery (Ophthalmology)  
University of Calgary  
Calgary, Alberta, Canada

Leon W. Klud, PhD  
Congressional Joint Committee on Taxation  
Washington, DC

Thomas Kornberg, PhD  
Department of Biochemistry  
University of California, San Francisco  
San Francisco, California

Suzanne R. Kunkel, PhD  
Scripps Gerontology Center Miami University  
Oxford, Ohio

Ute Kunzmann, PhD  
International University of Bremen  
Bremen, Germany

Claudia K. Y. Lai, RN, PhD  
School of Nursing  
The Hong Kong Polytechnic University  
Hong Kong SAR, China

Kenneth M. Langa, MD, PhD  
Department of Internal Medicine and Institute for Social Research  
University of Michigan  
Ann Arbor, Michigan

Melinda S. Lantz, MD  
Director of Psychiatry  
The Jewish Home and Hospital  
New York, New York

Felissa R. Lashley, RN, PhD, ACRN, FAAN, FACMG  
College of Nursing  
Rutgers University  
Newark, New Jersey

Nicola T. Lautenschlager, MD  
School of Psychiatry & Clinical Neurosciences  
Royal Perth Hospital  
Perth, Australia

Barry D. Lebowitz, PhD  
National Institute of Mental Health  
Bethesda, Maryland

Chin Chin Lee, MPH (c)  
Center on Aging  
University of Miami School of Medicine  
Miami, Florida

Makau Lee, MD, PhD  
University of Mississippi Medical Center  
Jackson, Mississippi

Bruce Leff, MD  
The Johns Hopkins University School of Medicine  
Department of Health Policy and Management  
The Johns Hopkins University Bloomberg School of Public Health  
Baltimore, Maryland

Eric J. Lenze, MD  
Western Psychiatric Institute and Clinic  
University of Pittsburgh  
Pittsburgh, Pennsylvania

Howard Leventhal, PhD  
Institute for Health and Department of Psychology  
Rutgers University  
New Brunswick, New Jersey

Jeff Levin, PhD  
Valley Falls, Kansas

Sue E. Levkoff, ScD, SM, MSW  
Brigham and Women’s Hospital  
Department of Psychiatry  
Harvard Medical School  
Boston, Massachusetts

Phoebe S. Liebig, PhD  
Andrus Gerontology Center  
University of Southern California  
Los Angeles, California

Robert D. Lindeman, MD  
University of New Mexico  
School of Medicine  
Albuquerque, New Mexico

Charles F. Longino Jr., PhD  
Department of Sociology  
Wake Forest University  
Winston-Salem, North Carolina

Oscar L. Lopez, MD  
Departments of Neurology and Psychiatry  
University of Pittsburgh School of Medicine  
Pittsburgh, Pennsylvania

Antonello Lorenzini, PhD  
Lankenau Institute for Medical Research  
Wynnewood, Pennsylvania

Jonathan D. Lowenson, PhD  
Department of Chemistry and Biochemistry  
University of California, Los Angeles  
Los Angeles, California

Judith A. Lucas, EdD, APN, BC  
Institute of Health Care Policy and Aging Research  
Rutgers University  
New Brunswick, New Jersey

Cindy Lustig, PhD  
University of Michigan  
Ann Arbor, Michigan

Stephen Lyle, MD, PhD  
Harvard Medical School  
Boston, Massachusetts

Thomas R. Lynch, PhD  
Director, Cognitive Behavioral Research and Treatment Program  
Duke University  
Durham, North Carolina
Contributors

J. Beth Mabry, PhD
Department of Sociology
Indiana University of Pennsylvania
Indiana, Pennsylvania

Chris MacKnight, MD, MSc, FRCP
Department of Medicine
Dalhousie University
Halifax, Nova Scotia, Canada

George L. Maddox, PhD
Long Term Care Resources Program
Duke University Center for the Study of Aging
Durham, North Carolina

Carol Magai, PhD
Department of Psychology
Long Island University
Brooklyn, New York

Kevin J. Mahoney, PhD
Graduate School of Social Work
Boston College
Chestnut Hill, Massachusetts

James Malone-Lee, MD, FRCP
Head, Department of Medicine
Archie Campus
University College London
London, UK

P. K. Mandal, PhD
Department of Psychiatry
University of Pittsburgh School of Medicine
Pittsburgh, Pennsylvania

Ronald J. Manheimer, PhD
North Carolina Center for Creative Retirement
University of North Carolina at Asheville
Asheville, North Carolina

Spero M. Manson, PhD
University of Colorado
Denver Health Sciences Center
Denver, Colorado

Kenneth G. Manton, PhD
Center for Demographic Studies
Duke University
Durham, North Carolina

Jennifer A. Margrett, PhD
Department of Psychology
West Virginia University
Morgantown, West Virginia

Kyriakos S. Markides, PhD
Department of Psychiatry
University of Texas Medical Branch
Galveston, Texas

Lori N. Marks, PhD
University of Maryland College Park
HLHP-Public & Community Health
College Park, Maryland

Elizabeth W. Markson, PhD
Associate Director, Gerontology Center
Boston University
Boston, Massachusetts

Sandy Markwood
CEO, National Association of Area Agencies on Aging
Washington, DC

George M. Martin, MD
Director Emeritus, Alzheimer’s Disease Research Center
University of Washington
Seattle, Washington

Anne Martin-Matthews, PhD
Scientific Director
School of Social Work and Family Studies
University of British Columbia
Vancouver, British Columbia, Canada

Lynn M. Martire, PhD
Department of Psychiatry
University of Pittsburgh
Pittsburgh, Pennsylvania

Meredith Masel, LMSW
Department of Preventive Medicine and Community Health
University of Texas Medical Branch
Galveston, Texas

Edward J. Masoro, PhD
Department of Physiology
University of Texas Health Science Center
San Antonio, Texas

Emad Massoud, MB, MSc, FRCS
Program Director
Otolaryngology-Head & Neck Surgery
Dalhousie University
Halifax, Nova Scotia, Canada

Roger J. M. McCarter, PhD
Department of Physiology
University of Texas
San Antonio, Texas

Gerald E. McClearn, MS, PhD
Center for Developmental and Health Genetics
Pennsylvania State University
University Park, Pennsylvania

R. J. McClure, PhD
Department of Psychiatry
University of Pittsburgh School of Medicine
Pittsburgh, Pennsylvania

Richard W. McConaghy, PhD
University of Massachusetts
Boston, Massachusetts

Anna M. McCormick, PhD
Biology of Aging Program
National Institute on Aging
Bethesda, Maryland

Peter N. McCracken, MD, FRCPC
Division of Geriatric Medicine
University of Alberta
Edmonton, Alberta, Canada

Robert R. McCrae, PhD
Gerontology Research Center
National Institute on Aging
Baltimore, Maryland

Ian McDowell, PhD
Department of Epidemiology
University of Ottawa
Ottawa, Ontario, Canada

Debbie McKenzie, BS, PhD
Department of Animal Health and Biomedical Sciences
University of Wisconsin, Madison
Madison, Wisconsin

Mary McNally, MSc, DDS, MA
Faculty of Dentistry
Dalhousie University
Halifax, Nova Scotia, Canada
<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Christina McNamara, RN, MN,</td>
<td>GNC</td>
<td>Queen Elizabeth II Health Sciences</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dalhousie University</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Halifax, Nova Scotia, Canada</td>
</tr>
<tr>
<td>Shelly McNeil, MD, FRCPC</td>
<td>Dalhousie University</td>
<td>Halifax, Nova Scotia, Canada</td>
</tr>
<tr>
<td>Michelle L. Meade, PhD</td>
<td>Beckman Institute</td>
<td>University of Illinois at Urbana-Champaign</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Urbana, Illinois</td>
</tr>
<tr>
<td>Kate de Medeiros, MS</td>
<td>University of Maryland</td>
<td>Baltimore, Maryland</td>
</tr>
<tr>
<td>Zhores A. Medvedev, PhD</td>
<td>National Institute for Medical Research</td>
<td>London, UK</td>
</tr>
<tr>
<td>Kimberly M. Meigh, PhD (c)</td>
<td>Communication Science and Disorders</td>
<td>University of Pittsburgh</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pittsburgh, Pennsylvania</td>
</tr>
<tr>
<td>Heather Menne, MGS</td>
<td>Margaret Blenkner Research Institute</td>
<td>The Benjamin Rose Institute</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cleveland, Ohio</td>
</tr>
<tr>
<td>E. Jeffrey Metter, MD</td>
<td>Division of Epidemiology and Clinical Applications</td>
<td>National Heart, Lung, and Blood Institute</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Baltimore, Maryland</td>
</tr>
<tr>
<td>Mathy D. Mezey, RN, EdD, FAAN</td>
<td>Director, The John A. Hartford Foundation Institute for Geriatric Nursing</td>
<td>New York University</td>
</tr>
<tr>
<td></td>
<td></td>
<td>New York, New York</td>
</tr>
<tr>
<td>Jean-Pierre Michel, MD</td>
<td>Geriatric Department</td>
<td>Geneva University</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Geneva, Switzerland</td>
</tr>
<tr>
<td>Richard B. Miller, PhD</td>
<td>Brigham Young University</td>
<td>Provo, Utah</td>
</tr>
<tr>
<td>Alexandra Minicozzi, PhD</td>
<td>Department of Economics</td>
<td>University of Texas at Austin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Austin, Texas</td>
</tr>
<tr>
<td>Arnold B. Mitnitski, PhD</td>
<td>Department of Medicine and Faculty of Computer Science</td>
<td>Dalhousie University</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Halifax, Nova Scotia, Canada</td>
</tr>
<tr>
<td>Ethel L. Mitty, EdD, RN</td>
<td>Steinhardt School of Education</td>
<td>New York University</td>
</tr>
<tr>
<td></td>
<td></td>
<td>New York, New York</td>
</tr>
<tr>
<td>Charles V. Mobbs, PhD</td>
<td>Mount Sinai School of Medicine</td>
<td>New York, New York</td>
</tr>
<tr>
<td>Frank J. Molnar, MSc, MDCM,</td>
<td>CanDRIVE Research Team</td>
<td>Elisabeth-Bruyere Research Institute</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ottawa, Ontario, Canada</td>
</tr>
<tr>
<td>Timothy H. Monk, DSc</td>
<td>Clinical Neuroscience Research Center</td>
<td>Western Psychiatric Institute and Clinic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>University of Pittsburgh Medical Center</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pittsburgh, Pennsylvania</td>
</tr>
<tr>
<td>Harry R. Moody, PhD</td>
<td>Brookdale Center on Aging of Hunter College</td>
<td>The City University of New York</td>
</tr>
<tr>
<td></td>
<td></td>
<td>New York, New York</td>
</tr>
<tr>
<td>James T. Moore, MD</td>
<td>Halifax Psychiatry Center</td>
<td>Daytona Beach, Florida</td>
</tr>
<tr>
<td>Vincent Mor, PhD</td>
<td>Center for Gerontology and Health Care</td>
<td>Brown University School of Medicine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Providence, Rhode Island</td>
</tr>
<tr>
<td>Pablo A. Mora, PhD</td>
<td>Institute for Health and Department of Psychology</td>
<td>Rutgers University</td>
</tr>
<tr>
<td></td>
<td></td>
<td>New Brunswick, New Jersey</td>
</tr>
<tr>
<td>Russell E. Morgan Jr., DrPh</td>
<td>President, SPRY Foundation</td>
<td>Washington, DC</td>
</tr>
<tr>
<td>John E. Morley, MB, MCh</td>
<td>Department of Gerontology</td>
<td>St. Louis University Health Sciences Center</td>
</tr>
<tr>
<td></td>
<td></td>
<td>St. Louis, Missouri</td>
</tr>
<tr>
<td>Roger W. Morrell, PhD</td>
<td>The Practical Memory Institute</td>
<td>Silver Spring, Maryland</td>
</tr>
<tr>
<td>Nancy Morrow-Howell, PhD</td>
<td>Warren Brown School of Social Work</td>
<td>Washington University</td>
</tr>
<tr>
<td></td>
<td></td>
<td>St. Louis, Missouri</td>
</tr>
<tr>
<td>Penelope A. Moyers, EdD, OTR,</td>
<td>Department of Occupational Therapy</td>
<td>University of Alabama at Birmingham</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Birmingham, Alabama</td>
</tr>
<tr>
<td>Katrin Mueller-Johnson, PhD</td>
<td>Institute of Criminology</td>
<td>University of Cambridge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cambridge, UK</td>
</tr>
<tr>
<td>Benoit H. Mulsant, MD, MS</td>
<td>University of Pittsburgh School of Medicine</td>
<td>Pittsburgh, Pennsylvania</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kingston, Rhode Island</td>
</tr>
<tr>
<td>Joanne Mundorf</td>
<td>Department of Communication Studies</td>
<td>University of Rhode Island</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kingston, Rhode Island</td>
</tr>
<tr>
<td>Norbert Mundorf, PhD</td>
<td>Department of Communication Studies</td>
<td>University of Rhode Island</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kingston, Rhode Island</td>
</tr>
<tr>
<td>Martin D. Murphy, PhD</td>
<td>Department of Psychology</td>
<td>The University of Akron</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Akron, Ohio</td>
</tr>
<tr>
<td>Ganesh C. Natarajan, MD</td>
<td>Boston University Medical Center</td>
<td>Boston, Massachusetts</td>
</tr>
</tbody>
</table>
H. Wayne Nelson, PhD  
Department of Health Science  
Towson University  
Towson, Maryland

F. Ellen Netting, PhD  
Virginia Commonwealth University  
School of Social Work  
Richmond, Virginia

Nancy E. Newall, MA  
Health, Leisure, and Human Performance Research Institute  
Winnipeg, Manitoba, Canada

Nancy R. Nichols, PhD  
Department of Physiology  
Monash University  
VIC, Australia

Robert A. Niemeyer, PhD  
Department of Psychology  
University of Memphis  
Memphis, Tennessee

Katherina A. Nikzad  
Graduate Center for Gerontology  
University of Kentucky  
Lexington, Kentucky

Christy M. Nishita, PhD  
Andrus Gerontology Center  
University of Southern California  
Los Angeles, California

Linda S. Noelker, PhD  
The Benjamin Rose Institute  
Cleveland, Ohio

Soo Rim Noh, PhD  
University of Illinois at Urbana-Champaign  
Champaign, Illinois

Larry D. Noodén, PhD  
Department of Biology  
University of Michigan  
Ann Arbor, Michigan

Dawn D. Ogawa, BA  
Institute for Health and Aging  
University of California, San Francisco  
San Francisco, California

Jiro Okochi, MD  
University of Occupational and Environmental Health  
Kitakyushu City, Japan

Morris A. Okun, PhD  
Department of Educational Psychology  
Arizona State University  
Tempe, Arizona

S. Jay Olshansky, PhD  
School of Public Health  
University of Illinois at Chicago  
Chicago, Illinois

Angela M. O’Rand, PhD  
Department of Sociology  
Duke University  
Durham, North Carolina

Erdman B. Palmore, PhD  
Departments of Psychiatry and Sociology  
Duke University Medical Center  
Durham, North Carolina

K. Panchalingam, PhD  
Department of Psychiatry  
University of Pittsburgh School of Medicine  
Pittsburgh, Pennsylvania

Alexandra Papaioannou, MD  
McMaster University  
Hamilton, Ontario, Canada

Denise C. Park, PhD  
Department of Psychology  
University of Illinois at Urbana-Champaign  
Champaign, Illinois

Scott L. Parkin  
Vice President, Communications  
The National Council on the Aging  
Washington, DC

Christopher Patterson, MD, FRCP  
McMaster University  
Hamilton, Ontario, Canada

Nancy L. Pedersen, PhD  
Department of Medical Epidemiology and Biostatistics  
Karolinska Institute  
Stockholm, Sweden

M. Kristen Peek, PhD  
Department of Preventive Medicine and Community Health  
University of Texas Medical Branch  
Galveston, Texas

Adam T. Perzynski, PhD (c)  
Department of Sociology  
Case Western Reserve University  
Cleveland, Ohio

Ruth Peters, BSc, MSc  
Imperial College Faculty of Medicine  
Hammersmith Campus  
London, UK

J. W. Pettigrew, MD  
Departments of Psychiatry and Neurology Health Service Administration  
University of Pittsburgh School of Medicine  
Pittsburgh, Pennsylvania

John P. Phelan, PhD  
The Biological Laboratories  
Harvard University  
Cambridge, Massachusetts

Charles D. Phillips, PhD, MPH  
Department of Health Policy and Management  
School of Rural Public Health  
Texas A&M University System Health Science Center  
College Station, Texas

Amy Mehraban Pienta, MA, PhD  
University of Michigan  
Ann Arbor, Michigan

Russell I. Pierce, MD, MPH  
Honolulu, Hawaii

Robert J. Pignolo, MD, PhD  
Division of Geriatric Medicine  
University of Pennsylvania  
Philadelphia, Pennsylvania

Karl Pillemer, PhD  
Department of Human Development and Cornell Institute for Translational Research on Aging  
Cornell University  
Ithaca, New York

Brenda L. Plassman, PhD  
Department of Psychiatry  
Duke University Medical Center  
Durham, North Carolina
Leonard W. Poon, PhD  
Gerontology Center  
University of Georgia  
Athens, Georgia

G. William Rebeck, PhD  
Neurology Service  
Massachusetts General Hospital  
Boston, Massachusetts

Peter R. Rockwood, MD  
Newfoundland Medical Board  
St. John’s, Newfoundland & Labrador, Canada

Linda Farber Post, JD, BSN, MA  
Bioethicist and Clinical Ethics Consultant  
Saddle River, New Jersey

Russell J. Reiter, PhD  
Department of Cellular and Structural Biology  
University of Texas Health Science Center  
San Antonio, Texas

Ekaterina Rogoeva, PhD  
Centre for Neurodegenerative Diseases  
Department of Medicine  
University of Toronto  
Toronto, Ontario, Canada

Michael J. Poulin  
Department of Social Ecology  
University of California, Irvine  
Irvine, California

Sandra L. Reynolds, PhD  
School of Aging Studies  
University of South Florida  
Tampa, Florida

Darryl B. Rolfsen, MD, FRCP  
Division of Geriatric Medicine  
University of Alberta  
Edmonton, Alberta, Canada

Colin Powell, MB, FRCP  
Queen Elizabeth II Health Sciences Center  
Dalhousie University  
Halifax, Nova Scotia, Canada

Arlan Richardson, PhD  
Department of Physiology  
Geriatric Research, Education, and Clinical Center  
University of Texas Health Science Center at San Antonio  
San Antonio, Texas

James C. Romeis, PhD  
School of Public Health  
St. Louis University  
St. Louis, Missouri

Pat Prinz, PhD  
University of Washington  
Seattle, Washington

Virginia Richardson, PhD  
College of Social Work  
Ohio State University  
Columbus, Ohio

Sarah F. Roper-Coleman, PhD  
University of California, Irvine  
Irvine, California

Jon Pynoos, PhD  
Andrus Gerontology Center  
University of Southern California  
Los Angeles, California

Brad A. Rikke, PhD  
Institute for Behavioral Genetics  
University of Colorado  
Boulder, Colorado

Debra J. Rose, PhD  
Division of Kinesiology and Health Science  
Co-Director of the Center for Successful Aging  
California State University, Fullerton  
Fullerton, California

Sara Honn Qualls, PhD  
Department of Psychology  
Gerontology Center  
University of Colorado at Colorado Springs  
Colorado Springs, Colorado

Sara E. Rix, PhD  
Senior Policy Advisor  
Public Policy Institute  
AARP  
Washington, DC

J. B. Ross, MB, BS, FRCPC D Obst RCOG  
Division of Dermatology  
Dalhousie University  
Halifax, Nova Scotia, Canada

Christine M. Quinn-Walsh, PhD (c)  
Neuroscience Program and Institute of Gerontology  
University of Michigan  
Ann Arbor, Michigan

Gay Roberts, PhD  
Department of Pharmacology  
Medical College of Pennsylvania  
Philadelphia, Pennsylvania

John Rother  
AARP  
Washington, DC

Paul E. Rafuse, PhD, MD, FRCSC  
Department of Ophthalmology  
Dalhousie University  
Halifax, Nova Scotia, Canada

Cynthia K. Robinson, MLS  
Director of Library and Information Services  
National Primate Center  
University of Wisconsin, Madison  
Madison, Wisconsin

Graham D. Rowles, PhD  
Graduate Center for Gerontology  
University of Kentucky  
Lexington, Kentucky

William L. Randall, EdD  
Department of Gerontology  
St. Thomas University  
Fredericton, New Brunswick, Canada

Laurence Rubenstein, MD, MPH  
Director, Geriatric Research, Education and Clinical Center  
Sepulveda, California

Arati V. Rao, MD  
Department of Medicine  
Duke University Medical Center  
Durham, North Carolina

David C. Rubin, PhD  
Department of Psychology  
Duke University Medical Center  
Durham, North Carolina
Contributors

David L. Snyder, PhD
Department of Pharmacology
Medical College of Pennsylvania
Philadelphia, Pennsylvania

Jay H. Sokolovsky, PhD
Department of Anthropology
University of South Florida
St. Petersburg, Florida

Nina S. Sonbolian, BS
Clinical Endocrinology Branch
NIDDK/NIH
Bethesda, Maryland

William E. Sonntag, PhD
Department of Physiology and Pharmacology
Wake Forest University School of Medicine
Winston-Salem, North Carolina

Dara H. Sorkin, PhD
Center for Health Policy Research
University of California, Irvine
Irvine, California

David W. Sparrow, DSc
Department of Medicine
Boston University School of Medicine
Brookline, Massachusetts

Avron Spiro III, PhD
Department of Epidemiology
Boston University School of Public Health
Boston, Massachusetts

Sara Staats, PhD
Ohio State University at Newark
Newark, Ohio

Bernard D. Starr, PhD
Gerontology Program
Marymount Manhattan College
New York, New York

Derek D. Stepp
Director, Association for Gerontology in Higher Education
Washington, DC

Anthony A. Sterns, MA
Creative Action, Inc.
Akron, Ohio

Harvey L. Sterns, PhD
Department of Psychology
The University of Akron
Akron, Ohio

Ronni S. Sterns, PhD
Institute for Life-Span Development and Gerontology
The University of Akron
Akron, Ohio

Alan B. Stevens, PhD
Director, Dementia Care Research Program
Division of Gerontology and Geriatric Medicine
University of Alabama
Birmingham, Alabama

Judy A. Stevens, PhD
National Center for Injury Prevention and Control
Atlanta, Georgia

David G. Stevenson, PhD
Department of Health Care Policy
Harvard Medical School
Boston, Massachusetts

Peter St George-Hyslop, MD, DSc
Centre for Research in Neurodegenerative Diseases
Department of Medicine
Division of Neurology
Toronto Western Hospital Research Institute
University of Toronto
Toronto, Ontario, Canada

Elizabeth A. L. Stine-Morrow, PhD
Department of Educational Psychology
University of Illinois at Urbana-Champaign
Champaign, Illinois

Leroy O. Stone, PhD
University of Montreal and Statistics Canada
Ottawa, Ontario, Canada

Neville E. Strumpf, PhD, RN, C, FAAN
Director of the Center for Gerontologic Nursing Science
University of Pennsylvania School of Nursing
Philadelphia, Pennsylvania

J. Jill Suitor, PhD
Purdue University
West Lafayette, Indiana

Robert J. Sullivan Jr., MD
Department of Community and Family Medicine
Duke University Medical Center
Durham, North Carolina

Emiko Takagi, MA, PhD (c)
Andrus Gerontology Center
University of Southern California
Los Angeles, California

Jeanette C. Takamura, MSW, PhD
U.S. Department of Health and Human Services
Washington, DC

Alvin V. Terry Jr., PhD
Director, Small Animal Behavior Core
Medical College of Georgia
Augusta, Georgia

David R. Thomas, MD, FACP, AGSF, GSAF
Division of Geriatric Medicine
St. Louis University Health Sciences Center
St. Louis, Missouri

Vince S. Thomas, PhD
Department of Community and Family Medicine
Dartmouth Medical School
Hanover, New Hampshire

Constance Todd, MPA
The National Council on the Aging
Washington, DC

Catherine J. Tompkins, PhD
Center for the Neural Basis of Cognition
University of Pittsburgh
Pittsburgh, Pennsylvania

Connie A. Tompkins, PhD
Communication Science and Disorders
Center for the Neural Basis of Cognition
University of Pittsburgh
Pittsburgh, Pennsylvania
Edgar A. Tonna, PhD, FRMS
Institute for Dental Research
New York University Dental Center
New York, New York

Maria Tresini, PhD
Lankenau Institute for Medical Research
Wynnewood, Pennsylvania

John A. Turner
AARP
Washington, DC

Peter Uhlenberg, PhD
University of North Carolina
Chapel Hill, North Carolina

R. Alexander Vachon III, PhD
President, Hamilton PPB
Washington, DC

Kimberly S. Van Haitsma, PhD
Polisher Research Institute
Madelyn and Leonard Abramson Center for Jewish Life
North Wales, Pennsylvania

James W. Vaupel, PhD
Founding Director, The Max Planck Institute for Demographic Research
Rostock, Germany

Paul Verhaeghen, PhD
Department of Psychology
Syracuse University
Syracuse, New York

Ronald T. Verrillo, PhD
Institute for Sensory Research
Syracuse University
Syracuse, New York

Jan Vrij, PhD
Basic Research Laboratory
Cancer and Therapy Research Center
San Antonio, Texas

Michael M. Vilenchik, PhD
Senior Scientist
Longevity Achievement Foundation
Media, Pennsylvania

Dennis T. Villareal, MD, FACE, FACP
Division of Geriatrics and Nutritional Science
Washington University School of Medicine
St. Louis, Missouri

Pantel S. Vokonas, MD
Boston University School of Medicine
Boston, Massachusetts

Heather M. Wallace
University of Kentucky
Lexington, Kentucky

Robert B. Wallace, MD, MSc
Department of Epidemiology
University of Iowa College of Public Health
Iowa City, Iowa

Edith Walsh, PhD
RTI International
Washington, DC

Christi A. Walter, PhD
Department of Cellular and Structural Biology
University of Texas Health Science Center
San Antonio, Texas

Eugenia Wang, PhD
Bloomfield Centre for Research in Aging
Sir Mortimer B. Davis Jewish General Hospital
Montreal, Quebec, Canada

Huber R. Warner, PhD
Biochemistry and Metabolism Branch
National Institute on Aging
Bethesda, Maryland

Debra K. Weiner, MD
Pain Medicine at Centre Commons
University of Pittsburgh Medical Center
Pittsburgh, Pennsylvania

Carlos Weiss, MD
Division of Geriatric Medicine and Gerontology
The Johns Hopkins University School of Medicine
Baltimore, Maryland

Tracy Weitz, MPA
Institute for Health and Aging
University of California, San Francisco
San Francisco, California

Chris Wellin, PhD
Department of Sociology and Gerontology
Scripps Gerontology Center
Miami University
Oxford, Ohio

David G. Wells, PhD
Department of Molecular Cellular and Developmental Biology
Yale University
New Haven, Connecticut

Jennie L. Wells, BSc, MSc, MD, FRCPC
St. Joseph’s Health Care Parkwood Hospital
and
The University of Western Ontario
London, Ontario, Canada

Susan Krauss Whitbourne, PhD
University of Massachusetts at Amherst
Amherst, Massachusetts

Heidi K. White, MD, MHS
Department of Medicine
Duke University Medical Center
Durham, North Carolina

Monika White, PhD
President/CEO, Center for Healthy Aging
Santa Monica, California

J. Frank Whittington, PhD
Department of Sociology
Georgia State University
Atlanta, Georgia

Darryl Wieland, PhD, MPH
Research Director, Geriatrics Services Palmetto Health Richland
and
Professor of Medicine
University of South Carolina School of Medicine
Columbia, South Carolina

Joshua M. Wiener, PhD
RTI International
Washington, DC

Kathleen H. Wilber, PhD
Andrus Gerontology Center
University of Southern California, University Park
Los Angeles, California
Contributors

Monique M. Williams, MD
Department of Medicine
Washington University School of Medicine
St. Louis, Missouri

Sherry L. Willis, PhD
Department of Human Development
Pennsylvania State University
University Park, Pennsylvania

Arthur Wingfield, PhD
Brandeis University
Waltham, Massachusetts

Phyllis M. Wise, PhD
Department of Physiology
University of Kentucky
Lexington, Kentucky

Christina Wolfson, PhD
Department of Epidemiology and Biostatistics
McGill University and Director of Centre for Clinical Epidemiology and Community Studies
Jewish General Hospital
Montreal, Quebec, Canada

Fredric D. Wolinsky, PhD
College of Public Health
University of Iowa
Iowa City, Iowa

Carsten Wrosch, PhD
Department of Psychology
Centre for Research in Human Development
Concordia University
Montreal, Quebec, Canada

Hans Christian Wulf, MD, DSc
Department of Dermatology
Bispebjerg Hospital
University of Copenhagen
Copenhagen, Denmark

Frances M. Yang, PhD
Brigham and Women's Hospital
Department of Psychiatry
Harvard Medical School
Boston, Massachusetts

Steven H. Zarit, PhD
Department of Human Development and Family Studies
Pennsylvania State University
University Park, Pennsylvania

Zachary Zimmer, PhD
Population Council
New York, New York

Gwen Yeo, PhD
Stanford Geriatric Education Center
Stanford University School of Medicine
Palo Alto, California

Laurie Young
Executive Director
Older Women's League
Washington, DC

Carsten Wrosch, PhD
Department of Psychology
Centre for Research in Human Development
Concordia University
Montreal, Quebec, Canada

Steven H. Zarit, PhD
Department of Human Development and Family Studies
Pennsylvania State University
University Park, Pennsylvania

Zachary Zimmer, PhD
Population Council
New York, New York

David Zitner, MD
Director of Medical Informatics
Faculty of Medicine
Dalhousie University
Halifax, Nova Scotia, Canada
LIST OF ENTRIES

AARP (The American Association of Retired Persons)
A-B-C Model
Abstract Thinking
Acid-Base Balance
Acquired Immune Deficiency Syndrome
Activities of Daily Living
Activity Theory
Adaptive Capacity
Adherence
Adjustment
ADL/IDL
Adult Day Care
Adult Development
Adult Foster Care Homes
Adult Protective Services
Advanced Glycation End-Products
African American Elders
Age and Expertise
Age Discrimination
Ageism
Age Stereotype
Aging, Attitudes Toward
Aging, Images of
Aging Policy
Aging Services
AIDS/HIV
Alcohol Use
Alzheimer’s Disease: Clinical
Alzheimer’s Disease: Genetic Factors
Ambulatory and Outpatient Care
American Association of Homes and Services for the Aging
American Federation for Aging Research
American Geriatrics Society
American Society on Aging
Americans with Disabilities Act
Anti-Aging Medicine
Anxiety
Aphasia
APOE 4
Apolipoprotein Epsilon 4
Apoptosis
Architecture
Arthritis
Asian and Pacific Islander American Elders
Assisted Living
Association for Gerontology in Higher Education
Attention
Attention Span
Autoimmunity
Autonomy and Aging
Baby Boom Generation
Baltimore Longitudinal Study of Aging
Behavior Management
Bereavement
Berlin Aging Study
Biography
Biological Aging Models
Biological Models for the Study of Aging: Flies
Biological Models for the Study of Aging: Nematodes
Biological Models for the Study of Aging: Rhesus Monkeys and Other Primates
Biological Models for the Study of Aging: Rodents
Biological Models for the Study of Aging: Transgenic Mice/Genetically Engineered Animals
Biological Models for the Study of Aging: Yeast and Other Fungi
Biological Theories of Aging
Biology of FAT
Biomarker of Aging
Blood
Blood Pressure
Body Composition
Boomers
Calcium Metabolism
Canadian Research on Aging
Cancer
Cancer Control
Cancer Prevention
Carbohydrate Metabolism
Cardiovascular System: Heart
Cardiovascular System: Overview
Cardiovascular System: Vascularature
Caregiver Burden
Caregiving (Informal)
Care Management

Italics indicate that this subject is covered under a different title.
List of Entries

Case Management
Cash and Counseling
Cash Payments for Care
Cell Aging: Relationship
Between In Vitro and In
Vivo Models
Cell Aging In Vitro
Centenarians
Central and Peripheral Nervous
Systems Morphology
Cerebrovascular Disease:
Stroke and Transient
Ischemic Attack
Chronobiology: Rhythms,
Clocks, Chaos, Aging, and
Other Trends
Circulatory System
Cognitive Behavioral Therapy
Cognitive Dysfunction: Drug
Treatment
Cognitive Impairment
Cognitive Processes
Communication Disorders
Communication Technologies
and Older Adults
Community Needs Assessment
Competition
Complementary and
Alternative Medicine
Compliance
Comprehensive Geriatric
Assessment
Compression of Morbidity
Connective Tissues
Consumer Education
Consumer Fraud
Consumer Issues
Consumer Protection
Continuity Theory
Creativity
Crime: Victims and Perpetrators
Critical Theory and Critical
Gerontology
Cross-Cultural Research

Daily Activities
Death and Dying
Death Anxiety
Delirium

Dementia
Dementia: Frontotemporal
Dementia: Lewy Body
Demography
Dentistry, Geriatric
Depression
Developing Nations
Developmental Psychology
Developmental Tasks
DHEA
Diabetes
Diet Restriction
Disability
Discrimination
Disengagement Theory
Disposable Soma Theory
Disruptive Behaviors
Divorce
DNA (Deoxyribonucleic Acid):
Repair Process
Doctor-Patient Relationships
Driving
Drug Interactions
Drug Reactions
Drug Side Effects
Duke Longitudinal Studies

Early Onset Dementia
Economics
Economic Security
Elder Abuse and Neglect
Elder Law
Electronic Patient Records
Emotion
Employee Retirement Income
Security Act
Employment
End-of-Life Care
Energy and Bioenergetics
Environmental Assessment
EPESE
Epilepsy
Episodic Memory
Established Populations for
Epidemiological Studies of
the Elderly (EPESE)
Estrogen Replacement Therapy
Ethics
Ethnicity
Ethnographic Research

Ethnography
European Academy for
Medicine of Ageing (EAMA)
Euthanasia
Evolutionary Theory
Exchange Theory
Executive Function
Exercise
Exercise Promotion
Eye: Clinical Issues

Family and Medical Leave Act
Family Relationships
Fear of Death
Fecal and Urinary Incontinence
Female Reproductive System
Filial Responsibility
Foster Homes
Frailty
Friendship
Frontal Lobe Dysfunction
Functioning

Gastrointestinal Functions and
Disorders
Gender
Gene Expression
Generalized Anxiety Disorder
Generativity, Theory of
Gene Therapy
Genetic Heterogeneity
Genetic Programming Theories
Geographic Mobility
Geriatric Assessment Programs
Geriatric Education Centers
Geriatric Medicine
Geriatric Psychiatry
Geriatric Research, Education,
and Clinical Centers
Geriatrics
Gerontological Society of
America
Gerontology
Goal Attainment Scaling
Goal Setting
Grandparent-Grandchild
Relationships
Group Therapy
Growth Hormone and Insulin-
Like Growth Factor-1
Guardianship/Conservatorship
Hair
Health and Retirement Study
Health Beliefs
Health Care: Financing, Use, and Organization
Health Care Policy for Older Adults, History of
Health Informatics
Health Information Through Telecommunication
Health Insurance
Health Maintenance Organizations
Health-Related Quality of Life
Hearing
Hemispheric Asymmetries
Hip Fractures
Hispanic Elderly
HMOs
Home Equity Conversion
Homelessness
Home Modifications
Homeostasis
Homocysteine
Homosexuality
Hormone Replacement Therapy (HRT)
Hospice
Hostility
Housing
Human Factors Engineering
Human Immunodeficiency Virus
Humanities and Arts
Humor
Hypertension
ICIDH
Immune System
Immunizations
Implicit Memory and Learning
Individual Retirement
Arrangements (IRAs)
Industrial Gerontology
Inflation
Influenza
Information-Processing Theory
Injury
Institutionalization
Instrumental Activities of Daily Living
Intelligence
Interference
Intergenerational Equity
Intergenerational Relationships
International Association of Gerontology
International Classification of Functioning, Disability, and Health
International Federation on Ageing
Internet Applications
Intercultural Psychotherapy
Introversion
Isomerization
Job Performance
Kidney and Urinary System
Language Comprehension
Language Production
Learned Helplessness
Learning
Legal Services
Leisure
Life Course
Life Events
Life Expectancy
Life Extension
Life Review
Life Satisfaction
Life Span
Life-Span Theory of Control
Lipofuscin
Lipoproteins, Serum
Living Wills and Durable Powers of Attorney
Longevity: Societal Impact
Longitudinal Data Sets
Longitudinal Research
Longitudinal Retirement History Survey (LRHS)
Long-Lived Human Populations
Long-Term Care: Ethics
Long-Term Care Insurance, Private
Long-Term Care Ombudsman Program
Long-Term Care Placement
Long-Term Care Policy
Long-Term Care Regulation
Long-Term Care Workforce
Loss
LRHS
Macroeconomics
Magnetic Resonance Spectroscopy: Brain Membrane and Energy Metabolism
Marital Relationships
MCI
Medicaid
Medicare
Medication Misuse and Abuse
Melatonin
Membranes
Memory: Autobiographical
Memory: Discourse
Memory: Everyday
Memory: Neurochemical Correlates
Memory: Remote
Memory: Spatial
Memory: Working
Memory and Memory Theory
Memory Assessment: Clinical
Memory Schema
Memory Training and Mnemonics
Menopause: Psychological Aspects
Mental Health
Mental Health Services
Mental Status Examination
Metamemory
Midlife Crisis
Migration
Mild Cognitive Impairment
Minorities and Aging
Minority Populations: Recruitment and Retention in Aging Research
Mitochondrial DNA Mutations
Mobility
Modernization Theory
Mood Disorders
Mortality
Motivation
Motor Function: Central Nervous System
Motor Performance
Multidimensional Functional Assessment
Musculoskeletal System

Narrative Analysis
National Association of Area Agencies on Aging
National Association of Boards of Examiners for Long-Term Care Administrators
National Council on Aging
National Institute of Mental Health Epidemiologic Catchment Area Project
National Institute on Aging
National Institute on Aging: Biology of Aging Program
National Long-Term Care Survey
Native Alaskans
Native American Elders
Native Peoples
Neuroendocrine Theory of Aging
Neuroplasticity
Neuroticism
Neurotransmitters in the Aging Brain
Neurotrophic Factors in Aging
Normative Aging Study
Nursing Home Reform Act
Nursing Homes
Nutrition
Nutrition Programs: Meals on Wheels

Obesity
Older Americans Act
Older Women’s League
Older Workers
Oral Health
Organizations in Aging

Osteomalacia
Osteoporosis
Outpatient Care
Oxidative Stress Theory

Pain and Pain Management
Palliative Care
Parent-Child Relationships
Parkinson’s Disease
Pension Plans
Pensions: History
Pensions: Policies and Plans
Personal Accounts
Personal Care/Personal Assistant/Personal Attendant Services
Personality
Pets
Pharmacodynamics
Phobias
Physician-Assisted Suicide
Physiological Adaptation
Plant Aging
Policy Analysis: Issues and Practices
Political Behavior
Political Economy of Aging Theory
Polypharmacy
Population Aging
Population Aging: Developing Countries
Postmenopausal Hormone Therapy
Poverty
Prejudice
Pre-Senile Dementia
Pressure Ulcers
Preventive Health Care
Prion Diseases
Prison Populations
Problem Solving
Problem-Solving Therapy
Productive Aging
Productivity
Professional Nursing
Progeroid Syndromes
Program of All-Inclusive Care for the Elderly (PACE)
Prostate Disease

Prostatic Hyperplasia
Proteins: Posttranslational Modifications
Proteolysis and Protein Turnover
Psychiatric Diagnosis and the DSM
Psychological Assessment
Psychosocial Functioning
Psychosocial Interventions
Psychotherapy
Purpose in Life
Quality Improvement and Assurance in Health Care
Quality of Life
Racemization
Racial and Ethnic Groups
Reaction Time
Reality Orientation
Rehabilitation
Religion
Reminiscence
Resilience
Resource Utilization Groups
Respiratory System
Respite Care
Restrains: Physical/Chemical
Retailing and Older Consumers
Retirement
Retirement Communities
Retirement Income and Pensions
Retirement Planning
Reverse Mortgages
Rigidity
Rural Elders
Savings
Seizures
Selection, Optimization, and Compension Model
Self-Assessed Health Status
Self-Care Activities
Self-Concept
Self-Esteem
Senescence and Transformation
Senior Centers
Senior Companion Program
Sexuality
Sibling Relationships
Side Effects
Skeletal Muscle Characteristics
Skin Aging
Sleep
Sleep Disorders
Social Breakdown Theory
Social Capital and Social Cohesion
Social Cognition and Aging
Social Gerontology: Theories
Social Isolation
Social Learning Theory
Social Problems: Aging, Poverty, and Health
Social Security
Social Security Income Program
Social Security Reform
Social Stratification
Social Stress
Social Support
Sodium Balance and Osmolality Regulation
Somatic Mutations and Genome Instability
Special Care Units for Persons with Dementia
Specialized Housing/Housing with Supportive Services
Speech
Stem Cells
Stress
Stress and Coping
Stress Theory of Aging
Stroke
Subjective Well-Being
Substance Abuse and Addictions
Successful Aging
Suicide
Sundown Syndrome
Supplementary Security Income Program
Support Groups
Surveys
Swedish Twin Studies
Taste and Smell
Tax Policy
Technology
Telemedicine and Telegeriatrics
Telomeres and Cellular Senescence
Temperature Regulation Abnormality
Terminal Change
Testosterone Replacement Therapy
Thanatology
Third World
Thyroid Gland
Touch
Transportation
Tuberculosis
Tumor Suppression
Twins Studies in Aging Research
Urinary Tract: Symptoms, Assessment, and Management
Vascular Cognitive Impairment
Veterans and Veteran Care
Vision: System, Function, and Loss
Vitamins
Volunteerism
Wandering
Wear-and-Tear Theories
Widowhood
Wisdom
Women’s Changing Status: Health, Work, Family
Word-Finding Difficulty
This page intentionally left blank
This page intentionally left blank
AARP (THE AMERICAN ASSOCIATION OF RETIRED PERSONS)

With more than 35 million members, AARP is the leading not-for-profit, nonpartisan membership organization for people who are 50 years of age and older in the United States. It is dedicated to making life better, not only for its members, but for all Americans. The AARP vision is a society in which all can age with independence, dignity, and purpose.

Mission

AARP provides information and resources; engages in legislative, regulatory, and legal advocacy; assists members in serving their communities; and offers a wide range of benefits, products, and services. These include AARP The Magazine, which is published every two months and is the highest circulation magazine in the United States; the AARP Bulletin, a monthly newspaper; AARP Segunda Juventud, a quarterly newspaper in Spanish; NRTA Live & Learn, a quarterly newsletter for 50+ educators; and www.aarp.org, the award-winning Web site. AARP has staff and offices in all 50 states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. AARP is dedicated to enhancing the quality of life as people age by leading positive social change and delivering value to members. AARP recognizes that the phrase “quality of life” means different things to different people. Some need help coping with the basics of daily living. Others want to get involved in personally rewarding volunteer activities or health promotion programs. And, some members want to make the most of their leisure time with sports and travel opportunities. The range of connections to services, activities, and products possible through AARP’s programs is so large that few are aware of all of them.

AARP serves the most rapidly growing portion of the population—an increasingly diverse segment— who are working full-time, part-time, and retired; married, widowed and single; urban, suburban, and rural; taking care of children, taking care of parents, or both, and empty nesters. The organization’s goals include:

- Informing members and the public on issues important to older Americans and their families.
- Advocating on legislative, consumer, and legal issues before Congress, the state houses of all 50 states, the courts, and regulatory bodies at every level of government.
- Fostering community service and health promotion programs.
- Offering a wide range of special products and personal services to members.

Membership

Membership in AARP is open to any person who is 50 years of age or older. Almost one-third of the U.S. population falls into this age group and more than 45% of all people over the age of 50 are AARP members. U.S. citizenship, or even U.S. residence, is not a requirement for membership. More than 40,000 members live outside the United States. People also do not have to be retired to join. In fact, 44% of AARP members work part time or full time. For this reason, AARP shortened its name in 1999 from the American Association of Retired Persons to just four letters. AARP. The “median age” of AARP members is 65, so half are younger than 65 and half are older. Slightly more than half of members are women.

History

Ethel Percy Andrus, PhD, who retired as principal of a large Los Angeles high school, founded the National Retired Teachers Association (NRTA) in 1947 to promote her philosophy of active, productive aging and to respond to the need of retired teachers for health insurance. At that time, private health insurance was virtually unavailable to older Americans, for it was not until 1965 that the Congress enacted Medicare, which provides healthcare benefits to those 65 and older.
Dr. Andrus approached dozens of insurance companies until she found one willing to take the risk of insuring older persons. She then developed other benefits and programs for retired teachers, including a discount mail-order pharmacy service. Over the years NRTA heard from thousands of others who wanted to know how they could obtain insurance and other NRTA benefits without being retired teachers. In 1958, Dr. Andrus realized the time had come to create a new organization open to all Americans. Today, NRTA continues as a division within AARP.

In 1963, Dr. Andrus established an international presence for AARP by founding the Association of Retired Persons International (ARPI), with offices in Lausanne, Switzerland, and Washington, D.C. While ARPI disbanded as a separate organization in 1969, AARP has continued to develop networks and form coalitions abroad with its office of International Affairs (IA). IA is creating a growing presence in the worldwide aging community, promoting the well-being of older people everywhere through advocacy, education, and policy development. IA also functions as a clearinghouse for information on successful programs and possibilities for older people throughout the world, both learning from and mentoring those abroad.

Dr. Andrus’s motto for AARP was “To serve, not to be served.” Since 1958, AARP has grown and changed dramatically in response to societal changes; however, AARP has remained true to its founding principle.

Advocacy Efforts

For a number of years, Fortune magazine has named AARP the nation’s foremost advocacy organization (“most powerful lobbying organization”). This is an extraordinary accomplishment given that AARP is a not-for-profit, nonpartisan organization that has no Political Action Committee (PAC), does not contribute any money to candidates or political parties, and does not endorse or oppose political candidates or parties. The strength comes from members choosing to be involved in policy issues that affect them and their families. Whether the issue is Social Security, Medicare, Medicaid, pension protection and reform, age discrimination, long-term care, work and retirement, or transportation, AARP volunteers make their presence count on Capitol Hill and in state capitals throughout the country.

AARP members are not only vocal on health and income security issues, but they are active advocates on consumer issues as well. AARP volunteers are fighting consumer fraud, including telemarketing, sweepstakes, and mail fraud. Issues range from the rights of grandparents to setting utility and telephone rates to safety standards for manufactured housing. AARP has had particular success in the courts opposing predatory lending, a practice by which older Americans are encouraged to remortgage homes that are paid off or nearly paid off for egregiously high interest rates and unfavorable payoff periods.

AARP backs up its advocacy efforts with quality policy research efforts. The AARP Public Policy Institute (PPI) was created in 1985 to conduct objective, relevant, and timely policy analyses to inform the development of AARP’s public policy positions, and to contribute to public debate and discussion. Research findings are typically published in the form of detailed reports such as Issue Papers, Issue Briefs, and Data Digests. PPI also publishes numerous shorter Fact Sheets, In-Briefs, and “FYIs” each year. All are available on the Web site.

Volunteer Programs

AARP volunteers are the heart and soul of the Association. The members of its Board of Directors and its national officers are all unpaid volunteers, as are the state presidents and thousands of legislative and program volunteers and chapter leaders. Members can be involved in a number of innovative community service and education programs, including tax preparation assistance, driver training and re-education, grief and loss counseling, and independent living programs, if they choose. Through their involvement in national state, and local affairs, AARP volunteers are shaping the experience of aging positively for members and for society.

Special Services

Dr. Andrus was a pioneer in establishing group health insurance for older Americans. She recognized then, as AARP does today, that making such services available to—and affordable for—older Americans is essential to maintain the quality of life for all people as they grow older. From the
beginning, AARP has responded to members’ needs by making available products and services created especially for them. Through market innovation and leadership, AARP Services, Inc. (ASI), a wholly owned subsidiary of AARP created in 1999, manages the wide range of products and services offered as benefits to AARP’s members. ASI also develops new products and services that reflect the changing expectations and needs of members. Developing good products means selecting quality business partners as providers, so ASI continually monitors each service’s operation to make sure AARP’s service-provider partners are meeting the Association’s standards.

Among the programs ASI manages are Medicare supplemental insurance, automobile/homeowners insurance, a prescription drug program, long-term care insurance, a motor ing plan, a credit card, and life insurance. ASI also oversees the AARP Privileges Program, designed to respond to the wide-ranging needs of the AARP traveler by providing discounts on hotels and motels, auto rentals, airlines, cruise lines, vacation packages, entertainment products, and consumer goods. Discounted legal fees are available from state Bar Association members of the AARP Legal Services Network. Profits from any of the services offered by ASI are rolled back into the activities of the non-profit AARP organization so that dues for members can be kept as low as possible and charitable services supported.

The Foundation

Through the AARP Foundation, AARP works to expand the understanding of aging with research and service. In its 30 years of grant making, the Foundation has supported more than 630 projects with grants totaling approximately $35 million. Foundation programs provide security, protection, and empowerment for older people in need. Low-income older workers receive the job training and placement they need to rejoin the workforce. Free tax preparation is provided for low- and moderate-income older individuals. The Foundation’s litigation staff protects the legal rights of older Americans in critical health, long-term care, and consumer and employment court cases. Additional programs provide information, education, and services to ensure that people older than 50 lead lives with independence, dignity, and purpose.

Foundation programs are funded by grants, tax-deductible contributions from AARP members, the general public, and AARP. In 2004, the Foundation reorganized and greatly enlarged its capacity to raise additional funds from individuals, corporations, other foundations, and government agencies. The Foundation also strengthened its partnership with AARP by increasing support of AARP’s charitable programs that advance the Foundation’s mission. AARP members support the Foundation’s charitable work through volunteerism, as well as through annual and long-term financial contributions.

Conclusion

AARP recognizes that aging is synonymous with living. As we progress along life’s continuum, we find that what matters most is not age but experiences along the way. AARP’s founder Dr. Ethel Percy Andrus once observed, “The stereotype of old age—increasingly costly and troublesome—is contradicted by the host of happy and productive older people participating and serving beyond the call of duty. Second only to the desire to live is the natural yearning to be wanted and needed, to feel that one’s contribution to life is essential.”

John Rother

See also
Organizations in Aging

A-B-C MODEL

See
Behavior Management

ABSTRACT THINKING

Young children understand the relation between objects and events in a functional manner. They note that the first object is seen to go with or to operate on the second object. Complementarity criteria are integral components of their thinking. By contrast, older children and young adults tend to use similarity criteria. As one ages, however, the use of complementarity criteria increases once again (Reese & Rodeheaver, 1985). The reversal to complementarity as people age is thought to be caused by environmental factors rather than attributable to changes.
in competence. Young children as well as elderly people are rarely required to state their thoughts in a specifically prescribed way, and complementary categorization may therefore seem more natural since such categories are grouped naturally in time and space.

Older adults do not necessarily lose the ability to use more abstract criteria, but they are often willing to indulge in an alternative mode that offers greater imaginary scope. Complementarity as an aspect of thinking has been found to be more prevalent in nonprofessional men or women from age 25 to 69, with neither age nor gender differences found to be significant (Denney, 1974). Luria (1976) observed the same phenomena in a study in Central Asia, where uneducated workers were more likely to engage in concrete thought, while educated collective farm members were more prone to use abstract thought.

Abstract thinking and aging has also been investigated in the context of the crystallized-fluid ability model (cf. Cattell, 1963). Convergent fluid abilities that involve abstract thinking have shown an average decline somewhat earlier than was found for the more concrete information-based crystallized abilities. Paradoxically, abstract thinking may become more important as people age because many lifelong experiences must be reappraised. Even well-established everyday behaviors that previously could be performed in a routine and concrete manner may now require a modicum of abstract thought to evoke a novel response appropriate to changed circumstances (cf. Schaie & Willis, 1999; Willis & Schaie, 1993).

An alternate explanation for the reduction in abstract reasoning with increasing age might be sought in the reduction of cortical volume in brain areas essential for high levels of abstract thinking (cf. Gunning-Dixon & Raz, 2003).

The contention that the increased incidence of concrete thought in elderly people may be the result of experiential rather than neurological factors is further supported by positive results of training studies that involve persons who had not earlier used abstract classification principles (Denney, 1974), or who had had a lower performance rating on abstract ability measures (Schaie & Willis, 1986; Willis, 1996, 2001).

See also
- Cognitive Processes
- Intelligence
- Metamemory
- Problem Solving

References


ACID-BASE BALANCE

Hydrogen ion (H⁺) is a highly reactive cation. For that reason it is essential that the concentration of F− in the body fluids be tightly regulated. In healthy people the H⁺ concentration of the blood plasma ranges from 36 to 43 nanomoles per liter (pH 7.45–7.35). H⁺ is produced by acids and consumed by
bases; thus, the regulation of the $H^+$ concentration is called acid-base balance.

The body is continuously producing acids and bases. The production of carbon dioxide, which is a major end product of metabolism, is equivalent to producing carbonic acid. Although large quantities of carbon dioxide are produced each day, they are eliminated from the body by the lungs through alveolar ventilation as quickly as they are produced. The important point is that the nervous system controls alveolar ventilation so that the concentration of carbon dioxide in the blood plasma is maintained at the level needed for the maintenance of an appropriate $H^+$ concentration in the body fluids. The body also produces fixed acids (i.e., acids not eliminated by the lungs) and produces bases. If fixed acid production is in excess of base production, the kidneys excrete the excess $H^+$ in the urine. It is also the case that if base production is in excess of the fixed acid production, the kidneys excrete the excess base in the urine. Although the finely regulated pulmonary and renal functions can sometimes transiently fail to do the job, no immediate problem occurs because the body is rich in chemical buffers that serve to blunt rapid change in $H^+$ concentration.

Do these exquisite systems for the control of $H^+$ concentration continue to function effectively at advanced ages? It has long been held that healthy elderly living in usual unchallenged conditions have no problem in maintaining normal acid-base balance (Lye, 1998). However, a careful meta-analysis of published data on acid-base balance and age has challenged this long-held view (Frassetto & Sebastian, 1996). This analysis indicates that a significant rise in steady-state blood $I_i^+$ concentration occurs with increasing adult age. Moreover, assessment of the concentration of blood carbon dioxide concentration revealed a decrease with age, and this would be expected because of the increase in alveolar ventilation by the respiratory system in response to a rising blood $H^+$ concentration. On the basis of these findings, plus the meta-analysis assessment that plasma bicarbonate concentration decreases with age, it is likely that the age-associated deterioration of kidney function is responsible for the increasing $H^+$ concentration. Of course, to be certain of the gerontological validity of the findings of this meta-analysis requires data from a well-designed longitudinal study. The results of such a study have yet to be reported. However, if the conclusions from this meta-analysis are valid, an age-associated progressive increase of this magnitude in the near steady-state $H^+$ concentration could have negative consequences in regard to bone loss, muscle mass loss, and kidney function.

In contrast to uncertainty of the effect of age on unchallenged, near steady-state acid-base balance, the evidence is clear that healthy elderly people respond less well than the young to an acid-base challenge. In an early study, young and old were challenged by a load of ammonium chloride (Adler, Lindeman, Yiengst, Beard, & Shock, 1968). The body metabolizes ammonium chloride to hydrochloric acid. In that early study, it was found that increased blood levels of $H^+$ and decreased levels of bicarbonate ion persisted much longer in old than in young individuals. Altered kidney function appears to be the main reason for this difference between young and old. Indeed during the first 8 hours following ammonium chloride administration, a much greater percentage of the acid load is excreted in the urine by the young than by the old (Lubran, 1995). There is also evidence that the elderly cope less effectively with increased acid loads caused by exercise. This decrease in the ability of the kidney to excrete $H^+$ predisposes the elderly to the development of and delayed recovery from metabolic acidosis (Lindeman, 1995). Whether the respiratory change in alveolar ventilation is as effective in the elderly in compensating for changes in blood $H^+$ concentration is subject to debate; not all studies have found the response of the respiratory system to chemical stimuli to be blunted with increasing age (Rubin, Tack, & Cherniack, 1982).

Of course, the elderly have many age-associated diseases that predispose them to acid-base disorders (e.g., chronic obstructive pulmonary disease and chronic renal disease). Thus, acid-base disorders are commonly encountered in geriatric medicine.

Edward J. Masoro

See also

Kidney and Urinary System

References

ACQUIRED IMMUNE DEFICIENCY SYNDROME

See AIDS/HIV

ACTIVITIES OF DAILY LIVING

The term activities of daily living (ADL) refers to a range of common activities whose performance is required for personal self-maintenance and to remain a participating member of society. As illustrated by the International Classification of Functioning, Disability, and Health (ICF) (WHO, 2001), ADL is a central aspect of human functioning, affected by and affecting health conditions, physiological and psychological functioning, and participation in life situations, while also interacting with environmental and personal factors (de Kleijn-de Vrankreijker, 2003). Intended for international use, ICF should provide a common language for gathering data and interdisciplinary communication. That, however, remains for the future. To date, the recoding of current disability survey questions to meet ICF criteria has proved to be difficult (Swanson et al., 2003). Nevertheless, the U.S. National Committee on Vital and Health Statistics identified ICF “as the only viable code set for consistently reporting functional status.” (Iezzoni & Greenberg, 2003).

The theoretical model of ADL proposed by Katz (1983) suggests three areas: mobility (e.g., Rosow & Breslau, 1966); instrumental (I) ADL, which is concerned with complex activities needed for independent living (e.g., taking own medications, using the telephone, handling everyday finances, preparing meals, shopping, traveling, and doing housework (Lawton & Brody, 1969)); and basic personal care tasks (BADL) (e.g., toileting, dressing, eating, transferring, grooming, and bathing (Katz et al., 1959)).

More recent analyses, typically based on large representative samples of older persons, offer conflicting suggestions regarding the psychometric characteristics of IADL and BADL items. Some investigators have found that these items constitute not two, but three dimensions (Fillenbaum, 1985; Stump, Clark, Johnson & Wolinsky, 1997; Thomas, Rockwood & McDowell, 1998). Within each factor, the items have sometimes been found to constitute a hierarchical measure, but this is not invariable. In fact, a multiplicity of hierarchies have been identified for the Katz items (Lazaridis et al., 1994). While there is considerable agreement across studies in the items included in each of these groups, differences in the items present reflect the datasets from which information was drawn. Thus, the study of Thomas et al. (1998), based on data from the Canadian Study of Health and Aging, which used the Older Americans Resources and Services ADL scale (Fillenbaum, 1988), identifies toileting, dressing, eating, transferring, and grooming as Basic self-care. Intermediate self-care items include bathing, walking indoors, housework, meal preparation, shopping, and traveling alone, while Complex self-management (which is recognized as having a substantial cognitive component) includes handling money, using telephone, and handling own medicine.

Alternatively, BADL and IADL items have been found to constitute a hierarchy (Spector & Fleishman, 1998; Suurmeijer et al., 1994). Spector & Fleishman (1998) used a set of items which overlap considerably with those of Thomas et al. (1998)—the only differences are the absence of grooming and the inclusion of incontinence, laundry, and the specification that housework is light—yet have come to a different conclusion regarding multidimensionality. Possibly alternative statistical techniques and different samples of elders (nationally representative vs. disabled) account for the discrepant findings.

Standardized ADL assessments have increased in use, acceptance, and importance during the last 40 years, while the number of such assessments has proliferated. Current measures date back to the Katz Index of Independence in Activities of Daily Living (Katz et al., 1959) and to the Barthel Index (Mahoney & Barthel, 1965). Both were developed in rehabilitation settings to measure tasks basic to personal self-care, and include comparable items, such
as feeding, continence, transferring, use of toilet, dressing, bathing, and for the Barthel, mobility.

Use of these scales has since diverged. Modifications of the Barthel permit increasingly specific focus on the type of rehabilitative intervention required and the impact of that intervention. Experience with this and related assessments used in rehabilitation have culminated in the Functional Independence Measure (FIM™, Linacre et al., 1994), which operationalizes the Uniform Data System for Medical Rehabilitation (UDS). FIM™ is currently the basis for reimbursement in rehabilitation, where level of functioning, and not diagnosis, indicates service needs. (See Multidimensional Functional Assessment for further information on FIM™.)

The level of detail required in rehabilitation is inappropriate where assessment of the general older population is concerned, because the overwhelming majority can perform basic activities. To better discriminate within the general older population, inquiry is directed to more difficult tasks, including mobility and instrumental ADL (although not all of these tasks are more difficult to perform than BADL activities).

The multiplicity of measures that exist differ in several important regards. Some are intended for general use, others with a specific subgroup (e.g., persons with arthritis, cognitive impairment, dementia, multiple sclerosis, stroke, etc.; see e.g., Bowling, 2001, for measures intended for neurological and rheumatological conditions, and cardiovascular disease; Burns, Lawlor & Craig, 2004, for measures designed for psychiatric conditions, including dementia; and Spilker, 1996 for measures in multiple areas). Information may be sought from the individual, from a family member, or a service provider. Information from the three may not be equivalent (Dorevitch, Cossar, Bailey, Bisset, Lewis, Wise, & McLennon, 1992). Items may differ across measures. Inquiry may focus on whether the person can perform the task (i.e., capability) or does perform the task (actuality), with what level of difficulty, or pain, and whether problems are the result of particular health conditions. There may be inquiry into the type of help received (e.g., from an aid, a person, or both); help from a person is seen as indicating more dependence than the use of an aid. The time interval considered (current, past week, past month, past year) may vary. Possible responses may be dichotomous (e.g., can do unaided vs. not), trichotomous (e.g., can perform unaided, need some help, cannot perform at all), or polychotomous (e.g., FIM™ uses very clearly specified seven-point scales). Differences in wording have yielded estimates of disability prevalence differing by up to 60%, with potentially serious impact on service planning (Freedman & Martin, 2004; Wiener, Hanley, Clark, & van Nostrand, 1990). Statistical techniques are now being applied in an attempt to equate different measures (Jette, Haley & Ni, 2003).

While the majority of scales require self- (or proxy-) report, performance scales have also been developed. Information from the two sources are not identical, but may be complementary, with level of performance valuable in distinguishing among persons who self-report no problems (Hoeymans, Feskens, van den Bos, & Kromhout, 1996; Myers, Holiday, Harvey, & Hutchinson, 1993; Reuben et al., 2004; Young et al., 1996).

Although of extraordinary value, current ADL scales nevertheless have some drawbacks. Environmental factors that might affect performance are seldom considered (Freedman & Martin, 2004). Some activities are rarely included (e.g., sexual activities), and few measures have kept pace with technological advances (e.g., use of ATMs, microwaves, cell phones). In its initial wave the Health and Retirement Survey (Soldo, Hurd, Rodgers, & Wallace, 1997) included such items, but these were later dropped. ADL tasks may be affected by gender and culture. The manner in which various activities must be performed may vary from country to country. Tasks important in one country may not be as relevant in another. Some tasks may not be relevant at all in, say, a developing country (Fillenbaum et al., 1999), or may measure different abilities (Jitapunkul, Kamolratanakul & Ebrahim, 1998).

ADL is central to any assessment of personal independent functioning. Information on ADL capacity has been used more extensively and for a greater variety of purposes than has information from any other type of assessment. It has been used to indicate individual social, mental, and physical functioning, as well as for diagnosis; to determine service requirement and impact; to guide service inception and cessation; to estimate the level of qualification needed in a provider; to assess need for structural environmental support; to justify residential location; to provide a basis for personnel employment
decisions; to determine service change and provide arguments for reimbursement; to calculate active and disabled life expectancy; and to estimate eligibility for specific services (e.g., attendant allowances). Accurate assessment of ADL is probably one of the most valuable of measures.

Excellent reviews, which provide information on psychometric characteristics, and some of which reproduce the ADL measures used in assessment of the elderly may be found in Bowling, 1997; 2001; Burns, Lawlor, & Craig, 2004; Israel, Kozarevic, & Sartorius, 1984; McDowell & Newell, 1996; Salek, 1998; and on the QOLID (Quality of Life Instruments Database) site (www.qolid.com). The latter lists 1000 quality-of-life instruments, including detailed information on more than 450 of these.

G E R D A  G .  F I L L E N B A U M

See also
Disability
Mobility
Self-Care Activities

References


Activity Theory

9


QOLID Quality of Life Instruments Database. www.qolid.com


ACTIVITY THEORY

In the gerontology of the early 1960s, activity theory and disengagement theory became opposing grand metaphors for successful aging. In the case of activity theory, the archetype image portrayed an older person who had managed to maintain vigor and social involvement despite the vagaries of aging. For disengagement theory, the archetype image was of an older person who had voluntarily and gracefully disengaged from the hustle and bustle of midlife to a more serene and satisfying contemplation of life from a distance. These dualistic images of two very different paths of aging have been a part of Western civilization for a long time.

Robert Havighurst and his colleagues at the University of Chicago (Havighurst, 1963; Havighurst, Neugarten, and Tobin, 1963) were the early spokespersons for activity theory. Havighurst laid no claim to have invented activity theory; he simply put in writing what many practitioners of the day assumed: that keeping active was the best way to enjoy satisfying senior years. According to this view, except for the inevitable changes in biology and health, older people are the same as middle-aged people, with essentially the same psychological and social needs. In this view, the decreased social involvement that characterizes old age results from the withdrawal by society from the aging person; and the decrease in interaction proceeds against the desires of most aging men and women. The older person who ages optimally is the person who stays active and who manages to resist the shrinking of his [or her] social world. [She or] he maintains the activities of middle age as long as possible, and then finds substitutes for those activities he [or she]...
is forced to relinquish—substitutes for work when [she or] he is forced to retire; substitutes for friends or loved ones whom he [or she] loses by death. (Havighurst, Neugarten, and Tobin, 1963, p. 419)

In contrast to activity theory, disengagement theory (Cumming and Henry, 1961) held that successful aging involved growing older gracefully by gradually replacing the equilibrium system of social relations typical of midlife with a new equilibrium more appropriate to the interests of people approaching the end of life. This new equilibrium was presumed to involve a lower overall volume of social relations and a less psychological investment in the social affairs of the larger community.

Rosow (1963) picked up this theme of equilibrium in his rendition of activity theory, but his position was that the best course of action was to maintain the equilibrium of middle age. He argued that Americans do not want to grow old and that, by inference, their “basic premise in viewing older age is that the best life is the life that changes least.” (Rosow, 1963, p. 216). He went on to argue that a “good adjustment” to older age involves maximum stability and minimum change in life pattern between late middle age and later years.

Activity theory assumed that activity produced successful aging through the relationship between activity and life satisfaction or subjective well-being. It was presumed that activity level was the cause and life satisfaction the effect.

**Major Concepts of Activity Theory**

Activity theory is built around four major concepts: activity, equilibrium, adaptation to role loss, and life satisfaction. Each of these very general concepts is open to a variety of interpretations, which has led to no small amount of confusion.

**Activity.** At its simplest, activity is any form of doing. But in Havighurst’s original formulation of activity theory, activity was not just a level of doing but also a pattern of activity that formed the person’s lifestyle. Activity theory predicted that maintaining both level and pattern of activities from middle age into old age would lead to the highest level of life satisfaction in older age.

**Equilibrium.** Activity theory makes the functionalist assumption that activity patterns arise to meet needs and that the needs of older people are no different from the needs of middle-aged people; therefore, whatever equilibrium the person has achieved in middle age should be maintained into one’s senior years. Significant assaults to this midlife equilibrium are best resisted, and lost activities or roles should be replaced. Simply dropping out would not meet functional needs and would therefore be expected to lead to lowered life satisfaction.

**Adaptation to Role Loss.** Role loss was assumed to be a common experience for aging individuals because of the withdrawal of society from the aging person. Activity theory predicted that the most successful way to adapt to role loss was to find a substitute role to satisfy needs. The original formulation assumed that role substitutes should be roughly equivalent to the roles lost, so retirement would lead to a search for job substitutes, for example. Later, the concept of substitution was broadened by Madox (1963) to include alternative activities of any kind.

**Life Satisfaction.** How do we know when a person has aged successfully? Both activity theorists and disengagement theorists agreed on one thing. Life satisfaction was the best criterion for measuring social and psychological adjustment. Havighurst and his colleagues’ (1963) concept of life satisfaction was made up of five components: zest and enthusiasm, resolution and fortitude, a feeling of accomplishment, self-esteem, and optimism. This construct addressed the level of subjective well-being experienced by an individual, not his or her evaluation of specific objective circumstances. The Life Satisfaction Index B (Havighurst, 1963) was constructed to measure these attributes, and it has been most often used as the dependent variable in formal tests of activity theory.

**Evolution of Activity Theory**

In its original form, activity theory was a homeostatic, equilibrium theory of the relation between activity patterns and life satisfaction. However, the theoretical ties between activity theory and functional
equilibrium theory were largely ignored, although they were made explicit by Rosow (1963).

Lemon, Bengtson, and Peterson (1972) reformulated activity theory into an interactionist theory. By interactionist, they meant both symbolic interactionist in the form of a relation between self and role and the use of reflected appraisals to bolster the self as well as social interactionist in the form of role supports going from others to the aging individual. Thus, for Lemon and colleagues, the motivation for maintaining activity was not the meeting of functional needs but the need to maintain a socially supported self-structure that was assumed to lead to optimal life satisfaction.

Lemon et al. (1972) developed a formal propositional theory that attempted to explain why high activity levels could be expected to produce high life satisfaction and declines in activity could be expected to result in lower life satisfaction. Their theory was based on a series of assumptions about the relationships among role loss, role supports (feedback from others about role performance), self-esteem, and life satisfaction. This reformulation of activity theory was essentially a domino theory in which role loss was presumed to lead to less role support and lower activity, which were presumed to lead to lower self-esteem, which in turn was presumed to cause lower life satisfaction. On the other hand, maintaining high activity levels by substituting for lost roles would maintain activity level and role support, which would maintain self-esteem, and thereby maintain life satisfaction. Further, they classified activities into informal, formal, and solitary, and they hypothesized that all three types would be associated with life satisfaction, but informal activity was expected to show the strongest association because of its greater likelihood of providing role support, followed by formal activity, and informal activity was expected to show the lowest association with life satisfaction because of its presumed lack of role support. Unfortunately, their test of the theory provided little support for this reformulation. The only significant association they found between activity and life satisfaction occurred for informal activities among married women. Longino and Kart (1982) retested Lemon, Bengtson, and Peterson’s (1972) hypotheses and reported more support for the hypothesized relationships between types of activities and life satisfaction. They also suggested several additional hypotheses to be included in the interactionist activity theory:

- Formal activity damages self-concept and lowers morale. This hypothesis was based on the notion that service use is the most common type of formal activity in an older population and that service use results in negative role support.
- Lower life satisfaction leads to increased formal activity. Here they argued that the causal direction of activity theory may be wrong. Elders with low morale tend to be targeted by formal service providers; therefore low life satisfaction causes formal activity, not the reverse.
- Formal activity is a variable context and its effects on life satisfaction depend on the extent to which it offers opportunities for supportive human relationships.
- Role supports may not be substitutable. If confidants are lost, they may not be replaceable.
- Frequency of activity is as important as the type of activity. They found that any level of informal activity resulted in life satisfaction near the sample mean, whereas an absence of informal activity resulted in a significant deficit in life satisfaction compared to the sample mean.

Part of the difficulty with the interactionist version of activity theory may have been its simplistic assumptions about the relation of self and roles. Research evidence on the relationship between self and role in later life suggests that the linkage is neither as direct nor as simple as the interactionist formulations of activity theory indicate. For example, Markus and Herzog’s (1991) review of the literature on aging and the self conceptualized the self as a dynamic, complex structure made up of past, current, and future images of the self arising from specific antecedents. Self-schema are used to organize and interpret experience, regulate affect, and motivate behavior. Life satisfaction is presumed to be one of the consequences of these self processes. In this formulation all roles are not equally important to the self, only those that are part of the set of core self-schema that persists over time. Likewise, the place of specific activities in the core self could be expected to be a significant intervening variable in the relations among activity patterns, activity change, the self, and life satisfaction.
Research on activity has addressed some of these concerns. Larson, Zuzanek, and Mannell (1985) and Mannell (1993), for example, looked at the meaning of specific activities for the individual as a significant intervening variable in the relationship between activity and life satisfaction. Larson and colleagues reported that the retired adults in their study voluntarily spent almost half of their waking hours alone, but being alone was not a negative experience for the majority of them. When they were alone, they were engaged in activities that required concentration and challenge. Mannell probed this issue further and found that the link between specific activities and life satisfaction was the culmination of a complex string of contingencies. First, activities had to be available that had a high potential for attracting individual investment of time and energy. Second, activities had to be freely chosen, not obligatory, and accompanied by a sense of commitment. Third, activities had to produce the experience of flow, life experience transported to a higher level of quality by activities that focus attention, match challenges to capabilities, reduce self-consciousness, and increase feelings of control. If these contingent conditions were met, then we could expect activities to bolster life satisfaction.

**Important Unaddressed Issues**

Does activity theory apply equally to men and women as they age? To what reference point in the past should patterns of activity and life satisfaction in old age be compared? When does old age begin chronologically? Does activity influence some of the components of life satisfaction more than others? Does activity influence life satisfaction, or is it the other way around? Is activity level correlated with life satisfaction consistently?

Gender differences are very obvious in the findings of research on aging and activities. The number and types of activities and the frequency of participation in an array of activities have all been found to differ substantially by gender, with activity patterns of older men showing a stronger relation to life satisfaction than the activity patterns of older women. However, there has been no attempt to integrate these findings into activity theory, to explain why activities are more important to the life satisfaction of older men than to older women.

Activity theory might be further refined by looking at specific components of subjective well-being. It is likely that self-esteem is not the only mental construct that is influenced by the experiences gained from a person’s activities. Lawton (1983) mapped a number of dimensions of subjective well-being that could profitably be used in research on activity theory.

Finally, activity level is not always correlated with life satisfaction. Indeed, in a meta-analysis of 10 predictors of subjective well-being among elders, Okun et al. (1984) found that activity level was only modestly related to life satisfaction when the effect of health was controlled. Health was by far the strongest predictor of life satisfaction. Research on activity theory should be sure to control the effects of health and life stage before coming to conclusions about the influence of activity level on life satisfaction.

**Directions for Activity Theory**

Current research using activity theory falls into two categories: research aimed at comparing activity theory with other theories as descriptions of typical patterns related to aging and research aimed at testing and extending the social psychological components of activity theory to better specify the causal relationships between activity and life satisfaction.

Researchers who focus primarily on activities tend to describe activity patterns and then compare their descriptions to the ideal descriptions presented in the homeostatic, functional version of activity theory. Because there is usually a good bit of change in the frequency of specific activities over time in later adulthood, the equilibrium hypothesis of activity theory is usually rejected.

However, researchers who focus primarily on life satisfaction are increasingly looking at the social psychological relation between specific activities and life satisfaction. These researchers have met with increasing success in identifying specific conditions under which activity is strongly related to life satisfaction. But as the list of specifications grows, the power of activity theory as a general theory of aging is diminished.

Despite the many difficulties with activity theory, its ties to the cultural conception of successful aging have made gerontologists reluctant to abandon
it. Some of each new generation of gerontologists have been attracted to the basic ideas contained in activity theory. Instead of rejecting the theory out of hand, it is used as an ideal standard against which to compare actual activity patterns. For those more interested in activity theory as theory, the focus has shifted to understanding the conditions under which the kernel of truth contained in the cultural conception could be expected occur in its more obvious forms. As a result, activity theory has seldom been tested in recent research but instead is more often used as one element of a more complex theoretical argument.

Robert C. Atchley

See also
Continuity Theory
Disengagement Theory
Social Gerontology: Theories

References


ADAPTIVE CAPACITY

A major characteristic of living things is the ability to adapt to environmental changes. For example, upon perceiving a threat mammals will incur an immediate activation of the sympathetic nervous system that will stimulate heart and breathing rate in preparation for the increased metabolic demands of fighting or fleeing. If the metabolic demand is actually activated (for example, by running), heart and breathing rate will be further activated as long as the metabolic demand from the muscles continues. Similarly, exposure to a novel antigen will produce a robust activation of the immune system, including the proliferation of immune cells that produce antibodies against the novel antigen, a process that is essential to survive infections. At the cellular level, many toxic insults produce a characteristic profile of molecular responses, called the heat shock response, that is highly protective.

However, there are limits to the extent to which organisms can adapt. For example, each individual can only sustain a maximum metabolic demand even at peak performance (such as during a sprint). In humans the maximum sustainable metabolic demand, constrained by a number of factors but especially by cardiovascular capacity, is often measured by the rate of oxygen consumed at maximum short-term effort on a treadmill (a parameter called VO2max). Thus VO2max constitutes a major indicator of the capacity of the cardiovascular system to adapt to short-term metabolic stress; thus VO2max may be considered to reflect short-term adaptive capacity for metabolic demand. It is has been amply demonstrated that in healthy humans VO2max decreases steadily during
aging, approximately 9% per decade (Rosen et al., 1998). Similarly, immune responses to novel antigens (McGlauchlen, 2003) and the heat shock response (Shamovsky, 2004) are increasingly attenuated with age.

On the other hand, short-term adaptive capacity can be modified by chronic stimulation, a phenomenon which may be termed long-term adaptive capacity. For example, repetitive aerobic exercise (for example, endurance training at 70% VO$_{2\text{max}}$ for 30 minutes 3 times per week for 12 weeks) enhances VO$_{2\text{max}}$, apparently by inducing remodeling of the cardiovascular system. The enhancement of VO$_{2\text{max}}$ by chronic training appears to occur about as well in healthy elderly men as in younger men, and older master athletes exhibit higher VO$_{2\text{max}}$ than healthy older nontrained humans. Nevertheless, VO$_{2\text{max}}$ decreases about as fast in athletes who are in training as in age-matched controls (although trained athletes continue to exhibit higher VO$_{2\text{max}}$ than nontrained healthy controls as they age). Furthermore, since the effect of age on VO$_{2\text{max}}$ is substantially greater than the training effect on VO$_{2\text{max}}$, even though training can enhance VO$_{2\text{max}}$ about as well in older as in younger individuals, this effect of training cannot completely reverse or prevent the reduction in VO$_{2\text{max}}$ during aging (Trappe et al., 1996).

Short-term and long-term adaptive capacity occur in response to many perturbations, including changes in temperature, altitude, diet, and many other environmental factors. In general, short-term adaptive capacity decreases with age. For example, a cold environment causes many physiological responses, including shivering and enhanced heat production, which allow maintenance of normal body temperature; these adaptations to cold are enhanced after chronic exposure to low temperature. As with VO$_{2\text{max}}$ (and possibly related to this parameter), the ability to adapt to a cold environment is impaired with age (Anderson et al., 1996). However, chronic exposure to cold enhances adaptation to cold about as well in older as in younger individuals. Nevertheless, as with VO$_{2\text{max}}$, because the effect of age on cold tolerance is greater than the effect of chronic exposure to cold, chronic exposure to cold cannot fully reverse the effects of age on cold tolerance. This pattern of greater impairments of short-term than long-term adaptive capacity is common for many responses to environmental perturbations.

An important but largely unresolved question is the physiological significance of adaptive capacity during aging under circumstances in which environmental fluctuations are minimal, as in the case of most human populations. The fact that the elderly are more likely to die of hyperthermia or hypothermia clearly indicates that in extreme circumstances impairments in short-term adaptive capacity can have profound effects. On the other hand, the vast majority of deaths during aging, either in human populations or in the laboratory, occur without major fluctuations in the environment. Nevertheless, VO$_{2\text{max}}$ is closely related to cardiovascular health, suggesting that long-term adaptive capacity, which is less impaired during aging than short-term adaptive capacity, could play an important role in mediating effects of lifestyle on health and mortality during aging (Bortz and Bortz, 1996). Since long-term adaptive capacity is relatively intact during aging, and especially since short-term adaptive capacity seems to be intrinsically reduced during aging, training and other lifestyle changes may be at least as valuable in the elderly as in the young. Consistent with this principle, elderly individuals who maintain a lifelong engagement with intellectual stimulation exhibit fewer cognitive impairments than nonengaged controls. While a training effect on age-related cognitive deficits has not yet been rigorously demonstrated, this question obviously is of great practical interest.

Adaptive capacity may reflect a fundamental process of aging. For example, long-lived lines of fruitflies and nematodes not only live longer, but even when young are more resistant to the effects of numerous environmental stresses than shorter-lived strains (Lin et al., 1998). Thus genetic influences on longevity also influence short-term adaptive capacity, suggesting that adaptive capacity may play an important role in age-related mortality even in benign environments.

Charles V. Mobbs

See also
- Stress Theory of Aging
- Successful Aging

References


**ADHERENCE**

When a physician prescribes a medication for a patient, an implied contract is made between the two—one requiring specific behaviors by both doctor and patient. The doctor must prescribe the correct drug in the proper dose, provide the patient with adequate instructions for its use and warnings about possible adverse effects, and monitor the patient’s use of the drug to ensure a therapeutic outcome. The patient is expected to purchase the medication, take it as directed, and report to the physician any untoward side effects—in other words, to adhere to the doctor’s instructions. For elderly patients, adherence may be particularly difficult, given their greater risk of adverse effects from medication.

**Types of Nonadherence**

Nonadherence (or noncompliance, as it is still sometimes called) can be classified as overuse, underuse, erratic use, and contraindicated (or inappropriate) use. Patients who overuse drugs either take more types of drugs than necessary, take more than the prescribed amount of one drug, or take a “pm” (i.e., take as needed) drug when it is not actually needed. Underuse includes the failure to have the prescription filled (“initial noncompliance”), the premature discontinuation of the drug, and the consistent failure to take as much of the drug as the doctor ordered. Erratic use means that the patient generally fails to follow instructions. This type includes missed doses (underuse), double doses (overuse), and drug confusion, which is taking the wrong drug by mistake or taking doses at the wrong time, by the wrong route of administration, or with the wrong liquid. Contraindicated drug use occurs when the patient takes a drug that is inappropriate either because it is unnecessary or potentially harmful. This can occur when the older patient selfmedicates incorrectly or when the physician prescribes the wrong drug—one that is ineffective, produces a harmful or unwanted side effect, or interacts negatively with other medications being taken, food, or alcohol. Obviously, these four types of nonadherence are not mutually exclusive, and the older patient may engage in more than one at a time.

Most researchers agree that the failure to take medications (underuse) is by far the most common type of nonadherence, generally comprising over half of all reported instances (e.g., Gurwitz, Glynn, Monane, Everitt, Gilden, Smith, et al., 1993). Although underuse can have serious consequences for a person for whom the medication is necessary for control of a dangerous condition, it is probably the safest form of misuse for those who take psychotropic medications and many of those on multiple drug regimens. This behavior has been termed intelligent noncompliance.

Shimp and Ascione (1988) have differentiated between unintentional nonadherence, when the patient merely forgets a dose or gets confused about how or when to take it, and intentional nonadherence, which occurs when the patient deliberately alters the dose or the timing or chooses not to take it at all. Evidence suggests that intentional nonadherence may be more common with up to 30% of prescriptions never even filled by the patient. A majority of older patients state that they would discontinue taking a drug that they felt was not working and self-medicators will stop using a drug or, use less because they do not like the drug, the dosage, the side effects, or the cost; or they get better results by taking it their way.

**Extent of Nonadherence**

It is extremely difficult to estimate how often physicians do not live up to their responsibilities under
the doctor-patient contract; the consensus is that the
failure rate is quite high (Simonson, 1994). We have
somewhat better data on the patient’s side of the bar-
gain. Nonadherence is, of course, a problem in pa-
tients of all ages. Early researchers suggested that
nonadherence is particularly likely among elderly
persons, because it is known to correlate highly
with several factors common to old age, including
chronic illness, multiple prescription drugs, social
isolation, and mental confusion. Later reviews of
adherence studies, however (e.g., Simonson, 1984),
concluded that no clear evidence exists of any re-
lationship between age and adherence. Simonson
(1984) reports that researchers have estimated that
nonadherence by the elderly ranges from 2% to
95%. Most studies place the proportion of older
people who admit some nonadherence in taking
prescription drugs at around 40%–60% (Botelho &
Dudrak, 1992), although many instances probably
are not therapeutically significant.

Nevertheless, Ascione (1994) argues that nonad-
herence in an older person is likely to have much
more serious consequences than in a younger in-
dividual because of the elder’s greater likelihood
of serious illness and comorbidity. The results of
nonadherence in older persons include failure to re-
cover, aggravation of the condition, hospitalization,
and the addition of medications to treat the supposed
intractable symptoms. So far, few investigators have
attended to sex or race differences in adherence,
though some findings suggest that they may exist
(Bazargan, Barbre, & Hamm, 1993; Kail, 1992).

Causes of Nonadherence

Many factors can contribute to nonadherence among
older persons. Simonson (1984) has organized them
into three main groups: those related to the patient,
to therapy, and to the health professional. Patient-
related causes include failure to understand the
importance of therapy; misunderstanding the doc-
tor’s instructions; self-medication; not feeling well;
physical disabilities, including sensory losses; and
lack of supervision. Factors associated with the ther-
apy itself include the number of drugs prescribed,
the frequency of doses, difficult dosage forms, ad-
verse drug reactions, and the expense of medica-
tions. Health professionals, including physicians,
nurses, and pharmacists, also can precipitate nonad-
herence in their elderly patients by failing to estab-
lish a good relationship with the patient, expressing
doubt about the drug’s efficacy, and being unwill-
ing to spend time educating patients. Using a dif-
ferent organization scheme, Ascione (1994) lists the
consuming factors as: (1) complexity of the drug
regimen; (2) the patient’s poor drug knowledge;
(3) the patient’s physical limitations (especially sen-
sory losses); (4) poor communication between pro-
essional and patient; and (5) psychosocial charac-
teristics of the patient, such as health beliefs and
social isolation.

Some researchers (e.g., Morrell, Park, Kidder, &
Martin, 1997) have suggested poor cognitive func-
tion, especially memory problems and the inability
to understand complex medical instructions, as
a possible cause of nonadherence in older people.
Research has so far gone to show that both memory
and visual perception can affect adherence, at least
among the oldest-old, and that various memory aids
can improve adherence (Morrow, Hier, Menard, &
Leirer, 1998). On the other hand, nonadherence is
patient-initiated and represents a majority of older
people’s attempts to control their own therapy. Thus,
the patient appears that cognitive deficits are a signifi-
cant cause of nonadherence for older persons who
suffer such losses but may have little or no effect on
the vast majority of elders.

Older people are at risk of nonadherence due to
many factors outside their control, including their
own health status, the number and types of drugs
they are prescribed, the failure of therapeutic in-
structions, health care organization costs, and social
isolation. In fact, nonadherence can create signifi-
cant problems for elderly persons (Ascione, 1994),
but many writers (e.g., Simonson, 1994) agree that,
“compared with the inability of health care profes-
sionals to prescribe and administer drugs properly
and to monitor their use by older patients, nonad-
herence is relatively less troublesome.”

Reducing Noncompliance

Ascione (1994) aptly summarizes what little is
known about reducing nonadherence among older
persons: “What appears most successful is a com-
prehensive approach that assesses the individual
needs of the patient, uses multiple strategies and in-
corporates a medication monitoring system to give
continual feedback to the patient.” He groups the strategies developed so far as dissemination of drug information, simplification of the administration process, and teaching medication management skills.

FRANK J. WHITTINGTON

See also

Doctor-Patient Relationships

References


Bazargan, M., Barbre, A. M., & Hamm, V., Failure to have prescriptions filled among Black elderly. *Journal of Aging and Health, 5*, 264–282.


ADJUSTMENT

See

Adaptive Capacity

ADL/IDL

See

Activities of Daily Living

ADULT DAY CARE

Adult Day Care Services

Adult day services (ADS) are “community-based group programs designed to meet the needs of functionally and/or cognitively impaired adults through an individual plan of care” (National Adult Day Services Association [NADSA], 2002). These programs provide a variety of health, social, and personal services in a protective setting. Most programs provide activities, meals, social services, personal assistance, and health services; others include nursing and medical services, rehabilitation therapies, counseling, and transportation. ADS vary greatly depending on whether they follow a medical, social, or combination model; whether they are dedicated to special populations (e.g., aged, disabled, Alzheimer’s care, and developmentally disabled); or whether they are for persons of all ages. For example, dementia-care programs may provide cognitive stimulation, family counseling, and music therapy (Jarrott, Zarit, Berg, & Johansson, 1998). ADS goals include improving participant functioning and independence; delaying or preventing placement in residential care; and alleviating caregiver burden.

ADS regulations vary widely across states and funding sources. Some states require licensure or certification; some have voluntary standards; still others require nothing. The Commission on Accreditation of Rehabilitation Facilities (CARF) voluntarily accredits ADS programs as a way to maintain standards through an agreement with NADSA. No federal policy governs adult day health services (ADHS) apart from the Program of All Inclusive Care for the Elderly (PACE), a model of acute and chronic care for elderly persons that is based on day health care and funded by Medicare and Medicaid. Medicaid also funds ADHS under 1915c HCBS waivers. Forty-five states report having waivers that include ADHS for persons meeting nursing home level-of-care criteria (http://www.cms.hhs.gov/medicaid/waivers). Federal funding of ADS comes through the Social Security Act including Medicaid (Title XIX), Social Services Block Grants-Title XX (SSBG), and the Older Americans Act (Title III). Other funding sources vary and include private pay, philanthropic support, other state programs, and private long-term care insurance. State programs vary widely for
eligibility, program goals and standards, services, staffing, reimbursement, and monitoring (Howell-White, Scotto Rosato, & Lucas, 2003; Lucas, Scotto Rosato, Lee, & Howell-White, 2001). Adult day health care is not a Medicare reimbursable service, although Medicare reimburses for rehabilitative services (i.e., physical, occupational, and speech therapy) delivered in some adult day health settings. The recent Medicare Modernization Act of 2003 allows for a demonstration of ADHS as a substitute for Medicare reimbursable home health care.

A recent national survey of ADS conducted by Partners in Caregiving (Cox, 2003) reported that 3407 adult day centers are operating in the United States, which represents a 25% growth rate between 1997 and 2002. For-profit programs represented the greatest growth sector in new programs (44%). Characteristics of centers reported in this survey include the facts that 78% are not-for-profit; most (74%) are affiliated with a larger organization; most operate 5 days a week for an 8 to 10 hour day; 21% are based on the medical model, 37% are social, and 42% are combination programs; the average number of enrollees is 43, with an average daily attendance of 26; average cost is $56 per day. Participant average age is 72, 66% are women, and more than 50% have some cognitive impairment. Most participants attend 2 to 3 days a week for 5 to 6 hours, with participants enrolled for an average of 2 years.

NADSA is the national association for ADS providers. It serves as an important resource for ADS programs, providing “national program standards and guidelines,” technical assistance, training, national conferences, newsletter, Web site, and advocacy with policymakers (NADSA, The National Adult Day Services Association, Inc. 772 Grant Street, Suite L, Herndon, VA 20170. www.nadsa.org).

Partners in Caregiving is another resource. This program is funded by RWJF and located at Wake Forest University. This program provides technical assistance to improve financial viability and quality with, teaching centers, a newsletter and Web site. Its work demonstrates that ADS can effectively serve people with chronic conditions (see http://www.rwjf.org/reports/npreports/partnerse.htm). (Partners in Caregiving, Wake Forest University School of Medicine, Medical Center Boulevard, Winston-Salem NC, 27157.)

Research in ADS

The seminal work by Weissert (1976; 1977) surveyed 10 adult day programs. Analysis resulted in conceptualizing the programs into the “medical” model (provides rehabilitative therapies) and “social” model (stresses social activities, client function, nutrition, and recreation). Using data from the National Adult Day Care Survey (Weissert et al., 1989) these prevailing models were expanded by Conrad and associates (1993) to include “special purpose” centers (i.e., serve single type of clientele). The Dementia Care Respite Services Program (Cox and Reifler, 1994; Reifler, Henry, Sherrill, Asbury, & Bodford, 1992) described dementia-specific adult day care. Their national survey of 240 centers found: 17% were social; 25% were medical; and the remaining were a combination medical-social model.

Program Effectiveness Research

Gaugler and Zarit (2001) provide a recent systematic review of ADS program effectiveness research. Their schema organizes program effectiveness research according to the ADS goals of client functioning, caregiver outcomes, and impact on institutionalization. A notable study by Weissert and colleagues (1980) used an experimental design to evaluate four programs (including On Lok) but found negligible effect on ADL functioning. Satisfaction was very high for 82.2% of clients (Weissert et al., 1990). This was followed by an evaluation of 24 California programs by Capitman (1982) which found 90% of enrollees maintained or improved ADL function. A large-scale study by Hedrick and associates (1993) determined the effect of adult day health care compared to usual care on health and psychosocial status at eight Veterans Affairs (VA) medical centers over one year. There were no differences in psychosocial, ADL functioning or health, but costs were significantly higher than for clients assigned to usual care. While large, their sample was 96% male and the effectiveness of social programs was not addressed. Gaugler (1999) in a quasi-experimental study of adult day services for dementia caregivers, did not find significant differences in frequency of behavior problems or ADL dependencies. Evaluations of ADS as part of integrated
demonstration programs have also been conducted. Eng and colleagues (1997) found PACE clients had lower mortality rates when compared to nursing home residents.

Studies of impact on family caregivers have reported that ADS can be quite effective in providing caregivers with emotional and psychological relief from the daily demands of care with sustained and regular utilization. A noteworthy example is the Adult Day Care Collaborative Study (ADCCS) (Zarit et al., 1998) that found utilization of ADS for at least 8 hours per week over at least 3 months resulted in significantly lower feelings of role overload, worry, depression, and anger. Replicating these results in a large-scale study was attempted in the Medicare Alzheimer’s Disease Demonstration Evaluation (MADDE) by Newcomer and colleagues (1998). Caregivers in the treatment group reported significantly less depression and burden, but effect sizes were small. Using longitudinal data from the ADCCS, Jarrott and colleagues (1999) found caregiver satisfaction to be high with ADS staff, program availability, and activities.

Experts have also been interested in whether ADS act as a substitute for or delay institutionalization. Weissert and colleagues’ study (1980) found participation in ADS lowered nursing home use. California’s evaluation, Capitman (1982) focused on nursing-home eligible clients and found ADS delayed placement about 15 to 22 months. For caregivers, Kosloski and Montgomery (1995) reported high respite use lowered probability of institutional care; however, Gaugler (1999) found that dementia clients using ADS were more likely to be placed in nursing homes. The large scale VA and MADDE studies (Hedrick et al., 1993; Newcomer et al., 1998) did not show significant effects on institutionalization. However, Weissert and associates (1997) in evaluating Arizona’s Long-Term Care System (ALTCS) comprised of many HCBS, found nursing home days were reduced when eligibility was “targeted” to those who were screened most likely to need long-term nursing home care. In 2004, Dabelko explored ADHS length of stay and reported that those older, at higher nutritional risk, nonwhite, and receiving public funding, disenrolled at higher rates. Lack of social support, cultural issues, and higher disability levels for later enrolled publicly funded clients were seen as important to earlier disenrollment. ADS stays were both for short-term and long-term care, indicating ADS may provide multiple roles in the continuum of care for older adults.

Other recent ADS studies have focused on changing client characteristics (Cefalu, Ettinger, & Espeland, 1996; Travis, Steele, & Long, 2001), funding streams, and policy issues. For example, Bradsher, Estes, & Stuart (1995) identified program growth, rising demand, and higher levels and chronicity of disability among ADS clients and noted the barriers to access for persons with dementia or behavior problems. Dabelko and Balaswamy (2000) compared users of ADS and home health care (HHC) users. ADS users were younger, had greater cognitive impairment, needed more supervised assistance with ADLs, and had more social contacts than HHC users—suggesting the need for integrated models (physical, mental, and social services) for both settings.

The research so far implies that ADS does not affect functional outcomes consistently, but appears to exert positive effects on subjective aspects of well-being, such as satisfaction. Work with PACE suggests that ADHS programs may serve as an important setting that can provide the coordinating link in a continuum of long-term care services, when enhanced with case management and access to acute care and chronic care services. The models that integrate ADS with adult day care with a variety of services and case management, such as PACE and ALTCS, appear effective in delaying nursing home use.

JUDITH A. LUCAS

See also

Program of All-Inclusive Care for the Elderly (PACE)

References


ADULT DEVELOPMENT

Adult development refers to normative and non-normative changes in the physical, cognitive, and psychosocial domains, which occur between age 20 and 65 years. These physical, cognitive, and psychosocial developmental changes in adulthood are highly variable depending on which stage in adult development is being examined. For instance, while early adulthood is characterized by growth and vitality, midlife is a stage where some developmental domains reach their full potential and other domains have developmental declines that become more common and noticeable. In contrast, later adulthood is characterized by the challenges of physical and cognitive decline, as well as psychosocial loss. However, many of these changes are not universal, so any discussion of adult development must be conditioned upon significant, interindividual variability.

Traditionally, developmental research has largely ignored adulthood in favor of childhood and adolescence. With the rise of the life-span prospective (review in Baltes, Staudinger, & Lindenberger, 1999) there has been an increased attention to old age and more recently to midlife (Lachman, 2004; Ryff, Singer, & Seltzer, 2002) and young adulthood; however, the focus on adult development still does not reach the degree of focus on childhood and adolescence. The age boundaries of each stage of adult development are somewhat vague and arbitrary, but most would agree that young adulthood encompasses between ages 20 and 40; midlife at least the years between 40 and 55, and at most from 35 to 65 years (Staudinger & Bluck, 2001); and late adulthood begins at age 65.

Three pioneers in life-span developmental psychology have focused on development in adulthood and should be mentioned: Erikson, Loevinger, and Levinson. Erikson’s (1985) stage theory of psychosocial development posits that as individuals move through life, they experience distinct crisis regarding a developmental issue important to the current phase of their life. According to Erikson, the normative crisis of early adulthood concerns “intimacy versus isolation,” in which the individual seeks to make a commitment to another individual. The normative crisis of midlife concerns the topic of “generativity versus stagnation,” which challenges the individual in the area of assisting and mentoring young people and thus guiding the next generation. In later life the individual is concerned with acceptance of their life and impending death. This stage is referred to as “ego integrity versus despair.” If an individual does not successfully master each of these goals, he or she experiences psychological distress related to the developmental topic.

A second theory of adult development builds on the work by Erikson and focuses on ego development (Loevinger, 1997). According to Loevinger, adult ego development moves through stages pertaining to conformity, conscientiousness, individualism, autonomy, and finally, in late adulthood, integration. A third conceptual approach addressing development in adulthood is Levinson’s “seasons” of adulthood (1986). The main goal of the season in early adulthood concerns the establishment of a family. During the midlife season, Levinson suggests that although biological capacities are decreasing, individuals are still able to maintain active and energetic lives. In addition, he also suggests that during this time of development, individuals are responsible for the current generation’s development. Finally, the late adulthood season is characterized as a period of reflection of one’s life and acceptance of impending death.

Physical, Sensory, and Cognitive Development in Adulthood

Adulthood is a time of life characterized mostly by growth and stability, but over the adult life span loss and decline begins (Heckhausen, 2001). Levels of stability or decline differ greatly in different areas of physical, sensory, and cognitive functioning. Although there is great interindividual variability, some of the most noticeable signs of aging across the life span include the loss of pigmentation leading to the graying of hair, thinning of hair caused by hair germination center destruction, rigidity of the skin’s dermal layer leading to wrinkling, and changes in the strength and tone of voice (Whitbourne, 2001). Less noticeable signs of aging, which may affect many individuals in adulthood, include decrease in bone density, decline in muscle mass, visual and auditory deterioration, changes in cardiovascular fitness and respiratory functioning, and changes in
body regulation (e.g. decreased basal metabolism rates, endocrine and immune function, and sexual changes) (Masoro & Austad, 2001).

In general, cognitive changes in adulthood are much more subtle than physical changes. Young adulthood is characterized as a time when cognitive abilities reach their peak levels (Lehman, 1945; Ericsson, 2000). Losses in midlife are primarily at the level of peak performances in that only at times when performance is pushed to its limits by optimizing training and performance conditions do declines in developmental reserve capacity become apparent (Lindenberger, Marsiske, & Baltes, 2000). A prominent theoretical perspective for interpreting cognitive developmental change is the distinction between fluid and crystallized intelligence (Horn & Cattell, 1966), or as in a more recent conceptualization between the pragmatics and mechanics of intelligence (Baltes, 1987). Crystallized intelligence refers to general knowledge developed through a lifetime of experiences (accumulated knowledge) (Sternberg, Grigorenko, & Oh, 2001). In contrast, fluid intelligence refers to “creative and flexible thinking” required to solve novel problems (e.g. anagrams, memory tests). In general, research examining age-related changes in fluid and crystallized intelligence has found that fluid intelligence declines with age, but crystallized intelligence remains stable or even increases (e.g. professional specialization) across the life span (Kaufman & Horn, 1996). However, in a more detailed examination of cognitive decline in fluid intelligence, it is important to distinguish between fluid intelligence pertaining to the solving of more practical problems and that pertaining to more traditional (academic) problem-solving tasks. Performance on traditional problem-solving tasks begins to decline around age 20 years and continues to decline throughout adulthood, whereas performance on practical problem-solving tasks peaks in midlife, suggesting that it is at this time that individuals are best at practical problem-solving (Sternberg, Grigorenko, & Oh, 2001).

In their related dual-processing model, Baltes and colleagues (1999) distinguish between the mechanics of intelligence that generally refer to processing abilities (information-processing strategies and problem-solving functions) independent of specific content, and the pragmatics of intelligence that typically refers to knowledge about facts and procedures, including practical thinking, expertise, wisdom, and knowledge accumulated across the life span. While the pragmatics of intelligence are expected to grow into adulthood and then remain stable into old age, there is abundant evidence of age-related decline in the mechanics of intelligence (Salthouse, 2003). The declines in mechanics of intelligence compromise individual capacities beginning in midlife only under conditions of multitasking and time pressure (Lindenberger, Marsiske, & Baltes, 2000). Thus, implications of these declines for everyday functioning in midlife are constrained to time-sensitive multitasking in everyday behavior (e.g., talking on the phone while merging into freeway traffic) and select professions (e.g., air traffic controllers). Strategies that are part of the pragmatics of intelligence (e.g., sequence activities to avoid multitask overload) in midlife can compensate for the weaknesses in the mechanics of intelligence (Baltes, 1993). However, such strategies may become increasingly insufficient as cognitive decline progresses in advanced old age.

Psychosocial Influences on Development in Adulthood

Adaptation to growth and resilience in managing losses are 2 key focuses in adult development (Heckhausen, 1999). Several developmental tasks and transitions represent important challenges for adaptation and resilience. First, adulthood is a period of continued growth but also of emerging decline and loss. In comparison to early adulthood, midlife into late adulthood (the 40s, 50s, 60s, and beyond) is marked by a dramatic increase in developmental changes that are loss-related. However, many developmental processes continue to advance in midlife (e.g., expertise) and even into old age (e.g. improved emotional balance). Thus, individuals have to cope with the co-occurrence of growth and decline (Heckhausen, 1999), perhaps more so during midlife than during any other phase of the life span. The individual needs to orchestrate the allocation of resources so that areas of functioning involving growth are optimized and other areas of impeding loss are protected.

Second, during adulthood the pronounced perspective on life shifts toward an increasing awareness of the “finitude of life.” While in early adulthood the future is open and many paths seem viable,
in midlife there is a focus shift from time lived from birth to time left before death. An aspect of Erikson’s (1963) developmental theory concerns the acceptance that the time left until death is limited and it is only through acceptance that ego integrity can be achieved. Because of this change in perspective, individuals may begin to view goals as unattainable, which then may lead to goal disengagement. The passing of these “developmental deadlines” can result in strong needs for emotion regulation and goal readjustments (Heckhausen, Wrosch, & Fleeson, 2001). Goals that are now “off time” are sacrificed for goals that can still be obtained. For goals that must be abandoned (e.g. due to the “biological clock” for procreation running out) individuals may need to cope with the loss of the goal through emotion regulation. Losses in old age often require further disengagement and selective optimization (Baltes & Baltes, 1990) of most cherished and/or essential areas of functioning (Schulz & Heckhausen, 1996). Regret of the lost goals may lead to depression and rumination and an increased need to cope with the loss.

Finally, developmental challenges in adulthood can vary with regard to whether they are age normative and nonnormative. Changes in physical (e.g. menopause) and cognitive (e.g. decreases in fluid intelligence) functioning are considered to be age normative and as such may be easier to cope with because the individual can prepare for the change and disengage in the goals associated with the decline. In contrast, nonnormative challenges cannot be predicted, so the adaptation to the developmental change can be more challenging and as such, there may be higher regulatory demands. For example, a cancer diagnosis is unpredictable and as such it will be more challenging and require more resources to adapt to the change.

Because of the many age-specific burdens and challenges in various stages of adulthood, the conclusion might be reached that these challenges overwhelm individuals. Indeed, the notion of a midlife crisis suggests that developmental losses, rising awareness of the finitude of life, and opportunities lost result in depression and problem behavior in a majority of midlife adults (Whitbourne, 1986; Hunter & Sundel, 1989). Although Jacques (1965) suggested that the midlife crisis is a normative developmental milestone generally accepted by the greater public, there is little empirical evidence to suggest that the midlife crisis is either normative or widespread (Hunter & Sundel, 1989). In fact, most research on midlife development has found that midlife is a period with “continuous development, maintained well-being, adaptivity, and resilience” (Heckhausen, 2001).

For many of the challenges encountered during adulthood, individuals have appropriate strategies for mastering them or at least avoiding the socioemotionally debilitating consequences. Specifically there are 3 types of regulatory resources available to deal with stressful situations: social support and social relations, general psychological resources, and specific control strategies for managing the stress of the loss. First, social support involves instrumental and emotional support from others in one’s social network. Second, general psychological resources comprise such personality characteristics as ego resiliency (Block & Block, 1980) or generalized self-efficacy beliefs (Bandura, 1977). Finally, strategies for managing the challenges of midlife include control striving, experience and knowledge about adult development, and the existence of multiple roles and identities. Control strategies of developmental regulation help individuals to match their goal selections (e.g., whether to focus on career goals or have a child) to the opportunities available at the particular age and its developmental ecology. Thus, for example, an impending deadline related to declining fertility might prompt a woman and/or her partner in early midlife to give priority to founding a family over pushing for advances in their career, whereas later in midlife other priorities take precedence (Heckhausen, Wrosch, & Fleeson, 2001). Sets of control strategies orchestrated for goal engagement or, for goal disengagement, can help the individual to address the transitions from better to worse opportunities in an organized and efficient manner.

Thus, during adulthood, each of its phases has its own set of challenges, opportunities, and risks for development. Many of these challenges involve the potential for disillusionment, decline, and loss. Growth and loss co-occur and confront the individual with converse regulatory challenges. It is most impressive to see how most individuals fare well across these transitions.

Sarah F. Roper-Coleman
Jutta Heckhausen
See also
- Life Course
- Life-Span Theory of Control
- Personality
- Selection, Optimization, and Compensation Model
- Successful Aging

References


ADULT FOSTER CARE HOMES

Adult foster care (AFC) typically involves minimal assistance and around-the-clock supervision for several adults residing in a private community-based dwelling. Proprietors of such homes supply material and emotional support typical of “informal” caregiving. There are approximately 34,000 community residential facilities, including AFC homes, across the United States (Wildfire, Hawes, More, Lux, & Brown, 1998). More often than not, residents of AFC homes are unrelated and require some assistance with activities of daily living, such as housekeeping, personal care, and meal planning and preparation. The amount of assistance can vary greatly among AFC homes and among residents within an AFC home. Assistance provided is generally more than is received in a board-and-care home but less than is found in assisted living or continuing care retirement communities where transportation, assistance with medication administration, supportive services, and onsite professional medical staff are often provided.

Stark and colleagues (1995) described AFC homes as a cottage industry in which there are limited profits from the provision of care. Often care is provided by family members of the foster care provider with occasional paid helpers for peak hours. AFC homes are highly effective for older adults with early- to mid-stage Alzheimer’s disease or other forms of dementia (Golant, 2003). Residents with complex medical conditions or who require extensive assistance are better suited to facilities equipped to provide higher levels of care, such as nursing homes. AFC homes are likely to increase in popularity in the coming years for several reasons: (1) fewer family members are available to care for older adults due to changes in family structure (Cantor, 1991); (2) people are living to older ages with chronic illnesses that necessitate assistance but not skilled care (Morgan, Eckert, & Lyon, 1995); and (3) the Olmstead Act encourages states to make available community-based housing options to all persons who are capable of living with minimum support (Pease, 2002; Centers for Medicaid and Medicare Services, 2005).

Oregon has made AFC homes one of the most viable support options for older adults by covering the cost of residence under home and community-based Medicaid waivers. As a testament to the appeal and affordability of AFC, 70% of AFC residents in Oregon are able to afford their own care. At present, Oregon has over 12,000 beds compared to fewer than 1,500 in Florida (Polivka, 2004). If Florida had the same proportion of AFC beds in comparison with nursing home beds, there would be over 60,000 AFC beds currently available. Kane (2001) has shown that residents of AFC homes fare better socially and psychologically than residents of other long-term care settings. Other studies have found higher levels of interpersonal and environmental satisfaction among residents of AFC (Curtis, Sales, Sullivan, Gray, & Hedrick, 2005).

History and Trends. The concept of adult foster care can be traced to Gheel, Belgium, in the year 600 A.D. when ill wanderers were taken into the homes of kind strangers and provided with care (Sherman & Newman, 1988). Although adult foster care for older adults in the United States is a fairly recent trend, board-and-care homes providing similar care can be traced to Colonial times (Reinardy & Kane, 1999; Sherman & Newman, 1979). English poor laws in the colonies provided reimbursement from public funds to unrelated families who provided food, shelter, and care to the elderly and the poor. Public foster family programs and boarding houses for mentally ill adults were also developed in the late 19th century. Boarding homes for older adults were established in the 1930s, and proprietary rest homes were common during the Depression.

Typically, AFC homes serve from 1 to 6 residents. The majority are older adults, often in an early or moderate stage of Alzheimer’s disease or in frail or declining health. One-third have diagnoses of mental illness and/or developmental disabilities (Melcher, 2000). While designed to provide assistance, these homes were originally designed for the support of older adults in declining health, not adults with significant mental health problems striving for independent living. Thus, adult foster care homes are not entirely appropriate for those with mental illness or developmental disabilities. The National...
Alliance for the Mentally Ill (NAMI) is working to find other similar resources for these populations.

Residents in AFC homes with more personal control over their lives and surroundings are more satisfied with their living arrangements (Polivka & Salmon, 2001; Reinardy & Kane, 1999). Compared with residents in nursing homes and assisted living facilities, AFC residents express a preference for their current placement, but report less satisfaction with their quality of life and personal control than do assisted living residents.

Management and Oversight. Proposed changes to long-term care policy in the United States through the 1970s and 1980s focused on alternatives to nursing home placement for older adults (Nyman, Finch, Kane, Kane, & Illston, 1997). Some states, such as Oregon, offer Medicaid coverage for AFC homes, while others are private pay only. AFC homes are not regulated by comparable standards or laws across the United States or abroad, a point of contention with the nursing home industry. Nursing homes are required to follow strict rules with heavy penalties for noncompliance, whereas in most states AFC homes are not subject to such oversight. With the advent of assisted living, the issue of governmental regulation for other types of congregate care, including AFC, is emerging as a significant public policy issue. Many states are developing recommendations, guidelines, and preliminary governance standards for the full range of congregate care settings between independent living and skilled nursing. Kentucky for example, with 265 AFC homes, requires state licensing and allows a maximum of 3 nonrelated residents per household (Pease, 2002). At issue with regulation and oversight are unannounced inspections of AFC homes, with the majority of residents in support of such measures to ensure quality of care and resident protection (Cummins, 2002).

Adult foster care homes, called by various titles but fitting the same description, are reported in 26 of the 50 states in the United States. Regulations and support services for such homes vary across the states (Hawes, Wildfire, & Lux, 1993; Folke-mer, Jensen, Lipson, Stauffer, & Fox-Grage, 1996). Much of the oversight is at the state level, although federal regulations for board-and-care homes were established with an amendment to the Social Security Act in 1976 (Pease, 2002). The Keys Amendment required states to develop minimum standards for homes with 3 or more residents that receive federal monies. In 1981, the Rinaldo Amendment to the Older Americans Act required states to have ombudsman representation for each AFC or board-and-care home. At present, the states are still negotiating the types and levels of governmental regulation and oversight. Oregon, Minnesota, Ohio, and Washington, states with substantial numbers of AFC homes, are pioneers in developing standards of care and regulation.

Providers and Training. The majority of AFC homes are family-owned and managed, with little or no profits for providers. Many of the providers have previous health care experience and the majority are aged 50 and older. Pay for care and services can be from private sources, Medicaid, or other government vouchers, Social Security or through the Veterans Administration. Oregon and Minnesota are reporting an increase in homes run by not-for-profit and for-profit organizations (Pease, 2002; Kane, Baker, Salmon, & Veazie, 1998).

Currently, very little training is provided to the proprietors and personnel of AFC homes. Needed educational programs for providers include training on legal issues, budgeting and management strategies, home and fire safety, accident prevention, medical emergency procedures, nutrition counseling, medication, exercise, personal hygiene, and use of and/or linkages to local community resources.

Advantages and Disadvantages. Perhaps the greatest advantage of adult foster care homes is the potential for close familial relationships to be fostered among residents and providers. Care is provided in a comfortable home-like setting within a community where social and formal service networks are stable and familiar. Skruch & Sherman (1995) found that family relationships were reported more between resident and provider than among residents. Such relationships are beneficial not only to residents but also to providers who might otherwise be living alone and in social isolation. Residents of AFC homes who have more control over their lives and surroundings appear to fare better physically and psychosocially than residents of other more medically focused congregate settings such
as nursing homes (Kane, 2001; Polivka & Salmon, 2001; Reinardy & Kane, 1999). Part of this may be attributed to the increased sense of privacy as compared to more institutionalized facility living, ability to retain significant personal possessions, freedom to structure one’s physical and social environment, and compatibility among residents and staff (Kane, Baker, Salmon, & Veazie, 1998).

 Provision of care within a community setting is beneficial to the community as well. The cost of AFC homes is much less than the provision of nursing home care and with increasing governmental funds covering the cost of adult foster care placements direct costs to individuals and their families are reduced. Residents of care homes are more likely to be involved in community organization activities and contribute to use of community resources. This type of symbiotic relationship is particularly valuable in small, rural communities and cities in which naturally occurring retirement communities are prevalent. Additionally, AFC community dwellings are also generally more architecturally attractive and able to blend into neighborhood environments than larger structures designed for congregate living.

 Adult foster care also provides a bridge between independent living and fully supportive skilled care. Depending on the resident, community-based service offerings, and facility-based assistance, the possibility of aging-in-place or remaining in care until death is enhanced. The comfortable, home-like surroundings can be structured to challenge those who are more independent while supporting those in declining health. A one-size-fits-all approach, typical of the highly structured medical model of residential care, is not the standard. Indeed, AFC homes epitomize flexibility of care provision and client-focused care.

 As with all situations involving care of the frail or cognitively impaired, the risk of victimization, neglect, and abuse is also present. The same characteristics that make the AFC homes so appealing are also the features that potentially contribute to the failure of this option. With limited oversight from a regulating body, there is limited assurance of quality care. Residents who are, or perceive themselves to be, neglected or abused may be fearful of retribution. They may not have access to authorities to which reports may be made. Lack of a central location, an invisible dispersion of AFC homes throughout communities, and the absence of centralized reporting mechanisms make it difficult for states to effectively monitor such facilities.

 **Conclusions.** Variations of AFC have been demonstrated to be effective in providing care for the ill and frail for many centuries. Such options are especially beneficial in delaying or avoiding entry into skilled nursing care and allowing residents to have more control over their daily lives, feel part of the larger community, and retain a modicum of privacy and independence. AFC is cost-effective and affords both social and physical health benefits compared to other congregate care settings.

 **Heidi H. Holmes**  
 **Graham D. Rowles**

**See also**  
Long Term Care: Ethics  
Long Term Care Ombudsman Program

**References**


Hawes, C., Wildfire, J. B., & Lux, L. J. (1993). *The regulation of board and care homes: Results of a survey in the*
ADULT PROTECTIVE SERVICES

Adult Protective Services (APS) protects vulnerable adults by investigating allegations of elder abuse, including abuse, neglect, abandonment, and financial exploitation. Based on the outcome of an investigation, APS may offer legal and/or social services. Adults who need APS tend to have physical or mental impairments that put them at risk for harming themselves (self-neglect) or being harmed by others.

Elder abuse or mistreatment is discussed in detail elsewhere in this encyclopedia, but indications are that factors placing older adults at risk for mistreatment include the presence of a brittle support system, loneliness, family conflict, alcohol abuse, psychiatric problems, social awkwardness, and short-term memory problems (Shugarman, Fries, Wolf, & Morris, 2003). In cases where elder abuse occurs in institutional settings, there are mechanisms set in place, flawed though they may be, to identify such abuse and manage the consequences. Such resources include institutional review processes and the State Ombudsman program adopted after the passage of the Omnibus Budget Reconciliation Act of 1987. When elder abuse occurs in the community, recourse is available through Adult Protective Services programs in each state.

Historical and Legislative Background

The need for APS has been acknowledged as a social problem since the early 1950s, but it was not until the 1960s that it was studied formally and incorporated into our public policies by passage of the 1962 amendments to the Social Security Act (Otto, 2000). By the end of the 1960s, there were only twenty community protective services programs in the country (Mixson, 1995). After the passage of the Title XX amendment to the Social Security Act (1974), federal funding was provided to the states through Social Security Block Grants (SSBG) that allowed states the flexibility to provide protective services to adults. SSBG funding reached a peak of $83.3 million spent on APS in 1980; since that time, funding has been reduced to just under $40 million (Otto, 2000).

In 1978, the Select Committee on Aging conducted the first intensive investigation on elder abuse
and recommended that states enact laws to address this problem (U. S. Congress, 1981). Since that time, all 50 states have established APS programs that provide a system of preventative, supportive, and surrogate services to community-dwelling older adults to enable them to remain in their homes without fear of abuse or exploitation (Greenberg, McKibben, & Raymond, 1999).

Most states include elder mistreatment provisions in their existing APS legislation, while many use domestic violence statutes and/or elder abuse laws to protect the older adults from abuse. California has a special criminal statute that pertains to elder abuse. In addition, 42 states have mandatory reporting laws (Capezuti, Bush & Lawson, 1997) that require various health care professionals, paraprofessionals, and laypersons (including various privately employed health care providers and caregivers) to report known or suspected mistreatment to their state agency. Eleven states address self-neglect as a type of neglect that may warrant protection, and either designate it as a separate category of elder mistreatment or include it within their general abuse definitions (Velick, 1995). For information on state agencies charged with responsibility for APS, the National Center on Elder Abuse provides a list of weblinks that can be accessed at http://www.elderabusecenter.org/default.cfm?p=apsstate.cfm (NCEA, accessed 10-28-04). In addition, information on state statutes can be found at http://web2.westlaw.com (cited in Jogerst, Daly, Brinig, Dawson et al., 2003).

**Service Philosophy and Delivery**

APS workers are frequently called on to make critical, life changing decisions in complex situations. Statutes typically require APS investigations to be initiated within 24 hours of receiving a report with the appropriate actions taken as quickly as possible to ensure the safety of the victim. Many cases involve life and death medical problems, difficult issues surrounding the older adult’s mental capacity to consent to or refuse services, undue influence, guardianship, powers of attorney, and the rights of victims to self-determination versus the state’s *parens patriae* duty to protect helpless citizens (National Association of Adult Protective Services Administrators [NAAPSA], 2003).

Although many have criticized APS for being modeled inappropriately on the Child Protective Services paradigm, some basic tenets of service exist that are unique to older adults. These tenets include the client’s *right to self-determination*, use of the least restrictive alternative, maintenance of the family unit whenever possible, use of community-based services rather than institutions, avoidance of ascription of blame, and the presumption that inadequate or inappropriate services are worse than none (Otto, 2000).

To protect and serve older adults subject to alleged abuse, APS receives reports, conducts investigations, evaluates risks to clients, assesses clients’ ability to give consent, develops and implements case plans, counsels clients, arranges for a variety of services and benefits, and monitors ongoing service delivery (Otto, 2000). Services most likely to be recommended by APS for abused older adults include medical and social services, guardianship, psychological and/or family counseling, legal counsel, and institutional placement when necessary.

**Prevalence of Abuse**

Pillemer & Finkelhor (1989) conducted the first random sample survey of abuse, relying on interviews with 2,020 community-dwelling elderly persons in the Boston area. They reported that the overall rate of mistreatment was 32 persons per thousand. Using population estimates of 1987 and assuming that their results could be replicated nationwide, this would imply over 950,000 older adults mistreated.

Because it was believed that most cases of elder mistreatment go unreported, in 1996 the National Center on Elder Abuse (NCEA) conducted the National Elder Abuse Incidence Study (NEAIS) to estimate the number of older adults mistreated in the United States over a 12 month period within 20 representative counties, relying on two sources of data: APS investigations and reports from 1,150 trained “sentinels,” that is, individuals employed by agencies that regularly provided services to elders (National Center on Elder Abuse [NCEA], 1998). Using probabilistic methods, the NEAIS investigators estimated that 551,011 older adults (or 16 in every 1000) were victims of abuse, neglect, exploitation, and/or self-neglect in 1996, with a range of the estimate being between 314,995 and 787,027.
Most cases of mistreatment (79%) were identified through the trained sentinels, while only 21% were substantiated reports through APS. However, in a more recent study, Jogerst et al. (2003) found abuse rates that ranged from 4.5 per 1000 in New Hampshire to 14.6 per 1000 in California, for a national range of between 160,000 and 520,000 victims of abuse. Estimates of the need for APS, thus, vary widely although all indicate a significant number of potentially abused older adults in our society.

**APS Referrals**

According to the National Elder Abuse Incidence Study, most substantiated reports to APS were from family members hospitals, law enforcement, in-home service providers, friend/neighbors, the victims themselves, and physicians, nurses, or medical clinics (NCEA, 1998). In a recent study of APS in Florida in the 1990s, Reynolds and Schonfeld (in press) found the most prevalent reasons for referrals to be medical neglect, conditions hazardous to health, inadequate supervision when a caregiver is present, inadequate food, bruises and/or welts, inadequate supervision when a caregiver is absent, and complaints of harassment, belittlement, or ridicule.

In the NEAIS (NCEA, 1998), researchers found that victims of abuse and neglect were women (57.6%), white (84%), and had low annual income (most had less than $14,000). The eldest victims, age 80 and older, were abused and neglected at the highest rate, two to three times their proportion of the older adult population. *Elder self-neglect* is a different category than those who are victims of acts perpetrated by others. Of those older adults who self-neglect, most were white (77.4% versus 20.9% black), female (65%), and age 75 or older (65%). Almost all (93.4%) have some difficulty caring for themselves, and have some form of confusion/disorientation (45.4% sometimes confused, 29.9% very confused).

In the same study, males were more often the perpetrators of mistreatment for abandonment (83.4%), physical abuse (62.6%), emotional/psychological abuse (60.1%), and exploitation (59.0%), while females were more likely to neglect an older adult (52.4%). More than three quarters of perpetrators (77.4%) were white, and most (66%) were under age 60. With respect to relationship with the victim, adult children were the most frequent perpetrators of all categories of abuse for abandonment (79.5%), exploitation (60.4%), emotional/psychological abuse (53.9%), physical abuse (48.6%), and neglect (48.6%—NCEA, 1998).

**Ongoing Issues for APS**

While it is commendable that all 50 states now address the need for Adult Protective Services in some formal manner, all APS programs are subject to a number of ongoing issues that threaten their ability to accomplish their missions. As noted in a survey of state APS administrators (n = 42 respondents), first and foremost are the issues of underfunding and understaffing, a problem that is rampant. Other problems include lack of emergency or alternative placements for victims, lack of public awareness, and insufficient community resources (NAAPSA, 2003).

Another issue is the outcome of APS referral for older adults and their families. In a recent study, Lachs, Williams, O’Brien, and Pillemer (2002) used the EPESE to examine older adults referred to APS in Connecticut, finding that referral to APS resulted in a five-time greater risk of nursing home placement compared to those not referred to APS. In spite of the stated desire to preserve the family unit and apply the least restrictive alternative interventions, Lachs and colleagues’ findings (2002) indicate that these efforts are of questionable effect.

**The Future of APS**

To ensure the maintenance and enhancement of programs to assist older adults suspected of being victims of abuse, several improvements should be made. First, APS programs need increased federal funding, improvements in training, access to examples of best practice models, and a national public awareness campaign (National Association of Adult Protective Services Administrators, 2003). Second, we need to continue advocacy for the rights of elders, and push for greater involvement of the medical community (Kohn, 2003). In one study, Marshall, Benton, and Brazier (2000) found that physician referrals accounted for only 2% of cases of abuse. The implication is that physicians...
are either unable or unwilling to identify and report potential abuse. Recent efforts to devise expedient methods for physicians to screen older adults for further diagnostic assessment for abuse have been encouraging (Fulmer, Guadagno, Bitondo Dyer, & Connolly, 2004), but much more needs to be done.

APS provides a much needed service to older adults living in the community. Communities, large and small, must be encouraged to recognize the potential threat of elder abuse and the importance of APS in protecting potential victims of abuse. This will take a commitment of time, money, and advocacy to ensure that APS remains a viable source of comfort to abused older adults.

Sandra L. Reynolds
Lawrence Schonfeld

See also
Elder Abuse and Neglect
Elder Law
Guardianship/Conservatorship

References

ADVANCED GLYCA TION END-PRODUCTS

As we age, the long-lived proteins in our body become gradually browner, more fluorescent, more highly crosslinked and less soluble. These changes are most apparent in the lens of the eye, which becomes visibly yellow and brown with age, interfering with the transparency of the lens and color vision. Similar changes occur in collagen, the major structural protein of the body, found in skin and tendons and in the basement membranes of the kidneys, arteries and other tissues. The gradual browning and crosslinking of arterial collagen is associated with the age-dependent decrease in elasticity and compliance of the arterial wall. These age-related changes in tissue proteins are thought to result, in part, from nonenzymatic reactions between proteins and reducing sugars in extracellular fluids. In 1984 Anthony Cerami introduced the term, advanced glycation end-product (AGE), to describe the class of compounds formed as a result of chemical reactions between sugars and proteins. The term AGE is a play on words—AGEs are involved in the chemical aging of tissue proteins and contribute to the...
FIGURE 1 Reaction of lysine with glucose to form the Amadori compound, fructoselysine, the primary glucose adduct on glycated proteins. Fructoselysine is oxidized to form AGEs, e.g. by oxidative cleavage to form carboxymethyllysine, or by oxidative reaction with arginine to form pentosidine. (CML)

age-dependent increase in chemical modification and crosslinking of tissue proteins.

The chemistry of “AGEing” reactions in vivo is similar to that of Maillard or browning reactions that occur during the cooking and caramelization of foods and enhance food color, taste, and aroma. One of the first steps in this reaction is the condensation of a reducing sugar with an amino group in protein, yielding a Schiff base (imine) adduct, which then undergoes an Amadori rearrangement to form a relatively stable ketoamine adduct to the protein (Figure 1). This process of addition of a sugar to a protein is known as nonenzymatic glycosylation, or glycation, of protein. The Amadori product is not brown or fluorescent, nor is it a protein crosslink. It is a reversible modification of protein, but is a precursor to AGEs, which are irreversible chemical modifications and crosslinks in protein.

The Maillard reaction first attracted the interest of biomedical scientists in the mid-1970s when a modified form of hemoglobin, isolated from normal human blood, was shown to contain glucose as an Amadori adduct. During the 120 day lifespan of the red cell, less than 10% of human hemoglobin is converted to this glycated form, now known as glycated hemoglobin or HbA1c. However, the concentration of glycated hemoglobin increases in the blood of diabetic patients and correlates strongly with mean blood glucose concentration during the previous one-month period. Measurements of glycated hemoglobin are widely used for monitoring long-term blood glucose control in diabetes.

Glycation is now recognized as a common chemical modification of body proteins, occurring mostly at the ε-amino group of lysine residues. The glycation of proteins in vivo suggested that the later, browning stages of the Maillard reaction also take place in the body, leading to the formation of AGEs. Indeed, more than a dozen structurally characterized AGEs are now known to accumulate with age in long-lived proteins, such as lens crystallins and tissue collagens—these same compounds are found in cooked foods, pretzels, and toasted bread. They include lysine modifications such as Nε-carboxymethyllysine (CML), Nε-carboxyethyllysine (CEL) and pyrraline; fluorescent and nonfluorescent crosslinks, such as pentosidine, crosslines, vesperlysines, and glucosepane; and imidazoles and imidazolones derived from glyoxal and methylglyoxal. Most of these AGEs increase in lens proteins with age, and, because of chronic hyperglycemia, are found at higher concentrations in collagen and other long-lived proteins (e.g., myelin and actomyosin from
Advanced Glycation End-Products

patients with diabetes). Increased age-adjusted levels of AGEs in tissue collagens are associated with the development of retinal, renal, neurological, and vascular complications of diabetes. AGEs are also detectable at high concentration in protein deposits in the brains of patients with Alzheimer’s disease, in atherosclerotic plaque, in amyloid plaque of patients with hemodialysis-associated amyloidosis, and in articular collagen in arthritis. In these diseases, AGEs may have a role in recruitment of macrophages, enhancing inflammation, and tissue damage. AGEs may also chelate transition metal ions (iron and copper) in redox-active form, catalyzing oxidative stress, and may react with soluble proteins, contributing to deposition of plasma protein in the vascular wall and glomerular basement membrane in diabetes.

AGE-proteins are recognized by scavenger receptors on macrophages and by AGE-specific receptors, including RAGE (Receptor for AGE) on macrophages. AGE receptors and RAGE are also found on endothelial and neural cells, myocytes, and lymphocytes. The uptake of AGE-proteins by macrophages and endothelial cells is associated with generation of oxygen radicals and release of cytokines that promote collagen turnover and biosynthesis, cell proliferation, and tissue remodeling, suggesting that receptor-mediated binding of AGEs may trigger the rejuvenation of tissues.

The meaning of the term, AGE, has evolved over time. It is now used to refer to a broad range of carbohydrate-derived products formed during advanced stages of the Maillard reaction in vivo. Not all AGEs accumulate in tissue proteins with age, and some AGEs react with and form crosslinks with other proteins, so that they are not necessarily “end-products.” AGEs may also be formed from a variety of carbohydrates other than blood sugar (glucose), including ascorbate, fructose, sugar phosphates, and even simpler molecules, such as methylglyoxal. Ascorbate is present at high concentrations in the lens and may be a major precursor of AGEs in lens proteins. There is increasing evidence that some circulation AGEs may also be derived from the diet, especially cooked foods, and that the dietary AGEs, known as glycotoxins, may affect renal and vascular function. Analogs of AGEs have also been detected in phospholipids and in DNA, and products similar to, and in some case identical to AGEs, known as advanced lipoxidation end-products (ALEs), are formed during peroxidation of lipids in plasma and membranes. More than 25 AGE/ALEs have been structurally characterized and have been measured in tissue proteins throughout the body by chemical analysis and immunological methods.

Oxygen and catalysts of oxidation reactions, such as copper and iron ions, accelerate the Maillard reaction. Oxygen and oxidative reactions are considered fixatives of the chemical modification of proteins by carbohydrates, and glycoxidation products are a subclass of AGEs formed by both glycation and oxidation reactions. All ALEs require oxygen and peroxidation reactions for their formation from lipids. Antioxidants and AGE/ALE inhibitors, such as aminoguanidine and pyridoxamine, which trap reactive sugars and dicarbonyl intermediates in formation of AGE/ALEs, are effective in preventing or retarding the development of complications in animal models of diabetes and are being tested in clinical trials. Other drugs used for treatment of diabetes and cardiovascular disease, such as angiotensin converting enzyme (ACE) inhibitors, angiotensin receptor blockers (ARBs) and hypolipidemic agents, also inhibit the accumulation of AGE/ALEs in collagen in experimental animals, suggesting that their beneficial effects may be attributed, in part, to inhibition of AGE/ALE formation. Although the relationship between AGE/ALEs and aging is still associative, caloric restriction, which extends the lifespan of rodents, also inhibits the accumulation of AGE/ALEs in tissue collagens, possibly through a combined effect on blood glucose and lipids and oxidative stress. Future research will continue to focus on the structure and mechanism of formation of AGE/ALEs, but especially on the AGE/ALE inhibitors for treatment of aging and chronic disease.

John W. Baynes

See also
Carbohydrate Metabolism
Diabetes

References


**Web Sites**

http://food.oregonstate.edu/color/maillard/
http://maillard.sc.edu

**AFRICAN AMERICAN ELDERS**

In recent years, substantial progress continues to be made in social and psychological research on black older adults, and the research and scholarly literature is expanding (Curry & Jackson, 2003; Whitfield, 2004; Beech & Goodman, 2004). The title of this entry reflects the heterogeneity of the black population in the United States: with the increased growth of both the black Caribbean and African immigrant populations in the United States, the term “African American,” denoting a native black heritage traced to slavery, is no longer as viable as in prior decades (Jackson, 2003; Jackson & Williams, 2003). Recent research continues to feature “racial” comparisons; however, more studies and analyses are being done, permitting greater attention to the heterogeneity among other racial and ethnic groups (Whitfield, 2004). Larger concerns with health disparities (Anderson, Bulatao, & Cohen, 2004; Beech & Goodman, 2004) are propelling greater focus on broader, more inclusive, and more heterogeneous concerns of both race and ethnicity among all groups, placing the previously strict comparison of black-white differences in a larger national and international context (Anderson, et al., 2004; Jackson, 2003).

While progress in research has been and can continue to be made with a focus within a race or ethnic group (Jackson, 1985; Whitfield, 2004), observed health morbidity and mortality differences among racial and ethnic groups have propelled research in a more strictly comparative framework. There is a need for more systematic, empirical research on aging within the black population, especially with a life-course focus (Brown, Jackson, & Faison, 2005). Continued improvement in the quality of data among race and ethnic groups, especially national survey data (for example, the *Health and Retirement Survey*, Jackson, Lockery, & Juster, 1996; and the *National Survey of American Life*, Jackson & Williams, 2003) is leading to greater use of more representative samples and the application of methodologically sophisticated data collection and analytic methods (Skinner, Teresi, Holmes, Stahl, & Stewart, 2001).

There is still not a great deal of support for a coherent field of *ethnogerontology* (Jackson, 1985). On the other hand, a growing emphasis on population aging worldwide (United Nations, 2002) is leading to greater concern with international issues and the immigration of older individuals (Jackson, 2003). The areas of socioeconomic status, health status, family and social support, psychological well being, and work and retirement are used below to sample progress over the last 5 years.

**Socioeconomic Status**

Older black Americans continue to lag behind older whites in all indicators of social and economic statuses (Anderson, et al., 2004; Federal Interagency Forum on Aging-Related Statistics, 2004; Friedland & Summer, 2005). Indicators of income, education, and poverty statuses reveal the continued poor position of older blacks relative to older whites. Belying a cohort replacement perspective, the continuing poor relative position of blacks suggests that entering new cohorts of children and adults are not faring appreciably better than prior ones (Brown, et al., 2005); unfortunately, recent data on the statuses of middle-aged and younger blacks, relative to whites, in housing, income, occupation, health,
African American Elders 35

and education indicates only small expected gains as new cohorts enter older ages (Anderson, et al., 2004; Muhammad, Davis, Leondar-Wright, & Lui, 2004).

Again it is important to note that some improvements in socioeconomic status indicators have occurred. For example, in 2001 approximately 34% of the black elderly lived below the poverty level. Today approximately 24% (compared to 8% of whites) live at or below this level, though women (27.4%) far outstrip men (18.1%) in this regard. Some of this gender difference is accounted for by sex differences in mortality rates and living arrangements between black men and women. But it is true that older blacks are better fed, better housed, and in better health than in earlier eras, though the relative differences between racial groups persist (Anderson, et al., 2004). According to the author, most of this improvement is attributable to government assistance programs (Williams & Jackson, 2005), which are still the prime support of black Americans in older (and to some extent younger) age groups. A larger relative proportion of blacks, as compared to whites, because of histories of poor occupational opportunities, lack of wealth, and private retirement funds, are heavily dependent upon these government programs (Jackson, et al., 1996; Brown & Jackson, 2005; Williams & Jackson, 2005).

The figures on net worth or wealth perhaps best illustrate the nature of the problem. Since 1984, the net worth of households headed by older whites has improved 81% to $205,000. Reflecting the continuing gap, the net worth of households headed by blacks rose 61% from $25,600 to $41,000: the gap was larger in 2004 than in 1984 (Federal Interagency on Aging Related Statistics, 2004). Continuing attacks on state programs, a stagnant national economy, especially in the northeast, slow job creation, particularly those that provide sustainable incomes at low education levels, and simultaneous growth in low-paying service positions (e.g., fast food restaurants) that do not provide sustainable incomes, leave little room for black youth and young adults, or for their middle-aged cohorts, whose educational attainments and job preparation capital still lags significantly behind that of whites (Muhammad, et al., 2004; Williams & Jackson, 2005). It continues to be uncertain that future cohorts of older blacks will be generally as well off as their white counterparts, although the author foresees growing heterogeneity among older black cohorts themselves in social and economic well-being as a function of the growing status differences among younger aged black cohorts (Jackson & Williams, 2003). Thus, it is likely that a growing, but still small, group of older blacks will take adequate pensions and financial resources into older age; this proportion, though larger than in prior years, will still be relatively small in comparison to the proportion of older whites who enjoy these statuses (Friedland & Summer, 2005).

**Health, Morbidity, and Mortality**

Recent papers clearly document that at nearly every point across the life course black Americans have poorer morbidity and mortality than whites (Hayward & Heron, 1999; Whitfield & Hayward, 2003; Williams & Jackson, 2005). At age 65, whites can expect to live on average 2 years longer than blacks. As earlier publications have pointed out, this is because black death rates are higher in adulthood in the below-65 age groups (Gibson, 1994; Gibson & Jackson, 1992). It is also well documented that there is increased longevity over that of whites among blacks who live to approximately the age of 85 or so (Federal Interagency Forum on Aging-Related Statistics, 2004). Many have suggested possible selection biases resulting in the survival of particularly robust and hardy individuals (e.g., Hayward & Heron, 2002; Whitfield & Hayward, 2003). Others have claimed that this supposed crossover is only an artifact of faulty reporting and exaggerated age claims. The effect has been firmly established (Preston, Elo, Rosenwaike, & Hille, 1996), although there continues to be no widely accepted explanations (Hummer, Benjamins & Rogers, 2004; Jackson, 1985). The *racial mortality crossover* appears to be a real phenomenon (Preston, et al., 1996), one that involves some type of “survival of the fit.” More important than the work on the *race crossover phenomenon*, however, is the recent research on active life expectancy. Crimmins and colleagues (2004) have shown large race and ethnic differences in active life expectancy and complex relationships between longevity and health. For example, Asian Americans may live longer in relatively good health as compared to Native Americans and black Americans (Hayward & Heron, 1999).
Research on older blacks has long documented heterogeneity in social and psychological health indicators (Anderson, et al., 2004). Clark and colleagues (1993) have shown evidence for greater functional health, in comparison to whites, among older blacks. Recent work (Hayward & Heron, 1999) points to the need for more focused and detailed studies on the relationships among race/ethnicity, mortality, and morbidity.

The nature of differences in the structure of health, the processes of health, and the influence of service use on experienced health problems remain open questions (Gibson, 1994; Williams & Jackson, 2005). The growing heterogeneity among the American black population, especially due to immigration, is a phenomenon that will have important implications for health and mortality, but also for understandings of well-being more generally (Jackson, Antonucci & Brown, 2004; Jackson, 2003).

**Family and Social Support**

Two myths have characterized research on the black family and social support networks (Antonucci & Jackson, 2004; Mendes de Leon & Glass, 2004; Taylor, Jackson, & Chatters, 1997). The first is a view of older blacks cared for by loving and extended family members and kin. The other is a view of the impoverished lonely older black abandoned by a disorganized and incompetent family system. National and other large social surveys indicate a reality somewhere in between (Taylor, et al., 1997; Taylor, Chatters, & Levin, 2004; Chatter, Taylor, Lincoln, & Schroepfer, 2002). These recent research findings document the existence of extended families but also demonstrate that much of the assistance is reciprocal, that the black aged often provide help to younger family members and neighbors (Chatters, et al., 2002; Antonucci & Cantor, 1994). The importance of community institutions like the church as sources of physical and emotional support to older blacks has also been well documented (Taylor, et al., 1997; Taylor, Chatters, & Levin, 2004). Some recent data indicates possible changes in the structure of American families and more dispersed living patterns that may result in lowered possibilities of support in older ages (Jackson, Brown, & Antonucci, 2005).

**Psychological Well-Being**

Research on well-being has shown an increasing sophistication over the last few years (Brown, et al., 2005; Federal Interagency Forum on Aging-Related Statistics, 2004). Structural factors, like income and education, tend to show small but positive relationships to well-being (Brown, et al., 2005). Some recent evidence also suggests that younger cohorts of blacks may be less satisfied than older cohorts at comparable periods in the life span (Brown, et al., 2005; Chatters & Jackson, 1989). This is in sharp contrast to whites, who have shown the opposite pattern. This lowered satisfaction and happiness in younger blacks may be related to rising expectations and structural constraints that are likely to persist into older age, portending future cohorts of older blacks with lowered levels of subjective well-being (Brown, et al., 2005).

**Work and Retirement**

Little empirical research had been devoted to the study of work and retirement in the black aged (Jackson, et al., 1996). Some earlier work had speculated that the entire retirement process, viewed within a life-span context, may be very different for blacks. Since blacks often have long histories of dead-end jobs with poor benefits and bleak expectations, the advantages of retirement are lessened (Brown, et al., 2005). Thus, inadequate income, poor housing, and uncertain futures face many older blacks at retirement age (Brown, et al., 2005). Faced with limited retirement resources, many blacks may continue working past customary retirement ages out of desperation (Brown, et al., 2005). Some recent research indicates that these individuals are physically, psychologically, and socially worse off than their retired black counterparts (Brown, et al., 2005). As suggested earlier, even the relatively poor but stable government retirement support blacks may receive (if they are fortunate enough to qualify) may, in contrast, be better than sporadic and poor jobs in the regular labor market (Jackson, 2001). Thus, retirement may provide a small but secure government income, leading to increased psychological and social well-being (Brown, et al., 2005).

In contrast to 5 years ago, more research on the social gerontology of the black aged is being included.
within the general investigation of ethnicity and cultural factors in aging (Antonucci & Jackson, 2004; Jackson, et al., 2004, 2005; Brown, et al., 2005). The existence of new national datasets and more powerful analytical techniques is increasing the quality and quantity of research on African American aging in all areas (Whitfield, 2004). New national data collection efforts, like the Health and Retirement Survey and the new National Survey of American Life (Jackson, et al., 2004) are improving the available data on the aging experience of African Americans (Curry & Jackson, 2004; Whitfield & Hayward, 2003). While better data is always needed, especially longitudinal and panel studies, the improvement in a relatively few short years has been impressive. Similarly, the approach to research on the black elderly is continuing to include a greater recognition of the heterogeneity among elderly blacks, as well as other race and ethnic groups (Anderson, et al., 2004; Brown, et al., 2005). Research is more focused on the role of the life course, culture, socioeconomic status, and gender as important structures and processes related to potential process differences within and among older groups of color (Anderson, et al., 2004; Jackson, et al., 2004; Whitfield, 2004).

The field of ethnogerontology as an organizing theoretical framework in the study of the black aged seems to be a growing reality over the last few years, though it is not characterized as such (Jackson, 1985). Recent research continues to reverse past trends of poor data and impoverished theory; generalizable, high-quality findings are beginning to emerge concerning health, socioeconomic status, social support, family patterns, well-being, work, and retirement among black older populations (Anderson, et al., 2004; Brown, et al., 2005). Interestingly enough, research emphases on differences within race and ethnic groups is being reversed of late, especially in health-related research (Anderson, et al., 2004; Williams & Jackson, 2005). This is due in part to the acceleration of work on health inequalities and disparities, bringing a greater focus to cross-ethnic group comparisons (Anderson, et al., 2004; Whitfield & Hayward, 2003). While of vital importance in addressing real disparities in physical and psychological health, one perverse outcome of this theoretical and research attention may be to impede further development of theory and empirical research that focuses on differences in social, psychological, and health statuses and processes within race and ethnic groups (Brown, et al., 2005). As noted in the earlier volume, work on population genetics may hold some promise for focusing greater attention on intra-group, individual factors and processes related to observed population level disparities (Whitfield, 2004).

JAMES S. JACKSON

See also
Ethnicity
Minority Populations: Recruitment and Retention in Aging Research

References


Age and Expertise

Two primary questions drive research on age and expertise. At what age do people typically reach peak performance levels? Do the same mechanisms support expert performance in early and late adulthood? Both lead to an intriguing issue: Can people develop and maintain expertise in later life?

Experts are usually defined as those who demonstrate consistently superior performance on representative tasks from a domain (Ericsson & Lehmann, 1996). It typically takes about 10 years (1000 hr–10,000 hr) of intense devotion to self-improvement activities, deliberate practice, to become a world-class expert.

Age and Peak Performance

Quetelet (1842/1969) and Lehman (1953) were among the first to identify the classic curvilinear function between age and performance, which showed a sharp rise in performance in young adulthood, a peak in the decade of the thirties, and gradual decline thereafter. Peak performance tends to occur in the mid-30s in intellectual domains, such as chess (Elo, 1965; Charness, Krampe, & Mayr, 1996) and in the 20s or early 30s in athletics (Schulz & Curnow, 1988; Schulz, Musa, Staszewski & Siegler, 1994; Stones & Kozma, 1995). According to Simonton (1997), the ability of aging elite artists and scientists to sustain exceptional performance is less the result of consistent success than consistent productivity. In both science and sports, individuals apparently past their prime have occasionally broken world records or won world championships, but not without several previous attempts. Also, a better predictor of the developmental trajectory is professional age, rather than chronological age. Several mechanisms have been proposed to account for such high-level performance in the face of expected age-related decline.

Mechanisms Supporting Expertise

General or specific abilities are usually assumed to underlie expert performance. By this logic, musicians who must memorize musical scores should have better memory for music notation than nonmusicians. Further, if aging degrades memory abilities, then older musicians ought to perform worse than younger ones in professional activities. The former assumption has proven accurate (e.g., Meinz & Salthouse, 1998) though the latter has not. Studies consistently fail to show much of a relationship between age and productivity in the workplace (Saltzhouse & Maurer, 1996).

One explanation for the failure to find a link between age and job performance is that older experts may not rely on the same abilities as younger ones to perform the same task. They may compensate for a decline in one ability (e.g., speed of response) by honing another (e.g., working memory). Saltzhouse (1984) showed that older high-speed typists are slower at tapping tasks than their younger counterparts, but compensate by buffering more text (greater eye-hand span) to give them additional time to create efficient overlapping keystroke patterns. It also appears that experts can partially circumvent general age-related declines in physical and psychological capacities by deliberately engaging in counteractive measures. Krampe and Ericsson (1996) found minimal age-related declines in speeded music-related performance (tapping task) among older expert pianists who maintained...
rigorous maintenance practice schedules, despite finding declines in general psychomotor speed. Relative to the older experts, older amateur pianists exhibited significantly slower performance in both tasks. Both cumulative and current practice levels were positively related to performance.

Similarly, Tsang and Shaner (1998) reported that age-related declines among pilots in flight simulator tasks appear to be somewhat attenuated by experience. When older active pilots were asked to perform two aviation-relevant tasks at the same time, their performance was comparable to middle-aged and younger pilots. However, when the same individuals were asked to perform two general tasks, older active pilots performed substantially worse than their younger colleagues, suggesting that the positive effects of maintenance practice were restricted to the domain of expertise.

Older pilots' memory for air traffic control messages is normally inferior to that of younger pilots (Morrow et al., 2001). However, it becomes comparable to that of younger pilots when sufficient environmental support, in the form of note taking, is allowed (Morrow et al., 2003). Thus, storing information in the environment can be a useful compensatory strategy for older adults when task demands exceed working memory capabilities.

Computer simulations hint at how acquired knowledge may compensate for waning abilities. Neural network models with greater knowledge of opening chess positions were better protected against simulated age-related declines, such as degrading the signal-to-noise ratio in the nervous system, on a recall task (Mireles & Charness, 2002). This is consistent with the finding that extensive knowledge of rare words is strongly predictive of crossword puzzle solving proficiency, even in the case of older puzzlers who exhibit age-related declines in reasoning and problem solving ability (Hambrick, Salthouse, & Meinz, 1999). These results imply that acquired knowledge can mitigate declines in age-sensitive fluid intelligence abilities to allow for exceptional performance even at the far end of the age spectrum.

Conclusions

Recent studies of expert performance reveal mixed findings. Although there is a strong tendency for basic abilities and for some aspects of domain-specific performance to decline with age, critical skills in some domains may be sustained through practice and the accumulation of structured knowledge. Experts may compensate for, or adapt to changing abilities. However, the nature and potency of these compensatory mechanisms are not thoroughly understood and will continue to spur future investigations.

A question that remains to be explored is whether expert levels of performance in a new domain can be attained at a later stage of life. Older adults may have additional monetary resources and time at their disposal to engage in skill acquisition, though research indicates that they take about twice as long as younger counterparts to learn a new skill, such as word processing (Charness et al., 2001). Further, deliberate practice requires strong motivation and it remains to be seen under what circumstances older adults choose to forego more enjoyable activities for those needed to build expertise.

Neil Charness
Tiffany Jastrzembski
Franklin G. Hines

This work was supported by a grant from the National Institute on Aging (1 PO1 AG17211-05, CREATE) to the first author.

References


AGE DISCRIMINATION

See

Ageism

Age Stereotype

Aging, Images of

AGEISM

Ageism is defined as a process of systematic stereotyping and discrimination against people because they are old, just as racism and sexism accomplish this for skin color and gender. It is deeply engrained in society, categorizing old people as senile, rigid in thought and manner, and old fashioned in morality and skills. In medicine, terms like “crock” and “vegetable” are common (Shem, 1978). Ageism allows the younger generation to see older people as different from themselves; thus, they suddenly cease to identify with persons who grow old as human beings. This behavior serves to reduce their own sense of fear and dread of aging. Stereotyping and myths surrounding old age are explained in part by a lack of knowledge and insufficient contact with a wide variety of older people. But another factor comes into play—a deep and profound dread of growing old. Ageism is a broader concept than gerontophobia, which refers to a rarer, “unreasonable fear and/or irrational hatred of older people, whereas ageism is a much more comprehensive and useful concept” (Palmore, 1972). This concept and term was introduced in 1968 (Butler, 1969).

Age prejudice is a human rights violation that is exhibited in health care, employment, the media. Discrimination exists in the very definition of who is considered poor in the United States, in that people age 65 and older must be poorer than younger adults in order to be counted as poor (Muller, 2001).

Age prejudice is a human rights violation that is exhibited in health care, employment, the media. Discrimination exists in the very definition of who is considered poor in the United States, in that people age 65 and older must be poorer than younger adults in order to be counted as poor (Muller, 2001).

Some of the myths of age include a lack of productivity, disengagement, inflexibility, senility, and loss of sexuality (Stone & Stone, 1997; Bytheway, 1995). There have been some advances in, and more attention to, the productive capabilities of older people, and a better understanding that older persons have desires, capabilities, and satisfaction with regard to sexual activities. The “write-off” of older persons as “senile” because of memory problems, for example, is being replaced by an understanding of the profound and most common forms of what is popularly


referred to as “senility,” namely, Alzheimer’s disease. Senility is no longer seen as inevitable with age. Rather, it is understood to be a disease or group of diseases. When means of effectively treating dementia are available, ageism will also decline.

The underlying psychological mechanism of ageism makes it possible for individuals to avoid dealing with the reality of aging, at least for a time. It also becomes possible to ignore the social and economic plight of some older persons. Ageism is manifested in a wide range of phenomena (on both individual and institutional levels), stereotypes and myths, outright disdain and dislike, or simply subtle avoidance of contact; discriminatory practices in housing, employment, and services of all kinds; epithets, cartoons, and jokes. At times, ageism becomes an expedient method by which society promotes viewpoints about the aged in order to relieve itself from the responsibility toward them, and at other times ageism serves a highly personal objective, protecting younger (usually middle-aged individuals, often at high emotional cost), from thinking about things they fear (aging, illness, and death).

Ageism, like all prejudices, influences the behavior of its victims (Hausdorff and Levy, 1999). Older people tend to adopt negative definitions about themselves and to perpetuate the various stereotypes directed against them, thereby reinforcing societal beliefs. They may in a sense “collaborate” with the enemy, with stereotypes.

Ageism can apply to stages of life other than old age. Older persons have many prejudices against the young and the attractiveness and vigor of youth. Angry and ambivalent feelings may flow, too, between older and middle-aged people. Middle-aged people often bear many of the pressures of both young and older people, and they experience anger toward both groups. Some older people refuse to identify with their peers and may dress and behave inappropriately in frantic attempts to appear young. Others may underestimate or deny their age.

Since the introduction of the concept of ageism, there have been some gains on the part of older adults. The Age Discrimination and Employment Act of 1967, amended in 1978, ended mandatory retirement in the federal government and advanced it to age 70 in the private sector. Mandatory retirement at all ages was abolished in the United States in 1986 (with a few exceptions, such as police officers and fire fighters), and the European Commission has mandated that members of the European Union have laws making age discrimination illegal in place by 2006.

Although the underlying dread, fear and distaste for older persons remains, several trends may help reduce ageism in the future: (1) With the aging of baby boomers old age is in the process of being redefined as a more robust and contributory stage of life. (2) Increasing interest in aging in the general public, mass media, government, and academia will support increasing knowledge and fewer misconceptions about older persons. (3) Increasing scientific research on aging has reduced and will continue to reduce ageism by providing a realistic picture of older people and aging and by improving the health of older persons. (4) By 2000 persons over the age of 65 and younger adults had nearly attained the same education level, challenging the stereotype that older men and women were illiterate or poorly educated. (5) As people become more aware of racism and sexism they tend to become more aware of discrimination in general, and will be less likely to approve or practice ageism (Palmore, 2004).

Reminiscence or life review has helped focus attention on what can be learned from listening to the lives of the old. Indeed, the memoir has become, in the minds of some, the signature genre of our age.

ROBERT N. BUTLER

See also

Age Stereotype
Aging, Images of

References

Muller, Charlotte, Nyberg James, & Estrine, Judith. (2001). Old and poor in America. International Longevity Center-USA.
AGE STEREOTYPE

An age stereotype is a simplified, undifferentiated portrayal of an age group that is often erroneous, unrepresentative of reality, and resistant to modification. Although the word *stereotype* was first used in the technology of duplicate printing, where a metal plate (i.e., the stereotype) was first cast into a mold, the American journalist Walter Lippmann introduced its usage for both scholarly and popular audiences in his 1922 book *Public Opinion*. Lippman argues that seeing things freshly and in detail is exhausting and so people see a trait that marks a type and “fill in the rest of the picture by means of the stereotypes we carry about in our heads” (p. 89). Age stereotypes have to do with people “filling in the picture” of a person or group of people after knowing only one characteristic—age. In this way, age stereotypes are similar to other overgeneralized and oversimplified portrayals of groups sharing a social characteristic; gender and race are persistent bases for stereotyping.

Age stereotypes can be positive and negative. Hummert and colleagues (1994) used a checklist of positive and negative adjectives to identify traits commonly attributed to people of different age groups. By combing these traits, the researchers identified several stereotypes of older people. The negative stereotypes included “shrew/curmudgeon” and “despondent”; positive stereotypes included “perfect grandparent,” “small-town neighbor,” and “golden ager.” Political scientist Robert Binstock (1983, 1994) makes a frequently cited argument that, since the 1960s and 1970s Americans have reversed their “compassionate stereotype” of the elderly as poor, frail, and dependent to a new stereotype of the elderly as prosperous, active, and politically powerful. Neither image is accurate. Is a positive stereotype better than a negative stereotype? Both are examples of overstated homogeneity and implicit creation of “other” or “outgroup.” By stereotyping people, we assume that everyone in the other group (not our own group) is like each other and that they are not like us. The fact that our assumptions about the “outgroup” are often negative compounds the problems that arise from stereotyping.

One of the problems with stereotyping is that we sometimes act on these oversimplified assumptions; this leads to *age discrimination*. Older workers have been discriminated against on the basis of the stereotypes that they are unable to learn new things, less productive than younger workers, more likely to miss work because of sickness, and set in their ways. Even though all of these stereotypes have been disproven by research, they still persist. The extent of *age discrimination in the workplace* that ensues from these stereotypes has been the impetus for continual changes to the *Age Discrimination in Employment Act*. A recent Supreme Court decision made it easier for older workers to sue their employer for age discrimination, allowing plaintiffs to use the same kind of evidence as is used in gender and race discrimination cases, and making it harder for employers to defend their actions on the basis that the age discrimination was not intentional (*New York Times*, April 1, 2005).

Recent research has examined additional consequences of stereotyping. Levy discusses a new line of research showing that older people internalize negative stereotypes and that these *aging self-stereotypes* can influence cognitive and physical health. Hess, Hinson, and Statham (2004) studied the ways in which positive and negative stereotypes influence the older adults’ performance on a memory task. Participants who were exposed to negative stereotypes performed more poorly than those who were primed with positive stereotypes. The idea of “*stereotype threat*” is used to help explain the impact of stereotypes on memory, cognition, and health. This concept suggests that when individuals are afraid that their behavior will reinforce a negative stereotype about a group to which they belong, their performance is affected.

Age stereotypes are communicated in numerous ways. Television programs, advertisements in all media, the jokes we tell, and birthday cards are often full of age stereotypes. Stereotypes stem from our need to simplify our social world through the creation of categories and they are related to *age norms* which suggest that certain roles and behavior are appropriate at certain ages and not at other ages. From these benign or neutral starting points, age stereotypes can lead to age discrimination, *aging self-stereotypes*, and can thus affect both psychological and social quality of life for older people. Further research on the origins, perpetuation, and impact of age stereotypes will help us understand a
complex array of factors that influence the experiences of aging in our society.

FAY LOMAX COOK
Updated by SUZANNE R. KUNKEL

See also
Ageism
Aging, Images of

References


AGING, ATTITUDES TOWARD

See
Ageism
Age Stereotype
Aging, Images of

AGING, IMAGES OF

Since the early 1970s, social scientists have been investigating the power of the media to influence attitudes about aging in the United States. The majority of research in assessing images of aging has been done in the realm of television. However, that may begin to change in the next decade as the pervasive influence of the Internet is explored with respect to images of aging.

Internet and Print

Internet and Aging. Using the Google search engine on the Internet in 2004, one can locate 9,220,000 links to Web sites that include reference to the aged, 8,520,000 to aging, 6,500,000 to elderly, and 985,000 just to images of aging. Many more sites are of interest to older adults, including those that provide information, products, and services, which may not have explicit references to aging or images of aging. The Internet features materials designed specifically for the Web as well as ready access to images first published through print and broadcast media.

Due to its interactive and highly segmented nature, it is difficult to generalize the portrayal of older adults on the Internet. However, due to the vast number of Web sites, those catering to the elderly are far more prevalent compared to television networks and programs. A recent study by Hilt and colleagues (2004) provide some insights on elderly Internet use patterns that may permit some inferences about Internet content related to older demographics. Email is one of the most common activities for older adults, and might aid in conveying a modern, upbeat image of older users. Web surfing tends to be targeted at sites that are useful (weather, health, travel, education) or entertaining (jokes, games, culture). Older adults often use Google.com and Yahoo.com to find these sites. The authors contend that currently local radio and television Web sites have limited usefulness to older viewers. But they recommend redesigning them to help older users navigate the Web and locate information and entertainment easily. Cody and colleagues (1999) found that training older adult learners in Internet use had a positive impact on their attitudes toward learning and perceived social support. As far as the content that is distributed via the Internet, Gerbner, and colleagues (2002) contend that the distortions found in the traditional media may be multiplied through additional channels, such as multichannel cable and satellite and Internet-delivered video. This is particularly significant, since levels of concentration in media ownership continue to increase.

Even the most popular Internet search engine, Google, has recently become the object of criticism because of ageist hiring practices. Recently, a 54-year-old director of operations was dismissed because he did not fit into the youthful culture of the company. The average age of Google’s male workers is 29.7 years old, and 28.4 for women (Liedtke, 2004).

Print Media. Despite widespread access to information via the Internet, television still yields great power to influence millions of people and, therefore, commands considerable attention. In the
Aging, Images of 45

Some magazines promote the image of an active and healthy older consumer. Older people are pictured in association with products such as medications, including those used to address incontinence and impotence, dental and digestive aids, cosmetics to reduce the signs of aging, and assorted health products. In contrast, upscale business publications might present affluent seniors, advertising elegant automobiles, life insurance companies, upscale travel, and financial institutions. De Luce (2001) examined images of aging in publications and reported that *Forbes*, *Fortune*, and *Prevention* offered the most images of mature models and marketing aimed at readers older than age 50, clearly targeting the segment of older adults who have considerable discretionary income. Hilt and Lipschultz (2004) point out that Americans aged 50 and older control half the country’s discretionary income and 75% of all personal assets. *Newspaper* articles featuring older people tend to focus on extremes: either the severely disadvantaged or those who are interesting because they accomplish feats contrary to age stereotypes, such as hang gliding or skydiving. One vivid recent example featured former President George Bush skydiving to celebrate his 80th birthday, a story that still appears on 6,690 Web sites to date.

**Television and the Aging**

The most pervasive mediated images of aging are projected by television. Often unrealistic expectations about life are encouraged when the world of television is confused with the real world. A major concern is not only what is shown, but also what is not shown, and what this lack of content teaches viewers. Older people are not seen on television in proportion to their numbers in real life (Signiorelli, 2004). Moreover, they appear to be marginalized and represented in negative stereotypes. In a review of 28 studies, Vasil and Wass (1993) found that older persons were underrepresented in both electronic and print media in terms of their presence in the United States population.

Although older adults are the group with the greatest exposure time to television (Hilt & Lipschultz, 2004), most research describes unfavorable portrayals of them on television. Studies of television programs and surveys of *older viewers* have demonstrated that television caters poorly to the needs of older adults. Powell and Williamson’s (1985) review of the mass media revealed stereotypic ageist biases and a trend toward learned helplessness. Robinson and Skill (1995) report that only 2.8% in their study of the 1,228 adult speaking characters in primetime television were determined to be 65 years and older. Of those older characters, only 8.8% were in lead roles, a figure that is lower than studies reported in the 1970s. In a study of primetime network programs broadcast between 1993 and 2002, Signiorelli (2004) reports that “less than 3% of the characters, both male and female, white and minority, in major and supporting roles, are characterized as elderly.” She also found that women aged 50 to 64 years are more often classified as elderly, while men in that age group are portrayed as middle-aged.

**Negative images of older adults** are not limited to fictional programs. In general, the television industry and advertisers have been obsessed with young viewers (Larson & Elkin, 1999). Numerous **older anchors** have become victims of the pressure to reach younger demographics. Reuven (2002) points to the average age of corporate (28 years) and advertising account representatives (31 years) as one of the factors that may play a role in the decline of older news personalities.

**Gender and Aging on Television**

Research since the 1970s has documented that women are less likely to be seen in television programs as they age than are men (Gerbner et al., 2002). Davis and Davis (1985) report that women appear on screen about one-third as often as do men. Men are more likely to be found populating dramas when they are in the 30 to 49 age bracket. Women are more likely to be in their 20s and early 30s. **Women on television** tend to be younger than men, and minority women tend to be younger than white women (Signiorelli, 2004). On television, for those older than age 50 men by far outnumber women. This picture is beginning to change, however. Robinson and Skill (1995) reported that the proportion of *female characters on primetime* aged 50 to 64 years has increased since 1975. They suggest that “this may be one of the reasons the public believes TV portrayals of older Americans has improved in recent years.” Nevertheless, Signiorelli (2004) contends that men in the 50 to 64 age group tend to be portrayed as
middle-aged, while women are more likely to appear elderly.

Although the predominant image of older women on television has been as a nurturer, followed by nags or adoring attendants, that pattern is beginning to change. Thanks to the expansion of cable, shows featuring older women in prominent roles are available in syndication as repeats long after episodes ceased production. In the 1980s, *Golden Girls* presented older women as attractive and sexually active; repeats of the series remain in syndication in 2004. With repeat episodes still broadcast via syndication, *Jessica Fletcher*, a murder mystery writer and amateur detective on *Murder She Wrote* appears as an attractive older woman who is intelligent, perceptive, courageous, and effective in her investigative skills. In science fiction series, characters that would be considered much older in human years are portrayed as *middle aged in various alien* species.

The popular Web site Seniornet.org recently requested reader input under the heading “What’s worth watching?” and the mostly female respondents tended to focus on *soap operas* (Days of Our Lives, As the World Turns, and Passion), music programs, and a number of *PBS programs* targeted to older viewers, such as *Maggie Growl* and *Sweet Old Song*, but also the cable channel *Court TV*. Among popular programs *West Wing* attracted considerable attention.

In general, younger characters are portrayed in more prestigious positions. An interesting gender interaction was found for the 50 to 64 age group: white men in this age group are still shown in prestigious positions, while professional prestige for women and minorities has already declined. After age 65, white men are also cast in less prestigious job categories (Signorielli, 2004).

One exception to the negative portrayal of the elderly on TV is advertising. In ads older persons are typically portrayed as vigorous and healthy. However, their gender distribution is contrary to demographic trends. While only 40% of adults older than 65 are male, in advertising between 62% and 70% of characters in this age group are males (Harris, 2004). Hajjar (1997) found similar effects in her content analysis of *television commercials*. Older than age 60 characterizations (8% of the total) were 70% male and 84% white. Positive characterizations tend to be clustered in the categories of food/beverage and financial/insurance, while negative ones focus on medical/pharmaceutical products.

**Health and Older Adults on Television**

The *medical show* remains a television staple, and *ER*, the most watched example in 2004, portrays older adults as patients, concerned family members, and health practitioners. The patients have suffered from various conditions ranging from acute illness and accidents to terminal illness and chronic problems associated with aging. Some have died, just as younger adults and children have on the same show.

Older people tend to have “multiple comorbid conditions and complicated prevention and treatment regiments” (Dishman et al., 2004). Poor health provides more drama than good health. It would be easy to assume that older people are going to be the ill people in the world of television drama. Characters in soap operas do not generally have diseases that viewers are likely to have. Often their health problems are so exotic that they are not threatening to the average viewer. In many continuing dramas, the ill get well. Death befalls only those who must be written out of the story. Thus, older people are not usually victims of illness on television.

**Consequences of Age Stereotyping**

The images of age presented on television tend to promote stereotypes. Stereotyping and simplistic portrayals are convenient shorthand for support characters in television programming. Older individuals are more likely to play supporting than central roles. As television educates viewers to see aging as a negative and undesirable experience, it perpetuates a self-fulfilling prophecy.

Gerbner and colleagues (2002) point out that the kinds of distortions discussed above can have considerable impact in shaping perceptions and attitudes, especially among heavy television viewers. Viewers older than age 65 are among the heaviest group of viewers. Grajczyk and Zöllner (1998) point out that it can be a lifeline and a window to the outside world, “a substitute for primary interpersonal communication, a tool for structuring time patterns and keeping up the rhythms of long-established every-day rituals.” Hofstetter and Schultze (1993) found that negative perceptions of aging appear to be related to “contextual aging” (i.e. social interaction, health, living alone, economic status) rather than chronological age.
Expectations for the Future

Television viewing by adults increases with age (Mundorf & Brownell, 1990). The aging American populace and the increasing proportion of disposable income among those older than 50 years have lead advertisers and television producers to gradually discover the gray market. In the early 1980s, networks began to change their programming strategies in response to these demographic and economic shifts in the population. Presently, extensive programming on cable channels offers viewers contemporary images of older adults. This contrasts to stereotypical images of rebroadcast shows from the 1950s and silent era films.

In a study of viewing preferences, older adults made little reference to cable programming (Mundorf & Brownell, 1990). The potential of cable TV appears to be increasing as more access and programming options are provided. With the expansion of cable and the increase in programming opportunities, we should expect more targeting of market niches that feature an increased number of older adults and especially more in lead characters.

Television is slowly mirroring the changes occurring among American men and women. As adults are living higher quality lives at older ages, what is portrayed as “old” keeps changing. Women in their 50s and 60s are seen as attractive and sexually active. But the changes are not happening fast enough for many older adults. Chafetz and colleagues (1998) report that many older adults expressed serious reservations about the attitudes displayed toward the elderly as implied in negative or insufficient news coverage.

Movies made for television frequently use older performers as central characters. Age-related issues are often confronted in an era where social problems are seen as legitimate subjects for comedy as well as drama. Each season showcases at least 1 significant film about aging and being old (“What’s worth watching,” 2004). Series programs have not ignored the story potential of being old in American society. Confronting old age is no longer taboo. In addition, images of aging on the Internet may soon gain comparable influence to those on television as more adults who possess computer expertise reach their 60s.

See also
Age Stereotype
Ageism

References


Web Sites

- aarpmagazine.org
- aoa.gov
- aging.today.org
- asaging.org
- generationsjournal.org
- gerontologist.gerontologyjournals.org
- helptheaged.org
- icaa.cc
- isapa.org
- ncoa.org
- seniornet.org

**AGING POLICY**

*See*

Policy Analysis: Issues and Practices

**AGING SERVICES**

*See*

Adult Protective Services

Senior Centers

Senior Companion Program

**AIDS/HIV**

By the end of 2003, approximately 38 million people were living with HIV/AIDS, and 20 million had died since the recognition of the epidemic (Joint United Nations Program on HIV/AIDS, 2004). Infection with human immunodeficiency virus (HIV) eventually progresses to HIV disease and acquired immunodeficiency syndrome (AIDS). AIDS can be thought of as one end of a spectrum of HIV-related conditions that may include acute infection, an asymptomatic period, and eventually certain opportunistic infections, neoplasias, and other conditions. The Centers for Disease Control and Prevention (CDC) has a still-current detailed surveillance definition and classification system for AIDS based on documentation of HIV infection, degrees of laboratory evidence of immunosuppression using CD4+ lymphocyte counts, and specified symptoms and AIDS indicator conditions (Centers for Disease Control and Prevention, 1992). The major result of HIV infection is both quantitative and qualitative immune impairment that largely affects the T-helper lymphocytes (T4, CD4+ cells), but macrophages, monocytes, glial cells, fibroblasts, and antigen-presenting dendritic cells also can become infected. This results in increased susceptibility to opportunistic infections and neoplasms. Major conditions resulting from opportunistic infections in the HIV-infected person include *Pneumocystis jiroveci* (formerly *carinii*) pneumonia (PCP); encephalitis due to *Toxoplasma gondii*, severe diarrhea and gastrointestinal problems due to *Cryptosporidium* spp., *Isospora belli*, and others; meningitis from *Cryptococcus neoformans*; candidiasis of the oral cavity, esophagus, and in women, the vagina; tuberculosis; herpes simplex virus lesions; retinitis due to *cytomegalovirus*; and disseminated infections due to cytomegalovirus, *Mycobacterium avium* complex, and others. Major neoplasms include Kaposi sarcoma and non-Hodgkin lymphomas.

HIV also affects certain cells and tissues directly, particularly in the central nervous system. The nervous system may be affected, even asymptomatically, in persons with HIV; effects such as AIDS dementia complex (ADC), vacuolar myopathy, and peripheral neuropathy are common (Peiperl, Coffey, & Volberding, 2004; Wormser, 2004). Medical treatment has been directed: (1) against HIV itself through the use of combinations of antiretroviral drugs, of which highly active antiretroviral therapy has been a mainstay, (2) toward immune system enhancement, and (3) toward the prevention and treatment of specific opportunistic infections and conditions. The latter includes nonpharmacological measures and the use of pharmacological and biological agents, including vaccines. Monitoring viral load and CD4+ cell counts as well as clinical
status is integral to the treatment. Treatment in the older adult parallels that of other adult age groups, with the necessary adaptations in dosage and/or regimens to account for the physiological and psychosocial consequences of aging, the presence of non-HIV–related coexisting chronic illness, possible interactions with drugs used to treat these other conditions, and the increased adverse drug effects in older persons due to these issues.

Transmission of HIV

The major documented transmission modes for HIV are those in which persons are exposed to HIV-containing blood or body fluids: (1) through intimate homosexual or heterosexual contact, (2) through parenteral or blood-borne exposure via transfusions, needlesticks, injection drug use, or similar means, or (3) vertically from an infected mother to her infant in the prenatal, perinatal, or immediate postnatal period. Several factors influence the likelihood of HIV acquisition, including risky behaviors such as unprotected sexual encounters, sex with high-risk partners, engaging in receptive anal intercourse, and sharing apparatus to inject drugs. The modes of HIV transmission (except perinatal) apply to all age groups including the elderly. Currently, sexual transmission is the leading mode of HIV acquisition in older adults.

Exposure Categories

The CDC classifies U.S. AIDS cases by the major exposure categories in a hierarchical manner. These categories for all adults and their percentages are as follows: male-to-male sexual contact (48%); injection drug use (27.5%); male-to-male sexual contact and injection drug use (7%); heterosexual contact (15%); and other, including hemophilia, blood transfusion, perinatal, and risk not reported or identified (2.5%) (Centers for Disease Control and Prevention, 2003). In the past, blood transfusion and/or tissue transplantation was an important mode of HIV acquisition in those older than 55 years, at one time even accounting for the majority of cases in those aged 65 years and older (Ship, Wolff, & Selik, 1991). Because of the protective mechanisms now in place to screen the blood supply, this acquisition mode has decreased significantly. On the other hand, AIDS cases due to heterosexual transmission have increased in those 65 years and older.

AIDS Cases in Older Adults

The term “invisible” has been used to describe many groups affected by the AIDS epidemic, including the elderly. Relatively little attention has been paid to both the present and future aspects of HIV in the older adult. Although the mean age of a first diagnosis of HIV/AIDS is rising, many aspects of HIV/AIDS in older adults, such as response to therapy, drug interactions, and updated epidemiological and clinical data have not been studied in controlled trials in older adults (Manfredi, 2004). In its standard statistical reporting of AIDS cases, the CDC gives data by 10-year intervals until age 65, after which it lumps together cases among those aged 65 years and older. Through 2002, approximately 6% of cumulatively reported U.S. adult AIDS cases occurred in those aged 55 years and older, and about 1.5% occurred in those aged 65 years and older (Centers for Disease Control and Prevention, 2003).

The statistics described above report the age at the time of AIDS diagnosis. It is expected that an increased absolute number of cases of both HIV infection and AIDS will eventually be seen in the older population, as well as a greater relative proportion of cases due to a decrease in perinatal transmission. Reasons for the increased number include: (1) HIV-infected persons may progress to symptomatic states and AIDS over a longer period of time, in part due to early and increasingly effective therapy such as highly active retroviral therapy, and thus persons who were infected in the middle-aged group will move into the elderly age category; (2) persons in older age groups may continue to receive blood transfusions and tissue/organ transplantation at higher rates than younger persons, so a certain number of cases (although relatively few, and a decreasing number) will continue to arise from this source; (3) the ready availability of drugs such as Viagra (sildenafil citrate) to treat erectile dysfunction has led to increased sexual activity in older males; (4) older persons may engage in risky sexual behaviors such as not using condoms for sexual encounters, for reasons including lack of concern about birth control, lack of awareness about HIV
risks, and difficulty manipulating protective devices due to conditions such as arthritis, and thus they become more vulnerable to infection with HIV and/or other sexually transmitted diseases; (5) the life expectancy for persons in the United States continues to increase, and older people enjoy better health and mobility, allowing them to pursue risky behaviors and activities; and (6) age-related changes in the body’s immune function and protective barriers, such as the drying of vaginal mucosa in women, make older people more susceptible to the acquisition of HIV when they are exposed.

**Sex, Drugs, and the Elderly**

Since the majority of cases of HIV transmission involve unprotected sexual contact and/or drug abuse, these areas have been the focus of general HIV prevention, assessment, and educational efforts. Society still subscribes to many false beliefs and negative views of sexuality in the older adult. Often, older people are seen as relatively asexual or as secure in a monogamous relationship. Even with the advent of drugs to treat erectile dysfunction, little has been described in the literature about sexual practices of the elderly population, including risky behavior, multiple and/or same-sex sexual partners, and so on. Health care workers may not ask about sexual activity as part of an older person’s health history. Most studies of sexuality among the elderly have concentrated on sexual dysfunction as opposed to sexual activity. Older persons may also believe they should hide their sexual activity, whether heterosexual, homosexual, or both, and they may not readily volunteer or discuss risk factors or exposures fearing the reaction of friends or family if they acknowledge sexual relationships, especially if those relationships are outside their usual partnership or marriage. Decades ago, sex-related activities were not openly discussed or displayed. “Gray” and “gay” were seen as antithetical terms, and men who had sex with other men were accustomed to being closeted to avoid discrimination. However, it is estimated that at least 1 million male homosexuals are older than 65 years (Ship, Wolff, & Selik, 1991). This may be an underestimate and may not consider cultural definitions of sexuality or occasional same-sex experiences.

Frequently sexual transmission of HIV occurs proportionately in the older population. More than 50% of all reported AIDS cases in those aged 55 years and older are classified in some exposure category pertaining to sexual transmission (Centers for Disease Control and Prevention, 2003). Probable heterosexual transmission of HIV was reported in a woman of 89 years (Rosenzweig & Fillit, 1992). Sexual relationships outside monogamous ones may be becoming increasingly common in the elderly. Examples include: (1) older men whose long-term partners have died may now have sexual contact with several other partners who may be younger, increasing the risk of exposure to HIV; (2) elderly women may seek sexual fulfillment with younger men in a non-monogamous relationship; and (3) elderly men (married or not) may pay for sexual relationships with prostitutes (male or female) or seek available sexual companionship, which, particularly in long-term care settings, may be with a male. All of these individuals may now be at risk for HIV infection but be reluctant to disclose this behavior unless the health care provider asks specific questions regarding sexual behavior. Primary care providers may not discuss topics related to HIV risk as frequently with older patients as with younger ones, and many fail to recommend HIV testing or consider HIV in the differential diagnosis.

A sentinel study examined risk factors and behaviors in a large national sample of adults older than 50 years. The prevalence of a known risk factor for HIV infection, such as being a transfusion recipient, having multiple sexual partners, or having a partner with a known risk for HIV infection, was 10%. Few of these respondents used condoms during sex or had HIV testing, particularly in comparison with a younger sample (Stall & Catania, 1994). In another study, few persons older than 50 years (11%) had discussed AIDS with their physician (Gerbert, Maguire, & Coates, 1990).

In addition to sexuality, drug abuse in the older adult is another topic that is often avoided in discussion. Few studies have addressed injection drug use for nonprescribed or nonmedical purposes in the elderly. Yet medical conditions that cause pain and discomfort might cause older adults to seek drugs, as might social conditions or other reasons. Furthermore, those who began using drugs at a younger age may continue this habit into old age. Thus, health care workers also need to consider drug use when assessing risk for HIV exposure in the older person, although currently AIDS attributed to this exposure category is infrequent in the elderly.
Clinical Aspects of HIV/AIDS and Survival in the Elderly

AIDS may mimic other conditions in the elderly, and it can be difficult to recognize HIV infection in this group. It can present with vague and non-specific signs and symptoms, such as weight loss and wasting, aches and pains, fever, cough, or cognitive impairment and confusion. Symptoms in the elderly may present against a background of multiple actual or potential illnesses and medication side effects and interactions. Cases of HIV infection in the elderly have been described in which ADC was the presenting and/or sole feature. The symptoms of ADC can include forgetfulness, slow thought processes, personality changes, depression, loss of concentration, and apathy, among other features. Many of these are similar to problems seen in the elderly from other causes, including the dementia seen in Alzheimer’s disease and in extrapyramidal disorders, as well as delirium. Because HIV infection can persist for years, with few manifestations, some persons acquiring it later in life may live their life span without showing major recognizable symptoms. Thus, clinicians must be ready to consider a differential diagnosis of HIV disease in the older adult regardless of gender.

In general, when compared to younger counterparts, older adults with HIV tend to have a shorter and more severe course, shorter AIDS-free intervals, a greater number of opportunistic infections which tend to be more severe, earlier development of neoplasms, and a shorter survival period (Stoff, Khalsa, Monjan, & Portegies, 2004). Other debilitating conditions of aging may complicate those due to HIV infection, compounding and/or accelerating disease progression and decreasing functional capabilities. For example, cognitive impairment may adversely affect adherence to therapy (Hinkin, et al., 2004). Alzheimer’s disease is commonly associated with aging, and it has been suggested that there is interaction between the pathologies induced by Alzheimer’s disease and HIV-associated disorders (Stoff, Khalsa, Monjan, & Portegies, 2004). Becker, Lopez, Dew, and Aizenstein (2004) noted that HIV-positive persons older than 50 years had a greater prevalence of cognitive disorder than younger persons, and dementia was a more common classification. Those with a higher HIV viral load were at greater risk to develop cognitive impairment.

Changed social networks and other conditions make the indirect consequences of AIDS significant for the older person.

Although some persons are still living who have been known to be HIV-infected for 20 years or more and who seem to have nonprogressive disease, the ultimate outcome of HIV infection is considered to be death. Yearly overall mortality rates remain high, although newer treatment regimens with highly active antiretroviral therapy have increased life spans. Since the advent of highly active antiretroviral therapy, it is questionable whether HIV progresses more rapidly in older people than in younger ones, but increased age was still found to be a factor shortening survival in older persons already HIV-infected (Porter et al., 2003).

Felissa R. Lashley

See also

Immune System

References


Felissa R. Lashley


**ALCOHOL USE**

Beverage alcohol (ethanol) has complex physiological and psychological effects on those who drink it, as well as a complex social history. Its use is ancient and almost universal, particularly in the development of Western civilization. Ancients often described alcohol as “the water of life”; they attributed magical significance to its effects in religious and social ceremonies and marked life-course transitions from birth to death with drinking behavior. Consuming alcohol in religious communion services and in convivial social toasts, such as “to your health,” are well-known cultural celebrations. Alcohol as a beverage appears in a remarkable variety of tastes, smells, and colors. It is consumed in a variety of settings, often with elaborate attention to the aesthetics of presentation. In sum, beverage alcohol in Western societies has a long history and has become a domesticated drug whose addictive potential tends to be understated (Roueche, 1960).

Beverage alcohol has a darker side. It can be misused as well as used to produce intoxication, and for a persistently and significantly large minority of drinkers it results in addictive behavior, clinically recognized as *alcoholism*. The ambivalence toward beverage alcohol is dramatically illustrated by national prohibition of beverage alcohol in the United States (1917–1933), a country in which a large majority of adults historically have drunk alcohol and in which an estimated 5% of adult drinkers persistently exhibit serious problems associated with their drinking.

Interest in how drinking and abuse of alcohol relate to aging is relatively recent. Scholars who know the relevant scientific literature note that in the first 2 decades of the major journal in the field, *The Quarterly Journal of Studies on Alcohol* (1940–1960), only 1 article referred to aging, old age, or gerontology. In this journal’s third decade (1960–1969), 13 articles referenced aging; only after 1970 did references to age and aging become common. By 1980 a comprehensive bibliography on aging and alcohol use listed 1,200 articles, over half of which had been published in the previous decade (Barnes, Abel, & Ernst, 1980). Also in that year, a monograph on alcohol and old age was published (Mishra & Kastenbaum, 1980). Increased interest in the *drinking behavior of older adults* in the 1980s, particularly abuse of alcohol, appeared to have 2 sources. One was the assumption that loss of status through retirement and the stresses of growing older would, particularly among men, increase the risk of abusive use of alcohol as an expression of frustration. A second source appears to have been the concern of social welfare agencies and administrators of long-term care facilities; they reported that the everyday problems of some older adults were in fact sometimes exacerbated by intoxication and apparent alcoholism.

Adequate evidence for characterizing the relationship between *drinking behavior and aging*, however, has continued to be somewhat sparse. Systematic comparisons of drinking behavior and alcohol abuse between societies are not available. But here, in general, is what the growing body of evidence indicates about drinking among older adults in the United States (Maddox, Robins, & Rosenberg, 1985; Midanik & Clark, 1994; Mishra & Kastenbaum, 1980):

1. A substantial majority of adults in the United States are not abstinent. At any point a minority of males (perhaps 20%) are abstinent or are ex-drinkers, and a larger minority of females are abstinent. A minority of males who drink and a smaller minority of females exhibit significant personal and social problems with their drinking. The usual estimate of alcoholism or serious problems with drinking among adults is 5%.
2. Among adults who drink, both the frequency and the quantity of alcohol consumed tend to decrease with age. Available cross-sectional evidence tends to be flawed as the basis for concluding that there is an age-related decrease in consumption; the same outcome could be explained by the different drinking patterns of earlier and later cohorts of adults. However, changing patterns of sociability with age, age-related health problems, and the complicated interaction of alcohol with prescribed medication appear to have a moderating effect on drinking behavior in later life.

Earlier assumptions that abusive drinking in adulthood ensured an early death appear to be wrong. Adults with a lifetime history of abusive drinking are observed in long-term care institutions. The assumption that “late-onset alcoholism” (i.e., an adult with no history of abuse who develops problems late in life) is common is not supported by evidence. Problems with drinking in later life appear typically to be a continuation of drinking patterns established in the adult years.

3. When abusive drinking or alcoholism is observed in later life, therapeutic intervention is at least as effective with older adults as with adults generally. Trend analysis of drug use (Johnson, 1996) and research on alcohol use among community-dwelling older adults (LaKhan, 1997) continue to reinforce these conclusions.

Although recognition of possible cohort differences requires one to be cautious in making broad generalizations about future patterns of drinking behavior among older adults, no current evidence has established an increased risk of abusive drinking in later life. Evidence continues to suggest that social factors associated with aging tend to moderate drinking behavior.

GEORGE L. MADDUX

See also
Substance Abuse and Addictions

References

ALZHEIMER’S DISEASE: CLINICAL

Alzheimer’s disease (AD) is a neurodegenerative condition of late adulthood with a characteristic pattern of progression that allows for an accurate clinical diagnosis during life (85% correlation with autopsy findings of neuritic plaques and neurofibrillary tangles). Early symptoms include decline in the memory of recent events, in executive abilities, and in word-finding. In AD’s moderate stage, judgment is impaired in financial affairs, supervision is required for most instrumental day-to-day tasks, and hallucinations and false beliefs can emerge, although they are more common in moderate later stages. The moderate stage is defined by impairment in instrumental activities of daily living and requiring prompting to complete personal ADLs, which otherwise are largely done without assistance. In the late stage, the patient needs help for basic activities, such as dressing, eating, and using the toilet; agitation, especially after dark, and aggressivity may occur, imposing an additional burden on caregivers often leading to the patient’s placement in a nursing home. The final stage is one of muscle rigidity leading to aspiration pneumonia. The life span of persons with AD is shorter than that for age-matched populations.

A diagnosis of dementia due to AD is made on the basis of a decline in two or more cognitive domains that interferes with a patient’s social or occupational life, and which has no other neurological psychiatric or systemic cause. A new trend is to diagnose AD in its early, purely amnestic stage, labeled “amnestic mild cognitive impairment” (aMCI); sophisticated
psychometric testing is required at this stage, and additional genetic and brain imaging testing may be needed. A pre-symptomatic stage of AD can be diagnosed in first-degree relatives of patients carrying presenilin or amyloid precursor protein mutations, using serial psychometric testing and brain imaging. Diagnosing AD in its pre-symptomatic or aMCI stages will be clinically meaningful once disease-modifying treatments become available.

A vascular component to dementia is frequently found in people aged 75 years and older, especially in those with a history of transient ischemic attacks (stroke-like symptoms lasting less than 24 hours), vascular risk factors (diabetes, high blood pressure, atrial fibrillation, high blood lipid levels), and evidence of strokes on brain imaging; the combination of AD and vascular components is referred to as “mixed dementia.” Vascular risk factors (VRF) are so frequent in patients with late-onset AD that they likely play a role in the emergence of symptoms and are certainly worth treating at all stages of AD. Along with an active and socially integrated lifestyle, treating VRF is currently one of the best ways to prevent dementia in the population at large.

Management of AD includes accurate diagnosis, education of both patients and caregivers about the disease, referral to community resources and lay associations, and drug treatments for depression and other psychiatric symptoms, cognitive and functional decline, and associated VRF. Within 5 years, it is expected that there will be treatments to target the primary pathophysiology of AD, acting on brain amyloid metabolism, synaptic plasticity, or inflammatory responses. Pharmacogenetic profiles of individuals at risk or in early stages of AD will help select the best long-term therapy. Until then, cholinesteraseinhibitors (donepezil, rivastigmine, galantamine) and the NMDA receptor antagonist memantine are used to treat symptoms through the mild to moderately severe stages of AD. Cognitive training alone for aMCI, or as value added to pharmacotherapy in mild AD, is being studied. Structured caregiver education and support in mild to moderate AD may delay the need for the patient’s placement in a nursing home.

For updates, consult:
www.alz.co.uk/adi/publications.html#gp
www.cnsforum.com

Serge Gauthier

See also
Dementia
Dementia: Frontotemporal
Dementia: Lewy Body

ALZHEIMER’S DISEASE:
GENETIC FACTORS

The majority of Alzheimer’s Disease (AD) cases are sporadic (~95%), with onset after 65 years of age. Multiple studies suggest a complex etiology of AD, with both environmental and genetic factors influencing the pathogenesis of the disease. Twin studies found the concordance rate for AD among monozygotic twins to be 78% versus 39% among dizygotic twin pairs, indicating a strong genetic influence (Bergem, Engedal and Kringlen, 1997).

The earliest sign of AD brain pathology is the deposition of extracellular amyloid plaques, consisting mainly of Aβ40/42 peptides generated by cleavage of the β-amyloid precursor protein (APP). The longer and more neurotoxic isoform (Aβ42) appears to be elevated in the brains of individuals affected with either sporadic or familial AD, implying that they have a shared pathogenetic mechanism. The combination of genetic and biochemical data led to the formulation of the amyloid cascade hypothesis which suggested that Aβ deposition was the primary event in disease pathogenesis (Glenner and Wong, 1984; Selkoe, 1991; Hardy and Higgins, 1992). To date four genes responsible for AD have been identified (Figure 1). The common pathological effect imparted by all four AD-linked genes is to alter APP processing and promote Aβ deposition.

Approximately 5% of cases are associated with early onset AD. The disease in these families is often transmitted as a pure genetic, autosomal dominant trait. Genetic analyses of such pedigrees have found three causal genes: APP (Goate, Chartier-Harlin, Mullan, Brown, Crawford, et al., 1991); presenilin 1 (PS1) (Sherrington, Rogayev, Liang, Rogayeva, Levesque, et al., 1995); and presenilin 2 (PS2) (Rogaev, Sherrington, Rogayeva, Levesque, Ikeda, et al., 1995; Levy-Lahad, Wasco, Poorkaj, Romano, Oshima, et al. 1995). Another genetic locus for inherited susceptibility to AD was resolved to the Apolipoprotein E (APOE) gene that acts as a risk factor and age at onset modifier for the late
onset form of AD (Saunders, Strittmatter, Schmechel, George-Hyslop, Pericak-Vance, et al., 1993) (Figure 1).

**APP Gene**

To date 15 distinct AD-associated mutations have been published in the APP gene located on chromosome 21q21 (http://molgen-www.uia.ac.be/ADMutations/). APP mutations affect at least 45 families in which the age at onset is ranging between 30 and 65 years. The Val717Ile is the most frequent substitution found in ~50% of APP families. Another five mutations either have a questionable pathogenic nature or are associated with a different stroke-related, but amyloid-dependant pathology (Levy, Carma, Fernandez-Madrid, Power, Lieberburg, et al., 1990; Van Broeckhoven, Haan, Bakker, Hardy, Van Hul, et al., 1990).

All known pathological APP mutations have a direct effect on APP processing. APP can be cleaved by at least two separate pathways. One involves $\alpha$-secretase cleavage within the $A\beta$ peptide sequence. The other pathway requires proteolysis by $\beta$- and $\gamma$-secretases to generate $A\beta_{40-42}$ peptides. AD mutations are clustered near the $\alpha$-, $\beta$-, or $\gamma$-secretase cleavage sites (Hardy, 1997). The majority of the mutations either lead to an elevation of the $A\beta_{42}$ peptide, or to an increase of both short and long forms of $A\beta$. In contrast, the Ala692Gly mutation reduces $\alpha$-secretase cleavage but increases the variety of the $A\beta$ species (Haass, Hung, Selkoe and Teplow, 1994). Furthermore, Val715Met and Glu693Gly reduce total $A\beta$ production, indicating that the overall ratio of $A\beta_{42}$ to the other $A\beta$ species may be a more relevant indicator of AD pathology than the absolute level of $A\beta_{42}$ or total $A\beta$ (Ancolio, Dumanchin, Barelli, Warter, Brice, et al., 1999; Nilsberth, Westlind-Danielsson, Eckman, Condron, Axelman, et al., 2001).

**PS1 and PS2 Genes**

Mutations in the *PS1 gene*, located on chromosome 14q24.3, are responsible for the most aggressive form of familial AD cases (age at onset 16-65 years) and account for 18%-50% of all early-onset AD cases. To date 140 different fully penetrant PS1 mutations have been found in 278 AD families (http://molgen-www.uia.ac.be/ADMutations/). PS1 mutations (mainly missense substitutions) are not clustered in a particular region but broadly distributed throughout the gene and cumulatively affect ~25% of the coding region of the PS1 gene. The Gly206Ala is the most frequent PS1 mutation observed in 18 unrelated Caribbean Hispanic families (Athan, Williamson, Ciappa, Santana, Romas, et al., 2001).

Most of the PS1 mutations are associated with the classical presentation of AD. However, in 15
families with different PS1 mutations the disease (in addition to dementia) is associated with spastic paraplegia characterized by progressive weakness of the lower limbs (reviewed in Rogaeva, 2002). The brain pathology of these cases differs from the typical picture for AD. Mature plaques are scarce; instead, there are diffuse, $\beta$-positive cotton wool plaques without a congophilic core and with only minor neuritic pathology and markers of inflammation (Crook, Verkkoniemi, Perez-Tur, Mehta, Baker, et al., 1998). Several observations argue in favor of the existence of a modifier in variant AD families. For example, an identical PS1 mutation has been found in a family with variant AD, as well as in a family with a typical AD.

PS1 shares amino acid and structural similarities with PS2 (chromosome 1q31-q42). However, AD that is associated with mutations in the $\text{PS2}$ gene is rare and variably penetrant (Sherrington, Froelich, Sorbi, Campion, Chi, et al., 1996). To date 10 distinct PS2 mutations have been reported in 45 families with age at onset ranging between 40 and 85 years (http://molgen-www.uia.ac.be/ADMutations/).

The concept that changes in APP processing are central to AD pathology won further support after the discovery that mutations in PS1 and PS2 genes cause the overproduction of the $\beta_{42}$ (Citron, Westaway, Xia, Carlson, Diehl, et al., 1997). Nevertheless, presenilins have a complex functional profile as integrators of several signaling pathways and it is possible that a dysfunction of these pathways can contribute to neurodegeneration in mutation carriers. In addition to APP processing, PS1 and PS2 are essential for the proteolytic cleavage of several proteins including Notch1 (De Strooper, Annaert, Cupers, Saftig, Craessaerts, et al., 1999).

**APOE Gene**

The three common isoforms of the APOE gene on chromosome 19q13.2 are encoded by alleles $\varepsilon2$, $\varepsilon3$ and $\varepsilon4$. The $\varepsilon4$ polymorphism is significantly over-represented in AD subjects (up to 40% from 15% in the general population), whereas the frequency of the $\varepsilon2$ allele is reduced from 10% to 2% in AD (Saunders, Strittmatter, Schmechel, George-Hyslop, Pericak-Vance, et al, 1993; Corder, Saunders, Risch, Strittmatter, Schmechel, et al., 1994). The mean age of onset of AD is less than 70 years among the $\varepsilon4/\varepsilon4$ population, but over 90 years for the $\varepsilon2/\varepsilon3$ population (Roses, 1998). The APOE $\varepsilon4$ allele is acting as a risk factor and may not be sufficient to cause AD. The link between the $\varepsilon4$ allele and AD has been confirmed in numerous studies across multiple ethnic groups.

Many studies suggest that APP processing is affected by the APOE polymorphisms. For example, the absence or presence of one or two $\varepsilon4$ alleles was found to correlate in a dose-dependent manner with the relative density of amyloid plaques (Schmechel, Saunders, Strittmatter, Crain, Hulette, et al., 1993). The APOE gene itself is not useful for pre-symptomatic testing since not all $\varepsilon4$ carriers will develop the disease and $\varepsilon4$-association is not entirely specific to AD. Nevertheless in the future APOE can be used in combination with other yet to be discovered AD risk factors. Notably, up to 68% of AD cases do not have an APOE-$\varepsilon4$ allele indicating that additional factors are involved in late-onset form of the disease.

**Search for Novel AD Risk Factors**

There are two approaches to finding susceptibility loci: linkage analysis (genome scans) and candidate gene studies. To date, several complete genome screens have been published for late-onset AD and more than 20 distinct AD loci were reported, however many of them are likely to be false positive results and will have to be confirmed in independent data sets (Pericak-Vance, Bass, Yamaoka, Gaskell, Scott, et al., 1997; Kehoe, Wavrant-De Vrieze, Crook, Wu, et al., 1999; Blacker, Bertram, Saunders, Moscarillo, Albert, et al., 2003). The linkage support was obtained for chromosomes 1, 5, 6, 9, 10, 12 and 19.

A subsequent follow-up study confirmed the presence of AD susceptibility loci on chromosome 12 (Rogaeva, Premkumar, Song, Sorbi, Brindle, et al., 1998; Mayeux, Lee, Romas, Mayo, Santana, Williamson, et al., 2002) and on chromosome 10 (Myers, Holmans, Marshall, Kwon, Meyer, et al., 2000; Ertekin-Taner, Graff-Radford, Younkin, Ecker, Baker, et al., 2000; Bertram, Blacker, Mullin, Keeney, Jones, et al, 2000; Lee, Mayeux, Mayo, Mo, Santana, et al 2003). However, the linkage results support very broad intervals on both chromosomes.
(≈70 cM) and often point to distant chromosomal regions. Therefore, the chromosome 10 and 12 loci could harbor several distinct AD genes; so far none of the genes responsible for these linkages have been found.

In candidate gene studies, genes are selected based upon the known biology of the disease and assessed to determine whether variants in each candidate are associated with disease. In recent years, many genes have been reported to be associated to AD (reviewed in Rogaeva, Tandon and St. George-Hyslop, 2001). However, most of these findings have not received the same robust replication as the association between AD and the APOE ε4 allele. The conflicting results could be explained by the genetic and neuropathological heterogeneity of AD.

**Conclusion**

Genetic studies have proven to be an effective way to develop understanding of AD. Altered APP/Aβ metabolism is central to all known causes of AD. Treatment and diagnostic strategies based on genetic knowledge are now about to reach the clinic. This will entail the identification of individuals predisposed to AD before they are affected while the neuronal damage is still negligible. The future of AD research should include studying the genetic epidemiology of AD with the objective of investigating gene/environment interactions.

**References**


**AMBULATORY AND OUTPATIENT CARE**

For an increasing number of older adults, ambulatory and outpatient care constitute the nexus of health care across time and transitions in health status. A spectrum of care settings and providers delivers formal care for older individuals outside the hospital setting. Ambulatory care can take place in locations as varied as hospital-based procedural units and individual patients’ homes. The rate of ambulatory care use continues to rise. In 2002, individuals aged 65 to 74 years made approximately 550 visits to office-based physician practices per 100 individuals in the United States. For individuals aged 75 years and older, this number was approximately 700 visits per 100 (Woodwell & Cherry, 2004). Family members often accompany patients to these visits and are integral in the care provided. Geriatricians provide but a small fraction of paid care; in the United States, only 9,000 of 650,000 licensed physicians have this added qualification (Mitka, 2002), and of those only approximately 10% had formal training in geriatric medicine in 1992 (Reuben & Beck, 1994). In ambulatory care, the complex interactions among social, health care system, psychological, and medical issues play out vividly, making collaboration across disciplines an essential facet of care for older adults.

Ideal ambulatory care would put the patient at the center of the health care system, acknowledge the heterogeneity and vulnerability of older persons from physiologic and social standpoints, and be continuous across care settings, in addition to being cost-effective. The obstacles to providing such care to older persons are substantial. The heterogeneity of health status in the elderly makes appropriate targeting of ambulatory care a major challenge. Compared to younger persons, a higher proportion of older individuals are not healthy. Sixty-two percent of older individuals have 2 or more chronic illnesses, compared with 21% in the general population. The result is that a small, ill subset of the population receives the majority of ambulatory care. For example, 66% of the Medicare budget is used for the care of individuals with 5 or more chronic illnesses, even though these individuals comprise approximately 1% of the U.S. population (Partnership for Solutions, 2002). Although the majority of health care spending is for hospital care, the chronically ill are the main focus of ambulatory care. The complex health status of older individuals often requires difficult decisions involving tradeoffs and the incorporation of personal preferences.

For healthy older persons, preventive services should be a major focus of care. The U.S. Preventive Services Task Force and the Canadian Task Force on Preventive Health Care have identified several conditions for which evidence supports screening in the elderly (Agency for Health Care Research and Quality, 2004; Canadian Task Force on Preventive Health Care, 2004). Growing evidence suggests that exercise can delay many adverse outcomes across the range of functional ability, if it is modified for the specific needs of the individual (Bean, Vora, & Frontera, 2004).

Practice guidelines based on small to moderate degrees of average benefit in younger persons who suffer from 1 chronic illness may not be applicable to people with multiple comorbidities (Kravitz, Duan, & Braslom, 2004; Tinetti, Bogardus, & Agostini, 2004). Older adults with multiple chronic illnesses
are often unable to surmount the economic privation and social isolation which can threaten health. In addition, their care trajectories often wend through different formal health care sites, leading to fragmented care. One study found that 39% of Medicare beneficiaries do not go straight home upon hospital discharge (Coleman, Min, Chomiak, & Kramer, 2004). Efforts dedicated to communication across care settings are necessary. It is now more widely recognized that older individuals bear the brunt of inadequacies and errors in health care. For example, work in the prescribing rates of potentially inappropriate medications for older outpatients has led to increased awareness and measurement (Goulding, 2004).

Several trends in ambulatory care delivery and research are encouraging. Health care for older people is entering an age of process scrutiny, outcome assessment, and demand for improvement. Recognition that a new model of care for chronic disease is needed has led to growth in research and practices that focus on systems processes and span silos of care. For example, comprehensive hospital discharge planning with a built-in ambulatory care bridge has been studied in more than 8 countries, and findings show a reduction of adverse outcomes related to congestive heart failure (Phillips, Wright, Kern, Singa, Shepperd, & Rubin, 2004). In addition, there has been an increase in the number of home-based practices and other alternative models of ambulatory care. The Program of All-inclusive Care for the Elderly (PACE) program, which integrates primary care for high-risk, nursing home–eligible persons with other services including medication coverage and social support in a capitated fee structure, has matured from a demonstration project to a system with more than 25 sites (Gross, Temkin-Greener, Kunitz, & Mukamel, 2004). Home-hospital care models that either substitute entirely for hospital admission or facilitate early hospital discharge have been developed in several countries, including Australia, Israel, Italy, the United Kingdom, and the United States (Shepperd & Iliffe, 2001). There is also increased interest in care models and systems that incorporate care principles crucial to chronic disease management (Bodenheimer, Lorig, Holman, & Grumbach, 2002). However, widespread dissemination of these innovations remains a challenge.

Two mainstays of care for older individuals have matured further. The comprehensive geriatric assessment (CGA) is an interdisciplinary assessment of an individual’s health and geriatric conditions. Geriatric evaluation and management (GEM) adds responsibility for implementation. Systematic review and meta-analysis of studies performed on 3 continents have shown that when targeted appropriately and with sufficient follow-up, home-based CGA reduces placement in nursing homes, functional decline, and mortality (Stuck, Egger, Hammer, Minder, & Beck, 2002). Outpatient GEM has also been shown to improve mental health scores without increasing cost (Cohen, Feussner, Weinberger, Carnes, Handly, Hsieh, et al., 2002). Nonetheless, not all trials have been consistent with benefit, and translating these results into practice has been a challenge (Rubenstein, 2004). The challenges have arisen in part because there is no single recipe for how CGA or GEM is performed. One example of an adapted CGA is a home-based intervention in which physical and occupational therapists implemented CGA and related principles to improve the function of older individuals (Tinetti, Baker, Gallo, Nanda, Charpentier, & O’Leary, 2002). Another challenge is that standard outcome measures may not capture changes important to many older individuals. This has led to research on how to use individualized responses in assessing program efficacy (Rockwood, Howlett, Stadnyk, Carver, Powell, & Stolee, 2003).

Recent growth in the area of palliative care has contributed to change in ambulatory care for older individuals. Strictly speaking, palliation refers to attention to the control of symptoms without regard for their cause. This field originated from care for dying patients, but it has now expanded to include many ill groups. Research and advocacy that prioritize pain control and incorporating the experiences of patients and their families have been combined with interdisciplinary and process-focused perspectives. Consensus regarding how palliative care can be targeted or reliably differentiated from other care has yet to be firmly established (Ahmedzai, Costa, Blengini, Bosch, Sanz-Ortiz, Ventafrrida, & Verhagen, 2004).

Carlos Weiss
Bruce Leff

See also
Geriatric Assessment Programs
References


AMERICAN ASSOCIATION OF HOMES AND SERVICES FOR THE AGING

The American Association of Homes and Services for the Aging (AAHSA), located in Washington, DC, serves 2 million people every day through mission-driven, not-for-profit organizations dedicated to providing the services people need, when they need them, in the place they call home. AAHSA members offer the continuum of aging services: assisted living residences, continuing care retirement communities, nursing homes, outreach programs, and senior housing. AAHSA is committed to creating the future of aging services through quality people can trust.
The AAHSA also houses the Institute for the Future of Aging Services (IFAS), a policy research center. The IFAS mission is twofold: (1) to create a bridge between the practice, policy, and research communities to advance the development of high-quality aging services and a high-quality long-term care workforce, and (2) to provide a forum for the health, supportive services, and housing communities to explore and develop policies and programs to meet the needs of an aging society. Through its connection with AAHSA, IFAS has access to untapped “living laboratories,” where independent researchers can study real-world providers and their efforts to improve the lives of older adults and those who care for them. IFAS disseminates these provider-driven, evidence-based models to the aging services provider community and policy makers.

Recently, AAHSA also established the Center for Aging Services Technology (CAST), which brings together technology companies, university researchers, care providers, and the government to collaborate in the development and application of technologies that can help increase quality of care for older people while decreasing costs. CAST works to identify technology-based solutions to deal with the challenges the U.S. society will face as the population ages.

In addition to its national focus, AAHSA now sponsors the International Association of Homes and Services for the Ageing (IAHSA), a not-for-profit educational and charitable organization with members from more than 30 countries. In recognition of its leadership in the field of aging, recently IAHSA was granted special consultant status to the United Nations Economic and Social Council.

AAHSA offers a number of benefits to its members, such as group purchasing and insurance programs. AAHSA was established in 1961 by a group of 99 persons, who felt a need to critically examine services to the elderly and provide leadership to not-for-profit organizations seeking to provide quality care to current and future generations of elderly persons.

**James E. Allen**

**See also**

Organizations in Aging

---

**AMERICAN FEDERATION FOR AGING RESEARCH**

The American Federation for Aging Research (AFAR) is a not-for-profit organization that supports research and research training with the goal of enhancing healthy aging through improved knowledge of the basic mechanisms of biological aging and age-related disorders. While AFAR supports clinically relevant investigations, it especially encourages research on age-related diseases that emphasizes aging’s underlying mechanisms.

AFAR has consistently directed its programs to the needs of beginning investigators, including students, postdoctoral fellows, and junior faculty members. More than 1,000 such scientists and physicians have launched their careers with the help of AFAR training and research grants. Information on its various programs, awardees, and corporate and foundation supporters can be found at www.afar.org/

Recently, AFAR has been collaborating with the National Institute on Aging, the John A. Hartford Foundation, Atlantic Philanthropies, and the Starr Foundation in support of the Paul B. Beeson Career Development Awards in Aging Research, a program that sustains and promotes clinically trained individuals who are pursuing research careers in the field of aging. Another innovation has been the development of an AFAR-sponsored educational Web site at www.infoaging.org/. AFAR’s educational activities also have been enhanced by the Dorothy Dillon Eweson Lecture Series, through its support of meetings of organizations such as the Gerontological Society of America and the American Geriatrics Society, and through a series of news conferences on recent developments in aging research. AFAR also honors distinguished scientists and citizens for their contributions to research on aging.

AFAR was founded in 1980, thanks largely to the visionary ideas of a New York City cardiologist, Irving S. Wright, and generous initial funding from New York philanthropists. Although the national headquarters remains in New York City, regional chapters are being developed, the first of which have opened in Ohio and upper New York state.

**George M. Martin**

**See also**

Organizations in Aging