Center for Spirituality, Theology and Health:
Vision, Mission, Accomplishments and Future Plans

I. Executive Summary

In 1998, with support from the John Templeton Foundation, we established the Center for Spirituality, Theology and Health (hereafter referred to as either "the Center" or CSTH) within the Center for Aging at Duke University Medical Center. The mission of the Center is to "(1) *conduct research on the relationships between religion, spirituality, and health, (2) train others to do so, (3) interpret the research for clinical and societal applications, (4) explore the meaning of the research findings within the context of theological positions, and (5) discuss how those theological positions might inform the design of future research*." The Center has established links with similar centers across the United States and internationally. The connections between religion, spirituality and health remain largely unexplored and the potential discoveries bridging these areas are as yet untapped, so there is still much work for the Center to do. This is especially true when one considers that CSTH is one of the only organizations devoted to doing and training others to do research on religion, spirituality and health, both within the context of a major research university and a world-renowned divinity school. The work of the Center is vital in bringing the study of religion, spirituality and health into the mainstream of medical science, in helping health professionals apply the research findings to clinical practice, and in interpreting what the research findings mean to the American public (two-thirds of whom indicate that religion is an important part of their daily lives) and to those in other countries around the world (the vast majority of whom are religious as well). In moving ahead, CSTH wishes to base these research efforts on a firm grounding of theological reflection so that the results of that research may help to inform faith communities and enable them to more effectively meet their goals, while at the same time contributing positively to public health.

Organizational Vision: "CSTH strives to be the leader for spirituality and health research within the context of serious theological discussion, addressing the 'big questions' of our time."

Expanded Mission: From a scientific perspective, we are interested in studying the biological mechanisms by which religion and spirituality may affect physical health and medical outcomes, acting through psychological, social, behavioral and genetic pathways. From a theological perspective, we wish to ground this research and interpret the findings within a range of theological perspectives, as well as consider how these theological perspectives might benefit from empirical research. We are now building a strong team of junior and senior researchers from multiple disciplines (medicine, psychiatry, nursing, sociology, psychology, public health, theology, chaplaincy, and representatives of diverse faith communities) to generate new research ideas, write research grants, publish and disseminate research findings, train other investigators within Duke and outside of Duke (on a national and international level), and engage in and stimulate true interdisciplinary scholarship in this area.

II. History and Accomplishments of the Organization

With generous support from the John Templeton Foundation, CSTH has been actively involved in a range of academic activities, including conducting research on R/S and health from 1998 through 2011; educating others to conduct such research through our research workshops (since 2004); consulting on this topic to other educational institutions, private foundations, and government organizations (including NIH, NSF, U.S. Army, Center for Medicare and Medicaid services, etc.); serving the general public by acting as a First Source of information on R/S and health for media groups in the U.S. and around the world; and providing lectures and workshops across the U.S. and in Canada, Puerto Rico, United Kingdom, the Netherlands, Denmark, Switzerland, Austria, Hungary, Australia, New Zealand, and Brazil. Between 2007 and 2010 CSTH brought researchers together locally at Duke and surrounding universities in the Research Triangle as well as nationally through monthly seminars, community of scholars meetings, and yearly national/international conferences. CSTH also was instrumental in establishing and operating the Society for Spirituality, Theology and Health in the U.S. from 2007-2010 and in founding the International Society of the Study of Religion, Spirituality and Health, in Switzerland in 2010-ongoing.

The research connected to CSTH during this time has included studies examining relationships between religious involvement and a host of psychological and physical health outcomes. The findings from this research has been published in over 200 scientific peer-reviewed articles, two-dozen books, and presented at hundreds of conferences. Significant findings from CSTH's research suggest links between religious involvement and lower rates of depression, faster recovery from depression, lower anxiety, greater well-being, improved coping with stress, positive personality changes, greater social support, lowered substance abuse (alcohol), reduced cigarette smoking, shorter hospital stays, shorter nursing home stays, better physical functioning, better cognitive functioning, lower blood pressure, less hypertension, better immune functions, and greater longevity. These findings have been published in peer-reviewed scientific journals ranging from JAMA to the American Journal of Psychiatry to the Archives of Internal Medicine and Journal of Family Practice. This research has garnered worldwide media attention from CNN, ABC, NBC, CBS, PBS, BBC (British), CBC (Canadian), and Korean PBS, and CSTH has been profiled in Time Magazine. CSTH members have presented religion and spirituality findings to the United Nations, the U.S. Senate, and the U.S. House of Representatives. In summary, CSTH has been at "the center" of research on religion, spirituality and health since the field began. Specific examples of the past, present, and future (planned) research accomplishments of CSTH now follow.

a. Seminal Research by CSTH: The Past

We summarize here specific examples of past research accomplishments of CSTH, and provide complete documentation of these findings in Appendix I.

1. RELIGION/SPIRITUALITY (R/S) and *Psychological Well-Being*. In the mid-1980's we conducted one of the first and largest studies to examine the relationship between R/S and

well-being in older adults. Over 250 studies by other investigators on R/S and well-being would follow this one (80% confirming our findings).

2. R/S and *Depression*. Soon we began looking at the relationship between R/S involvement and depression in medically ill older adults and eventually in older adults living in the community. This research would span over 20 years and produce dozens of peer-reviewed academic publications in this area. Nearly 400 studies from other investigators would follow these Duke studies, with two-third reporting similar findings (less depression among the more religious/spiritual).

3. R/S and *Anxiety*. Our group would also examine relationships between R/S and anxiety in both older adults and in adults of all ages. These too were followed by over 200 studies on this relationship by other research teams, with many reporting similar findings.

4. R/S and *Personality*. In one of the first studies to examine the effects of R/S on personality in older adults, we prospectively followed young elders over six years, finding that personality could change even in later life and R/S involvement was often a key factor in bringing about the development of positive personality traits.

5. R/S and *Coping with Illness*. This is perhaps the area that CSTH researchers have contributed the most to. Over 25 years, our researchers have been publishing on how R/S helps those with chronic illness cope with the disability, pain, and life changes associated with it, working with Ken Pargament at Bowling Green University.

6. R/S and *Blood Pressure*. In one of our first large population studies, we found lower blood pressure among older adults who were more religiously active; this finding would stimulate a number of studies (over 40) by other research groups examining this association.

7. R/S and *Immune Function*. Of all studies by CSTH researchers, the one that brought most attention to the role of religion in health examined religious involvement and immune function. Our finding that frequent religious attendance was associated with significantly lower levels of interleukin-6 in their blood, suggested that religious involvement was linked to stronger immune function and received world-wide attention in both the academic and popular press.

8. R/S and *Longevity*. Among the most important findings by CSTH researchers has been studies linking religious activity with greater longevity, a finding that many other investigators have now replicated (over two-thirds of 115 separate studies).

9. R/S and *Functional Disability*. Building on the work of Ellen Idler and Stan Kasl at Yale University, our research team has recently provided some of the strongest scientific evidence to date that religious activity may slow the progression of physical disability in later life. We will be focusing more on this area in the future, since predictors of functional disability are a major focus of the Center for Aging in which we reside (see below).

10. R/S and *Use of Health Services*. Our findings that religious involvement is related to shorter acute hospital stays and less time spent in a nursing home after hospital discharge indicate the kind of impact that religious involvement may have on one of the biggest concerns in our country today – the financing of health care.

11. *Definitions* and *Measurement* of R/S. In 1997 we developed the Duke University Religion Index (DUREL), and published it in the *American Journal of Psychiatry*. This 5-

item measure has become one of the most common measures of religious involvement used in epidemiological studies today (and has been translated into over a dozen different languages). A relatively recent paper in the *Journal of Nervous & Mental Disease* provided a seminal discussion (participated in by psychiatric epidemiologists from Harvard) on the way "spirituality" is currently being defined and how it is distinguished from "religion."

12. *Summaries of the Research* on R/S and Health. Summarizing the research by others on R/S and health has been one of the most important contributions that CSTH researchers have made to the development of the field, as it has brought together research from many different disciplines (medicine, nursing, public health, sociology, psychology, psychiatry, social work, etc.) into one place that is accessible to everyone. This includes the two editions of the *Handbook of Religion and Health* (2001, 2011), which is the most cited by scholars among all books, book chapters, and published scientific papers in the field of religion, spirituality, and physical health (see Google Scholar).

13. *Applications to Clinical Practice*. CSTH researchers have helped to interpret the research findings on religion/spirituality and health for clinical practitioners, focusing on the rationale for addressing spiritual needs and on developing specific methods for doing so that are applicable to doctors, nurses, and other health professionals working in acute hospital, outpatient, and long-term care settings.

b. Other Studies Citing Research by CSTH

Related to our record of past accomplishments is the number of times that other researchers have cited our research in the peer-reviewed literature. This is documented in the *Science Citation Index* and in *Google Scholar*.

The Science Citation Index provides the number of times that other researchers have cited a particular scientific publication. This provides a measure of the impact that a research group is having on a scientific field. Google Scholar acts in a similar way to assess impact that books are having.

Considerable evidence exists that the work by researchers in CSTH has influenced other researchers and helped to form the field into what it is today. Of the hundreds of original research publications and summaries of the research that have come out of the Center, we selected 17 articles/books to determine how often they were cited by other researchers. Those 17 articles alone received nearly 3,000 citations (based on Science Citation Index and Google Scholar, as of January 2011). See **Appendix II** for a detailed documentation of this summary.

c. CSTH Research on the Cutting Edge: The Present and Future

Currently, CSTH is involved in and seeking support for several major projects designed to uncover the basic mechanisms by which R/S involvement influences mental and physical health.

1. Religious vs. Conventional Cognitive-Behavioral Psychotherapy (CBT). Presently, CSTH researchers are conducting a randomized clinical trial to compare the effects of religious vs. conventional CBT for the treatment of major depression in persons with

disabling chronic illness. The focus of this study is to determine whether integrating religious resources into therapy is more effective than secular approaches in relieving depression, and whether religious CBT is capable of reversing the biological changes associated with depressive illness, evidenced by immune (pro and anti-inflammatory cytokines) and endocrine (cortisol and catecholamine) changes. This multi-site study (that involves both Duke and the Adventist Health System in California) is also investigating the effects of three genetic polymorphisms involving serotonin and other neurotransmitters, to determine whether genetic factors moderate the effects of religious CBT on depression outcomes.

2. Religious Involvement as a Predictor of Telomere Shortening. CSTH is developing a proposal to study the effects of religious involvement on the rate of cellular aging in female caregivers of those with chronic disabling illness. Stress levels may increase the rate of telomere shortening in caregivers, and CSTH wants to determine whether religious involvement can reduce that stress level and slow the rate of telomere shortening. Telomeres are at the ends of DNA strands and serve as a biological clock with the cell that determine cell lifespan. Linking R/S involvement with slowed telomere shortening would suggest that R/S is actually slowing the process of human aging.

3. Religiousness, Inflammatory Markers, and Physical Disability in Older Adults. A proposal to study the effects of religious involvement as a moderator of the relationship between inflammation and disability is in progress. High levels of pro-inflammatory cytokines predict the onset and progression of disability in older adults, and religious involvement appears to forestall the development of disability with aging, but causality has not been established. Possibly, R/S involvement may reduce stress levels and inflammatory cytokine levels, thereby delaying the onset of disability with aging.

4. Genetic Basis for Religious Involvement. A proposal is underway to examine the relationship between genetic polymorphisms that increase sensitivity to life events and religious involvement. Those who experience R/S may be more likely to have a certain genetic makeup that makes them more prone to develop depression and other emotional disorders, and yet because religious involvement is such a powerful coping behavior, it actually protects these individuals from depression and its physical consequences. These genes may also have something to do with the relationship between religious involvement, alcohol use, and cigarette smoking that could help explain the finding that religious individuals are less likely to smoke and abuse alcohol.

5. Spiritual Interventions in Persons Addicted to Opium/Heroin. Another proposal under development is a study of the effects of spiritual group intervention on addicts to help them desist from drug activity and remain off drugs. This study also would look at the biological changes in opium addicts that may be predisposing them to addiction and whether the spiritual intervention may reverse some of these changes.

6. Religious Coping Measures for Older African American Cancer Patients. CSTH is developing a proposal to adapt a group of existing measures of socio-cultural factors for use in an older African American cancer population, determine if these socio-cultural factors are related to religious coping strategies and health outcomes. An evaluation of the feasibility of a culturally relevant intervention that will improve the psychological functioning in older African American cancer patients with advanced cancer will follow.

7. Spiritual Needs and Physiological Responses of Women Undergoing Core Needle Breast Biopsy for Cancer. A CSTH proposal would examine associations of religiosity, spirituality, and un-met spiritual needs with psychosocial, emotional and physiological (endocrine) measures of stress in a subset of women undergoing imaging guided core breast biopsy for higher risk lesions. The focus of the study would be on the nature and importance of spirituality to patients undergoing imaging guided core needle biopsy; the un-met spiritual needs in this population; whether patients desire to have their spiritual needs addressed in the context of their medical care during imaging guided core biopsy; if so, how and by whom. Of further interest is how needs are distributed according to cancer risk status, socio-demographic factors, anxiety, life stressors, social support and factors related to communication with the radiologist at the time of biopsy. The purpose of the study is to develop a spiritual intervention to effectively meet the spiritual care needs of women undergoing imaging guided core breast biopsy, related to breast cancer diagnosis and adherence to follow-up care in women with benign results.

III. Relationship of CSTH to Center for Aging Research and Duke University

a. Relationship with Duke Center for Aging

CSTH is administratively located within the Center for Aging. CSTH has been engaged in aging-related research from its very beginning, and one of its greatest resources has been the expertise that lies within the Center for Aging, which adds credibility to the work done within CSTH. The Duke Center for Aging was ranked in 2010 by U.S. News & World Report as the 4th best Aging Center (geriatrics) in the country, ahead of Harvard's program and behind only Johns Hopkins, UCLA, and Mount Sinai. For a comprehensive list of research and training programs within the Center for Aging, see website: http://www.geri.duke.edu/index.php?option=com_content&view=article&id=50&Itemid=54

The following is an outline of research conducted in the Duke Center for Aging:

1. Biologic research in aging
   - i. Immune function and inflammation (cytokines)
   - ii. Genetics (telomere biology, aging genes)
   - iii. Cell growth and regulation
   - iv. Basic muscle biology in aging
2. Clinical research in aging
   - i. Functional disability (causes of functional decline)
   - ii. Impact of physical and mental diseases (co-morbid illness)
   - iii. Exercise and diet
   - iv. Role of palliative care
   - v. Quality of life

3. Social and behavioral research in aging

   i. Social factors and illness

   ii. Coping and adjustment to aging and chronic illness

   iii. Depression and emotional disorders

4. Multidisciplinary research in aging

   i. Global aging in collaboration with the Duke Global Health Institute

   ii. Claude D. Pepper Older Americans Independence Center

   iii. The Center for Aging works collaboratively with many different groups[1]

Note that many areas of CSTH research overlap with key areas of research interest in the Center for Aging, including issues related to immune functioning and inflammation (cytokines such as interleukin-6), genetics of aging (telomere research, genetic polymorphisms), functional disability, impact of co-morbid physical and mental illness, palliative care, quality of life, social support, coping with chronic illness, depression, social factors and illness, global health, etc. The faculty that runs the Center for Aging (director and co-director) is on the Executive Committee that runs CSTH. Thus, these two centers (CSTH and Center for Aging) are highly integrated.

b. Relationship of CSTH to Duke University and Duke Health Systems

CSTH and the Center for Aging are both located within the larger academic community of Duke University and a sprawling healthcare system that consists of Duke University Medical Center, Durham Regional Hospital, Raleigh Community Hospital, and a large number of outpatient medical and mental health clinics in Durham and Raleigh. Duke University has one of the top Divinity Schools in the country and world-renowned theologians including Stanley Hauerwas (ranked by Time Magazine as America's top theologian), Richard Hays (acting Dean of the Duke Divinity School), and Allen Verhey. All of these individuals have been involved with CSTH over the years, and Dr. Verhey is currently one of five members of the CSTH Executive Committee. Likewise, Duke University Medical Center (DUMC) provides medical treatments to people from all over the world, including the ruling family of Saudi Arabia and many well-known members of our government (the late Ted Kennedy, etc.). According to U.S. News & World Report 2010-2011, Duke University's School of Medicine was ranked 6th among academic centers doing medical research, and DUMC was ranked within the top 10 best hospitals in the country.

The significance to CSTH is that it is located within an environment of unparalleled resources in which to study the relationship between religion/spirituality and health. This together with its extensive experience and track record in studying the religion-health relationship over the past 25 years underscore its potential lead research in this area.

[1] Durham VA Geriatric Research, Education and Clinical Center (GRECC), the Hartford Center of Excellence, the Duke Institute for Genomic Sciences and Policy, the Duke Translational Medicine Institute, the Duke Center for Living, the Stedman Nutrition and Metabolism Center, Duke End-of-Life Institute, and Duke Divinity School

IV. Profile of Executive Committee Members

A major strength of CSTH lies in its "board of directors" that consists of the six members that make up its Executive Committee. A brief description of each member follows.

1. Harvey Jay Cohen, M.D., chairman. Dr. Cohen is recent past chairman of the Department of Medicine, and current director of the Center for Aging and Human Development, in which CSTH is located. Prior to becoming chairman of Medicine, he was vice chair of the department for faculty development and academic affairs since 2003. He helped to establish Duke's Division of Geriatric Medicine in the 1970s and was the architect of Duke's renowned fellowship program in geriatric medicine. He is professor of medicine and chief of the Division of Geriatric Medicine, and previously directed the Geriatric Research, Education, and Clinical Center at the Durham Veterans Administration Medical Center. In addition to his clinical and scientific achievements, Cohen is a gifted teacher who is revered by students, residents, and faculty across the medical school. He is a past president of the American Geriatrics Association and past president of the Gerontological Society of America. Dr. Cohen chairs the aging section of the Duke Global Health Institute.

2. Linda K. George, Ph.D. Dr. George is associate director of the Center for Aging, and professor of sociology, professor of health and social psychology, and professor of psychiatry and behavioral sciences at Duke University. She has a BA and MA from Miami University of Ohio, and obtained her Ph.D. and post-doctoral training at Duke University. Her major research interests include social factors and depression, the effects of stress and coping, the relationship between religion and health, and the effects of beliefs and expectations on health. Dr. George is past president of the Gerontological Society of America and former editor of the Social Sciences section of the Journal of Gerontology. She is currently chair of the Aging and Life Course Section for the American Sociological Association, where she also serves as Secretary-Treasurer of the Medical Sociology Section. She has also served on three National Institute on Aging study sections (full terms).

3. Dan G. Blazer, M.D., Ph.D. Dr. Blazer is the former dean of medical education, School of Medicine, and now serves as J.P. Gibbons' Professor of Psychiatry and Behavioral Sciences, head of appointments and promotions committee, and head of the University Council on Aging and Human Development. Dr. Blazer received his B.A. from Vanderbilt University, his M.D. from University of Tennessee, and his M.P.H. and Ph.D. degrees from the UNC Chapel Hill. Dr. Blazer has been the principal investigator on many projects funded by federal grants, state grants, and grants funded by private foundations. He was elected to the Institute of Medicine, National Academy of Sciences in 1995, and has served on committees for IOM continuously since that time. He is past chairman of the board and president of the American Geriatrics Society and president of the Psychiatric Research Society. Dr. Blazer is a world-renowned expert on geriatric depression and has authored the major textbooks used in this academic area.

4. Allen Verhey, Ph.D. Dr. Verhey is Professor of Theological Ethics at the Duke Divinity School. He is a graduate of Calvin College and Seminary and earned his Ph.D. in theology at Yale University in 1975. Before joining the faculty at Duke he taught for many years at Hope College in Holland, MI, and served as the Director of the Institute of Religion in the Texas Medical Center in Houston, TX. He has written several books, including *Reading the Bible in the Strange World of Medicine.* The volume he edited with Stephen

Lammers, *On Moral Medicine: Theological Reflections in Medical Ethics* won a CHOICE award. His articles and essays on health care ethics have appeared in a wide variety of publications, including *Hastings Center Report* and *Medicine and Philosophy*. He has lectured widely on issues related to theology and health care ethics. At Duke Divinity School he has been associated with the Duke Institute on Care at the End of Life, and has been a member of the Ethics Committee of Duke Medical Center. He was a Luce Fellow for 2007-2008, during which he wrote a forthcoming book on "The Art of Dying."

5. Warren Kinghorn, M.D., Th.D. Dr. Kinghorn received his MD from Harvard and Masters' and Doctorate in Theological Studies from Duke is an assistant professor in psychiatry at Duke University Medical Center, assistant professor of psychiatry and pastoral and moral theology at Duke Divinity School, a staff psychiatrist at the Durham VA Medical Center, and the director of the Psychiatric Emergency Care (emergency psychiatry) program at the Durham VA Medical Center. He recently completed his Th.D. at Duke Divinity School, where his work is focused on the philosophy of psychiatric diagnosis, the influence of contemporary biological psychiatry on the speech and practice of Christian religious communities, and the care of the mentally ill within religious communities. He is also interested in the teaching of medical professionalism and the intersection of theology with contemporary trauma theory.

6. Harold G. Koenig, M.D., M.H.Sc. Dr. Koenig is the director of CSTH. He completed his undergraduate education at Stanford University, his medical school training at the University of California at San Francisco, and his geriatric medicine, psychiatry, and biostatistics training at Duke University Medical Center. He is board certified in general psychiatry, geriatric psychiatry and geriatric medicine, and is on the faculty at Duke as Professor of Psychiatry and Behavioral Sciences, and Associate Professor of Medicine. Dr. Koenig has published extensively in the fields of mental health, geriatrics, and religion, with over 350 scientific peer-reviewed articles and book chapters, and nearly 40 books in print or in preparation. Biomedical scientists have ranked him among the world's top experts on religion and health (http://www.biomedexperts.com/Concept.bme/18754/Religion). His research on religion, health and ethical issues in medicine has been featured on dozens of national and international TV news programs, nearly a hundred national or international radio programs, and hundreds of newspapers and magazines (including Reader's Digest, Parade Magazine, Newsweek, Time, and Guidepost). Dr. Koenig has given testimony before both the U.S. Senate (1998) and U.S. House of Representatives (2008) on the benefits that religion has on public health

V. Services

CSTH provides a variety of services in order to further the goals outlined in its mission statement, including:

a. Developing grants for submission to NIH, private foundations, or industry sponsors to support cutting-edge research on religion, spirituality and health;

b. Serving as a central hub at Duke University through which junior and senior faculty can receive expert advice and mentorship, and utilize the CSTH website and extensive international mailing list;

c. Conducting weeklong research workshops to train investigators from Duke and other institutions to conduct research on religion, spirituality and health;

d. Holding a monthly research seminar for junior and senior researchers to present their research ideas and receive feedback from peers and members of our group;

e. Maintaining a website on religion, spirituality and health that provides resources for others around the world interested in this topic;

f. Conducting field-building activities, such as (1) writing scientific articles, books, and book chapters for peer-reviewed and non-peer-reviewed publication, (2) offering presentations on religion, spirituality and health to professionals and public audiences, (3) working with the media to interpret the research findings for public health implications and (4) consulting with healthcare organizations and government agencies to influence healthcare and public policy (U.S. and international);

g. Developing partnerships with educational and religious organizations (such as Adventist Health, Catholic Health Care, etc.) that share the mission of CSTH;

h. Conducting fundraising as necessary to support Center infrastructure in order to accomplish the activities above and specific research projects

VI. Management of the Center

1. *Administration*: CSTH is administratively housed in the Center for Aging, which is part of a non-profit organization (Duke University Medical Center), and has as its primary purpose to examine linkages between religion, spirituality, and health.

2. *Legal Entity***:** CSTH is part of Duke University Medical Center, a North Carolina non-profit corporation.

3. *Operations*: Harvey Cohen, who directs the Center for Aging, answers directly to the Dean of Duke University School of Medicine. CSTH is under the management of its founder, Dr. Harold G. Koenig, and a 4-person Executive Board that ratifies decisions made regarding the Center by Dr. Koenig.

VII. Summary

CSTH has accomplished a great deal during its existence, helping to stimulate the development of an entire new field of religion, spirituality, and health, which is just on the verge of moving into the mainstream of medicine. CSTH has a highly credible executive team leading its programs and is centered in an amazingly rich and diverse academic environment within a top-ranked research medical school, hospital, and university setting, along with close connections to a divinity school of worldwide renown.

Appendix I and II (see following pages)

Appendix I. Seminal Research by CSTH

1. RELIGION/SPIRITUALITY (R/S) and *Well-Being*. In the mid-1980's we conducted a seminal study examining the relationship between R/S and well-being in older adults.[1] Over 250 studies by other investigators on R/S and well-being would follow this one (80% confirming our results); several included our measure of R/S (Springfield Religiosity Scale). This study was the basis for a book, *Religion, Health and Aging* in 1988,[2] which would be the first academic volume of its kind and widely circulated. Eventually it would lead to the establishment of the Program on Religion, Health and Aging at Duke in 1995, which was the immediate predecessor of CSTH.

2. R/S and *Depression*. Soon we began looking at the relationship between R/S involvement and depression in medically ill older adults and eventually in older adults living in the community. This research would span over 20 years and produce dozens of peer-reviewed academic publications in this area. The most significant of these were published in the American Journal of Psychiatry,[3,4] and followed by similar reports by other researchers at Johns Hopkins (Peter Rabins and colleagues) and Columbia University (Lisa Miller and colleagues). Nearly 400 studies from other investigators would follow these Duke studies, with two-third reporting similar results (less depression among the more religious).

3. R/S and *Anxiety*. Our group would also examine relationships between R/S and anxiety in both older adults[5,6] and in adults of all ages.[7] These too were followed by over 200 studies on this relationship by other research teams, with many reporting similar findings. Prior to the Duke studies, most research had been done in young adults and college students, giving the impression that R/S involvement was neurotic and unhealthy. However, our Duke studies examined these relationships in adult, mature populations, often finding the exact opposite.

4. R/S and *Personality*. In one of the first studies to examine the effects of R/S on personality in older adults over time, we prospectively followed young elders over six years, finding that even in later life personality could change and R/S involvement was often a key factor in bringing about positive personality traits.[8]

5. R/S and *Coping with Illness*. This is perhaps the area that CSTH researchers have contributed the most to. Over 25 years, our researchers have been publishing on how R/S helps those with chronic illness cope with the disability, pain, and life changes associated with it. Hundreds of research studies by other researchers, both qualitative and quantitative, have followed our original reports of the major role that religion plays in the coping of those with medical illness, especially among those in later life.[9,10,11,12]

6. R/S and *Blood Pressure*. In the 1980's and 1990's we found that there was a connection between blood pressure and religious involvement.[13,14,15] This research set into motion a number of studies (over 40) by other research groups examining this association, including those in other countries.[16,17]

7. R/S and *Immune Function*. Of all studies by CSTH researchers, the one that brought most attention to the role of religion in health examined the relationship between religious involvement and immune function. Our finding that those attending religious services more frequently experienced significantly lower levels of interleukin-6 in their blood, suggesting stronger immune function among the more religious, received world-wide attention in both

the academic and population press.[18] This finding was soon to be replicated by an entirely different research group at the University of Iowa,[19] helping to demonstrate a possible biological mechanism explaining how R/S affects physical health. This research resulted in a consensus conference in which we brought the leading psycho-neuro-immunology researchers in the world together to discuss how their research might dovetail with research on spirituality and health.[20]

8. R/S and *Longevity*. Among the most important findings by CSTH researchers has been studies directly linking religious activity with greater longevity,[21,22,23] a finding that many other investigators have now replicated (over two-thirds of 115 studies).

9. R/S and *Functional Disability*. Building on the work of Ellen Idler and Stan Kasl at Yale University, our research team has recently provided some of the strongest scientific evidence to date that religious activity may slow the progression of physical disability in later life.[24,25] We will be focusing more on this area in the future, since predictors of functional disability are a major focus of the Center for Aging that we are a part of (see below).

10. R/S and *Use of Health Services*. Our findings that religious involvement was related to shorter acute hospital stays[26] and less time spent in a nursing home after hospital discharge[27] have provide evidence for how these relationships may impact one of the biggest concerns in our country today – the financing of health care. As our country becomes more and more secular, this may have consequences for the health costs that we must deal with in the days ahead (especially as the population ages).

11. *Definition* and *Measurement* of R/S. In 1997 we developed the Duke University Religion Index (DUREL), and published it in the *American Journal of Psychiatry*.[28] This 5-item measure has become one of the most commonly used tools for assessing religious involvement in large epidemiological studies, and has now been translated into Spanish, Portuguese, Chinese, Romanian, Japanese, Thai, Persian/Arabic, German, Norwegian, Dutch, Danish, Malaysian, and Serbian. This measure is now used in hundreds of studies worldwide.[29] A relatively recent paper in the *Journal of Nervous & Mental Disease* provided a seminal discussion on the way "spirituality" is currently being defined and how it is distinguished from "religion."[30] Accompanying this paper was a response by Ming Tsuang, a psychiatric epidemiologist and geneticist at Harvard, supporting the view that was presented.

12. *Summaries of the Research* on R/S and Health. Summarizing the research on R/S and health has been one of the most important contributions that CSTH researchers have made to the development of the field, as it has brought together research from many different disciplines (medicine, nursing, public health, sociology, psychology, psychiatry, social work, etc.) into one place accessible to everyone. The two editions of the *Handbook of Religion and Health* (2001, 2011)[31,32] summarize and discuss over 3,000 original data-based quantitative studies that have examined relationships between R/S and health. This reference source is the most cited of all books, book chapters, and published scientific papers in the field of religion, spirituality, and health (see Google Scholar). When we mention "hundreds of studies" above, this is where most of that research is documented.

13. *Applications* to Clinical Practice. CSTH researchers have contributed to interpretation of research findings on R/S and health for clinical practitioners, focusing on the research impact of patient care by doctors, nurses, and other health professionals. CSTH

research in this area[33,34] have educated and trained clinicians on methods of patient care.[35,36,37,38]

Appendix II. **Studies Citing Research Conducted by CSTH**

The *Science Citation Index* provides an effective measure of the impact of individual studies on a scientific field. In fact, the "impact factor" (IF) rating of scientific journals (which determines the journal's importance ranking in the scientific community) depends on the average number of times an article is cited by other researchers. For example, the IF for the *New England Journal of Medicine* is 47.1; for comparison, the IF for the journal *Science* is 29.8. The journal with the highest IF is *CA: A Cancer Journal for Clinicians* (IF=87.9). University tenure often is determined in part by the total of the IF scores of journals in which the scientist has published papers in his/her academic career.

1. R/S (R/S) and Well-Being. According to the Science Citation Index, our study on this topic[39] published in the *Gerontologist* in 1988 has been cited 102 times (as of 1/28/11); in comparison, note that the science journal with the highest rating of all science journals (CA) has an average of 87.9 citations per article (see above).

2. R/S and Depression. Among the two studies published in the *American Journal of Psychiatry*, the first one[40] was cited 228 times and the second one[41] was cited 166 times.

3. R/S and Anxiety. The study published[42] in the *Journal of Anxiety Disorders* has been cited 43 times.

4. R/S and Personality. The study[43] published in the *International Journal of Geriatric Psychiatry* has been cited 11 times.

5. R/S and Coping with Illness. The study on religious coping[44] in the *Gerontologist* was cited 138 times, the one[45] in *Psychosomatics* was cited 57 times, and the article[46] in *Journal of Nervous and Mental Disease* has been cited 28 times.

6. R/S and Blood Pressure. The study on religion and blood pressure[47] in the *International Journal of Psychiatry in Medicine* has been cited 71 times.

7. R/S and Immune Function. The study on religious attendance and interleukin-6 levels[48] in the *International Journal of Psychiatry in Medicine* has been cited 83 times.

8. R/S and Longevity. The studies in the *Journal of Gerontology* included one on religious attendance and longevity[49] cited 93 times and one on prayer and longevity[50] cited 46 times.

9. R/S and Functional Disability. Recent CSTH studies in this area have not been published long enough yet to accumulate citations (one article is still in submission).

10. R/S and Use of Health Services. The study in the *Southern Medical Journal* of length of hospital stay[51] has been cited 28 times and the one on nursing home stay in *Archives of Internal Medicine* was cited 15 times.

11. Measurement of R/S. The study reporting the DUREL[52] in the *American Journal of Psychiatry* has been cited 104 times, and the one on measuring spirituality[53] in the *Journal of Nervous and Mental Disease* was cited 15 times.

12. Summaries of the Research on R/S and Health. Google Scholar (the equivalent of the Science Citation Index for books) indicates that the first edition of the *Handbook of Religion and Health*[54] was cited 1,575 times (the most cited of any publication of any kind on religion, spirituality and health).

13. Applications to Clinical Practice. Finally, *Spirituality in Patient Care*[55] has been cited 157 times, and thus far has been translated into Portuguese and German.

Based on the number of times its research has been cited (nearly 3,000 times), this suggests that the work by researchers in CSTH has influenced other researchers and helped to form the field into what it is today.

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