

Preparing junior investigators to develop gerontological research

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There is a growing concern about the number of junior investigators in nursing committed to gerontological research. A rarity of nurses conducting research already exists since only 0.6% of the 2.2 million employed registered nurses in the US have a doctoral degree in nursing or a related field. This limited scholarly resource challenges junior investigators to identify appropriate programs to receive training and mentoring in gerontological research. Yet, this limitation can be addressed by an intensive summer program intended to mentor junior investigators in the development of gerontological research. This article discusses the feedback of 8 junior investigators participating in a week-long intensive program for gerontological research. Participating in this intensive summer program provided

opportunities for the junior investigators to develop mentoring relationships and receive useful feedback with directions to develop research careers.

There is a growing need for increased research by junior investigators in gerontology. By 2050, 20% of the US population will be ≥ 65 (78.9 million), a 127% increase from 2000.¹ Disability rates and functional limitations from chronic diseases among older Americans living in nursing homes have declined from the 1980s to the 1990s,^{2,3} and fewer older Americans have entered nursing homes in 1995 than in 1977.⁴ Thus, more older adults are seeking community and home-based nursing care.⁵ Nevertheless, the demand for long-term care is estimated to double by 2050 because of the increase in the number of elderly Americans expected in coming decades.⁶ Given this escalating demand for health care, there is a great need to develop research programs in gerontology to improve health care of older adults.

Unfortunately, there are few mechanisms in which junior investigators (assistant professors or post-doctoral fellows interested in gerontological research) can secure training in the development and execution of gerontological research. There are few senior scientists in nursing who can function as mentors, consultants, or collaborators in gerontological research. Furthermore, there are limited programs, seminars, or workshops for junior investigators to attend and establish workable knowledge about gerontological research. Therefore, the purpose of this article is to describe the experiences of 8 junior investigators in an intensive week-long training program for gerontological research. The participating junior investigators came from diverse backgrounds with a commitment to gerontological research. The article also discusses the impact of the intensive program on the research of the junior investigators.

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THE GERONTOLOGICAL NURSING RESEARCH SUMMER SCHOLARS PROGRAM

The Gerontological Nursing Research Summer Scholars Program (GNRSSP) is a unique mentoring mechanism designed to enhance and direct junior investigators in the development of gerontological research with clinical utility in the care of older adults. The GNRSSP was initiated in 2001 with objectives that emanated from the Gerontological Nursing Interventions Research Center (GNIRC) and the Hartford Center of Geriatric Nursing Excellence (HCGNE). Through the GNIRC and HCGNE, GNRSSP reaches the local and regional educational communities. Participation in GNRSSP facilitates the identification and access to senior scientists in gerontology that will also strengthen the development and maintenance of gerontological research.

The Gerontological Nursing Interventions Research Center (GNIRC)

The GNIRC was initiated in 1994 at The University of Iowa College of Nursing to develop research that focused on improving the health care of older adults in the Midwest region and facilitating the translation of gerontological research into practice.⁷ The GNIRC includes a research infrastructure, collaborative environment, and mentorship committed to gerontological research health care. The research infrastructure consists of senior scientists from diverse disciplines and a regional consortium of Midwestern universities dedicated to outcomes research for the identification and examination of gerontological nursing interventions. This component of GNIRC emphasizes the improvement of health care for older adults through scientific collaboration committed to gerontological research. In addition, a diverse research infrastructure enhances the potential for optimal care and health promotion, setting a precedent for healthcare policies. A collaborative environment is created as senior scientists from diverse backgrounds doing gerontological research establish a scholarly environment to develop and examine interventions to care for older adults with generalizable outcomes. This mechanism ensures the execution of local, national, and international studies to test the reliability of pilot studies supported by GNIRC so that innovative and progressive approaches for geriatric care can be identified, examined, and implemented worldwide. Extensive mentoring is possible within this thriving collaborative environment for the development of reliable and innovative research examining gerontological health care. Mentors can guide junior investigators into the culture of gerontological research while providing substantive knowledge and skills about establishing good research practice. Through their research and professional affiliations, the diverse mentors foster the independence and decision-making skills of junior

investigators while providing opportunities and resources for participation in national and international meetings and collaboration on publications. Every effort by both the junior investigators and mentors focuses on enhancing the scope of gerontological research and strengthening its translation into clinical practice. Finally, the GNIRC provides training opportunities to expand the knowledge base of the junior investigators about gerontology.

The John A. Hartford Center of Geriatric Nursing Excellence (HCGNE)

The initiative for HCGNEs commenced in 2000 to react to the critical need to promote the development of gerontological research across the nation.⁸ For the creation of a HCGNE, the goals of selected universities had to parallel the goals of the John A. Hartford Foundation, which focuses on the care of older adults through research, education, clinical practice, and public policy.⁸ Specifically, 5 universities received funding from the John A. Hartford Foundation because of their demonstrated commitment to gerontological research and the training and continued mentoring of junior investigators in gerontology. The University of Iowa College of Nursing is one of the 5 universities selected for its commitment to gerontological research and improved gerontological care that was clearly demonstrated by the GNIRC.

Like the other 4 HCGNEs, the one at The University of Iowa College of Nursing provides training and research opportunities that are designed to attract junior investigators in nursing to establish a gerontological research program. Junior investigators can receive degrees and certifications to document their increased knowledge to research phenomena related to the health care of the elderly. Dissemination of their gerontological research findings will promote education to improve clinical practice. As a result, public policy will be informed on local, state, and national levels for improved health care of older adults.

In an effort to increase the exposure of junior investigators to gerontological research and mentors in the field, The University of Iowa College of Nursing spearheaded a program collaboratively sponsored by the GNIRC and the HCGNE.⁹ The program is the GNIRC-HCGNE Gerontological Nursing Research Summer Scholars Program (GNRSSP). In GNRSSP, junior investigators achieve the objectives of GNIRC and HCGNE by examining gerontological issues for improved health care and quality of life for older adults.⁹

The Gerontological Nursing Research Summer Scholars Program (GNRSSP)

The GNRSSP involves 5 days of intensive mentoring, critical discussion, and guidance for junior investigators to develop or refine a program of gerontological

research.¹⁰ They enhance their potential for external funding by developing their grant-writing skills and identifying cogent gerontological issues. Most importantly, junior investigators critically assess their commitment to gerontological research and the clinical utility of their selected research. Thus, junior investigators can develop greater insights into the research process, its importance in gerontological nursing, and its value for improved health care for older adults.

Junior investigators are initially encouraged to establish a mentor-mentee relationship and establish a scholarly support group of peers. Mentors are representative of GNIRC Regional Training Consortium, Midwestern universities committed to gerontological research. The representative universities at the 2004 GNRSSP were St. Louis University, the University of Iowa, the University of Kansas, the University of Missouri-Columbia, and Wayne State University.⁸ Scientists from these universities have demonstrated scientific excellence in gerontological research and a commitment to mentor the next generation of gerontological scientists. Through “family-style” meals and dormitory-style living arrangements, junior investigators develop a strong support system that may transition into strong professional peer and mentor relationships. One outcome can be increased research options and avenues, advancing their potential as gerontological scientists.

The potential of junior investigators as innovative and pioneering gerontological scientists is strengthened by the daily activities. Each day of the 2004 GNRSSP consisted of a 30-minute presentation on specific elements of the research proposal followed by a 45–60 minute intense and thorough discussion of each element. Both peers and mentors participated. In the afternoons, individual and group discussions were held. From the informal critiques, further discussion occurred during meals, scheduled afternoon meetings with mentors, and planned evening group meetings. This non-threatening yet informative process allowed the junior investigators to actively participate in the critique of their work, to objectively scrutinize the research study, and to concretize the suggestions that will strengthen the study. Furthermore, they could meet with any of the mentors at any time to express any concerns, doubts, excitement, or realizations they may have had from the critiques. Through this informal and supportive sharing, junior investigators can (1) recognize their commitment to gerontological research in their mentors and peers and (2) internalize the significance of their research and urgency of its execution for improved health care of older adults. Consequently, junior investigators were inundated and completely engrossed in a diverse and supportive environment for the development of a strong foundation in gerontological research.

Thus, the outcomes of GNRSSP will greatly contribute to the health care of older adults. Junior investigators will continue to develop as gerontological scien-

tists, establish collaboration and networks with nationally and internationally recognized senior scientists in gerontological nursing, and fortify a commitment to improve health care for older adults.

PERSONAL EXPERIENCES OF JUNIOR INVESTIGATORS IN THE GNRSSP

Background Information of Junior Investigators

The 2004 GNRSSP included 13 junior investigators who were registered nurses with doctorate degrees. They were from diverse backgrounds and experiences committed to improved health care of older adults and their families. All of the junior investigators were affiliated to nursing programs. Eleven were from universities located in the Midwest and 2 from the East Coast. Eight were assistant professors with 1 associate professor, 1 full professor, 2 post-doctoral fellows, and 1 not affiliated with a university. Junior investigators comprised 12 females and 1 male; 69% were Caucasians.

Approximately 2 months after completing GNRSSP, only the 13 junior investigators were invited to share their experiences. The feedback was collected from only the junior investigators in an effort to examine the participants' perception of this intensive environment and its impact on their commitment to gerontological research. They were asked to summarize their research goals, give reasons for selecting GNRSSPP, give their perceptions of the outcomes, and discuss how these outcomes would contribute to the development of their research in gerontological nursing. Of the 13 junior investigators, 8 responded to the questionnaire. Their feedback is discussed in this article.

Research Programs and Goals of Junior Investigators

All of the 8 junior investigators share the goal of improving the health care of older adults and their families. Yet, their research programs represent a wide range of interests and approaches to achieving this overall goal. Two junior investigators are focusing on familial caregivers of the elderly. One examines the development of an experiential approach to symptom management training, initially for informal caregivers of patients with cancer, then caregivers of patients with other chronic illnesses. The other investigates the development of family caregiver assessment guides and educational materials related to self-care.

Three junior investigators are examining various aspects to improve the quality of life for older adults. One explores the use of a standard hydration measurement for nursing homes. The developed instrument will accurately reflect hydration needs and changes while taking into account the decrease in total body water that occurs as part of the aging process. Another investigates the clinical utility of non-nutritive sucking as a nursing

intervention that may positively affect the quality of life for patients in the advanced or terminal stages of Alzheimer's disease (AD). The third junior investigator is examining issues associated with enhancing and maintaining quality of life in elders with chronic illnesses. A deeper understanding of the spiritual experiences of elders and biomarkers will be used to develop and test holistic nursing interventions to enhance quality of life's meaning and purpose in these elders.

Two junior investigators are focusing on systems issues to improve the health care of older adults and their families. One examines the use of information technology to develop nursing interventions that improve the quality, safety, and cost of care. The other investigates the impact of nursing home systems of care, nursing home regulations, and other tools on the nursing process and care planning. The goal is to develop systems that improve quality of life for elderly residents in long-term care facilities.

Finally, one junior investigator is pursuing bench research on factors critical to objective diagnosis and improved prognosis and treatment for elderly African Americans living with neurodegenerative disorders such as Alzheimer's disease. The research uses the association among genetics, electrophysiology, and neuropsychiatry to understand the onset and progression of Alzheimer's disease.

Reasons for Selecting GNRSSP

Junior investigators gave several reasons for participating in GNRSSP. Most selected GNRSSP to develop or refine research grant proposals with "methodological designs that promote . . . clinical applicability and usefulness in the elderly community" or "strengthen the ability to write highly competitive and scientifically rigorous proposals for funding."

All junior investigators noted how important it was to receive critiques and mentoring from senior scientists in gerontological research. Positive feedback from previous participants of the GNRSSP was also a factor in the choice. As one junior investigator noted, "The University of Iowa is well-known for innovative gerontological research and for scientists who are pioneers and experts in this area." Another junior investigator noted the importance of the GNRSSP's focus on intervention research.

Two junior investigators identified the collaborative environment as a reason for participating. One junior investigator wanted to "decrease isolation" and "find a community of scholars with like interests, passion and enthusiasm." The other recognized "collaboration among scholars in their future research" as "very important in our research career development."

Tenure-track junior investigators identified renewing focus and reinforcing habits as reasons for participating. One junior investigator noted that, "my first commitment is to students," so there is limited time for

"concentrated work on a research proposal," which often gets "pushed to the side of teaching responsibilities." All junior investigators hoped that the intensive environment of GNRSSP would strengthen their future ability to work daily on research and publications.

Perceptions of the Outcomes

Several themes emerged from the junior investigators' discussion of the outcomes they experienced. One junior investigator stated, "This [GNRSSP] was everything I had anticipated and more."

Six of the 8 responding junior investigators felt that daily homework and presentations on the proposal were very helpful because it encouraged regular practice of writing. It was also a way of "chunking the writing of a proposal into manageable pieces." Another junior investigator believed that "being away from the office with a focused group of scholars and daily assignments intensified my commitment to the proposal. I refined my research proposal in only one week!" Everyone was able to identify progress in specific areas of their work.

All 8 junior investigators identified gaining knowledge and feedback as an outcome, either for the entire proposal or specific sections identified prior to GNRSSP. The knowledge gained was related to specific areas of gerontology, research proposal writing and methodology, and funding mechanisms. Listening to the critiques of other junior investigators' proposals and receiving feedback from colleagues were other important outcomes. One said, "I learned a great deal from the feedback that I received but also from the feedback that was given to colleagues as well." Another junior investigator noted, "Critiques from peers and faculty allowed refinement of my proposal by the end of the week."

Mentoring relationships and networking were identified as important outcomes. One junior investigator stated, "I was able to invite one of the senior faculties . . . as a mock reviewer for my R15 grant." Another added, "I have learned an effective mentoring system from our mentors." The GNRSSP also offered opportunities for developing professional relationships that will enhance junior investigators' research and visibility in the field of gerontology.

The 8 junior investigators left GNRSSP with an intensified commitment to their research. As one junior investigator noted, "I witnessed firsthand the commitment to gerontological research needed to effectuate change in the elderly community." Another stated, "It was wonderful to meet and work with other junior investigators from smaller universities and share our enthusiasm and commitment for gerontological research—my passion and enthusiasm were reawakened, and my sense of purpose and focus renewed." Following GNRSSP, junior investigators have developed professional relationships and taken efforts to develop a collaborative professional network.

Table 1. Linking Research Programs of Junior Investigators to Clinical Practice

Research Programs	Specific Areas	Relation to Clinical Practice
Alzheimer's Disease	Genetic, psychiatric, and neurological phenotype Non-nutritive sucking as a behavioral intervention	Diagnoses, treatment, and prognoses of patients Provision of care
Informal/Family Caregivers	Role of individualized experiential training in acute care settings Knowledge of nutritional needs of their frail, elderly care-recipients	Preparing informal caregivers for effective home caregiving Teaching family caregivers on how to assist their frail, elderly family members in their nutritional needs
Quality of life	Enhancing quality of life in chronically ill older adults	Interventions that complement medical treatments as well as promote quality of life.
Informational Technology	Use of informational technology in providing safe and quality care to older adults	Assessment, clinical reasoning, decision-making, evaluation, communication, and documentation
Long-term care settings	Measurement of hydration status of nursing home residents Care planning process	Provision of nursing home care Leadership structure in nursing homes and how it affects resident outcomes and family/staff satisfaction

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Outcomes' Contribution to the Development of Research Programs

Overall, the 8 junior investigators left with a better sense of what it takes to begin developing research in gerontology. One junior investigator stated, "I have a better understanding of what grant-funding agencies want in terms of proposals. I have a much better idea of how to focus my research area and develop a career as a researcher, allowing the program to expand and build." For others, "The support and encouragement, along with the well-packaged series of informative sessions and materials, were the much-needed ingredients in jump-starting scholarly work that was dragging." Seven junior investigators also commented on the importance of the "professional relationships" and the "network of colleagues and experts with interests and passion in the same area" that reflected a "willingness to be supportive in helping each other to meet individual goals." Finally, the junior investigators ended the week with a strengthened commitment to improve the care of elders through research.

RELATING RESEARCH TO NURSING PRACTICE

What ultimately drives junior investigators in nursing to do research is the desire to provide empirical evidence

for improved nursing practice. Through research, they experience an intensification of their role as healthcare providers and patient advocates. They care for patients in all stages of an illness, assessment, diagnosing, and treatment. They direct the care in both acute and long-term care settings. This link between research and practice can be identified in the innovative research programs of the junior investigators participating in the 2004 GNRSSP (see Table 1).

Examining the role of genetic factors and its association to environmental factors can facilitate a better understanding about the etiology of Alzheimer's disease (AD) and its phenotype. This knowledge will promote mechanisms for early diagnoses and curative treatment for AD while improving the individual and social perception of AD. Also, research identifying interventions for the care of persons with late-stage or the terminal stage of AD will improve the health care for persons who are often bedridden, relying on nurses and/or family caregivers for care.

Examining the ability of family members to care for relatives with chronic illnesses is critical for effective care in the home. Many adults aged ≥ 65 have at least one chronic disease, which can increase with age.¹¹ These older adults usually receive medical treatment on an outpatient basis, resulting in family members pro-

viding care. This intricate and reciprocal relationship between a family caregiver and an elderly relative can place the caregiver at risk for psychological and physical decline associated with caregiving.¹²⁻¹⁶ Thus, research about family caregivers will affect the quality of life for both the elderly relatives and family members.

Understanding the clinical utility of information technology (IT) is paramount since IT in health care has received considerable attention.^{17,18} Nurses can strengthen their clinical reasoning and decision-making through the use of database systems for health information management, data standards for health care applications, and health surveillance systems. This research is one effective way to identify the usefulness of IT in health care.

It is important to identify ways for effective assessment and maintenance of hydration of nursing home residents since hydration is critical for all humans, especially older adults.^{19,20} Older adults in nursing homes rely on the nursing staff to assist them in their everyday living, especially hydration.¹¹ Thus, this research can potentially decrease the purportedly neglect of hydration that nursing home residents experience.

THE IMPACT OF PERSONAL EXPERIENCES ON DEVELOPING RESEARCH PROGRAMS

The experiences of junior investigators in GNRSSP affected the development of their research in numerous ways. Junior investigators who were faculty had time to focus on their proposals, engage in scholarly dialogue, and cultivate professional relationships and mentorship. Their usual responsibilities leave little time to develop research. As one junior investigator said, "Time for concentrated work on research is limited and seems to always get pushed aside with other faculty responsibilities."

Junior investigators who were post-doctoral fellows also had experiences that contributed to their research. They said that GNRSSP provided helpful information on the development of their research agendas. One junior investigator stated that, "The mentorship in [GNRSSP] is very important in the professional development of junior investigators and has facilitated my development as a scientist and author." Another said that GNRSSP was a forum to discuss, identify, and implement research theories, methods, and clinical applications. As one junior investigator said, "Through [GNRSSP], I have established professional relationships with peers who have a strong clinical background. I am also networking with other research institutions to broaden my network of interdisciplinary research projects."

All the junior investigators agreed that certain components of GNRSSP were indispensable in developing their research. The comments, constructive criticism, teaching, mentoring, and encouragement from senior

scientists made the junior investigators evaluate the logic, significance, and practicality of their research. One suggested that, "The varied experiences and backgrounds of mentors and [junior investigators] enhance the development of collaborative work which is essential for the complex study or large federal grant." Another junior investigator said, "I [have] established professional relationships that will enhance my body of research and promote my visibility as a national/international researcher in [gerontology]." Junior investigators also identified appropriate instruments for specific age groups, diseases, and economic status. Within a week, they had refined their research proposals and gained enthusiasm about writing, submitting a research proposal, and obtaining funding.

Collaboration among the junior investigators was the most profound experience for all. They continually offered support, input, empathy, collegiality, and expertise to each other. Friendships, professional and personal, were established; the common interest in gerontological research initiated junior investigators' keen interest in one another's research. Also, they developed respect for each other and a strong appreciation for everyone's efforts to enhance their research. These junior investigators continue to correspond with each other and search for collaborative research projects. The 2004 GNRSSP will have an everlasting impression on these junior investigators' research as they make a difference in the lives of older adults.

CONCLUSION

The 8 junior investigators who participated in the 2004 Gerontological Nursing Research Summer Scholars Program are developing research programs that will improve health care of older adults. They are focusing on all aspects of care for older adults, including the elderly, caregivers, healthcare providers, informatics, and molecular base for gerontological diseases. These junior investigators have a clear recognition of the utility of gerontological research in practice through mentoring, critical feedback, and intensive assessment from senior scientists in gerontology. Several of the junior investigators are developing research destined to enhance assessment of older adults, promote proactive interventions, and provide care for both older adults and their families. The GNRSSP has contributed to the development of strong scientists through the senior scientists' commitment to mentoring and research in improving health care of older adults.

REFERENCES

1. Day JC. Population projections of the United States by age, sex, race, and Hispanic origin: 1995 to 2050. U.S. Bureau of the Census, Current Population Report, P25-1130, U.S. Washington, DC: Government Printing Office; 1996.

2. Manton KG, Corder L, Stallard E. Chronic disability trends in elderly United States populations: 1982-1994. *Proc Natl Acad Sci U S A* 1997;94:2593-8.
3. Freedman VA, Martin, LG. Contributions of chronic conditions to aggregate changes in old-age functioning. *Am J Public Health* 2000;90:1755-60.
4. Bonifazi W. A changing population. *Contemp Longterm Care* 1998;21:54-8.
5. Health Resources and Services Administration. Changing demographics: Implications for physicians, nurses, and other health workers. Rockville, MD: US Department of Health and Human Services; 2003.
6. Alexih LM. The impact of sociodemographic change on the future of long-term care. *Generations* 2001;25:7-11.
7. The University of Iowa College of Nursing. Gerontological nursing interventions research center (GNIRC). 2004. Available at: <http://www.nursing.uiowa.edu/centers/gnirc>. Accessed August, 2004.
8. John A. Hartford Geriatric Nursing Initiative. Building academic geriatric nursing capacity. Centers of excellence: John A. Hartford Foundation centers of geriatric nursing excellence 2000. Available at: <http://www.geriatricnursing.org/centers>. Accessed November, 2005.
9. The University of Iowa College of Nursing. The John A. Hartford center of geriatric nursing excellence. Nursing: Making a difference in older persons' quality of life (HGNI) 2005. Available at: <http://www.nursing.uiowa.edu/hartford/hcgne/summer.htm>. Accessed November, 2005.
10. The University of Iowa College of Nursing. Gerontological nursing research summer scholars seminar. 2001. Available at: http://www.nursing.uiowa.edu/hartford/hcgne/core/summer_scholar.htm. Accessed August, 2005.
11. Administration on Aging. A profile of older Americans, 2003. Washington, DC: US Department of Health and Human Services; 2003.
12. Carter PA. Caregivers' descriptions of sleep changes and depressive symptoms. *Oncol Nurs Forum* 2002;29:1277-83.
13. Land H, Hudson SM, Stiefel B. Stress and depression among HIV-positive and HIV-negative gay and bisexual AIDS caregivers. *AIDS Behav* 2003;7:41-53.
14. Schulz R, Beach SR. Caregiving as a risk factor for mortality: the caregiving health effects study. *JAMA* 1999; 282:2215-9.
15. Walsh SM, Estrada GB, Hogan N. Individual telephone support for family caregivers of seriously ill cancer patients. *Medsurg Nurs* 2004;13:189.
16. Yong F, McCallion P. Hwabyung as caregiving stress among Korean-American caregivers of a relative with dementia. *J Gerontol Soc Work* 2003;42:3-19.
17. Kiel JM. Electronic managed care: The utilization of information technology in a managed care environment. *Health Care Manag* 2003;22:16-20.
18. Rosow E, Grimes SL. Technology's implications for health care quality: a clinical engineering perspective. *Nurs Admin Q* 2003;27:307-17.
19. Bennett JA. Dehydration: hazards and benefits. *Geriatr Nurs* 2000;21:84-8.
20. Thomas DR, Tariq SH, Makhdomm S, Haddad R, Moinuddin A. Physician misdiagnosis of dehydration in older adults. *J Am Med Dir Assoc* 2003;4:251-4.