

THE NATIONAL INSTITUTE OF NURSING RESEARCH

# Changing Practice, Changing Lives: 10 Landmark Nursing Research Studies



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
National Institutes of Health

# CHANGING PRACTICE, CHANGING LIVES: TEN LANDMARK NURSING RESEARCH STUDIES

## Introduction

Nursing research gained a significant place in our Nation's science and health care enterprise with the founding of the National Center for Nursing Research (NCNR) on the campus of the National Institutes of Health (NIH) in 1986. NCNR began to address the pressing research needs for nursing at that time, and by 1994 it became the National Institute of Nursing Research (NINR). The year 2006 marked the Institute's twentieth anniversary at NIH. This booklet presents ten landmark research studies that NINR has supported during its history. These studies helped establish the foundation of NINR's work and illustrate the varied expertise of nurse researchers. They span issues that continue to be of great importance to nurses, such as symptom management, preventive health measures, health disparities, and the value of nursing care.

Since its beginning, the strength of NINR has been the talented and dedicated nurse researchers who have helped to build and develop nursing science. These studies demonstrate the versatility and vitality of the nursing research community, attributes that have been integral to nursing research since its early years and that nurse researchers can continue to pursue. As we have looked back on our landmark studies, we can see these attributes contribute to enhancing, informing, and guiding the biomedical and health care research mission of NINR.

Our health care system will face new and significant challenges as the 21st century progresses and our population continues to grow, age, and become more diverse. Many diseases that were once acute and life-threatening, such as heart disease, diabetes, and HIV, are now long-term chronic conditions. New global health threats continue to emerge. The examples presented in this booklet show that the research supported by NINR has been vital to addressing the wide-ranging and ongoing health needs of our nation. It is our sincerest hope that the foundation of solid science that NINR has built over the past 20 years will help nurse researchers meet new challenges in health care in the years to come. Our ultimate goal is to improve the health and well-being of all Americans.

Patricia A. Grady, PhD, RN, FAAN  
Director, National Institute of Nursing Research

## INADEQUATE NURSE STAFFING INCREASES RISKS FOR PATIENTS

This research is helping to:

PREDICT factors involved in hospital nursing care and patient safety;

PERSONALIZE methods to promote safe hospital environments and nurse job satisfaction;

PREEMPT adverse patient outcomes by promoting safe nurse working conditions and staffing levels.

The U.S. is experiencing a shortage of registered nurses (RNs). This shortage has been especially felt in hospitals, where over half of all nurses work. A survey in 2004 found the average vacancy rate for RN positions was over 16%. Over the next decade, as the population of the U.S. ages, many in the “baby boomer” generation will enter retirement. This is expected to generate a surge in health care needs due to the effects of aging and chronic illness. By the year 2020, the demand for nurses is projected to exceed the supply by 20%. However, the link between availability of RNs and the outcomes of hospitalized patients has not been well publicized or understood.

### Summary of Research

Dr. Linda Aiken, a professor at the University of Pennsylvania and Director of the NINR Center for Health Outcomes and Policy Research, has conducted several studies that examined the impact of nursing within the health care system. In looking at “Magnet” hospitals (hospitals known for their success in attracting and retaining nurses) and AIDS care units, she consistently found that higher nurse staffing levels were related to lower patient mortality and increased patient satisfaction.

In a widely reported study from 2002, Dr. Aiken examined job survey results from over 10,000 bedside nurses, in conjunction with hospital discharge abstracts of surgical patients. Results of the survey found that over 40% of the nurse respondents, who averaged 10 years of experience, reported high job dissatisfaction and emotional exhaustion or burnout.

The hospital data revealed that among post-operative patients, almost one-quarter experienced a major complication, and 2% died within 30 days of admission. Compared to units with an average patient/nurse ratio of 4 to 1, units with lower staffing had a 7% increased risk of patient death or failure-to-rescue (the development of a serious post-operative complication) for each extra patient assigned per nurse. An 8 to 1 ratio, the highest reported among the units in the study, increased the risk of adverse outcomes by 31%. In addition, poorer staffing intensified nurse dissatisfaction and burnout.

## Implications

The round-the-clock presence of nurses on hospital units allows for surveillance of patient conditions and early detection and response to problems. Over the past decade, however, health care industry cost control measures have led to cuts in the nursing staff at many hospitals. These cuts, imposed at the same time that the Nation is experiencing a shortage of qualified, trained nurses, are driving some nurses from the profession. Dr. Aiken's studies are among the first to document the relationship between nurse staffing on hospital units and the outcomes of patients. A good work environment lowers nurse burnout and staff turnover, while it improves patient safety and satisfaction with care.

According to Dr. Aiken, "Clearly, there is a direct relationship between nurse staffing and patient well-being. Nurse staffing is an issue that needs priority attention on a national scale. Patients' lives depend on it."

## Reference

Aiken LH, Clarke SP, Sloane DM, Sochalski J, Silber JH. Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. *Journal of the American Medical Association*. 2002; 288: 1987-1993.

## DEVELOPING AN INDEX TO REDUCE PRESSURE SORE RISK

This research is helping to:

PREDICT persons at risk for developing a pressure sore;

PERSONALIZE care to maintain skin integrity for immobilized patients;

PREEMPT the need to treat a pressure sore after it has developed, which often adds several days and tens of thousands of dollars to the cost of hospitalization.

Pressure sores, also known as pressure ulcers or bed sores, represent a serious health problem in hospitals, nursing homes, and other health care settings. These sores develop when a bedridden or otherwise immobilized patient remains in one position for too long. The constant pressure reduces blood supply to the skin and underlying tissues, leading to tissue death and an open sore. More than 4 million people develop pressure sores each year, primarily the elderly and persons suffering a major injury or disease, adding roughly \$9 billion in annual health care costs. Pressure sores also complicate patient care and delay recovery. The best treatment for pressure sores is prevention, and improved methods of assessment can help identify individuals at risk for pressure sores before they develop.

### Summary of Research

Dr. Nancy Bergstrom, currently at the University of Texas, Houston, began her research on pressure sores while at the University of Nebraska. Dr. Bergstrom has collaborated with Dr. Barbara Braden to develop and test the Braden Scale for Predicting Pressure Sore Risk<sup>®</sup>.

The Braden Scale is an instrument designed to help health care providers determine a patient's risk for pressure sores. The patient is assessed and given a score in six areas: ability to change positions, physical activity capability, nutrition and hydration status, exposure

of the skin to moisture, exposure of the skin to friction or shearing during movement, and the ability to sense and respond to pressure-related discomfort. The lower the overall score, the higher the pressure sore risk.

Dr. Bergstrom tested the Braden scale in a multisite clinical trial involving tertiary care hospitals, Veterans Administration (VA) medical centers and skilled nursing facilities. None of the participants initially had pressure sores. Nurses assessed the participants using the Braden scale every two to three days over one- to four-week periods. During the study, roughly 10% of the hospital or VA patients, and almost one-quarter of nursing home residents, developed a pressure sore. Patients with pressure sores were more likely to be older, white, and female. Findings supported the predictive value of the Braden scale to identify those patients at high risk for pressure sores.

## Implications

The Braden scale is now widely used in nursing homes and hospitals all over the world. Dr. Bergstrom has chaired two panels of the Agency for Health Care Policy and Research, now the Agency for Healthcare Research and Quality (AHRQ), to determine best practice information on pressure sore prevention. Her research and knowledge about pressure sores was instrumental in writing *Pressure Ulcers in Adults: Prediction and Prevention*, and *Pressure Ulcer Treatment*, from which the current AHRQ clinical guidelines for prevention and treatment of pressure sores were developed.

## Reference

Bergstrom N, Braden B, Kemp M, Champagne M, Ruby E. Multi-site study of incidence of pressure ulcers and the relationship between risk level, demographic characteristics, diagnoses, and prescription of preventive interventions. *Journal of the American Geriatrics Society*. 1996; 44(1): 22-30.

## COPING SKILLS TRAINING IMPROVES TEENS' SELF-MANAGEMENT OF DIABETES

This research is helping to:

PREDICT behavioral problems associated with teens diagnosed with type 1 diabetes;  
PERSONALIZE coping strategies to promote diabetes management and quality of life;  
PREEMPT long-term complications from diabetes and other chronic illnesses.

**Type I diabetes, a disease that affects how the body uses sugar for energy, is one of the most prevalent chronic conditions among youths, affecting over 200,000 children and adolescents in the U.S. However, management of diabetes, which involves frequent testing of blood sugar levels and injections of insulin, often proves very difficult among adolescents. Uncontrolled, diabetes can lead to problems such as poor circulation, high blood pressure, kidney damage, and blindness. Research on teenagers with diabetes has shown they have difficulties in diabetes management, often in association with social situations involving peer pressure and fear of being seen as different.**

### Summary of Research

Dr. Margaret Grey, dean of the Yale University School of Nursing, developed and tested an intervention called Coping Skills Training (CST) to improve diabetic teens coping and communication skills, healthy behaviors, and conflict resolution, in conjunction with routine diabetes management. This program was designed to increase teens' sense of competence and mastery by redirecting inappropriate or non-constructive coping styles into more positive behavior patterns.

To study the effectiveness of CST in a randomized, controlled trial, the investigators divided a group of teens with type I diabetes into experimental and control groups. Both groups received intensive



diabetes management training to learn about their disease and how to handle it. The teens in the intervention group also received the CST in small class sessions, using role-playing to explore common, difficult situations they might face with friends. These included issues such as managing food choices, making decisions about drugs and alcohol, and facing interpersonal conflicts. Sessions lasted 60 to 90 minutes weekly for six weeks, followed by monthly training visits. Both groups were followed for a year to assess their diabetes control and quality of life.

The teens that received CST maintained better metabolic control, and showed a significant improvement in long-term blood sugar levels, compared to the control group. Just as important, they experienced a decrease in depressive symptoms and reported a better quality of life.

### Implications

The benefits of behavioral interventions are evident, and the content of the CST program could benefit teenagers with other chronic conditions as they struggle through the turbulent years of puberty. So far, over 100 practices that manage the care for teenage diabetics have requested the CST manual developed by Dr. Grey and her team, to incorporate this training into their routine care. Furthermore, current clinical guidelines on the care of children and adolescents with diabetes emphasize the need for comprehensive behavioral care, not just disease management.

As Dr. Grey has said, “Nursing research is about helping people deal with the hand that they’ve been dealt. People who have children with chronic illnesses have been dealt a bad hand. It’s very difficult to manage a child with something like diabetes. It takes a tremendous amount of effort on the part of the entire family. And so what we do is try to develop ways that help them manage very difficult situations better that lead to better outcomes for families as well as for the children.”

### Reference

Grey M, Davidson M, Boland EA, Tamborlane WV. Clinical and psychosocial factors associated with achievement of treatment goals in adolescents with diabetes mellitus. *Journal of Adolescent Health*. 2001; 28 (5): 377-85.

## HELPING YOUTHS ESTABLISH HEALTHY HABITS OF EXERCISE AND DIET

This research is helping to:

PREDICT youths at risk for cardiovascular disease (CVD) related to sedentary lifestyles;  
PERSONALIZE strategies to help youths stay active and develop heart-healthy habits;  
PREEMPT the early stages of CVD, obesity, type 2 diabetes, and other chronic conditions in school-aged children, providing health benefits throughout adulthood.

While cardiovascular disease (CVD) usually strikes adults over 40 years of age, lifestyle behaviors that contribute to its development often begin in childhood. One major CVD risk factor is physical inactivity. Over one-quarter of adolescents say they are rarely involved in vigorous activities, and school-based physical education classes often do not provide adequate time or intensity of exercise. The rates of overweight and obesity among children are rising, often due to inactivity and poor nutrition. Children are increasingly found to have hypertension and elevated cholesterol. Smoking also tends to start during adolescence. Nurses working with children and teenagers can foster healthy lifestyle patterns to prevent the early development of CVD.

### Summary of Research

Dr. Joanne Harrell, professor at the University of North Carolina at Chapel Hill, is the principal investigator for the NINR-funded Cardiovascular Health in Children and Youth (CHIC) studies. She has developed education and exercise programs that focus on improving physical activity and reducing long-term cardiovascular risks for use in schools across North Carolina, which has one of the highest rates of death from CVD and stroke in the U.S.

An early CHIC study (CHIC I) involved over 1,200 elementary school students. In the program, the students received classes twice

a week for eight weeks on the importance of exercise, selecting “heart healthy” foods, and the dangers of smoking. In addition, they participated in a physical activity class three times a week that involved fun, noncompetitive aerobic activities including jumping rope to music, group relays, and dancing. Compared to children in a control group that continued in their standard physical education classes, children in the CHIC program had significantly greater knowledge about healthy habits and reported more physical activity. They also lowered their cholesterol and body fat, increased their aerobic power, and had a smaller rise in their diastolic blood pressure than the controls.

## Implications

A second CHIC study (CHIC II) tested interventions to increase health awareness and exercise habits in middle school students. Further research is ongoing with CHIC III, following previous CHIC participants and others through all stages of puberty to investigate the childhood development of several risk factors for CVD, obesity, and metabolic syndrome, a precursor to type 2 diabetes.

According to Dr. Harrell, the CHIC studies have two major goals: (1) to determine the development and prevalence of cardiovascular risk factors in youth; and (2) to test interventions to reduce these risk factors and improve heart health for young people. The results of these studies indicate a need to place emphasis within elementary and middle schools on health and physical activity to reduce the long-term risks of CVD. Dr. Harrell has stressed that parents, teachers, and health care professionals must help find ways for children to increase their amount of physical activity both during school and outside of school hours.

## Reference

Harrell JS, McMurray RG, Bangdiwala SI, Frauman AC, Gansky SA, Bradley CB. Effects of a school-based intervention improve to reduce cardiovascular disease risk factors in elementary-school children: The Cardiovascular Health in Children (CHIC) Study. *The Journal of Pediatrics*. 1996; 128: 797-805.

## A HEALTH CARE TEAM HELPS REDUCE HIGH BLOOD PRESSURE AMONG INNER-CITY BLACK MEN

This research is helping to:

PREDICT susceptibility of persons with high blood pressure to early organ damage;  
PERSONALIZE strategies to promote disease management and cardiovascular health;  
PREEMPT long-term health risks from high blood pressure and related chronic conditions.

High blood pressure (HBP), also known as hypertension, is the most common chronic disease among blacks in the U.S. and a major cause of disability and death, contributing to the mortality gap between blacks and whites. Uncontrolled, it can damage circulation to the major organs, most significantly the heart, kidneys, and brain. The management of HBP often involves behavioral changes and dietary modifications, along with a regimen of antihypertensive medications that require close follow-up from a health care provider. Black men living in urban or impoverished communities have a high incidence of HBP, and they generally have poor access to health services and often do not seek care or remain in treatment.

### Summary of Research

Dr. Martha Hill, the dean of the Johns Hopkins University School of Nursing, led a research group that developed a three-year program involving a multidisciplinary health care team to provide care for inner-city black men with HBP. To evaluate the program, they recruited over 300 black men (average age 42 years) diagnosed with HBP and living in inner-city Baltimore. Although many of the men reported taking some form of antihypertensive medication, half had no health insurance or regular doctor, and fewer than one in five had achieved adequate BP control. Roughly one-quarter showed evidence of heart and/or kidney damage. This was especially significant given the relatively young age of the men.

The health care team taught all of the study participants about the benefits of HBP control, and all received free annual check-ups. Half of the men, serving as the control group, received referrals to community health care sources for ongoing HBP care. The rest were enrolled in the HBP team intervention. The health care team consisted of a nurse practitioner, a community health worker and a physician consultant. The team provided free antihypertensive medications and follow-up care, ongoing assessments, home visits, and referrals to social services and job training.

At the conclusion of the study, men in both the control and the intervention groups showed decreases in smoking and consumption of salty foods. However, the men in the HBP team intervention showed a significant decrease in their systolic and diastolic pressures, with 44% lowering their blood pressure to within the normal range, and fewer signs of heart and kidney damage. They also reported more regular use of health care services and antihypertensive medications than the control group.

### Implications

According to Dr. Hill, no previous hypertension studies had targeted high-risk, young urban black men, who are frequently underserved by the health care system. Participation in this study was the first time many of these men had come into contact with formal health care. They were pleased to be part of the research and to improve their health. By establishing a lasting, trusting relationship with these at-risk men, the health care team encouraged them to make lifestyle changes and maintain medication regimens that helped to improve their management of HBP.

Dr. Hill said, “We used a comprehensive health care team approach with these men, who are considered hard to reach. The team approach was key to achieving control of hypertension and to retaining more than 90% of these men in the study protocol over three years’ time.”

### Reference

Hill MN, Han H, Dennison CR, Kim MT, Roary MC, Blumenthal RS, Bone LR, Levine DM, and Post WS. (2003). Hypertension care and control in underserved urban African American men: behavioral and physiologic outcomes at 36 months. *American Journal of Hypertension*, 2003; 16: 906-913.

## REDUCING HIV RISK AMONG YOUNG MINORITY WOMEN

This research is helping to:

PREDICT individuals and populations at high risk for HIV transmission;  
PERSONALIZE preventive strategies in developmentally and culturally sensitive ways;  
PREEMPT HIV transmission by promoting HIV awareness, abstinence, and safe sex practices.

**Infection with the human immunodeficiency virus (HIV), which can advance to Acquired Immune Deficiency Syndrome (AIDS), is a significant health problem in the U.S. and the world. The disease has spread to all populations, and heterosexual activity is an increasingly common mode of transmission. Cases of HIV/AIDS are increasing among younger people from 13 to 30 years of age. While new medications have extended the life of people with HIV, the disease has no cure. The key to defeating HIV lies with prevention. Educational programs are needed to reach and convince young people to reduce unsafe sexual practices and protect themselves from HIV, to help to slow or stop the spread of this and other sexually transmitted diseases (STDs).**

### Summary of Research

Dr. Loretta Sweet Jemmott, professor at the University of Pennsylvania and Director of the NINR Hampton–Penn Center to Reduce Health Disparities, has spent many years in the field of HIV/AIDS prevention. Her program of research, funded by a variety of sources including NINR, has focused on reducing risky sexual behavior, primarily among minority adolescents.

An early NINR-funded program among adolescent black women included sessions on HIV/AIDS prevention and safe sexual practices, along with skills demonstrations emphasizing negotiation with a

partner and proper condom usage. The sessions were led by black nurses, and used audiovisual demonstrations, technical skill building demonstrations, role-playing, and discussions built around several themes: "Respect Yourself, Protect Yourself—Because You're Worth It," "Be Proud, Be Responsible," and "Let's Work Together to Save our People and Community."

Building on this program in a study funded by the National Institute of Mental Health, Dr. Jemmott developed an educational intervention that delivered eight educational modules on sexual abstinence and safe sex practices to inner-city black middle school students. The study retained over 90% of its participants over the year-long period. Those who completed the modules were less likely to engage in sexual intercourse, and those who were already sexually active reported more consistency in their use of condoms and fewer episodes of unprotected sex.

## Implications

Dr. Jemmott was among the first to show that educational interventions can help reduce risky sexual behaviors and to demonstrate their effectiveness in schools, health clinics, and other primary care settings.

The educational programs are designed not only to increase awareness of HIV prevention but also to be entertaining, culturally sensitive, and gender appropriate. Based on the success of these programs, the Centers for Disease Control and Prevention (CDC) have used them as model curricula in their Division of Adolescent and School Health (DASH), and they are disseminated both nationally and internationally. Dr. Jemmott has been invited to South Africa to help decrease the impact of HIV/AIDS in Africa.

Dr. Jemmott said, "For the past 15 years I have observed how the HIV/AIDS epidemic has disproportionately impacted the African American community, becoming convinced the incidence could be reduced if people changed their sexual behaviors. Our research has demonstrated remarkable success in reducing HIV risk-associated sexual behaviors among African American adolescents and adults."

## Reference

Loretta S. Jemmott, AIDS & black women—testing risk behavior interventions, NINR grant RO1 NRO3123.

Jemmott JB 3rd, Jemmott LS, Fong GT. Abstinence and safer sex HIV risk-reduction interventions for African American adolescents: a randomized controlled trial. *Journal of the American Medical Association*. 1998; 279(19): 1529-36.

## GENDER-BASED DIFFERENCES IN PAIN RESPONSE

This research is helping to:

PREDICT persons who can be helped by certain medications for pain;

PERSONALIZE gender-based strategies to manage pain;

PREEMPT the lower quality of life and increased disability related to chronic pain.

Pain is often viewed as an annoying symptom or a temporary, secondary consequence of illness or injury. However, pain is responsible for 40 million health care visits each year. It can delay recovery and impact daily functioning, and coping with chronic pain may become the consuming focus of a person's life. This common symptom is particularly difficult to study because the perception of pain is highly subjective. In recent years, there has been an intensifying focus on understanding biological and psychological factors of pain. Pain is a very personal experience, and its treatment is a major public health concern.

### Summary of Research

Drs. Jon Levine and Christine Miaskowski of the University of California at San Francisco began their studies in pain by seeking to identify a longer-acting acute pain medication than those currently available to reduce postoperative distress. Their research in humans has centered on postoperative pain management following dental surgery.

The researchers tested the effects of nalbuphine, a member of a little-used class of medications called kappa-opioids, on women and men after surgery for wisdom tooth extraction. They found that women gained relief of their postoperative pain from a moderate dose of nalbuphine, while both higher and lower doses had little effect when compared to a placebo. In men, only a high dose offered slight,



short-term pain relief, while a low dose actually intensified the pain. Kappa-opioids have fewer negative side effects, such as nausea, confusion, and constipation, than the more commonly used mu-opioids like morphine. The difference in pain perceptions and responses between women and men uncovered in this study was an unexpected result.

## Implications

Pain can exert a powerful influence on recovery from illness and on quality of life. Previously, most studies on pain have focused on men. This interesting finding revealed the importance of considering gender in providing medications and identified new directions for research on the experience and relief of pain.

The research team continues to explore the exciting frontier of pain research, including studies on how pain is experienced and how it is relieved. The investigators plan to look at the brain mechanisms that underlie the gender differences in responding to kappa-opioid analgesia, how naloxone, an opioid blocker, is able to moderate these differences, and the effects of kappa-opioids in patients with many types of chronic pain. In laboratory studies, this research team has also used a rat model to explore gender differences in the perception and response to pain and the role of the female hormone estrogen in pain signaling and peripheral pain receptors.

## Reference

Gear RW, Miaskowski C, Gordon NC, Paul SM, Heller PH, Levine JD. The kappa opioid nalbuphine produces gender- and dose-dependent analgesia and antianalgesia in patients with postoperative pain. *Pain*. 1999; 83 (2): 339-45.

## A COMMUNITY-BASED PROGRAM IMPROVES SELF-MANAGEMENT OF ARTHRITIS AMONG OLDER HISPANICS

This research is helping to:

PREDICT which individuals will benefit from self-management of arthritis;  
PERSONALIZE treatment options, especially among Hispanics in the U.S.;  
PREEMPT declines in health and the need for health care visits due to the effects of arthritis and other chronic conditions by improving patient control and self-management.

**Chronic conditions such as arthritis, cardiovascular disease, and diabetes are the principal cause of disability in the U.S., and they account for a large percentage of all health care costs. Treatment plans often depend on patient self-management, which may involve strict medication schedules, diets, and exercise regimens, along with education programs that teach healthy behaviors, recognition of adverse symptoms, and coping with discomfort and disability.**

More than one in eight people in the U.S. are of Hispanic origin. Roughly one-fifth of Hispanics lack proficiency in English, which tends to isolate them from accessing or using community health resources, while nearly one-third lack any form of health insurance. Many older Hispanics do not have access to health care or to useful health information about chronic diseases, especially health materials written in Spanish.

### Summary of Research

Nurse scientist Dr. Kate Lorig of Stanford University in California and her research team have designed programs aimed at improving the health status, delaying deterioration, and reducing the need for health care visits related to chronic health conditions. Much of their initial work was devoted to arthritis, and resulted in the six-week Arthritis Self-Management Program, which helped to reduce pain and the need for physician visits while increasing the activity levels for arthritis sufferers.

Despite this success, the Arthritis program was not reaching the Hispanic population in the U.S., where arthritis is a leading cause of disability. In order to make the courses available to all Spanish-speaking persons, Dr. Lorig developed a new program, based on her previous work, that included a six-week series of classes along with a book, *Como Convivir con su Artritis (How to Live With Your Arthritis)*. Health care class leaders were recruited from the Hispanic community and received training to teach the course. The classes were held at local community sites. The book and the class materials contained detailed information in Spanish about self-management of arthritis, along with audiotapes to promote exercise and relaxation. Each class consisted of 10 to 15 people suffering from arthritis and also included additional family members who wanted to learn about the disease. One year after the program, a follow-up evaluation found that the study participants reported increased self-efficacy in managing their arthritis, improved activity levels and general health, decreased levels of pain, disability, and depression, and fewer visits to a physician, compared to a control group that received standard care.

### Implications

Dr. Lorig expanded this work to develop a new program, *Tomando Control de su Salud (Taking Control of Your Health)*, designed to address a variety of chronic conditions, including heart disease, hypertension, diabetes, and lung disease. Several organizations in the U.S. are now offering this model of chronic disease self-management. In addition, the National Health Service of England has adopted it as a nationwide program and is presently implementing it in primary health care sites. In addition, organizations and communities in Canada, Europe, Australia, China, Taiwan, Japan, Korea, and South Africa are using her work. This self-management model is making a difference in the lives of chronically ill adults throughout the world.

Dr. Lorig's research continues to develop and evaluate community-based self-management programs. She is now testing a course in Spanish specifically for type II diabetics that also includes telephone messages about managing the disease.

### Reference

Lorig K, Gonzalez VM, Ritter P. Community-based Spanish language arthritis education program: a randomized trial. *Medical Care*. 1999; 37: 957-963.

## TRANSITIONAL CARE IMPROVES OUTCOMES FOR ELDERLY AFTER LEAVING THE HOSPITAL

This research is helping to:

PREDICT problems in the transition of care for elders after hospital discharge;  
PERSONALIZE discharge planning and home care to individual health care needs;  
PREEMPT complications and rehospitalizations after elderly patients are discharged home.

With the aging of the population in the U.S., a greater number of older adults are living longer with chronic health conditions. Our current health care system tends to focus on acute care provided in hospitals. Less emphasis has been placed on home care after patients leave the hospital, where recovery and rehabilitation continues. Elders who are hospitalized for heart failure often have multiple medical conditions, symptoms, and medications, and they have the highest hospital readmission rate of all adult patient groups. This indicates a serious breakdown in continuity of care during the transition from the hospital to the home.

### Summary of Research

Dr. Mary Naylor, professor at the University of Pennsylvania, has worked with an interdisciplinary research team looking into ways to improve the outcomes and reduce the costs of care for elders living in the community. Dr. Naylor and several collaborators have developed a transitional care model that employs advanced practice nurses (APNs) to provide hospital discharge planning and transitional care for a variety of vulnerable patient populations.

In a randomized, controlled trial, Dr. Naylor and her team evaluated the effectiveness of the transitional care model in helping to maintain the health and function of elders with heart failure after hospital discharge. Roughly 80% of the elders had been hospitalized for a

sudden exacerbation of their condition, and the average length of hospital stay was five days. Elders participating in the intervention received a three-month APN-led program designed to manage their discharge planning. The APNs worked with the patients to identify goals, individualize care plans and learning needs, coordinate care across the different settings from hospital to home, and implement an evidence-based protocol to manage the multiple health issues of heart failure patients. A follow-up evaluation at one year showed that patients who had received the intervention had a longer time before first hospital readmission, along with fewer total rehospitalizations, hospital days, and deaths than the control group that continued in standard care. Improvements were also noted in patient satisfaction and quality of life. Although the APN program increased the initial cost of care, the total health care costs over the year-long study period were lower by almost \$3,500 per patient for those in the intervention group, when compared to the control group.

## Implications

The current health care system is often organized into separate areas—hospital, community, and home—but transitional care bridges this divide to promote better, cost-effective health care. The transitional care model offers potential health benefits to patients at a lower total cost of care, although more study is needed. A major national health insurer is conducting a pilot program in New Jersey, Delaware and Pennsylvania to evaluate the success of transitional care.

As Dr. Naylor states, “Nurses will play a pivotal role in addressing the health care needs of people throughout the 21st century. The cutting edge science, led by nurses and designed to advance knowledge related to promoting healthy lifestyles and caring for the chronically ill, will position nurses and other health team members to make a major difference in the lives of these people.”

## Reference

Naylor MD, Brooten DA, Campbell RL, Maislin G, McCauley KM, Schwartz JS. Transitional care of older adults hospitalized with heart failure: a randomized, controlled trial. *Journal of the American Geriatrics Society*, 2004; 52: 675-684.

## HOME NURSING VISITS BENEFIT LOW-INCOME MOTHERS AND THEIR CHILDREN

This research is helping to:

PREDICT the needs of young mothers at risk for pregnancy complications and children at risk for behavioral or developmental problems;  
PERSONALIZE pre- and post-natal care to help these women and their families cope;  
PREEMPT adverse pregnancy and child outcomes, and a continued cycle of pregnancy and impoverishment in low-income or minority families.

Unhealthy behaviors such as smoking, drinking, and drug use in young, high-risk pregnant women can lead to pregnancy complications such as high blood pressure or preterm labor, and to the delivery of a premature or low birth weight infant. If continued after delivery, these behaviors can contribute to poor parenting that results in childhood developmental delays, injuries, or neglect, difficulties in achieving economic self-sufficiency, and additional pregnancies before the family can adapt. Promoting health and well-being among young, disadvantaged mothers and their children who are caught up in the cycle of poverty, neglect, domestic violence, substance abuse, and other health and social problems is a key issue in addressing health disparities for our nation.

### Summary of Research

A team of investigators led by Dr. David Olds, formerly of the University of Rochester and currently at the University of Colorado, developed a program that involved public health nurse visits to the homes of disadvantaged young pregnant mothers. These visits start before the child is born and continue through the early childhood period.

Dr. Olds adapted a successful home nursing visit program originally developed in rural upstate New York for a group of over 1,000 low-income black women in urban Memphis, Tennessee. Mothers in the Memphis program received an average of seven home visits from a

public health nurse during their pregnancy, along with 26 visits after delivery that continued through the child's second birthday. The home visits were tailored to the needs of each family. Nurses provided prenatal care, taught parenting skills, linked the mothers to community services, and improved the mothers' social support systems. Results indicated that many of the beneficial effects seen in the upstate New York study applied to the Memphis families as well. The mothers had significantly less pregnancy-induced high blood pressure, a common pregnancy complication, and they demonstrated better timing of subsequent pregnancies. In the two years after delivery, childhood injuries were also substantially reduced.

## Implications

Analysis of the New York study showed increased self-sufficiency of the families and reductions in Aid to Families with Dependent Children and Food Stamp payments. A follow-up study of the Memphis program found that when the children reached six years of age (four years after the first study was concluded), they had higher IQ and language scores and fewer behavioral problems compared to similar children outside of the program, while the mothers showed lasting stability in family finances and relationships. This program of public health nurse visits is beginning to move from the research realm into public use.

Dr. Olds currently directs the Prevention Research Center for Family and Child Health at the University of Colorado Health Sciences Center. The focus of this Center is to examine the long-term impact of this home nursing visit program on low-income, first-time mothers and their families. With funding from NIH, other federal agencies, and private philanthropies, the Center is conducting follow-up studies to evaluate how this program affects maternal economic self-sufficiency, parenting function, and substance abuse, as well as the behavioral outcomes, adaptive functioning, and productive life-course of the children as they enter adolescence and young adulthood.

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