Raise the Voice tells a powerful story: how nurses are creating new, transformational options that help people stay healthy and cope better with illness.

Edge Runners are the practical innovators who have led the way in bringing new thinking and new methods to a wide range of health care challenges. Edge Runners have developed care models and interventions that demonstrate significant clinical and financial outcomes. Many of the stories underscore the courage and fighting spirit of nurse leaders who have persevered despite institutional inertia or resistance.

Below please find the Application to become an Edge Runner. The application should be thoroughly completed and submitted to Cheryl Sullivan, CEO of the American Academy of Nursing, with any documentation that may be required. Incomplete applications will be returned.

Important Note: Fellowship in the American Academy of Nursing is not required to be designated an Edge Runner.

1. Name of program/project
   Discharge Decision Support System

2. Name(s) of proposed Edge Runner(s)
   Kathryn H. Bowles, PhD, RN, FAAN, FACMI

3. Name of individual(s), contact information
   First and Last Name    Kathryn H. Bowles
   Phone Number           215-898-0323
   Email Address          bowles@nursing.upenn.edu
   Role in program        Principal Investigator and Inventor

4. Organizational affiliations (if relevant)
   University of Pennsylvania School of Nursing
   a) Targeted audience(s)
      Hospitalized adults aged 55 and older

5. Describe your work. What is it? What are the goals? What does it do? How are the goals accomplished?
   In more than a decade of funded research, the Bowles interdisciplinary team discovered a lack of standards and great variation in decisions by hospital...
discharge planners to refer older adults from acute care to post-acute care (PAC) such as home care or skilled nursing facility. This meant that many older adults were discharged home to self-care with multiple unmet needs and risk factors for poor outcomes. The Bowles team demonstrated that patients who needed post-acute care, and did not receive it, were readmitted 5 times more often than similar patients who did get PAC. Based on these preliminary studies, the team obtained NIH funding from the National Institute of Nursing Research (NINR) (NRO1-007674) to build and test a solution. The resulting Discharge Decision Support System (D2S2) is why Dr. Bowles deserves recognition as an Edge Runner.

The D2S2 is an evidence-based six item-screening tool completed by nurses with the patient upon admission to acute care. Based on how patients answer the questions, points accumulate to indicate high-risk patients likely to need post-acute care. The tool helps discharge planners identify high-risk patients early in the admission or assists with discharge referral decision making to get the right care to the right patient.

6. What health care challenge is being addressed? How is your program/project an innovative solution compared to what currently exists?

Dr Bowles’ work is both innovative and significant. Discharge planners make referral decisions for over 13 million older adults per year. The quality of these decisions determines whether older adults receive the right care to meet their needs or are discharged without supports and at risk for poor outcomes. Prior to the discovery of the D2S2 by the Bowles team, there was no standardized decision support tool to assist clinicians in these common and important decisions. The D2S2 is transforming the way clinicians identify high-risk patients and make referral decisions about who needs post-acute care (PAC). It is one of very few decision support tools developed and implemented by nurses. Right Care Solutions, a start-up company based on Dr. Bowles' work, are distributing the D2S2 commercially.

7. How does it reflect a nursing perspective? How does it exemplify the uniqueness of nursing by integrating mind, body, spirit and/or delivers a human service that is personalized, convenient, cost-effective, and innovative.

Most risk screening tools are developed using administrative data and medical diagnoses and to date none have acceptable sensitivity and specificity to accurately identify those at risk. The D2S2 is unique because it focuses on the factors that influence the self-care ability of patients once they are discharged. Based on Orem's self-care deficit theory, the D2S2 assesses factors that are highly predictive of a patient’s ability to perform self-care, including the availability of a caregiver. Built on “smart” technology that gets more accurate over time, the D2S2 learns based on characteristics of the patients, their situations, and the health care received.
8. Provide specific outcome data. This should include clinical and financial outcomes. Explain how your program/project has led to system-wide changes or new ways of doing work and delivering care.

   a) Clinical outcomes
   Consistently in three prospective studies with hospitalized older adults, patients who scored high (needing PAC) on the $D^2S^2$ were significantly older, had more medications, more co-morbid conditions, saw their physicians more often, and had more frequent hospital admissions in the past six months than patients who scored low risk. High scores are significantly correlated with readmissions, higher numbers of problems and unmet needs after discharge and poorer quality of life up to 60 days after discharge. These findings clearly demonstrate the usefulness of this invention to identify high-risk patients early in the hospital stay, to alert the discharge planning team, and to get patients the right care after discharge.

   b) The $D^2S^2$ helps clinicians identify the right patients for PAC and has a significant impact on patient outcomes. In a pre-post study of the $D^2S^2$ in usual care (without decision support) compared to a phase with decision support, the number of patients who refused PAC decreased significantly suggesting that clinicians offered referrals more appropriately and therefore patients were more likely to agree with the need (31% refused in usual care versus 23% using $D^2S^2$ p = .041).

   c) Financial outcomes
   Our study results, published in Professional Case Management, shows 6% reductions in both 30 and 60-day readmission rates from a period with usual care to when decision support using the $D2S2$ was implemented. In addition, the time to readmission lengthened when decision support was used p = .001.

   In a second recently completed study, funded by the NINR via the Small Business Innovation Research (SBIR) mechanism, we reproduced similar findings with a clinically and statistically significant decrease in 30-day readmissions among high-risk patients on units after using the $D2S2$ (10.6%) compared to patients from those same units prior to using the $D2S2$ (23.8%). Overall, combining high and low risk patients, and accounting for a .5% decline in concurrent readmissions across the hospital, use of the $D2S2$ achieved a 29% relative reduction in 30-day readmissions. These findings were reported in an NIH report to Congress titled, Profiles of Prosperity. The article on our work is titled: “Saving Millions in Health Care Costs: How RightCare Solutions is preventing hospital readmissions and reducing costs”. A manuscript is under revision for Research in Nursing and Health.
The return on investment is significant because of the Hospital Readmissions Reduction Program, which applies financial penalties to the discharging hospitals for readmissions. Based on their CHF, AMI, and Pneumonia 30-day readmission rates, hospitals are at risk for up to 2% of their total Medicare reimbursement for FY2014, and up to 3% of their FY2015 totals. A hospital with roughly $100M in Medicare reimbursement that is facing the maximum 3% penalty would thus lose $3M in reimbursement.

Each prevented readmission on average saves $5,000. To illustrate financial impact, we use our data from the just completed SBIR study. We saw a 29% relative decrease in readmissions on the six study units. If the D2S2 was rolled out to the rest of the units in the hospitals and the average results were similar for one year, then we estimate that roughly 2,000 readmissions would be avoided, resulting in the following cost savings to the system:

- CMS Penalty Savings: $1M - $3M
- Readmission Treatment Cost Savings: ~$2M
- Post-Acute Care Revenue: ~$500K
- Capacity-Related Opportunity: ~$600K

The D2S2 is currently installed in 10 hospitals as a link in the electronic health record and we just completed assessment of our 30,000th patient. Once populated by nurses or case managers, the algorithm is calculated and a score/alert is delivered to the appropriate clinicians alerting them of high-risk patients early in the hospital stay and allowing more time for individualized care planning.

9. Related articles, publications, press coverage
   a) Publications


b) Presentations


Bowles, KH. & Naylor, MD. (2011) Evidence-Based Strategies for Discharge Planning and Transitional Care. 2011 Emory Healthcare Quality Conference, Emory University Hospital, Atlanta, GA


Bowles, KH. (September 2011). How to Translate Research into Clinical Practice. Second Annual Research Symposium, Pennsylvania Hospital Research and Evidence Based Council.

c) Press Releases and Other Publicity (see attached)

RightCare Solutions Shows 29% Reduction in 30-Day All-Cause Readmission Rates in Pivotal Study
Monday, July 22, 2013
Press Release
Philadelphia, Penn. – July 22, 2013 – RightCare Solutions, Inc., an evidence-based technology organization specializing in hospital care transitions and readmission management, announced today that a pivotal study examining the impact of RightCare Solutions’ D2S2 care transitions software platform on all-cause 30-day readmissions met its primary endpoint showing a 29% reduction in all-cause 30-day readmission rates in the intervention group. Consistent with the data reported in previous studies, reductions were seen in high-risk patients at all three hospitals that participated in the study.

RightCare Solutions Assesses 30,000th Patient for Risk of Readmission
Monday, July 17, 2013
Press Release
PHILADELPHIA, July 17, 2013 /PRNewswire/ – In its mission to lower potentially preventable 30- and 60-day readmissions, RightCare Solutions, Inc., an evidence-based technology organization specializing in hospital care transitions and readmission management, announced today that it has screened its 30,000th patient through the D2S2 Care Transitions software platform. Pioneered through over a decade of academic research led by Dr. Kathryn Bowles, Professor of Nursing at the University of Pennsylvania School of Nursing, D2S2 (“Discharge Decision Support System”) was developed to predict which patients require post-acute care and who are thus at higher risk of readmission.

United for Medical Research Profiles of Prosperity - Saving Millions in Health Care Costs: How RightCare Solutions is preventing hospital readmissions and reducing costs
Monday, July 10, 2013
United for Medical Research Publication
RightCare Solutions's software saves hospitals money. Dr. Kathryn Bowles, a researcher who focuses on older patients, discovered that hospitals did not have complete information about whether patients could take care of themselves after a hospitalization. Many patients couldn’t keep track of their medications, had cognitive impairment or were depressed. Many had to be readmitted weeks or months later, a negative result for their health and for the hospitals’ costs.

Rx for better after-hospital care, reduced readmissions
Thursday, Jun 20, 2013
Philadelphia Daily News
ERIC HEIL, 30, of Plumsteadville, is co-founder, president and chief executive of RightCare Solutions Inc., a health-care tech company specializing in reducing readmission rates. The company’s software identifies patients who should be referred to post-hospital-care services to reduce unnecessary hospital re-admissions.

RightCare Expands Leadership Team for National Commercial Launch of Breakthrough Care Transitions Software to Reduce Readmissions
Mr. Matthew Ruth Named Chief Operating Officer
Wednesday, May 29, 2013
*Press Release*

FORT WASHINGTON, Pa., May 28, 2013 /PRNewswire/ – RightCare Solutions, Inc., an evidence-based technology organization specializing in care transitions and readmission management, announced today the addition to RightCare’s leadership team of Mr. Matthew Ruth, as chief operating officer. Matt joins RightCare as the company launches nationally its breakthrough care transitions software, based on cutting-edge technology from the University of Pennsylvania, School of Nursing. RightCare’s care transition platform is powered by D2S2: Discharge Decision Support System that helps risk stratify patients at hospital admission, improve workflow and prioritization, as well as connecting to post-acute care facilities and primary care physicians.

New Firm Works to Reduce Hospital Readmissions of Elderly Patients
Thursday, April 4, 2013 - Philadelphia, PA
*The Philadelphia Inquirer*

When Eric Heil was a senior systems engineering student at the University of Pennsylvania eight years ago, he volunteered to help a nursing-school professor with research aimed at helping doctors make better decisions about which elderly hospital patients needed additional care after discharge.

The University of Pennsylvania Health System and RightCare Solutions, Inc. Announce Expanded Partnership to Reduce Readmissions
Thursday, April 4, 2013 - Philadelphia, PA
*Press Release*

The University of Pennsylvania Health System and RightCare Solutions, Inc., an evidence-based technology organization specializing in hospital care transitions and readmission management, today announced an expanded partnership with the goal of improving care coordination and reducing readmissions.

Primer on US Hospital Readmissions Infographic Prepared by RightCare Solutions
Friday, January 4, 2013 - Philadelphia, PA
*Press Release*

RightCare Solutions, Inc., an evidence-based technology organization specializing in hospital discharge planning and readmission management, has created an infographic that serves as a primer on US Hospital Readmissions, combining the most relevant information on the subject in a single, easy-to-interpret location.

RightCare Solutions Presents at AMIA 2012 in Chicago
Monday, November 5, 2012 - Chicago, IL
*Press Release*

November 5, 2012 –RightCare Solutions, Inc., an evidence-based technology organization specializing in hospital discharge planning and readmission management was selected to present a theater demonstration of its Discharge
Decision Support System (D2S2) at the American Medical Informatics Association (AMIA) 2012 in Chicago, IL.

**RightCare Solutions and Thomas Jefferson University Hospital Announce Partnership to Reduce Readmissions**
Friday, November 2, 2012 - Philadelphia, PA

*Press Release*

RightCare Solutions, Inc., an evidence-based technology organization specializing in hospital discharge planning and readmission management and Thomas Jefferson University Hospital (Jefferson) today announced a partnership aimed at improving patient care transitions and reducing readmissions. By leveraging RightCare’s Discharge Decision Support System (D2S2), Jefferson’s staff of case managers will utilize evidence-based point-of-care tools to improve and enhance patient outcomes.

**RightCare Solutions Raises $1.75M Series A Financing Round**
Wednesday, October 10, 2012 - Philadelphia, PA

*Press Release*

RightCare Solutions, Inc., an evidence-based technology organization specializing in hospital discharge planning and readmission management, today announced it has secured Series A venture capital financing, led by Compass Partners, LLC and Domain Associates, LLC. The new funding will permit RightCare to further develop its unique Discharge Decision Support System Platform and expand early market adoption.

**RightCare Solutions to Ring the NASDAQ Closing Bell**
Tuesday, August 21, 2012 - Philadelphia, PA

*Press Release*

August 21, 2012 /PRNewswire via COMTEX/ — RightCare Solutions, LLC, an evidence-based technology organization specializing in hospital discharge planning and readmission management, today announced that Eric Heil, cofounder and chief executive officer, joined by members of the management team including Mrinal Bhasker, chief technology officer, will ring the NASDAQ closing bell today at 4:00 p.m. ET. The ceremony is to celebrate RightCare being named the Michelson Grand Prize Winner of the 2012 Wharton Business Plan Competition at the Wharton School of the University of Pennsylvania.

**RightCare Solutions selected as a Finalist in Independence Blue Cross Game Changers Challenge**
Sunday, July 15, 2012 - IBX Game Changers Challenge

*Independence Blue Cross Press Release*

Independence Blue Cross (IBX) is teaming up with Wharton Entrepreneurial Programs, the Department of Public Health of the City of Philadelphia, Ventureforth, and ?What If! Innovation Partners to launch the IBX Game Changers Challenge. The Challenge seeks to harness the creative energies of our community by soliciting proposals that can impact wellness indicators and improve our region’s health.
Startup RightCare in growth mode thanks to prize money
Friday, June 8, 2012
Philadelphia Business Journal
RightCare Solutions has secured startup money in an unusual manner. The Philadelphia company, which has a software product designed to improve health-care outcomes, won nearly $200,000 in two recent business competitions.

Janssen Healthcare Innovation Announces Discharge Decision Support System (D2S2) Winner of the Janssen Connected Care Challenge
Tuesday, May 22, 2012 - Janssen Connected Care Challenge
Janssen Pharmaceuticals, a J&J company, Press Release
Janssen Healthcare Innovation today announced Discharge Decision Support System (D2S2) is the winner of the crowdsourcing-inspired Janssen Connected Care Challenge and the $100,000 prize. D2S2 is a discharge decision support system that uses a proprietary algorithm to assemble and score key data upon admission in order to identify patients who should be referred to post-acute care services to reduce the risk of 30-day readmissions.

The Right Stuff: RightCare Solutions Wins Wharton Business Plan Competition Michelson Grand Prize with a Diagnostic to Reduce Hospital Readmission Rates
Thursday, April 26, 2012 - Philadelphia, PA
Wharton Entrepreneurial Program Announcement
The Wharton School of the University of Pennsylvania announced that student team RightCare Solutions won the $30,000 Michelson Grand Prize of the 2012 Wharton Business Plan Competition (BPC) (http://bpc.wharton.upenn.edu). The prize was awarded at the Wharton School’s annual Venture Finals on April 25, 2012, where student finalists received more than $115,000 in combined cash prizes, in-kind legal/accounting services, and office space at a Philadelphia co-working community for start-ups.

RightCare presents as one of the top 30 university startups across the country at the University Research & Entrepreneurship Symposium in Boston, MA
Wednesday, April 18, 2012 - BOSTON, MA
University Research & Entrepreneurship Symposium Press Release
URES is an invitation-only one-day conference established to bring world-class technologies from university research to Boston to showcase them before a group of New England’s top entrepreneurs and venture capitalists. The event will feature breakthrough technologies in three focus areas – information technology, life sciences and clean energy.

10. Awards and Recognition
Awards for RightCare Solutions-see attached announcements
Winner of the Michelson Grand Prize Wharton Business Plan Competition
Winner of the Janssen Connected Care Challenge $150,000 cash prize
Finalist in the Independence Blue Cross Game Changers Challenge
Rang the closing bell at NASDAQ August 2012
Received 1.75 million in venture capital investment

Awards for Dr. Bowles
2013 van Ameringen Endowed Chair in Nursing Excellence
2012 Fellow in the American College of Medical Informatics
2012 Biobehavioral Health System Department Award for Faculty Mentorship
2012 Barbara J. Lowery Doctoral Student Organization Faculty Award
2011 Summer Institute of Nursing Informatics Best Research Paper Award
2011 Recipient of the first Omaha System Nursing Research Award
2010 Finalist for the Harriet Werley Award for best nursing paper at the American Medical Informatics Association International Conference, Washington, DC
2010 Eastern Nursing Research Society Distinguished Contributions to Nursing Research Award
2009 Rutgers Annual International Nursing Technology Recognition Award for the Advancement of Computer Technology in Healthcare
2009 Espirit Award given by the Visiting Nurse Service of New York to the Beatrice Renfield Evidence Based Practice Fellows Program for contributions to practice and research
2008 Nursing Research Award, Heart Failure Society of America
2007 Fellow of the American Academy of Nursing
2004-present Beatrice Renfield Visiting Nurse Scholar, Visiting Nurse Service of New York

11. Public testimony from participants
Press release from a customer, Thomas Jefferson University Hospital (see attached)

Press release from the University of Pennsylvania Health System (see attached)

12. Has your innovation spread beyond the original work? If so, please describe what that spread has been.

Dr. Bowles and her interprofessional team invented the D2S2 through an NINR grant (NRO1-007674, 2001-2004). Further development and testing (2004-2009) made it useful for clinical application.
In 2011, Dr. Bowles’ and Co-Inventor Dr. Mary Naylor registered the D2S2 as an invention at the University of Pennsylvania (Penn) in 2011 and a patent is pending 46483-6007-PI-US/600771.

In 2012, Dr. Bowles founded RightCare Solutions, an information technology company, that licensed the D2S2 from Penn and the inventors.

RightCare Solutions was co-founded by Dr. Bowles and her former student Eric Heil. Eric was a research assistant on the original NINR funded study. That student is now the company’s Chief Executive Officer.

RightCare Solutions has further developed the invention into a software platform that improves the decision-making and workflow for case managers and discharge planners and has completed installations in the electronic health record in 6 hospitals. [www.rightcaresolutions.com](http://www.rightcaresolutions.com)

RightCare Solutions has completed assessments using the D2S2 on over 30,000 patients.

Eight additional hospitals are presently reviewing contracts to purchase a license to use D2S2 including sites in New Jersey, New York, Maryland, Louisiana, and Texas.

Johns Hopkins University Hospitals are using it in a CMS demonstration project and New York University Hospital just completed a pilot study with us and will install this year.

Dr. Bowles and her interprofessional team continue to develop discharge decision support with an NINR funded competing renewal (NRO1-007674, 2010-2015). This study expands the methodology used to develop the D2S2 to build decision support that not only identifies the right patient in need of PAC, but also suggests the right level of care. This study will expand the impact of this work and continue its dissemination across the nation and globally.

13. Funding agencies (if applicable)
   Two RO1s from the National Institute of Nursing Research (NRO1-007674 2001- 2015)

Please send completed application along with any documentation for review to:

Cheryl Sullivan, CEO
American Academy of Nursing
1000 Vermont Ave, NW Suite 910
Washington, DC 20005
Fax (202) 777.0107
Email Cheryl_Sullivan@AANnet.org
Email Subject Edge Runner Application