

RN4CAST

nurse forecasting in Europe

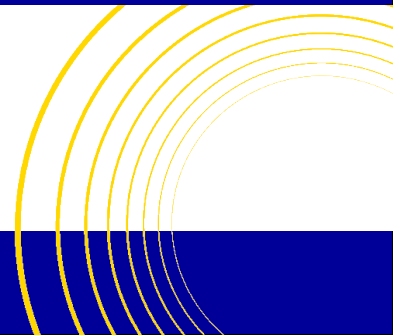
THE RN4CAST STUDY

ANNE MARIE RAFFERTY

KING'S
College
LONDON



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RN4CAST RATIONALE

- Worldwide numeric, skill, and geographic imbalances in healthcare and nursing workforce.
- The workforce crisis is likely to increasingly affect quality and safety of healthcare and health system performance.
- Strategic investments in healthcare and nursing workforce are expected to accelerate health gains by enhancing the performance of health care organizations and health systems.

- Nursing workforce planning and forecasting efforts...
 - have a poor record of accurately predicting future nursing workforce needs and of informing policy interventions that avoid cyclical shortages.
 - don't take into account the dynamics between nurse-to-patient ratios, skill mix, nurse education level, and nursing work environment on one hand and nurse wellbeing and patient outcomes on the other hand.

Example of the dynamics between nursing organization of care and patient outcomes and nurse wellbeing (Aiken et al., 2010)

Nurse staffing levels in Californian hospitals increased substantially after mandated minimum nurse-to-patient ratios. When compared to states with higher workloads, Californian workloads are associated to lower patient mortality, and lower nurse burnout, job dissatisfaction and, and better nurse-perceived quality of care.

RN4CAST OBJECTIVE

The RN4CAST project aims innovative forecasting methods by addressing not only volumes, but quality of nursing staff as well as quality of patient care.

7th Framework Programme for Research and Technological Development



- 2007-2013
- €50 billion funding for health, energy, space, ICT,...
- 'RN4CAST: nurse forecasting in Europe': €3 million funding for 2009-2011
 - Theme Health
 - Optimising the delivery of health care
 - Quality, efficiency and solidarity of health care systems, including transnational health systems
 - Health care human resources planning in nursing

- RN4CAST project co-ordination
 - co-ordinator: Walter Sermeus, Katholieke Universiteit Leuven, Belgium
 - vice-coordinator: Linda Aiken, University of Pennsylvania
 - manager: Koen Van den Heede, Katholieke Universiteit Leuven, Belgium

- RN4CAST Partners
 - 12 European partners
 - U.S.
 - 3 International Cooperating Partner Countries of the EU

RN4CAST CONSORTIUM



| | |
|----------------------|--------------------------------|
| Belgium | Catholic University Leuven |
| England | King's College London |
| Finland | Kuopio University |
| Germany | Technical University Berlin |
| Greece | University of Athens |
| Ireland | Dublin City University |
| Netherlands | UMC St Radboud Nijmegen |
| Norway | Norwegian Knowledge Centre HSR |
| Poland | Jagiellonian University |
| Spain | Institute of Health Carlos III |
| Sweden | Karolinska Institute |
| Switzerland | Basel University |
| United States | University of Pennsylvania |
| Botswana | University of Botswana |
| China | Sun Yat-sen University |
| South Africa | North-West University |

- Multicountry, multilevel, cross-sectional design to obtain important unmeasured factors in forecasting models, collected at the hospital, nursing unit, and individual nurse and patient level:
 - Hospital profile data
 - Nurse survey
 - Patient outcomes data
 - Patient survey
- Setting
 - At least 30 general acute hospitals in each European country.
 - At least 2 general surgical and internal medicine wards in each hospital.

- **Hospital profile data**
 - Organizational context
 - Bed size
 - Teaching status
 - Technology level
 - Staffing numbers
 - Nurses
 - Physicians
 - Organization and management of nursing work

RN4CAST DESIGN

| Country | Nurse survey | | Patient survey | |
|--------------|--------------|-------------|----------------|------------|
| | N hospitals | N units | N hospitals | N units |
| Belgium | 67 | 272 | 60 | 244 |
| England | 46 | 413 | -- | -- |
| Finland | 32 | 126 | 32 | 128 |
| Germany | 49 | 199 | 13 | / |
| Greece | 24 | 65 | 24 | 65 |
| Ireland | 30 | 112 | 10 | 38 |
| Netherlands | 28 | 131 | -- | -- |
| Norway | 35 | 238 | -- | -- |
| Poland | 30 | 119 | 30 | 119 |
| Spain | 33 | 281 | 15 | 104 |
| Sweden | 79 | 79 | -- | -- |
| Switzerland | 35 | 134 | 34 | 127 |
| Total | 486 | 2169 | 210 | 825 |

- **Nurse survey**

- Work environment: Practice Environment Scale of the Nursing Work Index
- Nurse wellbeing: burnout
job satisfaction
intention to leave the hospital/profession
- Nurse-perceived quality: unit and hospital level quality of care
readiness of patients for discharge
frequency of adverse events,
safety climate (AHRQ safety culture)

- Nurse survey

- Staffing: patient-to-nurse ratios
- Demographics: education level
 - migration
 - age
 - gender
 - sex
 - experience as a nurse

RN4CAST DESIGN

| Country | Distributed | Retreived | Response rate |
|--------------|--------------|--------------|----------------|
| Belgium | 4421 | 3186 | 72,07 % |
| England | 7609 | 2990 | 39,30 % |
| Finland | 2450 | 1131 | 46,16 % |
| Germany | 3210 | 1508 | 46,98 % |
| Greece | 675 | 367 | 54,37 % |
| Ireland | 2495 | 1406 | 56,35 % |
| Netherlands | 3228 | 2217 | 68,68 % |
| Norway | 6600 | 3752 | 56,85 % |
| Poland | 2677 | 2605 | 57,31 % |
| Spain | 3340 | 2804 | 83,95 % |
| Sweden | 14624 | 10133 | 69,29 % |
| Switzerland | 2261 | 1632 | 72,18 % |
| Total | 53590 | 33731 | 62,94 % |

- **Patient outcomes**

Derived from routinely collected administrative databases

- Patient demographics
- Characteristics of the hospital admission and discharge
- Principal and secondary International Classification of Diseases diagnosis and procedure codes
- Diagnosis Related Groups assignment
- Outcomes: length-of-stay
discharge status (mortality and 30-day mortality)

- **Patient survey**

Derived from the Consumer Assessment of Healthcare Providers and Systems survey

- Communication with nurses and doctors
- Responsiveness of hospital staff
- Pain management
- Communication about medicines
- Discharge information
- Cleanliness and quietness of the hospital environment
- Overall rating of the hospital
- Willingness to recommend the hospital to friends and family

RN4CAST DESIGN

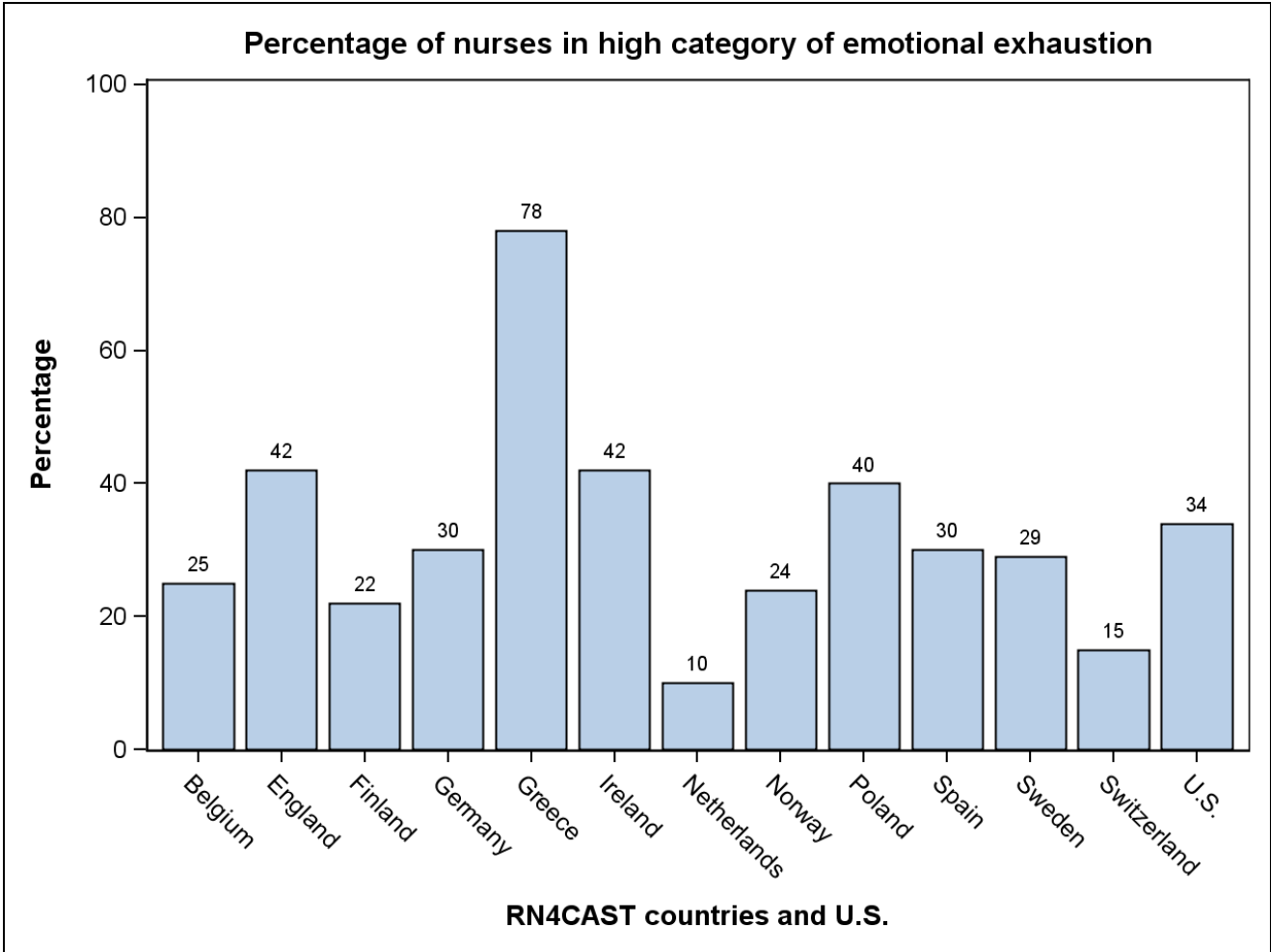
| Country | Distributed | Retreived | Response rate |
|------------------------------|--------------|--------------|---------------|
| Belgium | 3870 | 2623 | 67.78% |
| England | -- | -- | -- |
| Finland | 3752 | 1947 | 51.89% |
| Germany | 390 | 262 | 67.18% |
| Greece | 1334 | 616 | 46.18% |
| Ireland | 307 | 285 | 92.83% |
| Netherlands | -- | -- | -- |
| Norway | -- | -- | -- |
| Poland | 4416 | 4136 | 93.66% |
| Spain | / | 470 | / |
| Sweden | -- | -- | -- |
| Switzerland | 1458 | 997 | 68.38% |
| Total (without Spain) | 15227 | 10866 | 71.36% |

RN4CAST RESULTS

- Cross-national findings on the relationship between hospital organization of nursing care and patient satisfaction and nurse wellbeing.
 - Objective: determine the effects of hospital nurse practice environments and workloads on patient satisfaction, nurse-perceived quality of care, and factors affecting nurse retention.
 - Design: nurse and patient survey samples in the 12 European RN4CAST countries (about 34000 nurses and 11000 patients) and in four U.S states (about 27000 nurses).

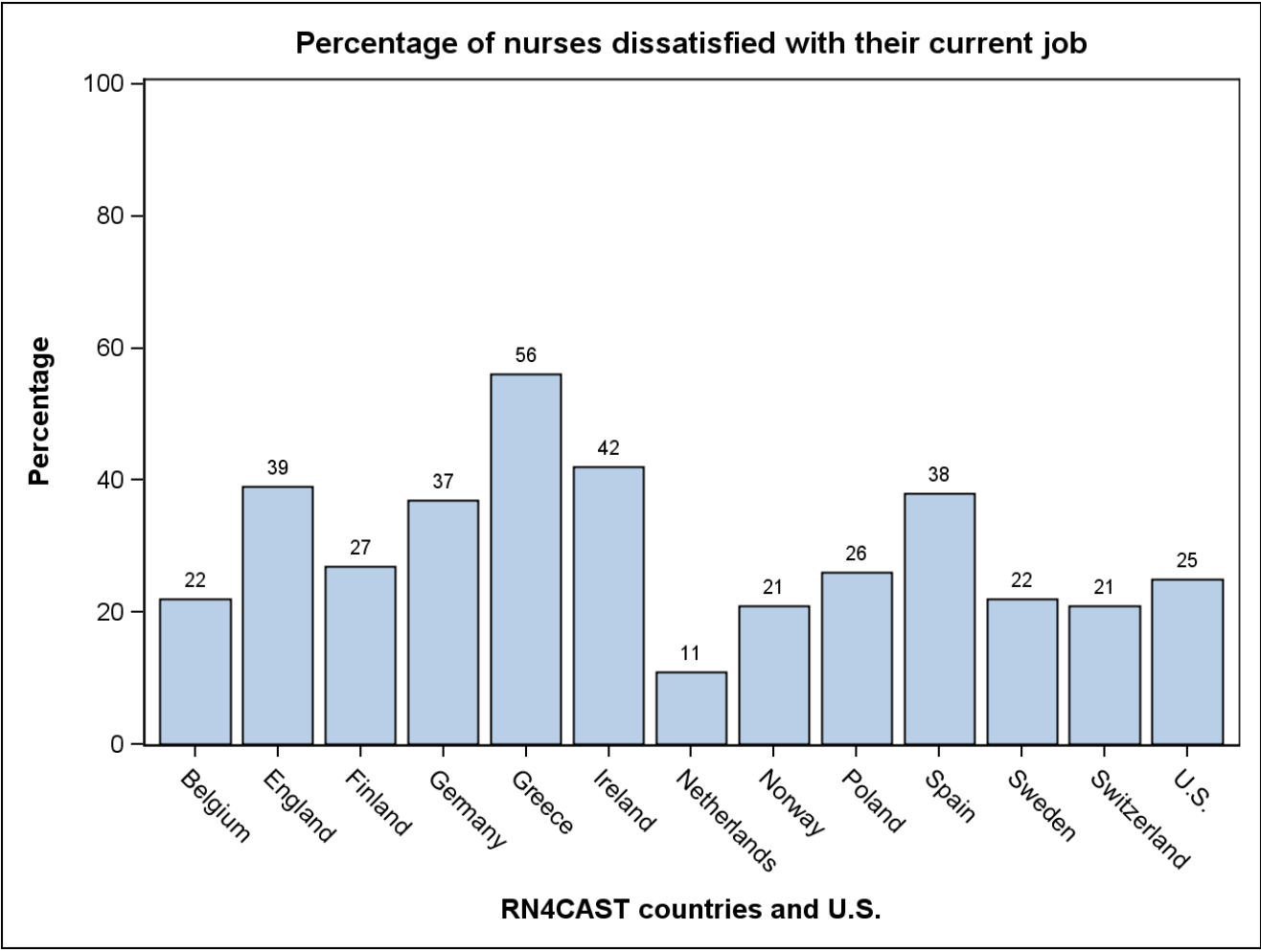
RN4CAST RESULTS

Nurse wellbeing: burnout



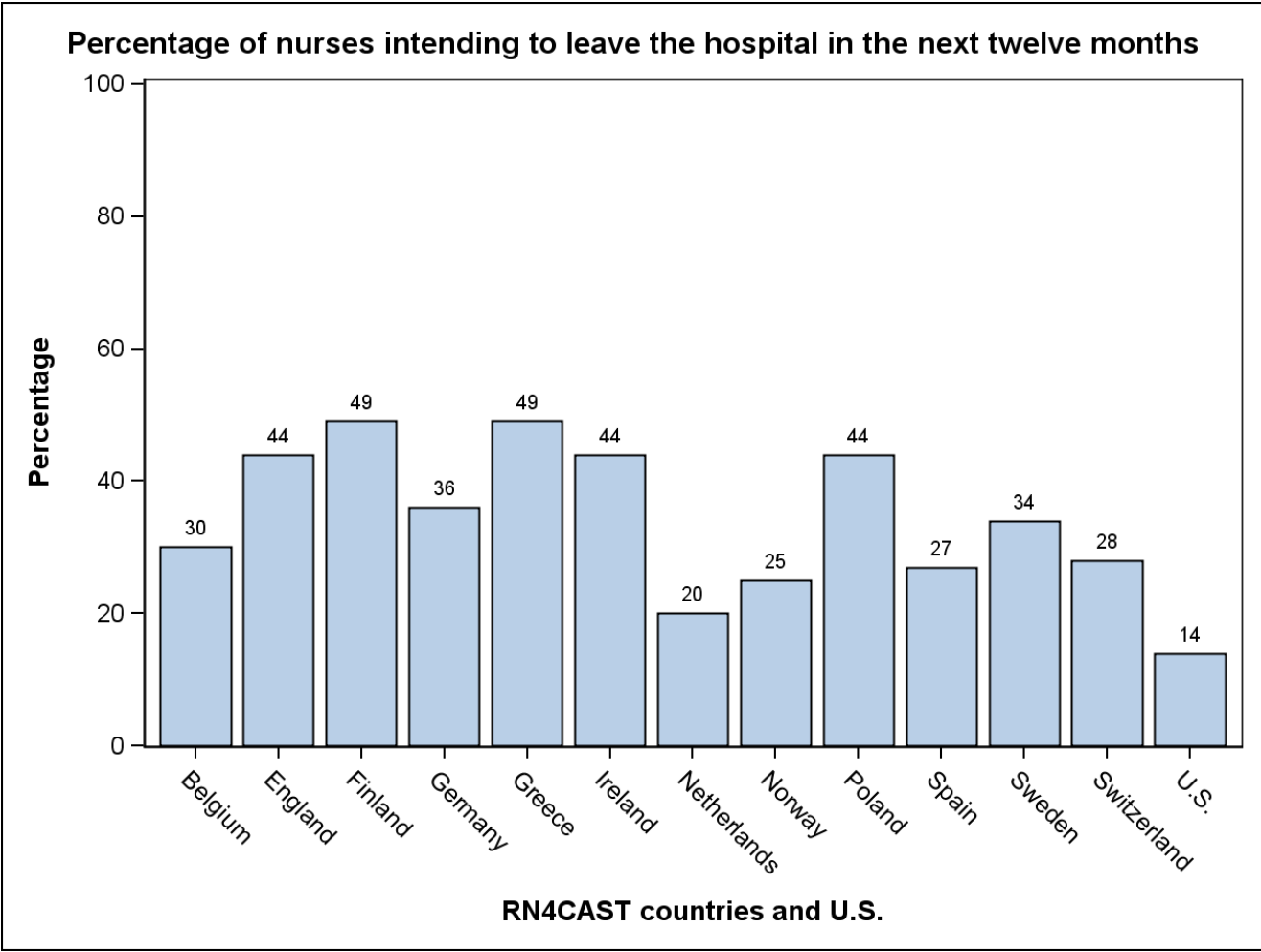
RN4CAST RESULTS

Nurse wellbeing: job dissatisfaction



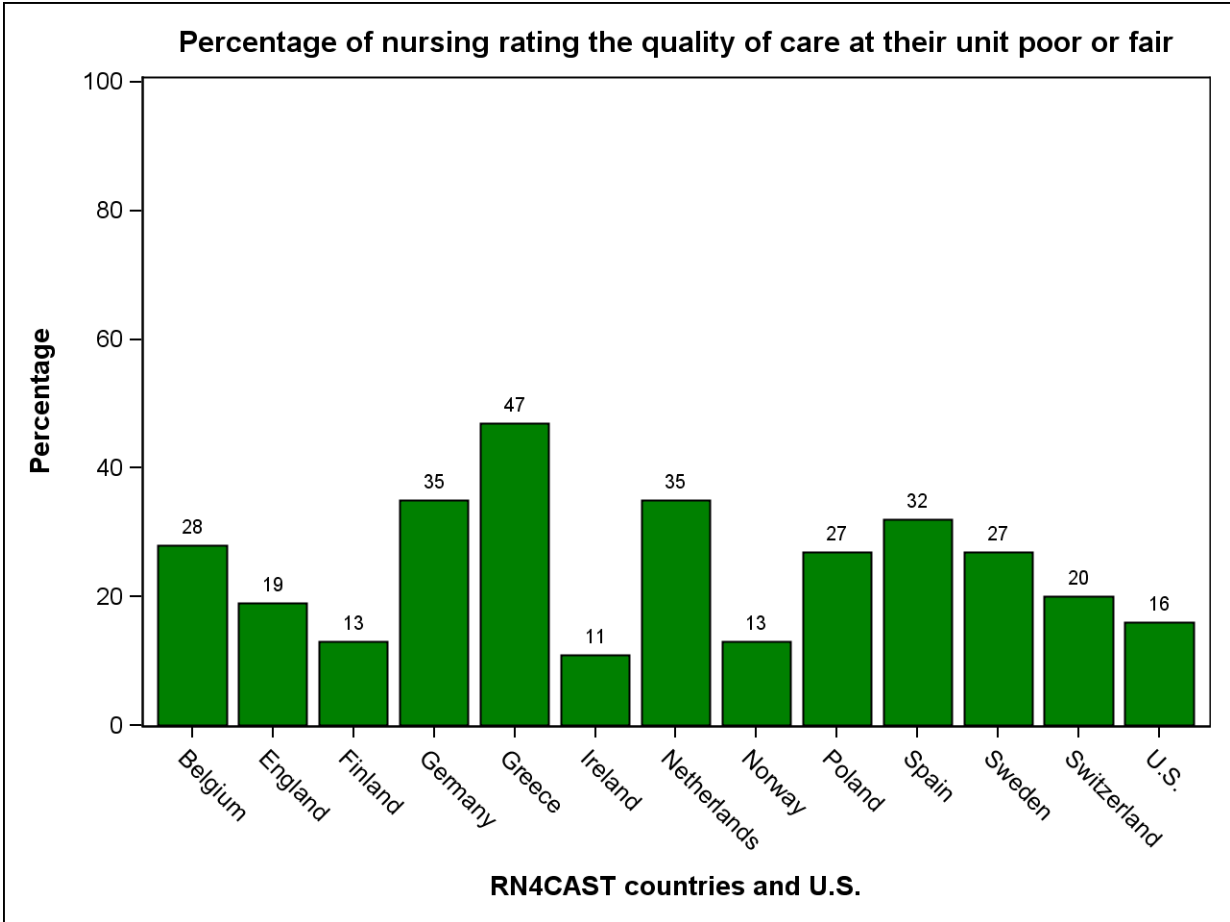
RN4CAST RESULTS

Nurse wellbeing: intention to leave



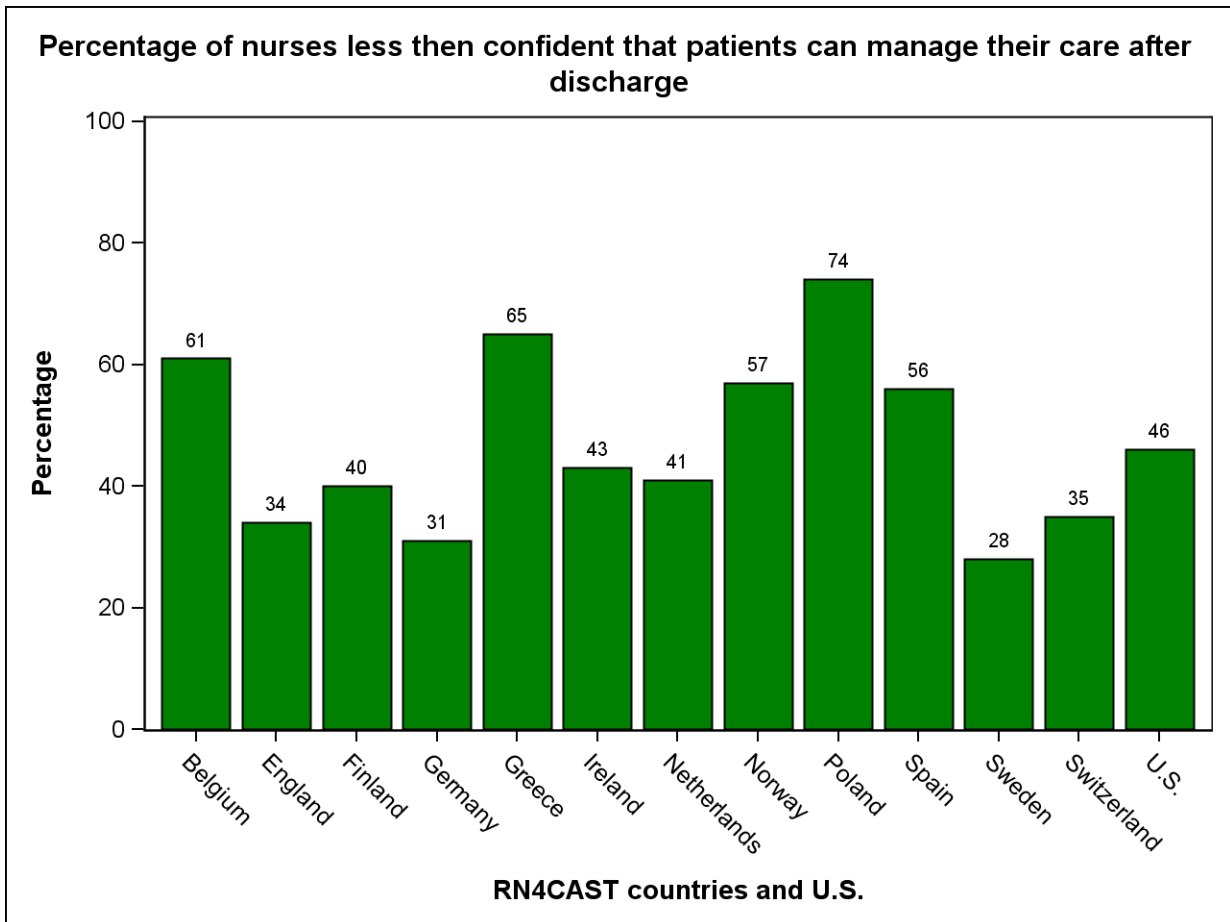
RN4CAST RESULTS

- Nurse-perceived quality of care: poor or fair unit quality of care



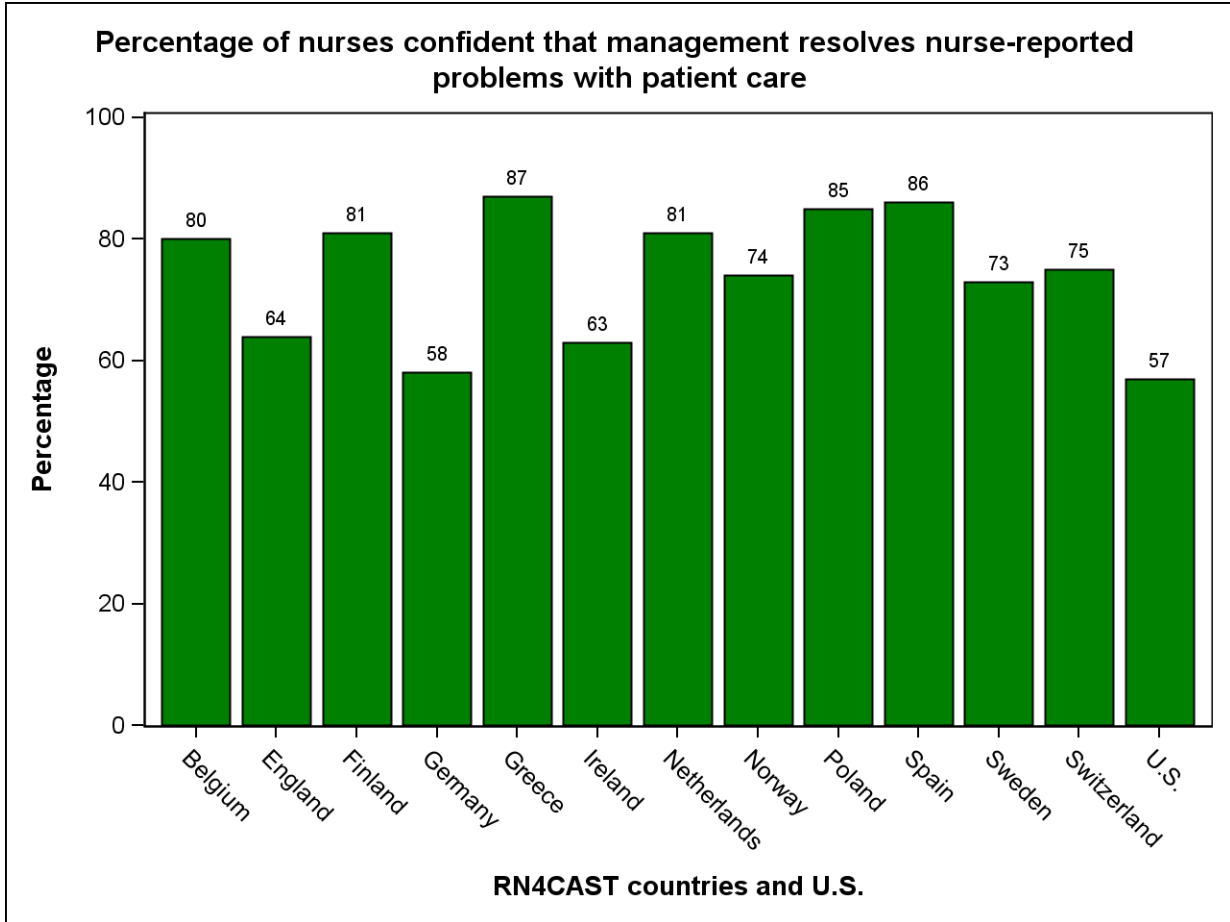
RN4CAST RESULTS

- Nurse-perceived quality of care: less than confident that patients can manage their care after discharge



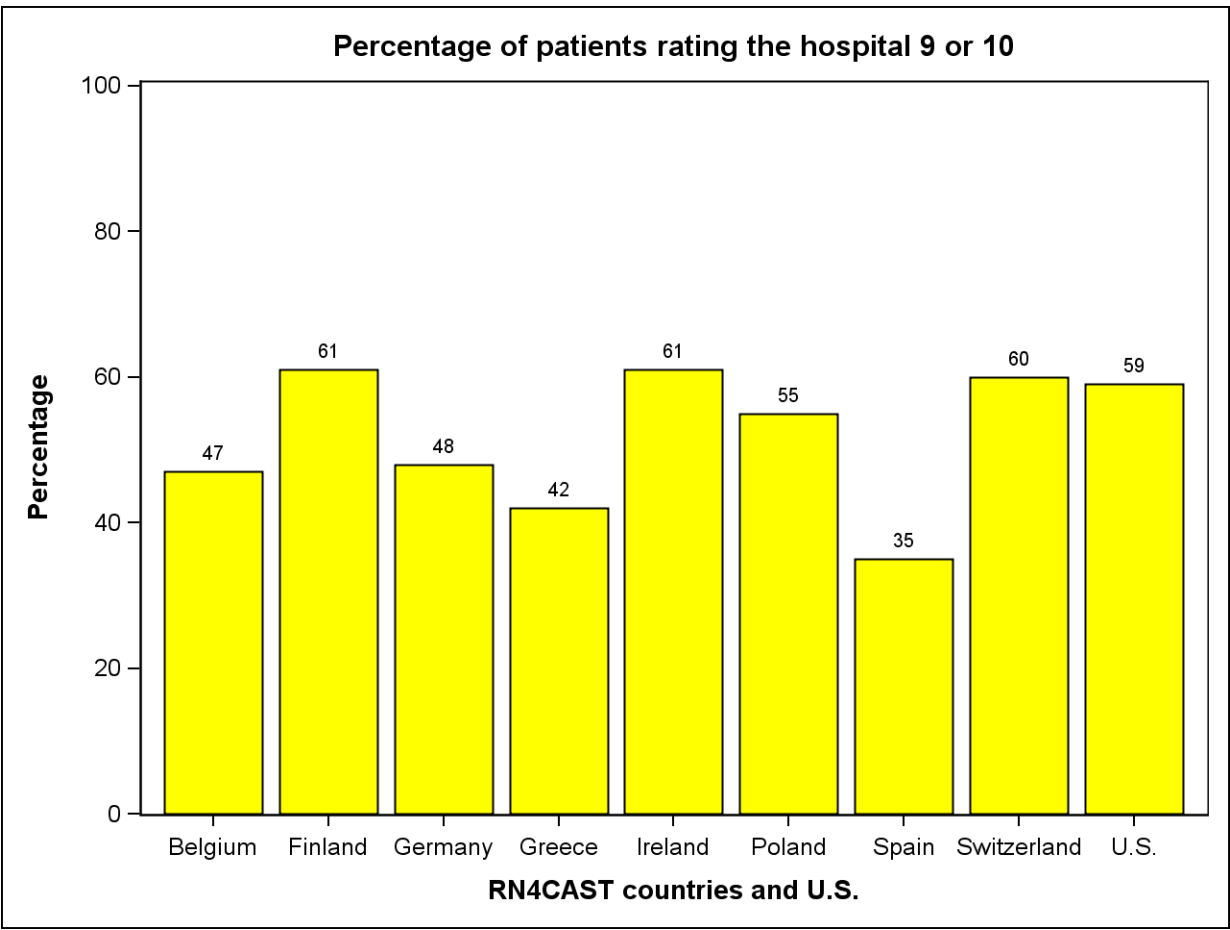
RN4CAST RESULTS

- Nurse-perceived quality of care: less than confident that management resolves nurse-reported problems with patient care



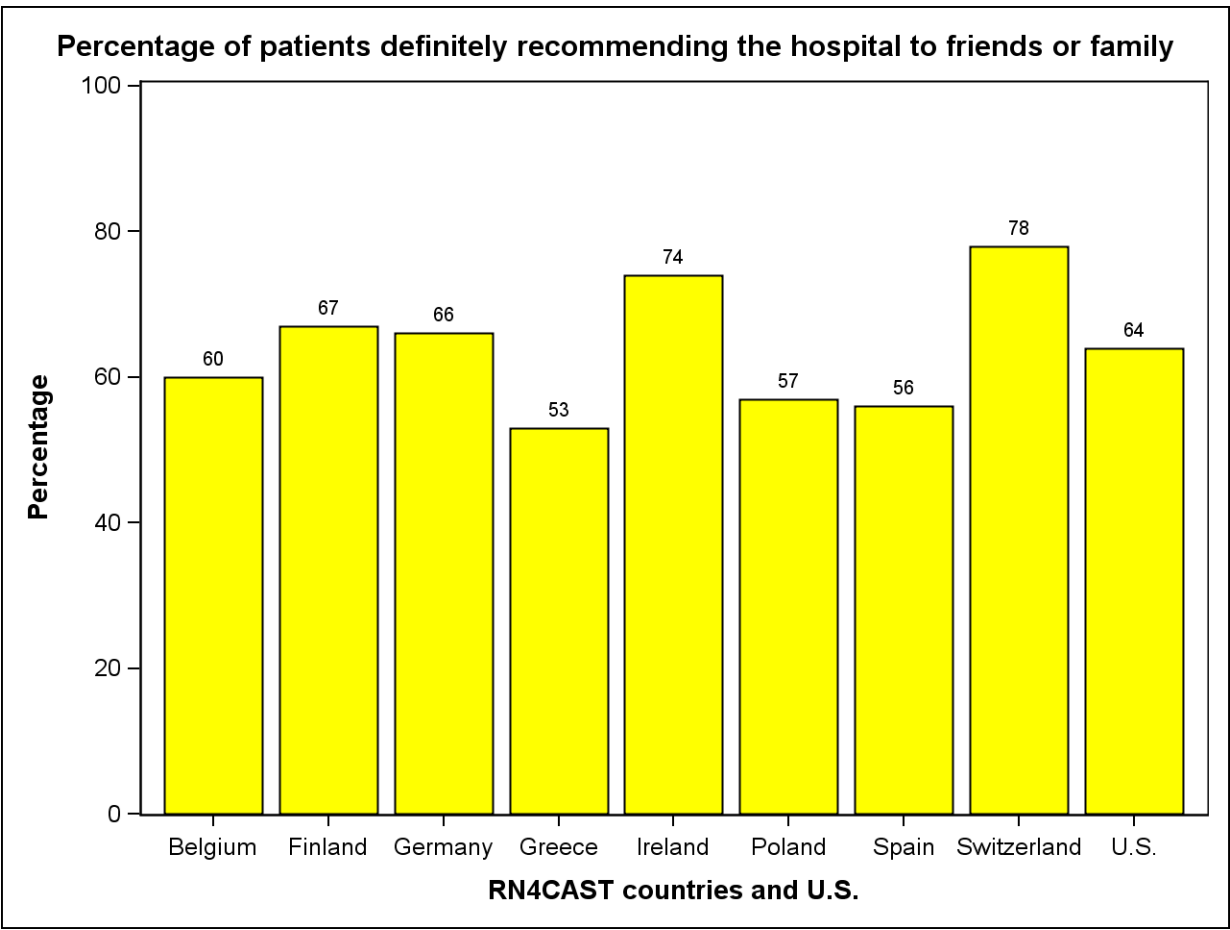
RN4CAST RESULTS

- Patient satisfaction with care: hospital rated 9 or 10



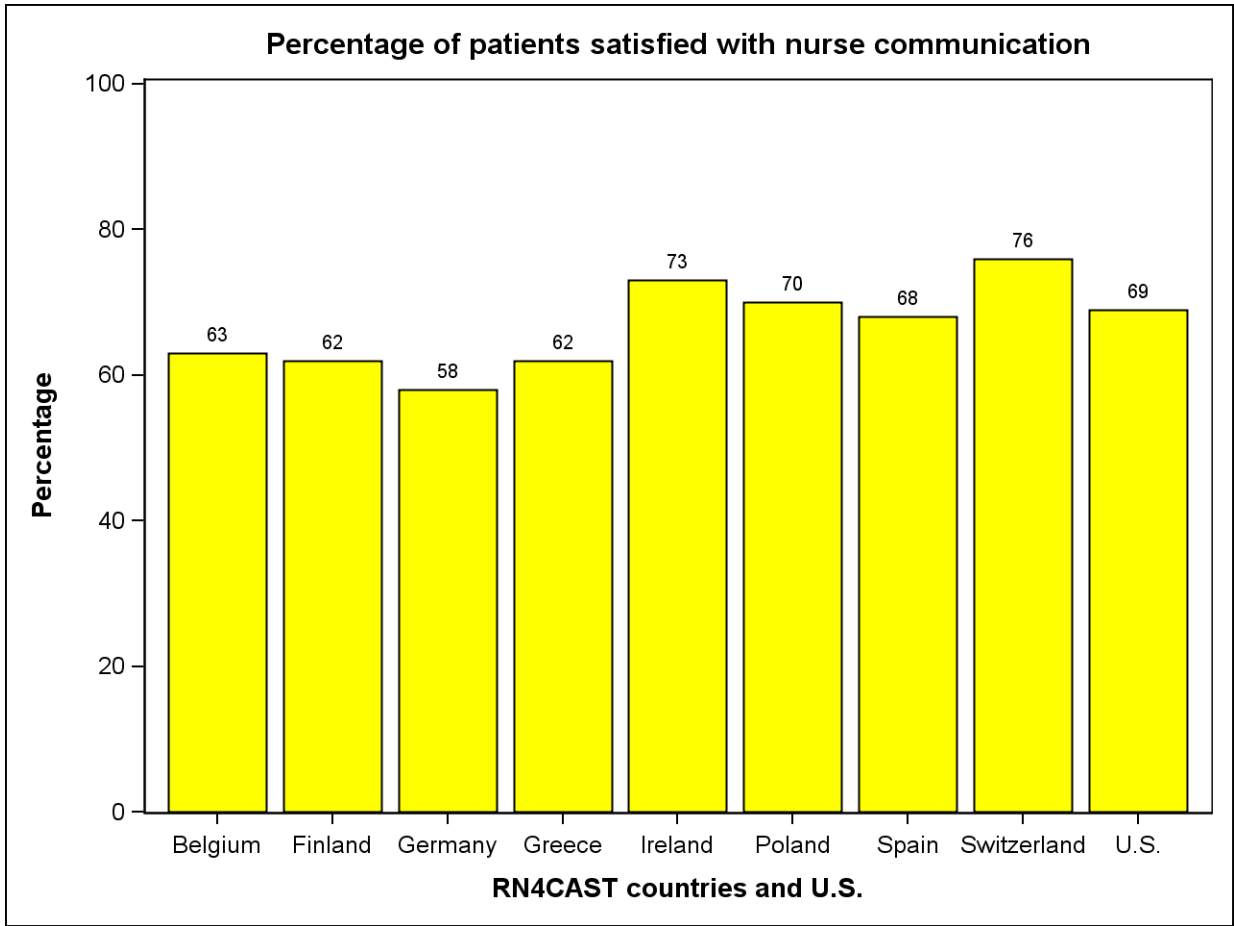
RN4CAST RESULTS

- Patient satisfaction with care: definitely recommending the hospital



RN4CAST RESULTS

- Patient satisfaction with care: good nurse communication



RN4CAST RESULTS

- Organization of care and nurse wellbeing/nurse-perceived quality

| | | Europe | | | |
|---|----------------------|---|-------|-----------------------|-------|
| | | Odds Ratios from Models in Which Effects are Modeled - | | | |
| | | Separately | | Jointly with controls | |
| Outcome | Effect | OR | P | OR | P |
| High Burnout | Practice Environment | 0.69 | <.001 | 0.68 | <.001 |
| | Staffing | 1.11 | <.001 | 1.08 | <.001 |
| Job Dissatisfaction | Practice Environment | 0.63 | <.001 | 0.53 | <.001 |
| | Staffing | 1.14 | <.001 | 1.1 | <.001 |
| Intent to Leave | Practice Environment | 0.72 | <.001 | 0.61 | <.001 |
| | Staffing | 1.06 | <.001 | 1.05 | .010 |
| Poor/Fair Unit Quality | Practice Environment | 0.48 | <.001 | 0.54 | <.001 |
| | Staffing | 1.19 | <.001 | 1.18 | <.001 |
| Less Than Confident patients can manage care | Practice Environment | 0.47 | <.001 | 0.69 | <.001 |
| | Staffing | 1.11 | <.001 | 0.99 | .772 |
| Less Than Confident Mgmt. resolves pt. problems | Practice Environment | 0.51 | <.001 | 0.54 | <.001 |
| | Staffing | 1.06 | .001 | 1.03 | .232 |

RN4CAST RESULTS

- Organization of care and nurse wellbeing/nurse-perceived quality

| | | United States | | | |
|---|----------------------|---|-------|-----------------------|-------|
| | | Odds Ratios from Models in Which Effects are Modeled - | | | |
| | | Separately | | Jointly with controls | |
| Outcome | Effect | OR | P | OR | P |
| High Burnout | Practice Environment | 0.69 | <.001 | 0.71 | <.001 |
| | Staffing | 1.12 | <.001 | 1.03 | .022 |
| Job Dissatisfaction | Practice Environment | 0.58 | <.001 | 0.6 | <.001 |
| | Staffing | 1.17 | <.001 | 1.06 | <.001 |
| Intent to Leave | Practice Environment | 0.7 | <.001 | 0.69 | <.001 |
| | Staffing | 1.1 | <.001 | 1.03 | .197 |
| Poor/Fair Unit Quality | Practice Environment | 0.52 | <.001 | 0.54 | <.001 |
| | Staffing | 1.2 | <.001 | 1.06 | .001 |
| Less Than Confident patients can manage care | Practice Environment | 0.71 | <.001 | 0.72 | <.001 |
| | Staffing | 1.1 | <.001 | 1.04 | .005 |
| Less Than Confident Mgmt. resolves pt. problems | Practice Environment | 0.56 | <.001 | 0.56 | <.001 |
| | Staffing | 1.12 | <.001 | 1.01 | .655 |

RN4CAST RESULTS

Organization of care/nurse wellbeing and patient satisfaction

Odds Ratios Indicating the Effects of the Different Factors
on the Odds of -

| Nursing Factors/ Nurse Characteristics | Rating Hospital 9 or 10 | | Definitely Recommending Hospital | | Saying That Nurses Always Listen, Understand, and Treat Them with Respect | |
|---|----------------------------|---------|-------------------------------------|---------|---|---------|
| | Europe | US | Europe | US | Europe | US |
| Staffing | 0.93** | 0.96*** | 0.94** | 0.95*** | 0.98 | 1.00 |
| Practice environment | 1.16* | 1.18*** | 1.20** | 1.23*** | 1.11* | 1.06** |
| Percent of Nurses That - | | | | | | |
| Would Recommend Their Hospital | 1.19** | --- | 1.18** | --- | 1.09** | --- |
| Report that Care in Their Hospital is Fair or Poor | 0.88** | 0.88*** | 0.87** | 0.87*** | 0.94** | 0.93*** |
| Are High on Burnout | 0.93** | 0.93*** | 0.94* | 0.93*** | 0.95* | 0.98 |
| Are Dissatisfied with Job | 0.92** | 0.90*** | 0.91** | 0.91*** | 0.95** | 0.97* |

RN4CAST RESULTS

- 13 differently-organized and differently financed health care systems have hospital quality, safety and staff retention problems associated with organizational behaviors related to nursing.
- Elements of hospital organization of nursing care are associated to nurse wellbeing, nurse-perceived quality of care, and patient satisfaction.
- Hospital organization of nursing care is a promising area for international as well as national focus to improve quality of hospital care and the retention of a qualified and committed nurse workforce.

RN4CAST FURTHER STEPS

- Study the relation between hospital organization of nursing care and clinical patient outcomes (mortality, 30-day mortality, length-of stay, adverse events).
- Integrate findings in workforce planning models.