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# Introduction to the challenges for HWF employment

## Linking HWF and quality of care

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Professor in Healthcare Management  
KU Leuven



# Outline

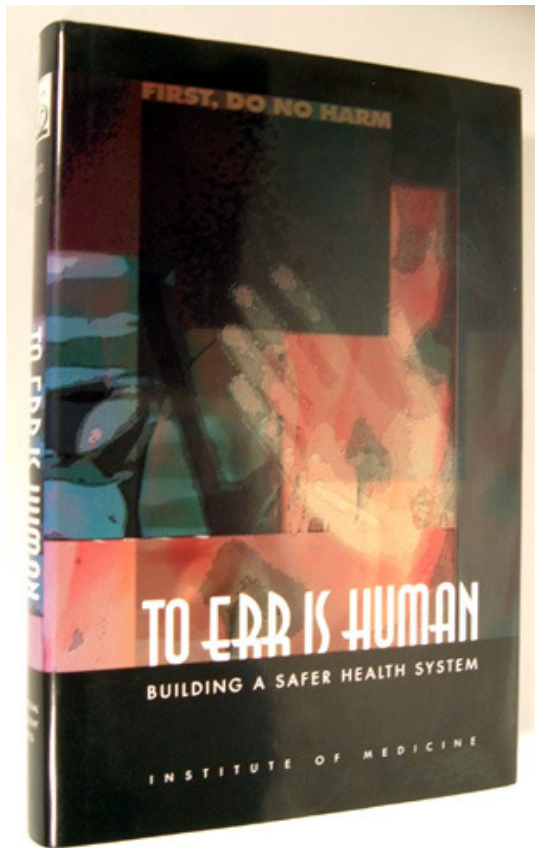
- How good is the quality of our health system ?
- The role of HWF in delivering quality of care
- Investing in HWF, lessons from RN4CAST
  - Employment: nurse staffing & innovation
  - Skills: qualifications & scope of practice
  - Health worker: work environment

# Quality of care and patient safety

## To Err Is Human: Building a Safer Health System

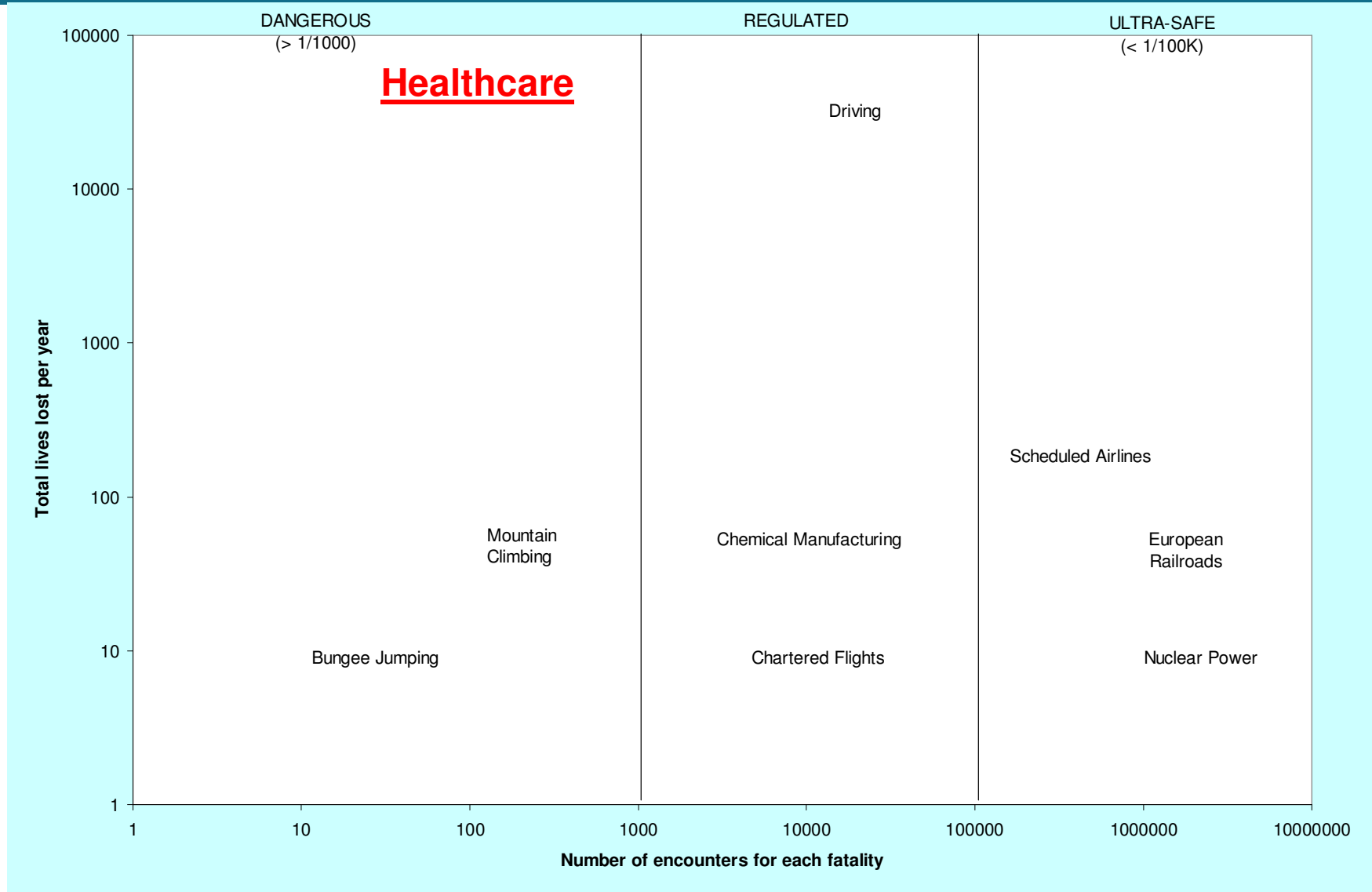
Linda T. Kohn, Janet M. Corrigan, and Molla S. Donaldson, Editors; Committee on Quality of Health Care in America, Institute of Medicine

ISBN: , 312 pages, 6 x 9, (2000)

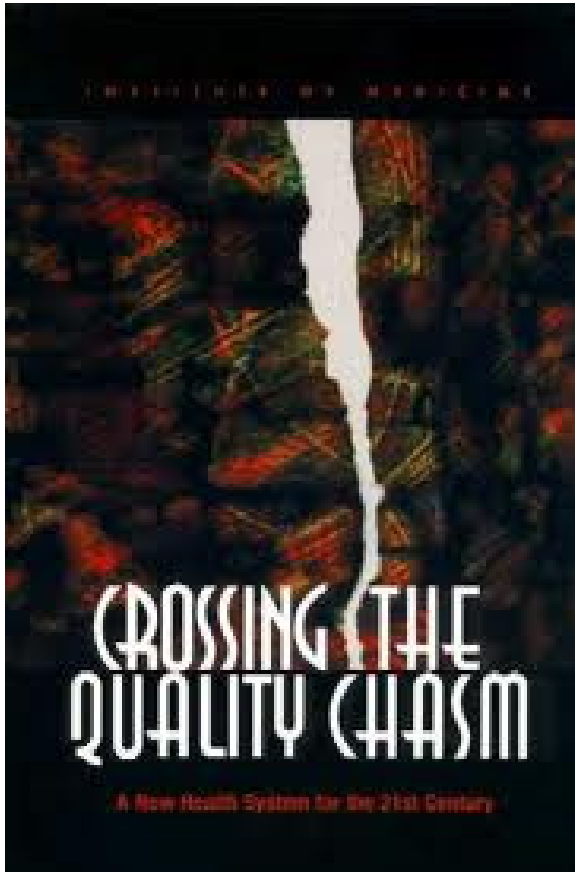


- 44,000 – 98,000 deaths because of “Adverse Events”
- 8<sup>e</sup> cause of death USA
- More than car accidents and breast cancer
- IOM 1999: 5% - 5%
- Levinson 2010: 13,5% – 10%

# How safe is healthcare?



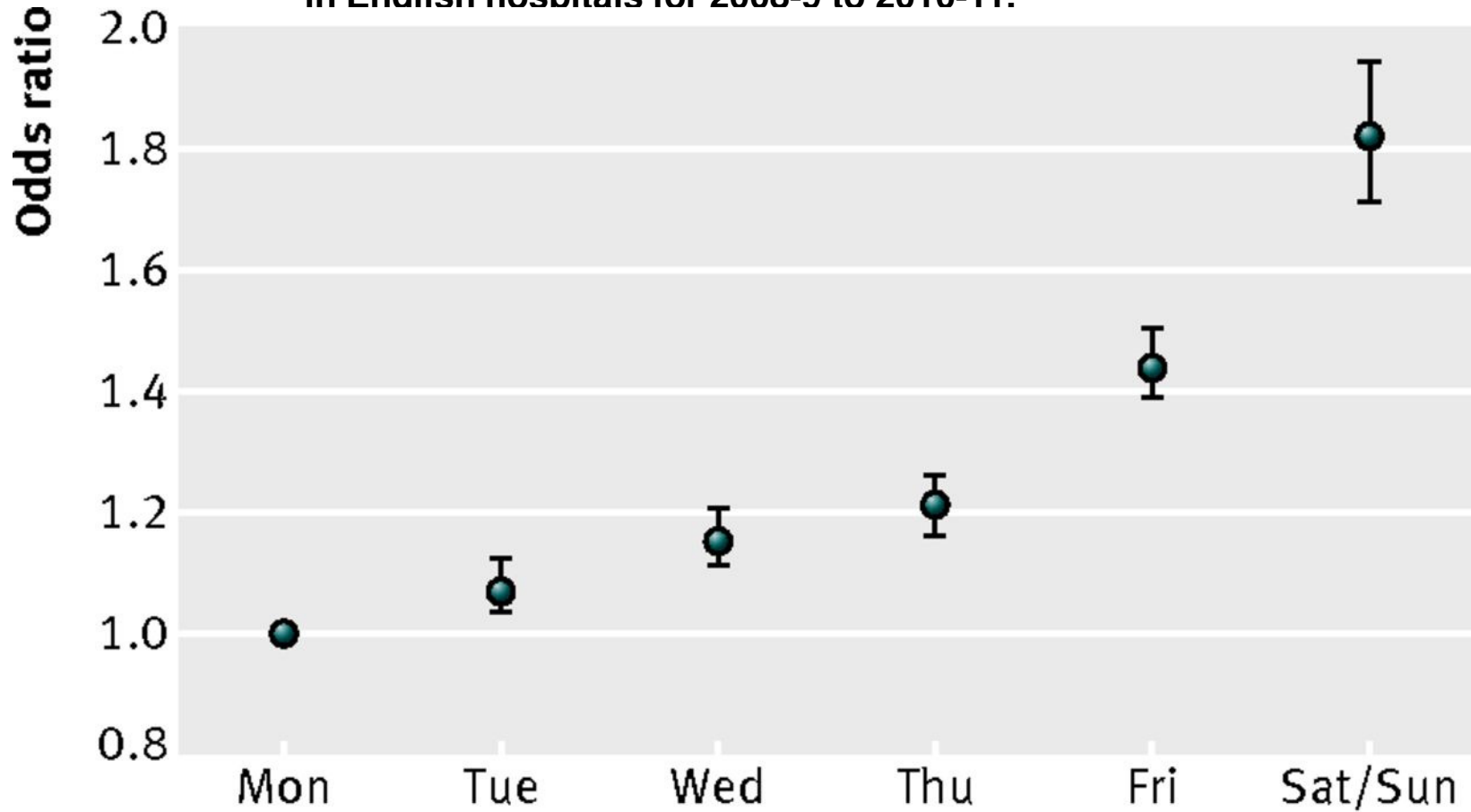
# The six dimensions of quality of care



# Timely ?



Adjusted odds of death and 95% confidence intervals by day of procedure in English hospitals for 2008-9 to 2010-11.



Days of week **EUVEN**

# Effectiveness ?



**SPECIAL ARTICLE**

## The Quality of Health Care Delivered to Adults in the United States

Elizabeth A. McGlynn, Ph.D., Steven M. Asch, M.D., M.P.H., John Adams, Ph.D., Joan Keesey, B.A., Jennifer Hicks, M.P.H., Ph.D., Alison DeCristofaro, M.P.H., and Eve A. Kerr, M.D., M.P.H.

### BACKGROUND

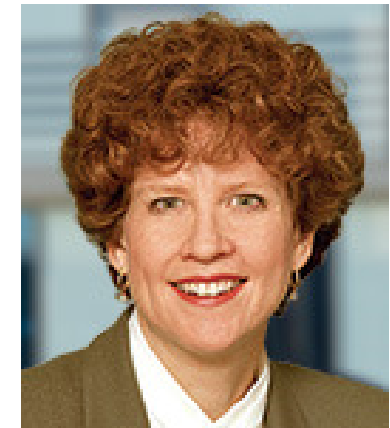
We have little systematic information about the extent to which standard processes involved in health care — a key element of quality — are delivered in the United States.

### METHODS

We telephoned a random sample of adults living in 12 metropolitan areas in the United States and asked them about selected health care experiences. We also received written consent to copy their medical records for the most recent two-year period and used this information to evaluate performance on 439 indicators of quality of care for 30 acute and chronic conditions as well as preventive care. We then constructed aggregate scores.

### RESULTS

Participants received 54.9 percent (95 percent confidence interval, 54.3 to 55.5) of recommended care. We found little difference among the proportion of recommended preventive care provided (54.9 percent), the proportion of recommended acute care provided (53.5 percent), and the proportion of recommended care provided for chronic conditions (56.1 percent). Among different medical functions, adherence to the processes involved in care ranged from 52.2 percent for screening to 58.5 percent for follow-up care. Quality varied substantially according to the particular medical condition, ranging from 78.7 percent of recommended care (95 percent confidence interval, 73.3 to 84.2) for senile cataract to 10.5 percent of recommended care (95 percent confidence interval, 6.8 to 14.6) for alcohol dependence.



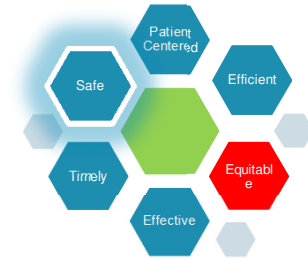
## RAND:

- 30 conditions
- 439 indicators
- 54.9%

N Engl J Med 2003;348:2635-45.

Copyright © 2003 Massachusetts Medical Society.

# Equitable ?



## Map 7: Percentage of people in the National Diabetes Audit (NDA) with Type 2 diabetes receiving all nine key care processes by PCT

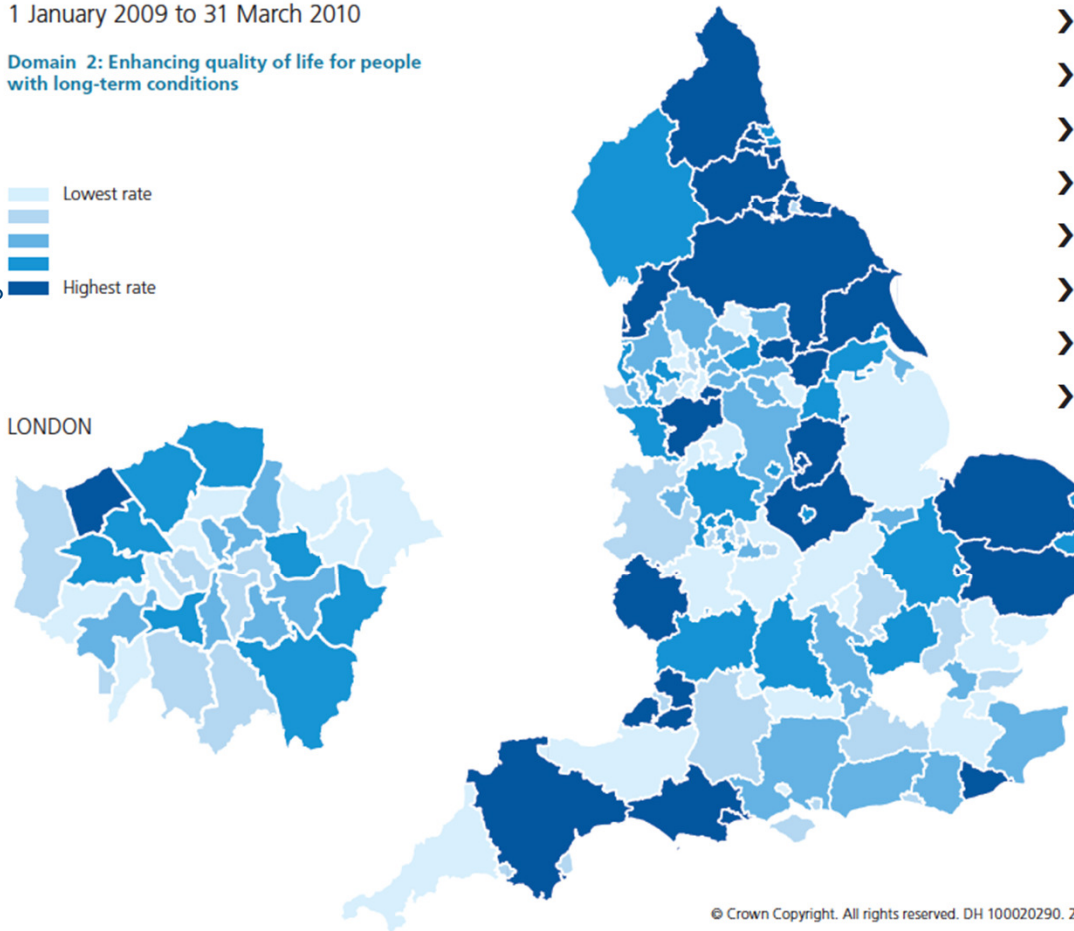
1 January 2009 to 31 March 2010

Domain 2: Enhancing quality of life for people with long-term conditions

Ave=52%

7% - Lowest rate  
-  
71% - Highest rate

LONDON



- › HbA1c measurement;
- › Cholesterol measurement;
- › Creatinine measurement;
- › Micro-albuminuria measurement;
- › Blood pressure measurement;
- › Body mass index measured;
- › Smoking status recorded;
- › Eye examination;
- › Foot examination.

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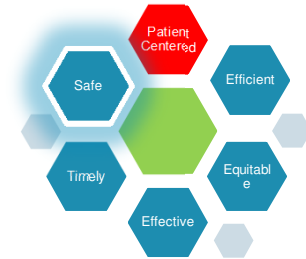
<http://www.rightcare.nhs.uk/index.php/nhs-atlas/atlas-downloads/>



# Efficiency ?



# Patient-Centered?



## Robert Francis Report:

- 400 – 1200 extra deaths
- Patients left uncared
- Too financial driven executive board

News > Society > Mid Staffordshire NHS Trust

## Mid Staffordshire NHS trust left patients humiliated and in pain

Francis inquiry finds 'shocking' failures in care as hospital focused on cutting costs and hitting government targets

Sarah Boseley

guardian.co.uk, Wednesday 24 February 2010 17.19 GMT

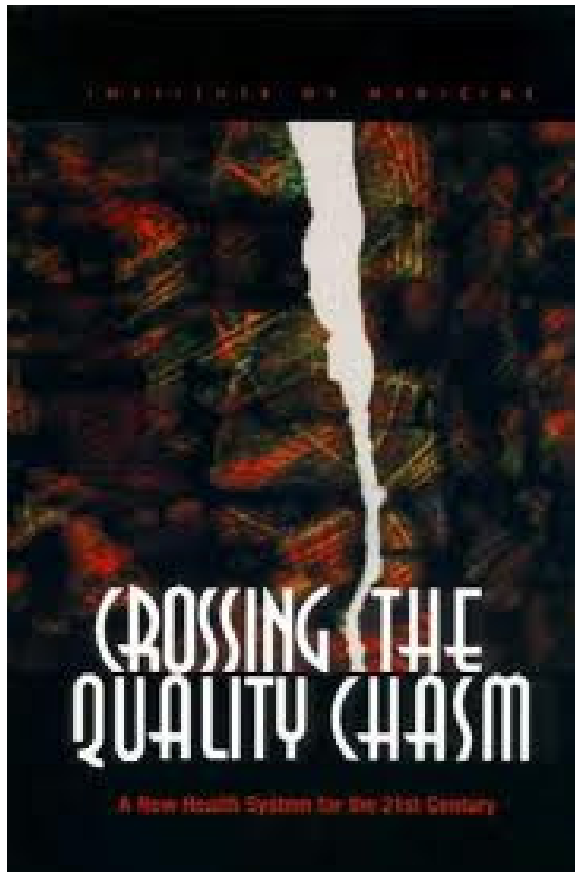
## Stafford Hospital: The victims of the hospital scandal



In the years leading up to 2008 hundreds of people died at Stafford Hospital amid "appalling" levels of care.

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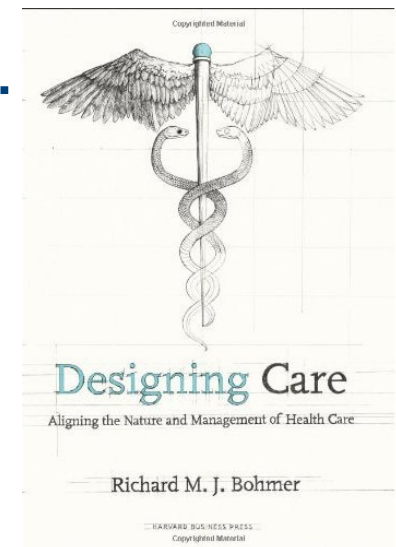
# Performance of health systems: Generally poor



# How can we do it?

## Why are we performing so poorly?

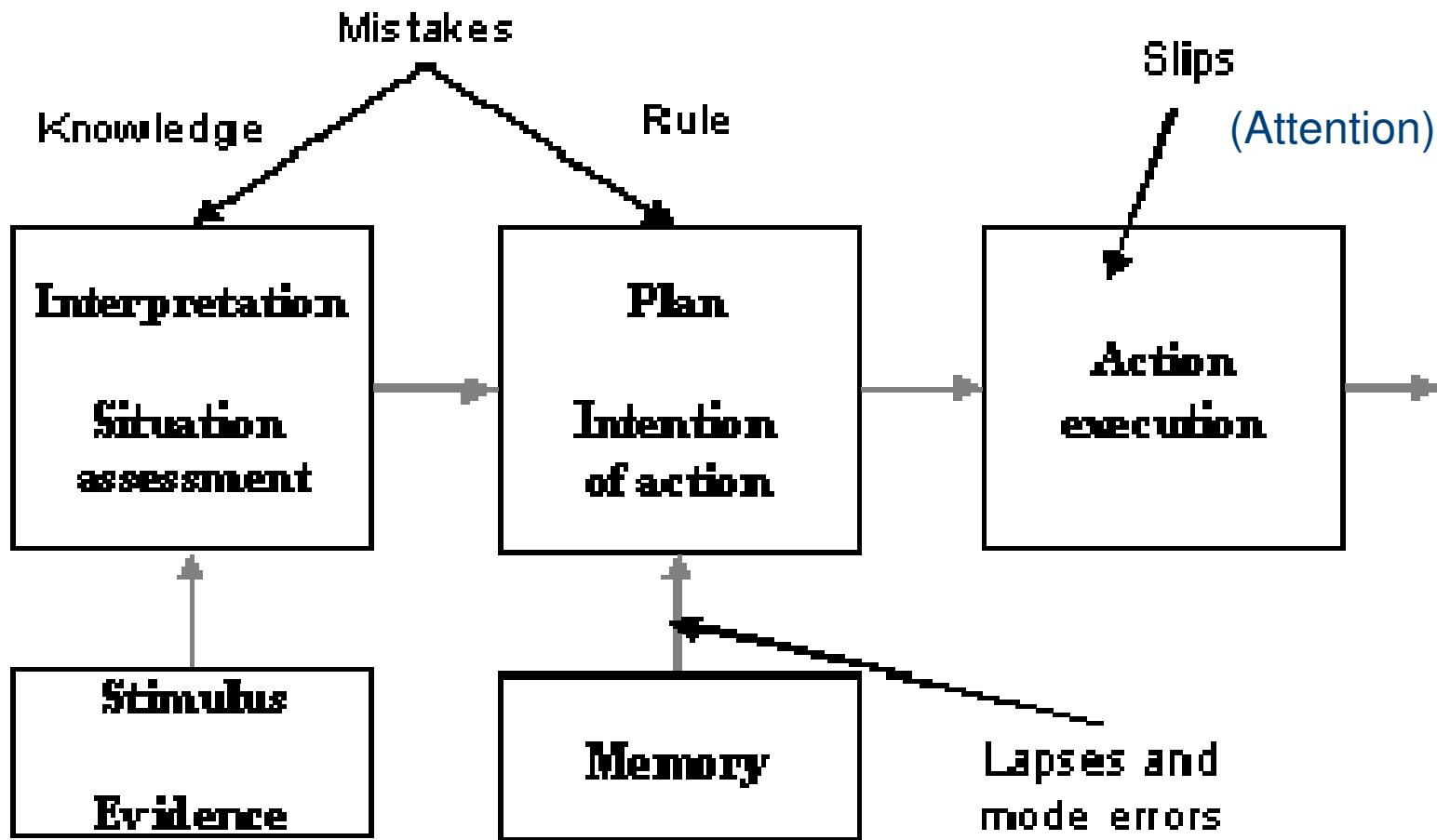
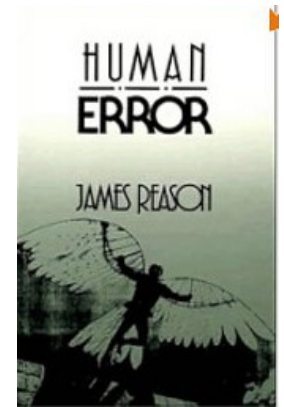
- We do not know what to do ...
- If we know we don't do it ...
- If we do it, we don't do it good enough ...

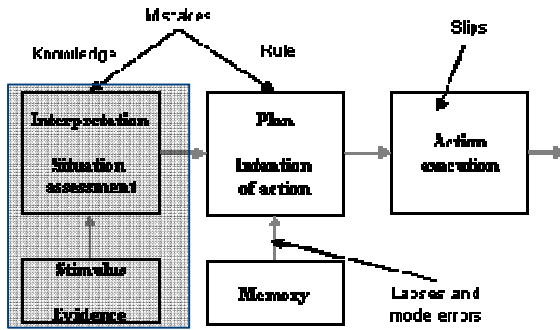


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Bohmer, R. (2009). *Designing Care*. Harvard Business Press, Boston, 261pp.

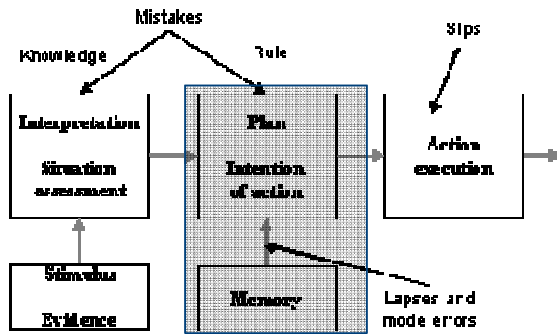
# Why? Theory of human factors





We do not know what to do ...

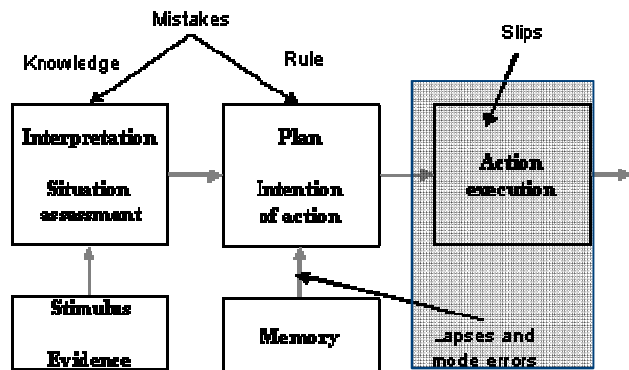
- An analysis of different care pathways show that the existing evidence is not used
  - CP Hip Arthroplasty: 19 EBM guidelines 100% - 26% (e.g. pre-op physiotherapy session)
  - CP Normal delivery: 41 EBM guidelines: 100% - 9% (e.g. postnatal depression screening)
- Knowledge tests of nurses: scores between 20%-60% on prevention of wound infection, prevention of pressure sores, VAP guidelines, pharmacology, ....



If we know we don't do it

- Our memory is limited
- Low compliance to guidelines
- Low quality of patient documentation
  - E.g. quality of nursing record documentation
    - Poor/moderate (76%) accuracy of nursing diagnoses documentation
    - Poor/moderate (95%) accuracy of intervention documentation

(10 Dutch hospitals, 341 patient records)



If we do it, we don't do it good enough ...

## Nurses' work:

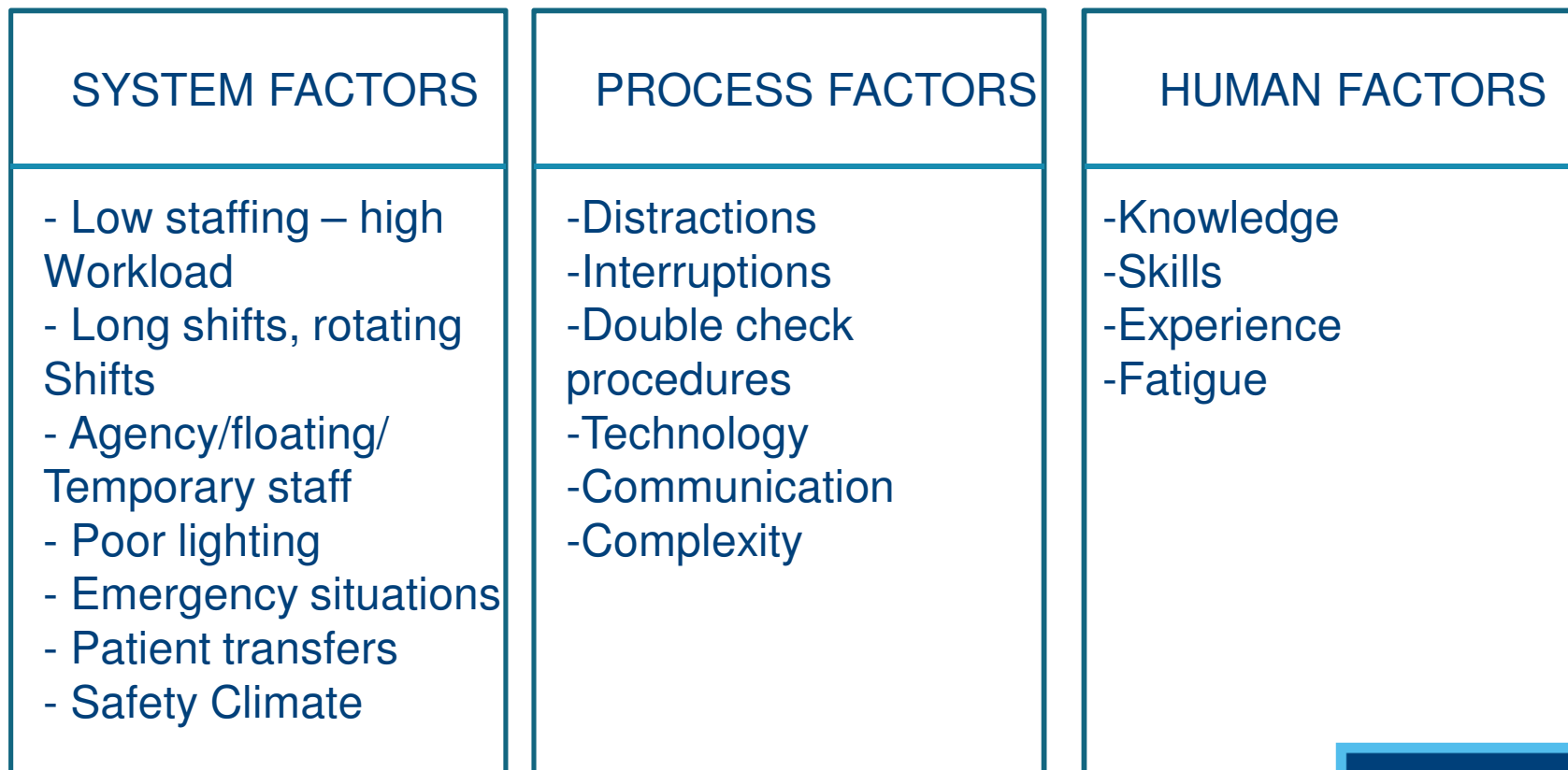
- Staccato work pace (av. task: 3 min)
- Mid task interruptions (8x/h)
- Patient shifts (157x/shift)
- Cognitive shifts (9x/h)
- High workloads
- Is leading to inaccuracies, errors, ...



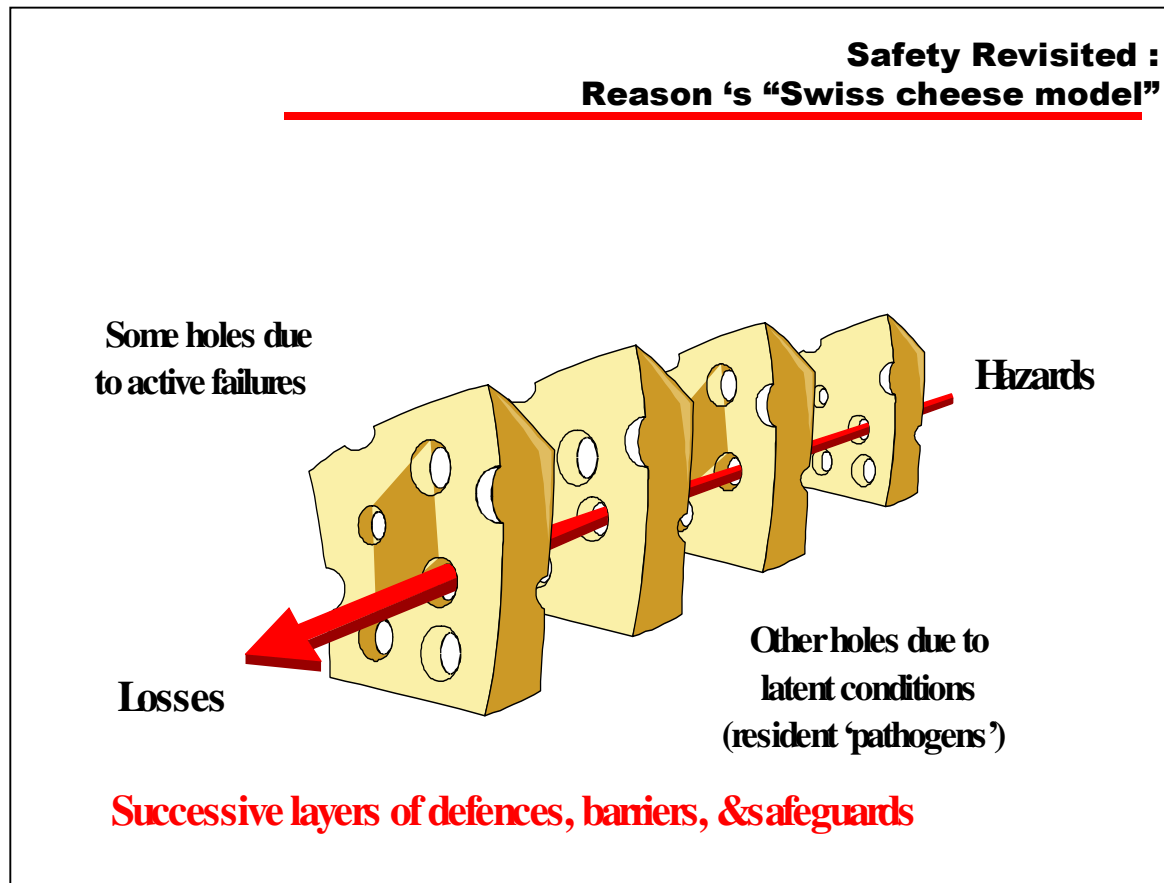
# Different factors

Latent failures

Active failures



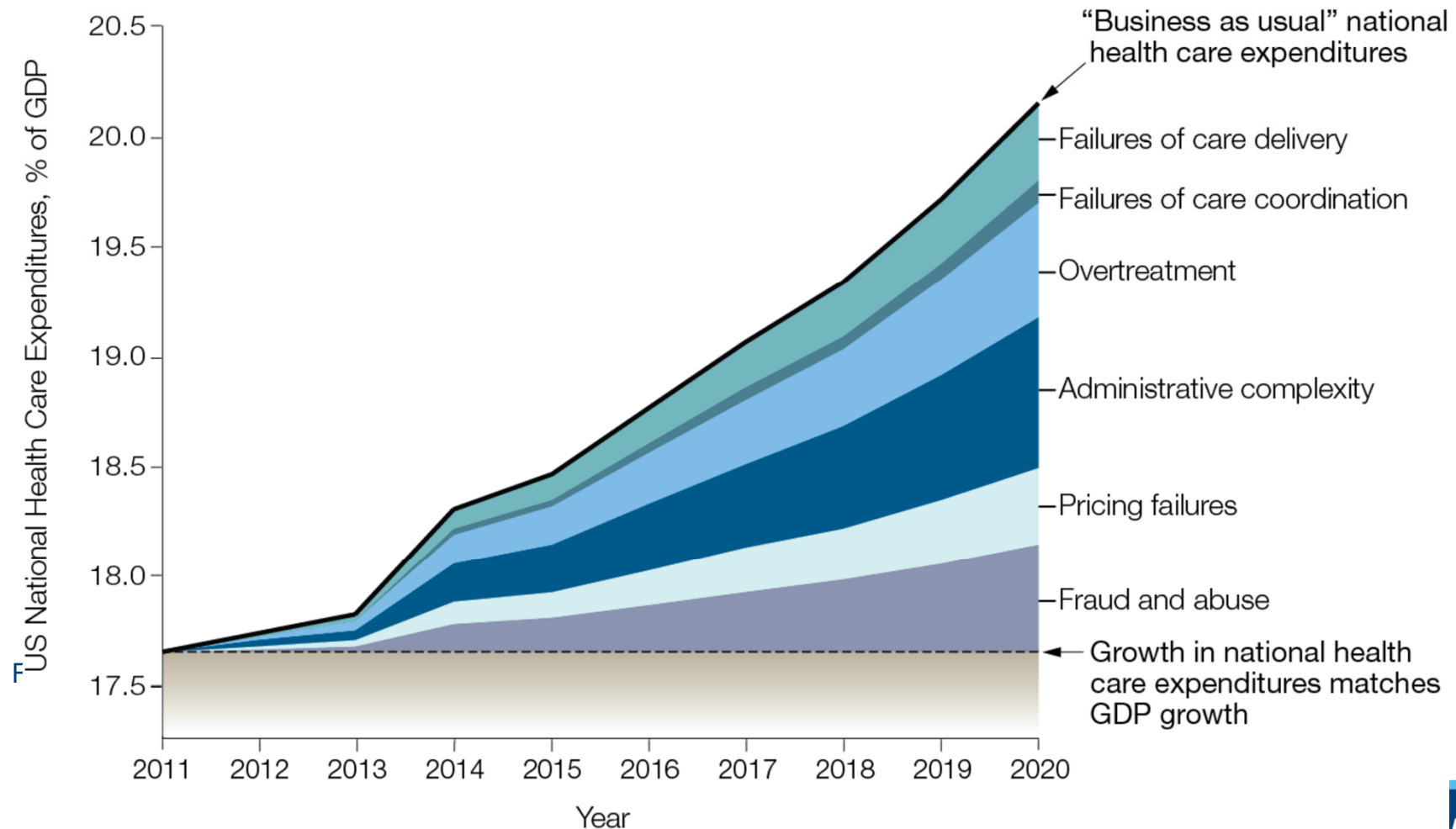
# Swiss cheese model - J. Reason



We can't change the human condition, but we can change the conditions under which humans work.

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# Impact of the cost of low quality on GDP: estimated +/- 3% GDP

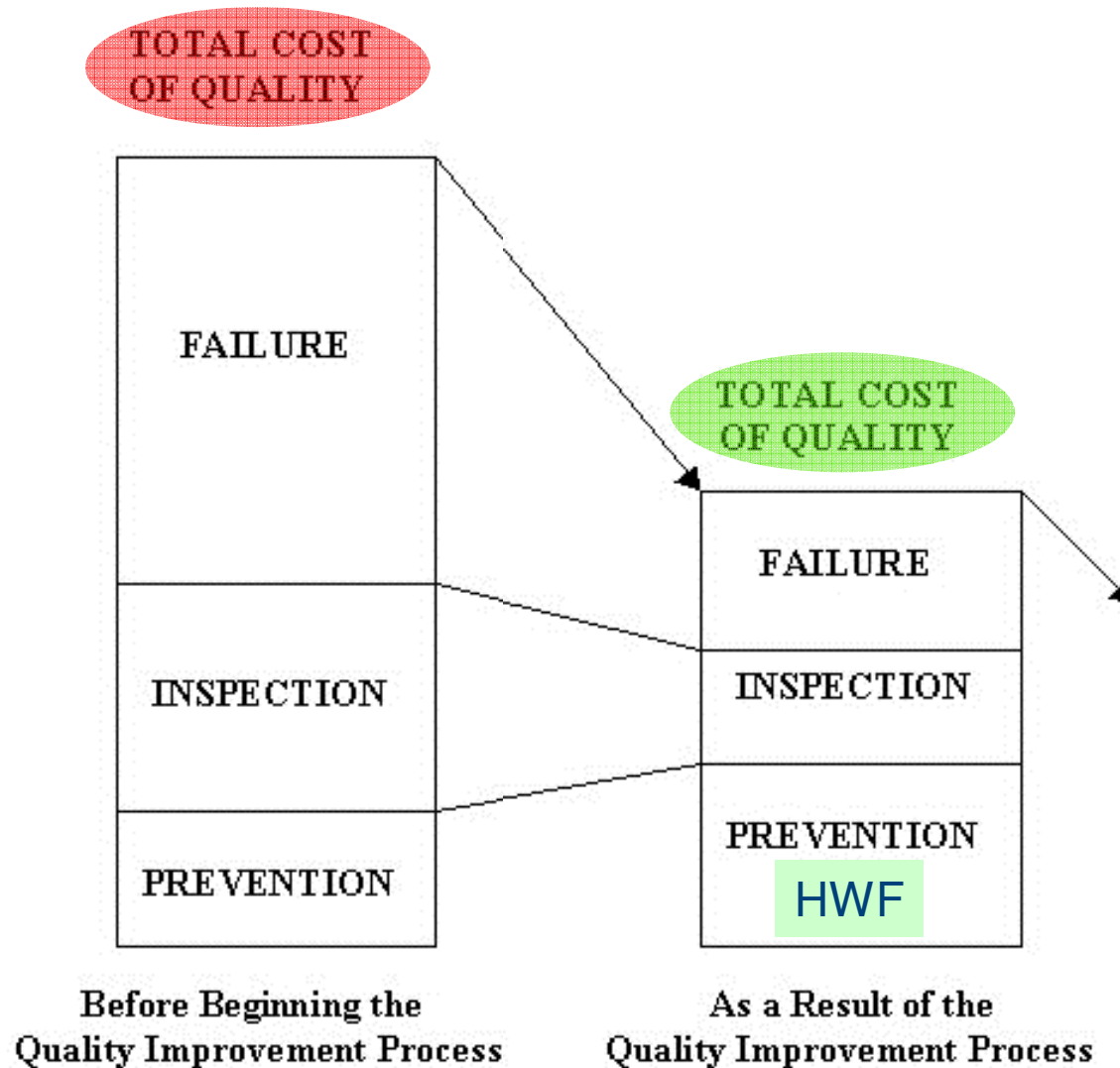


Date of download: 11/23/2014

Berwick D, Hackbarth A, Eliminating Waste in US Healthcare, JAMA. 2012;307(14):1513-1516

NO LEVEN

The way to go? Making prevention costs (e.g. HWF) to decrease failure and overall costs.

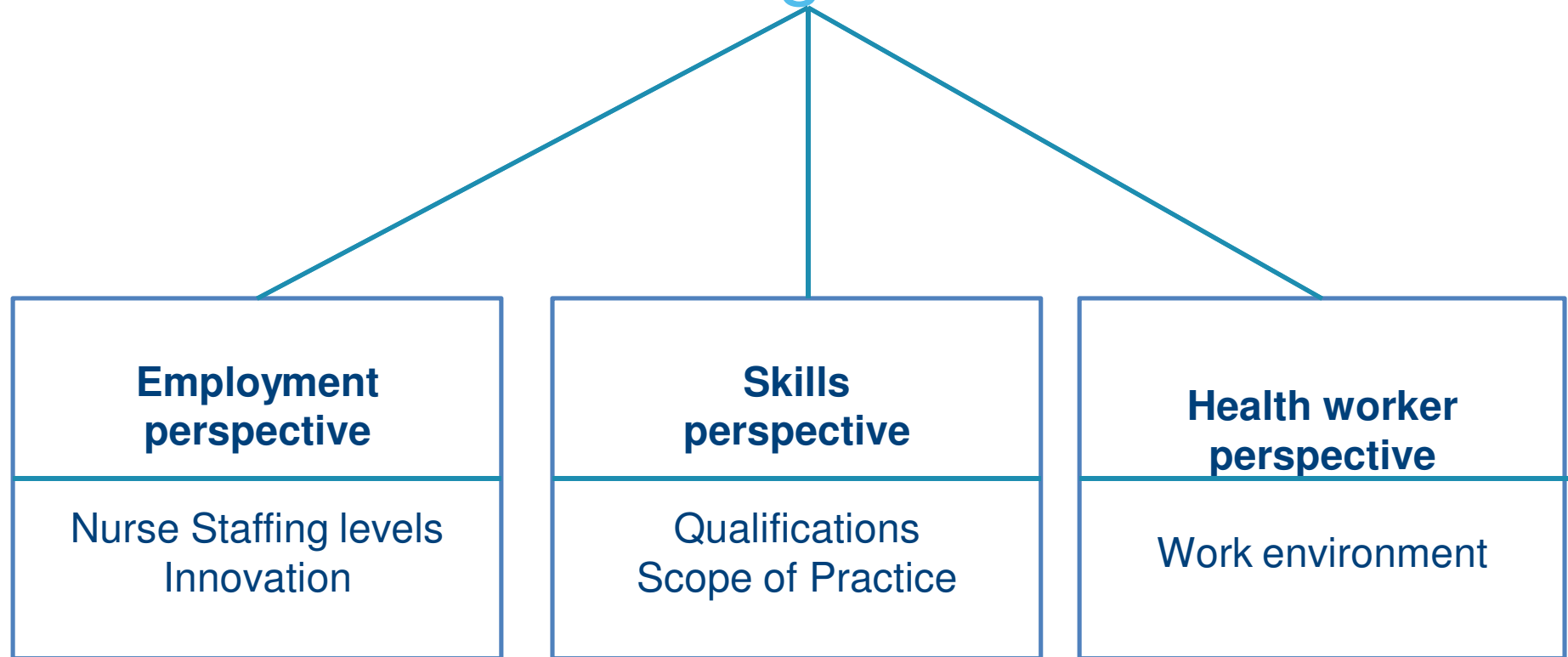


# Investing in HWF? Lessons from RN4CAST

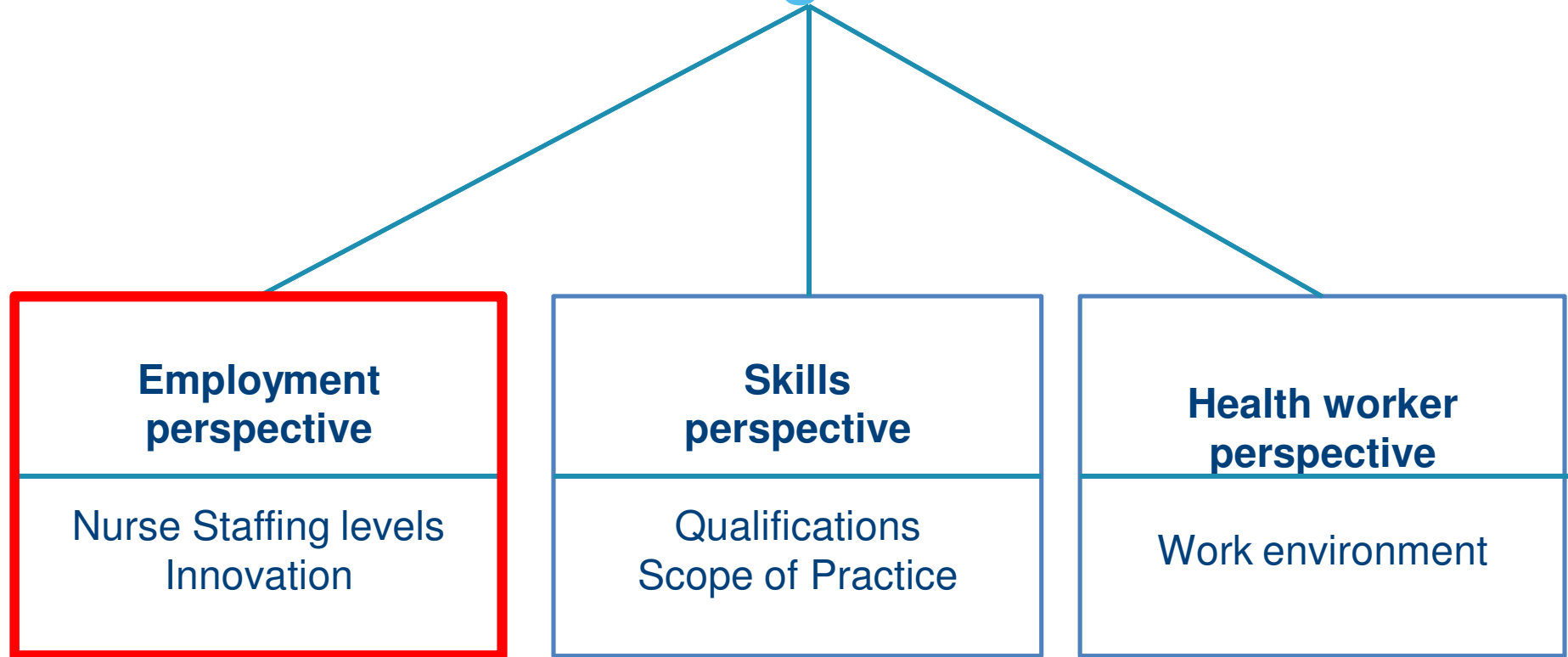
# Nurse Forecasting in Europe (RN4CAST)

- Largest Nurse Workforce study in Europe/world
  - 12 European countries, 486 hospitals, 33731 nurses, 11318 patients, 422730 patient records
  - Comparison with US, China, South-Africa data
  - Acute hospitals, general medicine & surgery
  - Nurse survey: nurse staffing and qualification levels, nurses' work environments, scope of practice,
  - Patient survey: patients' experiences with care of doctors/nurses
  - Analysis of hospital discharge summaries
  - 2009-2011
  - Reported in Lancet, BMJ, BMJ Q&S, IJNS, ...

# Investing in HWF



# Investing in HWF





# Employment perspective: How many nurses do we need?

	Nurse staffing (patients to nurse)		Nurse education (% of nurses with bachelor's degrees)	
	Mean (SD)	Range	Mean (SD)	Range
Belgium	10.8 (2.0)	7.5-15.9	55% (15)	26-86%
England	8.8 (1.5)	5.5-11.5	28% (9)	10-49%
Finland	7.6 (1.4)	5.3-10.6	50% (10)	36-71%
Ireland	6.9 (1.0)	5.4-8.9	58% (12)	35-81%
Netherlands	7.0 (0.8)	5.1-8.1	31% (12)	16-68%
Norway	5.2 (0.8)	3.4-6.7	100% (0)	100-100%
Spain	12.7 (2.0)	9.5-17.9	100% (0)	100-100%
Sweden	7.6 (1.1)	5.4-9.8	54% (12)	27-76%
Switzerland	7.8 (1.3)	4.6-9.8	10% (10)	0-39%
Total	8.3 (2.4)	3.4-17.9	52% (27)	0-100%

Means, SDs, and ranges are estimated from hospital data—eg, the 59 hospitals in Belgium have a mean patient-to-nurse ratio of 10.8, and the patient-to-nurse ratio ranges across those 59 hospitals from 7.5 to 15.9. Similarly, the 31 hospitals in Switzerland have, on average, 10% bachelor's nurses, and the percent of bachelor's nurses ranges across those 31 hospitals from 0% to 39%.

**Table 2: Nurse staffing and education in nine European countries**

	Number of hospitals	Mean discharges per hospital (range)	Deaths/discharges (%)
Belgium	59	1493 (413-4794)	1017/88 078 (1.2%)
England	30	2603 (868-6583)	1084/78 045 (1.4%)
Finland	25	1516 (175-3683)	303/27 867 (1.1%)
Ireland	27	738 (103-1997)	292/19 822 (1.5%)
Netherlands	22	1419 (181-2994)	466/31 216 (1.5%)
Norway	28	1468 (432-4430)	518/35 195 (1.5%)
Spain	16	1382 (186-3034)	283/21 520 (1.3%)
Sweden	62	1304 (295-4654)	828/80 800 (1.0%)
Switzerland	31	1308 (158-3812)	590/40 187 (1.5%)
Total	300	1308 (103-6583)	5381/422 730 (1.3%)

Only hospitals with more than 100 surgical patient discharges were included in the analyses. Data shown are for discharged patients for whom information about 30 day mortality, age, sex, type of surgery, and comorbidities were complete. Data were missing for those characteristics for less than 4% of all patients.

**Table 1: Hospitals sampled in nine European countries with patient discharge data, numbers of surgical patients discharged, and numbers of patient deaths (RN4CAST data)**

ROLE OVER

# Significant effect of staffing and education

	Partly adjusted models		Fully adjusted model	
	OR (95% CI)	p value	OR (95% CI)	p value
Staffing	1.005 (0.965-1.046)	0.816	1.068 (1.031-1.106)	0.0002
Education	1.000 (0.959-1.044)	0.990	0.929 (0.886-0.973)	0.002

The partly adjusted models estimate the effects of nurse staffing and nurse education separately while controlling for unmeasured differences across countries. The fully adjusted model estimates the effects of nurse staffing and nurse education simultaneously, controlling for unmeasured differences across countries and for the hospital characteristics (bed size, teaching status, technology, and work environment), and patient characteristics (age, sex, admission type, type of surgery, and comorbidities present on admission). OR=odds ratio.

**Table 4: Partly and fully adjusted odds ratios showing the effects of nurse staffing and nurse education on 30 day inpatient mortality**

# How many nurses do we need?

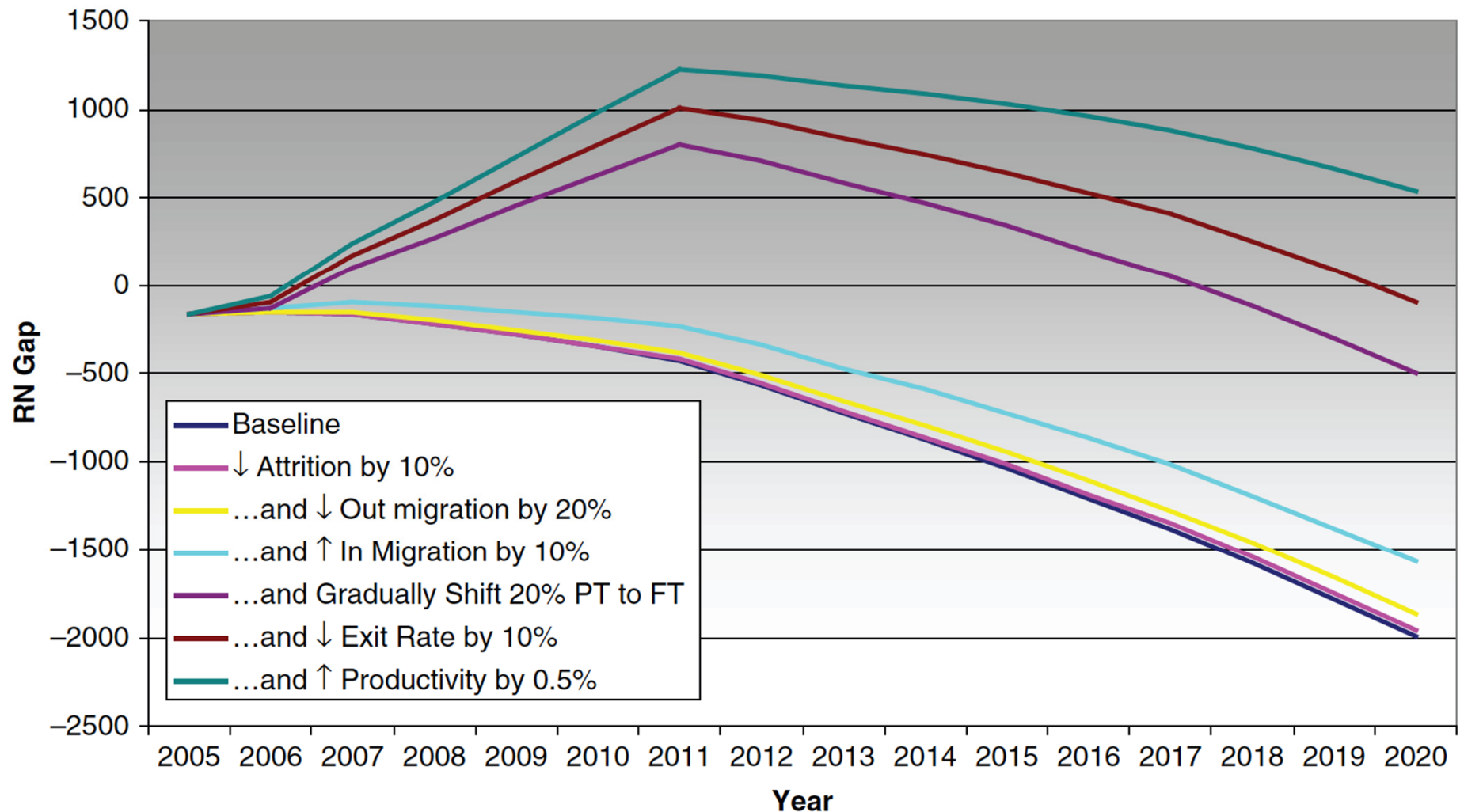
- High variability in nurse staffing in Europe: 5ppn (NO) – 13 ppn (ES)
- Evidence that nurse staffing and patient outcomes are related: mortality, complication rates, LOS,.....
- Current nurse staffing levels are not useful for forecasting/planning purposes
- No single nursing staff-to-patient ratio can be recommended\* – context specific / more research
- Nurse staffing is not absolute, the cost-effectiveness should be evaluated

# Cost-effectiveness of nurse staffing

- One RN more will generate 72% of her salary in medical savings: less deaths, less complications, short length of stay, less medical costs,...
- This is only a partial estimate of the economic value of nursing, omitting the intangible benefits such as:
  - of reduced pain and suffering by patients and family members;
  - benefits to the hospital such as improved reputation, reduced malpractice claims and payouts, and reduced compliance-related costs;
  - the benefits of increased staffing related to improved work environment (e.g. reduced turnover)

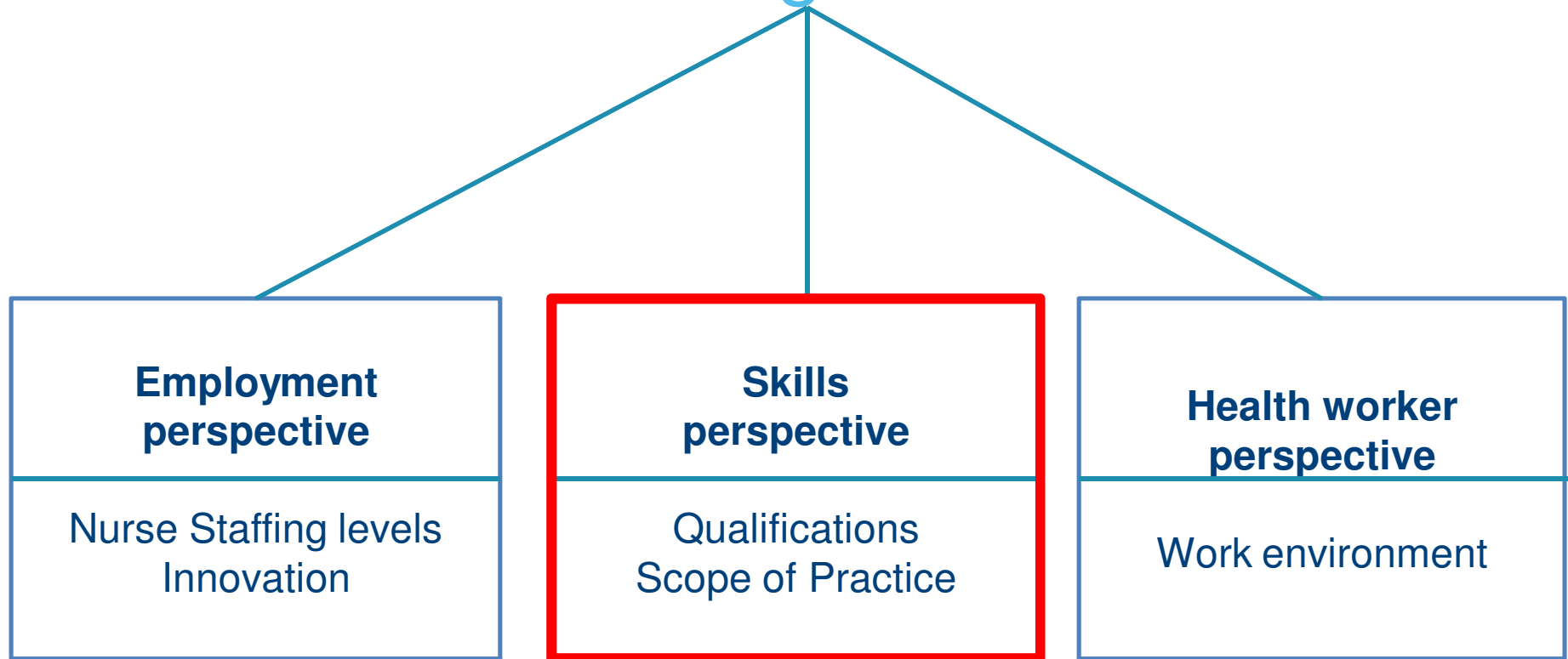
# Moderator: capacity for innovation

- Support systems for human failure
- Technological innovation (ICT, EPR, reminder/alert systems, ....)
- Clinical process innovation (care pathways, lean management, redesign, communication tools, ....)
- Organizational innovation (integrated practice units IPU, integrated care delivery across organizations, care coordination, clinical affiliates,...)
- ....



Tomblin Murphy G et al., An applied simulation model for estimating the supply of and requirements for registered nurses based on population health needs. Policy Polit Nurs Pract. 2009 Nov;10(4):240-51.

# Investing in HWF



# Skill perspective: What nurses do we need?

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ROLE OVER



# Significant effect of education

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# Skills perspective: Scope of practice Care left undone in European hospitals

STAFFING LEVELS	HIGH NO	MEDIUM EN	LOW DE	12 countries
1. Comfort/talk with patients	39.1 (9.4)	65.0 (7.9)	81.0 (11.6)	<b>52.6 (18.5)</b>
2. Develop or update nursing care plans/care pathways	38.7 (11.2)	46.5 (12.6)	55.2 (11.3)	<b>41.7 (13.8)</b>
3. Educating patients and families	25.0 (6.1)	52.1 (9.2)	51.3 (14.0)	<b>40.6 (17.1)</b>
4. Oral hygiene	29.9 (10.8)	28.9 (7.9)	30.2 (14.3)	<b>34.4 (14.5)</b>
5. Adequately document nursing care	21.6 (8.2)	32.9 (10.4)	40.7 (13.7)	<b>27.5 (13.2)</b>
6. Adequate patient surveillance	26.3 (8.4)	34.7 (8.4)	37.7 (12.6)	<b>27.2 (13.6)</b>
7. Planning care	15.8 (6.3)	27.8 (8.2)	43.7 (12.3)	<b>25.8 (14.9)</b>
8. Frequent changing of patient position	23.0 (9.5)	28.8 (10.5)	22.4 (13.1)	<b>24.7 (15.5)</b>
9. Skin care	30.1 (8.3)	21.1 (7.4)	28.5 (14.2)	<b>24.5 (12.8)</b>
10. Prepare patients and families for discharge	13.6 (5.0)	20.9 (7.6)	23.5 (9.5)	<b>22.4 (11.0)</b>
11. Administer medications on time	15.5 (5.8)	23.6 (8.6)	20.2 (10.6)	<b>19.4 (10.5)</b>
12. Pain management	4.6 (3.1)	7.4 (6.3)	19.7 (10.1)	<b>10.0 (9.2)</b>
13. Treatments and procedures	7.0 (4.3)	11.2 (6.3)	14.2 (9.4)	<b>9.2 (9.0)</b>

# Scope of practice: Nursing Care Left Undone because of Lack of Time

	Estimate	Standard error	p Value
<b>Organisational context of nursing</b>			
Nurse staffing	0.09109	0.01413	<0.0001
Nurse work environment	-2.1901	0.1758	<0.0001
Non-nursing tasks during last shift	2.1780	0.1922	<0.0001
<b>Nurse factors</b>			
Gender	0.2483	0.06567	0.0002
Education	0.1951	0.04244	<0.0001
Employment	0.1708	0.03905	<0.0001
Professional experience in the hospital	-0.01727	0.001995	<0.0001
<b>Hospital characteristics</b>			
Number of beds	-0.00008	0.000124	0.5198
Technology level	-0.07750	0.09712	0.4249
Teaching status	0.1148	0.1078	0.2869

Multiple multilevel linear regression model with hospital-level as random and country-level as fixed effects, accounting for the hierarchical structure of the data (nurses nested within hospitals within countries).

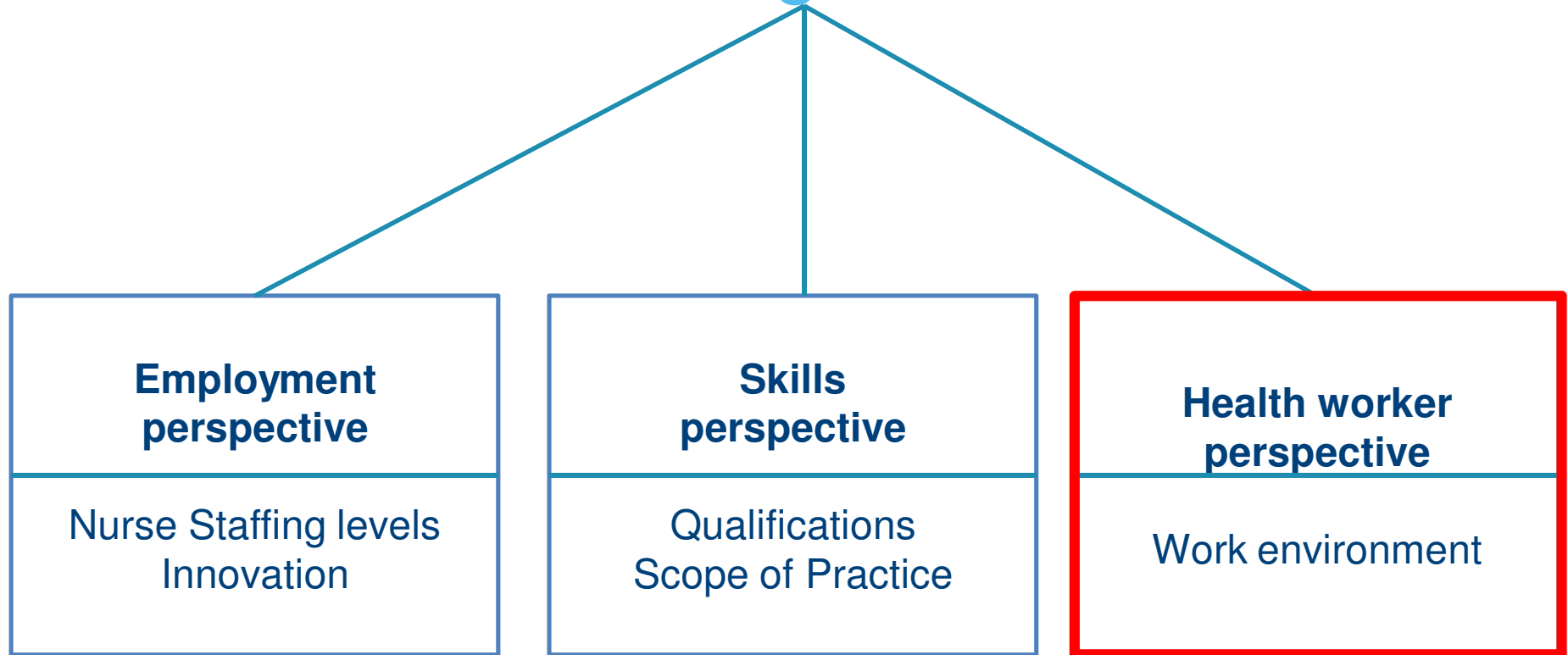
# Skills perspective: qualification

- Economic evaluation of the 80% BSN nurse workforce recommendations
- Design:
  - Patient-level analysis of electronic data in 1 hospital (USA)
  - 8526 med-surgical patients, matched with 1477 direct care nurses
- Results:
  - Lower mortality (OR=0,89,  $p<0,01$ )
  - Lower rate of readmissions (OR=0,81,  $p=0,04$ )
  - Shorter length of stay (-2%,  $p=0,03$ )

# Skills perspective

- Impact of qualification on patient outcomes
- High variability on scope of practice of nurses across Europe
- Depending on nurse staffing, availability of support staff, ...
- Current division of labor: not useful to future predictions and forecasts
- More research into task reallocation
  - of medicine to nursing/allied health professionals
  - of nursing/allied health professionals to non-qualified staff and patients

# Investing in HWF



# Health worker perspective

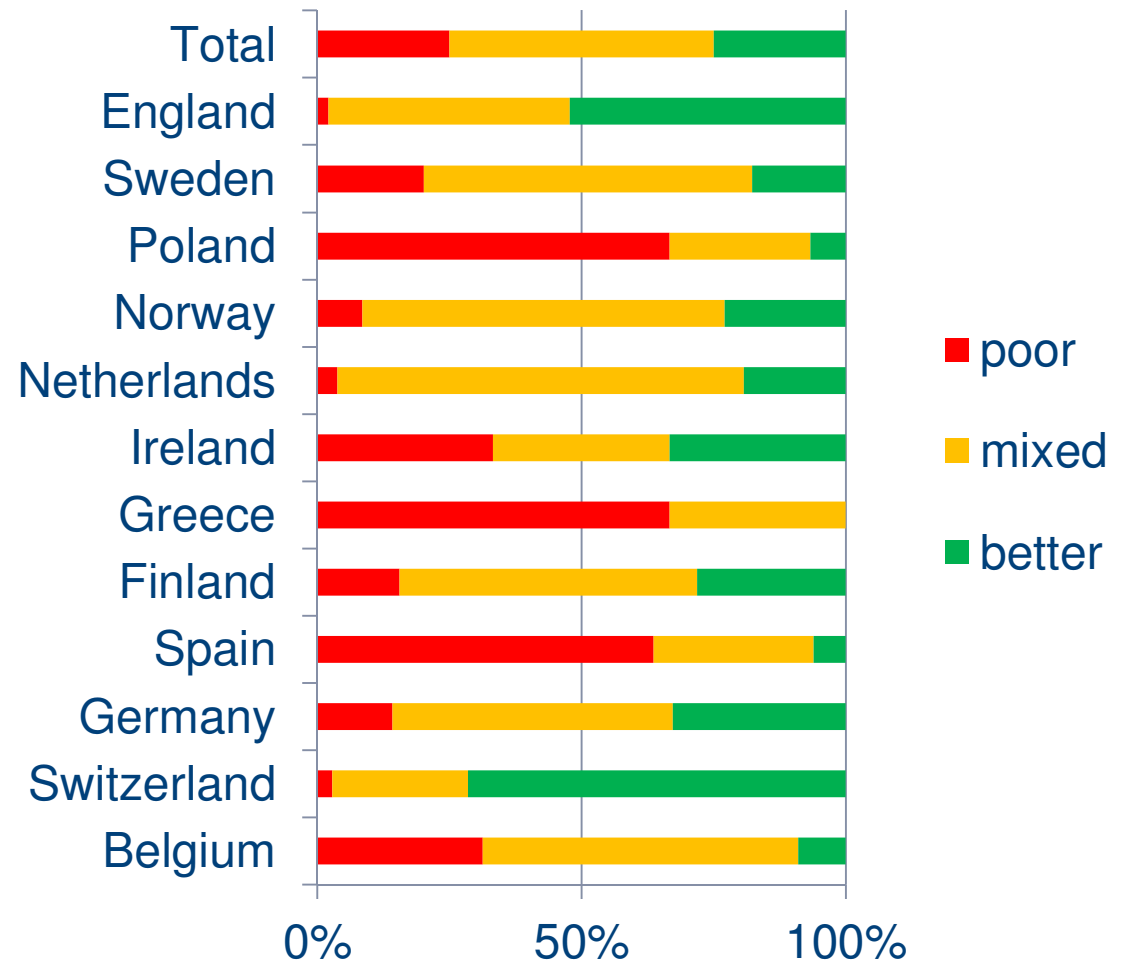
- Existing evidence on effective HRM practices in healthcare
  - Relation focused > task focused leadership style
  - Focus on clinical autonomy, management support
  - Interdisciplinary practice, relational coordination
- Impact on:
  - Staff satisfaction with work, roles and pay
  - Staff relationships with work
  - Staff health & wellbeing
  - Patient satisfaction and wellbeing

# The reality check: Nurses' work environment

Captures 5 dimensions:

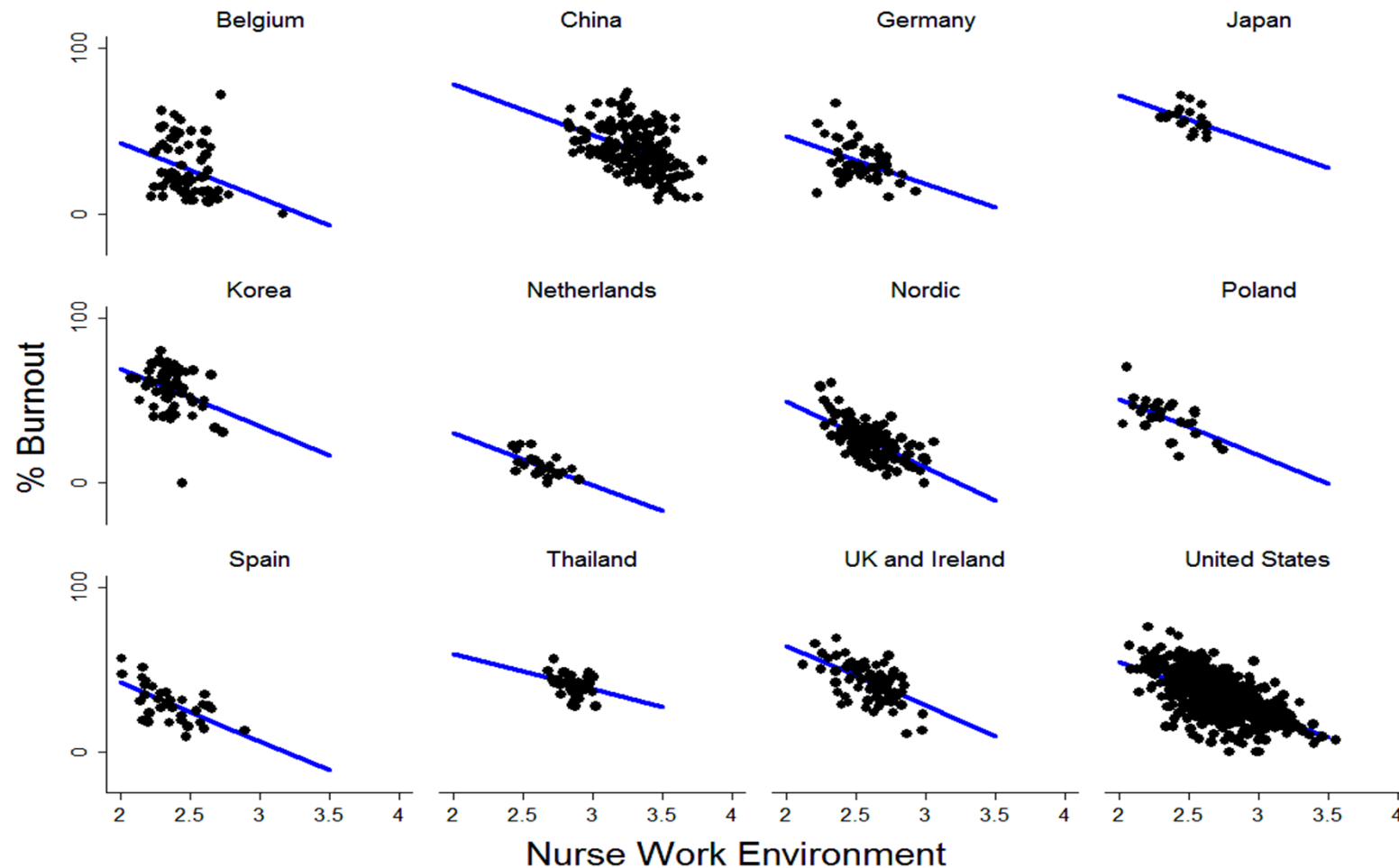
- ❑ Staffing adequacy
- ❑ Nursing foundations for quality
- ❑ Nurse manager ability & leadership
- ❑ Nurse-physician relations
- ❑ Nurse involvement in hospital affairs

Hospitals classified into quartiles by PES scores





# Hospitals with Better Work Environments: Lower Nurse Burnout, in every country



# Intention to leave hospital & profession

Intention to leave the hospital and the profession in 10 European countries.

Country (number of nurses)	Nurses intending to leave the hospital workplace as % of all nurses	Nurses intending to leave the profession as % of all nurses
Belgium ( <i>n</i> = 3186)	30	9
Finland ( <i>n</i> = 1131)	49	10
Germany ( <i>n</i> = 1508)	36	17
Ireland ( <i>n</i> = 1406)	44	11
Netherlands ( <i>n</i> = 2217)	19	5
Norway ( <i>n</i> = 3752)	25	9
Poland ( <i>n</i> = 2605)	44	9
Spain ( <i>n</i> = 2804)	27	5
Switzerland ( <i>n</i> = 1632)	28	6
UK ( <i>n</i> = 2918)	44	10
Ten country mean ( <i>n</i> = 23,159)	33	9

# Explaining factors for intention-to-leave the profession

Factor	Odds Ratio	95% BI
Nurse-Physician Relationship	0,86	0,79-0,93
Leadership	0,76	0,70-0,86
Participation in hospital affairs	0,68	0,61-0,76
Age (older)	1,13	1,07-1,20
Gender (female)	0,76	0,55-0,80
Hours/week (FT)	0,76	0,66-0,86
Burn-out	2,02	1,91-2,14

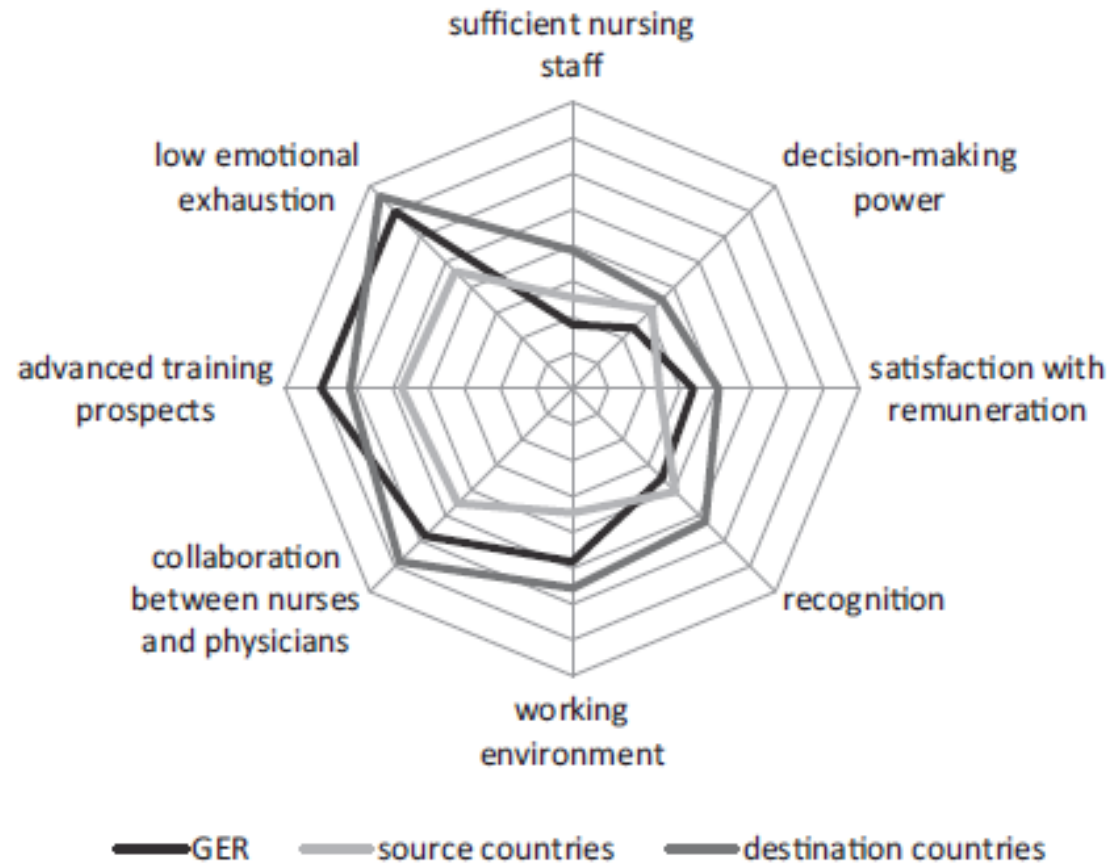
# Explaining migration from a practice environment perspective

- Linking RN4CAST & Prometheus for Germany
- Destination countries: UK, NL, SE, NO, CH
- Source countries: PL, GR, ZA

Odds ratios (OR) with 95% confidence levels for push factors in Germany, adjusted for age, years of nursing, and gender.

Push factors/variables (ref = no/0)	OR	95% CI		p-Value
		Lower	Upper	
Poor work environment	3.235	2.434	4.301	<.001
Emotionally exhausted	2.445	1.860	3.215	<.001
Low recognition	1.769	1.299	2.407	<.001
Poor advanced training prospects	1.686	1.278	2.225	<.001
Lack of collaboration between nurses and physicians	1.647	1.265	2.145	<.001
Perceived staff shortage	1.553	1.048	2.302	.028
Low remuneration	1.326	0.996	1.766	.054
Restricted decision-making power	1.193	0.852	1.670	.305

# Source countries worse than destination countries: myth or reality?



# Health worker perspective

- High variability on work environment and effective HRM practices in Europe
- Current turn-over and migration data not useful if not adjusted for work environment
- Improving work environment may have important impact on:
  - HWF retention
  - HWF migration (between and within countries)
  - Estimates of inflow and retention of HWF

# General conclusions

- Main focus of our health system is quality of care: safe, effective, efficient, patient centered, timely and equitable care
- Health workforce is a key-element
- Often seen as a cost, but should be seen as an investment (preventive cost) leading to reduction of failure costs & overall costs (impact estimated to be 3%)
- Key messages for discussion:
  - Employment: Numbers & capacity for innovation
  - Skills: Qualifications, skill mix, scope of practice
  - Health worker: Work environment

THANK YOU FOR  
YOUR ATTENTION



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More info: [WWW.RN4CAST.EU](http://WWW.RN4CAST.EU)