Arbeitsbelastung & Risikomanagement

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Innere Medizin

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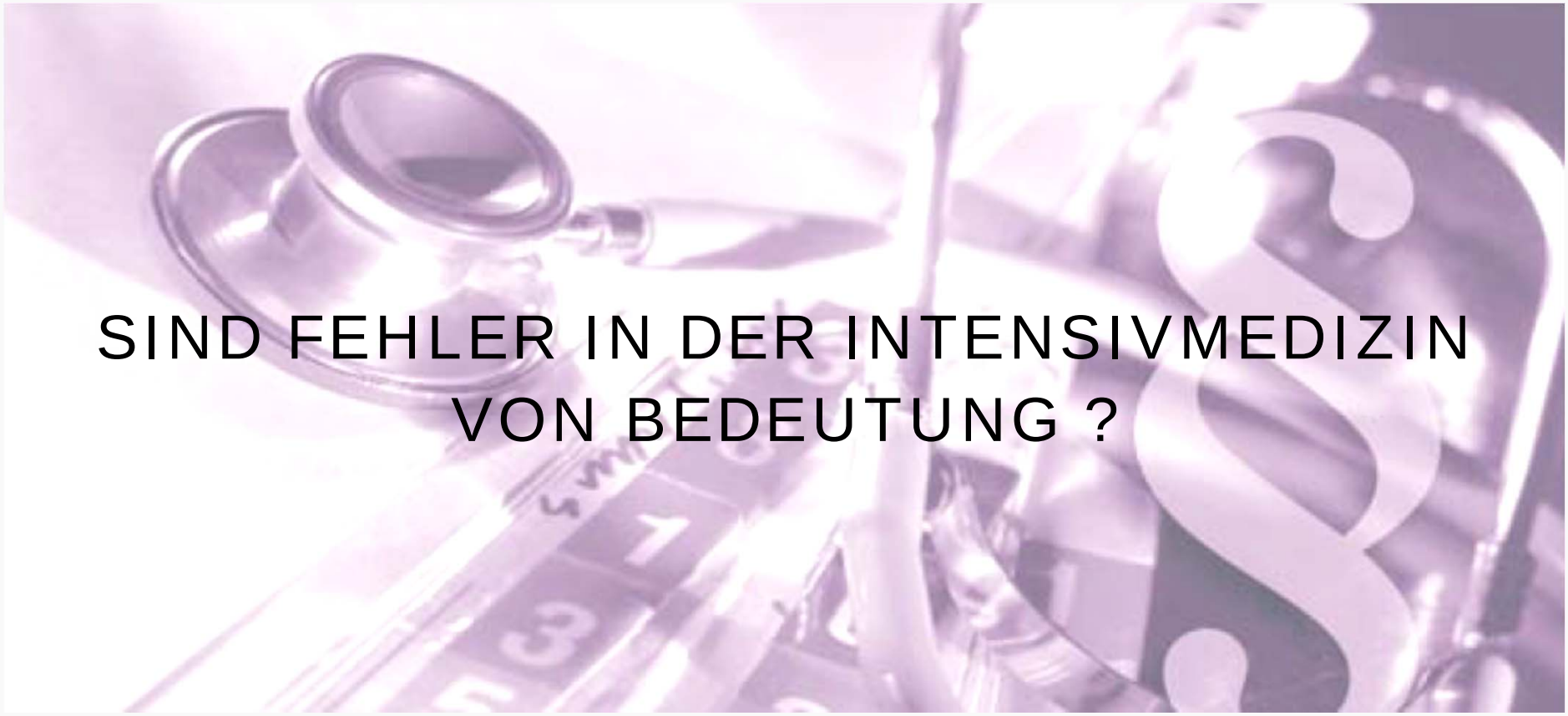
Inhalt

- **Perspektive: Patientensicherheit**
  - Charakteristik und Häufigkeit von Fehlern
  - Systemfaktoren versus Individuum
  - Arbeitszeit und Leistungsfähigkeit
  - Arbeitszeit und Fehler
- **Perspektive: Mitarbeitersicherheit**
  - Arbeitszeit und Selbstgefährdung
  - Burnout

Übermüdung

Profil, 9. März 2009



SIND FEHLER IN DER INTENSIVMEDIZIN VON BEDEUTUNG ?

BMJ

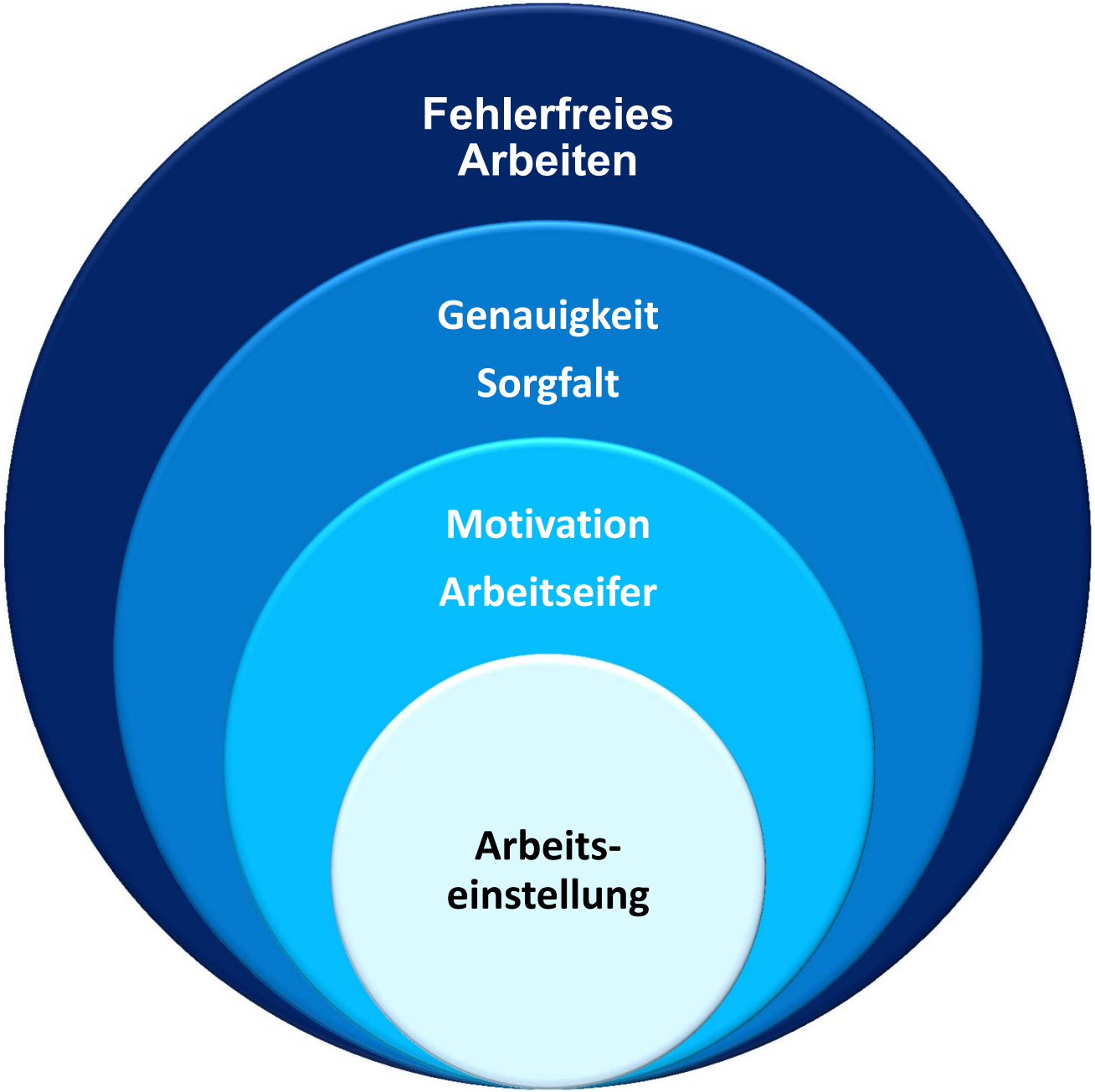
Errors in administration of parenteral drugs in intensive care units: multinational prospective study

Andreas Valentin, Maurizia Capuzzo, Bertrand Guidet, Rui Moreno, Barbara Metnitz, Peter Bauer, Philipp Metnitz and on behalf of the Research Group on Quality Improvement of the European Society of Intensive Care Medicine (ESICM) and the Sentinel Events Evaluation (SEE) Study Investigators

BMJ 2009;338;b814
doi:10.1136/bmj.b814

	Events / 100 pt days	lower 95% CI	upper 95% CI
All	74.5	69.5	79.4
Wrong time	33.4	30.1	36.7
Missed medication	22.4	19.7	25.1
Wrong dose	10.2	8.4	12.0
Wrong drug	5.3	4.0	6.6
Wrong route	3.2	2.2	4.2

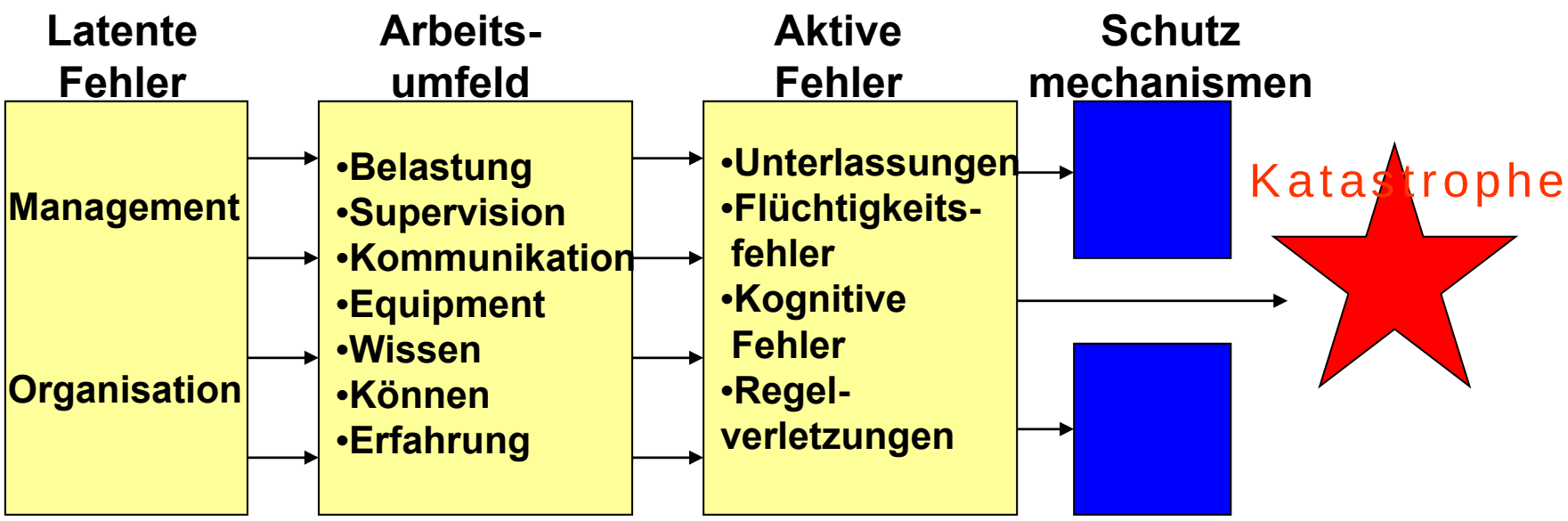

DER FAKTOR MENSCH


Fehlerfreies Arbeiten
Genauigkeit
Sorgfalt
Motivation
Arbeitseifer
Arbeits-einstellung

Most errors are committed by good, hardworking people trying to do the right thing

Wachter RM & Pronovost PJ, NEJM 2009

Katastrophenmodell



nach Vincent et al. BMJ 1998


SYSTEMFEHLER ARBEITSZEIT ?

SEE 2

Contributing factors	
Workload, Stress, Fatigue	33%
Recently changed drug name (Genericon)	18%
Communication-Written	14%
Experience, Knowledge, Supervision	10%
Communication-Oral	9%
Violation of protocol or standard	9%
Hand over	6%
Equipment failure	-----
Others	-----

Valentin A, BMJ 2009

SEE 2

Workload

ICU related factors	OR	lower 95% CI	upper 95% CI
ICU size (bed)	1.01	1.00	1.02
Patients per nurse	1.30	1.03	1.64
Occupancy rate (%)	1.03	1.00	1.05
CIRS in place	0.69	0.53	0.90
Routine check at shift change	0.68	0.52	0.90

- **Arbeitszeit**
  - Kontinuierlich
  - Durchrechnung
  - Pausenzeiten, Ruhezeiten
  - Gesicherter Schlaf
  - Freizeit zwischen Diensten
- **Aufgaben, Belastung**
  - Kontinuierlich (z.B. Intensivdienst)
  - Limitierter Zeitraum (z.B. OP)
  - Komplexität
  - Selbstbestimmter Ablauf?
- **Faktoren**
  - Alter
  - Individuelle Resistenz (genetischer Polymorphismus ?)

Definition Schlafdefizit

Akut ?

Chronisch

< 5-6h

über eine Periode von mehreren Nächten

Selbsteinschätzung von Intensivmedizinischem Personal

„Auch wenn ich übermüdet bin, erbringe ich in kritischen Phasen eine gleichwertige Leistung.“

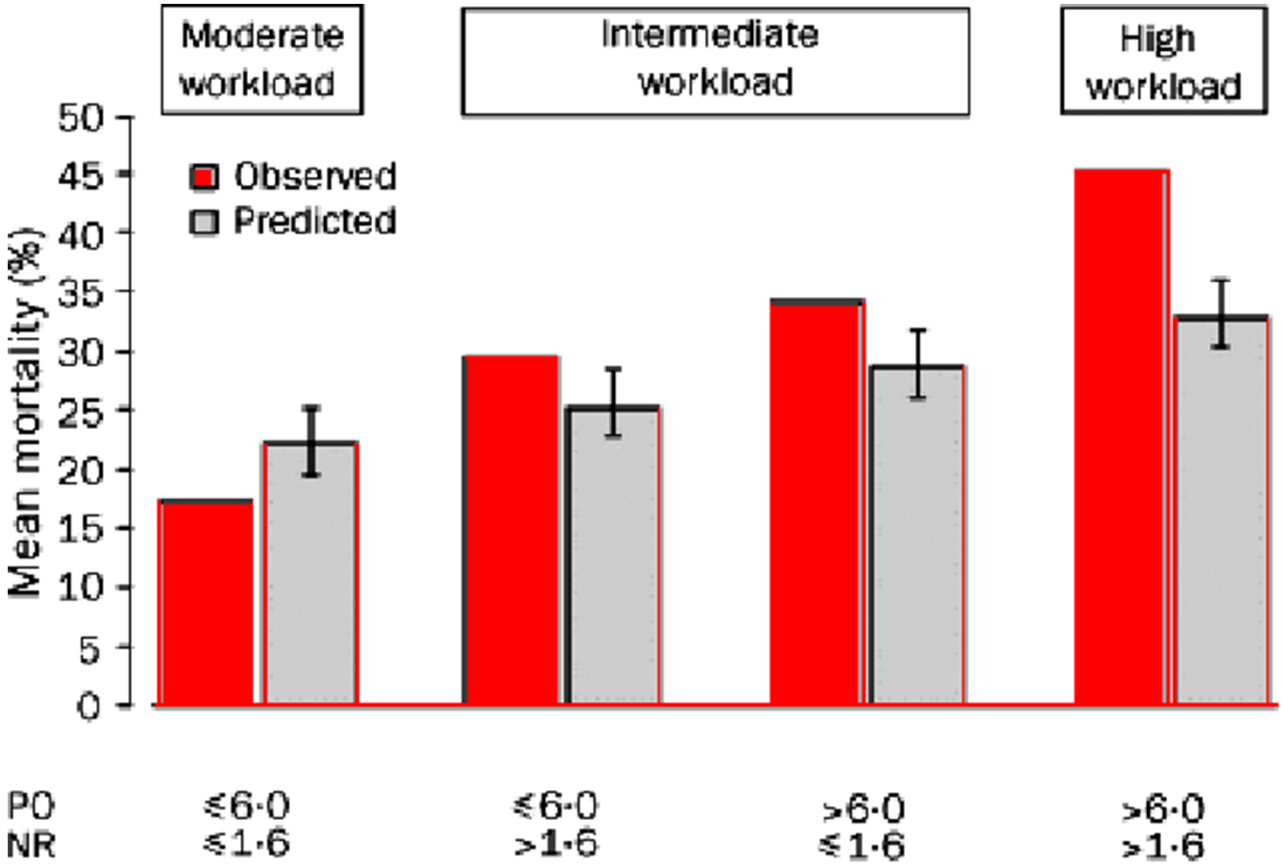
Zustimmung:

Piloten	26%
Intensivmediziner	64%
Intensivpflegepersonen	64%

Sexton JB, BMJ 2000

Hospital mortality in relation to workload of ICU nursing staff

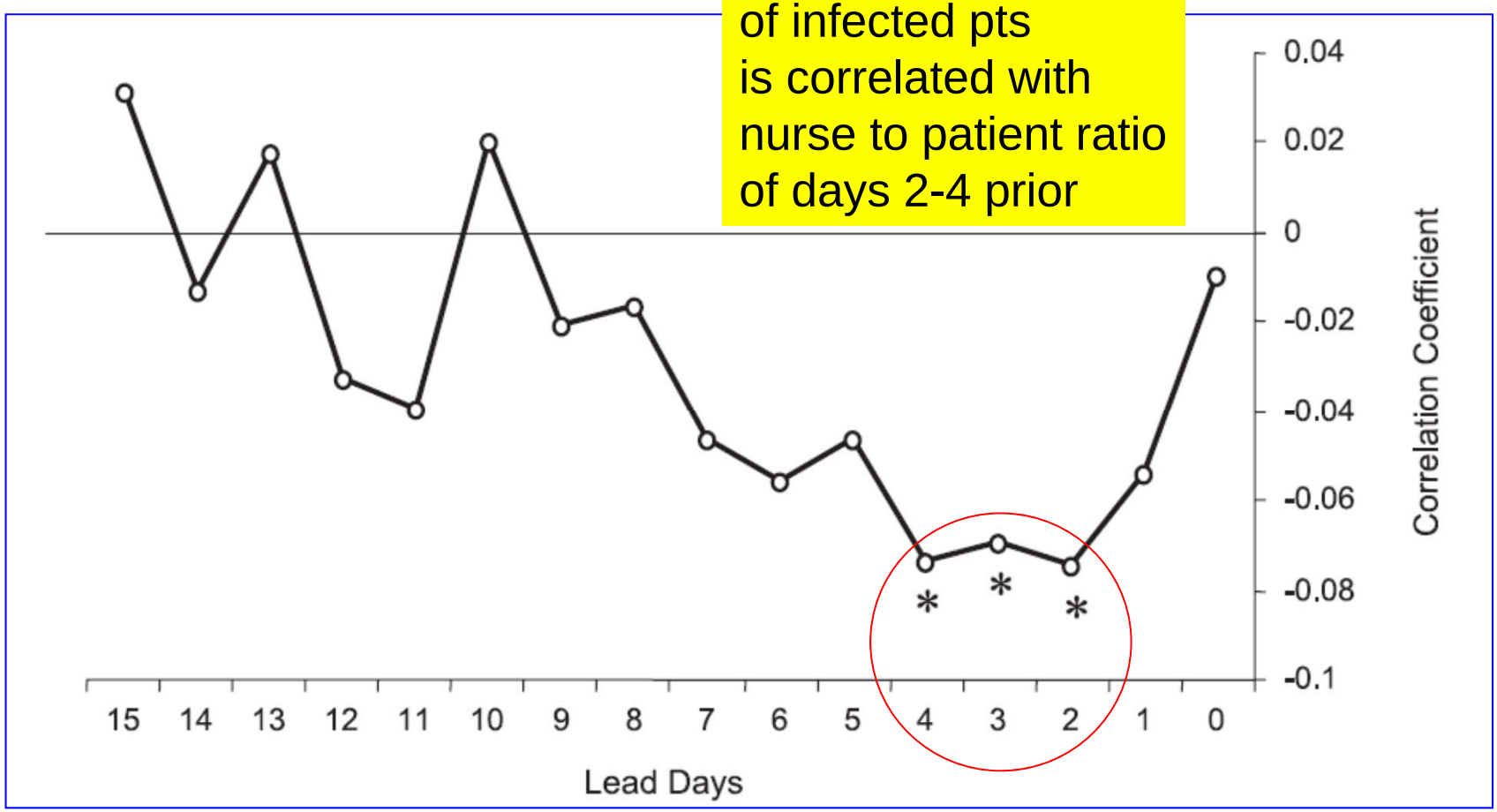
Tarnow-Mordi WO, Lancet 2000



To stay in the ICU during periods of high workload is associated with an increased risk for hospital mortality
(OR 3.1; 95% CI 1.9-5.0)

The effect of workload on infection risk in critically ill patients

The daily porportion of infected pts is correlated with nurse to patient ratio of days 2-4 prior

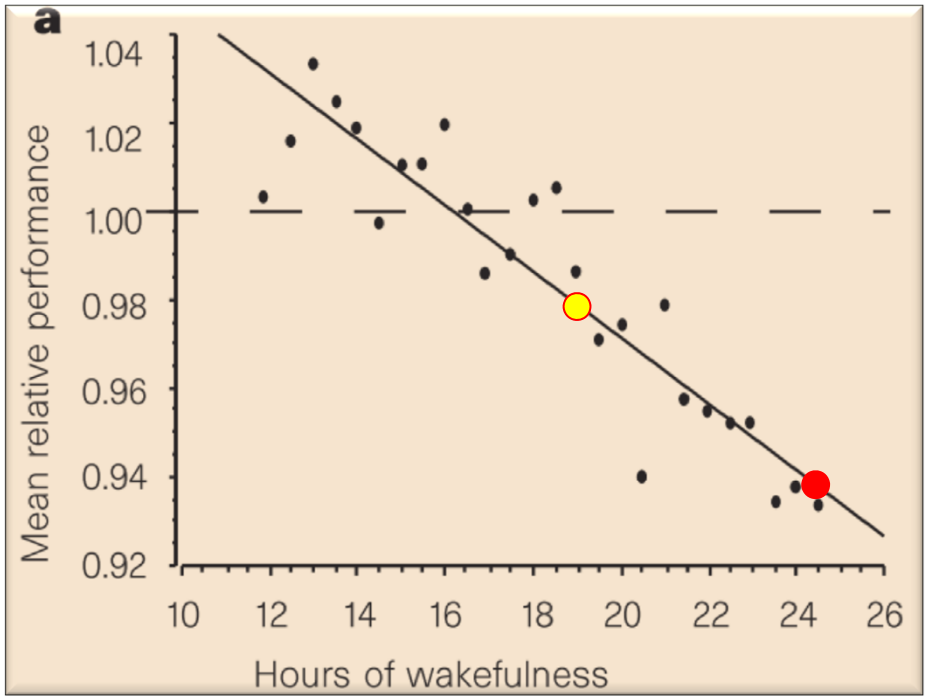


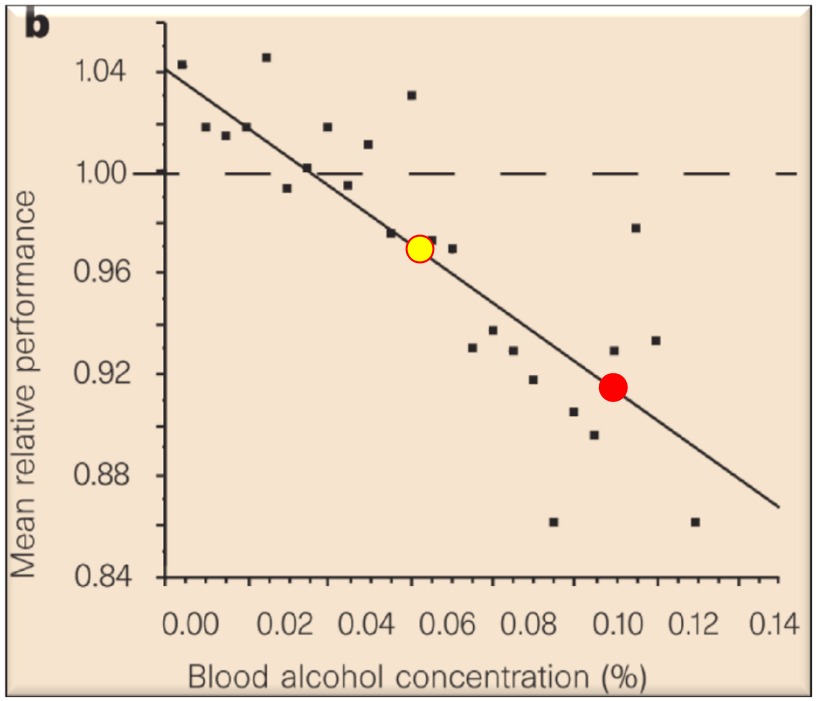
Hugonnet S, Crit Care Med 2007


AKUTE EFFEKTE

Fatigue, alcohol and performance impairment

Dawson D, Nature 1997



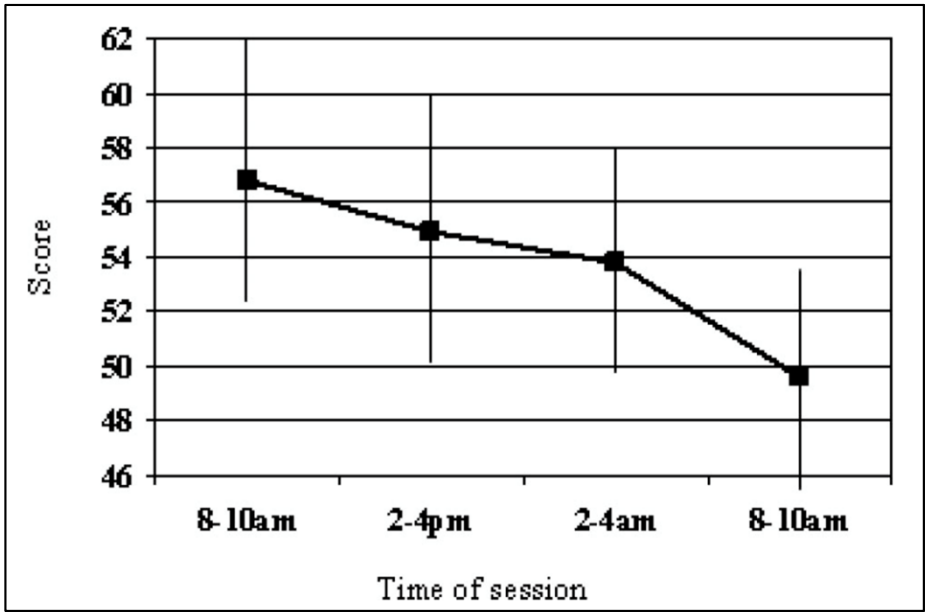


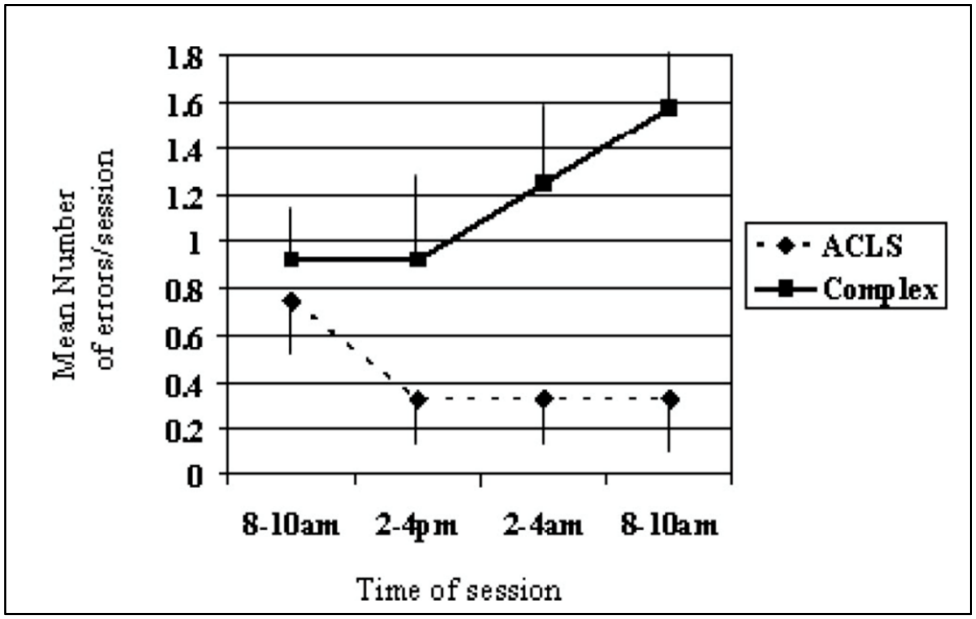
- 0.05g%
- 0.10g%

The impact of prolonged continuous wakefulness on resident clinical performance in the intensive care unit: a patient simulator study.

Sharpe R, Crit Care Med 2010

12 residents





Global performance score for complex scenarios

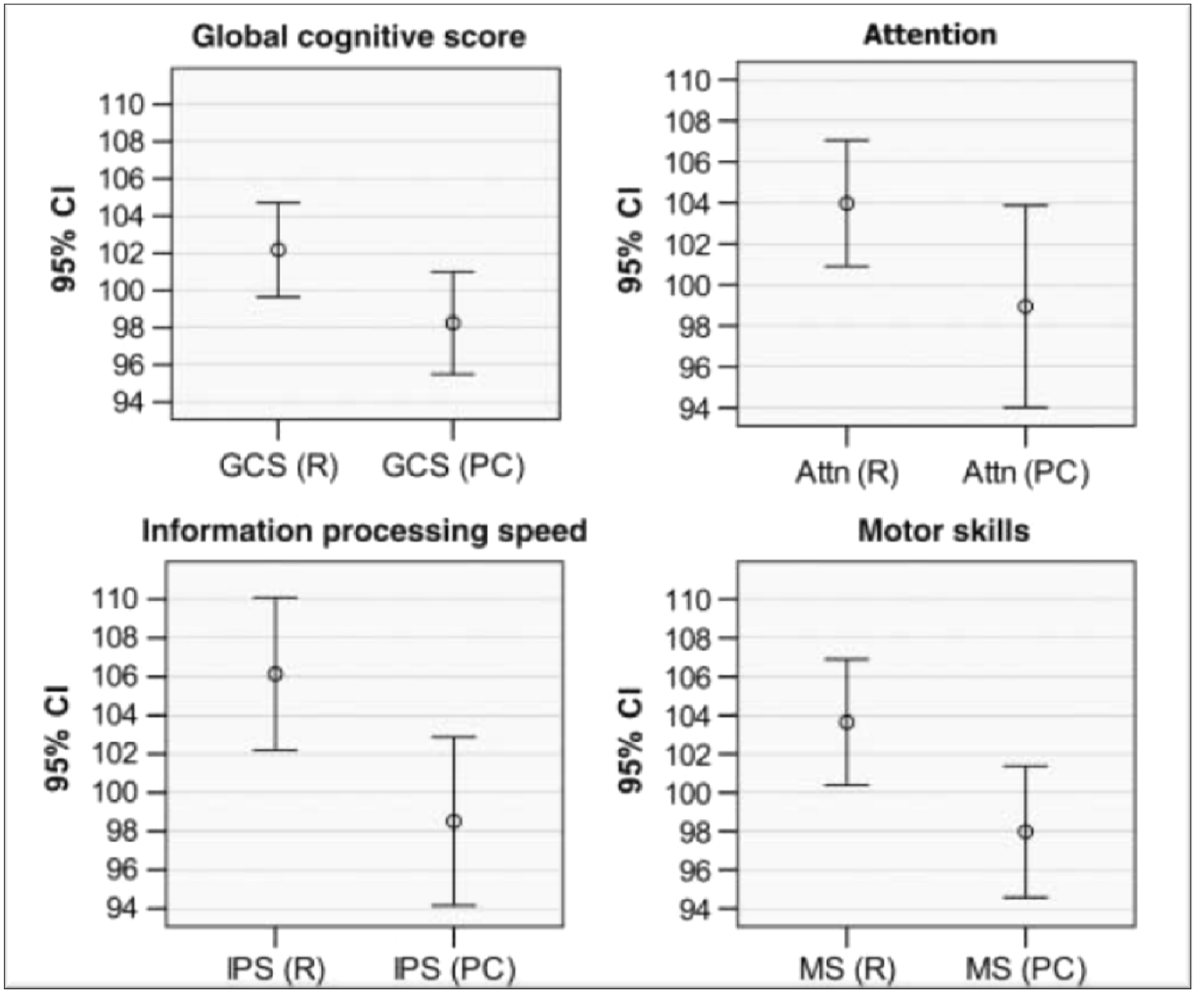
Mean number of errors per session

Junior doctors' extended work hours and the effects on their performance: the Irish case

- 30 junior doctors
- Cognitive Tests & clinical decision making
- R = rested
- PC = postcall
- Call shift:

  Average consecutive working hours 33 h

  Sleep 2.6 h



Flinn F, Int J Qual Health Care 2011

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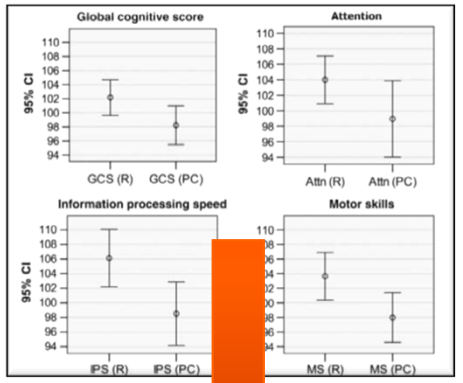
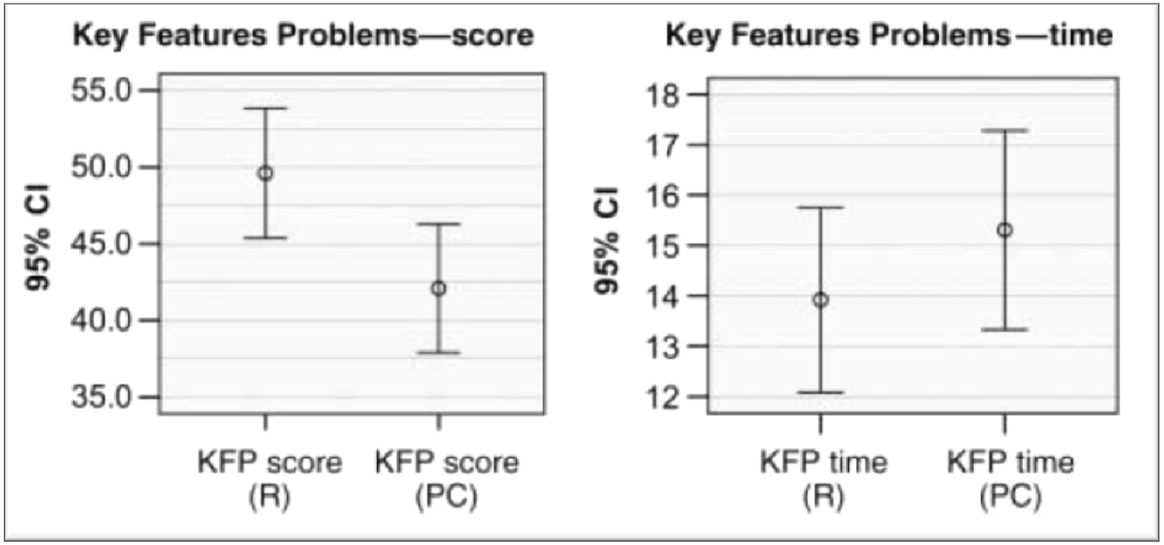
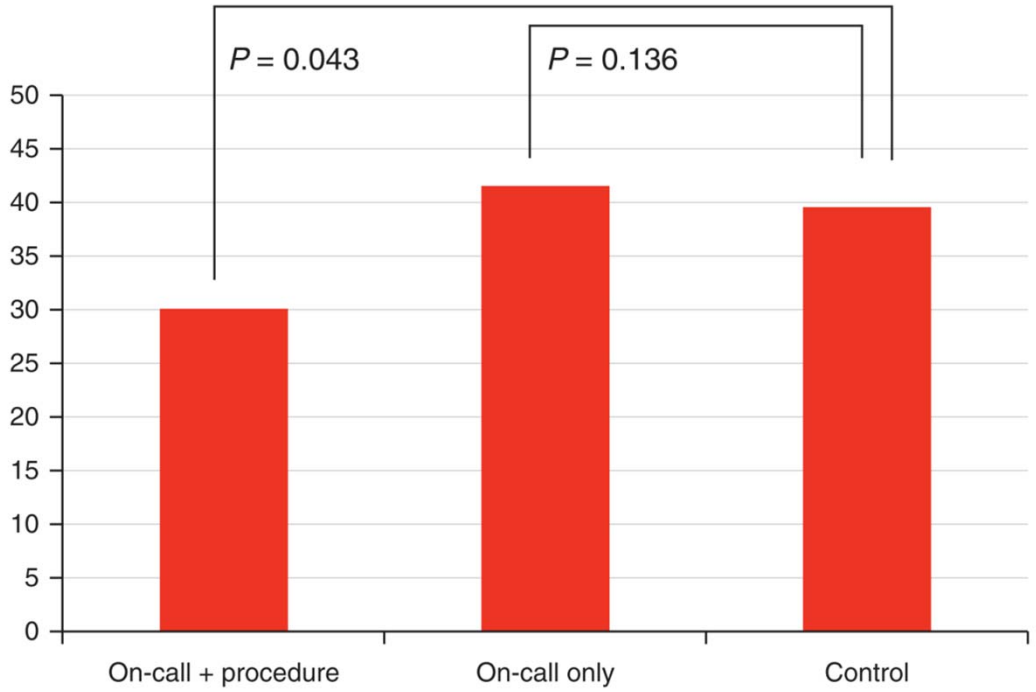




Flinn F, Int J Qual Health Care 2011

Influence of previous night call and sleep deprivation on screening colonoscopy quality



Being on call the night prior and performing an emergent procedure lead to **a significant 24% decrease in the adenoma detection rates**

Benson M, Am J Gastroenterol 2014


CHRONISCHE ÜBERMÜDUNG

Arnedt J. JAMA 2005

Neurobehavioral performance of residents after heavy night call vs after alcohol ingestion

4 weeks heavy call
- 80-90h/week
- Overnight call every 4th/5th night (36h)

4 weeks light call
- 44h/week
- No overnight call

Post call tests: Attention, Vigilance, Driving (Simulation)

Performance

=

Performance
+ 0.05g% blood alcohol

Impact of extended-duration shifts on medical errors, adverse events, and attentional failures

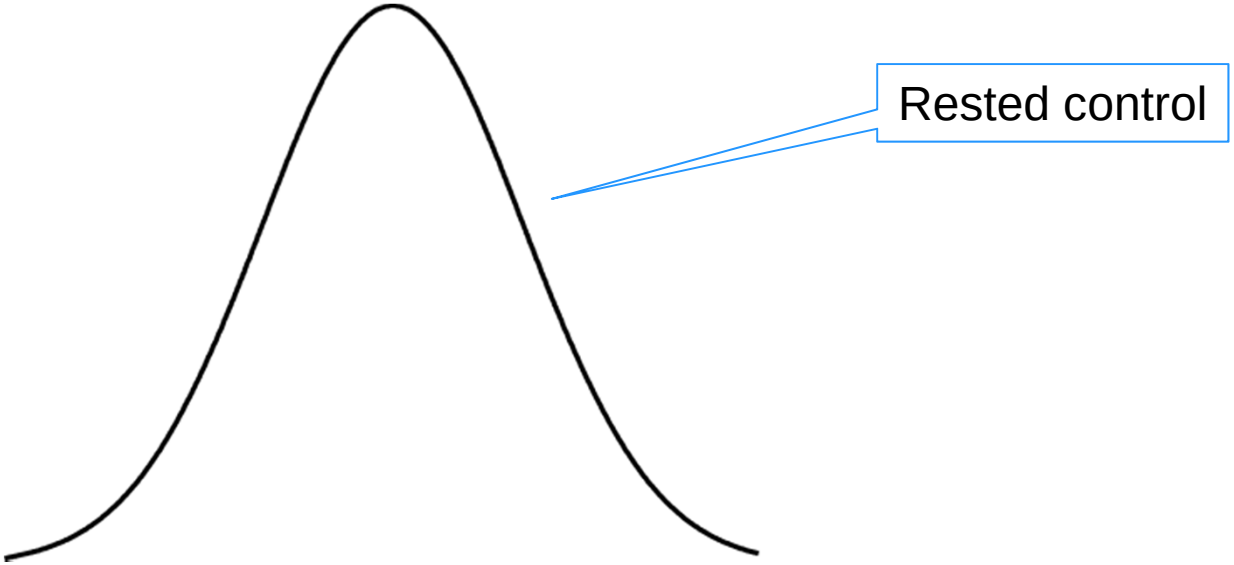
	Extended-Duration shifts		
	0	1-4	≥5
	Rate per person per month		
Fatigue related medical error	**0.038**	**0.098**	**0.16**

	Extended-Duration shifts		
	0	1-4	≥5
	Odds ratio		
Fatigue related medical error	**Control**	**3.5 (3.3-3.7)**	**7.5 (7.2-7.8)**

Barger L, PLoS Med 2006

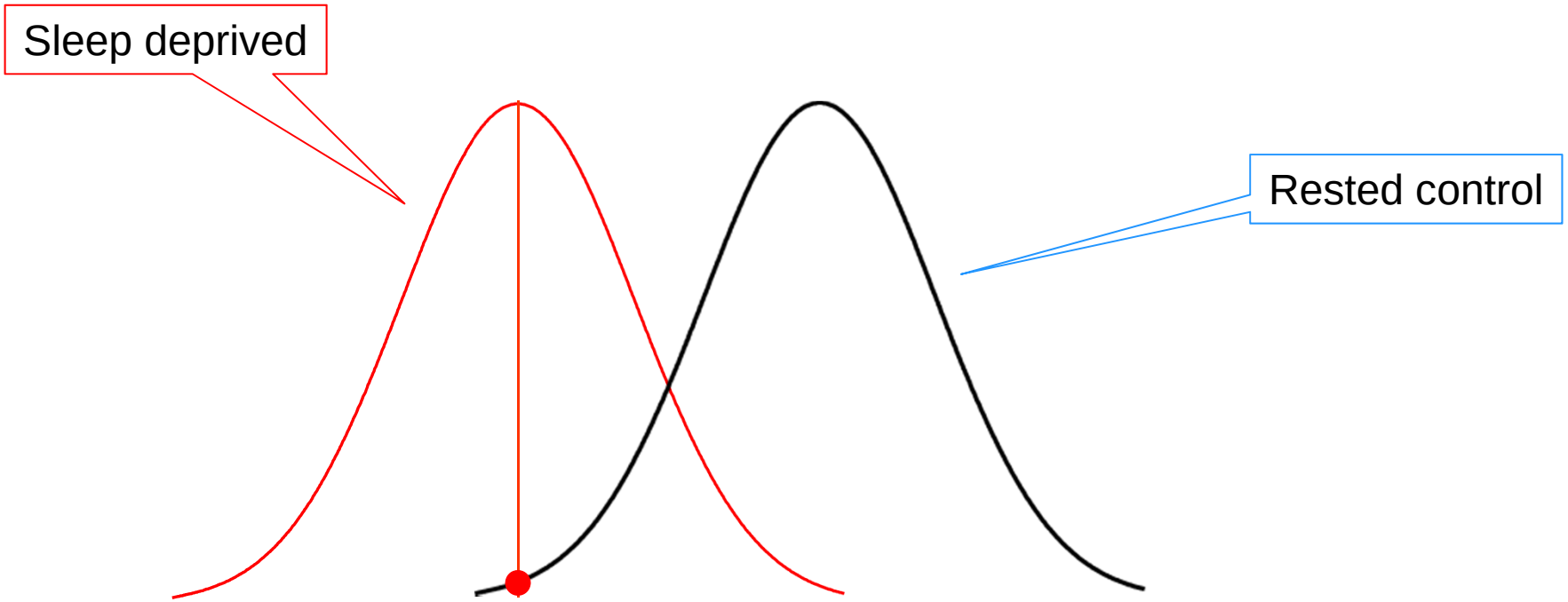
Philibert J, Sleep 2005

Clinical performance in residents



Philibert J, Sleep 2005

Clinical performance in residents



Sleep-deprived physicians performed
at the 7th percentile of the rested group

Effect of Reducing Interns‘ Work Hours on Serious Medical Errors in Intensive Care Units

CP Landrigan et al, NEJM 2004

	Traditional	Intervention
Average hours/week	77-81	60-63
Consecutive hours	up to 34	16
Patient days	1294	909
Errors/1000 pt days	136	100

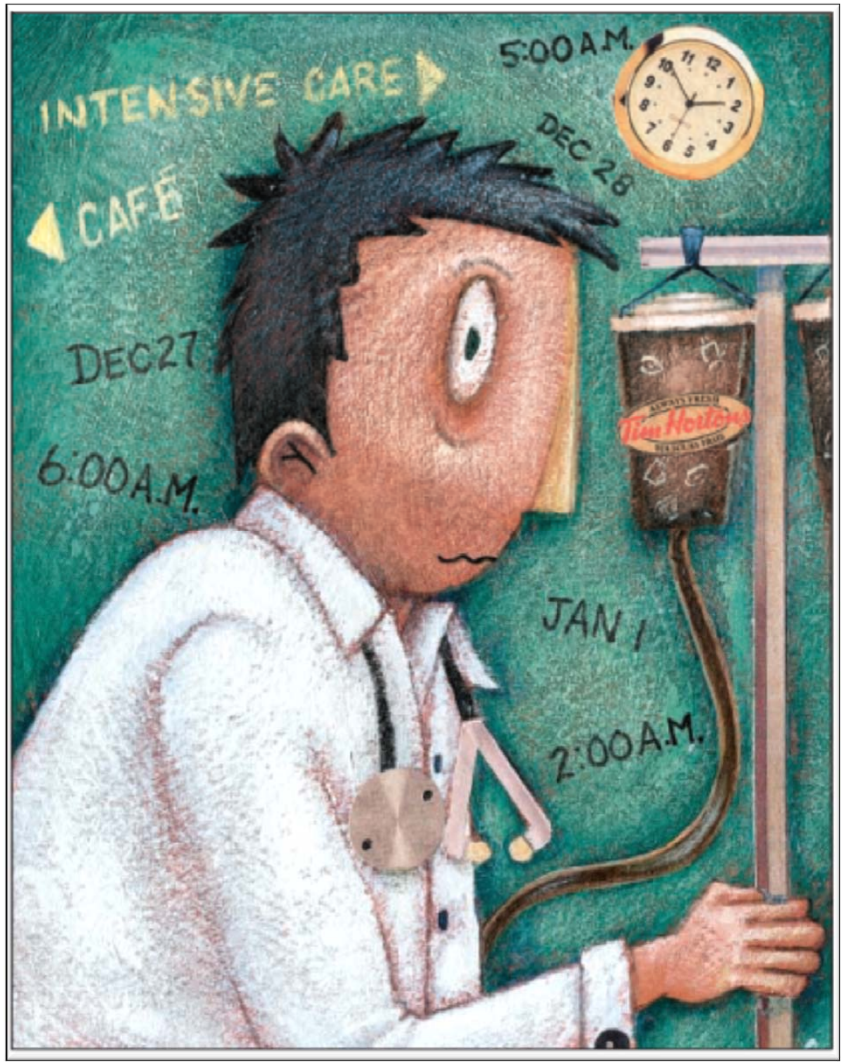
- 26%

Wieviel Arbeitszeit ist Ärzten zumutbar ?

Die Gesundheit ist ein Zustand des vollständigen körperlichen, geistigen und sozialen Wohlergehens und nicht nur das Fehlen von Krankheit oder Gebrechen.

(WHO 1946)

Diary of an ICU slave



- I will spend day and night giving fluids, then ordering diuretics….
- ……the night compresses to one continuous, atonal beep.
- I‘m a mechanical implement, a robot. Machines never sleep. On this first day of the new year, I‘m the ultimate workhorse…….

Nelson S, CMAJ 2003

Rauchenzauner M, Eur Heart J 2009

Effects of a 24 h physicians on-call duty (night shift)

Study group

- 30 physicians (Internal Medicine, Neurology, Otorhinolaryngology
- Randomized comparison between night shifts (24h) and day shifts (8h)

Methods

- Diary, 24h ECG, 24 RR, Blood chemistry, Urin analysis

Results

- **During night shifts:**
- **ECG: higher rate of premature beats**
- **RR: higher diastolic BP, higher systolic BP during sleep time**
- **Blood: TNF alpha increased during night shift**
- **Urin: Noradrenaline excretion higher**

Extended work duration and the risk of self-reported percutaneous injuries in interns

	Extended work	Nonextended work	OR (95%CI)
Percutaneous injuries	**1.3** per 1000 opportunities	**0.8** per 1000 opportunities	**1.6 (1.5-1.8)**

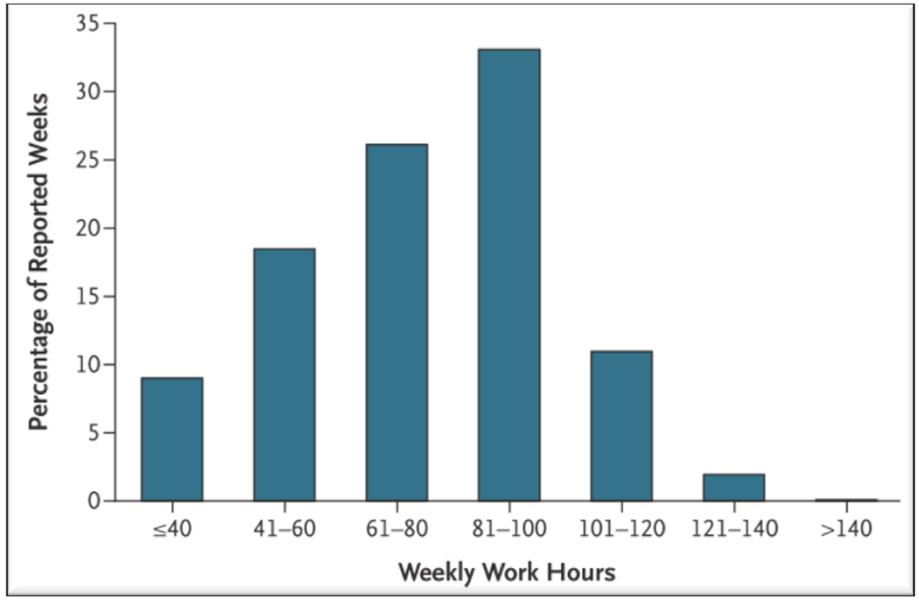
	Night time	Day time	OR (95%CI)
Percutaneous injuries	**1.5** per 1000 opportunities	**0.7** per 1000 opportunities	**2.0 (1.9-2.1)**

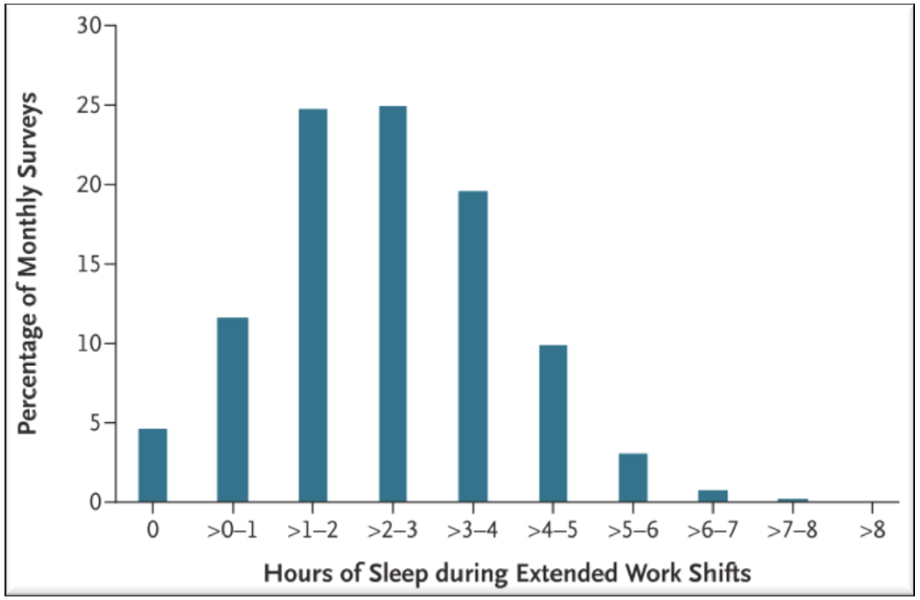
Ayas N, JAMA 2006

Extended work shifts and the risk of motor vehicle crashes among interns

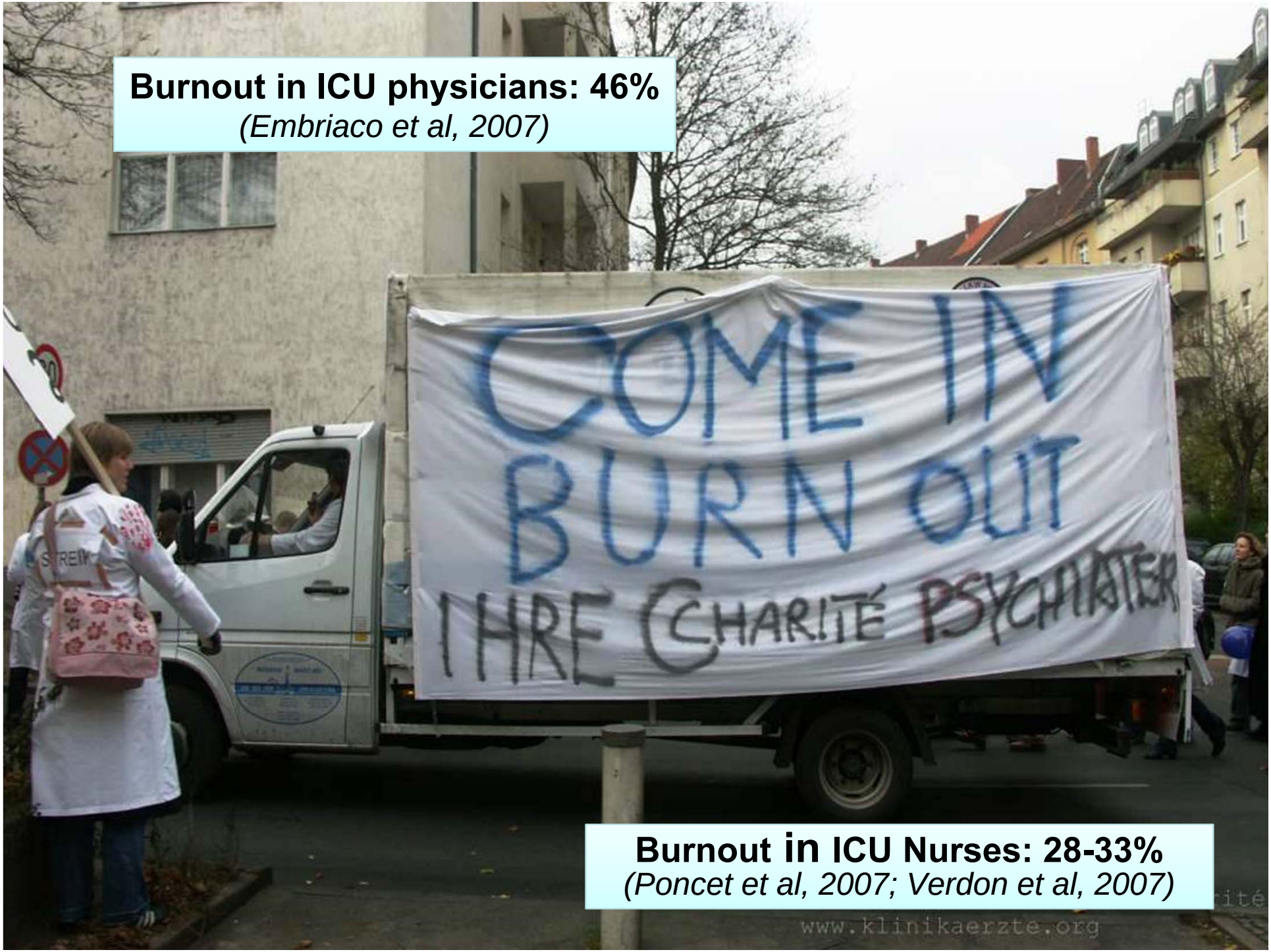
Barger L, NEJM 2005

- 2737 Interns
- Weekly work hours (mean): 71±3
- Extended workshifts (mean): 32±4





- OR for reporting a **motor vehicle crash** after an extended work shift **2.3** (95%CI 1.6-3.3)
- OR for reporting a **near miss incident after** an extended work shift **5.9** (95%CI 5.4-6.3)



Burnout in ICU physicians: 46%
(Embriaco et al, 2007)

Burnout in ICU Nurses: 28-33%
(Poncet et al, 2007; Verdon et al, 2007)

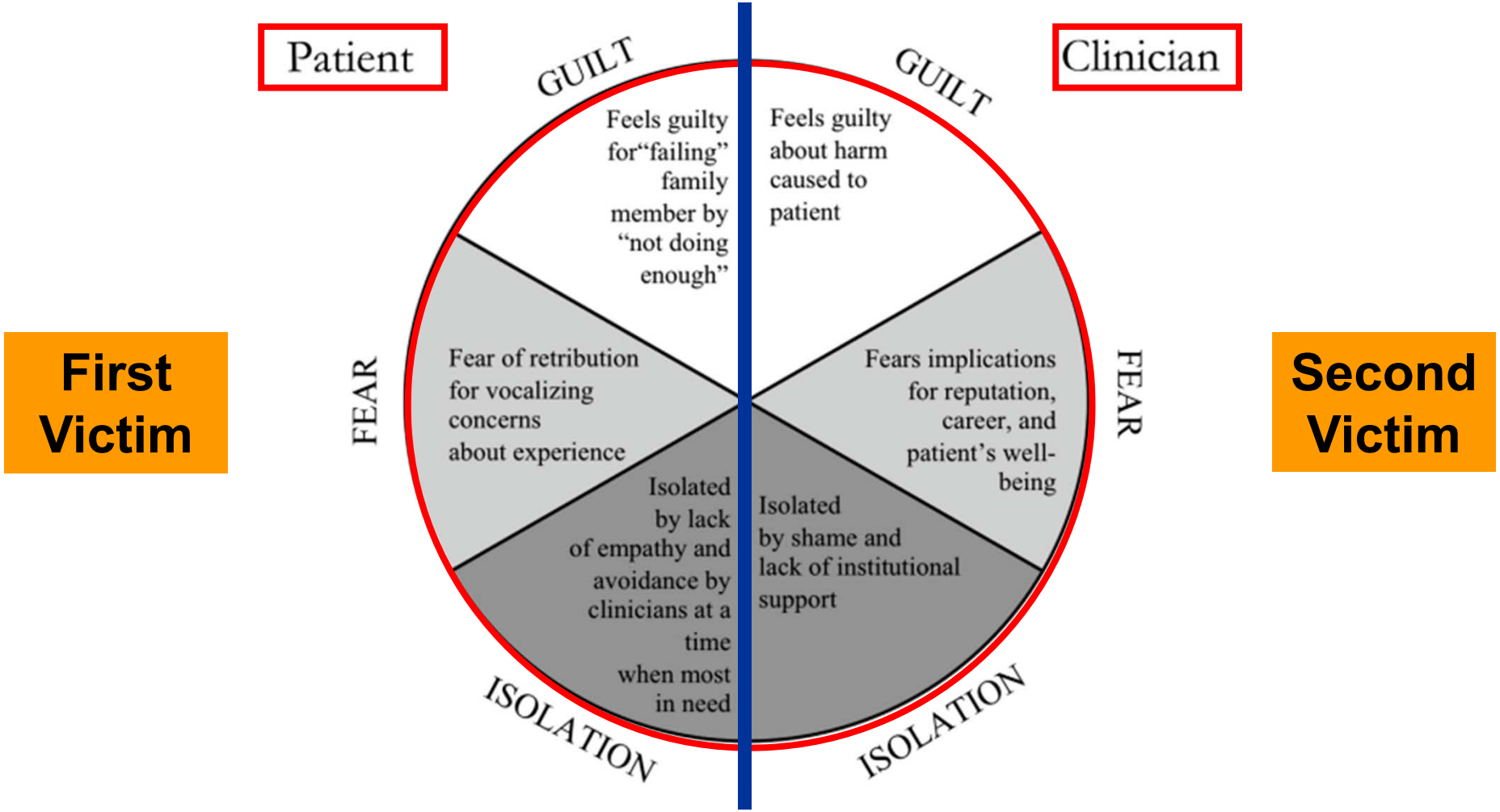
Factors associated with a higer Maslach Burnout Inventory Score

Variable	OR (*95% CI*)	p Value
Demographic factor		
Female sex*	1.58 (1.09–2.30)	0.02
Organizational factors		
Night shifts per month, for each day	1.12 (1.02–1.23)	0.02
Night shift before the survey*	1.60 (1.06–2.44)	0.03
Period since the last nonworking week, for each day	1.003 (1.001–1.005)	0.02
Conflict with a nurse during the last 7 d*	1.70 (1.02–2.83)	0.04
Conflict with a colleague intensivist during the last 7 d*	2.73 (1.75–4.25)	0.001
Relationships with nurses, for each additional point of the 0–10 rating scale	0.85 (0.77–0.93)	0.001
Relationships with chief nurses, for each additional point of the 0–10 rating scale	0.77 (0.67–0.87)	0.001

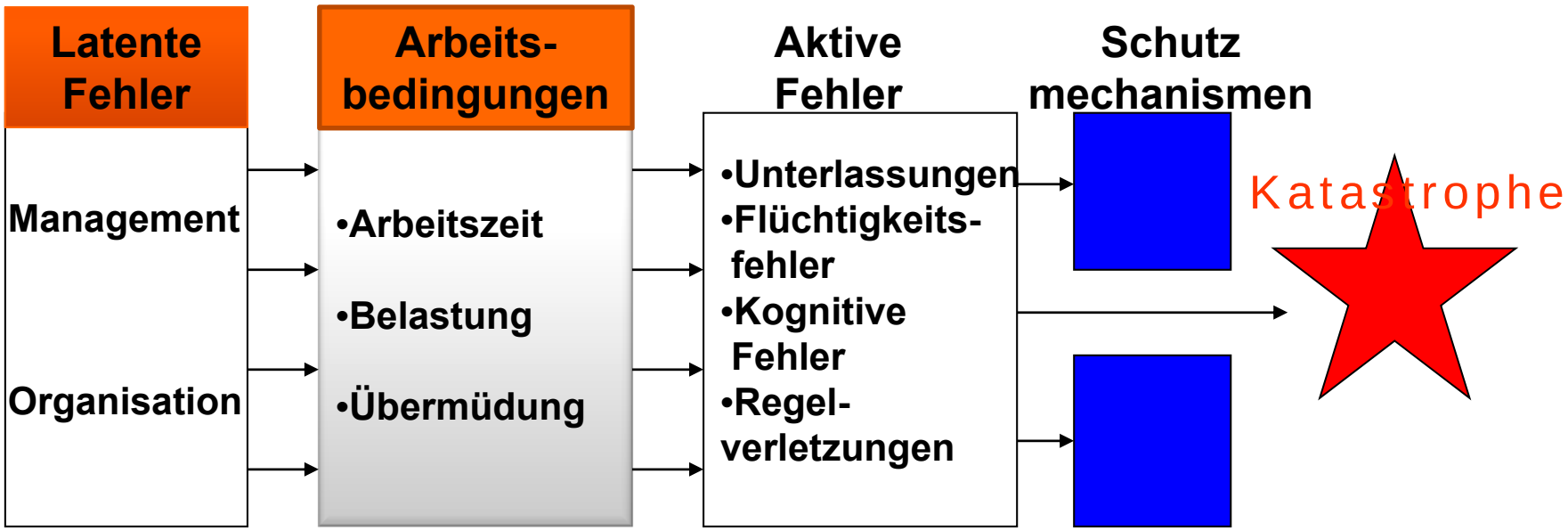
Embriaco N. Am J Resp Crit Care Med 2007

Bell SK, Acad Med 2010

Emotional toll following error



Katastrophenmodell



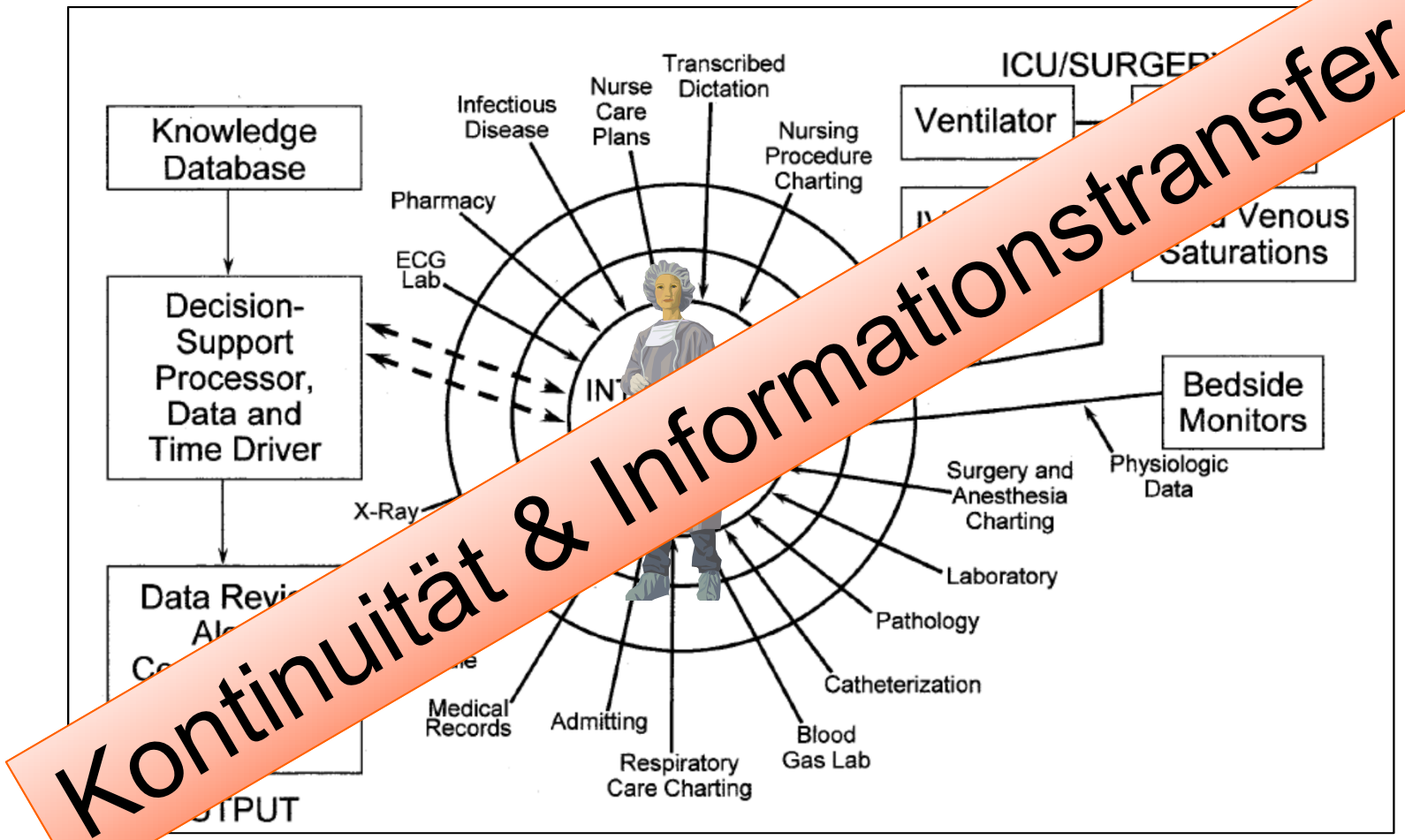
nach Vincent et al. BMJ 1998

Is critical information lost over 24 hours ?
Does a checklist prevent loss of information ?

Patient Care Item	n	No. of Lost Observation	No. of Lost Study	*p*
Critical laboratory/ test results	150	22/61 (36.1%)	4/89 (4.5%)	<0.0001
Antibiotics/cultures/ meds	193	11/94 (11.7%)	1/99 (1%)	0.010
Nutrition/vent/other	177	12/80 (15%)	4/97 (4.1%)	0.043
Tubes/CVP/IVs	117	12/47 (25.6%)	4/70 (5.7%)	0.018
Consults	52	4/21 (19.1%)	1/31 (3.2%)	NS
Total	689	61/303 (20.1%)	14/386 (3.6%)	<0.0001

Stahl K, J Trauma 2009

Multitasking and Information overload



Kontinuität & Informationstransfer

Gardner R, Resp Care 2004

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England Northern Ireland Scotland Wales UK Politics Education

30 September 2013 Last updated at 17:39 GMT

2.1K Share

Pilot hours regulation plan rejected by MEPs

If MEPs vote in favour, the changes to the rules will be introduced EU-wide in 2015

England Northern Ireland Scotland Wales UK Politics Education

27 September 2013 Last updated at 10:59 GMT

Share

'More than half' of pilots have slept while flying

More than half of pilots have fallen asleep while in charge of a plane, a survey by a pilots' union suggests.

Of the 56% who admitted sleeping, 29% told Balpa that they had woken up to find the other pilot asleep as well.

The survey comes after it emerged that two pilots on an Airbus passenger plane were asleep at the same time, with the aircraft being flown on autopilot.

Some 84% of pilots said their abilities had been compromised in the last six months by tiredness

We can not change the human condition,
but we can change the conditions
under which humans work

Fazit

- Patientensicherheit u. Mitarbeitersicherheit wird durch überlange Arbeitszeiten und chron. Schlafdefizit reduziert.
- Arbeitszeit > 16h reduziert Leistungsfähigkeit signifikant.
- Ruhezeiten, Art der Arbeitsbelastung, etc. sind wichtige Einflussfaktoren.
- Keine klare Evidenz für ein ideales ärztliches „Arbeitszeitmodell“
- Eigeneinschätzung von Ärzten bedarf einer Korrektur
- Problemstellung: Kontinuität u. Informationstransfer
- Gesundheitspolitische Frage: welche Bereitschaft besteht für eine Systemverbesserung (was ist ein nicht übermüdeter Arzt wert ?)