Are longer nursing shifts in medical/surgical wards associated with reduced quality of care and patient safety? A cross sectional survey in 12 European countries

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Objectives:

- To describe shift patterns of European registered nurses

- Investigate associations between shift patterns and nurse reported care quality, safety and care left undone.

  - shift length
 - working beyond contracted hours (overtime)

Shift patterns

- Traditional "8 hour"

  - 3 Shifts per day

    - "Early" (e.g. 07:00-16:00)

    - "Late" (e.g. 13.00-22:00)

    - "Night" (e.g. 21:30-07:30)

  - 5 shifts per WTE nurse per week

- Extended "12 hour"

  - 2 shifts per day

    - Day (07:00-19:30)

    - Night (19:00-07:30)

  - 3 per WTE nurse per week

Prevalence

- Survey of US registered nurses indicated that 65% worked shifts of 12 to 13 hours (Stimfel et al 2012)

- UK/Europe?
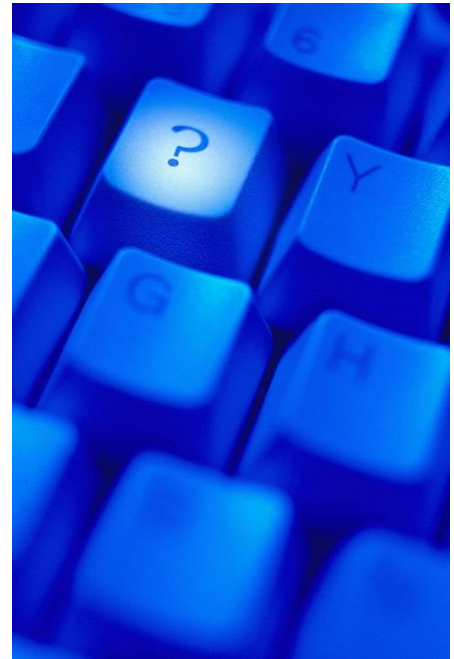
Stimpfel AW, Aiken LH. Hospital Staff Nurses' Shift Length Associated With Safety and Quality of Care. J Nurs Care Qual 2012

Pros?

- Employers

  - Reduced overlaps

  - Fewer handovers

  - Improved 'in day' continuity

  - Increased efficiency

  - ?Improved quality

- Nurses

  - Improved experience of continuity

  - Satisfaction with more days off work

NHS Evidence Quality & Productivity Case Study: Moving to 12-hour shift patterns: to increase continuity and reduce costs (Basingstoke and North Hampshire NHS Foundation Trust) [accessed at http://www.bipstar.co.uk/files/NHS%20Evi%2012hourshiftworking.pdf 26/3/2014]

Evidence summary
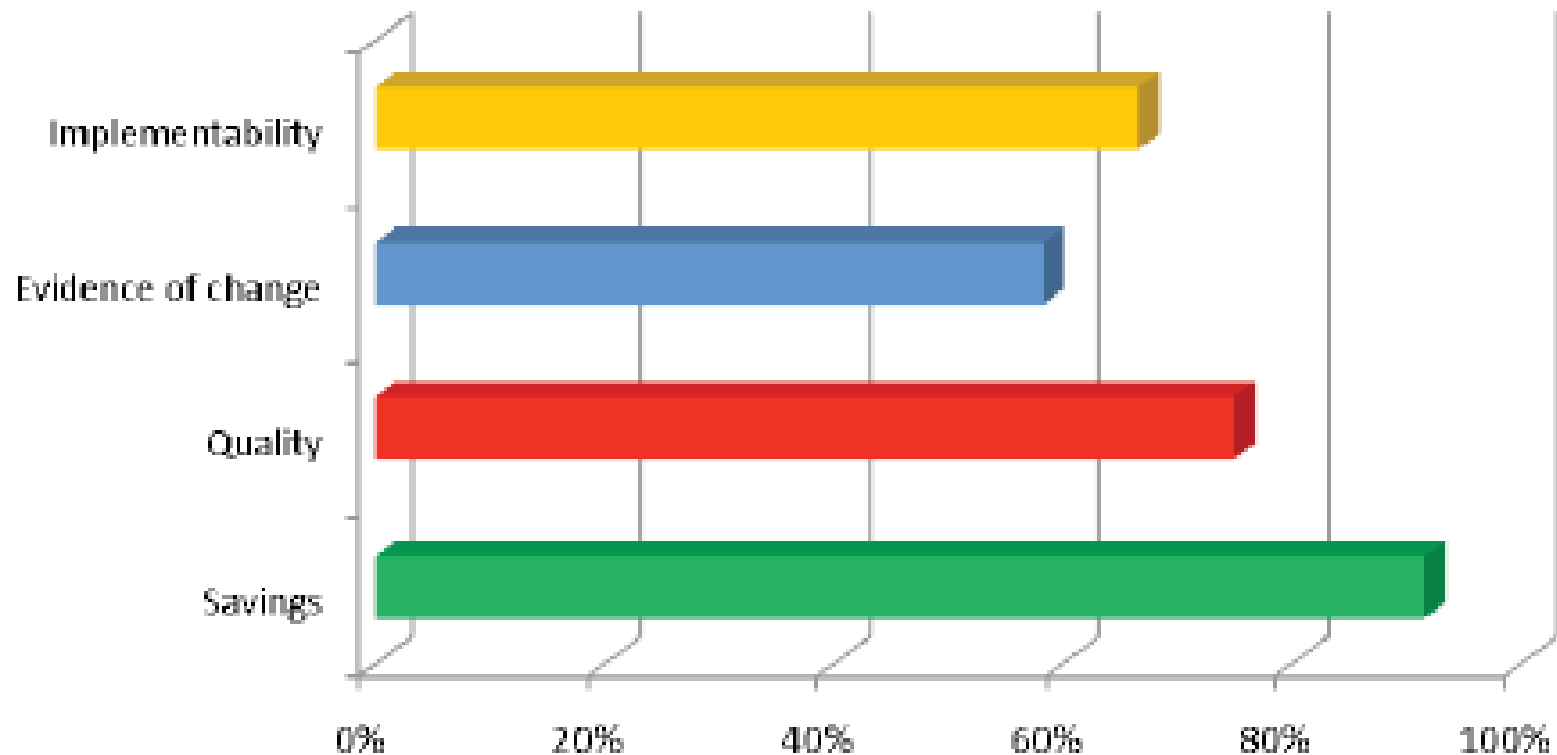
Source: NHS Evidence Quality & Productivity Case Study: Moving to 12-hour shift patterns: to increase continuity and reduce costs (Basingstoke and North Hampshire NHS Foundation Trust)

Cons?

- Long working hours are correlated with fatigue and decreased levels of alertness (Geiger-Brown et al 2012)

- Potentially more adverse events including mortality (Trinkoff et al 2011)

- Nurses working 12+ hours reported lower quality care (Stimpfel et al 2012)

Geiger-Brown J, Rogers A, Trinkoff AM, et al. Sleep, Sleepiness, Fatigue, and Performance of 12-Hour-Shift Nurses. Chronobiology International 2012;29:211-219

Stimpfel AW, Aiken LH. Hospital Staff Nurses' Shift Length Associated With Safety and Quality of Care. J Nurs Care Qual 2012
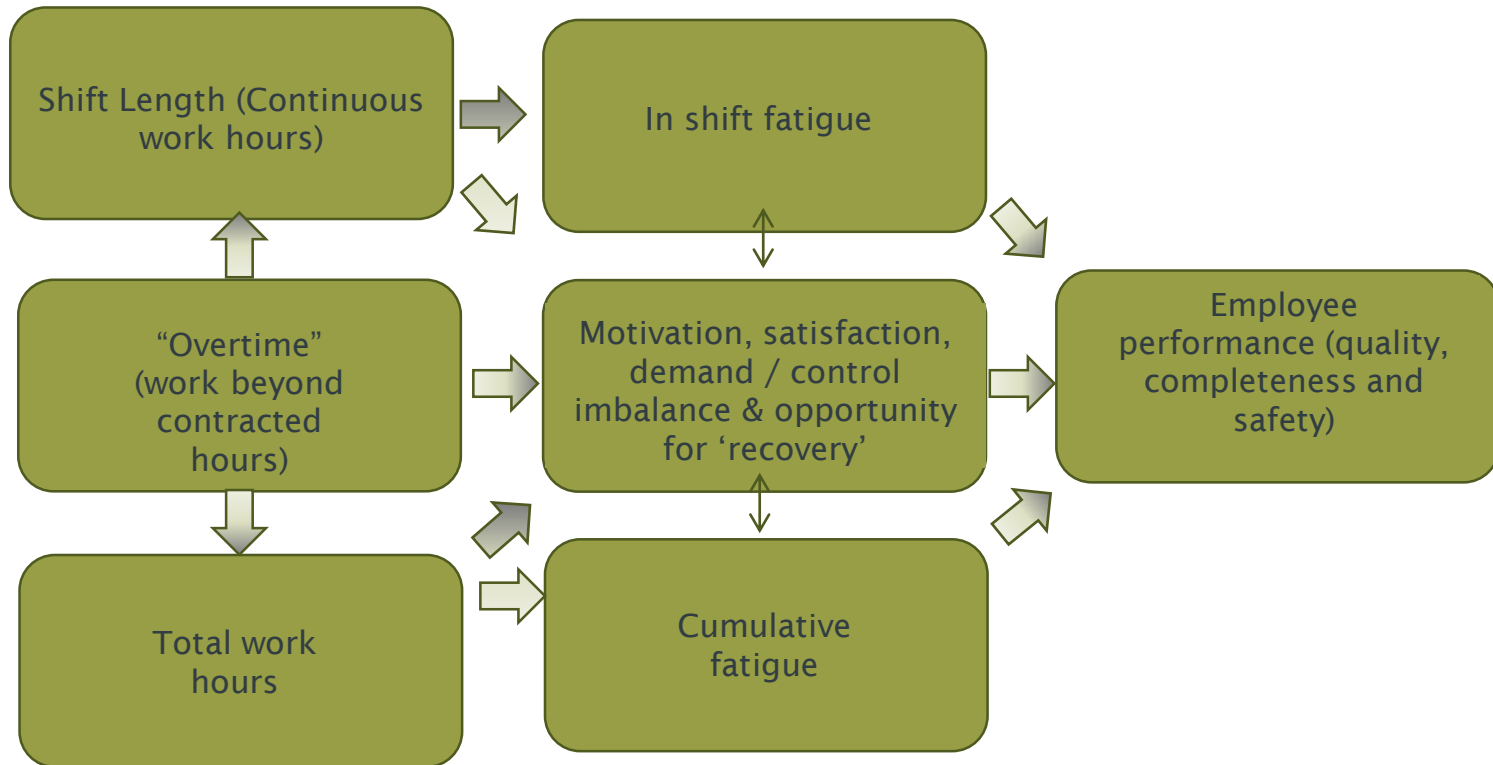
Trinkoff AM, Johantgen M, Storr CL, et al. Nurses' work schedule characteristics, nurse staffing, and patient mortality. Nursing research 2011;60:1-8
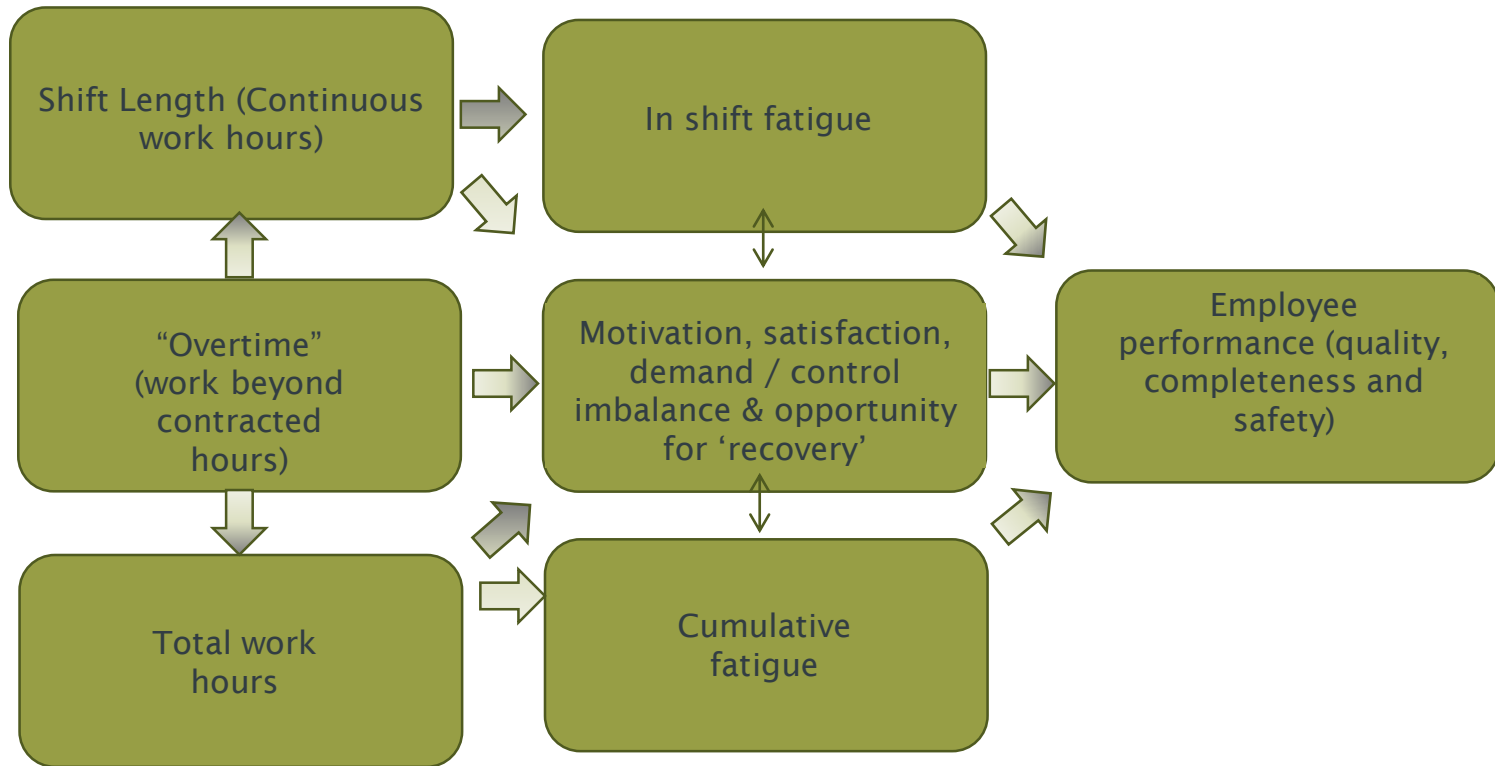
Limitations

- Systematic review inconclusive (Estabrooks et al 2009)

- "Shift-length" and "overtime" confounded

- Most adverse evidence relates to shifts of 13 hours or more

Estabrooks CA, Cummings GG, Olivo SA, et al. Effects of shift length on quality of patient care and health provider outcomes: systematic review. Quality and Safety in Health Care 2009;18:181-188

Framework

Shift Length (Continuous work hours)

In shift fatigue

"Overtime" (work beyond contracted hours)

Motivation, satisfaction, demand / control imbalance & opportunity for 'recovery'

Employee performance (quality, completeness and safety)

Total work hours

Cumulative fatigue

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┌─────────────────────┐        ┌─────────────────────┐
│ Shift Length        │   ⇒    │                     │
│ (Continuous         │        │  In shift fatigue   │
│ work hours)         │        │                     │
└─────────────────────┘   ⇘    └─────────────────────┘
         ⇑                              ↕                    ⇘
┌─────────────────────┐        ┌─────────────────────┐   ┌─────────────────────┐
│ "Overtime"          │   ⇒    │ Motivation,         │ ⇒ │ Employee            │
│ (work beyond        │        │ satisfaction,       │   │ performance (quality,│
│ contracted          │        │ demand / control    │   │ completeness and    │
│ hours)              │        │ imbalance &         │   │ safety)             │
└─────────────────────┘        │ opportunity         │   └─────────────────────┘
         ⇕                      │ for 'recovery'      │
                                └─────────────────────┘
                                        ↕                    ⇗
┌─────────────────────┐        ┌─────────────────────┐
│                     │   ⇗    │                     │
│ Total work          │        │  Cumulative         │
│ hours               │   ⇒    │  fatigue            │
│                     │        │                     │
└─────────────────────┘        └─────────────────────┘
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RN4CAST Survey

- Based on IHOS survey

- Translated into the 10 primary languages / 12 countries

- 54140 questionnaires distributed to RNs on med / surg wards response rate 62%

- Nurses were asked to report

  – number of hours worked

  – the period of the day (day / night)

  – whether they had worked beyond their contracted hours on the last shift they worked

Measures of quality

- **In general, how would you describe the quality of nursing care delivered to patients on your unit/ward?**

  - fair or poor as opposed to good or excellent.

- **Please give your unit/ward an overall grade on patient safety**

  - poor, failing, acceptable, very good or excellent

Missed care

- **On your most recent shift, which of the following activities were necessary but left undone because you lacked the time to complete them?**

(**based on** Schubert M, Glass TR, Clarke SP et al. Rationing of nursing care and its relationship to patient outcomes: the Swiss extension of the International Hospital Outcomes Study. *Int J Qual Health Care* 2008;**20**(4):227-37.)

- Adequate patient surveillance
- Adequately document nursing care
- Administer medications on time
- Comfort/talk with patients
- Develop or update nursing care plans/care pathways
- Educating patients & family
- Frequent changing of patient position
- Oral hygiene
- Pain management
- Planning care
- Prepare patients & families for discharge
- Skin care
- Treatments & procedures

RN4CAST Cross-sectional survey (2009-10)

Country		Hospitals (Trusts)	Wards	Nurses
Belgium		67	272	3186
England		46 (31)	413	2990
Finland		32	126	1131
Germany		49	199	1508
Greece		24	65	367
Ireland		30	112	1406
Netherlands		28	131	2217
Norway		35	238	3752
Poland		30	119	2605
Spain		33	281	2804
Sweden		79	79	10133
Switzerland		35	134	1632
Total		**486**	**2169**	**33731**

Random / representative sample of hospitals, census sample of nurses from 2 or more general medical / surgical wards per hospital

Analysis

- Binomial / Poisson general mixed multi-level model (R / LME)

  – Nurses nested in wards nested in hospitals nested in countries

  – Control for

    - shift type (day / night)

    - nurse staffing levels

    - nurse age

    - hospital size

    - high technology hospitals

    - teaching status

Working patterns

Hours worked	All		Day		Night		Overtime	
	n	(%)	n	(%)	n	(%)	n	(%)
≤8 hours	15930	(50%)	15411	(63%)	519	(7%)	2669	(31%)
8.1-10 hours	9963	(32%)	5960	(24%)	4005	(57%)	4175	(49%)
10.1-11.9 hours	1159	(4%)	357	(1%)	802	(11%)	461	(5%)
12-13 hours	4313	(14%)	2670	(11%)	1643	(23%)	1145	(13%)
>13 hours	260	(1%)	229	(1%)	31	(0%)	156	(2%)
All	31625	(100%)	24627	(100%)	7000	(100%)	8606	(100%)

Variation between and within countries
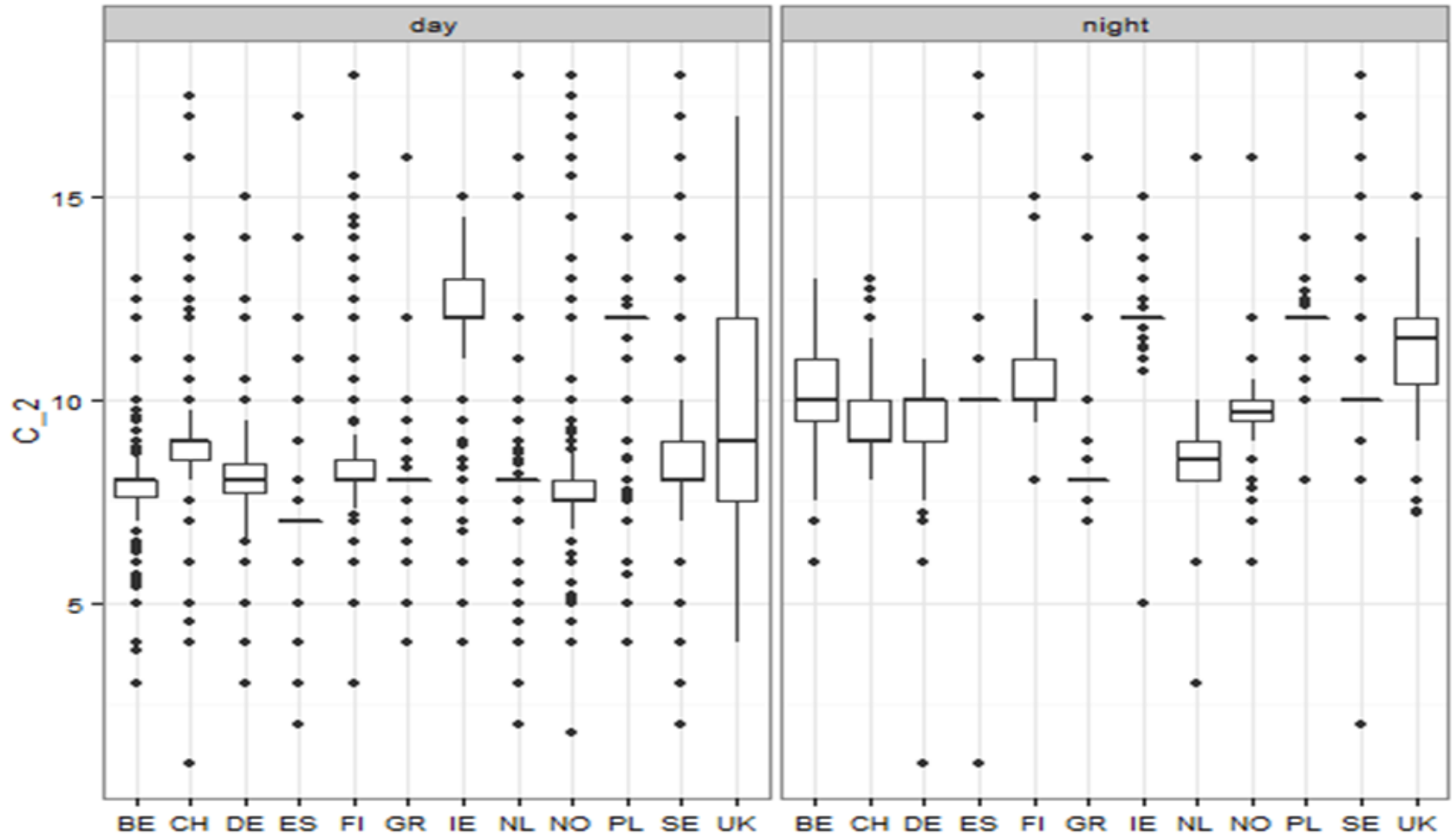
Quality

- poor/fair quality of care 25%

- "poor" or "failing" patient safety 7%

- Mean 3 activities left undone on their last shift.

- 88% report leaving some care undone

Associations between working patterns and quality / safety

	Poor / fair quality		Poor / failing safety		Missed care	
	OR [1]	95% CI	OR	95% CI	RR[2]	95% CI
≤ 8 hours shift						
8.1-10	**1.02**	0.82 - 1.29	**1.07**	0.94 - 1.22	**1.04***	1.02 - 1.06
10.1-11.9	**1.21**	0.85- 1.73	**1.31**	0.99 - 1.75	**1.08***	1.03 - 1.12
≥ 12	**1.36***	1.00 - 1.85	**1.46***	1.16 - 1.83	**1.13***	1.09 - 1.17
Worked beyond contracted hours	**1.32***	1.05 - 1.66	**1.66***	1.50 - 1.85	**1.29***	1.27 – 1.31

[1] Odds Ratio

[2] Rate Ratio

Discussion

- increased fatigue, loss of alertness and impaired decision making are plausible mechanisms to explain reduced ratings of quality and safety with longer shifts

- overtime may be associated with less favourable working environments

- the paradox whereby longer shifts appear to be preferred by nurses yet deliver poorer evaluations of safety grade and quality of care also merits further investigation.

Limitations

- Cross sectional

- Subjective outcomes

- "Common method" bias

Conclusions

- a policy of moving to longer shifts to reduce overall workforce requirements may have unintended consequences and reduce the efficiency and effectiveness of the workforce.

- the increased flexibility associated with overtime may not deliver the desired goals.