

# Nurse staffing levels, quality and outcomes of care in NHS hospital wards: what does the evidence say?

There is ample evidence demonstrating associations between nurse staffing levels in hospital wards and important patient and staff outcomes. Reviews have concluded that the evidence is consistent with low registered nurse staffing causing worse outcomes. But much of the evidence is from health systems that are very different to the NHS and gives little indication of the actual staffing levels that should be deployed. This evidence brief considers evidence specifically derived from the NHS, which identifies the levels of staffing on wards that were associated with the outcomes reported.

## What is the problem?

There is an increasingly large amount of research showing that low nurse staffing levels in hospital wards are associated with worse outcomes for patients and staff. Inconsistency in results and limitations in methods have led some to question the validity of this evidence. Nonetheless, substantial overviews of the evidence as a whole concur with the common sense conclusion: low nurse staffing limits the ability of nurses to deliver high quality care, which can lead to low job satisfaction, errors or omissions in care and, in some cases, adverse outcomes for patients [1, 2].

However, the evidence offers little direct guidance for those wishing to set staffing levels on wards. Most studies simply offer an estimate of the average effect of changing staff levels. The estimates are prone to bias and, crucially, give no clear indication of the actual staffing levels to be achieved. In effect, the answer to the question of how many nurses to deploy on a ward is 'more'.

Furthermore, while the relationship between nurse staffing and outcomes has been observed in a diverse range of countries, differences in the configuration of services and composition of the workforce make it unlikely that the same staffing level would apply in all settings.

This review considers evidence specifically derived from the NHS, in order to determine if it indicates safe staffing levels in general wards.

## Data sources

We searched MEDLINE, CINAHL, EMBASE, the Cochrane Library and other databases using the comprehensive search strategy developed for the evidence reviews undertaken to support development of the NICE guidance on safe staffing in acute wards [3]. We selected studies undertaken in the UK that estimated associations between nurse staffing levels on general wards and any quality or outcome measure. We focussed on studies that reported outcomes associated with specific ward staffing levels rather than general associations or whole hospital nurse staffing.

## Results

We found a total of 10 papers reporting associations between nurse staffing levels and outcomes in the NHS [4-13]. Papers were published between 1999 and 2016 using data gathered from 1992 to 2010. There is a degree of overlap between the patient and staff cohorts involved but there are at least seven distinct studies underlying these reports. All studies were observational, with all but one involving large numbers of hospitals or Trusts (range 2 to 183), mainly in England.

Samples were typically large, ranging from 2917 to 8887 nurses and from 9877 to over 12 million patients.

All but one study showed some significant associations between higher registered nurse staffing levels and improved quality and/or outcomes [11]. Although the relationship with registered nurse staffing was not always significant in multivariate analyses [e.g.12] most analyses in most studies showed a significant relationship with outcomes including mortality, staff burnout and incomplete nursing care.

## Associations between staffing levels and quality / outcomes

Five papers derived from three distinct studies reported associations between specific ward based staffing levels and some measure of quality or a patient or nurse outcome in the NHS.

One study (reported in a single paper) focussed on staffing in stroke units in 2011-12 [5] while two further studies (each reported in two papers focussing on different outcomes) examined staffing in general medical / surgical wards in the late 1990s [9, 10] and 2010 [7, 8].

### Mortality

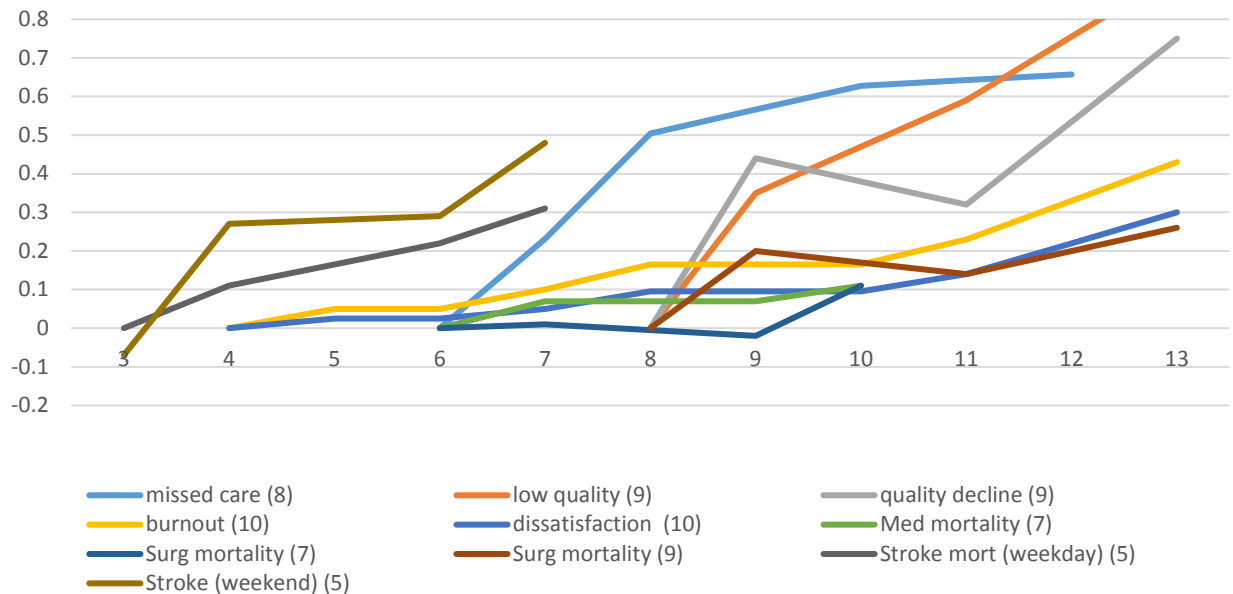
The odds of death for surgical patients were increased by 26% in the hospitals with lowest staffing on general wards (over 12 patients per RN, hospital wide) compared to the best (8.4 patients per RN or fewer) [9]. For medical patients, the odds of death were reduced by 11% in hospitals where average staffing on medical wards was 6 or fewer patients per RN [7]. A similar association was seen for surgical patients in surgical wards but it was not statistically significant. Stroke units with 6.7 or more beds per RN on weekdays had 31% higher mortality compared to units with 3.3 or fewer beds per RN on weekdays [5]. The difference was even greater for weekend staffing levels.

### Quality of care & staff experience

Nurses' reports of poor or declining quality were significantly more likely in hospitals with the lowest staffing on general wards (12+ patients to nurse) compared to the highest (8 patients or fewer per nurse) [9]. The odds of nurses reporting missing necessary care were reduced by 66% in better staffed wards ( $\leq 6$  patients per RN) compared to the worst (11+ patients per RN)[8].

Odds of reporting dissatisfaction and emotional exhaustion were reduced by 43% and 30% among nurses in the best staffed wards ( $\leq 4$  patient per RN) compared to the worst (13+ staffed wards [10].

## %increase in odds of adverse outcome by average RN staffing



### Health Care Assistants

Five studies considered the relationship between support worker or health care assistant staffing and outcomes in their analysis in addition to RN staffing [5, 7, 8, 12, 13]. In three of these there was some indication that higher levels of support worker staffing or lower skill mix was associated with worse outcomes, although studies reporting relationships with HCAs deployed on wards found no association (positive or negative) with the outcomes studied [7, 8].

### Thresholds

Mandatory staffing policies in the US and Australia suggest *minimum* staffing levels that are equivalent to between 4 & 7 patients per nurse in general acute wards during day time [14]. A US study showed a significant increase in mortality to be associated with patients experiencing any shifts with 8 or more hours below target staffing identified using a validated staffing tool [15]. In its guidance, NICE identified a threshold of more than 8 patients per registered nurse as associated with increased risk [16].

Figure 1 gives an approximation of the results of the studies mapped against staffing levels. While the odds of adverse outcomes were generally increased when average staffing fell below the 1:8 threshold, better outcomes were often associated with higher staffing levels and ratios of 1:7 and lower. For some services, significant increases in risk occurred well below this threshold. While not giving a clear 'safe' staffing level this evidence reinforces that a 1:8 threshold represents a level at which risk is known to be increased, not an optimal safe staffing level.

### Conclusions

The evidence from the NHS is consistent with international research showing that lower nurse staffing levels are associated with worse outcomes in a variety of general acute wards or patient groups. It is hard to discern a clear threshold and the staffing levels reported are averages. For several of the studies we reviewed, significant differences in outcomes were only observed when comparing the best to the worst staffed wards.

The evidence is specific to registered nurse staffing levels. Where other staff groups were considered, there was no evidence to support substitution of health care assistants for RNs. The required levels of HCA staffing are unclear from this evidence and must be determined in addition to RN staffing levels.

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