Safe staffing for nursing in adult inpatient wards in acute hospitals

NICE safe staffing guideline

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Introduction

Following publication of the Francis report on Mid Staffordshire (Francis 2013), the Keogh review into the quality of care and treatment provided in 14 hospital trusts in England (Keogh 2013) and the Berwick report on improving the safety of patients in England (Berwick 2013), the Department of Health and NHS England asked NICE to develop evidence-based guidelines on safe and effective staffing.

The need for guidelines on safe and effective staffing was also highlighted in the recent policy documents and responses:

- How to ensure the right people, with the right skills, are in the right place at the right time. A guide to nursing midwifery and care staffing capacity and capability (National Quality Board 2013)
- Hard truths. The journey to putting patients first (Department of Health 2013)

This is the first guideline for this new NICE work programme and it makes recommendations on safe staffing for nursing in adult inpatient wards in acute hospitals, based on the best available evidence. For the purposes of this guideline the term nursing refers to registered nurses and healthcare assistants, unless otherwise specified.

The guideline also identifies indicators that should be used to provide information on whether safe and effective nursing care is being provided in adult inpatient wards in acute hospitals. (For further information, see the scope for the guideline.)

This guideline does not cover nursing workforce planning or recruitment at regional or national levels. Intensive care, maternity and mental health wards, day units and assessment or admission units are also not covered.

This guideline is primarily for use by NHS provider organisations or others who provide or commission services for NHS patients. It is aimed at healthcare boards, hospital managers, ward managers, healthcare professionals and commissioners. Those responsible and accountable for staffing for nursing in adult inpatient wards in acute hospitals at organisational and at a ward level should take this guideline fully into account when exercising their professional judgement. However, this guideline

does not override the need and importance of using professional judgement to make decisions appropriate to the circumstances.

The guideline will also be of interest to the public, and to people involved in developing toolkits and resources for assessing and determining safe and effective nursing staff requirements.

The National Quality Board for England considers nursing staff capacity and capability are key determinants of the quality of care experienced by patients, and has issued guidance about what is expected of commissioners and providers in this area (National Quality Board 2013). The Department of Health recently consulted on Introducing Fundamental Standards that promote care that is safe, high quality, and puts patients first (Department of Health 2014).The National Quality Board guidance and the Department of Health consultation should be read alongside this NICE guideline.

NICE will offer a separate endorsement process to assess whether submitted toolkits for informing nursing staff requirements comply with the guideline recommendations. An endorsement mark, which is a seal of approval, will be awarded to toolkits that meet the endorsement criteria.

Patient-centred care

This guideline makes recommendations on safe nursing staff requirements for the care of patients on adult wards in acute hospitals.

Patients have rights and responsibilities as set out in the NHS Constitution for England: all NICE guidance is written to reflect these. The Department of Health's Compassion in Practice strategy also sets a shared purpose for nurses, midwives and care staff to deliver high quality, compassionate care, and to achieve excellent health and wellbeing outcomes (Department of Health 2012).

Care should take into account individual needs and preferences. Patients should have the opportunity to make informed decisions about their care and treatment, in partnership with their healthcare professionals. Healthcare professionals and others responsible for assessing safe nursing staffing requirements on adult wards in acute hospitals should also refer to NICE's guidance on the components of good patient experience in adult NHS services

Evidence to recommendations

When drafting the recommendations the committee considered the evidence from the systematic reviews, an economic analysis report and the expert reports described in section 2. In some cases where there was limited or no published evidence, the committee considered whether it was possible to formulate a recommendation on the basis of their experience and expertise.

The following factors were considered by the committee when drafting the recommendations:

- whether there is a legal duty to apply the recommendation (for example to be in line with health and safety legislation)
- the nature and quality of the evidence base (for example the risk of bias in the studies looked at, or the similarity of the patient populations covered)
- the relative benefits and harms of taking (or not taking) the action
- any equalities considerations.

The evidence to recommendations tables presented in appendix 1 detail the committee's considerations when drafting the recommendations.

In general, recommendations that an action 'must' or 'must not' be taken are usually included only if there is a legal duty to apply the recommendation, for example to comply with health and safety regulations.

Recommendations for factors that should (or should not) be used or actions that should (or should not) be taken when determining safe nurse staffing use directive language such as 'agree', 'assess', 'calculate', 'ensure procedures are in place', 'record' or 'take'.

Recommendations where the quality or strength of the evidence is weaker and/or there is a closer balance between benefits and harms (factors that could be used or actions that could be taken) use 'consider'.

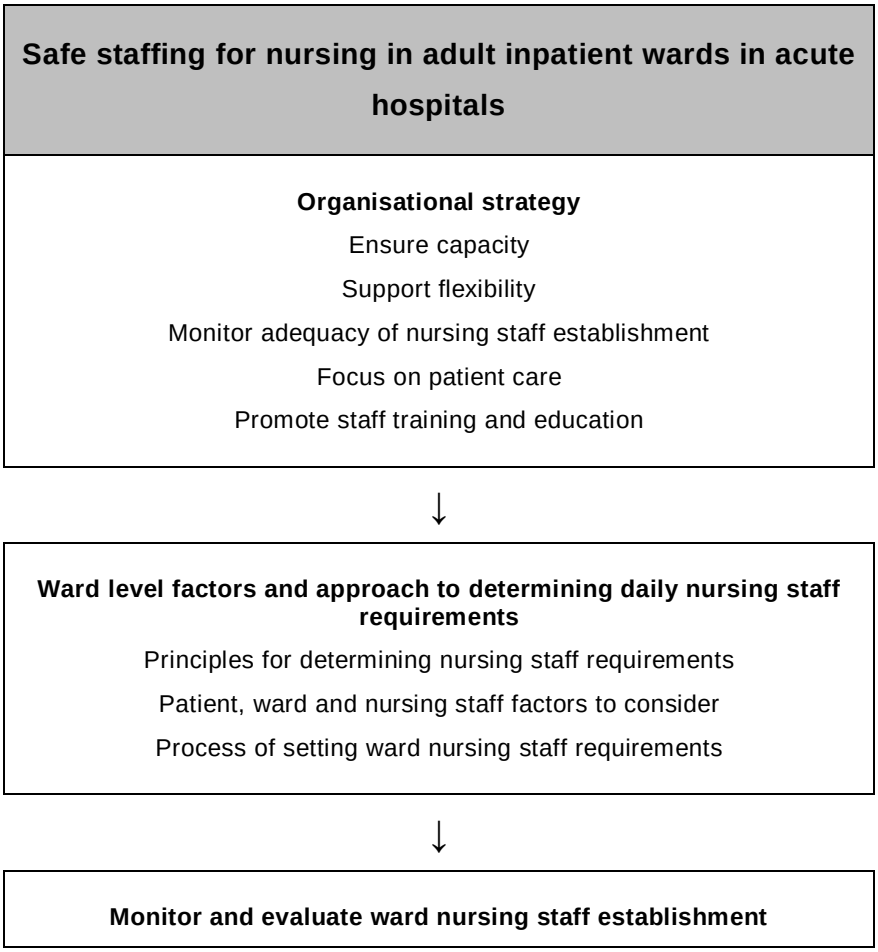
1 Recommendations

This guideline on safe staffing for nursing in adult wards in acute hospitals begins with recommendations for the responsibilities and actions at an organisational level that are required to support safe staffing for nursing in individual wards.

There is no single nursing staff to patient ratio that can be applied across the wide range of wards to safely or adequately meet the nursing care needs of patients. This guideline therefore recommends the factors that need to be systematically assessed at ward level when determining nursing staff requirements, with the nursing care needs of individual patients being the main driver. These factors should then be used in a staged approach to set safe nursing staff requirements throughout a 24-hour period.

This guideline also makes recommendations for monitoring whether the calculated nursing staff requirements are being met and, most importantly, whether patients are receiving the nursing care they need. The actions if staffing requirements are not being met are also outlined.

This sequence of recommendations is summarised in the figure below.



1.1 Organisational strategy

These recommendations are aimed at the hospital board, senior management and commissioners who should take the following responsibilities and actions to support safe staffing for nursing at a ward level. They should be read alongside National Quality Board (2013) How to ensure the right people, with the right skills, are in the right place at the right time. A guide to nursing, midwifery and care staffing capacity and capability. NHS England.

Ensure capacity

1.1.1 Develop assurance mechanisms to ensure nursing staff establishments (the number of registered nurses and healthcare assistants that are funded) for wards or departments are sufficient to provide safe nursing care to patients at all times.

1.1.2 Agree the required ward or departmental establishments and ensure they are signed off by the appropriate senior nursing manager at the level of

the ward leader or matron, with a final sign off by the designated board member (such as the chief nurse or equivalent). At a minimum, this should be done when the ward establishment and budget are set and when the actual nursing staff roster is posted.

1.1.3 Include capacity to deal with planned and predictable variations when agreeing the nursing staff establishments. This includes variations in total nursing requirement (such as seasonal variations indicated by historical records of nurse staffing requirements) and staff availability (for example, indicated by historical records of absences for any reason).

1.1.4 Be aware that improved patient outcomes are associated with a higher proportion of registered nurses in the nursing staff establishment.

Support flexibility

1.1.5 Ensure procedures allow for flexibility in ward nursing staff, to meet unplanned variations in the total nursing requirement (for example, caused by changes in patients' nursing care needs) or the availability of nursing staff. These procedures should enable an increase or decrease in staffing for nursing care from the planned daily or shift allocation. Flexibility in ward nursing staffing should not compromise safe nursing in other wards.

1.1.6 Consider approaches to support flexibility, such as adapting nursing shifts, skill mix, location and contractual arrangements, and implement them if appropriate.

Monitor adequacy of nursing staff establishment

1.1.7 Ensure there are procedures for systematically monitoring and reviewing nursing staff establishments of individual wards on a regular basis (at least twice a year). These procedures should include periodic monitoring of a range of nursing sensitive indicators (see box 2 in recommendation 1.3.1). Nursing staff establishments should be adjusted in line with the results of the regular reviews.

1.1.8 Ensure there are procedures to identify differences between the nursing staff available on a ward and the nursing staff required to meet the total nursing requirement. This should be done on a shift-by-shift basis or throughout a 24-hour period. These procedures should include reviewing reported nursing red flag events (see box 1 in recommendation 1.2.19). The procedures should facilitate effective responses to unplanned variations in the total nursing requirement and enable prompt action to be taken to address any staffing deficits.

Focus on patient care

1.1.9 Ensure patients receive the nursing care they require, including specialist care, regardless of the ward to which they are allocated, the time of the day or the day of the week. This includes planning to place patients in wards where their clinical needs can be best met.

Promote staff training and education

1.1.10 Ensure nursing staff have appropriate experience and training to estimate total nursing requirements on a daily basis.

1.1.11 Encourage active involvement in programmes that assure quality of nursing care and benchmarking of nursing sensitive outcomes to maximise the effectiveness of the nursing staff establishment.

1.1.12 Promote involvement of nursing staff in developing and maintaining hospital policies and governance about nursing staff requirements.

1.2 Ward level factors and approach to determine daily nursing staff requirements

These recommendations are aimed at nursing staff who are in charge of individual wards or each shift.

Principles for determining nursing staff requirements

1.2.1 Use a systematic approach that takes into account the patient, ward and staffing factors below to determine total nursing requirement (the nursing staff requirements to meet patients' nursing needs throughout a 24-hour period). This approach should include the use of a staffing toolkit that is

agreed locally to be consistent with the recommendations in this guideline. When staffing toolkits have been endorsed by NICE, these should be used.

1.2.2 Use informed professional judgement to make a final assessment of nursing staff requirements. This should take account of the local circumstances, variability of patients' nursing needs, and previous nursing red flag events (see section 1.2.19).

Patient factors

1.2.3 Use individual patients' nursing needs as the main driver for calculating the nursing staff requirement for a ward.

1.2.4 Consider using nursing care activities summarised in tables 1 and 2 as a prompt to inform professional judgement of the nursing staff requirements. This should be an holistic assessment of patients' nursing needs and take account of specific nursing requirements and disabilities, as well as other patient factors that may increase nursing staff requirements, including:

- Difficulties with understanding, cognition or confusion, such as those associated with learning difficulties, mental health issues, or dementia
- Increased risk of clinical deterioration
- End of life care.

1.2.5 Any patient-related condition that requires the continuous presence of a member of the nursing team should be considered as needing 1:1 nursing to patient care (often referred to as 'specialing' care) and should be factored into the nursing staff requirements.

	Table 1: types of ongoing nursing care activities that change nursing staff requirements		
	Routine nursing care needs	**Additional nursing care needs (approx. 20-30 minutes per activity)**	**Significant nursing care needs (more than 30 minutes per activity)**
Care planning	Simple condition and care plan	Complex condition or care plan (e.g. multiple comorbidities)	Attending multidisciplinary meetings
Communication	Providing information and support to patients, including all emotional and spiritual needs	Complex multiple health needs	Difficulties with communication including sensory or language issues
Eating and drinking	Ensuring food and drink provided and consumed	Assistance with eating and drinking	Parenteral nutrition
Fluid management	8 hourly IV fluids	IV fluids more frequently than 8 hourly or blood components	Complex fluid management (e.g. hourly or requiring monitoring in ml)
Hygiene	Minimal assistance with washing, dressing, grooming	Assistance for some hygiene needs requiring one nursing staff	Assistance for all hygiene needs or requiring two nursing staff
Management of equipment	Simple intermittent (e.g. catheters, IV access)	Central lines, drains, stomas	Multiple lines, drains
Medication	Regular oral medication	IV medication or frequent PRN medication	Medication requiring complex preparation / administration, or two nursing staff
Mobilisation	No assistance needed	Assistance needed (e.g. post-op or during out of hours periods)	Mobilisation with assistance of two nursing staff
Mouth care	No assistance needed	Assistance needed	Intensive mouth care needed (e.g. patient receiving chemotherapy)
Observations	4-6 hourly	2-4 hourly	More frequent than 2 hourly
Pressure area care	Less frequently than 4 hourly	2-4 hourly	More frequent than 2 hourly or requiring two nursing staff
Toileting	No assistance needed	Assistance needed	Frequent assistance or two nursing staff needed
Abbreviations: IV, intravenous; PRN medication, medication administered as needed			

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	Table 2: types of <u>one-off</u> nursing care activities that change nursing staff requirements		
	Routine nursing care needs	**Additional nursing care needs (approx. 20-30 minutes per activity)**	**Significant nursing care needs (more than 30 minutes per activity)**
Admission		Admission assessment	
Discharge planning	Simple follow-up and transfer home	Co-ordination of different services	Organising complex services, support or equipment
Patient and relative education	Routine teaching about condition, routine post-op care	Teaching about a significant new condition (e.g. diabetes, heart disease, cancer)	Teaching about a new complex or self-managed condition
Patient escorts	Routine escorts or transfers for procedures	Escorting a patient off a ward for 20-30 minutes	Escorting a patient off a ward for more than 30 minutes
Procedures and treatments	Simple wound dressings, specimen collection	Catheterisation, nasogastric tube insertion, multiple wound dressings	Complex wound dressings (e.g. vacuum assisted closure), tracheostomy care

Ward factors

1.2.6 Take into account the following ward factors when determining nursing staff requirements:

- Estimated patient turnover in the ward throughout a 24-hour period (including both planned and unscheduled admissions, discharges and transfers).
- Ward layout and size (including the need to ensure the safety of patients who cannot be easily observed and the distance needed to travel to access resources).

NursingStaff factors

1.2.7 Take into account the following staff factors when determining nursing staff requirements:

- Nursing activities and responsibilities, other than direct patient care. These include:
  - communicating with relatives and carers
  - managing the nursing team and the ward
  - professional supervision and mentoring of nursing staff

  - communicating with and providing nursing clinical support to all the healthcare staff involved with the care of patients on the ward.

  These activities and responsibilities may be carried out by more than one member of the nursing team.
- Support from non-nursing staff such as allied health professionals and administrative staff.

1.2.8 Take into account the following staff factors when determining ward nursing establishments:

- Planned absence: for example for professional development, or for annual or maternity leave.
- Unplanned absence: for example, sickness absence. Use knowledge of current and historical sickness (and other unplanned) absence rates (allowance for these types of planned and unplanned absence is commonly known as uplift).

Process for setting ward nursing staff requirements

1.2.9 Consider determining nursing staff requirements using the following stages:

- Estimate total nursing requirement to deliver patient care needs throughout a 24-hour period
- Determine required ward nursing staff establishment and shift allocation
- Assess whether available nursing staff meets actual required total nursing requirement.

The following diagram summarises the process of setting nursing staff requirements for an individual ward.

248 **Summary of the process of determining nursing staff requirements**

(1) Estimate total nursing requirement throughout a 24-hour period

Average nursing hours per patient day

Use results of a systematic approach and staffing toolkit

x

Average bed utilisation

The average number of patients treated in a ward per day

+

Additional workload in nursing hours per day

This should take into account:

• Estimated patient turnover

• Ward layout and size

• Diversity of clinical specialities cared for by the nursing team

• Nursing activities and responsibilities, other than direct patient care

↓

(2) Determine required ward nursing staff establishment and shift allocation

Use the care needs of patients and the estimated time when care will be required together with professional judgement to determine:

• Skill mix

• Allocation of nursing staff during shifts

Add an allowance for planned and unplanned absence (commonly known as uplift) to your estimate of total nursing staff requirement

↓

(3) Assess whether available nursing staff meets actual total nursing requirement throughout a 24-hour period

Address any concerns in real time, taking into account:

• Actual patient needs

• Nursing red flags

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Stage 1: estimate total nursing requirement throughout a 24-hour period

1.2.10 Calculate average nursing need of the ward's patients. This should be measured using a staffing toolkit (see recommendation 1.2.1). Also, consider taking into account the patient factors and nursing care activities outlined in recommendations 1.2.3 to 1.2.5.

1.2.11 Consider expressing average patients' nursing needs in nursing hours per patient day (the number of hours of nursing care per patient throughout a 24-hour period – see the glossary for a further explanation). Nursing hours per patient day enables the nursing needs of individual patients and different shift durations of the nursing staff to be more easily accounted for compared with a nurse to patient ratio.

1.2.12 Use bed utilisation (the number of patients under the responsibility of a ward nursing team during each 24-hour period), rather than bed occupancy, when determining nursing staff requirements. This will ensure the nursing care needs of patients who may be discharged or transferred to another ward during a 24-hour period are also accounted for.

1.2.13 Determine the nursing staff requirements in terms of whole time equivalents based on the patients' nursing needs and average daily bed utilisation. Make allowance for additional nursing workload based on ward factors and staff factors relevant to each ward (see recommendations 1.2.6 and 1.2.7).

1.2.14 The total nursing requirement of a ward can be calculated by:

- the average nursing needs of the patients (see recommendation 1.2.10)
- multiplied by the bed utilisation of the ward (see recommendation 1.2.12)
- plus the additional workload from other ward and staff factors (see recommendation 1.2.6 and 1.2.7)

Stage 2: determine required ward nursing staff establishment and shift allocation

1.2.15 Use professional judgement to identify the appropriate knowledge and skill mix required within the nursing team, allocating the nursing activities to the different members of the nursing team, including healthcare assistants, in order to meet the nursing needs of patients. Allocation of nursing activities should take into account that improved patient outcomes are associated with a higher proportion of registered nurses in the nursing staff establishment.

1.2.16 Use patients' nursing needs and the estimated time of day when care will be required to design the staffing roster and how nursing staff are allocated to care for patients during shifts.

1.2.17 Add an allowance for planned and unplanned absence (commonly known as 'uplift') to the estimate of total nursing requirement. This is to ensure that the ward nursing staff establishment is sufficient to provide the estimated total nursing requirement at all times (see recommendation 1.2.8).

Stage 3: Assess whether available nursing staff meets actual total nursing requirement throughout a 24-hour period

1.2.18 Systematically assess the adequacy of the nursing staff present on a daily or shift by shift basis. Where possible consider calculating actual total nursing requirements in nursing hours per patient day. Take into account the patient factors outlined in recommendations 1.2.3 to 1.2.5.

1.2.19 Monitor whether the available nursing staff adequately meet patients' nursing needs. This should involve consideration and reporting of nursing red flag events (see box 1) over each 24-hour period and at the handover between each shift where possible.

Box 1: nursing red flags

- Unplanned omission in providing patient medications or delay of more than 30 minutes in providing planned pain relief
- Patient vital signs not assessed and recorded as outlined in the care plan
- Regular checks on patients to ensure that their fundamental care needs are completed as outlined in the care plan. This is often referred to as 'Intentional rounding' and involves checks on aspects of care such as:
  - Pain: asking patients to describe their level of pain level using the local pain assessment tool
  - Personal needs: scheduling patient visits to the toilet or bathroom to avoid risk of falls
  - Placement: making sure the items a patient needs are within easy reach
  - Positioning: making sure the patient is comfortable and the risk of pressure ulcers is assessed and minimised
- Shortfall of more than 8 hours or 25% (whichever is reached first) of registered nursing staff present compared with the actual total nursing requirement for the shift.

1.2.20 Record nursing red flag events. These could be reported by any member of the nursing team, and by patients, relatives or carers, and should be reported to the registered nurse in charge of individual wards or in charge of each shift, the management team or hospital-based patient support services.

1.2.21 Identification of a nursing red flag event should prompt an immediate response by the registered nurse in charge. The response may include an urgent need for additional nursing staff to be allocated to the ward.

1.2.22 Keep records of the calculated actual total nursing requirements and reported red flag events so that they can be used to inform future planning of nursing staff establishments.

Appendix 2 provides an example that illustrates this process.

1.3 Monitor and evaluate ward nursing staff establishment

These recommendations are aimed at the hospital board, senior management and nursing managers or matrons to support safe staffing for nursing at a ward level.

1.3.1 Monitor whether the available staff for nursing on the ward adequately meets patients' nursing needs. Monitor the safe nursing indicators in box 2, which evidence has shown to be sensitive to the number of available nursing staff and skill mix. Consider continuous data collection of the safe nursing indicators, and regular auditing. Appendix 3 gives further guidance on data collection for the nursing sensitive indicators in box 2. Reports of nursing red flag events (see box 1) should also be reviewed when undertaking this monitoring.

Box 2: safe nursing indicators

Patient reported

Data can be collected for the following indicators from the National Inpatient Survey (suggested specific questions for each area are detailed in appendix 3):

- Adequacy of meeting patients' nursing care needs
- Adequacy of provided pain relief
- Adequacy of communication with nursing team.

Safety outcomes

Data can be collected for the following indicators from the Safety Thermometer:

- Falls: record the severity of any fall that the patient has experienced within the previous 72 hours in a care setting. The severity of the fall is defined in accordance with NRLS categories: no harm; low harm; moderate harm; severe harm; death.
- Hospital acquired pressure ulcers: record pressure ulcers developed 72 hours (3 days) or more after admission to an organisation. The category (2, 3 or 4) of the patient's worst new pressure ulcer is recorded.
- Medication administration errors: record any error in the preparation, administration, or omission of medication by nursing staff. The severity of the medication error should be recorded.

Staff reported

- Missed breaks: record the proportion of breaks expected for nursing staff working on inpatient hospital wards that were unable to be taken.
- Nursing overtime: record the proportion of nursing staff on inpatient hospital wards working extra hours (both paid and unpaid).

Nursing staff establishment

Data can be collected for the following indicators from the NHS England and the Care Quality Commission joint guidance to Trusts on the delivery of the 'Hard Truths' commitments on publishing staffing data regarding nursing, midwifery and care staff levels.

- Planned, required and available nursing staff for each shift: record the total nursing hours for each shift that were planned in advance, were deemed to be required on the day of the shift, and that were actually available.
- High levels and/or ongoing reliance on temporary nursing: record the proportion of nursing staff working on inpatient hospital wards who are on temporary or agency contracts.

1.3.2 Compare the results of the safe nursing indicators with previous results from the same ward and data from other wards on a regular basis, at least 6 monthly. The comparisons should also take into account the specific ward and patient characteristics and the frequency of reported nursing red flag events.

1.3.3 Consider increasing the ward nursing staff establishment, taking into account the occurrences of the nursing red flag events, poor safe nursing indicator results, and whether registered nurses are caring for more than 8 patients during the day time on a regular basis because this may lead to increased risk of harm.

2 Evidence

The Committee considered the following commissioned reports.

- **Evidence review 1**: Griffiths P, Ball J, Drennan J, Jones J, Reccio-Saucedo A, Simon M (2014) The association between patient safety outcomes and nurse/healthcare assistant skill mix and staffing levels and factors that may influence staffing requirements. University of Southampton
- **Evidence review 2**: Simon M, Ball J, Drennan J, Jones J, Reccio-Saucedo A, Griffiths P (2014) Effectiveness of management approaches and organisational factors on nurse sensitive outcomes. University of Southampton
- **Economic analysis**: Cookson G, McGovern A (2014) The cost effectiveness of nurse staffing and skill mix on nurse sensitive outcomes. University of Surrey

The Committee also considered the following reports:

- **Expert paper 1**: Expert testimony presented to the Safe Staffing Advisory Committee
- **Expert paper 2**: Patient testimony presented to the Safe Staffing Advisory Committee
- **Expert paper 3**: Safe nurse staffing of adult wards in acute hospitals - report from the Safe Staffing Advisory Committee sub-group meeting 11 April 2014

The reviews, economic analysis and expert papers are available on the NICE website.

Evidence review 1 focused on ward level-activities and covered the following review questions:

- What patient safety outcomes are associated with nurse and healthcare assistant staffing levels and skill mix?
  - Which outcomes should be used as indicators of safe staffing?
  - What outcomes are associated with tasks undertaken by registered nurses, healthcare assistants, and other staff?
- What patient factors affect nurse and healthcare assistant staffing requirements at different times during the day? These include:

  - Patient dependency and acuity assessment and grading
  - Patient turnover.
- How does the ward environment, including physical layout and diversity of clinical disciplines, affect safe staffing requirements?

Evidence review 2 focused on ward level managerial activities and organisational level factors; and covered the following review questions:

- What management approaches affect nurse and healthcare assistant staffing requirements?
  - What nursing staff supervisory and/or team management approaches are required?
  - What approaches for identifying required nurse staffing levels and skill mix are effective, and how frequently should they be used?
- What organisational factors influence safe staffing at a ward level? This includes:
  - Management structures and approaches
  - Organisational culture
  - Organisational policies and procedures, including staff training.

The **economic analysis** used the best available evidence and data from the UK to determine the relationship between nursing and skill mix and nursing sensitive outcomes. The cost effectiveness of altering staffing or skill mix was also assessed.

Expert paper 1 presented testimony from the topic specialist member on the experience of safe staffing in the New Zealand public health system.

Expert paper 2 presented testimony from the topic specialist lay member of the committee.

Expert paper 3 presented a summary of a sub-group meeting of the committee to explore:

- the key patient factors and nursing needs that must be considered when calculating the nursing care requirements of patients
- aspects of nursing missed care that could be monitored as red flag nurse staffing indicators.

3 Gaps in the evidence and research recommendations

The Safe Staffing Advisory Committee identified a number of gaps in the available evidence and expert comment related to the topics being considered. These are summarised below.

1. There is a lack of high quality studies exploring and quantifying the relationship between registered nurse and healthcare assistant staffing levels and skill mix and any outcomes related to patient safety, nursing care, quality and satisfaction. All of the identified studies were observational and the majority were not for UK populations. Where evidence was available it tended to be associational with limitations due to confounding factors that affected the outcome.

2. There is a lack of appropriately designed experimental studies relating to the outcomes of interest. The outcomes identified generally report on failures of care rather than the more positive aspects of quality of care. There is also a lack of research on measures of missed care that could be routinely monitored and therefore easily collected and investigated.

3. There is a lack of evidence from UK data that allows the effects of actual nursing staff that are present (as opposed to variations in nursing staff) to be readily determined.

4. There is a lack of good quality research on the:

    a) effect of different patient factors and patients' nursing care needs on the nursing staff requirement

    b) indicators that are most sensitive to numbers of available nursing staff

    c) impact of healthcare assistants on the outcomes of interest

    d) effect of ward layout and ward size on nursing staff requirements

    e) relationship between time of day and patient related outcomes

f) impact of ward level team leadership and management (including supervisory roles and models of organising nursing care), on nursing staff requirements

g) influence of organisational training approaches.

5. There is a lack of research that assesses the effectiveness of using defined approaches or toolkits to determine nursing staff requirements and skill mix. Only one study, which assessed one particular approach, was identified and this did not assess the frequency of its use. No evidence relating to other approaches was found.

6. There is limited evidence about the effectiveness of management structures and organisational culture. There is some evidence from studies assessing the 'American Nurses Credentialing Center Magnet Programme' and the transferability of the principles and practices in this programme warrants further exploration.

7. No evidence was found relating to organisational policies and procedures and nursing staff or nursing sensitive outcomes in acute adult wards. Studies evaluating 'Lean' type approaches, for example the 'productive ward' and the elimination of non-productive care activities in order to help release more time for nursing care, were also not identified.

8. There is a lack of economic studies exploring nursing staff establishments and requirements and skill mix. Any evidence identified is derived from countries with very different contexts and cost bases to the UK and therefore are of limited relevance to NHS decision making.

9. No economic evidence relating to ward environment and patient factors and their effect on nursing staff requirements was identified. No economic evidence was found that explored the relationship between ward-based management approaches (including the use of toolkits) and organisational factors and nursing staff requirements.

10. There is a lack of data collection in relation to wide variety of outcome variables at a ward level that would allow a detailed economic analysis of patient outcomes in relation to nursing staff establishments or requirements in the NHS. Patient level costing data were also limited, which hampered a clearer understanding of the cost implications of nursing staff changes and skill mix.

3.1 Topic of research question

Research questions will be developed for inclusion in the final guideline.

4 Related NICE guidelines

- Pressure ulcers: prevention and management of pressure ulcers. NICE clinical guideline 179 (2014)
- The assessment and prevention of falls in older people. NICE clinical guideline 161 (2013)
- Patient experience in adult NHS services. NICE clinical guideline 138 (2012)
- Acutely ill patients in hospital. NICE clinical guideline 50 (2007)

5 Glossary

Adult inpatient wards in acute hospitals

Wards that provide overnight care for adult patients in acute hospitals, excluding intensive care, maternity and mental health wards, day care units and assessment or admission units.

Bed utilisation

The number of patients under the responsibility of a ward nursing team during each 24-hour period. This should include patients who are discharged or transferred to another ward during the 24-hour period.

Effective nursing care

When nursing care and treatment is delivered in line with current legislation, standards and guidelines to achieve good outcomes.

Endorsement

The NICE endorsement programme assures users that an endorsed nurse staffing toolkit provides estimation of nurse staffing requirements in line with the relevant NICE guideline recommendations. An endorsement mark, which is a seal of approval, will be awarded to toolkits that meet the endorsement criteria.

Heathcare assistant

Healthcare assistants are unregistered clinical staff working in hospital or community settings under the guidance and supervision of a registered healthcare professional. They may have variety of titles such as health care support worker, nursing auxiliary, assistant practitioner, or nursing assistant. Their responsibilities may vary, depending upon the healthcare setting.

Missed care

When a patient does not receive an aspect of routine care assessed by healthcare professionals as being required. Care may be delayed, performed to a sub-optimal level, omitted or inappropriately delegated.

Nursing hours per patient day

This is how the nursing care requirements of patients could be expressed once measured. It represents the nursing care requirements as number of hours of nursing care per patient over a 24-hour period, as opposed to a ratio of how many patients each nurse cares for. The two measurements are interchangeable as illustrated in the table below:

Nurse to patient ratio	Nursing hours per patient day
1:1 (One nurse is caring for only 1 patient)	**24** (Each patient requires 24 nursing hours per patient day)
1:2 (One nurse is caring for 2 patients)	**12** (Each patient requires 12 nursing hours per patient day)
1:4 (One nurse is caring for 4 patients)	**6** (Each patient requires 6 nursing hours per patient day)
1:6 (One nurse is caring for 6 patients)	**4** (Each patient requires 4 nursing hours per patient day)
1:8 (One nurse is caring for 8 patients)	**3** (Each patient requires 3 nursing hours per patient day)

If a nurse works an 8-hour shift (excluding breaks), they can contribute 8 hours of nursing care that day. If they are looking after 8 patients in a shift, they are therefore able to provide an average of 1 hour of care to each patient during that shift.

Nursing skill mix

The composition of the nursing team in terms of qualification and experience. This is typically expressed as a ratio of registered nurses to healthcare assistants. It should also encompass individual clinical competencies and areas of expertise of the nursing team.

Nursing red flags

Events that prompt an immediate response by the registered nurse in charge of the ward. The response may include an urgent need for additional nursing staff to be allocated to the ward.

Nursing staff establishment

The number of registered nurses and healthcare assistants that are funded to work in a particular ward, department or hospital.

Nursing staff

This refers to registered nurses and healthcare assistants, unless otherwise specified.

Patient acuity

This refers to how ill the patient is, their increased risk of clinical deterioration and how complex or time-consuming the care they need is. This term is sometimes used interchangeably with the terms ‘patient complexity’ or ‘nursing intensity’.

Patient dependency

The level to which the patient is dependent on nursing care to support their physical and psychological needs and activities of daily living, such as eating and drinking, personal care and hygiene, mobilisation.

Patient turnover

Rate of movement of patients into and out of a ward. This can be calculated by the number patient admissions, discharges and internal transfers during a defined period of time.

Registered nurse

A registered nurse holds active registration with the Nursing and Midwifery Council with a licence to practise, having graduated from a nursing programme at a college or university.

Safe nursing care

When reliable systems, processes and practices are in place to meet required care needs and protect people from missed care and avoidable harm.

Staffing toolkit

A practical resource to help calculate the staffing requirements for wards or organisations. They may be electronic or paper based.

Total nursing requirement

The total nursing care required by each patient (including time to communicate with carers and relatives). This needs to take into account all the relevant patient factors and other factors such as ward and staff factors. This is usually expressed as number of nursing hours per patient day (see Nursing hours per patient day)

6 Contributors and declarations of interest

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Declarations of interests

The following members of the Safe Staffing Advisory Committee (SSAC) made declarations of interest. All other members of the SSAC stated that they had no interests to declare.

SSAC member	Interest declared	Type of interest	Decision taken
James Buchan	Paid columnist 'Nursing Standard', Nursing advisor	Personal Pecuniary Interest	Declare and participate
James Buchan	Professional advisor, NHS Centre for Workforce Intelligence	Non-Personal Pecuniary Interest	Declare and participate
Ann Casey	Part of the team that developed the Safer Nursing Care Tool	Personal non-pecuniary interest	Declare and participate
Georgina Dwight	Remuneration from consultancy undertaken in 2011	Personal Pecuniary Interest	Declare and participate
Elaine Inglesby	Member of the Safe Staffing Alliance	Personal Non-Pecuniary Interest	Declare and participate
Hugh McIntyre	Chair of Quality Standards Advisory Committee	Personal Pecuniary Interest	Declare and participate
Julia Scott	NICE Social Care Fellow (until May 2014), honorary Fellow of Brunel University	Non-Personal Pecuniary Interest	Declare and participate
Julia Scott	Chief Executive of the College of Occupational Therapists	Personal non-pecuniary interest	Declare and participate
Other declarations			
Peter Griffiths (Author, evidence reviews)	Co-author on one of the studies referred to in the review 1. Other studies of potential relevance co-authored were considered for but excluded from the review. These studies were handled according to the protocol and as specified in our tender (i.e. members of the team who were not authors considered the studies eligibility and undertook risk of bias assessments)	Personal non-pecuniary interest	Declare and participate

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8 About this guideline

How this guideline was developed

The Department of Health asked the National Institute for Health and Care Excellence (NICE) to produce this guideline on safe staffing in adult wards in acute hospitals (see the scope).

The recommendations are based on the best available evidence. They were developed by the Safe Staffing Advisory Committee – for membership see section 6.

The guideline was developed in line with the methods and processes contained in the draft manual for developing all NICE guidelines. Modifications to this were needed in order to produce this guideline in the requested timeframe.

Your responsibility

This guideline represents the views of NICE and was arrived at after careful consideration of the evidence available and the committee's considerations. Those working in the NHS, local authorities, the wider public, voluntary and community sectors and the private sector should take it into account when carrying out their professional, managerial or voluntary duties.

Implementation of this guideline is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement the guideline, in their local context, in light of their duties to have due regard to the need to eliminate unlawful discrimination, advance equality of opportunity and foster good relations. Nothing in this guideline should be interpreted in a way that would be inconsistent with compliance with those duties.

Other information

NICE has developed tools to help organisations implement this guideline. These will be available when the final guideline is published.

See the NICE website for details of the NICE endorsement programme for nursing staff toolkits. Details will be available when the final guideline is published.

We will develop a pathway and information for the public and tools to help organisations put this guideline into practice. Details will be available on our website after the guideline has been issued.

Copyright

Appendix 1: Draft evidence to recommendations tables

The following tables summarise the Committee's considerations when making the recommendations. The tables are draft and will be reviewed and updated after consultation.

The references cited in the tables, other than those in section 7, are listed in the evidence documents on the NICE website. For more information about the evidence the Committee considered, see section 2.

1.1 Organisational strategy

Ensure capacity

1.1.1	**Develop assurance mechanisms to ensure nursing staff establishments (the number of registered nurses and healthcare assistants that are funded) for wards or departments are sufficient to provide safe nursing care to patients at all times**
1.1.2	**Agree the required ward or departmental establishments and ensure they are signed off by the appropriate senior nursing manager at the level of the ward leader or matron, with a final sign off by the designated board member (such as the chief nurse or equivalent). At a minimum, this should be done when the ward establishment and budget are set and when the actual nursing staff roster is posted.**
Trade-off between benefits and harms	The Committee considered no harms were likely.
Economic considerations	The Committee considered that while this recommendation had potential cost implications, for example in requiring additional nursing staff, this is fundamental to providing safe and effective patient care.
Quality of evidence	The Committee considered the evidence from Evidence review 1 when making this recommendation: • There is evidence from large observational studies, of good quality (++ for internal validity) that hospitals / units with higher nurse staffing have lower rates of mortality (Blegen et al. 2011, Needleman et al. 2011, Sales et al. 2008, Sochalski et al. 2008) and failure to rescue (Park et al. 2012, Twigg et al. 2013). • There is mixed evidence on the association between nurse staffing levels and hospital acquired infections. No studies showed a significant association with catheter associated UTI. One weak

	study (-) showed a significant association between low staffing and higher rates of pneumonia (Duffield et al. 2011) but 1 strong study showed a significant association in the opposite direction (Twigg et al. 2013). One study (++ for internal validity) showed higher rates of surgical site infection to be associated with lower staffing (Twigg et al. 2013). Two studies, (++ & - for internal validity), showed significant negative associations between staffing and other infections (Blegen et al. 2008, Duffield et al. 2011). • There is evidence of an association between staffing levels and falls from 3 (+ or ++) studies (Donaldson et al. 2005, Patrician et al. 2011, Potter et al. 2003). Evidence from non-significant studies supports this direction of association. • Evidence is mixed for an association with pressure ulcers. Three studies (1+, 2- for internal validity) found significant negative associations between staffing levels and pressure ulcers with lower staffing associated with lower rates of ulcers (Donaldson et al. 2005, Duffield et al. 2011, Hart and Davis, 2011) but 2/12 studies, (++ for internal validity), found a significant association in the opposite direction (Cho et al. 2003, Twigg et al. 2013). • Evidence from three studies (internal validity -,-,++) found no association between nurse staffing levels and venous thromboembolism (Duffield et al. 2011, Ibe et al. 2008, Spetz et al. 2013). • Three small studies with low / moderate (-,+,- for internal validity) gave no significant association with satisfaction (Ausserhofer et al. 2013, Potter et al. 2003, Seago et al. 2006). • There is strong evidence showing lower hospital use in terms of length of stay (Blegen et al. 2008, Frith et al. 2010, O'Brien-Pallas et al. 2010b, Spetz et al. 2013) or readmission (Weiss et al. 2011) is associated with higher levels of nurse staffing. The evidence includes some studies with strong internal validity (two ++, two + and one -). • Limited evidence from two (- and ++ for internal validity) studies (Shever et al. 2008, Twigg et al. 2013) suggests that cost of care is increased with higher nurse staffing levels although the picture is mixed with the lowest staffing levels also associated with increased hospital costs. The committee noted that none of the studies were undertaken in the UK and few were rated highly for external validity and that the evidence is derived from a diverse range of settings including from studies which drawn on nationally representative samples of hospitals in developed countries. The Committee also considered evidence from the following

	documents when making this recommendation: • Francis R (2013) Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry. London: The Stationery Office • National Quality Board (2013) How to ensure the right people, with the right skills, are in the right place at the right time. A guide to nursing, midwifery and care staffing capacity and capability. NHS England
Other considerations	The Committee felt that decisions about nursing staff establishments need to be owned by the whole management team involved in that area and signed off by the designated board member such as the chief nurse or equivalent. The Committee also felt that whilst the chief nurse or equivalent should be primarily involved in setting the nursing staff establishment of wards, all directors have responsibility for ensuring the patient needs are met. There was consensus for a need to ensure the system at an organisational level is in place to deliver the required nursing staff.

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1.1.3	**Include capacity to deal with planned and predictable variations when agreeing the nursing staff establishments. This includes variations in total nursing requirement (such as seasonal variations indicated by historical records of nurse staffing requirements) and staff availability (for example, indicated by historical records of absences for any reason).**
Trade-off between benefits and harms	The Committee considered no harms were likely.
Economic considerations	The Committee considered that while this recommendation had potential cost implications, for example in requiring additional nursing staff, this is fundamental to providing safe and effective patient care.
Quality of evidence	The committee considered evidence from the National Quality Board (2013) How to ensure the right people, with the right skills, are in the right place at the right time. A guide to nursing, midwifery and care staffing capacity and capability. NHS England when making this recommendation.
Other considerations	There was no other relevant formal published evidence supporting this recommendation, however the Committee contributed their professional and personal experience, which described the importance of ensuring nursing staff requirements includes additional capacity to deal with planned and predictable variations. The Committee wished to acknowledge the inadequacy of establishing staffing requirements without additional capacity for predictable variations such as leave entitlement, maternity leave,

	study leave, and average or expected sickness rate. The amount is not set and can vary dramatically between individual wards. The Committee also wanted to acknowledge that this additional capacity is not the contingency for large variations in demand for nursing care requirement.

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1.1.4	**Be aware that improved patient outcomes are associated with a higher proportion of registered nurses in the nursing staff establishment.**
Trade-off between benefits and harms	The Committee considered no harms were likely.
Economic considerations	The Committee considered that while this recommendation had potential cost implications, for example in higher salary costs to pay for more registered nurses, this would provide benefits in terms of improved patient outcomes. Whist the improved outcomes are unlikely to be cost neutral they are it is likely to be a cost-effective relationship at some level between increasing the proportion of registered nurses from historic levels. The economic analysis identified a plausible incremental cost effective ratio of approximately £1400 per fall avoided. The incremental cost effective ratio is likely to become more favourable if the additional benefits of increased nurse staffing are also included.
Quality of evidence	The Committee considered the evidence from Evidence review 1 when making this recommendation. This identified a number of relevant studies as follows which showed a clear association between the proportion of registered nurses in the staffing establishment and positive outcomes. Skill mix and patient outcomes: • Studies (++ for internal validity) found that a higher proportion of registered nurses on wards is associated with a significantly lower rate of death (Estabrooks et al. 2005, He et al. 2013) or failure to rescue (Blegen et al. 2011). • Studies of mixed quality (++,++,-) found a significant association between a higher proportion of registered nurses in the nursing workforce) and lower rates of pneumonia (Cho et al. 2003) surgical site infection (McGillis Hall et al. 2004) lower post-operative sepsis (Blegen et al. 2011) but one study (- for internal validity found that higher rates of pneumonia were associated with a richer skill mix. • Four studies (internal validity ++,+,+, -) found that higher proportion of registered nurses in the nursing workforce was

	associated with significantly fewer falls (Blegen and Vaughn, 1998, Donaldson et al. 2005, Duffield et al. 2011, Patrician et al. 2011). • Three weak studies (all – for internal validity) found that a higher proportion of registered nurses in the nursing workforce were associated with fewer pressure ulcers (Blegen et al. 2011, Duffield et al. 2011, Ibe et al. 2008). • Two weak studies (internal validity -) provided no evidence of association between skill mix and venous thromboembolism (Duffield et al. 2011, Ibe et al. 2008). • A single moderate study (+ for internal validity) showed significantly fewer complaints with a higher proportion of registered nurses in the nursing workforce (Potter et al. 2003). • Two weak studies (- for internal validity) indicated that a higher proportion of registered nurses in the nursing workforce might be associated with lower resource use in terms of hospital stay (Frith et al. 2010) or total nursing hours and overall cost of nursing hours (McGillis Hall et al. 2004). Skill mix and care processes or nurse outcomes: • No study found significant associations between skill mix and missed care but one (+ for internal validity) found no significant interaction effect between staff groups, suggesting that the level of registered nurse staffing is the important determinant of the missed care rate. • A single study of (+ internal validity) found that a higher proportion of registered nurses in the nursing workforce was significantly associated with lower turnover (Staggs and Dunton, 2012). Health care assistant staffing and outcomes: • Studies (+ and – for internal validity) found no association with mortality (Unruh et al. 2007), failure to rescue (Park et al. 2012), length of stay (Unruh et al. 2007), venous thromboembolism (Ibe et al. 2008) or missed care (Ball et al. 2013). • Studies (+ and – for internal validity) found that higher healthcare assistant staffing was associated with higher rates of falls (Hart and Davis, 2011, Lake et al. 2010) pressure ulcers (Seago et al. 2006), readmission rates (Weiss et al. 2011), medication errors (Seago et al. 2006), physical restraints (Hart and Davis, 2011) and lower patient satisfaction (Seago et al. 2006). • One weak study (- for internal validity) found that higher healthcare assistant staffing levels were associated with lower rates of pressure ulcers (Ibe et al. 2008). • There we no studies looking at associations of the proportion of

	healthcare assistants in the nursing workforce with costs, infections or nurse outcomes. Economic studies of nurse staffing and skill mix: • The costs of increased nurse staffing may not be offset by savings from better patient or system outcomes (such as reduced hospital stays) although some scenarios modelled did suggest additional costs of increased staffing might be more than offset by savings from improved patient outcomes and thus lead to a net saving (Needleman et al. 2006). • Studies suggest that increasing nurse staffing has the potential to be cost-effective in terms of cost per life year saved (Twigg et al. 2013), that increasing registered nurse staffing (rather than licensed practical nurse staffing (Needleman et al. 2006)) on general (medical/surgical) wards (rather than ICU (Shamliyan et al. 2009)) may be more cost effective than the alternatives.
Other considerations	Many of the studies that were examined relied upon on historical data from 10 or more years ago. Changes since then in the healthcare assistant workforce could mean that there may be increased skills amongst healthcare assistants resulting in potentially less difference between registered nurses and healthcare assistants and therefor the incremental cost effective ratio may be less favourable. The Committee also felt that increasing skilled staff (i.e. better trained healthcare assistants) could lead to some benefits. However, there was no suggestion from the evidence that replacing registered nurses with healthcare assistants will be of benefit. Because none of the economic studies was conducted in the UK, used an NHS perspective or adopted evidence of the impact of nurse staffing levels on outcomes from the NHS, the results of the studies are of limited value in informing decision-making in the NHS context.

699 **Support flexibility**

1.1.5	**Ensure procedures allow for flexibility in ward nursing staff, to meet unplanned variations in the total nursing requirement (for example, caused by changes in patients' nursing care needs) or the availability of nursing staff. These procedures should enable an increase or decrease in staffing for nursing care from the planned daily or shift allocation. Flexibility in ward nursing staffing should not compromise safe nursing in other wards.**
Trade-off between	The Committee considered there were potential harms if flexibility is enabled at the expense of leaving one ward understaffed in order to

benefits and harms	provide additional staff to another ward. The recommendation therefore includes a statement to highlight this potential harm.
Economic considerations	The Committee considered that while this recommendation had potential cost implications, for example in requiring additional nursing staff, this is fundamental to providing safe and effective patient care.
Quality of evidence	The Committee considered Expert paper 1: Expert testimony presented to the Safe Staffing Advisory Committee when making this recommendation.
Other considerations	There was no formal published evidence supporting this recommendation, however the Committee contributed their professional and personal experience, which described the importance of ensuring nursing staff being flexible in order to deal with unplanned variations in demand for nursing care requirements. The Committee wished to acknowledge the need to redeploy staff across different wards within hospitals to deal with variations to the planned shift by shift or day to day levels in order to meet the needs of patients.

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1.1.6	**Consider approaches to support flexibility, such as adapting nursing shifts, skill mix, location and contractual arrangements, and implement them if appropriate.**
Trade-off between benefits and harms	The Committee considered no harms were likely.
Economic considerations	The Committee considered that while this recommendation had potential cost implications, for example in requiring additional nursing staff, this is fundamental to providing safe and effective patient care.
Quality of evidence	There was no formal published evidence supporting this recommendation, however the Committee contributed their professional and personal experience, which described the available options that can be used in order to deal with unplanned variations in demand for nursing care requirements.
Other considerations	This recommendation is based on the consensus views of the Committee. They agreed that this flexibility can be achieved through adaptation in nursing shift length as well as the number of nurses working. Additional capacity could also be achieved by changing the skill mix to better suit the activities that are required to meet the care needs of the wards patients. Flexibility can be achieved by changing the geographical location of the work of nursing staff between different wards or clinical sites, as well as alterations in the contracted working patterns and hours.

701 **Monitor adequacy of nursing staff establishment**

1.1.7	**Ensure there are procedures for systematically monitoring and reviewing nursing staff establishments of individual wards on a regular basis (at least twice a year). These procedures should include periodic monitoring of a range of nurse sensitive indicators (see box 2 in recommendation 1.3.1). Nursing staff establishments should be adjusted in line with the results of the regular reviews.**
1.1.8	**Ensure there are procedures to identify differences between the nursing staff available on a ward and the nursing staff required to meet the total nursing requirement. This should be done on a shift-by-shift basis or throughout a 24-hour period. These procedures should include reviewing reported nursing red flag events (see box 1 in recommendation 1.2.19). The procedures should facilitate effective responses to unplanned variations in the total nursing requirement and enable prompt action to be taken to address any staffing deficits.**
Trade-off between benefits and harms	The Committee considered no harms were likely.
Economic considerations	The Committee considered that while this recommendation had potential cost implications, for example in requiring additional nursing time, this is fundamental to providing safe and effective patient care.
Quality of evidence	There was no formal published evidence supporting this recommendation, however the Committee contributed their professional and personal experience, which described the importance of assessing whether the available nursing staff can adequately meet the nursing care needs of patient.
Other considerations	This recommendation is based on the consensus views of the Committee. The Committee agreed that it was important to recommend procedures to ensure that nursing staff establishments of individual wards are regularly reviewed and monitored. They also agreed to recommend procedures that ensure effective responses to any unplanned variations can subsequently be made.

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703 **Focus on patient care**

1.1.9	**Ensure patients receive the nursing care they require, including specialist care, regardless of the ward to which they are allocated, the time of the day or the day of the week. This includes planning to place patients in wards where their clinical needs can be best met.**
Trade-off between benefits and harms	The Committee considered no harms were likely.
Economic considerations	The Committee considered that while this recommendation had potential cost implications, for example in requiring additional nursing staff, this is fundamental to providing safe and effective patient care.
Quality of evidence	The Committee considered Expert paper 2: Patient testimony presented to the Safe Staffing Advisory Committee when making this recommendation. The Committee also considered evidence from the following documents when making this recommendation: Francis R (2013) Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry. London: The Stationery Office National Quality Board (2013) How to ensure the right people, with the right skills, are in the right place at the right time. A guide to nursing, midwifery and care staffing capacity and capability. NHS England
Other considerations	There was no other relevant formal published evidence supporting these recommendations, however the Committee contributed their professional and personal experience, which described the benefits of having an appropriate environment of care. The Committee wished to acknowledge that reorganisation of staff and management of the nursing team and also organisation of the care environment should be efficient as possible to reduce unproductive nursing time.

704 **Promote staff training and education**

1.1.10	**Ensure nursing staff have appropriate experience and training to estimate total nursing requirements on a daily basis.**
Trade-off between benefits and harms	The Committee considered no harms were likely.

Economic considerations	The Committee considered that while this recommendation had potential cost implications, for example in requiring additional training and education, this is fundamental to providing safe and effective patient care.
Quality of evidence	There was no formal published evidence supporting this recommendation. However, the Committee contributed their professional and personal experience, which described the importance of recommending that nursing staff have appropriate experience and training in estimating total nursing requirements.
Other considerations	This recommendation is based on the consensus views of the Committee. The Committee agreed some of the concepts recommended in this guideline suggest significantly different approaches to determining staffing requirements and therefore felt that it was essential that appropriate training should be provided in order for the guideline recommendations to be applied.

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1.1.11	**Encourage active involvement in programmes that assure quality of nursing care and benchmarking of nursing sensitive outcomes to maximise the effectiveness of the nursing staff establishment.**
1.1.12	**Promote involvement of nursing staff in developing and maintaining hospital policies and governance about nursing staff requirements.**
Trade-off between benefits and harms	The Committee considered no harms were likely.
Economic considerations	The Committee considered that while this recommendation had potential cost implications, for example in requiring additional nursing time, this is fundamental to providing safe and effective patient care.
Quality of evidence	The Committee considered the evidence from Evidence review 2 when making this recommendation. This identified a number of relevant studies as follows: Management structures/procedures and organisational culture: Seven studies investigated the association between American Nurses Credentialing Center Magnet recognition and nurse and patient outcomes, six in US hospitals (Goode et al. 2011, Hess et al. 2011, Kalisch and Lee, 2012, Kelly et al. 2011, Lacey et al. 2007, Lake et al. 2010) and one in England (Aiken et al. 2008). All studies employed a cross sectional/correlational design except for the study of Aiken et al. (2008), which used a before and after design. Three

	studies (Goode et al. 2011, Kelly et al. 2011, Lake et al. 2010) were large, including fifty or more hospitals in the analysis. Four studies based their analysis solely on survey data from nurses (Aiken et al. 2008, Hess et al. 2011, Kelly et al. 2011, Lacey et al. 2007), while Kalisch and Lee (2012) combined survey data with organisational level information requested from each participating hospital. Two studies (Goode et al. 2011, Lake et al. 2010) used data from secondary sources like the National Database of Nursing Quality Indicators (NDNQI). Five studies were assessed with moderate internal and strong external validity (Goode et al. 2011, Kalisch and Lee, 2012, Kelly et al. 2011, Lacey et al. 2007, Lake et al. 2010, all studies: +,++), while the validity of two studies was judged as weak (-/-) (Aiken et al. 2008, Hess et al. 2011). • Three of four studies (Aiken et al. 2008 [BA, -/ , UK], p=0.008, Kelly et al. 2011 [CS, -/++, US], p<0.05, Lacey et al. 2007 [CS, -/+, US], p<0.001) found nurses were more satisfied with their job in Magnet hospitals, which are recognised for nursing excellence and innovations in professional practice, while one study (Hess et al. 2011 [CS, -/-, US]) did not confirm this difference. • Two studies (Kelly et al. 2011 [CS, -/++, US], p<0.05, Lacey et al. 2007 [CS, -/+, US], p<0.001) found lower nurse burnout in Magnet hospitals than in non-Magnet organisations, but this was not confirmed by the study of Aiken et al. (2008 [BA, -/-, UK]) which found no association. The same three studies found nurses were less likely to intend to leave in Magnet hospitals than non-recognised hospitals. Of these studies, only one (Kelly et al. 2011 [CS, -/++, US]) presented an analysis that controlled for the possible confounding effect of overall staffing levels. • We found three studies comparing Magnet vs. Non-Magnet hospitals and nurse sensitive patient care outcomes and controlling for staffing levels. Lake et al. (2010 [CS, -/++, US]) found lower rates of falls (p<0.01), Goode et al. (2011 [CS, -/+, US]) found lower rates of pressure ulcers (p<.10), and Kalisch and Lee (2012 [CS, -/+, US]) found lower amounts of nurse reported missed care (p<0.05) in Magnet hospitals. • However, Goode et al. (2011 [CS, -/+, US]) found no significant differences for heart failure mortality and failure to rescue, and higher rates of postoperative sepsis and metabolic derangement (p<0.05) in Magnet hospitals. Organisational policies and procedures, including staff training: • One study (Kooker and Kamikawa, 2011 [ITS, -/-, US]) that assessed the effect of a staff training intervention focused on nurse retention and found improved staff retention (no test of

	significance) and job satisfaction (no test of significance) after the introduction of the programme. • McGillis Hall et al. (2008 [BA, -/+, CAN]) tested a workplace change programme to improve resource availability only finding improved nurse ratings for the quality of work (p=0.02), but not for four patient reported outcomes including patient perceived hospital quality and five nurse-reported outcomes including job satisfaction. • Kalisch et al. (2013 [BA, -/-, US]) investigated crew resource management training and found decreased nurse reported missed care (p=0.029) and improved teamwork (p= 0.001).
Other considerations	The Committee felt that it was important to emphasise that identifying and meeting required nurse staffing levels alone do not deliver improvements in nurse sensitive outcomes. As well as identifying ward nursing staff establishment, there was evidence that you can optimise the impact of having safe nursing staffing available by putting them within a specific programme such as the Magnet experience. Health care organizations assessed as achieving Magnet status are recognized for their quality patient care, nursing excellence and innovations in professional practice and are evaluated on five elements: transformational leadership; structural empowerment; exemplary professional practice; new knowledge, innovations, and improvements; and empirical outcomes. Structural and organisational characteristics associated with Magnet recognition include active involvement (at the hospital level) in nurse sensitive outcome benchmarking, active programmes of quality assurance and structures to actively promote the involvement of clinical nurses in the setting of hospital policies and governance. The recognition process consists of a comprehensive and rigorous assessment and takes about two years. The award is given for a period of four years. The Committee also commented that Magnet research involves safe staffing levels and requirement of a certain proportion of registered nurses in the nurse staffing establishment and so felt it was hard to disaggregate the effects of these from the overall benefits of the Magnet approach.

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1.2 *Ward level factors and approach to determine daily nursing staff requirements*

Principles for determining staffing requirements

1.2.1	**Use a systematic approach that takes into account the patient, ward and staffing factors below to determine total nursing requirement (the nursing staff requirements to meet patients' nursing needs throughout a 24-hour period). This approach should include the use of a staffing toolkit that is agreed locally to be consistent with the recommendations in this guideline. When staffing toolkits have been endorsed by NICE, these should be used.**
1.2.2	**Use informed professional judgement to make a final assessment of nursing staff requirements. This should take account of the local circumstances, variability of patients' nursing needs, and previous nursing red flag events (see section 1.2.19).**
Trade-off between benefits and harms	The Committee considered no harms were likely.
Economic considerations	The Committee considered that while this recommendation had potential cost implications, for example in requiring additional nursing time, this is fundamental to providing safe and effective patient care.
Quality of evidence	The Committee considered evidence from Evidence review 1 and Evidence review 2 when making this recommendation: • The studies by Needleman and Patrician (Needleman et al. 2011, Patrician et al. 2011) provide evidence of an association between variation in staffing at the level of a nursing shift and subsequent averse outcomes. Both do provide stronger evidence that the association between low nurse staffing and adverse events – mortality (Needleman et al. 2011), falls and drug administration errors (Patrician et al. 2011) – are causal. • While dozens of studies explore workload measurement systems, they are primarily descriptive in nature (Fasoli and Haddock, 2010). This also includes studies on well-known approaches like the AUKUH / Safer Nursing Care tool (Smith et al. 2009), Patient Intensity Nursing Index (Prescott et al. 1991, Prescott et al. 1989, Soeken and Prescott, 1991) or RAFAELA (Rainio and Ohinmaa, 2005, Rauhala and Fagerstrom, 2007), which have been described and tested for their reliability and validity (albeit to a limited extent), but ultimately not for their effect on patient outcomes. In addition to these organizational level tools, a small body of literature exists which explores the effectiveness of

	governmental initiatives such as mandated staffing ratios in California (e.g. Mark et al. 2013, McHugh et al. 2012, McHugh et al. 2011), which are beyond the scope of this review. An alternative approach, though mandated, is the Nursing Hours per Patient Day (NHPPD) method, which is used to determine safe staffing levels for wards in Western Australia. • A single observational study (Twigg et al. 2011) was identified, which assessed the effectiveness of the Nursing Hours Per Patient Day (NHPPD) method by comparing nursing sensitive outcomes before and after the introduction of the NHPPD method in Western Australia. • The NHPPD method differentiates between 7 different ward types, which are described by patient complexity, intervention levels, the presence of high dependency beds, the emergency/elective patient mix and patient turnover. Depending on the ward type, different nursing hours per patient day are assigned and guidance is provided in developing staffing rotas to achieve this across the day4. Twigg et al. (2011) investigated changes to fourteen nursing sensitive outcomes (central nervous system (CNS) complications, wound infections, pulmonary failure, urinary tract infection (UTI), pressure ulcers, pneumonia, deep vein thrombosis, ulcer/gastritis/upper gastrointestinal bleed, sepsis, physiologic/metabolic derangement, shock/cardiac arrest, mortality, failure to rescue, length of stay) two years before and after the introduction of the NHPPD method in three tertiary care hospitals in Western Australia (-,+ for internal validity). • Three nurses sensitive outcomes improved after the introduction of the NHPPD method in surgical wards: CNS complications (rate ratio 0.46, $p<0.05$), pneumonia (rate ratio 0.83, $p<0.05$) and ulcer/gastritis/upper gastrointestinal bleeds (rate ratio 0.63, $p<0.05$). Mortality decreased for medical and surgical patients (rate ratio 0.75, $p<0.05$). No significant differences were found for wound infections, pulmonary failure, urinary tract infections (UTI), pressure ulcers, deep vein thrombosis, sepsis, physiologic/metabolic derangement, shock/cardiac arrest, failure to rescue and length of stay. There is no evidence on how frequently the method should be used. We found no evidence about the effectiveness of other methods.
Other considerations	The Committee felt that there is a need to set staffing requirements for each shift based on the strong evidence that mortality increases when required or the set staffing level is not met for particular shifts. They emphasised the need to ensure safety day to day and therefore there is a need to assess nursing staff needs daily. However, this does need to be balanced with practicality. The Committee wished to acknowledge that few tools have been

	tested to check their validity and that robustness of the development of a tool is different to the validity of the tool in use. Tools therefore have some internal validity, but there is a need to measure the impact of using the tool. The evidence is limited on the effectiveness of the impact of tools for organisations or healthcare systems. The Committee agreed that tools should include patient input as part of the process of planning and assessment of care and feedback as part of indicators. The Committee wished to acknowledge the need for a compromise between subjectivity of informed professional judgement compared to the objectivity of a staffing tool. They agreed there will always be a place for informed judgement to improve the accuracy of estimates and to deal with variability and problems meeting the required staffing.

710 **Patient factors**

1.2.3	**Use individual patients' nursing needs as the main driver for calculating the nursing staff requirement for a ward.**
1.2.4	**Consider using nursing care activities summarised in tables 1 and 2 as a prompt to inform professional judgement of the nursing staff requirements. This should be an holistic assessment of patients' nursing needs and take account of specific nursing requirements and disabilities, as well as other patient factors that may increase nursing staff requirements, including:** • **Difficulties with understanding, cognition or confusion, such as those associated with learning difficulties, mental health issues, or dementia** • **Increased risk of clinical deterioration** • **End of life care.**
1.2.5	**Any patient-related condition that requires the continuous presence of a member of the nursing team should be considered as needing 1:1 nursing to patient care (often referred to as 'specialing' care) and should be factored into the nursing staff requirements.**
Trade-off between benefits and harms	The Committee considered no harms were likely.
Economic considerations	In hospitals in which patient factors are taken into account as the main driver for setting staffing levels, there is likely to be little cost impact. However, where it is not taken into account, there are potential cost implications, for example, in requiring additional

	nursing time. The Committee considered that these costs would be unavoidable because considering patient factors as the main driver of patients' nursing care requirements is essential in determining safe nursing staff requirements.
Quality of evidence	The Committee considered evidence from Evidence review 1 when making this recommendation. This identified a number of relevant studies which clearly demonstrate a strong association between patient acuity and dependency and nursing requirements: • Eleven studies were identified supporting the association of dependency/acuity and patient outcomes in staffing adjusted analyses (Duffield et al. 2011, Frith et al. 2010, Frith et al. 2012, He et al. 2013, McGillis Hall et al. 2004, O'Brien-Pallas et al. 2010b, Park et al. 2012, Patrician et al. 2011, Potter et al. 2003, Sales et al. 2008, Unruh et al. 2007). The results were drawn from studies with mixed validity but including 4 studies rated as high for internal validity (4 rated as ++) and external validity (3 rated as ++). • Three reviews support this association (Edwardson and Giovannetti, 1994, Fasoli and Haddock, 2010, O'Brien-Pallas et al. 2005) although Fasoli and Haddock (2010) emphasise the lack of any clear validated measures that accurately link dependency and acuity to staffing requirements with the precision required for workforce planning. The Committee also considered Expert paper 3: Safe nurse staffing of adult wards in acute hospitals - report from the Safe Staffing Advisory Committee sub-group meeting 11 April 2014 to inform this recommendation.
Other considerations	The definition and variation in the understanding of the terms dependency and acuity were discussed. Consensus was agreed to move away from acuity and dependency definitions and use nursing care need of patients instead. The Committee also wanted to acknowledge that needs of particular groups are not well captured in the literature – comorbidities, complex needs, learning difficulties, mental health issues, communication. However, they should be included when assessing nursing requirements. The Committee also felt there is a need to include emotional, spiritual needs and needs of relatives and carers and to emphasise a need ensure holistic care is adequately covered. Age was considered to be a significant, independent driver of workload and therefore should be considered when determining staffing levels. Specialist nurse provision and access was also felt to impact nurse establishment. This also applies to allied healthcare professionals, the medical team, admin support etc.

711 **Ward factors**

1.2.6	**Take into account the following ward factors when determining nursing staff requirements:** • **Estimated patient turnover in the ward throughout a 24-hour period (including both planned and unscheduled admissions, discharges and transfers).** • **Ward layout and size (including the need to ensure safety of patients that cannot be easily observed and the distance needed to travel to access resources).**
Trade-off between benefits and harms	The Committee considered no harms were likely.
Economic considerations	In hospitals in which patient turnover rate on wards is taken into account for setting staffing levels, there is likely to be little cost impact. However, where it is not taken into account, there are potential cost implications, for example, in requiring additional nursing time. The Committee considered that these costs would be unavoidable because considering patient turnover is essential in determining safe nurse staffing requirements. The Economic analysis found that total whole time equivalent nursing staff per adjusted bed was dependant on ward size. Larger wards required fewer staff per bed with a substantial increase in the number of staff per bed for the smallest wards; 10-12 beds or fewer.
Quality of evidence	The Committee considered evidence from Evidence review 1 when making this recommendation. Patient turnover: • Five studies were identified showing a significant association between patient turnover and patient outcomes in staffing adjusted analyses (Donaldson et al. 2005, Duffield et al. 2011, Needleman et al. 2011, Park et al. 2012, Patrician et al. 2011) with ratings for internal validity of ++, ++,++,+,- and external validity of ++,++,+,+,+. One study specifically analysed the interaction of patient turnover and RN hours per patient day on failure to rescue in 42 hospitals in the US finding a diminishing association of RN hours per patient day with failure to rescue with increasing levels of patient turnover (Park et al. 2012). • Two recent reviews (Fasoli and Haddock, 2010, Myny et al. 2011) identified turnover as a factor associated with increased nursing workload. Ward layout: • A single study of low internal validity (Hurst, 2008) explored the association of different ward layouts and whole time equivalent

	nurses per occupied bed. The study found lowest staffing levels on racetrack wards compared to other designs including nightingale wards, other bay designs and hub and spoke wards and other designs (including wards with all single room accommodation)13 . Although the study reports acuity levels per ward layout, staffing variables are unadjusted for differences in patient acuity, ward specialty or clustering of wards in hospitals and therefore results are likely to be confounded. It is clear that there is confounding by ward speciality as some ward types (e.g. 'other') are identified as containing high numbers of high dependency beds and therefore have disproportionately high staffing requirements. Furthermore while quality of care was measured and reported as broadly equivalent it was not controlled for in analyses. We identified one review investigating the effects of physical environment factors of hospital wards (Huisman et al. 2012). This did not find evidence for the association of ward layout and staffing requirements, patient or staff outcomes. Ward size: • One primary study found (internal validity +) found less total RN hours and lower proportion of RNs with increasing ward size (Blegen et al. 2008) although the absolute differences were small (1.6. minutes less care per patient per additional bed on the unit). The relationship between ward size and staffing requirements is not fully understood, but it is hypothesised that with increased ward size economies of scale may influence care hours and skill mix, with more opportunity for delegation in a larger team (Blegen et al. 2008). However, there was no control for quality of care and so no indication of equivalent outcomes. Two reviews (Fasoli and Haddock, 2010, Myny et al. 2011) also identified ward size as a relevant factor for staffing requirements, although the implications of their findings were unclear. In each case this conclusion was based on one primary study, different in each review. Myny (2011) presented results indicating that larger units were associated with "higher role overload" which appeared to be associated with lower staffing levels. While Fasoli and Haddock identified 'volume' as a key variable in the literature, its significance was unclear in the sense that it could be referring to efficiencies associated with specialism or the self-evident need to consider total patient load rather than ward size per-se.
Other considerations	The Committee felt that admissions, transfers and discharges of patients in and out of the wards are a significant factor on nursing workload, which often involves the senior nurses The Committee wished to acknowledge the need to account for care required by all of the patients who are under the responsibility of the ward nursing team. There may be some patients who are not

	physically on the ward but still require care from that nursing team, and this needs to be accounted for. The committee wished to acknowledge that increased use of single beds can be beneficial if required by patient needs, but there is potentially an increase in nursing time required to look after more single beds. In particular, a higher number of single rooms that are geographically distant do require more staffing, but it is important to consider the whole layout, not the number of single rooms alone. In determining the ward factors the Committee emphasised that it is important to take into account the needs of patients which may then affect nursing requirements and the impact of the environmental factors needs to be determined – especially sensory issues. The Committee wished to acknowledge that ward layout is a small confounding factor that the consensus of the Committee felt does increase workload. It therefore needs to be taken into account and adjustments made by professional judgement, but it is not a key driver of nurse staffing.

712 **Staff factors**

1.2.7	**Take into account the following staff factors when determining nursing staff requirements:** • **Nursing activities and responsibilities, other than direct patient care. These include:** – **communicating with relatives and carers** – **managing and the nursing team and the ward** – **professional supervision and mentoring of nursing staff** – **communicating with and providing nursing clinical support to the all healthcare staff involved with the care of patients on the ward.** **These activities and responsibilities may be carried out by more than one member of the nursing team.** • **Support from non-nursing staff such as allied health professionals and administrative staff.**
1.2.8	**Take into account the following staff factors when determining ward nursing establishments:** • **Planned absence: for example for professional development, or for annual or maternity leave.** • **Unplanned absence: for example, sickness absence. Use knowledge of current and historical sickness (and other**

	unplanned) absence rates (allowance for these types of planned and unplanned absence is commonly known as uplift).
Trade-off between benefits and harms	The Committee considered no harms were likely.
Economic considerations	In hospitals in which nursing activities and responsibilities, other than direct patient care are taken into account for setting staffing levels, there is likely to be little cost impact. However, where it is not taken into account, there are potential cost implications, for example, in requiring additional nursing time. The Committee considered that these costs would be unavoidable because considering ward layout is essential in determining safe nurse staffing requirements.
Quality of evidence	The Committee considered evidence from Evidence review 1 and Evidence review 2 when making this recommendation: • Eight studies found differences in outcomes between wards with different ward types (case mix) (Blegen and Vaughn, 1998, Duffield et al. 2011, Frith et al. 2012, Hart and Davis, 2011, Lake et al. 2010, Sales et al. 2008, Seago et al. 2006, Unruh et al. 2007) and four studies (Duffield et al. 2011, Frith et al. 2010, Sales et al. 2008, Unruh et al. 2007) identified case mix as a factor independent of acuity. • Two reviews (Fasoli and Haddock, 2010, Myny et al. 2011) supported this by identifying case mix / ward type as a factor affecting staffing requirements but no studies give clear evidence of specific differences in staffing requirements between ward types (e.g. medical vs surgical or care of older people). • Two studies were identified that explored the association between the introduction of a new supervisory post (Bender et al. 2012 [ITS, -/-, US], Burritt et al. 2007 [BA, -/-, US]) and patient and staff outcomes. The introduction of a new supervisory post was associated with improved patient satisfaction with nursing care (Bender et al. 2012, r= .63, p=0.02), a reduction in falls (Burritt et. al., 2007, -20 , ns) pressure ulcers (Burritt et. al., 2007, -38 , p=0.02) and increased job satisfaction of staff (Burritt et. al., 2007, +5.5 , ns). • Two studies that explored models of nursing care delivery (Barkell et al. 2002 [BA, -/-, US], Wells et al. 2011 [BA, -/-, CAN]) that changed from a team nursing model (where a team of nurses with different skill levels care for a group of patients) to one that incorporated a total patient care model (where a group of patients is assigned to a nurse who delivers all necessary care) found no significant differences in patient satisfaction, urinary tract infections, pneumonia or levels of job satisfaction.

	• Two studies explored a change from a total patient care model to a team based approach (Fairbrother et al. 2010 [CBA, -/-, AUS], Tran et al. 2010 [CBA, -/-, AUS]). Fairbrother et al. (2010 [CBA, -/-, AUS]) reported significantly higher levels of extrinsic job satisfaction of the • Team based approach to care over a total patient care approach (F 5.4, p<0.005); however Tran et al. (2010 [CBA, -/-, AUS]) reported no statistically significant difference between a team based approach to the delivery of nursing care and job satisfaction. • One study (Dubois et al. 2013 [CS, -/+, CAN]), found that the risk of experiencing any event with consequences (medication administration errors, falls, pneumonia, urinary tract infection, unjustified restraints and pressure ulcers) was significantly lower (OR=0.477, 95 -CI 0.25-0.91) in clinical areas with professional models of care characterised by higher nurse skill levels and staffing levels to those with functional models. - • One study (Kovner et al. 1994 [CBA, -/+, US]) that explored mixed interventions (reorganisations, case management, shared governance, computerisation, education) on the delivery of care, reported that the interventions, taken as a whole, improved the job satisfaction with professional interaction (p<0.05) but not other aspects of job satisfaction. The Committee also considered evidence from the National Quality Board (2013) How to ensure the right people, with the right skills, are in the right place at the right time. A guide to nursing, midwifery and care staffing capacity and capability. NHS England when making this recommendation.
Other considerations	The evidence suggests and is congruent with the experience of the Committee that there are functions that are required of nurses over and above direct clinical care that contributes to the provision of coherent, quality nursing service. These include for example communication, supervision (of team, professional), clinical support, mentorship, education, patient flow, team organisation, delegation. This needs to be accounted for in the assessment of the total nursing care requirement of the service. The Committee felt that there is evidence that suggests an additional form of a role that provides mentorship or supervision, but the evidence is weak and may be associated with increasing staffing. There is therefore a need to estimate the value of a professional supervisory role which is independent of case-load, and a need to measure non-direct patient care activities in addition of other supernumerary roles. The importance of a leadership role is enhanced from the evidence,

	but the Committee did not wish to make any recommendations regarding team care models. Ongoing training and education is required, including provision of continuing professional development. There is therefore a need to allowing time in the total nursing requirement of wards for personal training of the nursing staff, training others. The amount required depends on roles that people have including healthcare assistants. The Committee wished to emphasise that it is especially difficult with unplanned and unfamiliar case mix to nurses. Therefore appropriate placement of patients in wards where their care needs will be met, with nurses who are experienced with dealing with patients with those care needs is important – otherwise the delivery nursing care becomes less efficient.

713 **Process for setting ward nursing staff requirements**

1.2.9	**Consider determining nursing staff requirements using the following stages:** • **Estimate total nursing requirement to deliver patient care needs throughout a 24-hour period** • **Determine required ward nursing staff establishment and shift allocation** • **Assess whether available nursing staff meets actual required total nursing requirement.**
1.2.10	**Calculate average nursing need of the ward's patients. This should be measured using a staffing toolkit (see recommendation 1.2.1). Also, consider taking into account the patient factors and nursing care activities outlined in recommendations 1.2.3 to 1.2.5.**
1.2.11	**Consider expressing average patients' nursing needs in nursing hours per patient day (the number of hours of nursing care per patient throughout a 24-hour period – see the glossary for a further explanation). Nursing hours per patient day enables the nursing needs of individual patients and different shift durations of the nursing staff to be more easily accounted for compared with a nurse to patient ratio.**
1.2.12	**Use bed utilisation (the number of patients under the responsibility of a ward nursing team during each 24 hour period), rather than bed occupancy, when determining nursing staff requirements. This will ensure the nursing care needs of patients who may be discharged or transferred to another ward during a 24 hour period are also accounted for.**

1.2.13	**Determine the nursing staff requirements in terms of whole time equivalents based on the patients' nursing needs and average daily bed utilisation. Make allowance for additional nursing workload based on ward factors and staff factors relevant to each ward (see recommendations 1.2.6 and 1.2.7).**
1.2.14	**The total nursing requirement of a ward can be calculated by:** • **the average nursing needs of the patients (see recommendation 1.2.10)** • **multiplied by the bed utilisation of the ward (see recommendation 1.2.12)** • **plus the additional workload from other ward and staff factors (see recommendation 1.2.6 and 1.2.7)**
Trade-off between benefits and harms	The Committee considered no harms were likely.
Economic considerations	The Committee considered that while this recommendation had potential cost implications, for example in requiring additional nursing time, this is fundamental to providing safe and effective patient care.
Quality of evidence	The Committee considered evidence from Evidence review 2 when making this recommendation: • One study (Twigg et al. 2011 [BA, -/+, AUS]) demonstrated that the introduction of a nursing hours per patient day staffing method reduced some adverse patient outcomes (CNS complications on surgical wards RR 0.46 (95 -CI: 0.23, 0.92), pneumonia on surgical wards RR 0.83 (95 -CI: 0.70, 0.99), gastrointestinal bleeds on surgical wards RR 0.63 (95 -CI: 0.43, 0.92), and mortality). There is no evidence on how frequently the method should be used. We found no evidence about the effectiveness of other methods. The Committee also considered evidence from the following when making this recommendation: • Expert paper 1: Expert testimony presented to the Safe Staffing Advisory Committee • Francis R (2013) Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry. London: The Stationery Office • National Quality Board (2013) How to ensure the right people, with the right skills, are in the right place at the right time. A guide to nursing, midwifery and care staffing capacity and capability. NHS England.

Other considerations	The Committee wished to acknowledge the inadequacy of establishing staffing requirements based on bed occupancy due to this not recognising the additional workload encountered in wards with frequent patient transfers, admissions or discharges.

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1.2.15	**Use professional judgement to identify the appropriate knowledge and skill mix required within the nursing team, allocating the nursing activities to the different members of the nursing team, including healthcare assistants, in order to meet the nursing needs of patients. Allocation of nursing activities should take into account that improved patient outcomes are associated with a higher proportion of registered nurses in the nursing staff establishment.**
1.2.16	**Use patients' nursing needs and the estimated time of day when care will be required to design the staffing roster and how nursing staff are allocated to care for patients during shifts.**
1.2.17	**Add an allowance for planned and unplanned absence (commonly known as 'uplift') to the estimate of total nursing requirement. This is to ensure that the ward nursing staff establishment is sufficient to provide the estimated total nursing requirement at all times (see recommendation 1.2.8).**
Trade-off between benefits and harms	The Committee considered no harms were likely.
Economic considerations	The Committee considered that while this recommendation had potential cost implications, for example in requiring additional nursing time, this is fundamental to providing safe and effective patient care.
Quality of evidence	The Committee considered evidence from Evidence review 1 when making this recommendation: • Studies with high internal validity (++) found that a higher proportion of registered nurses on wards is associated with a significantly lower rate of death (Estabrooks et al. 2005, He et al. 2013) or failure to rescue (Blegen et al. 2011). • Studies of mixed quality (++,++,-) found a significant associations between a higher proportion of RNs in the nursing workforce) and lower rates of pneumonia (Cho et al. 2003) surgical site infection (McGillis Hall et al. 2004) lower post-operative sepsis (Blegen et al. 2011) but one study with low internal validity (-) found that higher rates of pneumonia were associated with a richer skill mix. • Four studies (internal validity ++,+,+, -) found that a richer RN skill mix was associated with significantly fewer falls (Blegen and

	Vaughn, 1998, Donaldson et al. 2005, Duffield et al. 2011, Patrician et al. 2011). • Three weak studies (all -) found that a richer RN skill mix was associated with fewer pressure ulcers (Blegen et al. 2011, Duffield et al. 2011, Ibe et al. 2008). • Two weak studies (internal validity -) provided no evidence of association between skill mix and VTE (Duffield et al. 2011, Ibe et al. 2008). • A single moderate study (+) showed significantly fewer complaints with a richer RN skill mix (Potter et al. 2003). • Two weak studies (-) indicated that a richer RN skill mix might be associated with lower resource use in terms of hospital stay (Frith et al. 2010) or total nursing hours and overall cost of nursing hours (McGillis Hall et al. 2004). The Committee also considered evidence from the following when making this recommendation: • Expert paper 1: Expert testimony presented to the Safe Staffing Advisory Committee • Francis R (2013) Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry. London: The Stationery Office • National Quality Board (2013) How to ensure the right people, with the right skills, are in the right place at the right time. A guide to nursing, midwifery and care staffing capacity and capability. NHS England.
Other considerations	The Committee wished to acknowledge the need for a compromise between subjectivity of informed professional judgement compared to the objectivity of a staffing tool. They agreed there will always be a place for informed judgement to improve the accuracy of estimates and to deal with variability and problems meeting the required staffing. The Committee also felt that the physical and intellectual demands on nursing staff specific to their role, responsibilities and the patient needs on the ward should also be taken into account when determining shift duration of the nursing staff. No formal recommendation was made on shift duration as evidence regarding the effects of shift duration and the optimal shift duration were not fully covered by the literature reviews that were considered by the Committee. However the topic of nurse shift duration is the focus of a separate piece of work that is being undertaken by NHS England.

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1.2.18	**Systematically assess the adequacy of the nursing staff present on a daily or shift by shift basis. Where possible consider calculating actual total nursing requirements in nursing hours per patient day. Take into account the patient factors outlined in recommendations 1.2.3 to 1.2.5.**
1.2.19	**Monitor whether the available nursing staff adequately meet patients' nursing needs. This should involve consideration and reporting of nursing red flag events (see box 1) over each 24 hour period and at the handover between each shift where possible.**
1.2.20	**Record nursing red flag events. These could be reported by any member of the nursing team, and patients, relatives or carers and should be reported to the registered nurse in charge of individual wards or in charge of each shift, the management team or hospital-based patient support services.**
1.2.21	**Identification of a nursing red flag event should prompt an immediate response by the registered nurse in charge. The response may include an urgent need for additional nursing staff to be allocated to the ward.**
1.2.22	**Keep records of the calculated actual total nursing requirements and reported red flag events so that they can be used to inform future planning of nursing staff establishments.**
Trade-off between benefits and harms	The Committee considered no significant harms were likely. However felt it was important to be alert to potential harm if allocating additional staff to a understaffed ward put other wards at increased risk of harm.
Economic considerations	The Committee considered that while this recommendation had potential cost implications, for example in requiring additional nursing time, this is fundamental to providing safe and effective patient care.
Quality of evidence	The Committee considered evidence from Evidence review 1: • The study by Needleman (Needleman et al. 2011, Patrician et al. 2011) provides evidence of an association between variation in staffing at the level of a nursing shift and subsequent averse outcomes – Mortality and exposure to below-target shifts. Risk of death increased with exposure to increased number of below-target shifts. Hazard ratio per below-target shift, 1.02 95% CI, 1.01 to 1.03 p<0.001. When number of below-target shifts restricted to in ≤5 days after admission, hazard ration increased to 1.03 95% CI, 1.02 to 1.05 p<0.001. When exposure specified in a window of previous 6 shifts, hazard ratio was 1.05 95% CI, 1.02 to 1.07 p=0.001. -High-turnover shifts and increased risk of death. Analyses that included all hospital admissions and cumulative

	exposure during ≤30 days, hazard ration per high-turnover shift was 1.04 95% CI, 1.02 to 1.06 p<0.001. When restricted to those in ≤5 days, hazard ratio increased to 1.07 95% CI, 1.03 to 1.10 p<0.001. • There is some strong evidence that a lower level of nurse staffing is associated with higher rates of drug administration errors (Frith et al. 2012, O'Brien-Pallas et al. 2010a, Patrician et al. 2011) (rated as ++,+,-) and missed nursing care (Ball et al. 2013, Tschannen et al. 2010, Weiss et al. 2011) (rated as ++,++,-) including paperwork (Ball et al. 2013). The Committee also considered evidence from the following when making this recommendation: • Expert paper 1: Expert testimony presented to the Safe Staffing Advisory Committee • Francis R (2013) Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry. London: The Stationery Office • National Quality Board (2013) How to ensure the right people, with the right skills, are in the right place at the right time. A guide to nursing, midwifery and care staffing capacity and capability. NHS England.
Other considerations	The Committee discussed the merits of monitoring process measures. The benefits of process measures that were identified include: More closely related to purely nurse staffing, as opposed to the wider care team; They can be measured immediately and therefore addressed rapidly if required; There is a high prevalence of them and therefore sufficient scale to detect deviation from the expected levels; Much less dependent on case mix and the proportion of completion of the process measure is relevant not the incidence. Agreement from the Committee was made regarding what could be measured – and there was consensus that a single indicator was not suitable but a combination of process measures and outcomes.

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717 ***Monitor and evaluate ward nursing staff establishment***

1.3.1	**Monitor whether the available staff for nursing on the ward adequately meets patients' nursing needs. Monitor the safe nursing indicators in box 2, which evidence has shown to be sensitive to the number of available nursing staff and skill mix. Consider continuous data collection of the safe nursing indicators, and regular auditing. Appendix 3 gives further guidance on data collection for the nurse sensitive indicators in box 2. Reports of nursing red flag events (see box 1) should also be reviewed when undertaking this monitoring.**
1.3.2	**Compare the results of the safe nursing indicators with previous results from the same ward and data from other wards on a regular basis, at least 6 monthly. The comparisons should also take into account the specific ward and patient characteristics and the frequency of reported nursing red flag events.**
Trade-off between benefits and harms	The Committee considered no harms were likely.
Economic considerations	The Committee considered that while this recommendation had potential cost implications, for example in requiring additional nursing time, this is fundamental to providing safe and effective patient care.
Quality of evidence	The Committee considered evidence from Evidence review 1 when making this recommendation. Registered / all nurse staffing levels and patient outcomes: • There is evidence from large observational studies, of good quality (internal validity ++) that hospitals / units with higher nurse staffing have lower rates of mortality (Blegen et al. 2011, Needleman et al. 2011, Sales et al. 2008, Sochalski et al. 2008) and failure to rescue (Park et al. 2012, Twigg et al. 2013) . • There is mixed evidence on the association between nurse staffing levels and hospital acquired infections. No studies showed a significant association with catheter associated UTI. One weak study (-) showed a significant association between low staffing and higher rates of pneumonia (Duffield et al. 2011) but 1 strong study showed a significant association in the opposite direction (Twigg et al. 2013). One study (++ for internal validity) showed higher rates of surgical site infection to be associated with lower staffing (Twigg et al. 2013). Two studies, ++ & - for internal validity, showed significant negative associations between staffing and other infections (Blegen et al. 2008, Duffield et al. 2011). • There is evidence of an association between staffing levels and falls from 3 (+ or ++) studies (Donaldson et al. 2005, Patrician et

	al. 2011, Potter et al. 2003). Evidence from non-significant studies supports this direction of association. • Evidence is mixed for an association with pressure ulcers. Three studies (1+, 2- for internal validity) found significant negative associations between staffing levels and pressure ulcers with lower staffing associated with lower rates of ulcers (Donaldson et al. 2005, Duffield et al. 2011, Hart and Davis, 2011) but 2/12 studies, both rated as strong for internal validity (++), found a significant association in the opposite direction (Cho et al. 2003, Twigg et al. 2013). • Evidence from three studies (internal validity -,-,++) found no association between nurse staffing levels and venous thromboembolism (Duffield et al. 2011, Ibe et al. 2008, Spetz et al. 2013). • Three small studies with low / moderate (-,+,-) internal validity gave no significant association with satisfaction (Ausserhofer et al. 2013, Potter et al. 2003, Seago et al. 2006). • There is strong evidence showing lower hospital use in terms of length of stay (Blegen et al. 2008, Frith et al. 2010, O'Brien-Pallas et al. 2010b, Spetz et al. 2013) or readmission (Weiss et al. 2011) is associated with higher levels of nurse staffing. The evidence includes some studies with strong internal validity (two ++, two + and one -). • Limited evidence from two studies (Shever et al. 2008, Twigg et al. 2013) suggests that cost of care is increased with higher nurse staffing levels although the picture is mixed with the lowest staffing levels also associated with increased hospital costs. Registered / all nurse staffing levels and care processes / nurse outcomes: • There is some strong evidence that a lower level of nurse staffing is associated with higher rates of drug administration errors (Frith et al. 2012, O'Brien-Pallas et al. 2010a, Patrician et al. 2011) (rated as ++,+,-) and missed nursing care (Ball et al. 2013, Tschannen et al. 2010, Weiss et al. 2011) (rated as ++,++,-) including paperwork (Ball et al. 2013). • There is also some contradictory evidence on drug administration errors with one study (Blegen and Vaughn, 1998) of moderate internal validity (+) finding that wards with more nursing staff had significantly higher error rates . • No significant relationships were found from five studies that reported nurse outcomes(Ausserhofer et al. 2013, O'Brien-Pallas et al. 2010a, O'Brien-Pallas et al. 2010b, Staggs and Dunton, 2012) but the overall quality of this evidence was moderate to low

	internal validity (three studies rated +, 2 rated -) Health care assistant staffing and outcomes: • Studies of moderate and low internal validity (+,-) found no association with mortality (Unruh et al. 2007), failure to rescue (Park et al. 2012), length of stay (Unruh et al. 2007), VTE (Ibe et al. 2008) or missed care (Ball et al. 2013). • Studies with moderate to low internal validity (+,-) found that higher HCA staffing was associated with higher rates of falls (Hart and Davis, 2011, Lake et al. 2010) pressure ulcers (Seago et al. 2006), readmission rates (Weiss et al. 2011), medication errors (Seago et al. 2006), physical restraints (Hart and Davis, 2011) and lower patient satisfaction (Seago et al. 2006). • One weak study (-) found that higher HCA staffing levels were associated with lower rates of pressure ulcers (Ibe et al. 2008). • There we no studies looking at associations with costs, infections or nurse outcomes. The Committee used their professional and personal experiences to inform the other indicators that have been suggested to be monitored from this recommendation and also considered evidence from the following when making this recommendation: • Expert paper 1: Expert testimony presented to the Safe Staffing Advisory Committee • Francis R (2013) Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry. London: The Stationery Office • National Quality Board (2013) How to ensure the right people, with the right skills, are in the right place at the right time. A guide to nursing, midwifery and care staffing capacity and capability. NHS England.
Other considerations	The Committee were keen to emphasise that providing the number of nursing staff that were deemed to be required alone would not necessarily result in improved outcomes for patients. They therefore felt that it was important to recommend that the quality of the delivery of patient care should be monitored and used to drive improvements. There was evidence (but not necessarily a causal association) between a number of outcomes and registered nurse staffing levels – mortality, hospital acquired infections, falls, completed/missed care and medication errors. None of the studies were undertaken in the UK and few were rated highly, however the Committee agreed they were able to make recommendations based on this evidence as it was derived from a diverse range of settings including from studies which were drawn on nationally representative samples of hospitals in developed countries.

	The Committee wished to acknowledge that outcomes like mortality and hospital acquired infection, despite having good evidence were not felt to be a suitable indicator as significantly confounded by many other factors. Falls also has reasonable evidence, but should not be used as indicator to measure between wards or hospitals due to the large variation in incidence that is largely driven by the demographics of the population that is being treated, but could be used as an improvement measure. Other outcomes collected as part of the Care Thermometer were discussed. It was noted that the Care Thermometer records the prevalence and not the incidence of events. There was strong consensus decision that infections, VTE (no evidence to support) and catheter associated UTI, like mortality are too greatly influenced by the wider healthcare team and should therefore not be used as indicators.

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1.3.3	**Consider increasing the ward nursing staff establishment, taking into account the occurrences of the nursing red flag events, poor safe nursing indicator results, and whether registered nurses are caring for more than 8 patients during the day time on a regular basis because this may lead to increased risk of harm.**
Trade-off between benefits and harms	The Committee considered the potential harms of this recommendation being misinterpreted to mean that if a nurse is caring for 8 patients, then this is represents a safe number of nursing staff. The Committee wished to emphasise that there is no floor or ceiling in the number of registered nurses and healthcare assistants that are required to care for the patients of a particular ward and that the required number of nursing staff should be determined by individual wards according to the recommendations stated in this guideline.
Economic considerations	The Committee considered that while this recommendation had potential cost implications, for example in requiring additional nursing time, this is fundamental to providing safe and effective patient care.
Quality of evidence	The Committee considered evidence from Evidence review 1 when making this recommendation. Three studies that gave specific information on levels of staffing in English hospitals. One, with a main outcome of mortality, was excluded from the review as it did not control for care assistant staffing. It used data from the late 1990s. The second used nurse reported missed care as its outcome. This study used more recent data (2009/10) The main outcome of the third study was staffing levels and organisational attributes on nurse outcomes. This was part of a set of studies known as the Hospital

	Outcome Study with researchers from Scotland, England, the United States, Canada and West Germany. RAFFERTY, A. M., CLARKE, S. P., COLES, J., BALL, J., JAMES, P., MCKEE, M. & AIKEN, L. H. 2007. Outcomes of variation in hospital nurse staffing in English hospitals: Cross-sectional analysis of survey data and discharge records. International Journal of Nursing Studies, 44, 175-182. • This cross-sectional analysis combined nurse survey data (N = 3984) with discharge abstracts of general, orthopaedic, and vascular surgery patients (N = 118 752) in 30 English acute trusts. Patients and nurses in the quartile of hospitals with the most favourable staffing levels (the lowest patient-to-nurse ratios) had consistently better outcomes than those in hospitals with less favourable staffing. • Patients in the hospitals with the highest patient to nurse ratios (12.4–14.3) had 26% higher mortality (95% CI: 12–49%) than patients in those with the lowest ratios (6.9–8.3 patients per nurse); the nurses in those hospitals were approximately twice as likely to be dissatisfied with their jobs, to show high burnout levels, and to report low or deteriorating quality of care on their wards and hospitals. • Most of the increased risk in mortality occurred between the best staffed hospitals compared to any hospital with lower staffing. BALL, J. E., MURRELLS, T., RAFFERTY, A. M., MORROW, E. & GRIFFITHS, P. 2014. 'Care left undone' during nursing shifts: associations with workload and perceived quality of care. BMJ Qual Saf, 23, 116-25. • This study examined the nature and prevalence of care left undone by nurses in English National Health Service hospitals and assessed whether the number of missed care episodes reported by nurses is associated with nurse staffing levels and nurse ratings of the quality of nursing care and patient safety environment. Data were derived from a cross-sectional survey of 2917 registered nurses working in 401 general medical/surgical wards in 46 general acute National Health Service hospitals in England. • Most nurses (86%) reported that one or more care activity had been left undone due to lack of time on their last shift. Most frequently left undone were: comforting or talking with patients (66%), educating patients (52%) and developing/updating nursing care plans (47%). The number of patients per registered nurse was significantly associated with the incidence of 'missed care' ($p<0.001$). • When registered nurses cared for 6.13 or fewer patients the odds

	of missing any care and the rate of care missed were significantly reduced (OR 0.343 p<0.001, beta -1.087, p<0.001) compared to the lowest staffed wards (11.67 patient per nurse or worse).. • This study found no significant association with HCA staffing and no significant interaction between RN and HCA staffing. While we assessed this study as having high external validity (++) because it included a random sample of wards from a random sample of English hospitals, there are potential limitations in internal validity (+). The most significant of this is that the measure is nurses' reports of care left undone on the last shift. While this subjective measure has been shown to relate to other measures of quality its validity as an objective measure of 'missed care' is uncertain. This and similar studies suggest a line of development for quality measures rather than providing a solution. SHEWARD, L., HUNT, J., HAGEN, S., MACLEOD, M. & BALL, J. 2005. The relationship between UK hospital nurse staffing and emotional exhaustion and job dissatisfaction. Journal of Nursing Management, 13, 51-60. • This study explored the relationship between nurse workload, nurse characteristics, and hospital variables and nurse outcomes, specifically job dissatisfaction and burnout. Fifty nine adult, acute, multi-speciality hospitals employing 100 nurses minimum in England and Scotland formed the sample. Data derived from a 1999 survey of 19 454 registered nurses in Scotland and England (50% response rate). • The study showed statistically significant relationships between nurse patient ratios and emotional exhaustion and dissatisfaction with current job. Compared to nurses reporting the worst staffing (patient to nurse ratio 13 or more patients per nurse) nurses reporting better staffing were significantly less likely to report emotional exhaustion (adjusted odds ratios 0–4 Patients 0.57 [95% CI 0.46–0.71] 5–8 Patients 0.67 [0.55–0.81] 9–12 Patients 0.80 [0.71–0.92]) and job dissatisfaction (OR 0–4 Patients 0.70 [95% CI 0.58–0.83], 5–8 Patients 0.75 [0.66–0.85], 9–12 Patients 0.84 [0.72–0.99]).
Other considerations	The evidence from a single study conducted in the UK (Rafferty et al 2007) which the Committee considered provided support to there being an increased risk of serious adverse events when registered nurses were caring for more than 8 patients during the day time. There were limitations in the evidence considered as it was a single study that found this negative association for registered nurse staffing numbers in the day time only on surgical wards. The data used in the study was also historic dating from the late 1990s, and did not account for any variations in the contribution of healthcare assistants to the nursing team. However the Committee felt the

	evidence was strong enough to suggest that is unlikely that safe staffing can be achieved when registered nurses were caring for more than 8 patients during the day time on a regular basis. The Committee agree there is risk that registered nurses were caring for more than 8 patients during the day time on a regular basis could lead to harm, with the risk of harm likely to disproportionally increase as the number of patients each registered nurse is caring for rises. The Committee felt there was a need to understand locally at what point reducing number of patients cared for by each member of the nursing team has an elevated risk, or conversely when increasing the number of nursing staff further has little benefit. It is anticipated that this relationship is not linear and the shape of curve and variation from it should be based on the total nursing requirement as described by this guideline. Other studies conducted in the UK provide evidence for nurses' satisfaction and missed care being negatively affected by the number of patients registered nurses care for, however these other adverse outcomes occur at different thresholds to the serious adverse events that were found to have increased risk of occurring when registered nurses were caring for more than 8 patients during the day time.

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Appendix 2: Example to illustrate the process of determining nursing staff requirements

This example is intended to illustrate the process of setting ward nursing staff requirements as described in recommendations 1.2.9 to 1.2.22. Many of the calculations could be supported by a NICE endorsed staffing toolkit.

The ward used in this example is a 28 bedded surgical ward that treats a combination of patients who have undergone elective surgery as well as patients who have been admitted as emergencies who are likely to need urgent surgery.

Stage 1: Estimate total nursing requirement to deliver patient care needs throughout a 24-hour period	
Average nursing needs of patients = 5.32 hours per patient day	Over a period of a few weeks, the average nursing needs of patients treated on the sample ward was worked out to be 5.32 nursing hours per patient day using a NICE endorsed staffing toolkit.
Average bed utilisation = 30	Over the same period of time, the average number of patients treated during each 24-hour period was 30. This was because, on average, all of the beds were occupied each day, plus there were 2 patients discharged each day with new patients subsequently admitted in their place.
Additional workload = 5.6 nursing hours per day	The additional workload was estimated using professional judgement to be 5.6 nursing hours per day. This was calculated based on the additional activities and responsibilities of the nursing staff, other than direct patient care, which included, for example, supervising other nursing staff, and coordinating workflow. There was also additional time deemed necessary to deal with other ward factors that were not accounted for by the staffing toolkit. These related to: allied healthcare professional work delegated to the nursing team; work involved with maintaining a clean, tidy and well stocked environment; administrative activities not covered outside of normal working hours.
Total nursing requirement = 165.2 hours per day	**This was calculated as average nursing needs of patients (5.32) X bed utilisation (30) + additional workload (5.6) = 165.2 nursing hours per day.**

Stage 2: Determine required ward nursing staff establishment and shift pattern	
Skill mix = 68% registered nurses	Analysis of the nursing needs of patients showed that the majority of care required registered nurses. It was estimated that up to 37% of required total nursing requirement could be delegated to healthcare assistants. This was reduced to 32% to allow for the fact that healthcare assistants would not be able to undertake the activities that require registered nurses, but registered nurses could undertake all healthcare assistant activities. The specialist competencies that were required amongst the registered nurses were also determined when determining the skill mix.
Nursing staff required each day = 15 registered nurse and 7 healthcare assistant shifts	The nursing staff on the example ward all work 7.5 hour shifts (excluding breaks), therefore 22 nursing shifts per day were required (165.2/7.5). Based on 68% needing to be registered nurses, 15 registered nurse and 7 healthcare assistant shifts were required each day. Analysis of the time when patient nursing needs were required showed that there were obvious peaks between 8:00 am and 10:30 am and between 1:00 pm and 2:30 pm. These peaks were associated with dietary and hygiene activities, mobilisation and medication/treatments. The roster was therefore designed to accommodate additional staff working in the early morning and late evening by: overlapping the start and end times of the various shifts; allocating more healthcare assistants to the morning shift, when the majority of the activities that could be delegated to healthcare assistants took place.
On average, a full time equivalent member of the nursing team anticipated to provide = 1620 hours per year	Full-time working (37.5 hours per week) equates to a maximum of 1950 working hours per year (37.5 x 52), excluding any leave or absence. Data from the ward showed that the annual leave and study leave entitlements, plus other anticipated absence such as sick leave or maternity leave, would be an average of 44 days or 330 hours (44 X 7.5) per year for each member of the nursing team. On average, a full time existing member of the nursing team could therefore provide an anticipated 1620 hours per year (1950 – 330). This is equivalent to an uplift 20.4% (1950/1620).

Ward nursing staff establishment = 25 registered nurses and 12 healthcare assistants full time equivalents	**This was calculated as follows:** • **The ward's total nursing requirement of 165.2 nursing hours per day equates to 60,298 nursing hours per year (165.2 x 365).** • **On the basis that an average each full time equivalent member of the nursing team can provide 1620 hours per year, the number of full time equivalent nursing staff required is 37.22 (60,298/1620).** • **Based on the skill mix assessment that 68% need to be registered nurses, 25 registered nurses and 12 healthcare assistants were required in the ward nursing staff establishment.**

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Stage 3: Assess whether available nursing staff meets actual total nursing requirement throughout a 24-hour period.	
Available nursing staff = 150 hours	Because of unplanned absence at short notice, the available nursing staff on a particular day was 13 registered nurse and 7 healthcare assistant shifts. The available nursing staff could therefore provide 150 nursing hours that day (20 x 7.5) or 97.5 registered nurse hours and 52.5 healthcare assistant hours.
Actual total nursing requirement = 194 hours	On the same day, the average nursing needs of the patients that were being treated on the ward was determined to be 6.08 nursing hours per patient day using a NICE endorsed staffing toolkit. Anticipated bed utilisation during that 24-hour period was 31. Additional workload remained at 5.6 hours per day. The actual total nursing requirement was therefore 194 hours (6.08 X 31 + 5.6). Based on a required average skill mix, this should be 132 registered nurse hours and 62 healthcare assistant hours.
Nursing red flag events	On the same day two red flag events occurred: (i) a shortfall of 34.5 registered nurse hours (132-97.5) and (ii) a delay of more than 30 minutes in providing planned pain relief to 2 patients.
Staffing problems addressed in real time	**The nursing matron was notified about the red flag events which included the shortfall from the required nursing hours. Additional nursing staff were therefore allocated to work on the ward that same day.** **At the weekly staffing review, the events leading to the shortfall were analysed to see if changes to the nursing staff roster or ward establishment were needed.**

Appendix 3: Safe nursing indicators

Safe nursing indicator: Adequacy of meeting patients' nursing care needs

Patients' experience of nursing care on hospital inpatient wards

Data collection

Local collection of patient experience could use the following National Inpatient Survey questions developed by the Picker Institute:

Q.28 Did you have confidence and trust in the nurses treating you?

Q.29 Did nurses talk in front of you as if you weren't there?

Q.30 In your opinion, were there enough nurses on duty to care for **you** in hospital?

Q.40 How many minutes after you used the call button did it usually take before you got the help you needed?

Outcome measures

Responsiveness to inpatients' personal needs.

Safe nursing indicator: adequacy of provided pain relief

Patients' experience of nursing care on hospital inpatient wards

Data collection

Local collection of patient experience could use the following National Inpatient Survey questions developed by the Picker Institute:

Q.39 Do you think the hospital staff did everything they could to help control your pain?

Outcome measures

Responsiveness to inpatients' personal needs.

Safe nursing indicator: adequacy of communication with nursing team

Patients' experience of communication with nursing staff on hospital inpatient wards

Data collection

Local collection of patient experience could use the following National Inpatient Survey questions developed by the Picker Institute:

Q.27 When you had important questions to ask a nurse, did you get answers that you could understand?

Q.34 Did you find someone on the hospital staff to talk to about your worries and fears?

Q.35 Do you feel you got enough emotional support from hospital staff during your stay?

Outcome measures

Responsiveness to inpatients' personal needs.

Safe nursing indicator: falls

People falling whilst admitted to hospital

Definition

A fall is defined as an unplanned or unintentional descent to the floor, with or without injury, regardless of cause (slip, trip, fall from a bed or chair, whether assisted or unassisted). Patients 'found on the floor' should be assumed as having fallen, unless confirmed as an intentional act.

Record the severity of any fall that the patient has experienced within the previous 72 hours in a care setting. The severity of the fall is defined in accordance with NRLS categories:

- No harm - fall occurred but with no harm to the patient
- Low harm - patient required first aid, minor treatment, extra observation or medication.
- Moderate harm - likely to require outpatient treatment, admission to hospital, surgery or a longer stay in hospital
- Severe harm - permanent harm, such as brain damage or disability, was likely to result
- Death - where death was the direct result of the fall

Data collection

Proportion of people admitted to hospital who fall while in hospital.

Numerator: the number of people in the denominator who fall whilst in hospital.

Denominator: the number of people admitted to hospital.

Data source: Local data collection, which could use data from the Safety Thermometer. Data will also be collected nationally on hospital falls (including 'found on floor') per 100,000 bed days by the Falls and Bone Health audit.

Outcome measures

Hospital falls per occupied bed days.

Safe nursing indicator: hospital acquired pressure ulcers

People acquiring pressure ulcers while in hospital

Definition

New pressure ulcer – a pressure ulcer developed 72 hours (3 days) or more after admission to an organisation. The category (2, 3, or 4) of the patient's worst new pressure ulcer is recorded.

Data collection

Proportion of people admitted to hospital who develop a pressure ulcer while in hospital.

Numerator: the number of people in the denominator who develop a new pressure ulcer whilst in hospital.

Denominator: the number of people admitted to hospital.

Data source: Local data collection, which could use data from the Safety Thermometer. Data on the number of patients in hospital with a pressure ulcer greater than category 2 (irrespective of location of origin) will also be collected for the NHS Outcomes Framework 2014/15 indicator 5.3: Proportion of patients with category 2, 3 and 4 pressure ulcers.

Outcome measures

Incidence of pressure ulcers in hospital.

Safe nursing indicator: medication administration errors

People receiving the wrong medications whilst in hospital

Definition

A medication administration error is any error in the administration, omission or preparation of medication by nursing staff. This could include deviation from prescriptions, manufacturer medication information instructions or recommended local pharmacy procedures. The severity of the medication error should be recorded,

Data collection

Proportion of people admitted to hospital who experience a medication error while in hospital.

Numerator: the number of people in the denominator who experience a medication error whilst in hospital.

Denominator: the number of people admitted to hospital.

Data source: local data collection, which could include critical incident reports.

Outcome measures

Incidence of medication errors while in hospital.

Safe nursing indicator: missed breaks

Nursing staff unable to take scheduled breaks

Definition

A missed break occurs when a nurse is unable to take any scheduled break due to lack of time.

Data collection

Proportion of breaks expected for registered nurses and healthcare assistants working on inpatient hospital wards that were not taken.

Numerator: the number of breaks in the denominator that were not taken.

Denominator: the number of breaks expected for registered nurses and healthcare assistants on inpatient hospital wards.

Data source: Local data collection.

Outcome measures

Proportion of missed breaks due to lack of time amongst nursing staff.

Safe nursing indicator: nursing overtime

Nursing staff working extra hours

Definition

Nursing overtime includes any extra hours (both paid and unpaid) that a nurse is required to work beyond their contracted hours at either end of their shift.

Data collection

a) Proportion of registered nurses and healthcare assistants on inpatient hospital wards working overtime.

   Numerator: the number of registered nurses and healthcare assistants in the denominator working overtime.

   Denominator: the number of registered nurses and healthcare assistants on inpatient hospital wards.

b) Proportion of nursing hours worked on hospital inpatient wards that are overtime.

   Numerator: the number of nursing hours in the denominator that are overtime.

   Denominator: the number of nursing hours worked on hospital inpatient wards.

Data source: Local data collection. Data are also collected nationally on the number of staff working extra hours (paid and unpaid) in the NHS National Staff Survey by the Picker Institute.

Outcome measures

Staff experience.

Safe nursing indicator: planned, required and available nurses for each shift

The number of planned, required and available nursing hours on hospital inpatient wards

Definition

The number of nursing hours which were planned in advance, deemed to be required during that shift and that were actually available.

Data collection

a) Proportion of total nursing hours for each shift that were planned in advance and that were actually available

   Numerator: the number of total nursing hours for each shift that were actually available.

   Denominator: the number of total nursing hours for each shift that were planned in advance.

b) Proportion of total nursing hours for each shift that were deemed to be required on the day and that were actually available

   Numerator: the number of total nursing hours for each shift that were planned in advance.

   Denominator: the number of total nursing hours for each shift that were deemed to be required on the day.

Data source: local data collection, which could include data collected for the NHS England and the Care Quality Commission joint guidance to Trusts on the delivery of the 'Hard Truths' commitments on publishing staffing data regarding nursing, midwifery and care staff levels.

Outcome measures

Deviation between planned and available nursing staff; deviation between planned and required nursing staff.

Safe nursing indicator: high levels and/or ongoing reliance on temporary nursing

Temporary nursing on hospital inpatient wards

Definition

Nurses who are working on hospital inpatient wards who are not contracted with the hospital.

Data collection

Proportion of registered nurses and healthcare assistants working on inpatient hospital wards who are on bank or agency contracts.

Numerator: the number of registered nurse and healthcare assistant shifts in the denominator who are employed on bank or agency contracts.

Denominator: the number of registered nurse and healthcare assistant shifts per calendar month to work on inpatient hospital wards.

Data source: local data collection, which could include data collected for the NHS England and the Care Quality Commission joint guidance to Trusts on the delivery of the 'Hard Truths' commitments on publishing staffing data regarding nursing, midwifery and care staff levels.

Outcome measures

Expenditure (£) on bank/agency staff per inpatient bed.