Safe staffing for nursing in A&E departments - appendix 1: Evidence to recommendations

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The document obtained by HSJ was labelled as the final guideline and was completed following a public consultation in January 2015, and includes changes made to the guidance as a result of the consultation, further analysis and work by the safe staffing committee.

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1 Organisational requirements

Recommendations

Focus on patient care

1.1.1 Ensure that patients attending A&E departments receive the nursing care they need at all times of the day and night, on weekdays and at weekends.

Accountability for A&E nursing staff establishments

1.1.2 Develop procedures to ensure that a systematic process is used to set the A&E nursing staff establishment to provide safe care at all times to patients attending A&E departments. The board should ensure that the budget for the A&E department covers the required nursing staff establishment (as determined by recommendation 1.2.2).

1.1.3 Ensure that all A&E departments have the capacity to do the following:

- Deliver the nursing care that all patients need from the time of attendance at the department, through initial and on- going assessment, and care delivery to discharge.
- Provide triage, minor, major, resuscitation and paediatric A&E services, and where appropriate major trauma A&E services.
- Provide staff to cover all the nursing roles needed for each shift, including

leadership, supervision and oversight of each shift.

- Provide specialist input for children where the A&E department receives adults and children, by having a registered children's nurse on each shift. Where this is not operationally possible ensure there is at least 1 A&E nurse on each shift with the necessary competencies in caring for children and young people.
- Meet the needs of the local population in the A&E department, for example: Older people, people with learning disabilities, people with mental health needs (including dementia) or people with complex psychosocial needs. People whose first language is not English and who may need access to translation services. People with sensory impairment or communication difficulties. This may include ensuring that A&E nursing staff receive extra training in these areas, or that they have access to specialist input such as translation services outside the A&E nursing team when needed.
- Allow for: uplift (which may include consideration of annual leave, maternity leave, paternity leave, study leave [including mandatory training and continuing professional development] and sickness absence);time for all A&E nursing staff to give and receive supervision and training in line with professional guidance.
- Predict and respond to variation over time as indicated by records of A&E nursing staff requirements (for example, changes in demand for A&E services).

1.1.4 Develop procedures to ensure that the A&E nursing staff establishment is developed by registered nurses with training and experience in setting staffing establishments and responsibility for determining nursing staff requirements at A&E departmental level. The procedures should ensure that the A&E nursing staff establishment is approved by the director of nursing or chief nurse (or delegated accountable staff).

1.1.5 Ensure that senior A&E nursing managers (for example, A&E matrons) are accountable for the A&E nursing staff roster that is developed from the A&E nursing staff establishment.

Organisational level actions to enable A&E responsiveness

1.1.6 Develop escalation plans to address risk to patient care posed by:

- variation in demand for A&E services
- variation in patients' nursing needs
- departmental crowding (as agreed locally).

1.1.7 Determine the level of risk at which action should be taken locally, taking into account the size of the A&E department and the availability of neighbouring services.

1.1.8 Ensure that escalation plans contain actions to address unexpected variation in demand for A&E services and patients' nursing needs in the A&E department. These may include:

- addressing patient flow issues throughout the organisation
- moving patients out of the A&E department to an appropriate alternative location (previously agreed by the board)
- sourcing extra staff (for example, using an on-call system)
- collaborating with other organisations to address departmental crowding. These organisations might include: mental health trusts; ambulance trusts; primary and community services; social care services; commissioners.

1.1.9 Ensure that escalation plans also contain actions to:

- make the A&E department safe if departmental crowding cannot be resolved
- respond to deficits in A&E nursing staff without compromising patient care in other parts of the hospital.

1.1.10 Develop escalation plans in collaboration with A&E registered nurses who are responsible for determining nursing staff requirements at A&E departmental level, and other organisations where necessary to facilitate a whole system response.

1.1.11 Ensure that the director of nursing or chief nurse (or delegated accountable staff) approves actions within escalation plans related to A&E nursing staff.

Monitoring the adequacy of A&E nursing staff establishments

1.1.12 Review the A&E nursing staff establishment at board level at least every 6 months, ensuring that the review includes analysis of:

- data on variation in demand for A&E services
- nursing red flag events (see box 3)
- safe nursing indicators (see box 4 and section 7).

1.1.13 Review the A&E nursing staff establishment at board level more often than every 6 months if the director of nursing or chief nurse (or delegated accountable staff) identifies that this needed. For example, if:

- staff absenteeism is increasing
- departmental crowding is increasing
- A&E nursing staff deficits occur frequently
- the implementation of escalation plans is increasing
- local services are reconfigured and this may impact on demand for A&E services.

1.1.14 Change the A&E nursing staff establishment if the review indicates this is needed.

1.1.15 Discuss the A&E nursing staff establishment with commissioners at least every 12 months (this may be part of contract reviews).

Monitoring and responding to changes

1.1.16 Ensure that A&E departments have procedures in place for monitoring and responding to unexpected changes in A&E nursing staff requirements throughout a shift.

1.1.17 Ensure that there are procedures in place for:

- informing members of staff, patients, family members and carers what nursing red flag events are (see box 3) (for example, by publicising them in public spaces and staff rooms): Consider the red flag events that are most relevant to patients and staff, and tailor the information and its location accordingly.
- enabling members of staff, patients, family members and carers to report nursing red flag events (see box 3) to the A&E registered nurse in charge of the shift
- monitoring and responding to nursing red flag events (see box 3).

1.1.18 Ensure that responses to nursing red flag events and unexpected changes in A&E nursing staff requirements do not cause nursing red flag events in other parts of the A&E department or hospital.

Promoting staff training, education and time for indirect care activities

1.1.19 Ensure that all A&E nursing staff receive training to deliver the care they are required to provide, including:

- specialty specific continuing professional development
- statutory and mandatory training
- training in providing care for specific population groups such as children, older people, people with learning disabilities, sensory impairment, mental health needs (including dementia) or complex psychosocial needs.

1.1.20 Ensure that A&E registered nurses have time allocated for training and mentoring other nursing staff such as:

- student nurses
- newly qualified nurses
- nurses who are returning to practice
- nurses who have qualified oversees
- non-registered nursing staff.

1.1.21 Ensure that A&E nursing staff have time allocated for:

- supervising and assessing the competencies of non- registered nursing staff
- taking part in indirect care activities such as clinical governance activities, safeguarding and liaison with other professionals.

1.1.22 Ensure that A&E registered nurses have time allocated for activities related to setting the A&E nursing staff establishment, and assessing the nursing staff needed for each shift, including collecting and analysing data.

1.1.23 Involve A&E nursing staff in developing and maintaining nursing staff policies and governance, including escalation planning.

1.1.24 Facilitate and promote multidisciplinary working in the A&E department.

Evidence summary

The evidence review addressed 5 review questions that aimed to explore what factors (staffing, patient, environmental and organisational) should be used to determine A&E nursing staff requirements. For organisational factors, 1 study with a weak quality rating met the inclusion criteria. No economic evidence was identified.

The included retrospective observational study used statistical modelling to explore the impact of changing organisational variables (such as annual average of nurses, physicians and physical bed capacity reported by the hospital) on patient care time. The study found that a combined increase in the number of nurses, physical bed capacity and the number of doctors at an organisational level, was associated with a reduction in the average waiting time of patients in ED. The study was conducted in Australia and the quality was weak for internal and moderate for external validity.

Committee considerations

Consideration of the included evidence

The committee discussed the included study and noted that the study counted the number of doctors within the hospital rather than within the A&E department specifically and did not take into account the time of day. It was also acknowledged that studies conducted in Australia may be more similar to UK based practice compared with other countries. Overall, the committee agreed that there was a lack of evidence directly examining the association between organisational factors and serious incidents such as death or medication errors.

Minimum functions of A&E departments

The committee discussed the minimum functions that all A&E departments should be capable of carrying out. These functions included delivery of care needed, the provision of triage, resuscitation and paediatric A&E services, provision of staff to cover all nursing roles (including coordination and oversight of each shift) and the provision of specialist input based on the needs of the patient for subgroups of the population such as children, older adults and people with learning difficulties. The committee specifically discussed the need for A&E departments to the have at least 1 A&E nurse on each shift with the necessary competencies in caring for children and young people. Although the committee recognised that some departments may need a specialist registered children's nurse, it was also recognised that safe care could be delivered by staff with minimum competencies in relation to caring for children and young people as set out by the Royal College of Paediatrics and Child Health, Royal College of Nursing and Skills for Health.

Variation in demand for A&E services

The committee also discussed variation in the demand for A&E services. It was agreed that some variation was predictable and staffing requirements could be adjusted for example to reflect an increased demand after bank holidays. However, it was also noted that some variation was unexpected (for example due to unplanned staff absence, unexpected fluctuations in patient demand or nursing needs or departmental crowding) and staffing levels would need to be adjusted quickly to meet this demand. The committee agreed that escalation procedures at an organisational level should be in place to enable A&E departments to meet unexpected increases in demand for services.

Crowding

The committee discussed the issue of crowding in A&E departments in detail. In particular it was noted that crowding is common in A&E departments in the UK and this is often due to problems with discharge from A&E or transfers to other wards. Furthermore, it was noted that most of the time crowding may be linked to poor outcomes such as increased waiting times and missed care.

Escalation plans

The committee agreed that escalation policies should be in place to address any risks to patient care which may be a result of variation in patient demand or nursing needs and to enable A&E departments to cope with crowding. It was recognised that these procedures may be difficult to translate into practice and therefore should be agreed locally in order to manage local service configurations and needs. The group agreed that all escalation plans should include details around the level of risk at which action should be taken, although it was recognised that this may vary locally depending on the size of the A&E and the availability of neighbouring services. The committee also discussed that escalation procedures should not impact on patients' care in other parts of the hospital. For example using staff from other areas within the hospital may not be appropriate as they may not have the skills and experience required for A&E settings. In addition this approach may not be sufficient if appropriate staff are not available when an increase in demand is observed. Therefore the committee agreed that escalation plans should include a number of options that could be used and different levels of escalation. People should be able to use escalation plans progressively because in practice, actions may not always be successful in coping with the additional demand. The committee also emphasised the importance of a whole system response to successfully implement actions to address crowding. The committee agreed that any escalation plan should be developed in collaboration with A&E registered nurses who are responsible for determining nursing staffing requirements. Other organisations such as mental health trusts, ambulances trusts, primary and community services, social care services and commissioners should also be included when developing the escalation plan.

The committee felt the use of escalation plans may have some additional cost implications for some organisations (such as provision of additional staffing) but agreed that it is a necessary requirement for safe care to be delivered in A&E settings.

Accountability for implementation

The committee agreed that it was of upmost importance to ensure that senior managers, board and commissioners are accountable for staffing decisions in order to support the implementation of the recommendations. As part of this discussion, the group agreed the implementation of some escalation plans may be difficult and accepted that some plans relying on additional temporary staffing may be costly to implement but would be needed to ensure safe care for all patients. The committee also agreed that the organisational context for A&E nursing staff is the same as the organisational context for nurse staffing in adult inpatient wards in acute hospitals. Therefore the committee extrapolated from the evidence and recommendations that were part of the organisational recommendations that were developed for the safe staffing for nursing in adult inpatient wards in acute hospitals. The committee reviewed each of the recommendations that were developed for the acute adult inpatient guideline. Recommendations that were based on evidence that was not relevant to A&E nursing staff were removed, and recommendations that could be adapted for A&E nursing staff were amended and used.

Equality issues

The committee discussed equality issues that may impact on the recommendations. Specifically, it was agreed that children and young people who attend A&E require nurses who have a minimum level of knowledge, skill and competence in both emergency nursing skills and in the care of children and young people. Similarly, it was agreed that additional training might be needed for nursing staff who provide care for older people, people with learning disabilities, sensory impairment, mental health needs (including dementia) or complex psychosocial needs, and in addressing language barriers.

The committee emphasised the need to include consideration of additional nursing activities, and time needed for nursing activities for activities for children, older people, people with learning disabilities, sensory impairment, mental health needs (including dementia) and complex psychosocial needs when estimating the nursing staff requirements.

Summary of link to recommendation area

Focus on patient care (recommendation 1.1.1)

- Overall, the committee reviewed the recommendation on patient care that was used in the safe staffing guideline for nursing in adult inpatient wards in acute hospitals and agreed that this would also be relevant to A&E settings.

Accountability for A&E nursing staff establishments (recommendations 1.1.2 to 1.1.5)

- Overall, the committee reviewed organisational recommendations that were used in the safe staffing guideline for nursing in adult inpatient wards in acute hospitals and agreed that these would also be relevant to A&E settings. The committee made specific recommendations for the minimum functions that all

A&E departments should be able to carry out.

- The committee agreed that the specific recommendations were unlikely to have a substantial cost impact and felt the recommendations should be easily implemented.

Organisational level actions to enable A&E responsiveness (recommendations 1.1.6 to 1.1.11)

- Overall, one included study showed that increased numbers of doctors, nurses and physical bed capacity in hospitals may be associated with a reduction in the average waiting time for patients.
- The committee agreed that specific recommendations on flexibility in A&E nursing staff provision and the use of escalation procedures were important to ensure departments were able to cope with unplanned variation in demand. In addition it was agreed that escalation plans should be determined locally to ensure they are specific to local service configurations and reflect local need. The committee made a specific recommendation to ensure escalation plans contained several possible actions and levels of escalation. This was considered important as not all actions taken to cope with increased demand will be successful in practice.
- The committee agreed that developing procedures to enable A&E responsiveness may have additional costs to and felt the recommendations may be challenging to implement in some organisations.

Monitor adequacy of A&E nursing staff establishments (recommendations 1.1.12 to 1.1.15) and monitoring and responding to changes (recommendations 1.1.16 and 1.1.18)

- Specific recommendations were made to ensure nursing red flags, indicators, variations in A&E demand and feedback from other organisations involved in whole system responses to A&E crowding were included in the board's review of the nursing staff establishment. This was because the committee felt it was important to identify all possible risks to patient safety as early as possible.
- A specific recommendation to review A&E nursing staff establishments more frequently than 6 monthly was made to ensure that if needed, staffing requirements are amended to reflect changing local demands.
- The committee agreed that monitoring adequacy of A&E nursing staffing establishments on a 6 monthly basis may have a small increase in cost and may require development to develop robust systems for implementation.

Promote staff training and education (recommendations 1.1.19 and 1.1.24)

- Overall the committee felt that recommendations on training and education that were used in the safe staffing guideline for nursing in adult inpatient wards in acute hospitals were also relevant for A&E nursing staff.
- The committee agreed that the specific recommendations were unlikely to have a substantial cost impact and felt the recommendations should be

easily implemented.

2 Setting the A&E nursing staff establishment

Recommendations

1.2.1 Determine the nursing staff establishment for the A&E department at least every 6 months.

1.2.2 Use a systematic process to calculate the A&E nursing staff establishment. The process (or parts of the process) could be supported by a NICE endorsed toolkit (if available). The process should contain the following components:

- Use historical data about the nursing care needs of people who have attended A&E over a sample period (for example 7 days)
- Estimate the total number of A&E nursing care hours needed over the sample period. This should take into account: patient factors, for example acuity and dependency (see box 1 for other examples); time to undertake patient care activities (see box 2 for examples).
- Divide the total number of A&E nursing care hours by the number of patient attendances in the sample time period to determine the average number of A&E nursing care hours needed per person attending A&E.
- Use historical data about demand for A&E services over at least the past 2 years to predict the likely demand for A&E services in the next 6 months.
- Multiply the predicted number of A&E attendances over the next 6 months by the average number of nursing care hours needed per patient attendance to determine the predicted total number of A&E nursing care hours needed over the next 6 months.
- From the total predicted number of A&E nursing care hours, identify the hours of nursing time and skill mix needed to deliver the patient care activities that are required. Take into account the following: environmental factors, for example seasonal variance (see box 1 for other examples); staffing factors, for example the availability of other members of the A&E multidisciplinary team and the activities that can be provided by them (see box 1 for other examples); the patient care activities that can be safely delegated to trained and competent non-registered nursing staff; unpredictable variation in attendances. Increase the predicted number of A&E nursing care hours to ensure that the need for higher than expected actual nursing care hours can be met at least 85% of the time.
- Allow for the following: meeting the following ratios: 1 registered nurse to 1 cubicle in triage, 1 registered nurse to 4 cubicles in majors, 1 registered nurse to 2 cubicles in the resuscitation area; meeting nurse-to-patient ratios for the following situations when needed: major trauma (2 registered nurses to 1 patient), cardiac arrest (2 registered nurses to 1 patient), priority ambulance calls (1 registered nurse to 1 patient); the locally defined rate of uplift (for example, to allow for annual leave, maternity leave, paternity leave, study leave and sickness absence).
- Divide the total number of A&E nursing care hours by 26 to give the average number of A&E nursing care hours needed per week over the next 6 months.

- Divide the weekly average by the number of hours for a full- time working week to determine the number of whole-time equivalents needed for the A&E nursing staff establishment over the next 6 months.
- Convert the number of whole-time equivalents into the annual A&E nursing staff establishment.

See figure 1 for a summary of this process.

1.2.3 Use professional judgement at each stage of the calculation and when checking the calculations for the A&E nursing staff establishment.

1.2.4 Base the A&E nursing staff roster on the A&E nursing staff establishment calculations, taking into account the following:

- Predicted variation in demand for A&E services according to time of day and day of week. Consider staggering shift start times of individual nursing staff to correspond with peaks in demand.
- Enabling family liaison to be provided for patients, family members and carers receiving life-changing news.
- Ensuring that 1 band 7 (or equivalent pay band) registered nurse is included on every shift at all times to lead, supervise and oversee the shift.

Evidence summary

The evidence review addressed 3 review questions that aimed to

explore what factors (staffing, patient and environmental) should be used to determine A&E nursing staff requirements. The following studies were included;

- Staffing factors (2 studies included) - one study showed that the introduction of a specialist psychiatric nurse service was associated with more appropriate referrals but there was no impact on waiting times, repeat attendances or satisfaction. One further study showed that staff absenteeism was increased when fewer nurses were scheduled for a shift. Both studies had a weak quality rating.
- Patient factors (1 study included) - one study showed that as nursing workload increases, nurses spend the longest amount of time providing indirect patient care. This study was rated weak for quality.
- Environmental factors (0 studies) - no evidence was identified

In addition there was a further review question that aimed to identify the method that should be used to determine nursing staff requirements. For this question, 2 studies were identified that met the inclusion criteria. There was no strong evidence to support a specific toolkit or approach to determine nursing staff requirement in A&E. Two studies were identified; one UK based study found the Jones Dependency Tool was reliable for assessing patient dependency and could be used for calculating nursing workload in A&E. There was a lack of information on the reliability or validity of the tools in the other study to ascertain their utility or quality in practice. Generally, the quality of the included studies for these review questions was weak.

No economic studies were identified. The de novo economic analysis developed for this guideline showed that:

- Low nursing skill mix and low staff numbers will have a negative impact on outcomes (more patients leaving without being seen, higher average duration in A&E departments and higher occupancy).
- Variations in attendance volumes and spikes in attendance volume in A&E department can cause significant effects on outcomes.
- Moving towards a higher average skill mix of nurses might improve some patient and process outcomes.

An additional analysis was conducted during the consultation phase of the draft guideline exploring the impact of using standard deviation of demand in type 1 A&E units in England (draft recommendation 1.2.2). The analysis found that using a historical average (based on attendance) plus 1 or 2 standard deviations to estimate the expected attendances in the future could substantially reduce the number of days where actual attendances are underestimated using a historic average alone. However, the analysis also found that this might also lead to substantial over-estimation of attendance.

Committee considerations

Consideration of the included evidence

The committee agreed that there was a lack of evidence directly examining the association between nursing staff and serious incidents such as death or medication errors. Therefore it is difficult to establish whether the use of particular factors to determine staffing requirements has an impact on safety.

The committee discussed the evidence relating to patient, environmental, staffing and organisational factors that should be used to determine nursing staff requirements. Overall, the evidence was difficult to interpret and findings were often unclear as some studies showed that particular factors were significantly related to A&E nursing staff, whereas other studies found the same factors were not significantly related to A&E nursing staff. In particular the committee discussed the following limitations of the evidence:

- Lack of data on rare events: many of the important safety outcomes that occur in A&E settings, such as death, are relatively rare. A very large sample would need to be examined to detect statistical differences in death rates according to variance in staffing numbers. This means that if a study is too small, it is difficult to establish if the lack of a statistically significant finding is because there is no relationship, or because the sample was too small to observe the relationship.
- Endogeneity: This problem can occur when an outcome is partly determined by an explanatory factor. For example, when adverse outcomes are felt more likely to happen in a particular area of care, more qualified staff might be allocated to that area of care. This means that the techniques used in research to analyse the data can over- or under- estimate the impact of a factor (such as staffing) on an outcome (such as adverse effects).

- Multicolinearity: This problem is caused when two or more explanatory factors being examined are highly correlated meaning that one can be closely predicted from the other (e.g. staffing and clinical risk, as it is likely that more staff will be required for higher risk cases).

Consideration of economic evidence

The committee carefully considered the implications of the de novo economic analysis produced for this guideline. The committee agreed that the overall model structure was representative of a typical A&E department. The committee agreed with the findings that variations in attendance volumes and that spikes in attendance volume in A&E department can cause significant effects on outcomes and felt that variation in attendances should be considered carefully in establishment planning and when considering responsiveness to patient demand. The committee agreed that low staffing levels and a lower skilled workforce would likely result in worse outcomes (longer average duration in A&E, number of patients per nursing staff, average occupancy, and proportion of patient who leave without being seen)

The committee debated the strength of the association between staff skill mix and pay (pay bands were used a proxy for productivity on the economic analysis). The committee agreed that using nurse pay bands as a proxy measure of a nurse's productivity and skills may be inaccurate because nurses on different bands (such as a band 7 nurse) would undertake different tasks and activities compared to nurses on other pay bands. The type of activities and tasks undertaken by nurses on different pay band will also be determined locally. However, the committee agreed, that more experienced and skilled nurses would likely be paid on higher bands, and thus more productive if they undertook similar activities and tasks. In conclusion, there the committee agreed that there was likely to be some positive relationship between pay bands and productivity of nurses and therefore skill mix and outcomes. However, the committee, were unable to determine which factor (skill mix of the nursing staff or the total staffing numbers) would be the most important contributor to changes in outcomes using the economic analysis results.

The committee agreed that given the limitations of the evidence, the results of studies included in the evidence reviews and the economic analysis alone could be misleading, and should be treated with caution. Thus, the committee used its knowledge and experience to list the factors that should be considered when determining the number of A&E nursing staff needed (see box 2 of the guideline).

Total nursing hours

The committee discussed the importance of using nursing hours required rather than the total number of patients. This is because the total number of patients does not accurately reflect the time spent on nursing activities, for example for patients with high dependency and acuity, the level of care provided is likely to be high and require increased nursing time. In addition, the number of patients does not take into account patients who have a long length of stay. Therefore, it was agreed that total nursing hours should be used for all staffing calculations.

Issues with current practice

The committee discussed how staffing requirements are currently determined and highlighted that staffing to the average patient attendance and profile was not adequate to meet demands. Specifically, staffing levels may not meet demand approximately almost half of the time using the historical average. This issue is exacerbated by the lack of flexibility available for A&E departments, as using staff from other departments may not be appropriate as specific skills are required. The committee highlighted that it would be important to take this into account when calculating staffing requirement.

Methods/approach to determine staffing requirement

Although no evidence was identified that assessed the use, reliability and validity of any specific toolkits, the committee discussed the BEST tool. This tool is often used in practice to determine nursing staff levels in A&E settings. However, the committee acknowledged that there was no evidence identified to show that the use of BEST leads to an improvement in the safety or quality of care that is provided by nurses in A&E. Therefore, the committee did not explicitly recommend the use of BEST.

The committee also discussed that systematic processes should be used to help inform decisions about the number and skill mix of nurses and healthcare assistants needed. The committee acknowledged that there is a compromise between objectivity of systematic approaches compared to the subjectivity of professional judgement and agreed that it would be inappropriate to rely on professional judgement alone or decision support toolkits alone. The committee discussed the time taken for senior nurses to use a systematic process and agreed that additional training and time would be needed to use a systematic approach. Therefore, the committee agreed that it should recommend use of a systematic process that could be automated by a toolkit, and that the results of these approaches should be checked using professional judgment.

One UK based study found the Jones Dependency Tool (JDT) was reliable for assessing patient dependency and could be used for calculating nursing workload in A&E. The committee agreed that this tool assessed patient dependency (including additional nursing needs for people with additional needs such as people with mental health problems) and was a good indicator of actual nursing hours required. It was also agreed that the Jones Dependency Tool was currently in use across A&E departments in the UK to determine nursing workload. The committee agreed that this tool was an example of a validated patient dependency tool that could be used to assess patient factors when determining nursing requirements.

Calculation for nursing staff establishment

The details of the calculation that should be carried out to determine staff establishment were also discussed. The committee agreed on a systematic process to calculate the A&E nursing staff establishment. It was agreed that nursing care tasks and the associated time to carry out these tasks as well as patient, environmental and staffing factors would impact on average weekly nursing workload. The committee agreed on key nursing activities and timings, and recommended that the organisations should be responsible for estimating the average number of A&E nursing care hours needed over a sample period (for example 7 days) for a patient. The committee suggested the need for historical data to predict the likely nursing hours for the subsequent 6 months was discussed. Using the historical demand data, and the key activities the expected number of A&E nursing care hours can be estimated and from that the whole time equivalents needed for the establishment.

In order to address the drawbacks of staffing to the average patient attendance and profile, it was agreed to take in to account the unpredictable variation in attendances, by staffing for above the expected number of attendances. The committee were cautious about the implication of this recommendation, recognising the balance between being able to meet unexpected demand on most occasions, and the desire to avoid persistent overstaffing. The additional analysis conducted during the consultation phase suggested that increasing expected attendance numbers by for example adding 1 standard deviation to the mean number of historical attendances, should result in excess demand (that is, demand unable to be met by planned staffing levels) only occurring approximately 15% of the time. It was however noted that using averages and standard deviation was not the only way to do this, and that the important outcome was ensuring that higher than expected demand could be met most of the time. This would ensure that there would be sufficient staff to deal with higher than expected demand on the majority of occasions when this occurs. The group agreed that the calculated staff establishment should be compared to minimum staffing ratios using professional judgement to ensure that these can be met and are appropriate.

Staffing ratios

The committee discussed that in clinical practice, general staffing ratios were often implemented in specific departments within A&E settings. In particular there was agreement that due to the high level of dependency and acuity, patients in major trauma and cardiac arrest would require a minimum of 2 registered nurses to provide care for each individual patient. Similarly, it was agreed that priority ambulance calls would require one registered nurse providing care for each individual patient. The group also agreed that use of minimum ratios for registered nurse to cubicles would be appropriate. Specifically, 1 registered nurse to 1 cubicle in triage, 1 registered nurse to 4 cubicles in majors and 1 registered nurse to 2 cubicles in the resuscitation area were agreed as the minimum staffing requirements.

The committee considered making recommendations for minimum ratios on the number of registered nurses to cubicles in minors. The committee highlighted variable case-mix of people in minors in each organisation, and suggested that it may be difficult and inappropriate to set a minimum staffing ratio in minors. The committee also considered specific minimum ratios on occasions where families would receive life changing news. It felt that while this was an important part of a nurse's role and central to meeting the needs of patients, family members and carers, it would not have a substantial safety implication and so no minimum ratio was recommended. It did however recommend that the staffing level should enable family liaison to be provided to patients, family members and carers.

Overall, it was agreed that these ratios should be used as a minimum to ensure that staff from other areas were not used to cover these situations as this would have a knock on effect on other areas. However, it was also acknowledged that these ratios are not fixed as additional staff may be needed. For example, more than 2 nurses may be required for one patient undergoing resuscitation and these nurses will work in other areas when they are not required in resuscitation. The group also strongly supported a separate recommendation for at least one band 7 registered nurse on each shift. It was agreed that this role provided leadership in the department and in the committee's experience was associated with higher levels of safe care.

Patient factors

The committee discussed patient factors that may be important when determining staffing levels. The evidence showed that as nursing workload increases, nurses spend the longest amount of time providing indirect patient care. The committee questioned the definitions of direct and indirect care and whether these activities would be related to nurse productivity in practice. The committee agreed that in clinical practice there are no established standards or guidelines for the proportion of nursing time that is spent on activities to provide patient care. The committee agreed that patients who have more needs (or higher dependency on others) would require more nursing time. The group discussed the Jones Dependency Tool which is used to determine patient dependency and agreed that this tool was appropriate for use within A&E. In addition to patient dependency the committee also recognised that patient demographics, for example the provision of additional support to patients whose first language is not English, would impact on staffing requirements. Specifically, the timely access and use of translators in A&E settings may impact on nursing requirements. The committee also discussed patient acuity and the nursing activities associated with different levels of acuity. The group differentiated between nursing activities required to address acute care needs that are immediate and need to be carried out in the A&E department compared with needs that are ongoing and normally addressed when patients are admitted onto wards for longer-term care. It was agreed that while the A&E department is crowded (for example when there are problems with discharge and transfers to appropriate wards), A&E nursing staff are required to provide both immediate and longer term care. In addition, the committee discussed other factors such as the casemix of patients (for example the proportion of patients with high dependency and acuity would have an important impact on nursing staff requirements) who attend A&E and the amount of patient support provided.

Environmental factors

There was no evidence identified for environmental factors. The committee discussed that the location of other related units (for example diagnostic imaging) or inpatient wards were important in determining nursing staff requirements. This is because transfers are usually carried out by nursing staff and the time taken to physically transfer patients to units that are located further away from A&E results in less nursing time spent in A&E settings. It was also recognised that transferring patients to another hospital often has a bigger impact on staffing compared with transfers within the same hospital. For example, nursing support may be needed to undertake external transfers and this would significantly reduce the nursing time spent on A&E. The group also discussed the availability of other neighbouring services and the impact this may have on staffing needs. Specifically, the existence of mental health services or places of safety close to A&E may have a large impact on both the casemix of patients attending A&E and staffing requirements (for example nurses with experience in mental health settings). The committee also discussed the layout of A&E and agreed that this may also impact on nursing workload for example if there were several side rooms and patients cannot be directly observed from these rooms. Finally, the group also discussed the importance of planned events (for example new year, marathons and music festivals). It was noted that people attending these events will have different demographics and needs but will impact on staffing requirements. For instance some A&E departments may cancel annual leave to ensure adequate nursing staff during planned events. Similarly, the group discussed seasonal variation and agreed that this would also impact on staffing needs if for example higher proportions of older adults attend A&E during the winter months.

Staffing factors

The evidence showed that the introduction of a psychiatric nurse was associated with appropriate referral but had no impact on other outcomes. The committee discussed this study and questioned whether the mental health nurse was part of the A&E nursing establishment. It was agreed that in practice, nurses with specialist skills (for example nurses with experience in mental health or paediatric settings) are often needed in A&E settings due to the wide ranging demographics of attending patients. When these staff are not available within the A&E nursing establishment, access to specialist input would need to take place through an alternative route. The committee agreed that the proportion of staff with specialist skills would be an important factor to consider when determining staffing need. A further study showed that staff absenteeism was increased when fewer nurses were scheduled for a shift. The committee discussed this study and noted that absenteeism may be related to increased stress and workload. The group also discussed that the amount of nursing activities other than direct patient can also have an important impact on determining nursing need. Specifically, it was agreed that transferring patients, communicating with relatives and carers and providing training and mentoring for student nurses would all require nursing time.

Summary of link to recommendation area

Setting the A&E nursing staff requirements (recommendations 1.2.1 to 1.2.4)

- No evidence was identified that assessed the use, reliability and validity of any specific toolkits to calculate staffing requirements. However, one UK based study found the Jones Dependency Tool was reliable for assessing patient dependency.
- The committee made a specific recommendation for the use of a systematic approach as it was agreed that this would be an appropriate trade-off between subjective bias and the consistency and validity of a systematic approach. The key steps for determining the staffing establishment were agreed so that there is enough staff to deliver safe care. It was also agreed that any calculations should be checked using professional judgement and be compared against minimum staffing ratios for specific areas where patient acuity and dependency are particularly high.
- The committee agreed the recommendations would have a small additional cost and implementation impact for larger A&E departments, however it acknowledged that staffing costs may be substantially increase in smaller units. The use of a systematic approach would have a small additional cost due to additional training and time needed to use any toolkit.

Box 1 factors to consider when determining A&E nursing staff requirements

Patient factors

- Overall, one included study for patient factors showed that as nursing workload increases, nurses spend the longest amount of time providing indirect patient care.
- The committee made specific reference to patient factors that are likely to result in increased nursing time. For example, higher patient acuity and dependency may result in increased numbers and longer duration of activities that are required to provide safe care.

Environmental factors

- No evidence was identified for environmental factors.
- The committee made specific reference to environmental factors that are likely to result in increased nursing time or increased demand. For example, transfers to other units that are located further away from the A&E department would result in increased nursing time. Similarly, during winter there may be increased demand for services from older adults.

Staffing factors

- Overall, two studies were included; one showed that the introduction of a specialist psychiatric nurse was associated with more appropriate referrals but had no impact on other outcomes. The other study found staff absenteeism was higher when fewer nurses were scheduled for a shift. These findings were likely to be confounded by stress and workload.
- The committee made specific reference to staffing factors that are likely to result in increased nursing time. For example training and mentoring student nurses require additional time during shifts.

3 Assessing differences in the number and skill mix of A&E nursing staff needed and number of A&E nursing staff available (recommendations 1.3.1 –1.3.5) and Monitoring and evaluating A&E nursing staff establishments (recommendations 1.4.1 –1.4.4)

Recommendations

Assessing differences in the number and skill mix of A&E nursing staff needed and number of A&E nursing staff available

1.3.1 Assess differences between the A&E nursing staff needed and the number of staff available at the beginning of every shift, for the current and following shift, using professional judgement. This assessment could be facilitated by using an evidence-based toolkit endorsed by NICE. Take into account the patient, staffing and environmental factors outlined in box 1.

1.3.2 Reassess and record differences between the A&E nursing staff needed and the number of staff available during a shift when:

- there is unexpected variation in demand for A&E services or patients' nursing needs
- there is unplanned staff absence during the shift
- patients are spending longer than needed in the A&E department
- patients need extra support, specialist input or continuous nursing
- a nursing red flag event has occurred (see box 3).

1.3.3 Follow escalation plans if the number of A&E nursing staff available is different from the number of staff needed (see recommendation 1.1.8).

1.3.4 Notify the registered nurse in charge of the shift if a nursing red flag event occurs (see box 3 for examples). The registered nurse in charge should determine whether A&E nursing staff levels are the cause of the event, and the action that needs to be taken.

1.3.5 Record nursing red flag events (including any locally agreed nursing red flag events) for reviewing, if they are assessed to be linked to A&E nursing staff levels.

Monitoring and evaluating A&E nursing staff establishments

1.4.1 Monitor whether the A&E nursing staff establishment adequately meets patients' nursing needs using the safe nursing indicators in box 4 (and any locally agreed A&E safe nursing indicators). Consider continuous data collection of these safe nursing indicators (using data already routinely collected locally where available) and analyse the results. Section 7 gives further guidance on these indicators.

1.4.2 Compare the results of the safe nursing indicators with previous results at least every 6 months.

1.4.3 Analyse reported nursing red flag events (see box 3) and any additional locally agreed nursing red flag events and the action taken in response, if the events were assessed to be linked to A&E nursing staff levels.

1.4.4 Review the adequacy of the A&E nursing staff establishment (see recommendations 1.1.12 and 1.1.13) if indicated by the analysis of nursing red flag events, safe nursing indicators or differences between the number of A&E nursing staff needed and those available.

Evidence summary

The evidence review addressed one review question which explored the association between safe staffing and patient outcomes. 9 studies were included for this review question. Generally, the quality of the included studies was weak with the exception of one relatively strong retrospective observational study (Daniel 2012) which found a weak positive relationship between staffing proportions in the ED and patient satisfaction with nursing care. Overall, the evidence was conflicting at times but tended to show that lower nursing staff levels were associated with poor outcomes, these are summarised below;

- lower nursing staff was also associated with higher numbers of patients leaving without being seen and increased emergency department care time.
- there was conflicting evidence for the association between nursing staff levels and patient waiting times and time to antibiotics
- no association was found between staffing levels and medication errors or rate of aspirin administration following a cardiac event

No economic studies were identified. The de novo economic analysis developed for this guideline showed that:

- Low nursing skill mix and low staff numbers will have a negative impact on outcomes (more patients leaving without being seen, higher average duration in A&E departments and higher occupancy).
- There was no association trend between low nursing skill mix and low staff numbers with death, and a weak trend for patient leaving without being seen.

Committee considerations

Consideration of the included evidence

The committee agreed that the included evidence was conflicting but showed a general trend that lower nursing staff levels were associated with poor outcomes. The group discussed these findings with reference to the methodological limitations of evidence (see evidence to recommendations table for setting the A&E nursing staff establishment). It was also noted that there was a lack of evidence for important safety outcomes such as medication errors, death and other serious events.

Nursing deficits

The committee discussed that it would be important to identify when the number of A&E nursing staff available is lower than nursing staff requirements. It was agreed that this may happen when there is an unplanned increase in demand for services, staff sickness and crowding in the A&E department. It was also agreed that it would be important to carry out this assessment when safety incidents occur as this may be due to staff shortages.

The committee also emphasised that escalation plans should be implemented when nursing deficits have been identified (see evidence to recommendations for organisational strategy). It was discussed that these plans could be explored at a local level to facilitate innovative and flexible approaches. However the committee suggested that possible actions included the use of on- call staff, moving patient out of the A&E department and safely delegating activities to other staff with the appropriate skills and experience.

Red flags and indicators

The committee agreed that it was important that organisations should be alerted to potential safety issues so that appropriate responses can be actioned. This requires monitoring of events that can alert staff about harm that could be occurring, or is likely to occur because the number of available nursing staff is too low. This requires the use of both red flags which require immediate action if they occur, and indicators of safe staffing that can be monitored over a period of time to check if the planned nursing establishment is sufficient to provide safe care.

The format and delivery of the information about red flags should be accessible to all people in accident and emergency departments. The committee felt that organisations should check to see if this information and how to report them is clearly understood by people.

The committee agreed that a list of red flags and indicators should be developed but it was not confident in the findings of the evidence review and noted that some important outcomes were not reported. The evidence from the economic analysis and the knowledge and experience of the committee were also used to inform decision making for red flags and indicators. This information was used to develop a list of red flags (see box 3 in the guideline) and indicators (see box 4 in the guideline).

Specifically, the results of the economic analysis suggested that spikes in A&E attendance and average duration in A&E departments, showed relatively consistent associations with lower staffing levels and skill mixes. The committee felt that these may be good indicators to use. In contrast, the results examining the association between death and staffing levels or skill mix were considered to be inconsistent. This may have been due to the small numbers of reported incidents in the evidence and the included data sources. The committee also highlighted the lack of primary research investigating the association of death with staffing levels or skill mix and therefore agreed that it was not appropriate to use death as an indicator for safe staffing. The committee also considered the outcome of patients leaving the accident and emergency department without being seen. The economic analysis results did not show a clear trend and were considered to be inconsistent in some scenarios, however, the evidence from primary studies and the overall results demonstrated that lower skill mixes and staffing levels were associated with more patients leaving without being seen. Therefore, the committee felt that patients leaving without being seen would be an appropriate indicator for safe staffing.

When red flags have taken place, the committee agreed that the numbers of nursing staff available, the red flags and the response should be recorded so that they can be used for future planning, alongside regular reviewing of safe nursing staffing indicators.

Monitoring and evaluating A&E nursing staff establishments

The committee discussed monitoring of A&E nursing establishments and agreed that these should be regular enough to identify potential problems. The committee acknowledged the small added administrative burden associated with monitoring and evaluation (of red flags and indicators) but felt it was necessary to prevent safety incidents in the future and could potentially be cost- saving in the long run. Overall, it was agreed that 6 monthly monitoring would be the minimum required but more regular monitoring may be carried out.

Summary of link to recommendation area

Assessing differences in the numbers and skill mix of A&E nursing staff needed and number of A&E nursing staff available (recommendations 1.3.1 to 1.3.5)

- The evidence was conflicting at times but tended to show that lower nursing staff levels were associated with poor outcomes such as leaving without being seen. It is noted that there was no significant association with some clinical outcomes such as medication errors.
- The committee made specific recommendations on assessing nurse deficits using professional judgement and emphasised the importance of implementing possible actions as part of the escalation plan to prevent unsafe care. The use of a decision support toolkit endorsed by NICE was specifically recommended to facilitate this assessment.
- The committee acknowledged the small added administrative burden associated with red flag recording but felt it was necessary to prevent safety

incidents in the future.

Monitoring and evaluating A&E nursing staff establishments (recommendations 1.4.1 to 1.4.4)

- The committee made a specific recommendation to compare safe nursing indicators with previous results at least 6 monthly to ensure safe care is being delivered

Box 3 Nursing red flag events

- The committee specifically referenced 7 red flags which should prompt immediate review of staffing levels. These were agreed based on trends from the evidence review, economic modelling and the knowledge and experience of the committee

Box 4 A&E Safe nursing indicators

- The committee specifically referenced safe nursing indicators for patient experience, clinical quality, staff reported and staff establishment which should be monitored longer term to monitor potential issues with staffing levels. These were agreed based on trends from the evidence review and health economic modelling and the knowledge and experience of the committee