Children and Young People's Work Stream: Evidence Review

Author: Dr Keith Hurst, keithhurst.research@yahoo.co.uk, December 2016

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Section 1: Main Summary.

1. This report has six sections. Section 1 précis Sections 2 to 6.

Section 2 – Introduction, background and context

2. Owing to the NHS workforce's size and cost, workforce planning and development (WP&D) is a crucial strategic and operational issue. However, some commentators in the literature aren't enamoured by NHS WP&D efforts, particularly in children and young people's (C&YP) services.
3. Staff to bed ratios in C&YP wards vary inexplicably and seem unrelated to patient dependency/acuity, which questions workload-based method validity and reliability, and how they are used. Consequently, workforce planners face significant methodological and operational challenges.
4. **Recommendation 1:** C&YP ward managers should justify any deviation from the C&YP best-practice general acute ward FTE to occupied bed average (+/- 10%); i.e., 1.9 to 2.3 FTEs per occupied bed.
5. Children and young person's services have unique features, which means that C&YP WP&D requires deeper and wider thinking. Young patient ward staffing is geared to handling the complexities surrounding their physiological needs and psychological development across an age spectrum ranging from 0 and 19 years. Young patient's dependency on adults is a significant factor in C&YP services and parents/carers can make a notable contribution to meeting the inpatient's needs, which helps the ward team, but parent/carer involvement requires skilled interventions such as explanation, education and partnership approaches to care.
6. **Recommendation 2:** C&YP dependency/acuity rating scales should include parent/carer weightings so that additional demands on the ward team are reflected in dependency/acuity-based staffing calculations.

Section 3 – Review aims and objectives

7. The review aims to highlight C&YP ward staffing method strengths and weaknesses, thereby enabling C&YP Work stream team members to make informed decisions.
8. Objectives included systematically reviewing and précising C&YP WP&D publications.

Section 4 – Methodology

9. All main library databases (e.g., CINAHL) were searched using key C&YP WP&D terms. Twelve thousand publications were located - reduced to 120 after filtering. All 120 were summarised and appear as an annotated bibliography (Section 6).

Section 5 – Children and young people's WP&D framework

10. All C&YP workload measures and staffing methods can be placed into six categories; i.e., (from simple to complex): (i) professional judgement or consensus techniques; (ii) staff per occupied bed methods; (ii) dependency/acuity-quality systems; (iii) time-intervention approaches; (v) regression models; and (vi) macro, population-based approaches.
11. Each category has unique strengths and weaknesses. No method is likely to satisfy all success criteria listed in Section 2.
12. **Recommendation 3:** workforce analysts should reject workload and staffing methods that fail to address key criteria listed in Section 2 (which can be used as a checklist).
13. **Recommendation 4:** C&YP ward managers should use at least two methods for calculating ward workload and staffing requirements (i.e., triangulation) to improve Trust Board members' confidence in results emerging from staffing reviews.

Section 5.1: Professional judgement or consensus techniques

14. Also known as the Telford approach, expert, multidisciplinary teams use local intelligence to determine an appropriate workforce size and mix. The method is simple and effective, and was given credence in the NICE (2014) NHS WP&D report. In Scotland, professional judgement is usually paired with dependency/acuity-quality methods – a technique called triangulation.
15. Software (recently converted to care hours per patient day [CHpPD] data) simplifies and speeds professional judgement calculations.
16. **Recommendation 5:** professional judgement software should have a dual function; i.e., recommended staffing should appear as (i) full-time equivalents (FTEs) (the conventional metric); and a new metric (ii) CHpPD, to satisfy Carter's reporting requirements.
17. The professional judgement method addresses most ward workload-based issues (e.g., time-out), which makes it a good teaching and learning exercise for ward managers new to workload and staffing reviews. Ownership and transparency are strong. On the downside, professional judgement techniques are deemed too subjective; i.e., clinicians and non-clinicians may arrive at different answers. Another weakness is that the method's service quality connections are tenuous. Although ward establishments only need reviewing when ward structure or activity change, regrouping expert teams to review their earlier recommendations can be challenging.
18. **Recommendation 6:** professional judgement methods (and software), ready for roll-out in the NHS, should be available from a national website.

Section 5.1: Time-out (headroom)

19. The professional judgement process specifically asks users to decide what time-out (headroom/uplift; i.e., sickness, holiday, study, maternity and compassionate leave)) percentage covers sickness absence, etc. Meta-analysis (data pooling) showed that percentage allowances in the literature ranged from 21.6% to 25.3%. Commentators were keen to differentiate good (e.g., study leave) from bad (e.g., short-term sickness) time-out. Failure to

address time-out in staffing calculations can lead to staff burnout, recruitment and retention problems, thereby threatening service quality and patient safety.

20. **Recommendation 7:** time-out percentages (AKA headroom/uplift) should be explicit in all ward staffing calculations. Managers should justify any deviation from the 21.6% to 25.3% range emerging from the evidence review.

Section 5.2: Staff per occupied bed methods

21. Empirically and professional judgement determined staff to bed ratios occur regularly in the literature. Ratios have two functions: (i) benchmarking C&YP ward staffing; and (ii) providing multipliers that convert C&YP bed occupancy into establishments.
22. Commentators stressed that ratios should be drawn from quality-assured wards, so that multipliers don't perpetuate sub-optimal care. In the UK Nursing Database (2016), for example, the average staff to bed ratio in 93 best-practice C&YP wards was 2.19.
23. **Recommendation 8:** staff to bed ratio based multipliers should be empirical and drawn only from quality assured services to avoid extrapolating from wards delivering sub-optimal care.
24. The irrationality issue raised in Section 2 re-emerges in the staff to bed ratio literature; i.e., ratios range from 0.75 to 7.1 (although some ratios are context specific).
25. The method's strength is that objectivity is introduced into ward staffing reviews. Ratios (which are automatically standardised) are meaningful. Another plus is that modern software: (i) provides ratios; (ii) removes manual calculation (which is error prone); and (iii) provides grade-mix recommendations. Staff to bed ratios are easily converted into CHpPD and staffing costs, and confirm whether the no-more-than-eight benchmark is breached (NICE, 2014).
26. **Recommendation 9:** ratio-based ward staffing methods and supporting software should have a dual function; i.e., results should appear as (i) FTEs (the conventional metric); and (ii) CHpPD, to satisfy Carter's reporting requirements.
27. Child and young people ward registered nurse (RN) to support worker (SW) ratios in the literature were uniform; ranging from 78:22 to 80:20. However, researchers weren't always clear whether RN to SW ratios were derived empirically or determined using professional judgement.
28. Other downsides are that ratios assume a fixed workload; i.e., staff to bed ratio is the same for low and high dependency/acuity patients. Similarly, generic ratios are insufficient for wards where 'specialing' (one-to-one care) is commonplace. Core ratios exist for C&YP wards, but updating them is challenging and expensive work.
29. Another problem emerging from the review was that numerators (i.e., FTEs or headcount) and denominators (i.e., bed complement or occupancy), used to generate ratios, weren't always clear, which makes benchmarking dubious.
30. **Recommendation 10:** researchers and analysts should clarify which denominators and numerators were used when calculating staff to bed ratios so that meta analyses are robust.
31. The review revealed an important ward staffing issue. The gap between funded (budgeted) and actual (in-post) staffing is growing, either from recruitment and retention problems or austerity measures. These concerns would not materialise without staff to bed ratio data.
32. Staff to bed ratios can be presented in other ways; e.g., staff per patient per shift, which range widely in the literature; from 2.4:1 for day shifts and 5.8:1 at night; i.e., ratios vary according to context (e.g., HDUs and patient age). Meta-analysing (pooling) these ratios, therefore, is

not recommended owing to the ratio's context specific nature, which means that Work Stream Group members may need to present context specific rather than generic ratios.

33. An alternative to staff to bed ratios is Carter's (2016) CHpPD - recommended as the main nursing workload and workforce metric. Calculating CHpPD is easy although there are issues about: (i) census points (i.e., midnight vs. mid-day); (ii) whether CHpPD should be broken down by dependency/acuity level; and (iii) relating CHpPD to patient outcomes.
34. The review revealed that C&YP CHpPD were significantly higher than (for example) adult medical wards, so generic CHpPD data have no place in NHS WP&D. Similarly, differentiating RN and SW CHpPD and their influence on staffing costs is important.
35. **Recommendation 11:** adult ward CHpPD aren't suitable for C&YP units. Separate C&YP CHpPD benchmarks are urgently needed before the Unify reporting system is finalised.
36. **Recommendation 12:** Staff to bed ratio methods (and supporting software), ready for roll-out in the NHS, should be available from a central source; e.g., a web-based platform.
37. The review was extended to explore allied health professional (AHP) and AHP support staff (AHP SW) ratios. Only one database (NHS Benchmarking Database, 2016) offered up-to-date and meaningful ratios. Two metrics emerge: (i) AHP and AHP SW to occupied bed ratios (c.f. RNs and SWs); and (ii) AHP and AHP SW to finished consultant episodes (FCEs). The latter better reflects the AHP peripatetic roles. Both feature in Section 5.2.
38. **Recommendation 13:** Despite the valuable treatment and care that AHPs contribute to C&YP services, there's a dearth of AHP workload and staffing data, which should be corrected by commissioning AHP workforce research and development.

Section 5.3: Dependency/acuity-quality methods

39. This method requires staff to categorise patients according to their reliance on staff for their treatment and care. Care times, attached to dependency-acuity levels, generate ward establishments appropriate for the ward's current workload. Although C&YP dependency-acuity systems are unique (owing to a parent weighting), not all rating scales in the review had care times attached.

Section 5.3a – dependency-acuity

40. Researchers have experimented with alternatives to traditional dependency-acuity scales; e.g., SNCT Level 0 to 3. Analysts tried substituting healthcare related groups (HRGs) and paediatric early warning scores (PEWS), with mixed results. However, none should be written off.
41. Dependency-acuity-quality database software is expensive to build and maintain. Another downside is that methods may not recommend enough staff for safe cover when occupancy and dependency/acuity are low (i.e., the small-ward problem). Also, if staff see no staffing adjustments, then they may rebel against collecting dependency/acuity data.
42. **Recommendation 14:** Modern dependency-acuity software should be adapted to report staffing requirements as: (i) FTEs; (ii) CHpPD; and (iii) no-more-than-eight breaches. Staff costs should also be reported owing to CY&P staffing and cost variations noted in the evidence review. Dependency-acuity methods and supporting software should be available centrally; e.g., a web-based platform.

Section 5.3b – staff activity

43. Staff activity is another important dependency/acuity-quality component. Commentators observed that C&YP staff activity is unique, not least because parents influence the way C&YP ward staff work.
44. **Recommendation 15:** adult ward staff activity data should not feature in C&YP workload and staffing databases and workload calculations; i.e., unique WP&D databases are required for C&YP services.

Section 5.3c – staffing multipliers

45. Meta-analysing (pooling) dependency-acuity staffing multipliers in the literature was impossible owing to varying metrics and opaque calculations behind the multipliers.
46. **Recommendation 16:** researchers and analysts should explicate their workload and related data collection and analytical methods to improve uniformity and aid meta-analysis.

Section 5.3d – quality assurance

47. Drawing dependency-acuity and staff activity data from quality assured wards (c.f. summary point 20) ensures that optimal care is perpetuated. However, some commentators in the literature felt that workload-staffing-quality links aren't always made, despite seven distinct service quality indicators (e.g., nurse sensitive indicators) materialising in the literature.
48. Dependency/acuity-quality methods that included service quality data in their matrix show how: (i) service quality suffers in high-workload understaff wards (a significant risk factor); (ii) workload and staffing (and mix) can be related to outcomes; and (iii) crucial data are drawn only from best-practice wards.
49. **Recommendation 17:** workforce researchers and analysts should draw workload and staffing data only from quality assured services so that staffing recommendations perpetuate good quality care.

Section 5.3e – skill mix

50. Staff (skill/grade) mix is spotlighted in the C&YP WP&D literature. Commentators felt that staff mix is more than simply RN to SW ratios; i.e., there were strong arguments about ensuring that the RN proportion includes at least two RNs with children's nursing qualifications on each shift. Another staff mix issue materialises in C&YP wards housing patients spanning the full age range; i.e., ward teams should include RNs with adult and children's nursing expertise.
51. **Recommendation 18:** C&YP service managers should ensure that: (i) staffing recommendations are sufficient to meet current workloads; (ii) 80% RN to 20% SW ratios are the norm; and (iii) ward teams always include practitioners with children's nursing expertise.

Section 5.3f – psychometrics

52. Invalid and unreliable dependency/acuity-quality instruments make WP&D efforts futile. Unfortunately, evidence emerged in the review, which showed that data in some pilot projects were suspect owing to staff's poor assessment and data recording skills. Consequently, researchers go to some length testing instrument validity and reliability and fool-proofing their data collection systems.
53. **Recommendation 19:** dependency/acuity-quality methods (and supporting software), ready for roll-out in the NHS, should be available centrally; e.g., via a web-based platform.

Section 5.4: Time-intervention approaches

54. This method encourages staff to build detailed care plans using interventions attached to care times or staff to bed ratios. Two methods located in the literature have strong empirical foundations. Time-intervention approaches are easily the most sensitive workload and staffing method, which, however, come with a price; i.e., selecting interventions (from lengthy lists), more than once daily, adds significantly to practitioners' administrative workload.
55. Timed-intervention lists and associated care times are more easily updated than staff to bed ratio and dependency/acuity-quality methods, which makes development work cheaper. Care times and multipliers can be adjusted according to context (e.g., single rooms). Another advantage is that interventions can be divided into value and non-value added work.
56. Only one time-intervention method in the review addressed skill mix and costs.
57. The main downsides were the commercial licence that attracted fees. Hospital managers, working to tight budgets, may simply rule out valuable techniques simply because they attract a fee.
58. **Recommendation 20:** links to timed-intervention methods, ready for roll-out in the NHS, should be available centrally.

5.4a: Ward design

40. Ward design and its influence on workload and staffing were addressed by several authors, who deemed that building layout affects C&YP ward staffing. If the NHS continues to move to wholly single-room wards, then workload-based staffing methods geared to bay-room wards, for example, aren't appropriate owing to the way staff activity changes. Single room wards require more staff, but benefits outweigh costs.
41. **Recommendation 21:** workload data collected in Nightingale, bay and race-track wards are not suitable for workload and staffing estimations single room wards. Researchers and analysts should explicate what adjustments were made to generic staffing systems to make them appropriate for single-room design wards.

Section 5.5: Regression models

42. The final and most sophisticated ward staffing method in the review is the regression model – an inferential statistical technique that allows analysts to predict an unknown (e.g., staffing establishments) from a known variable (e.g., workload index). For example, if burns dressings are the ward's main workload driver, which can be related to staffing in C&YP

trauma units, then dressing procedures can be used to predict staffing establishments. The regression approach, therefore, can predict future workforce needs.

43. Regression methods are also used to quantify damaging and beneficial effects created by under- and optimal-staffing. Like the time-intervention method, once the core database is created, updating is relatively straight forward.
44. This method's main downside is that the topic is skimpily addressed in the C&YP literature. Also, the core database (using data drawn from quality assured wards) will be expensive to create, especially if there are multiple workload drivers. Obviously, the WP&D team using regression methods requires a bio-statistician.
45. The regression method is useful for professionals delivering peripatetic services (e.g., AHPs).
46. **Recommendation 22:** research and development for building AHP and AHP SW databases, which feed AHP regression analyses and other workforce calculations, should be commissioned without delay.

Section 6: Annotated Bibliography

47. Publications contributing to the review are summarised in Section 6.

Section 2 to 5: Main Report

Section 2: Introduction, Background and Context

Healthcare workforce planning and development (WP&D) is a crucial public sector issue owing to NHS workforce dynamics; e.g., size, cost, recruitment and retention, changing morbidity and demography, etc. The NHS workforce grew significantly in 2015, but is now slowing (HSJ, 2015). Indeed, McMurtie *et al.*, (2014) project that the UK's RN workforce will fall by 12.2% in the next eight years, so it's unlikely that CY&P services will be immune to recruitment and retention problems. Health service pay accounts for 59% of NHS spending, which can rise to 64% in children and young people's (C&YP) hospitals (Ellis and Chapman, 2006). Despite these striking and gloomy predictions, old and recent reviews report that NHS WP&D isn't done well, especially in C&YP services (King, 2000; Paediatric Nursing, 2003; Ellis and Chapman, 2006; Curson *et al.*, 2010; Williams, 2012), which led Hancock (1980), Ellis and Chapman (2006) to place paediatric WP&D in the 'Cinderella' group. Workforce planners, therefore, face significant operational and methodological challenges.

The Carter report (DoH, 2016) highlighted a 144% variation in NHS ward staffing hours (n = 1000 wards); i.e., there were almost two-and-a-half times more care hours per patient day (CHpPD) in some wards. Carter didn't specify how ward size and occupancy were controlled in his review, or which clinical specialties were most prone to CHpPD variations. The Audit Scotland (1994) report, although dated, noted that ward staffing variations couldn't be explained by patient need alone, especially in C&YP's wards (Paediatric Nursing, 2003). Another WP&D source, the UK Nursing Database (2016), which includes seven staffing and patient datasets collected in 93 C&YP and 21 children's hospice wards, standardises CHpPD using staff to bed ratios, which also show remarkable variances. For example, the 93 C&YP ward in-post average was 2.9 FTEs per occupied bed (sd = 1); i.e., 16% of the wards in the database had more than 3.89 FTEs, while 16% had less than 1.91 FTEs per occupied bed. Like Carter (2016) and Audit Scotland (1994), the UK Nursing Database (2016) variances are hard to explain and C&YP ward establishments seem historical and irrational.

Large empirical studies report that NHS wards aren't always staffed to their funded (budgeted) establishments (Audit Scotland, 1994, UK Nursing Database, 2016), which is caused by either austerity measures or recruitment and retention difficulties. If managers in all 93 C&YP wards determined their staffing establishments systematically using empirical data, then the fundamental question is 'Are C&YP workload-based staffing techniques fit for purpose?'. Without assurances, C&YP ward workload methods are likely to generate questionable staffing recommendations, inaccurate cost and service quality information; i.e., bluntly put, useless for WP&D purposes.

Most inpatient workload-based staffing methods can be categorised in six main ways (described later). However, C&YP wards have uncommon/unique features that require additional considerations, which, if addressed, ensure that recommended staffing matches the time required to meet child and young patient treatment and care needs:

1. Parents can demand and give time; i.e., they can assist with fundamental care, such as helping their son/daughter to eat and drink. Anxious parents, on the other hand, require additional support and reassurance from ward staff, especially in end-of-life care or when their son/daughter is critically ill. Consequently, dependency/acuity rating scales often include a parent/carer weighting so that sufficient staff are available for safe care (Evans, *et al.*, 1994; Nursing Children and Young People, 2013; Odgaard *et al.*, 2011).
2. The C&YP ward patient age range means that teenagers and toddlers are housed in a C&YP ward. Consequently, if C&YP wards are single-room design (to meet patient sensitivities), then additional staffing may be needed; i.e., even when occupancy and dependency/acuity scores are the same, single-room design wards may need more staff than bay-design wards (Hart, 1992; Kusayanagi, 2004; Hurst, 2009; Yeadon *et al.*, 2015).
3. The young patient's recuperative powers mean that dependency and acuity can vary markedly from shift-to-shift (Audit Commission, 1993; Doman 2004); especially in medical admission/assessment units. Also, high dependency children are often looked after in general wards because some hospitals do not have C&YP HDUs or PICUs. Consequently, occupancy, dependency/acuity and throughput (which drive nursing workload) may need measuring more frequently than once daily, which adds to ward nurses' administrative workloads.
4. Children's wards often have a unique staff mix because they employ specialist practitioners (e.g., nursery nurses, play specialists, school teachers, etc.) not usually found in general acute, adult wards. Consequently, the C&YP ward staff mix is likely to need wider and deeper considerations. Similarly, outreach services (from C&YP wards to community services) are an important staff mix consideration (Nicholson, 1998; Kusayanagi, 2004; Harper *et al.*, 2010).
5. There are four NHS England providers dedicated to C&YP treatment and care. That is, staff deployment may be easier in specialist hospitals owing to a larger, expert staff pool from which to draw.

Other staffing and patient issues that influence C&YP ward workload and staffing are the measuring instrument's psychometric properties; i.e., owing to their cost and quality implications, C&YP workload-based staffing data collection instruments need exposing to the same psychometric scrutiny that is applied to broader research and development (R&D). Evaluation questions/criteria include:

1. Are data collection (e.g., dependency/acuity) instruments valid; i.e., are all data, critical to workforce analysis, collected and are they accurate?
2. Are instruments reliable; i.e., is data collection consistent. Would independent staff, using the same instrument, measuring the same patients, generate the same results (Min and Scott, 2015)?
3. Are instruments user friendly; i.e., is data collection burdensome for ward staff (especially if workload information is gathered more than once daily).
4. Do methods generate workload indices that permit internal and external benchmarking? That is, can ward workload trends be plotted and can workload be benchmarked against other wards in the same clinical speciality?
5. Does 'specialing' (i.e., one-to-one care) attract an additional weighting? Specialing is a growing workload issue (UK Nursing Database, 2016); i.e., 5.2 FTEs are required to

provided one-to-one care for one patient, which may not register in more basic dependency-acuity measures.
6. Are care times drawn from best-practice sites so that optimal care is perpetuated?
7. How is time-out (headroom/uplift); i.e., sick, holiday, maternity, compassionate and study leave) handled? Around one in five staff is away from their ward at any time, so without the uplift, safe care may be jeopardised.
8. Do results generated by a workload system compare recommended staffing (based on workload) with funded (budgeted), actual (in post) and temporary (bank, agency and overtime) FTEs. The gap between funded and actual NHS staffing is growing, so local intelligence is needed to highlight wards where temporary staff must be used to fill vacancies (UK Nursing Database, 2016).
9. Do methods satisfy Carter's CHpPD reporting requirement; i.e., can they generate actual and recommended CHpPD – intended to be the main staffing metric from 2016 (DoH, 2016)?
10. Do methods report regis1tered nurse (RN) and healthcare support worker (SW) FTEs and CHpPD separately? That is, can funded, actual and recommended skill mix be compared?
11. Is ready-for-action (RfA or unproductive) time reported and how is it handled? The C&YP RfA time is 1% lower than (for example) adult medical wards (UK Nursing Database, 2016), so unique RfA data are important.
12. Is the workload system supported by software? If yes, then what are the licensing arrangements and costs? What is the staffing system's connection to e-rostering? That is, does the workload system 'talk to' an e-rostering system?
13. How easy is it to update crucial workload data?
14. Does the system generate a ward-to-board report? That is, are workload review outputs (data and commentary) meaningful for managers and practitioners.

It's unlikely that any C&YP staffing system will satisfy all 14 criteria. Nevertheless, 1 to 14 forms a useful checklist when evaluating C&YP workload and staffing methods.

Section 3: Review Aim and Objectives

The evidence review's aim, therefore, is to: (i) describe C&YP ward staffing systems and highlight their methodological strength; and (ii) enable C&YP Work Stream members to make informed decisions. The objectives are to:

1. Trawl and summarise published and grey literature for actual and potential C&YP workload staffing systems.
2. Classify C&YP ward workload staffing methods using six categories (listed in Section 5).
3. Highlight each method's strengths and weaknesses.
4. Shortlist methods according to their utility.
5. Recommend methods that C&YP Work Stream Group members might judge suitable for wider NHS use.

Section 4: Methodology

The main electronic databases (CINAHL; Medline, PubMed, Google Scholar, etc.), were searched using:

Pead* OR Pedia* OR Child* AND Teen* AND Workload AND Staff*

Twelve thousand publications were located, which were filtered using the following criteria:

1. Was the article peer reviewed?
2. Was evidence determined empirically?
3. Is it written in English?
4. If it's an older publication, then does it include theoretical and practical elements that are relevant today?
5. Does the publication address staffing demand and/or supply?
6. Can methods and data from adult, critical care and neonatal ward literature be applied to C&YP wards?

Consequently, 120 publications were shortlisted and summarised (see Section 6 - Annotated Bibliography). A WP&D framework, originally described by Kirk (1990) and developed by Arthur and James (1994); Nuffield Institute, (2003); Department of Health and Children (2005); Harper *et al.,* (2010); and Williams (2012), emerged from the literature (see Section 5), was found to be useful for thinking about and acting on C&YP WP&D. Publications:

1. Ranged from descriptive to empirical.
2. Presented dependency/acuity data and staffing multipliers that could not easily be compared (for benchmarking purposes).
3. Were not amenable to meta-analysis (data pooling).
4. Often featuring narrowly focused evidence (Curson *et al.,* 2010).
5. Were nurse and doctor centric; i.e., few allied healthcare professional (AHP) publications emerged.

Moreover, few articles comprehensively answered all the main questions/criteria in Section 2. However, each publication offers valuable insights into one or more C&YP WP&D methodological, strategic and operational issues.

Section 5: Children and Young People's WP&D Framework

Most WP&D methods can be categorised in five ways; i.e., from least to most sophisticated (Kirk, 1990; Arthur and James, 1994; Nuffield Institute for Health; 2003; Department of Health and Children, 2005); Harper *et al.,* 2010; and Williams 2012):

1. Professional judgement or consensus techniques.
2. Staff to occupied bed ratios.
3. Dependency/acuity-quality methods.
4. Time-intervention approaches.
5. Regression models.
6. Macro, population-based techniques

Two or more methods can be used together (triangulation), so that analysts can confidently report their findings (Nuffield Institute for Health, 2003; Ball and Catton, 2011).

Section 5.1: Professional judgement or consensus techniques

Also known as the Telford approach, expert, multidisciplinary groups use local intelligence to agree a ward team's size and mix (Telford, 1979). Arthur and James (1994) separate intuitive and professional judgement methods, which are combined by other commentators because intuitive and professional judgement methods share similar strengths and weaknesses. Strengths include Telford's enduring, simple but effective approach (given credence by the NICE, 1014). It's common, especially in Scotland, to triangulate ward staffing methods using professional judgement with, for example, dependency/acuity-quality techniques; i.e., Telford's simplicity can be paired with more sophisticated approaches. Professional judgement methods can include qualitative variables that are less easy to measure (Harper *et al.*, 2010). Data collection and (software supported) analysis steps are simple, and the method is a good way to introduce healthcare managers to workload based staffing methods, since Telford techniques underline the main workload variables (e.g., time-out). If nothing else, Telford encourages critical scrutiny (Arthur and James, 2004). Figure 1 shows software that is free and easy to use.

Figure 1: Professional Judgement Software

	A	B	C	D	E	F	G	H	I
1	**For the Professional Judgement method use this template**								
2	**Row**	**Column B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**
3		**Seven-Day Wards**	**Mon**	**Tues**	**Wed**	**Thur**	**Fri**	**Sat**	**Sun**
4	1	N.B. *Italicised* /red values can be changed by you							
5	2	Enter early or day shift length in this row	*7.5*	*7.5*	*7.5*	*7.5*	*7.5*	*7.5*	*7.5*
6	3	Enter staff needed on early or day duty in this row	*4*	*4*	*4*	*4*	*4*	*3*	*3*
7	4	If you have a three-shift system then enter late late duty shift in this row	*7.5*	*7.5*	*7.5*	*7.5*	*7.5*	*7.5*	*7.5*
8	5	If you have a three-shift system then enter staff needed on late duty in this row	*4*	*4*	*4*	*4*	*4*	*3*	*3*
9	6	Enter night shift length in this row	*10*	*10*	*10*	*10*	*10*	*10*	*10*
10	7	Enter staff needed on night shift duty in this row	*3*	*3*	*3*	*3*	*3*	*2*	*2*
11	8	What is your sickness and absence level?	*22%*						
12	9	Occupancy	*20*						
13	10	CHpPD	5.49	5.49	5.49	5.49	5.49	3.97	3.97
14	11	FTEs required	**18.9**						

Although Figure 1 specifies wards and seven-day working; the software can be used in any working environment (e.g., physiotherapy clinics), working Mon. to Fri (or any permutation). The software allows users to decide working days, shift length, handover period, how many staff are needed for safe care on each shift and time-out allowance. The Figure 1 software has been converted to satisfy Carter's (2016) CHpPD reporting requirements (blue row 10).

Determining staff-mix is easy but crude in the Telford approach; i.e., Figure 1 is completed once for registered practitioners (RP) and a separate matrix is completed for healthcare support workers (SW). The software is transparent and ward staff feel they own the process (Arthur and James, 1994; Nuffield Institute, 2003; Harper *et al.*, 2010).

The professional judgement method has its critics; e.g., Kirk (1990) called it the best-guess approach. It has been called subjective, which may account for situations where non-clinicians and clinicians looking at the same environment decide different staffing establishments (Kirk, 1990). Some view the method's service quality connection tenuous; preferring a more objective service quality determinant, which must be applied concurrently. Although the method is quick

and simple, if workload changes (i.e., occupancy and or dependency/acuity increase), then Figure 1's matrix has to be refreshed; hence the method's workload insensitive criticism. The last criticism, awkward to use manually (Arthur and James, 1994; Nuffield Institute, 2003; Harper *et al.,* 2010) has been removed by software such as Figure 1.

5.1a Time-out (headroom)
The more recent C&YP methodological literature addresses time-out in detail (Audit Scotland, 2002; GOSHman Panda, 2005; West London University, 2015), specifically, what time-out uplift should be added to a ward's/department's core establishment to cover staff leave. Time-out is important because approximately one in five staff is away from their ward/department at any time owing to:

- Holidays (13.5-14.8%)
- Sickness (3.8-5.5%)
- Study leave (1.5-1.9%)
- Maternity leave (1.5-1.8%)
- Other (1.3%).
  Total = 21.6% to 25.3%.

Owing to staff lost through time out, ward/department establishments are much lower than what appears on paper. Consequently, it's common policy in many (but not all) trusts (Audit Scotland, 2002) to add time-out allowances to ward establishments. Blue row 8 in Figure 1, for example, shows that recommended staffing is increased by 22% (which can be adjusted). The time-out range in UK clinical specialities generally is wide; specifically, the C&YP 93 best practice ward average is 23.6% (UK Nursing Database, 2016). Best-practice wards staff tend to report 'good' time out; i.e., less sickness and more study leave, which improves practitioner knowledge and skills. Andrews (2005) showed that increased study leave (good time-out) can be cost neutral owing to the benefits that accrue. Some studies in the review connect C&YP ward workload and time-out to burnout, recruitment and retention problems, even though job satisfaction is high (Akman *et al,* 2016; Alves and Guirardello, 2016), which is unsurprising if staff, expected to cover unfilled posts and absent workers, vote with their feet. Compounding workload and staffing problems by short-changing ward/department teams suffering high time-out, therefore, isn't recommended. If NHS managers face RP shortfalls predicted in the UK (HSJ, 2015), then time-out is an increasingly important WP&D element; i.e., pruning study leave in wards with high vacancy rates to save money carries risks.

Section 5.2: Staff per occupied bed methods
Empirically determined FTE to occupied bed ratios emerge regularly in the C&YP WP&D literature. Their purpose is to:

(i) Benchmark wards/departments; and
(ii) Act as multipliers that convert ward occupancy/department throughput into a staffing establishment (Bowden *et al.,* 1989; Ellis and Chapman, 2006).

Staff to bed ratios should be drawn only from wards/departments that never fall below a minimum service quality score to avoid extrapolating from teams delivering sub-optimal care.

That is, concurrent nursing quality measures are integral to staff to bed ratios. Grech *et al.*, (2012) showed how dangerous staffing and occupancy data drawn from sub-optimal wards were. However, the picture isn't always clear and straight forward; e.g., when staff to bed ratio and service quality data are combined, results can be counter-intuitive. Audit Scotland (2002), for example, found no relationship between staff to bed ratios and patient falls, which implies that service quality metrics (discussed later) need choosing carefully (Kirk, 1990).

The staff to bed ratio method's strength is that it introduces objectivity into workload-based staffing calculations; i.e., satisfying the professional judgement critics' 'best guess' jibe. Benchmarks are meaningful to professionals and public. Ratios are standardised automatically; i.e., they are adjusted according to ward size, occupancy, total establishment and grade mix. Modern software shows staff to bed ratios and CHpPD data concurrently, thereby addressing Carter's reporting requirements (UK Nursing Database, 2016). This method interprets grade-mix meaningfully (more so than professional judgement techniques); i.e., total FTEs per occupied bed can be broken down to Band 7, 6, etc., (Table 1) – thereby comprehensively addressing staffing and grade mix. Harper *et al.*, (2010) feel that grade mix breakdown is vital in modern WP&D owing to risks that staff in wards/departments with imbalanced grade mix will work inappropriately (e.g., RPs undertaking clerical and housekeeping tasks).

The UK Nursing Database (2016) provides FTE to occupied bed figures unique to C&YP wards. Moreover, software (emerging from the database) allows users to adjust occupancy and time-out uplift; i.e., if ratios act as staffing multipliers, then including time-out in the calculations helps to avoid situations where recommended establishments fall below safe levels if sickness levels rise. Staff to be ratio data are easily converted into the no-more-than-eight metric (the level at which mortality starts to rise) (NICE, 2014). Finally, ratio data are easily converted into staff cost per bed, which often feature in modern software (UK Nursing Database, 2016).

The ratio method's main weakness is that it assumes fixed workloads; i.e., the staff to bed ratio is the same for low and high dependency/acuity patients – a distinct problem in C&YP wards owing to the tendency to nurse high dependency/acuity children in general wards (Ellis and Chapman, 2006). Similarly, a generic multiplier will not be safe in wards where specialing (one-to-one care) is commonplace; i.e., when the 5.2 FTE to one staff per shift requirement is ignored. Databases that generate staff to bed ratios are costly to maintain; although cost-benefit analyses easily show that methods represent value for money; i.e., a relatively small ward/department sample generates unique benchmarks and staffing multipliers that can be used throughout the NHS. Another caveat is that users must be careful when interpreting staff to bed data in the literature; i.e., it isn't always clear how staff to bed ratios were calculated; i.e., did authors use: (i) funded (budgeted) or (ii) actual (in-post) establishments as the numerator. If (ii) was used, then were temporary (i.e., bank, agency and overtime) staff included? Which denominator was used in the calculation: was is bed establishments or bed occupancy? Mixing these key elements has significant benchmarking and establishment setting implications, which may explain why Kirk (1990) calls the staff to bed method dubious. For accuracy and standardisation, actual staff to bed figures should include substantive and bank/agency/overtime figures. Occupied beds (the denominator) is more likely to reflect reality because C&YP wards have an average 78-80% occupancy (Royal College of Nursing, 2010; NHS Benchmarking Database, 2016). Analysts also need to resist using census (one-off) bed occupancy and staffing establishments; i.e., occupancy

and staffing datasets should be tracked over one month and throughout different seasons (such as winter and summer). If analysts follow these simple rules, then they can make the ratios transparent and uniform. Table 1, an extract from the UK Nursing Database (2016), illustrates how ratios are used.

Table 1: C&YP RN and SW FTE to bed ratios (n = 93 wards).

	A	B	C	D	E
	Variable	*Funded*	*Actual*	*Temporary*	*Recommended*
1	Average occupancy (patients)	13.2	13.2	13.2	13.2
2	Total FTE:bed	2.76	2.19	0.16	2.13
3	Band 7 FTE:bed	0.09	0.08	0	0.08
4	Band 6 FTE:bed	0.62	0.51	0.03	0.50
5	Band 5 FTE:bed	1.46	1.13	0.07	1.1
6	Band 4 FTE:bed	0.17	0.09	0.01	0.09
7	Band 3 FTE:bed	0.07	0.05	0.01	0.04
8	Band 1-2 FTE:bed	0.35	0.33	0.04	0.32
9	Daily staff cost per occupied bed	£186	£148	£10	£143

Table 1 illustrates some important points:

(i) There's a significant funded-actual staffing gap in 93 UK CY&P wards (B2 vs. C2). However, the differences within Agenda for Change (AfC) bands are uniform; i.e., RN establishments aren't being diluted with SWs, which is encouraging.

(ii) It's not clear whether funded-actual gaps are caused by recruitment and retention problems or austerity measures (i.e., qualitative data aren't included in the database/software). If the gap is caused by austerity measures, then large funded-actual gaps are likely to negatively influence management-staff side relationships.

(iii) Funded (B2), Actual (C2) and Temporary (D2) establishments are transparent and easily compared.

(iv) Recommended (workload-based) staffing is less than actual and temporary staffing combined (E2 vs. C2+D2), which probably reflects the buffer required in C&YP wards. Consequently, actual running costs (C2+D2) are less than budgeted (B2), which implies that austerity measures are biting.

Table 1's most important feature is that C2 can be used to: (i) benchmark any C&YP ward/department against best practice units; and (ii) adjust any unit staffing to match best practice levels (broken down by grade in C3 to C8). Although software automates the process, the calculation is simple:

Total FTEs required: 13.2 occupied beds * 2.19 = 28.9.
Band 5 FTEs required: 13.2 * 1.13 = 14.9.
etc.,

In practice, managers replace 13.2 with their actual occupancy. Table 1's multipliers include a 23.6% time-out uplift (which can be adjusted).

Rassin and Silner's (2007) Israeli study revealed an 0.75 RN to acute wards bed ratio. However, it's not clear whether these are FTEs or headcounts and if occupied beds or bed complements were used in the calculations. If Rassin and Silner's (2007) ratios are compared with Table 1, then the Israeli ratio falls well short of the UK's. The Israeli C&YP ward ratio sat midway in their clinical specialty league table.

Rassin and Silner's ward RN to SW ratio was 80:20; better than the 78:22 in Table 1, Column C. Respondents in the RCN (2010, 2013) C&YP ward survey indicated that an 80:20 RN to SW ratio was typical in NHS C&YP wards. An 80:20 ratio, therefore, seems appropriate.

5.2a Allied Health Professionals

Allied health professionals (AHP), despite their numbers (6% of the NHS workforce) are a WP&D Cinderella group. They are an untapped resource, which could help reduce the NHS deficit, recruitment and retention difficulties. Twelve disciplines feature in the AHP staff group, ranging from life-saving emergency practitioners to professional who significantly improve patients' quality of life: (i) paramedics; (ii) radiographers; (iii) occupational therapists; (iv) speech and language therapists; (v) prosthetists; (vi) orthotists; (vii) podiatrists; (viii) physiotherapist; (ix) orthoptists; (x) dieticians; (xi) art and (xii) music therapists (Read, 2016).

The staff to bed ratio method has a major advantage; i.e., calculations are transferrable between occupational groups. However, only one database emerged from the review that included AHP, their support staff (SW), and healthcare scientists, offering up-to-date and meaningful ratios. That is, two metrics emerge from the NHS Benchmarking Database (2016): (i) AHP and AHP SW to occupied bed ratios (c.f. RNs and SWs in Table 1); and (ii) AHP and AHP SW to finished consultant episodes (FCEs). Metric (i) is valuable; i.e., AHPs and RNs are using the same indicator. Metric (ii), on the other hand, better reflects AHPs' peripatetic roles. Some AHP staff groups will need unique multipliers; e.g., paramedics could use FTE to ambulance journey ratios. Either way, the AHP workforce is vital for C&YP welfare and recovery, which is illustrated in Table 2.

Table 2: AHP and AHP SW full-time equivalents (FTE) to occupied bed/finished consultant episodes (FCE) ratios.

	A	B	C	D
		Trust Group		
	Ratio	*Small Acute*	*Peripheral Teaching*	*Specialist C&YP*
1	AHP FTE to occupied beds	1:2.32	1:2.12	1:1.68
2	AHP SW to occupied beds	1:2.74	1:2.12	1:1.2
3	AHP FTE to FCE	1:408	1:382	1:267
4	AHP SW to FCE	1:483	1:381	1:274

Table 2 shows that the four English C&YP specialist hospitals (Col. D) employ proportionally more AHPs and AHP SWs than small, acute (Col. B) and peripheral teaching hospitals (Col. C). Small, acute trusts (Col. B) were deemed to be the nearest comparator, which can be changed to another trust group if required; e.g., peripheral teaching hospitals (Col. C). Interestingly, the FTE

to FCE ratio difference between small acute and C&YP trusts matches the FTE to bed ratio differences between the two trust groups; a reasonable validity indicator.

The main downside with the AHP and AHP SW ratios in Table 2 is that the AHP group (unlike nursing, which can be broken down by AfC band) includes 12 disciplines (Read, 2016). Unfortunately, the NHS Benchmarking Database (2016) does not breakdown Table 2, B1 into AHP constituent groups. A second problem is that four C&YP specialist trusts isn't a large enough sample to generate staff to bed/FCE ratios drawn only from best-practice sites, unlike the small-acute hospital group, which can be segregated into best and worst practice sites (using CQC ratings for example). That is, if D1 is used as a staffing multiplier (FTE multiplier * occupied beds), then we can't be sure that a 1.68 multiplier provides enough staff for high-quality care. In short, the AHP workforce is a group ripe for WP&D research (Read, 2016).

5.2b Alternatives to Staff to Bed Ratios

Staff to bed ratios can be presented in other ways; e.g., data can be shown as staff per shift. In the RCN's 2010, the average was 3.6 RNs and 0.8 SWs per shift. Another variation is patient per staff (i.e., the no-more-than-eight guidance). Dickinson and Jackson's study (1999), although dated, confirm that patient per staff metrics are viable today. Their data (drawn from 72 wards) was 4:1 on day shifts and 6:1 at night. Williams (2012) recommends 4:1 (throughout 24 hours) in general wards and 2.1 in HDUs. However, it's not always clear if these ratios are RN only or RN+SW to patient ratios. The 93 best practice C&YP wards in the UK Nursing database (2016), recommend 2.4 RN/SWs to one patient ratio on the day shift and 5.8:1 at night, which are more generous than Dickinson and Jackson's ratio (their data are 16 years old and young patient dependency and acuity have increased over time). Patient to staff data are important because they help analysts address the no-more-than-eight safe care guidance explained in the NICE (2014) report. One study in the literature (Ismael and Ganhi, 2011) suggest how the staff to bed approach is used to adjust staffing during austere times. They used the RCN (2010) C&YP staffing guidelines: 3:1 for children under two years; 4:1 for other ages and 5:1 at night. Because the ratios couldn't be met using the existing establishment and funding, the C&YP ward was downsized to 12 beds (plus four observation beds), rather than increasing the staffing establishment, thereby maintaining safe care levels and nursing costs.

5.2c Care Hours per Patient Day (CHpPD)

Another alternative metric in the staff to be ratio methodological group is CHpPD was given credence in the Carter (2016) report. However, CHpPD metrics have been used in the UK since 1980 and is the predominant workload-based staffing method in some N. American and Australian states. The CHpPD metric is expected to become a standard reporting measure in the UK, which will eventually include medical practitioners and AHPs (Carter, 2016; Min and Scott, 2016). Carter raised CHpPD's profile in 2016 after rejecting conventional reporting techniques such as staff to be ratios because, as small values, ratios are too insensitive (i.e., unable to highlight staffing variations that well), which may cause ward managers to miss important staffing efficiency and effectiveness issues. The average CHpPD in the Carter report (2016) was 9.13 hours (all specialties). Kirk (1990), 25 years ago, recommended 6 CHpPD in C&YP wards; i.e., significantly less generous. One CHpPD methodological issue hasn't been resolved in the literature; i.e., it's unclear why Carter uses midnight occupancy as the denominator; which

generates CHpPD that are more than a mid-day generated figure; i.e., the Carter CHpPD metric is more generous. Table 3 compares adult medical and C&YP ward CHpPD.

Table 3: Adult Medical C&YP Ward CHpPD (UK Nursing Database, 2016)
Key: Dep. = dependency-acuity level: 1 = low; 4 = high; NA = not available

	A	B	C	D
	Dependency-acuity level	*Adult Medical Wards*	*C&YP Wards*	*Carter (2016)*
1	N wards	208	93	1000
2	Dep. 1 CHpPD	1.97	7.72	NA
3	Dep. 2 CHpPD	3.96	8.32	NA
4	Dep. 3 CHpPD	7.31	10.9	NA
5	Dep. 4 CHpPD	12.3	14.18	NA
6	Average	5.64	10.19	9.13

Table 3 illustrates three important issues:

(i) Carter's generic figure (D6) does not represent reality in C&YP wards (Col. C).
(ii) Carter's generic figure (D6), although close to the C&YP wad average (D6 vs. C6) masks the differences between high and low dependency-acuity patients (D6 vs. C2 to C5).
(iii) The C&YP wards generate more CHpPD than adult medical wards (Col. B).

Kirkby (2015) writes a sobering account, implying that CHpPD alone is not the solution to workload-based staffing calculations; i.e., triangulation is needed. The author shows that CHpPD is easy to calculate – primarily the reason why it's adopted in the Carter report; e.g., a 1:2 (staff to patient ratio) is 12 hrs per patient day; 1:6, on the other hand, is 4 CHpPD. Kirkby repeats the warning materialising in the staff to be ratio literature; i.e., standardisation is required; e.g., should the numerator be funded or rostered numbers? The author, unlike Carter, attaches significance to dependency/acuity variables; notably 'specialing' or one-to-one care. Her final warning is that CHpPD must be related to nursing outcomes and costs so that better arguments for more resources can be made.

Levensham *et al.,* (1993) underline the connection between staffing and costs, which is why Carter (2016) recommends that RP and SW CHpPD are reported separately for costing purposes. Consequently, modern systems; e.g., the UK Nursing Database (2016) include CHpPD cost analyses. Other systems, such as GOSHman (2005), have the potential to present CHpPD costs. The UK Nursing Database's (2016) outputs appear in Figure 2, which obviates the need to collect CHpPD separately from dependency/acuity data.

Section 5.3: Dependency-acuity-quality methods
The dependency-acuity-quality method requires staff to classify patients using dependency-acuity rating criteria, which is important because dependency-acuity is perceived to be increasing in C&YP wards (Ellis and Chapman, 2006). Care times (drawn from best-practice wards – hence quality in the method's title) are attached to dependency-acuity scores so that care hours always match patient demands. The Safer Nursing Cate Tool (SNCT [formerly AUKUH]) endorsed by NICE in 2014 (NICE, 2014) and the daily living activity (ADL) method featuring in the UK

Nursing Database (2016) are probably the UK's most commonly used acuity-quality methods (Smith *et al.,* 2009). The dependency-acuity quality method, unlike professional judgement and staff to be ratio approaches, is sensitive to occupancy ***and*** case mix. As the UK Nursing Database (2016) shows, the C&YP subset is one among 30 clinical specialties; i.e., separating C&YP and adult ward data is a bonus and an imperative because there are remarkable differences between adult and children's ward structures, processes and outcomes.

Dependency-acuity quality methods use staff activity data extensively, including allied professionals such as play specialist and teacher contributions to C&YP units, so skill mix recommendations are unique; i.e., the system's strong empirical basis should satisfy many critics (Arthur and James, 1994). Another strength is that e-rostering software developers are building-in dependency/acuity based multipliers into their products, thereby killing two birds with one stone.

On the downside, dependency-acuity quality datasets, developed specifically for C&YP wards, can quickly become dated (DoH, 1997). Consequently, database building and maintenance costs are expensive (Arthur and James, 1994) because seven (invaluable) datasets are required in each ward:

(i) Occupancy, throughput, patient dependency/acuity.
(ii) Staff activity by grade.
(iii) Service quality.
(iv) Ward design.
(v) Funded, actual and temporary staff FTEs by grade.
(vi) Time-out.
(vii) Staff costs.

However, probabilistic sampling ensures that neither too much nor too little dependency-acuity quality data are collected, which means that methods rolled out country-wide are cost effective, an advantage that off-sets a major disadvantage. Another disadvantage is that dependency-acuity quality software may not recommend enough staff for safe cover when occupancy falls below ten and dependency/acuity is light (called the small-ward problem). However, modern software (such as the UK Nursing Database, 2016) has a safety feature, which guarantees that ward staffing does not breach the unsafe staffing barrier; i.e., recommended establishments will always allow at least two staff per shift. Another weakness, is that collecting patient dependency/acuity data adds to the ward staff's administrative burden, which may be disliked especially if data aren't used purposefully. Figure 2, an extract from the UK Nursing Database (2016), illustrates most dependency-acuity quality issues.

Figure 2: C&YP Ward Dependency-acuity-quality Software

Children and Young People's Ward Care Hours per Patient Day (93 Wards).				
Trust: UK				
A	B	C	D	E
	Dependency/Acuity			
1	Dep.1 (daily average)	1.22		
2	Dep.2 (daily average)	5.30		
3	Dep.3 (daily average)	4.85		
4	Dep.4 (daily average)	1.80		
6	Specialed patients (daily average)	0.00		
7	Patients	13.17		
	Adjustments			
8	Preferred time-out?	23.6%		
9	Preferred RfA time?	11.5%		
10	Preferred RN proportion?	79%		
	ADL Multipliers			
11	Dep.1 CHpPD (no headroom, RfA included)	7.72		
12	Dep.2 CHpPD (no headroom, RfA included)	8.32		
13	Dep.3 CHpPD (no headroom, RfA included)	10.90		
14	Dep.4 CHpPD (no headroom, RfA included)	15.18		
16	Specialed patients	24.00		
	Recommended CHpPD and FTEs			
17	RN CHpPD (excludes headroom, RfA included)	94.7		
18	FTE equivalent (includes headroom, RfA include	22.1		
19	SW CHpPD (excludes headroom, RfA included)	25.2		
20	FTE equivalent (includes headroom, RfA include	5.9		
21	Total CHpPD (excludes headroom, RfA included	119.9		
22	FTE equivalent (includes headroom, RfA include	28.0		
	Actual Staffing coverted to CHpPD			
23	Actual and temporary staff FTEs?	31.0		
24	Actual bed occupancy (C7)	13.2		
25	Total CHpPD (headroom deducted)	134.2		
	Recommended Staff per Shift	**Three Shifts**	**Two Shifts**	
26	Early shift headcount	6.9	Day	6.9
27	Late shift headcount	4.9	Night	2.9
28	Night shift headcount	2.9		
	Recommended Patient to RN Ratio	**Three Shifts**	**Two Shifts**	
29	Early	2.4	Day	2.4
30	Late	3.4	Night	5.8
31	Night	5.7		
	Cost per Patient Day			
32	Actual	£160		
33	Recommended	£144		

Figure 2 is an exert from dependency-acuity-quality software commonly used in the UK (fuller guidance is available). The C&YP SNCT software (in development) looks like Figure 2 and behaves in the same way. The red items in this C&YP specific software are over-written by the user. If red values are adjusted, then the ward's actual and recommended FTEs and CHpPD (rows 17 to 22) change. In Carterian terns, the ward's recommended CHpPD (row 25) can be

compared with its actual (row 21). Rows 29 to 31 shows if C&YP ward staffing breaches the no-more-than-eight guidance (NICE, 2014).

5.3a: Dependency-acuity measures

Quantifying a patient's reliance on ward staff to meet his or her treatment and care needs is a mainstay in the dependency-acuity-quality method (Audit Commission, 1993). Dependency-acuity ratings are succinct ways to describe an individual's treatment and care needs, and ultimately his/her care requirements (as FTEs or CHpPD) and associated costs (Levensham *et al.,* 1993).

Children's ward dependency-acuity scales are unique; i.e., many include a parent weighting (Beal *et al.,* 1996). Evans (1994) and the Nursing Children and Young People report (2013) authors noted that children and staff benefit from parents' presence. Parents at other times, however, require more support from staff, which boosts the young patient's dependency-acuity score and adds to staffs' workload. Consequently, parental involvement should reckon in any staffing calculations. Research yields surprising and counter-intuitive results, however. Evans (1994), Odgaard *et al.,* (2011); Priddis and Shields (2011) noted that C&YP ward staff were ambivalent about parental involvement, probably because continued parental presence requires staff time despite parents relieving ward staff from some fundamental care such as eating, drinking and bathing. Gomes *et al.,* (2008) suggest that: (i) fathers only present; (ii) mothers only present; or (iii) both present may need separate dependency-acuity weightings.

Some analysts explore how healthcare resource groups (HRG) and diagnostic related groups (DRGs) can be used as dependency/acuity classifications. Knauf *et al.,* (2006) used five dependency-acuity groups, with staffing multipliers attached, that they relate to DRGs:

- 1 minimum (16 patients to 1 staff);
- 2 sub-acute (8:1);
- 3 acute (4:1);
- 4 intensive (2:1); and
- 5 maximum (1:1).

Morris *et al.,* (2014), on the other hand, concentrate on two HRG groups (basic and advanced) to separate children who consume more and less resources. The researchers' motivation was the remarkable cost differences between basic and advanced child and young patient stays. The main benefit, therefore, is that staffing costs can be aligned to reimbursement data (children's services usually attract higher reimbursement) (Knauf *et al.,* 2006; DH, 2007). Not all HRGs in the literature have staffing multipliers attached, which must be created. Knauf *et al.,* (2006) seem happy to use professional judgement based multipliers. Smith *et al.,* (2009), on the other hand, eschewed professional judgement approaches, accepting only empirically built multipliers. The RAFAELA nursing and patient scoring system, a popular ward workload and staffing method in Sweden's adult and C&YP wards, also satisfies the empirical requirement (Fagerstrom and Rauhala, 2007). Consequently, RAFAELA generates three country-wide, invaluable benchmarking possibilities:

(i) Nursing intensity (workload) score.

(ii) Daily nursing resource (staff per bed) requirements.
(iii) Optimal nursing workload indicators.

Diagnostic related groups were rejected in the RAFAELA project because nursing costs couldn't be disaggregated from broader DRG reimbursements (also noted by Knauf *et al.*, 2006). This problem is important because RAFAELA showed that C&YP ward costs were greater than adult wards (hence more generous reimbursement for C&YP services). However, C&YP ward intensity scores fluctuated more than other clinical specialities. Higher C&YP-ward staffing (and costs), therefore, may be a safety net in case workload increases (Knauf *et al.*, 2006; Fagerstrom and Rauhala, 2007). Stilwell and Hawley's (1993) old study includes economic principles that are applicable today. The authors noted that nursing costs (unsurprisingly) rose with increasing dependency-acuity. However, there were large overlaps between dependency groups, which has implications for HRG-based staffing and costing.

The paediatric early warning score (PEWS) track and trigger system, like HRGs, shows promise as a potential dependency-acuity system component (Oliver *et al.*, 2010; Ennis, 2014). The young patient's characteristics and vital signs; e.g., temperature, heart and breathing rate, blood pressure, airway, oxygen saturation and consciousness levels, contribute to track and trigger scoring. A clear advantage is that PEWS is operating in many UK C&YP wards, thereby removing the need to duplicate dependency-acuity measurements. However, a threat to PEWS track and trigger systems is staff assessment and data recording skills (Oliver *et al.*, 2010). A second problem is recalibrating existing CHpPD to match PEWS scores - a challenging exercise (Smith *et al.*, 2009). Once created, PEWS categories, if used to determine C&YP ward establishments, requires multiplying total patients falling into each PEWS category by its FTE multiplier.

Another consideration emerges from the Doman *et al.*, (2004), Ellis and Chapman (2006) research, who feel that dependency-acuity measures are especially important in C&YP wards owing to the tendency to look after high dependency children in general C&YP wards when children's HDU and PICUs may not exist in the trust. For these reasons, C&YP dependency-acuity categories in the literature range widely. Levensham *et al.*, (1993), recommend a four-group classification. Kirk (1990), Bradey *et al.*, (2008), Wyatt and Healey (2005) a five-group arrangement. The Bradey *et al.*, (2008) system, developed for community child care, seems equally applicable to C&YP wards. Dependency-acuity methods that follow children and young people into the community have benchmarking and patient monitoring benefits. Two main downsides, on the other hand, persist: (i) staffing multipliers aren't always attached to dependency-acuity categories; and (ii) data from unique classification systems can't be meta-analysed (pooled).

Allied health professional patient scoring systems feature in the literature. The Barthel Index (http://physical-therapy.advanceweb.com/Article/The-Original-Barthel-Index-of-ADLs.aspx), probably the best-known patient activity and rehabilitation classification, easily lends itself to becoming a dependency/acuity, workload and staffing indicator. However, no Barthel related staffing multipliers were found in the literature and will probably have to be created.

5.3b: Staff activity

The CY&P ward staffing multipliers are derived from two components:

(i) Dependency-acuity scores (described in the section above).
(ii) Care times attributed to each dependency-acuity level.

Component (ii) requires extensive activity analyses to generate CHpPD, but views are mixed in the literature. Kirk (1990) suggest that data are only needed for the most time-consuming activities, a recommendation that modern approaches don't heed. The UK Nursing Database (2106), for example, has 1.85 million nursing activities (with care times), which were collected in adult and C&YP wards, classified into 32 activities. Detailed activity analyses are helpful; e.g., child and young patient activity data, according to the literature, has unusual elements. Beringer and Julier (2009), for example, report that escorting children for investigations (e.g., scans) is particularly work intensive. Indeed, activity data in the UK Nursing Database (2016) (93 wards) shows that C&YP ward staff spent 3.7% of their time escorting children; 1.5% higher than found in 208 adult medical wards. Understanding C&YP ward activities has other advantages, Beringer and Julier (2009) lowered CY&P escorting time to adult ward levels, which indicates that efficiencies can be made. Hall and Nayer's (2014) study also explains why C&YP activity differs from adult wards. Building trust with child and young patients, and their parents/carers takes time and skill. These additional communication activities may explain why staff time spent communicating with young patients and parents/carers is 4.1% higher than found in adult medical wards (NHS Nursing Database, 2016). These differences are important because the main component in workload-based formulas is direct (i.e., face-to-face) patient care. Kusayanagi (2004) unearthed an unusual phenomenon, which underlines why C&YP ward activity data are unique. Their observations showed that adult ward RNs worked at a pace dictated by patients. In C&YP wards, on the other hand, activity was governed by RNs work pace. Scaife *et al.*, (2014) explain another activity phenomenon; i.e., leading a C&YP ward is challenging and daunting for junior RNs. Additional education, training and mentoring is recommended for Band 5s, activities that aren't always included in dependency-acuity-quality methods.

5.3c Staffing multipliers

The main R&D behind workload-based staffing methods is creating valid and reliable dependency-acuity rating scales, before attaching them to equally valid and reliable staffing multipliers (Smith *et al.*, 2009). Together, these two components:

- Allow managers to set or check ward establishments.
- Adjust staffing according to workload.
- Determine staffing establishments for new services.
- Benchmark a ward's actual FTEs/CHpPD against best-practice sites.
- Highlight wards where quality and safety are at risk owing to high workload and understaffing.
  (Wyatt and Healey, 2005; Smith *et al.*, 2009)

Meta-analysing (pooling) C&YP staffing multipliers (i.e., care time per patient) in the literature was impossible owing to:

(i) Different metrics; i.e., staff to bed ratios; staff per shift; CHpPD, etc.;
(ii) No uniform dependency-acuity categories (with and without staffing multipliers attached);
(iii) Insufficient studies in unique (e.g., staff per patient per shift) multiplier group;
(iv) Non-transparent calculations (e.g., were headcounts or FTEs used?).
(v) Unclear whether time-out (headroom) is included/excluded in the staffing multiplier.
(vi) Whether RfA time is included.
(vii) Crude grade mix; i.e., RN and SW split vs. detailed Band 8 to 1 staffing data.

5.3d: Quality assured wards

Several authors in the literature berate healthcare workforce planners for failing to incorporate outcome measures into healthcare workload systems; probably because there is no single patient outcome measure (Audit Scotland, 2002; Alpern *et al.,* 2015; Kirkby, 2015). Those dependency-acuity systems that include parallel service quality measures generate two assurances:

(i) Data used to create staffing multipliers are drawn only from wards/departments that achieve optimal care.
(ii) Fluctuating service quality data can be related to workload and staffing variations. (Arthur and James, 1994; Pelander *et al.,* 2008).

Quality measures, associated with C&YP workload and staffing in the literature, include:

- Untoward incidents; e.g., slips, trips and falls; medication errors; and infection rates (Audit Scotland, 2002; Stegenga *et al.,* 2002); Fenton *et al.,* 2004; Stratton, 2008; Ball and Catton, 2011; Min and Scott, 2016).
- Risk adjusted mortality rates/Confidential Enquiry into Stillbirth and Death in Infancy (CESDI) (Parry *et al.,* 1995; Callaghan *et al.,* 2003; Pronvost *et al.,* 2003; Joyce *at al.,* 2004; Platt and Brown, 2004; Hamilton *et al.,* 2007; Ball and Catton, 2011).
- Failure to rescue (Needleman *et al.,* 2002).
- Monitor-type nursing process framework (Gale and Goldstone, 1985; Donnelly, 1986ab; UK Nursing Database, 2016).
- Child and parent/carer satisfaction/complaint data (Pelander *et al.,* 2008; Stratton, 2008).
- NMC's core nursing standards; e.g., kindness, respect and support (Williams *et al.,* 2013).

Stegenga *et al.,* (2002) noted that C&YP ward gastro-intestinal infection rates were related to ward staffing. They used two metrics: CHpPD (12.5hrs) and patient to staff ratios (3.31: 1). The researchers noted that understaffing led to higher infection rates. Similarly, Stratton (2008) found a strongly inverse relationship between C&YP CHpPD and central line infections. The authors also noted the connection between temporary staffing and parent complaints. The UK Nursing Database (2016), even though it includes only wards that pass a service quality test, shows remarkable differences between the best-of-the-best and the worst-of-the-best wards; notably staff to bed ratios and grade mix; i.e., the best-of-the-best wards employ more staff and proportionally more RNs. Consequently, researchers believe that low staffing is a significant risk factor (Ball and Catton, 2011).

Williams *et al.,* (2013) designed an unusual C&YP quality assurance study, which is easily applied to workload and staffing systems. The authors used a questionnaire based on the NMC's core nursing principles: kindness, respect, dignity and support. Interestingly, kindness and respect shown to patients and families achieved higher scores than parental support. The authors suggest that information giving and emotional support drive these scores. It's possible, therefore, that low support scores are related to lower staffing levels and/or dilute grade mix.

5.3e: Staff mix

The RP to SW ratio receives significant attention in the ward staffing literature. Needleman *et al.,* (2002), for example, showed strong connections between staffing (headcount and mix) and patient outcomes. Thinking goes deeper in C&YP studies; i.e., simple C&YP RP to SW ratio metrics may not be sufficient. A significant concern is that a proportion of the C&YP RP workforce should include practitioners with specialised knowledge and skills and with formal children's nursing qualifications (Bailey, 1996; Beal, 1999; Hamilton *et al.,* 2007). Williams (2012) recommends an 80:20 RN to SW ratio, while the RCN's Nursing Children and Young People Report (2013) set a minimum 70:30, with at least two child specialist nurses on each shift with access to a senior children's nurse always. This guidance isn't heeded; e.g., the Nursing Standard (2011), for example, reported that one in twelve C&YP's surgical wards in one survey didn't have a registered children's nurse on each shift.

Kusayanagi (2004) noted the C&YP ward age range, which may mean that specialist practitioners may not fully use their children's nursing expertise – an important revalidation issue. With teenagers, the ward team may need to include RNs specialising in adult nursing ***and*** practitioners with children's nursing knowledge and skills. If ward based C&YP RNs have a peripatetic (outreach) role (i.e., follow children into the community), then specialist knowledge and skills and, therefore, skill mix, assume more importance (Buckingham and Wilson, 1997). Doman *et al.,* (2004) believe that RPs with critical care skills are needed owing to the tendency to look after high dependency children in C&YP general wards. However, Draper *et al.,* (2004) weren't confident that the NHS has sufficient RNs with CY&P experience/expertise, which may be true in 2016 owing to the NHS's RN shortage.

Another skill mix issue is whether play specialists, nursery nurses and teachers, etc., should be explicit in C&YP ward/department staffing systems. Despite their importance to skill mix (see Table 2), allied professionals, broadly, were discussed far less in the C&YP literature.

5.3f: Validity, reliability and usability

Min and Scott (2015), Ball and Catton (2011) underline that invalid and unreliable nursing workload measures make workload analysis efforts futile. For example, Oliver *et al.,* (2010) showed that critical PEWS observations were recorded in only 53% of patients, which questions PEWS accuracy and places child and young patients at risk. It also questions whether PEWS can become a reliable dependency-acuity measure. Most peer reviewed publications account for their data collection instrument's psychometric properties; in some cases, using novel but effective techniques. Smith *et al.,* (2009), who built the AUKUH (later renamed SNCT) care levels and multipliers, exposed them to rigorous validity, reliability and usability tests to ensure that: (i) dependency-acuity scoring by ward staff; and (ii) staff activity data assigned to patient dependency-acuity categories were accurate and reliable.

Section 5.4: Time-intervention approaches

The time-intervention method requires ward staff to identify (in a checklist) nursing interventions specific to the patient's treatment and care. GRASP, probably the most well-known, includes 48-50 interventions, which account for 80% of nursing work (Clayton, 1980; Diggs, 1980; JoNA, 1985; Milne, 1988). The shortlisted bespoke care plan has care times or multipliers attached, which are converted into FTEs/CHpPD. If completed accurately, then care hours should match patient needs precisely. Owing to the method's detailed and individual care plans, time-intervention methods are easily the most accurate, but these methods should be computerised, otherwise manually allocating interventions to care plans is cumbersome and time consuming, especially if repeated more than once daily. The nursing interventions list and associated care times can easily be updated locally; more so than the dependency-acuity-quality elements and the staff to bed ratio method, which require empirical data. Wilson (1983) suggests that time-intervention method reliability can be checked by matching GRASP's care hours' form to the patients' care plan.

GOSHman's PANDA (2005) system, although not a pure time-intervention method, has many time-intervention methodological characteristics (e.g., 50 detailed treatment and care elements), which, unlike GRASP, are geared specifically to C&YP wards. Table 4 is an extract from PANDA.

Table 4: Examples form GOSHman PANDA

No	*Classification*	*Guidance*
2	Nebulised adrenaline.	Upper airway obstruction needing close observation requiring two or more nebulised adrenalin doses (within 12 hours).
14	Difficult pain control.	Patient with pain that is difficult to control. Includes patients requiring multiple visits from pain control team and/or those patients outside normal pain protocols.

PANDA's 50 categories (sitting in nine groups; e.g., airway, monitoring and drug therapy); were determined empirically (Ellis and Chapman, 2006). PANDA answers authors' concerns about accounting for normal to high dependency patients found in C&YP wards (noted earlier) by differentiating low and high dependency-acuity children (Ellis and Chapman, 2006). The method's other advantages include short-stay, single room and parental weighting adjustments.

Ward nurses decide which treatment/care category applies to each child/young patient 12 hourly. Classification was originally done manually, which may explain why Ellis and Chapman's (2006) experienced varying response rates. Later, a machine-readable form was implemented, which reduced data processing time. The system's software converts the extensive 50 category list into FTEs using a simple and clear method; i.e., professional judgement determined patient-acuity (PAC) staffing multipliers:

PAC 1 (orange): intensive care - 1 staff to 1 patient.
PAC 2 (yellow): high dependency - 1:2.
PAC 3 (blue): normal dependency child under two years - 1:3.

PAC 4 (green): normal dependency child over two years - 1:4
(Ellis and Chapman, 2006)

Establishments can be set for actual, 80% or 100% occupancy; although actual occupancy (discussed earlier) is more precise. Nursing costs are generated by the software, which also spotlights wards under pressure owing to high workload. Near real-time monitoring means that managers can evaluate workloads, deploy nurses efficiently and observe working practices (GOSHman, 2005; Ellis and Chapman, 2006).

Owing to the extensive time-intervention activities listed in these methods, another strength is that ward staff activity (like the dependency-acuity-quality method) can be divided into value- and non-value added work (Arthur and James, 1994). It's not clear from the broader literature how time-intervention methods address skill mix. Ellis and Chapman (2006), on the other hand, use PANDA's data to verify RN and SW competency and staff development needs.

The main downside, however, is that commercial systems have a licensing fee (Ball and Catton, 2011), whereas SNCT, for example, is free for NHS users. Ward staff find updating the care plans (at least daily) time consuming. The NHS Scotland Mental Health and Learning Disabilities Ward Staffing Tool, however, overcomes the problem and could be adapted for C&YP wards. Some nurses don't like the methods task-oriented approach, preferring instead a more holistic care plan. PANDA's categories, on the other hand, were constructed to provide holistic care (i.e., social, physical, etc.) (Ellis and Chapman, 2006).

5.4a: Ward design
Single rooms are an important issue in the C&YP literature (Kusayanagi, 2004; Hall *et al.*, 2007; Hutton, 2010; Yeadon and Mannion, 2015). Patient/family choice is paramount when determining where child and young patients are located; notably: (i) deciding which child and young patient should be isolated; and (ii) addressing teenager (wanting to live an adult life-style) sensitivity about staying in a ward housing children, which can make teenagers feel uncomfortable. Both problems, however, are automatically solved in single-room wards. Hutton (2010) showed that young patients' preferences (notably privacy and independence) significantly affect ward layout and ultimately staffing. Hurst's (2009) work showed that decanting bay ward patients into a single-room ward requires 7% more staff owing to increased 'travelling time'. Interestingly, Morris *et al.*, (2014) found that wards where children were nursed in cubicles did not attract greater costs, which questions whether more staff are needed in single-room wards. Clearly, ward design is an important C&YP WP&D variable and that ward structure, processes and outcomes aren't fully understood.

Section 5.5: Regression models
The regression method has wide application in C&YP WP&D. Regression studies allow analysts to understand how two variables are related, so that they can be used operationally; i.e., at what point variable A influences variable B, so that prediction is possible. The regression method, therefore, helps analysts to predict an unknown value from another variable; e.g., analysts select a clinical specialty's main workload driver (burns dressings), which, when paired with time taken to complete the procedure (with observations repeated in several wards), can be used to predict staffing requirements. The regression method is also used to identify which workload

variables influence outcomes, such as how far low RP to bed ratios influence failure to rescue (Cameron, 1979; Needleman *et al.*, 2002).

Regression analysis has an important role in ward staffing and patient safety; because it's the only WP&D method that can forecast staffing requirements; i.e., if waiting list admissions are known, then future workforce demands can be calculated using a regression model. Once core data (i.e., independent and dependent variables) are gathered, database maintenance and use are relatively straight forward; e.g., if the independent variable value is known (such as child renal dialysis cases), then software will predict the dependent variable (e.g., FTEs required) quickly and easily.

Figure 3: Regression software

	A	B
	Linear Regression-based Staffing Methods	
1	Independent Variable	Dependent Variable
2	*Cases*	*Hours*
3	3	6
4	7	11
5	5	8
6	4	7
7	8	13
8	3	5
9	9	15
10	4	7
11	6	10
12	11	18
17	**Cases**	11
18	***Hours***	17.8

Figure 3 shows a simple linear regression software template. In blue rows 3 to 12, researchers systematically recorded how many cases (e.g., complex wound dressings) occurred in the shift (Col. A) and how many hours were required to complete them (Col. B). In B17, the manager has entered how many dressings take place in the ward each day (in B17) and the software predicts how many hours are needed on the shift (B18). N.B., in practice, more than ten observations are required to build a robust regression model.

Recent workshops held with NHS managers and practitioners, including AHPs, revealed that applying the regression model to therapist services had merit. Practitioners felt that identifying the main independent variables (e.g., stroke patients in the case load) could easily be connected to FTE requirements using regression analysis. However, databases need to be created for each independent variable and tethered to required FTEs. Moreover, data creating ratios must be drawn from best-practice services so that the model wouldn't be extrapolating from sub optimal care.

The regression methods main downsides are the skimpy C&YP WP&D literature and the method's inability to handle qualitative variables (Harper *et al.,* 2010). Like the staff to bed ratio and dependency-acuity-quality methods, designing and building core databases can be expensive and time consuming, which may explain why the literature search didn't turn up many recent studies. Another limitation is that managers need reassuring that regression data are drawn from quality assured wards. Experienced analysts are required to undertake regression calculations, especially if there are multiple independent variables (e.g., RPs and SWs) and to help users predict beyond the range.

Section 6: Annotated Bibliography

A

Author(s): Akman, O., Ozturk, C., Bektas, M., Ayar, D. and Armstrong, M.A.
Year: 2016
Title: Job satisfaction and burnout among paediatric nurses.
Publisher: Journal of Nursing Management, 24, 7, pp. 923-933, 7 JUN 2016 DOI: 10.1111/jonm.12399.
Summary: Purpose: This study aims to determine paediatric nurse job satisfaction factors and burnout levels. Methods: 165 nurses working in paediatric clinics completed the Minnesota job satisfaction scale and the Maslach burnout scale. Findings: Average emotional-exhaustion and depersonalisation scores were low, while personal accomplishment scores were high. High job satisfaction, being married, increased age and a decreased patient assignments were significantly associated with a low burnout levels. Conclusions: Paediatric nurses experience burnout at significant levels. The most important variable that affected job satisfaction was income. Implications for nursing practice. Results could guide WP&D that might prevent or alleviate paediatric nurse burnout.
Key words: Children's wards; nurse burnout; nurse job satisfaction.

Author(s): Alpern, E.R., Feldston, E.S., Hain, P.D., Shah, S.S. and Macy, M.L.
Year: 2015
Title: Academic Structure and Function of Observation Units in Children's Hospitals: A Mixed-Methods Study.
Publisher: Paediatrics, Volume 15, Issue 5, pp.518–525, doi.org/10.1016/j.acap.2014.12.005.
Summary: Observation unit (OU) use has been promoted recently to decrease resource utilization and costs for selected patients, but little is known about their operations, especially paediatric OUs. This study aimed to characterize OU infrastructure and function within freestanding children's hospitals and to compare characteristics between hospitals with and without OUs. Methods: All 43 freestanding children's hospitals that submit data to the Paediatric Health Information System were contacted in 2013 to identify OUs that admitted unscheduled patients from their emergency department (ED) in 2011. Semi-structured interviews were conducted with representatives at hospitals with these OUs. Hospitals with and without OUs were compared. Results: Fourteen (33%) from 43 hospitals had an OU during 2011. Hospitals with OUs had more beds and more ED visits compared to those without OUs. Most OUs (65%) were in the ED and had <12 beds (65%). Staffing models and patient populations differed

between OUs. Nearly 60% were hybrid OUs, providing scheduled services. The OUs lacked uniform outcome measures. Emerging themes included: admissions were intuition based, certain patients were not well suited to OUs, OUs had rapid-turnover cultures, and observation status was arbitrary. Challenges included patient discontent with co-payments and payer-driven utilization reviews. Conclusions: OUs were in higher volume hospitals and varied by location, size, and staffing. Most functioned as hybrid OUs. Practitioners in OUs based admissions on intuition, had staffing cultures centered on rapid patient-turnover, lacked consistent outcome measures, and faced challenges regarding utilization review and patient co-payments.
Key words: Children's wards; hospital; hospitalization; observation status; observation unit.

Author(s): Alves, DFS. and Guirardello, EB.
Year: 2016
Title: Safety climate, emotional exhaustion and job satisfaction among Brazilian paediatric professional nurses,
Publisher: Volume 63, Issue 3, pp.328–335.
Summary: Background: International studies indicate that job satisfaction and burnout interfere with the safety climate and care quality. However, no relational evidence is available for Brazilian paediatric hospitals. Aims: To assess emotional exhaustion and job satisfaction correlation and their predictive effect paediatric professional nurse perceptions regarding safety climate and care quality. Design: Cross-sectional correlational design. Methods: The study was conducted with registered nurses (RN), technician and assistant nurses from two Brazilian paediatric hospitals over three months in 2013–2014 using instruments to assess safety climate, care quality, job satisfaction and emotional exhaustion. Results: Data related to 267 professional nurses from 15 wards and three intensive care units were analysed. Overall, respondents exhibited moderate emotional exhaustion, were satisfied with their jobs and considered care quality to be good. However, respondents exhibited low concordance regarding positive safety-climate perceptions. The variables, emotional exhaustion and job satisfaction, exhibited significant correlations with safety climate and were considered to predict the latter. Conclusion: Emotional exhaustion and job satisfaction among professional nurses influence the safety climate in paediatric hospitals. Implications for nursing or health policy: Investments to reduce emotional exhaustion and to improve job satisfaction among professional nurses allocated to paediatric hospitals might contribute to the patients' safety.
Key words: Workload; children's wards; stress; burnout.

Author(s): Andrews, S.
Year: 2005
Title: Time for study.
Publisher: Paediatric Nursing, 17(7): 42-44.
Summary: Children's nurses in a London hospital ward have increased their study time without increasing agency staffing.
Key words: Time out; children's wards.

Author(s): Arthur, T. and James, N.
Year: 1994
Title: Determining nurse staffing levels: a critical review of the literature.
Publisher: Journal of Advanced Nursing, 19, pp.558-565.

Summary: Summary: Shows that there is no perfect nursing workforce planning system, but that robust ones can inform decision making. Several methods are explored, broadly categorised as top-down and bottom-up. Intuitive methods are flexible and adaptable; responsive to changing demands; consistency can't be checked; prone to shroud waving. Consultative methods (Telford and Brighton) are more structured professional judgement methods; encourages critical scrutiny; can be deemed too subjective. Staffing norm methods; i.e., nurse to be ratios; can be empirically determined or set by expert groups; allows benchmarking; ignores local variation. Staffing formula methods: calculation uses independent variables (e.g., throughout) and dependent variables (e.g., nursing establishments); more consistency and less subjective; good for planning; assumes variables use optimum data. Nursing intervention methods use times (GRASP); accurate if timings are validated; can distinguish direct and indirect care; expensive to implement. Patient dependency methods (Criteria for Care); usually related to service quality; too many dependency categories mean complexity and potential inaccuracy.
Key words: Critical review: professional judgement; timed-task; dependency/acuity methods; regression.

Author(s): Audit Commission.
Year: 1993
Title: Children First: A Study of Hospital Services.
Publisher: London: HMSO.
Summary: Surveyed paediatric ward staffing levels. Seven hospitals and 31 wards are included. Notes that few met the DoH recommended C&YP establishments, and that dependency was a key nursing workload variable.
Key words: Children's wards; dependency; historical data.

Author(s): Audit Scotland.
Year: 2002
Title: Planning Ward Nursing – legacy or design?
Publisher: Edinburgh: Audit Scotland.
Summary: Research team audited 330 Scottish acute and primary care trusts. Nurses make up 50% of NHS Scotland staff but there is variation among health boards. Much variation is unexplained and not by patient demands (pp.3,4). Nurses per bed ranged from 0.93 to 1.23 (p.21). The average nurse per capita was 10.2, but the variation was wide (p.28). Factors associated with higher staffing were: ward layout; direct admissions; acute wards; peripatetic nursing staff part of the establishment; high admissions; bed blocking; proportionally consultants attached to the ward (p.22). Factors not connected to higher staffing were: domestics; porters; ward clerks; elective admissions; borders; ward attenders; student placements (p.23). Nursing expenditure in 00-01 was £1.17b. Health Board nursing expenditure in 2001 ranged from 30 to 39% (p.28). Scottish nursing costs per bed vary between care groups and explained by grade-mix differences (p.5). The average acute trust RN to HCA split was 73:27 and RN expenditure ranged from 64-81% (p.31). Temporary staff costs increased from £25m in 97-98 to £35m in 00-01 (p.3) and half went on agency nursing costs. Two trusts in the Scottish study allowed no time-out in its WP&D (p.4). Typical time out is: holidays 13.5% (11.5% for HCAs); sickness 5.5%; maternity and study leave 3% (p.18). Recruitment and retention issues complicate nursing WP&D (p.3). Only two-fifths of wards were staffed to their funded establishments. There's no single quality or outcome measure attached to nursing WP&D. Proxies such as untoward

incidents are used. No relationship between nurses per bed and patient accidents (pp.8,9). Nursing workforce pressures include direct EWTD (nursing hours worked) and indirect (junior doctors), (p.12). Poor WP&D leads to: compromised care quality; poor supervision; inappropriate working; higher temporary staffing; nursing inefficiency and ineffectiveness (p.15). Few work dedicated workforce planners are employed (p.17).
Key words: Nurses per bed; costs; temporary staff; ward design; staff mix; costs; temporary staffing; time out; NSIs.

B

Author(s): Bailey, J.
Year: 1996
Title: Children first: the local audit.
Publisher: Paediatric Nursing 8(3): 6-7.
Summary: Local children-service audits in hospital show poor RSCN cover on some children's wards and many children still in adult wards.
Key words: Children's wards; staff mix.

Author(s): Beal, J., Richardson, D., Dembinski, S., Hipp, K., McCourt, M., Szlachetka, D. and Vaccaro, D.
Year: 1999
Title: Responsibilities, Roles and Staffing Patterns of Nurse Practitioners in the Neonatal Intensive Care Unit.
Publisher: American Journal of Maternal Child Nursing, 24, 4, pp.168-175.
Summary: To describe the NP's unique contribution to caring for critically ill infants through the studying NP responsibilities, roles, staffing patterns and patient profiles. Design: This prospective descriptive study was conducted in conjunction with a regional multi-site outcomes study. Methods: Data were collected at five regional level II/III NICUs in Massachusetts and Rhode Island. Twenty-two NPs were surveyed. Existing data on outcomes from 2,146 very low birth weight infants were used to describe patient profiles. Nurse practitioner care was defined as assignment to an NP at admission. Illness severity was measured using the Score of Neonatal Acute Physiology (SNAP). Results: NP roles included all NICU care levels and antepartum consultation, delivery room management, transport, and outpatient follow-up. Practitioners were equally involved with all patient complexities and birthweights. Patient assignments were most often made by a rotational system with the resident/fellow or by infant complexity with the NP in some NICUs caring for sicker smaller babies. Clinical Implications: This study documents a blended NP-MD care model in the NICU with each provider bringing unique strengths to the team. Nurse practitioners working in the NICU provide an invaluable contribution to parent support and teaching, post NICU follow-up care, and professional education and research. The NP role in the NICU should not be viewed as a substitution for resident physicians.
Key words: Neonatal staffing; parents; skill mix.

Author(s): Ball, J. and Catton. H.
Year: 2011
Title: Planning nurse staffing: are we willing and able?

Publisher: Journal of Research in Nursing, Vol.16, No. 6, pp.551–558, doi:10.1177/1744987111422425
Summary: Academic research and public enquiries demonstrate the link between adequate staffing levels and patients' experiences and outcomes. Health care providers have a legal duty to ensure (and demonstrate to care regulators) that staffing levels are safe. Yet effective workforce planning evidence, locally or nationally, is scarce. Several tools exist to help employers to determine nurse staffing required. Although not perfect, the technical resource is none the less available to support planning, but are we willing to use it? In England, the different systems have not been reviewed or tested and there is no consensus about the best approach to use. The authors assert that decisions about current and future nursing workforce configurations are currently taken in a data vacuum. Fundamental nurse deployment – registered nurse proportions, patients to nurse ratios – are not systematically captured or recorded, either nationally or locally. We argue that a first step in planning is to establish this baseline. We need data on nursing inputs to relate to the growing data on patient outcomes, to enable managers and policy makers to understand current workforce configuration efficiency and inform future.
Keywords: Nurse staffing, Nurse workforce planning, Patient safety, Skill mix, Staffing levels.

Author(s): Beringer, A. and Julier, H.
Year: 2009
Title: Time off the ward: an action research approach to reducing nursing time spent accompanying children to X-ray.
Publisher: Paediatric Nursing, 21(2): 31-33. (3p)
Summary: Nursing staff in a busy medical ward were concerned about the time spent off the ward accompanying children to X-ray and for other radiological investigations. They chose this as the focus for an action research project. AIM: To improve accompanying a child to X-ray processes and reduce the time spent off the ward by nursing staff. METHOD: A facilitated action research approach was used which involved defining the issue, gathering baseline measures, introducing changes in practice and repeating the measures. OUTCOMES: The changes in practice included telephone timings between ward staff and X-ray, including X-ray in new staff and student orientation programme and establishment a link nurse system. Audits, performed before and after changes demonstrated that time spent in X-ray was halved. CONCLUSION: Changes in day-to-day practice, implemented at ward level, can have a measurable impact on routine events and in building co-operative relations between departments. The facilitated action research process provided a structure and direction to improving practice whilst providing an opportunity to learn new skills.
Key words: Staffing; workload; activity; children's wards.

Author(s): Bradey, A-M., Gyrne, G., Horan, P., Macgregor, C. and Begley, C
Year: 2008
Title: Reliability and validity of the CCNCS: a dependency-workload measurement system.
Publisher: Journal of Clinical Nursing, 17, pp.1351-1360.
Summary: Refines and test the Community Client Needs Classification System (CCNS) – a system designed to measure workload using direct and indirect care elements. It's suitable for all care groups. Community nursing workload measurement is complex owing to service range in the patient's home. Forty-four Ireland public health nurses tried the system on all their caseload for one month. Total time spent in minutes on each client per week. User satisfaction was also

recorded – scores were positive. Inter-rater reliability scores were good. Also, higher dependency patients were given more time. Discrimination was good. Assessment criteria were reduced from 9 to 5 after testing. The following is scored 1 to 5: (i) nursing assessment; (ii) physical care; (iii) psycho-social; (iv) child and family support; (v) teaching and health promotion; (vi) case management; (vii) environment. Simple preventative or technical intervention. Self-caring patient. Guthrie, oxygen administration, nebuliser, venepuncture. Family and patient likely to provide most intervention with encouragement and support. Skilled technical care. Specimens. Complicated dressings. Pain and symptom control. Infected umbilical cord. Tracheostomy care. Complex intervention. Total parenteral nutrition. Infected wounds. Leg ulcers. Frequent visits. Immediate, crisis intervention. Complex care plan. Children at risk. No home help. No staffing formula are provided.
Key words: Dependency and acuity; community nursing.

Author(s): Bowden, H. Pierce, G. and Shaw, V.
Year: 1989
Title: Finding the right level.
Publisher: Nursing Times, 85, 23, pp.48-50.
Summary: Uses nurses per occupied method to set nursing establishments. Method is well explained and specimen data are provided. Data are old, however, but useful for historical analyses.
Key words: Nurses per occupied bed; historical data.

Author(s): Brookes, J.
Year: 2011
Title: Engaging staff in the change process.
Publisher: Nursing Management - UK, 18(5): 16-19.
Summary: Reports on an away day held for staff in a children's hospital acute ward. An appreciative leadership approach was adopted to boost morale, improve standards and motivate staff to transform the ward environment.
Key words: Staff mix; leadership.

Author(s): Buckingham, M. and Wilson, G.
Year: 1997
Title: Skill-mix. Use of skill-mix to improve a health visiting service.
Publisher: Health Visiting, 70, 7, pp.267-269.
Summary: Explores many structures, processes and some outcomes of an extension of nursery nurses' and Registered Sick Children's Nurse's role toward the work that is normally the health visitor's domain. The new worker's qualifications and experience, supported by appropriate in-service education and supervision were factors in the project's success. Missing protocols and guidelines, on the other hand, were a barrier.
Key words: Staff mix; outreach.

C

Author(s): Callaghan, L A., Cartwright, D. W., O'Rourke, P. and Davies, M W.
Year: 2003

Title: Infant to staff ratios and risk of mortality in very low birthweight infants.
Publisher: Archives of Disease in Childhood Foetal & Neonatal Edition, 88, 2, pp.94-97.
Summary: To assess the effect that infant to staff ratios in the first three days of life, have on the survival to hospital discharge among very low birthweight infants (<1500g), having adjusted for initial risk and unit workload. Design: In a retrospective patient-cohort analysis, infants per nurse per shift were averaged for the first three days after admission and related to mortality by logistic regression analysis. Infant to staff ratio was divided into terciles: low (1.16-1.58), medium (1.59-1.70) and high (1.71-1.97) infants per staff member. Subjects: 692 very low birthweight infants admitted to the Intensive Care Nursery, Royal Women's Hospital, Brisbane between January 1996 and December 1999. Main outcome measures: Survival to hospital discharge, adjusted for initial risk using the Clinical Risk Index for Babies (CRIB) score, and adjusted for unit workload using dependency scores. Results: There were 80 deaths among the 692 babies in the study period. The mortality odds, adjusted for initial risk and infant dependency scores (unit workload), were improved by 82% when an infant/staff ratio greater than 1.71 occurred, suggesting improved survival with the highest infant/staff ratio. The low and medium staffing levels corresponded with similar odds ratios for mortality. Conclusions: Infants exposed to higher infant to staff ratios have an improved survival to hospital discharge.
Key words: Neonatal staffing; regression, NSIs.

Author(s): Cameron, J.
Year: 1979
Title: The Aberdeen Formula. Revision of nursing workload per patient as a basis for staffing.
Publisher: Nursing Times Occasional Paper, 75, 49, pp.131-132.
Summary: Updates the Aberdeen Formula's timed-task/activity, regression-based nursing workload system. The main changes reflect the growing old inpatient population.
Key words: Timed-task/activity, regression.

Author(s): Clayton, T.
Year: 1980
Title: In a nutshell … GRASP, the measurement tool.
Publisher: Health Care Systems, Dimensions, Fall, no page numbers.
Summary: Describes GRASP's principles, strengths and weaknesses.
Key words: Timed-task/activity.

Author(s): Curson, J.A., Dell, M.E., Wilson, R.A., Bosworth, D.L. and Baldauf, B.
Year: 2010
Title: Who does workforce planning well? Workforce review team rapid review summary.
Publisher: International Journal of Health Care Quality Assurance, Vol. 23 Iss: 1, pp.110 – 119.
Summary: Purpose: This article sets out to disseminate new knowledge about workforce planning, a crucial health sector issue. The Health Select Committee criticised NHS England's failure to develop and apply effective workforce planning. The Workforce Review Team (WRT) commissioned the Institute for Employment Research, Warwick University, to undertake a "rapid review" of global literature to identify good practice. A workforce planning overview, its theoretical principles, good practice exemplars are provided before discussing their application to healthcare. Design/methodology/approach – The literature review, undertaken between September- November 2007, determined the

current workforce planning evidence within and outside health service provision, and any consensus on successful workforce planning. Findings – Most literature was descriptive and there was little comparative or evaluative research- based evidence to inform UK healthcare workforce planning. Workforce planning practices were similar in other countries. Practical implications – There was no evidence to challenge current WRT approaches to NHS England workforce planning. There are several indications about how this might be extended and improved, given additional resources. The evidence- base for workforce planning would be strengthened by robust and authoritative studies. Originality/value – Systematic workforce planning is a key healthcare quality management element. This review highlights useful information that can be turned into knowledge by informed application to the NHS. Best practice in other sectors and other countries appears to warrant exploration.
Key words: Keywords: National Health Service; United Kingdom; Peer review; Evidence strength.

Author(s): Cusack, J. Field, D. Manktelow, B.
Year: 2007
Title: Impact of service changes on neonatal transfer patterns over 10 years.
Publisher: Archives of Disease in Childhood Foetal and Neonatal Edition, 92, 3, pp.181-4.
Summary: Many changes have been made to neonatal care staffing and organisation in the UK in the past 10 years. This study assessed the extent to which these changes had affected babies' transfer between different services. Methods: Data from the Trent Neonatal Survey, an on-going neonatal intensive care activity study in the UK's former Trent Health Region, were used to evaluate neonatal inter-hospital transfers between 1 January 1995 to 31 December 2004. Transfer types were analysed and trends in gestation and disease severity over the study period were assessed. Inappropriate transfers were identified. Results: 8105 babies were transferred over the period; 2294 babies underwent urgent postnatal transfer and this equates to approximately two such transfers every three days. The maximum journeys by any baby was eight. Intensive care activity rose during the 10 years but inappropriate transfers remained persistently high. Conclusions: Organisational changes in neonatal care during the 10-year period have been insufficient to deal with the rising demand, as reflected by the persistently high inappropriate transfer rate.
Key words: Neonatal staffing.

D

Author(s): Department of Health and Children, Ireland.
Year: 2005
Title: Report of the Working Group to: examine the development of appropriate systems to determine nursing and midwifery staffing levels.
Publisher: Dublin: Department of Health and Children.
Summary: Nursing recruitment and retention is a major issue (p.11). Staff numbers and mix have a major effect on healthcare quality and costs (p.11). The NPOB method is felt to be outdated and weak (p.14). Staff mix harder to achieve since there's no perfect method (p.15). Workload is 4th out of 19 factors felt to influence nursing attrition. Workload is a universal recruitment and retention issue (pp.15-16). Staff mix is felt to influence: nursing efficiency and effectiveness; changing and developing roles; competency-based training; technological

innovations; recruitment and retention; service planning; EWTD; health service reform; and nursing shortages (p.26). Questionnaire sent to managers in all hospitals were followed by site visits. Designed to get a national nursing WP&D picture (56% response). Nursing WP&D methods: Historical 46%; Professional judgement 22%; Acuity-quality 11%; NPOB 8%; None 4%; Timed-task 2%; Regression 2%; other 1% (p.9, 21). Ten percent had a computerised staffing system (p.22). Only 2% evaluated their staffing system (p.23). Care groups included: general; elderly; maternity; learning disability; psychiatry; children; palliative care (p.37). Learning disability nursing units had no WP&D system (p.22). The main CrCU system from the UK (SOPRA) in use in Ireland (p.23). Report recommendations: it's important that any imported system and data are adjusted to the Irish culture (p.25). There are differences in: grading; support staff roles; extended roles and not least a longer working week (p.25). Staffing methods must include staff mix formulas; dependency and workload are essential to monitor changing workload; assessment frequency should be determined locally; methods must include quality indicators and the show relationships between workload, staffing and patient care; rostering systems should accommodate work-life balance, include all staff groups; reflect the environment in which nurses work; address in-service education to use the system and related IM&T at local levels; IM&T must be compatible with government policy, integrated into local IM&T systems and involve users in decision making (pp.26-31) Also recommends a pilot study to test and implement these issues. Once evaluated, results can be rolled-out and a national database created (p.31).

Key words: Acuity-quality; costs; CrCUs; education and training; IM&T; staffing methods; nurses per bed; dependency; professional judgement; quality; system reviews; recruitment and retention; regression; duty rotas; ward layout.

Author(s): DH
Year: 2007
Title: Payment by Results Guidance 2008/09.
Publisher: London: DH

Summary: Latest HRG and PbR guidance for commissioners and providers using recent cost and activity data. Some tariff payments have decreased despite inflation. The tariff has been brought into line with clinical practice. Some procedures, such as shoulder joint treatments, have been removed owing to varying treatment costs. Tariff involving prosthetics are reimbursed at standard rates. NICE guidance has been used to modify the tariff. Other procedures have been made subject to indicative tariffs, which is the starting point for local negotiations. Some providers will be eligible for specialist top-up payments, such as children's services. The reasons, however, are medical not nursing based. Independent providers will normally be paid tariff rates adjusted using MFF. Antenatal admissions (N12) have been scrutinised and payment will only be made if admission was necessary. Admission tariff payment continues to be based on HRG 3.5 and spells not FCEs. Outlier LoS continues to be based on HRG trim points. The outlier payment operates after LoS exceeds the trim point – calculated in the same was as reference costs. There are separate trim points for elective and emergency admissions, which attract separate per diem rates unique to the HRG. The OPD tariff is front-loaded, while follow-ups are paid less to discourage unnecessary repeat attendances. Low volume OPD procedures fall outside PbR owing to volatile costs. The A&E tariff has three components: (i) high cost; (ii) standard; (iii) and minor. Tariff payments can be adjusted for: (i) emergency admissions; (ii) short stay; (iii) top-ups for some specialist services; (iv) 80/20 funding split for A&E activity;

and (v) long-stay patients. Unbundling can occur in rehabilitation and diagnostic episodes. The idea is that providers are incentivised to offer treatment and care in the best setting, such as primary/community care-based rehabilitation. The tariff, therefore, should not obstruct more appropriate provision. Rehabilitation is not currently classified and remains outside PbR. Local negotiation is necessary, therefore. In some cases, the trim point payment may be used to fund care. Stroke care is one example. After the acute phase (7-12 days), commissioners may encourage Early Supported Discharge and unbundle the tariff to agree payment. The tariff can be flexible, based on: (i) advanced agreements; (ii) agreed outcomes; and (iii) risk carrier. Critical care HRGs remains outside PbR. Work is underway to develop CrCU HRGs.
Key words: HRGs; patient classification.

Author(s): Dickinson, K. and Jackson, K.
Year: 1999
Title: Staffing levels on children's wards: a snapshot survey.
Publisher: Journal of Child Health Care, 3(4): 5-11.
Summary: A snapshot staffing-levels survey was undertaken in 72 wards/units across the United Kingdom. A ratio of 4:1 children to staff during day shifts and 6:1 during night shifts was established as a working 'benchmark' for the study's purposes. Many respondents expressed concern around ward establishment levels. High vacancy levels in D grade posts was identified, which has implications for the standard and service quality. The need for a benchmark ratio for children's nurses is discussed. Further work is necessary to explore the study's findings.
Key words: Children's wards; staffing; quality; NPOB.

Author(s): Diggs, W.A.
Year: 1980
Title: New methodology affords 'Grasp' on minimum nursing staff.
Publisher: Health Care Systems, Fall, no pages.
Summary: Describes GRASP's background and development since 1970. Article is geared to critical care. Components are thoroughly described. Data are provided but no data collection instruments. The patient care hour chart has 48 nursing interventions.
Key words: Timed-task/activity.

Author(s): DoH
Year: 1997
Title: A Bridge to the Future - Nursing Standards, Education and Workforce Planning in Paediatric Intensive Care.
Publisher: Wetherby: DoH.
Summary: Provides a dependency-based formula for calculating nursing establishment and grade-mix in children's wards.
Key words: Children's wards; dependency.

Author(s): Doman, M., Prowse, M. and Webb, C.
Year: 2004
Title: Exploring nurses' experiences of providing high dependency care in children's wards.
Publisher: Journal of Child Health Care, 8(3): 180-197.

Summary: Critically ill child care has received much attention in the past decade, and many recommendations from reports relating to paediatric intensive care provision have been addressed. In comparison, high dependency care has received less attention. This care is often provided on general children's wards, yet its impact on nursing staff and care delivery have received little attention. This article presents a study (using focus groups) that explores nurses' experiences providing high dependency care on children's wards. Following analysis, six categories emerged: definitions and high dependency care have in a high dependency unit; problems in district general hospitals; the skills needed for high dependency care; team working; and staffing for high dependency care. These findings have implications for current clinical, managerial and educational practice and for future developments in high dependency child care.
Key words: Dependency; acuity; HDUs; children's wards.

Author(s): Donnelly, P.
Year: 1986a
Title: Spotlight on children: It's the quality that counts.
Publisher: Nursing Times, 82, 26, pp.59-61.
Summary: Describes Criteria for Care and how it was applied to paediatric wards. Also includes the Monitor component and how it was applied to paediatric wards. Specimen instruments and data are provided.
Key words: Children's wards; dependency-acuity; quality.

Author(s): Donnelly, P.
Year: 1986b
Title: Staffing a children's unit.
Publisher: Nursing Times, 82, 39, pp.35-36.
Summary: Extends the Donnelly (1986a) article.
Key words: Children's wards; dependency-acuity; quality.

Author(s): Draper, E S, Manktelow, B N, McCabe, C, Field, D J.
Year: 2004
Title: The potential impact on costs and staffing of introducing clinical networks and British Association of Perinatal Medicine standards to the delivery of neonatal care.
Publisher: Archives of Disease in Childhood Foetal & Neonatal Edition. 89, 3, pp.236-40.
Summary: To produce models to estimate the impact of introducing clinical networks and the 2001 BAPM standards to neonatal care delivery. Design: Prospective observational study using a geographically defined population and data collected by questionnaire on staffing levels and cot availability. Setting: Trent Health Region UK. Subjects: All infants born to Trent resident mothers at or before 32 weeks' gestation between 1 January 1998 and 31 December 1999. Staffing numbers and cot availability for neonatal care in 2001. Methods: A modelling exercise was carried out using information for all neonatal admissions for Trent resident infants. Three models were investigated: (a) current care provision; (b) network where three lead centres provided intensive care for the region and the remaining units provided either high dependency or special care alone; (c) network where six lead centres provided the intensive care for the region and the remaining units provided either high dependency or special care alone. Overall costings, staffing levels and cot requirements were calculated for each model. Staffing levels and

cot availability were used to calculate current care provision costings. Results: Running costs were approximately £33.35 million, although a proportion of nursing posts are currently unfilled. Estimates for introducing a three-centre model meeting BAPM 2001 standards range from £37.31 to £43.4 million. Equivalent figures for the six-centre model were: £36.32 to £42.62 million. Approximately 370 and 230 babies a year would be involved in transfer in the three and six centre models respectively. This is in contrast with 374 and 368 urgent transfers that took place in 1998 and 1999 respectively. Conclusion: The costs associated with introducing managed clinical networks and meeting BAPM care standards are not excessive, especially when considered against the likely 7-10-year timetable. Attracting and retaining sufficient staff will pose the major challenge.
Key words: Neonatal care; NPOB; costs.

E

Author(s): Ellis, J. and Chapman, S.
Year: 2006
Title: Nurse staffing requirements.
Publisher: Nursing Management, Vo. 13 No. 4, pp.30-33.
Summary: Changing morbidity and technological developments place increasing demands on healthcare providers. Staffing accounts for 59% of NHS expenditure, rising to 64% in one C&YP's hospital. Staffing in the NHS' biggest asset and investment. Productivity likely to become an increasingly important point. Healthcare staffing isn't always systematic and empirically based. Dependency-acuity methods are preferred to staff: occupied beds because dependency-acuity is increasing. There are few methods for C&YP's wards. Too many HDU children are looked after in general wards. GOSHman's system identifies high and low dependency-acuity children using 50 holistic care categories (determined empirically) into nine groups (machine read). Application is valid and reliable. Multipliers attached to each category, which easily determine the ward's staffing needs (based on actual and predicted occupancy). System is software supported and identifies wards under pressure. Roll out has been successful. Deployment and working styles can be monitored. Competency (related to HDU patients) data also emerge. Data are also used to redeploy staff where workload is low (moving staff to the front line).
Key words: Children's wards; staffing; dependency-acuity.

Author(s): Ennis, L.
Year: 2014
Title: Paediatric early warning scores on a children's ward: a quality improvement initiative.
Publisher: Nursing Children & Young People, 26(7): 25-31.
Summary: The quality improvement initiative's aim was to incorporate a paediatric early warning score (PEWS), track and trigger system in children's routine care in an acute general children's ward at a regional hospital in the Republic of Ireland. Without a nationally recommended specific PEWS strategy, a local plan was developed. Structuring and implementing the PEWS and track and trigger system is presented. Data from the first year were collected to evaluate clinical utility and effectiveness. In the busy acute children's service, the PEWS initiative was found to benefit early detection, prompt referral and timely, appropriate management of children at potential clinical deterioration risk. Nursing staff were empowered

and supported to communicate concerns immediately and to seek rapid medical review, according to an agreed PEWS escalation plan. Outcomes were significantly improved.
Key words: Children's wards; dependency-acuity.

Author(s): Evans, M.A.
Year: 1994
Title: An investigation into the feasibility of parental participation in the nursing care of their children.
Publisher: Journal of Advanced Nursing 20(3): 477-482.
Summary: It is believed that inpatient children benefit from having their parents present. It is for this reason that care by parents is evolving. Although such a philosophy is beneficial for the child, it has undoubtedly evolved owing to low staffing levels, and in such an environment the guidelines for safe practice are easily called into question. In a new paediatric oncology ward, it was decided to consider instituting care by parents in a structured way using practice research based. A teaching tool was formulated and five mothers who presented consecutively to the paediatric oncology ward were taught how to administer intravenous antibiotics to their child. Mothers' views on the teaching programme were sought using taped interviews and data were analysed using grounded theory. This method allowed a theoretical framework based on realistic data to emerge and the resultant themes provided a valuable insight into mothers' views on the subject. It emerged that nurses' attitudes towards care by parents require clarifying and that changes need to take place if parent care is to be taken on board. Negotiation to allow mutual understanding between parents and nurses is essential to implement such a scheme.
Key words: Children's wards; parents; caregivers.

F

Author(s): Fagerstrom, L. and Rauhala, A.
Year: 2007
Title: Benchmarking in nursing care by the RAFAELA patient classification system – a possibility for nurse managers.
Publisher: Journal of Nursing Management, 15, pp.683-692.
Summary: Looks at the RAFAELA system's benchmarking possibilities. RAFAELA includes three workload measures: patient nursing intensity score; daily nursing resource and optimal nursing workload. Benchmarking is about collecting data; comparing organisations; exploring the gaps between organisations; and improving services. Costs, nursing intensity score, workload per nurses, quality and optimal nursing values are compared. Diagnostic related groups were considered but data were minimal and all staff costs are used rather than nursing costs. Paediatric ward staffing costs were higher than adult wards despite children's wards generating lower workloads, although the paediatric ward workloads fluctuated. Authors agree that DRGs are an important way forward. Eighty-six wards in 14 hospitals were included in the study. Optimal nursing workload was exceeded half the time. A recent Australian studied showed that 30-50% of nurses felt they could not meet the patients' needs owing to staffing shortfalls.
Key words: Nursing intensity; costs; acuity; DRGs; benchmarking; children's wards; workload.

Author(s): Fenton, A., Leslie, A. and Skeoch, C.
Year: 2004

Title: Optimising neonatal transfer.
Publisher: Archives Disease in Childhood: Foetal and Neonatal Edition 89(3). pp. F215-F219. OS - June 2004. 8(6).
Summary: Need for appropriately funded, organised transfer systems in critically ill neonates managed clinical network for neonatal intensive care. Referrals, staffing, training and clinical aspects are considered. Relationship between probable nosocomial bacteraemia and organisational and structural factors in UK neonatal intensive care units.
Key words: NICUs; KPIs.

G

Author(s): Galvin, J.A. and Goldstone, L.
Year: 1985
Title: Junior Monitor.
Publisher: Loughton: Gale Publications.
Summary: The Monitor pack for children's nursing.
Key words: Quality.

Author(s): Gomes, G.C.; Lunardi Filho., WD and Erdmann, AL.
Year: 2008
Title: Perceptions of nursing team as to the father as a caretaker in paediatric wards.
Publisher: Revista Gaucha de Enfermagem, 29(3): 431-437.
Summary: Fathers have increasingly participated in child care. The study objective was to identify nursing staff perceptions regarding father as a caregiver in paediatric units. A qualitative, descriptive and exploratory study was conducted during 2005 in a Brazilian paediatric unit. Four nurses and fifteen orderlies were interviewed using semi-structured interviews. Data were submitted to thematic analysis. Results showed that the team believed that children need both the mother and the father, but space does not allow both to be present. The nursing team also believes that mothers undertake better child care than fathers. Fathers are only accepted as caregivers in the hospital under special situations. It was concluded that the nursing team needs to think how to help fathers practice participatory fatherhood in paediatric wards.
Key words: Caregivers; children's wards; fathers; nurse attitudes; paternal role; ward design.

Author(s): GOSHman
Year: 2005
Title: Paediatric Acuity and Nursing Dependency Assessment (PANDA) Tool (v2) Classification and Guidance.
Publisher: GOSHman.
Summary: Uses 50 classification criteria to place a child in one of staffing multiplier categories: ranging from 1:1 to 1:4 nurse to patient ratio (professional judgement based). Differentiates routine from HDU and ICU care. The RN to patient ratios are assessed at least daily, but twice daily is recommended. Any child not falling into any classifications is categorised as normal. Scores are adjusted for short-stay patients. Child complexity and single room weightings are accommodated. Demanding parents attract a weighting. Recommended staffing is expressed as FTEs required for actual, 80% or 100% occupancy. A 20% to 22% uplift is added to cover leave. Results can be triangulated internally. Strong on costing. Software supported.

Key words: Dependency; acuity; NpOB; children's wards; costing.

Author(s): Grech, V., Cassar, M. and Distefano, S.
Year: 2012
Title: Nurse staffing levels on the NPICU in the island of Malta.
Publisher: Journal of Paediatric Intensive Care, 1(1), pp.25-29.
Summary: Nurse staffing levels in neonatal paediatric intensive care units (NPICU) are often inadequate. Malta is a small Island in the central Mediterranean (total population around 400,000) with a birth rate just under 4000/annum, with one NPICU. This study analysed nurse staffing levels for one year to ascertain whether levels are adequate. Methods: daily ward occupancies were classified by dependency and ideal nursing requirements were estimated using internationally approved standards, daily, for the 12-month period. These were compared with the actual daily morning nursing levels to estimate deficit/s. Results. There were 373 admissions to the unit resulting in 5464 patient days (daily census at 0700 hrs) and 1471 free bed days (occupancy 78.8%). Occupancy varied between 8 and 23 patients (mean 15). Staffing levels ranged between 7 and 17 nurses (mean 11). The overall mean deficit was of 3.3 nurses per day, but this ranged from a maximum of 11 to a rare 7 nurse surplus. Conclusions: this study only focused on a daily morning snapshot where the nursing staff is at its peak number – the nocturnal deficit is naturally worse. Furthermore, experience levels vary owing to short rotations through the unit; i.e., inexperienced midwifery staff. Moreover, there are no staff designated as responsible for education and training, extra staff for unpredictable high dependency situations, to compensate for leave, sickness, maternity leave, study leave, staff training and attendance at meetings. Clearly, the Maltese NPICU is overall understaffed.
Key words: Hospital bed capacity; infant; new-born; intensive care units; neonatal workload; staff mix.

H

Author(s): Hall, J. and Nayar, S.
Year: 2014
Title: Building trust to work with children after a severe traumatic accident.
Publisher: Contemporary Nurse: A Journal for the Australian Nursing Profession, 46(2): 161-169.
Summary: Trust is integral to nursing; yet little is known about how nurses establish trust when working with patients. This grounded theory study explored nurses' perspectives of how to build trust with a child and family in paediatric acute healthcare. Seven paediatric acute care nurses were asked what they did when they cared for a child admitted to an acute care ward from emergency department or intensive care unit following a severe traumatic accident. Building trust emerged as the basic social process for an effective working relationship between a nurse and family to promote the rehabilitation of the child. Argues that building trust is critical to nurses developing a working relationship with both child and family to promote optimal health, and enables nurses to effectively step out and handover childcare to the family.
Key words: Children's wards; nurse-patient relations; professional-family relations; skill mix.

Author(s): Hall, J., Roopnarine, S. and McLean, J.
Year: 2007

Title: Introduction of an isolation policy in paediatric wards.
Publisher: Paediatric Nursing, 19(9): 14-17.
Summary: Where and how to care for children with infections, or those requiring protection, is a daily debate in many paediatric settings. Placing patients into single rooms for infection control purposes is well documented but there is little guidance on when to remove patients from isolation rooms. Unless isolation for each patient is evaluated daily, cubicles availability falls, resulting in potentially unnecessary transfers to other hospitals where such facilities are available. A new isolation policy was introduced to improve isolation room availability on paediatric wards in a large inner city teaching hospital with over 100 paediatric inpatient beds. A change management framework included empowering organisational action and consolidating improvements. Strategies were introduced to prompt daily isolated child-review, including clear criteria for isolation and nursing staff in the emergency department challenging the decision to admit a child into an isolation room. The policy and subsequent audits resulted in improved staff awareness, using isolation rooms more effectively and reduced transfers to other hospitals.
Key words: Patient isolation; children's wards, single rooms.

Author(s): Hamilton, KE. Redshaw, ME. and Tarnow-Mordi, W.
Year: 2007
Title: Nurse staffing in relation to risk-adjusted mortality in neonatal care.
Publisher: Archives of Disease in Childhood Foetal & Neonatal Edition, 92, 2, pp.99-103.
Summary: Objective: To assess whether risk-adjusted mortality in very low birthweight or preterm infants is associated with nursing provision. Design: prospective study of risk-adjusted mortality in infants admitted to a random sample of neonatal units. Setting: 54 UK NICUs stratified by: patient volume; consultant availability; nurse: cot ratios. Patients: 2585 very low birthweight (birthweight <1500 g) or preterm (<31 weeks' gestation) infants. Main outcome measure: Death before discharge or planned deaths at home, excluding lethal malformations, after adjusting for initial risk 12 hours after birth using gestation at birth and illness severity in relation to nursing provision calculated for each baby's neonatal unit stay. Results: 57% of nursing shifts were understaffed, with greater shortages at weekends. Risk-adjusted mortality was inversely related to the nurse provision with specialist neonatal qualifications (OR 0.67; 95% CI 0.42 to 0.97). Increasing the nurse ratio with neonatal qualifications to intensive care and high dependency infants to 1:1 was associated with a 48% decrease in risk-adjusted mortality (OR: 0.52, 95% CI: 0.33, 0.83). Conclusions: Risk-adjusted mortality did not differ across neonatal units. However, survival in neonatal care for very low birthweight or preterm infants was related to proportion with neonatal qualifications per shift. The findings could be used to support specific specialist nursing provision standards in neonatal and other intensive and high dependency care areas.
Key words: Neonatal staffing; skill mix; key performance indicators.

Author(s): Hancock, C.
Year: 1980
Title: Finding the right level.
Publisher: Nursing Mirror, 150, 2, pp.37-8.
Summary: Considers studies that establish staffing methods. Explains that acute wards have been well studied but Cinderella care groups like paediatrics have not been evaluated.
Key words: Review; historical.

Author(s): Harper, P.R, Powell, NH., and Williams JE.
Year: 2010
Title: Modelling the size and skill-mix of hospital nursing teams.
Publisher: Journal of the Operational Research Society, 61, pp.768-779.
Summary: Previously published work has described how the hospital capacity simulation tool, PROMPT was developed, which has now been adopted in several UK hospitals and is used for both strategic and operational planning and managing key hospital resources. The work, as presented here, extends the PROMPT functionality to consider in more detail workforce issues. Working with some current hospital users, the research focussed on detailed planning for calculating inpatient nursing team size and skill-mix. The chosen method uses both simulation and optimization. Outputs from the PROMPT three-phase discrete event simulation are fed into a stochastic programme, which suggests optimal nurses to employ (whole time equivalents) by skill-mix and the corresponding numbers by shift. A novel feature is the ability to predict and compare nursing needs based on different methods of capturing patient-to-nurse ratios as currently adopted across the UK. Illustrative results from one hospital demonstrate that although overall nursing teams on different wards are appropriate and comparable to the outputs from the work's simulation phase, often the nurses employed at different grades is not well matched to patient needs and skill-mix should be reconsidered. Results from the optimization phase suggest that it is cost beneficial to increase permanently employed nurses to account for fluctuations in demand and corresponding high temporary (agency) nurse costs. The tool's scenario functionality permits changing size and skill-mix following changes in patient volumes, patient case-mix, bed numbers and stay. Professional judgement - expert groups; handles immeasurable variables. Nurses per occupied bed; aggregated over time; data emerge from quality assured wards; doesn't handle inappropriate working too well. Acuity-quality methods: relationship between nurse activity and service quality is complex; grade mix from best practice wards may not suit every context. Timed-task; base information is easily updated. Regression methods: can't incorporate qualitative variables.
Key words: Simulation; stochastic programming; healthcare modelling; nurse skill-mix; NpOB; professional judgement; acuity-quality; timed-task; regression.

Author(s): Hart, R.
Year: 1992
Title: Children's participation in healthcare facility design
Publisher: Child Health Design, Spring, pp.3-5.
Summary: Addresses hospital design according to children's varying and conflicting needs. Explores whether professional's insights are enough when designing buildings.
Key words: Layout; historical.

Author(s): Health Service Journal.
Year: 2015
Title: Analysis.
Publisher: Health Service Journal,125, 6471, p.4.
Summary: NHS nursing workforce was 5.5% larger in 2015 compared to 2014, but growth is slowing. Participation rates are shrinking.
Key words: Recruitment and retention.

Author(s): Hurst, K.
Year: 2009
Title: Do single rooms require more staff than other wards?
Publisher: Nursing Standard, 24, 2, p.14,
Summary: Recommends a 7% staffing uplift for single-room design wards simply caused by extra travelling time.
Key words: Ward design; activity; workload.

Author(s): Hutton, A.
Year: 2010
Title: How adolescent patients use ward space.
Publisher: Journal of Advanced Nursing, 66(8): 1802-1809.
Summary: Aim. Reports ward space use study in a purpose-built adolescent ward and the influence space had on both adolescent patients and nurses. Background. A separate ward environment gives adolescent patients opportunities to be with peers, have privacy and independence and be nursed away from younger children. Adolescent wards should cater for these differences and to set routines around this age group. Methods: data were collected between 2002 and 2003 by participant observation and interview. Thirty-five observations were undertaken (adolescent and nursing staff), with associated interviews. Seventeen semi-structured individual nurses and 11 adolescent interviews were conducted, aimed at exploring ward space. Patient demographics, ward policies and patient information sheets were also used. Findings: adolescent patients created their own ward spaces from personal effects that interested them. These spaces show nurses who they are. Adolescent patients want to be identified as more than 'just' a patient when they are in hospital. What these spaces do is to assist the adolescent patient in escaping the ward homogeneity by cutting across its activities. Conclusions: by understanding patients through their self-created spaces, nurses can improve adolescents' capacity to contribute to their own care, whilst enhancing their care experiences through understanding and collaboration.
Key words: Adolescents; ward design.

I

Author(s): Ismael, A.Q. and Ganhi, A.
Year: 2011
Title: Staffing Small Units.
Publisher: Nursing Children and Young People. 25, 2, 13-13. http://dx.doi.org/10.7748/ncyp2013.03.25.2.13.p10707.
Summary: An audit carried out in Good Hope Hospital, Birmingham in 2011 examined bed occupancy on the paediatric ward to assess nursing requirements using the RCN guidelines. This audit was prompted by a plan to reduce nursing levels, which subsequently went ahead based on occupancy data collected during the subsequent summer. Current staffing levels include two trained nurses with one healthcare assistant (HCA) providing additional support during the day. The children's ward was downsized to 12 inpatient beds, but with an additional four observational beds, therefore allowing a maximum of 16.
Key words: NpOB; children's wards; downsizing.

J

Author(s): Joyce, R. Webb, R. and Peacock, JL.
Year: 2004
Title: Associations between perinatal interventions and hospital stillbirth rates and neonatal mortality.
Publisher: Archives of Disease in Childhood Foetal & Neonatal Edition, 89,1, pp.51-6.
Summary: Previous studies suggest that high risk and low birthweight babies have better outcomes if born in hospitals with level III neonatal intensive care units. Relationships between obstetric care, particularly intrapartum interventions and perinatal outcomes are less well understood, however. Objective: to investigate obstetric, paediatric and demographic factor effects on hospital stillbirths and neonatal mortality rates. Methods: cross sectional data on all 65 Thames Regions maternity units, 1994-1996, covering live births and stillbirths. Hospital level analyses investigated associations between staffing rates (consultant/junior paediatricians, consultant/junior obstetricians, midwives), facilities (consultant obstetrician/anaesthetist sessions, delivery beds, special care baby unit, neonatal intensive care unit cots, etc.), interventions (vaginal births, caesarean sections, forceps, epidurals, inductions, general anaesthetic), parental data (parity, maternal age, social class, deprivation, multiple births) and birthweight on standardised stillbirth rates and neonatal mortality. Results: uni-factorial analyses showed consistent negative associations between obstetric intervention and stillbirth rates. Staffing, facilities and parental data also showed significant associations. Scores for interventional, organisational and parental variables were derived for multifactorial analysis to overcome statistical problems caused by high inter-correlations between variables. A higher intervention score and higher consultant obstetricians per 1000 births were both independently and significantly associated with lower stillbirth rates. Organisational and parental factors were not significant after adjustment. Only Townsend deprivation score was significantly associated with neonatal mortality (positive correlation). Conclusions: birth weight adjusted stillbirth rates were significantly lower in units that took a more interventionist approach and in those with more consultant obstetric staffing. There were no apparent associations between neonatal death rates and the hospital factors measured.
Key words: Neonatal staffing; key performance indicators.

K

Author(s): King, S.
Year: 2000
Title: Research: Safe staffing levels for children's wards.
Publisher: Paediatric Nursing, 12, 2, pp.28-31.
Summary: Considers DoH guidelines on paediatric ward safe staffing levels; notably the RSCN mix. Highlights the reasons why staffing recommendations may be inadequate. Believes that two RSCN per shift isn't enough. Discusses a three-group dependency/acuity classification. Plots the occasions when children's wards didn't meet the DH staffing guidance. Several variables (environmental hazards, dependency, shift systems) are discussed. No formula or data are provided other than simple RSCN to patient ratios. Feels that C&YP WP&D methods are inconsistent.

Key words: Children's wards; grade-mix; NPOB; safety.

Author(s): Kirk, R.
Year: 1990
Title: Using workload analysis and acuity systems to facilitate quality and productivity.
Publisher: Journal of Nursing Administration, 20, 3, pp.21-30.
Summary: Recommends six nursing hours per patient day. Offers a method for establishing nursing intervention times. Underlines staffing to achieve quality care. Calls professional judgement the best guess approach. Cheap and fast, but easily biased. Calls NpOB historical averaging: easy and inexpensive, calculations can be dubious. Data must be drawn from best-practice wards. Calls the acuity-quality system logging. Work sampling is like logging but is more empirical. Predertmined standards is work sampling methods endorsed by national leaders. Time and motion studies can be used to validate timed-task methods. Recommends that only the time-consuming nursing interventions are measured. Attached CHpPD to five acuity levels.
Key words: CHpPD; timed-task; quality; professional judgement; acuity-quality; NpOB.

Author(s): Kirkby, K.
Year: 2015
Title: Hours per Patient Day: Not the Problem, Nor the Solution
Publisher: NURSING ECONOMIC$/January-February 2015/Vol. 33/No. 1.
Summary: Hours per patient day (HPPD) is a metric that is easy to use when determining budgeted FTEs and for comparing staffing across organizations. The NHpPD metric is easy to calculate: a 1:2 ratio is 12 CHpPD; 1:3 is 8; 1:4 is 6; 1:5 is 4.8 and 1:6 is 4 CHpPD. There are many considerations in determining the appropriate CHpPD. Standardisation is required; e.g., is funded, rostered and/or temporary staffing the numerator? Automated patient acuity, staffing, and human resource systems provide information for determining budgeted CHpPD and in making defensible requests for adjustments. Argues for CHpPD to be adjusted according to dependency/acuity. No matter how much data we have about staffing levels, nurse education and skill levels, the care environment; and patient acuity, the real key is determining the outcomes we need to compare staffing against; i.e., nursing quality and nurse staffing. We must quantify the savings associated with positive outcomes and get this information in the public's hands so they can make informed decisions.
Key words: Nursing hours per patient day; outcomes; KPIs.

Author(s): Knauf, R.A. Ballard, K. Mossman, P.N. and Lichtig, L.K.
Year: 2006
Title: Nursing Costs by DRG: Nursing Intensity Weights (NIW).
Publisher: Policy, Politics, & Nursing Practice, 7, 4, pp.281-289.
Summary: DRGs generally recognise hospital clinical and financial care characteristics but they do not reflect nursing time and costs – a problem because nursing is the largest hospital cost item. The authors argue that it's wrong to bundle nursing in with hotel-type costs. Despite awareness - there is a lack of data to resolve the issue. At best, we have the ward's total nursing cost divided by occupancy and by 365 to generate a daily nursing cost per occupied bed, which, technically, should be what patients pay. One way to overcome the problem is to attach nursing weights to DRGs using professional judgement. A modified Delphi technique and patient data (discharges, LoS, perioperative days, admission source, disposal, age, principal and secondary

diagnoses and procedures) was used in the USA. Patients were classified as 1 minimum; 2 sub-acute, 3 acute; 4 intensive, or 5 maximum using assessment, planning emotional support, medical needs and physical needs' criteria. Consequently, acuity level 1 (NIW 0.75) required a 16 patients to1 nurse ratio; 2 (1.5) 8:1; 3 (3) 4:1; 4 (6) 2:1; 5 (12) 1:1. These data combinations are meaningful but how were they attached to the DRG? A simple technique is used to calculate the average DRG nursing cost (p.287) from weighting NIWs, which is the amount patients pay. Empirically determined weights weren't used owing to insufficient time and money. Authors recognise that activity-based DRG nursing costs would be valuable. The modified Delphi technique reliability assessment results were strong. Compression, another DRG problem (especially for nursing), is lessened since daily flat-rate charges for care groups are necessary. Consequently, under- and overpayment risk is reduced. Plainly, it's wrong to subsidise treatment costs. Paediatric wards had the sixth highest nursing intensity (23 specialties).
Key words: Nurses per bed; acuity; costs; DRGs; children's wards.

Author(s): Kusayanagi, H.
Year: 2004
Title: Difficulty for the nurses who take care of children and adults in the same ward.
Publisher: Journal of Japan Academy of Nursing Science, 24(2): 62-70.
Summary: The study's purpose was to identify the difficulties for the nurses caring for children and adults in the same ward. Ethnonursing was applied to this study. The main participants were 7 nurses. The study was conducted by careful observation and interview with the main participants, and additional interview for 14 general participants. Five sub themes and one main theme emerged. Nurses cared for children at the nurse's own pace, in contrast they cared for adult patients at the patient's own pace. Nurses recognized their ward was specialized for children, however they also paid significant attention to adult patients who might feel uncomfortable with children. Nurses felt the adult and child mixed condition did not allow their professional skills and knowledge to be used, also nurses were exploring their specialties. In consequence, those findings suggested the following: nursing teams should be divided into one for children and another for adults, both child care specialists and nurses with adult care expertise are required in this ward, and nurses should be given the opportunity to examine their future career development.
Key words: Nurse attitudes; staffing; children's wards; mixed wards.

L

Author(s): Levenstam, A.K. and Bergbom Enberg, I.
Year: 1993
Title: The Zebra system - a new patient classification system.
Publisher: Journal of Nursing Management, 1, 5, pp.229-237.
Summary: When economic systems in the healthcare field are becoming more like those in 'the market for goods and services' it is important that patients' nursing needs and costs can be documented in a systematic and reliable way. One way is to use a patient classification system. The most used patient classification system in Sweden is the Zebra system, which makes it possible both to describe the individual patients' dependency level and to calculate the patients' nursing care requirements in staffing terms and costs, per month, per year, per patient stay, per diagnosis or DRG. It gives possibilities for managers to analyse the patient distribution in

different categories during different time periods, or if the patients' need can explain the staffing requirements during a certain period, or if the distribution of days in different categories are related to age groups or diagnosis or DRG. Uses a four-group dependency-acuity system.
Key words: Dependency; nurses per occupied bed; HRGs.

Author(s): Lord Carter of Coles.
Year: 2016
Title: Operational productivity and performance in English NHS acute hospitals: Unwarranted variations.
Publisher: London: DH.
Summary: Nursing hours per patient day (NHpPD), as a workload measure, has been around since 1980 (Barr, 1983). It's the predominant workload-based staffing method in some N. American and Australian states. Carter (2016) raised care hours per patient day's (CHpPD) profile in the UK. There are strong relationships between CHpPD and patient outcomes (Bolton *et al.*, 2003; Cho *et al.*, 2003; Pitkäaho *et al.*, 2016; and Twigg *et al.*, 2012), although relationships aren't always consistent or positive (Van den Heede *et al.*, 2009). Despite CHpPD's weaknesses and limitations, Carter's rationale (p.21) is that: conventional staffing measures; i.e., ward establishments, skill mix and patient to staff ratios, may not adequately highlight staffing variations; and there's no consistent way to interpret nursing productivity and efficiency, which CHpPD can correct. Carter's unclear why FTEs per occupied isn't acceptable – a metric (like the no-more-than-eight guidance) that is understood by the public (Kirkby, 2015). There was 144% variation (median 9.13, range 6.3 to 15.48 CHpPD) in the Carter study wards (p.22). However, dependency/acuity and clinical specialty weren't controlled, which makes comparisons meaningless. Within-ward time-series comparisons (i.e., seasonal actual vs. recommended), however, are permissible. Care hours per patient day will be the main staff deployment metric in England from April 2016 (p.9, p.70). The formula is simple: (daily RN + SW hours) / occupied beds. Ward managers should report two CHpPD measures: available and required hours (p.21). NHS Improvement staff intend to collect monthly CHpPD data in 2016, moving to daily collection in 2017, so that the metric becomes the principal staff deployment measure. Carter's CHpPD principles will be rolled out to cover AHPs and doctors in 2017 (acute services only) (p.27). Combining registered nurse (RN) and support worker (SW) hours presents meaningful CHpPD; however, dilute staff mixes (i.e., proportionally more SWs than RNs) are masked. Consequently, Carter (p.21) recommends that CHpPD is broken into RNs, SWs and AHPs by AfC Band. Carter's CHpPD can be used to benchmark staffing variations, which provide meaningful management data – as Carter puts it: from ward to board (p.21). The metric is universal and can be calculated for all ward types (e.g., single room design) and specialties (e.g., elderly care to critical care) (p.21). However, ward structure, process and outcome variations mean that benchmarking should be cautious. Used alongside a quality indicator, CHpPD is an even more powerful measure (p.22). The new metric is easily converted to staffing costs, which also increases CHpPD's value (Dowler, 2016). Commissioners should relate well to CHpPD (Harrington *et al.*, 2006; Nursing Standard, 2016). Why does Carter use midnight bed occupancy as the CHpPD denominator (p.21)? Midnight occupancy may not reflect ward peaks and can make CHpPD appear generous. An alternative formula, which overcomes this weakness, is: Total FTEs * 37.5 / (1+time-out) / 7. Carter doesn't address dependency and acuity, and its influence on required CHpPD, variables that Kirby (2015) and Twigg *et al.*, (2013) double-underline. Does that mean we use professional judgement based staffing recommendations?

Midnight dependency/acuity will not be the same as mid-afternoon, for example, so generic multipliers (which Carter proposes) should be used cautiously. Carter (p.21) mentions specialing (one-to-one), but doesn't explain its CHpPD weighting. It's surprising that Carter doesn't address this important dependency/acuity issue in more detail. The new metric imposes additional data collection and reporting burdens on ward staff (p.22). Consequently, it's imperative that actual and required CHpPD are culled from existing workload and staffing metrics, incorporated into e-rostering software and dashboards (p.23). Carter doesn't indicate how time-out (headroom/uplift) or ready-for-action (RfA) time feature in CHpPD calculations. Without adequate training and supervision, nursing workload and staffing metrics (including CHpPD) can be unreliable, especially if they're driven by dependency/acuity, (Min and Scott, 2015).
Key words: Care hours per patient day; costs, irrational NPOB; skill mix.

Author(s): Lucchini, A., Elli, S., Schilfano, L., Rolla, F., Pegoraro, F. and Fumgalli, R.
Year: 2103
Title: Nursing Activities Score (NAS): 5 Years of experience in the intensive care units of an Italian University hospital.
Publisher: Intensive and Critical Care Nursing, On line Dec 2013.
Summary: Objective: To retrospectively analyse Nursing Activities Score (NAS) in an intensive care department from January 2006 to December 2011. Method: sample included 5856 patients in three intensive care units (GICU: General Intensive Care Unit, Neuro ICU: Neurosurgical Intensive Care Unit, CICU: Cardiothoracic Intensive Care Unit) in an Italian University hospital. The NAS was calculated for each patient every 24 hours. Inpatients admitted to general ICU, the following scores: SAPS 2 and SAPS 3 (Simplified Acute Physiology Score), RASS (Richmond Agitation Sedation Scale) and Braden were also recorded along with the NAS. Results: mean NAS for all patients was 65.97% (± 2.53), GICU 72.55% (±16.28), Neuro ICU 59.33% (±16.54), CICU 63.51% (SD ± 14.69). The average length of hospital stay (LOS) was 4.82 (± 8.68). The NAS was high in patients with increasing LOS ($p < 0.003$) whilst there were no significant differences for age groups except for children 0–10 years ($p < 0.002$). The correlation of NAS and SAPS 2 was $r = 0.24$ ($p = 0.001$), NAS and SAPS 3 $r = -0.26$ ($p = 0.77$), NAS and RASS $r = -0.23$ ($p = 0.001$), NAS and Braden $r = 0.22$ ($p = 0.001$).
Key words: Keywords: Intensive care units; Critical Care; Nursing workload; Nursing management.

M

Author(s): Marshall, M. and Blair, G.
Year: 2013
Title: Changing direction.
Publisher: Health Service Journal, 123, 6369, pp.24-5.
Summary: Fewer resources and increasing demands make effective service provision even harder to achieve. Radiology skill mix reviews can help service staff do more with less. Assistant practitioners in the radiology department, undertake x-rays under supervision, helps services to meet demand and releases registered practitioners to undertake more technical work.
Key words: AHPs, skill mix, assistant practitioners.

Author(s): McMurtie, L., Cameron, M. Oluanaigh, P. Osbourne, Y.
Year: 2014
Title: Keeping our nursing and midwifery workforce: Factors that support non-practising clinicians to return to practice.
Publisher: Nurse Education Today, Volume 34, Issue 5, pages 761–765.
Summary: Background: Within Australia and internationally (Health Workforce Australia, 2012) an increasing and on-going nursing workforce shortage is documented. Recent international estimates indicate that there will be ongoing and significant gaps in the nursing workforce; the United Kingdom is predicted to have 12.12% fewer nurses over the coming eight years if a current 'steady state' is maintained (Buchan and Seacombe, 2011); Canada is predicted to have a 60,000-nurse shortage by 2022 (Tomblin *et al.,* 2012) with Australia's anticipated nursing shortage reported as over 90,000 by the year 2025 (Health Workforce Australia, 2012). Queensland Health in response to their tracked emerging nursing and midwifery workforce shortages developed a nursing and midwifery refresher programme to return registered staff back to the workforce. A study was undertaken between 2008 and 2010 to provide an understanding how non-practising nurses and midwives maybe supported back into the workforce. Methods: programme applicants (444) were invited to respond to an on-line survey designed to understand what programme aspects supported their learning and ability to return to the workforce. This number represents those who applied but not all completed or commenced the programme. Descriptive statistics (Polit and Beck, 2008) were used to collate quantifiable survey responses and free text and unsolicited responses were themed. Results: The survey achieved a 35.5% response rate (n = 158) with 20% unsolicited comments (e mail responses) which were included in the themed results. Key themes supporting participants' learning and ability to return to the workforce were: programme structure and content, preferred flexibility in employment status, preceptor and educator support, learning contract and supernumerary supervised clinical time. Respondents were 94% female and 6% male, with 37.7% > 51 years old. Child rearing was the foremost reason for female staff relinquishing workforce roles (36.6%). The primary reason for returning to the workforce was maintaining registration (40.5%). Both theory and clinical placement components were seen by participants as contributing to their confidence to return to the health workforce. Conclusion: The Queensland Nursing and Midwifery Refresher Programs provided a structured programme for registered, non-practising nurses and midwives to return to the Queensland Health workforce. Responses indicated that clinical supervision and contract learning should be central to a return to workforce induction programme for registered but non-practising nurses and midwives. Most nurses and midwives returning to the workforce were approaching retirement age in 10–15 years.
Key words: Keywords: Nursing refresher; Nursing and midwifery refresher; Return to work; Re-entry.

Author(s): Milne, C.
Year: 1988
Title: Getting to grips with GRASP.
Publisher: Nursing Standard, 10, 3, pp.22-23
Summary: Describes GRASP's use in Britain, its nature and purpose and application to one hospital. GRASP's dependency, care hours and quality components are covered. Specimen instruments are provided. Emphasises its flexibility. Found that 50 nursing activities accounted for 80% of nursing time.

Key words: Timed-task/activity; quality; dependency.

Author(s): Min A. and Scott L.D.
Year: 2016
Title: Evaluating nursing hours per patient day as a nurse staffing measure.
Publisher: Journal of Nursing Management 24, 439–448.
Summary: Aims: To identify the techniques used to measure nurse staffing and to evaluate nursing hours per patient day's (NHPPD) reliability, validity and limitations. Background: numerous studies have attempted to identify appropriate nurse staffing levels; however, variations in nurse staffing measures may have caused inconsistent findings regarding the relationships between nurse staffing and service quality. Evaluation: 17 studies using nurse staffing measures were reviewed. Key issues: six common nurse staffing measures were identified: nurse-to-patient ratios, full time equivalents, NHPPD, skill mix, nurse-perceived staffing adequacy and nurse-reported assigned patients. Conclusions: Among nurse staffing measures, NHPPD is the most frequently used and is highly beneficial. This measure shows some inter-rater reliability. The NHPPD's predictive validity for patient falls is high, whereas for pressure ulcers is low. Implications for nursing management: for NHPPD to be applied more effectively as a nurse staffing measure, there is a need for additional reliability testing in various units with large sample sizes; further validity research for additional patient outcomes; appropriate adjustments in its application to capture variations in nurse characteristics, patients and hospital units; and a consistent data collection procedure.
Key words: Key words: hours per patient day; nurse staffing; care quality; reliability; validity.

Author(s): Morris, K.P., Oppong, R., Holdback, N. and Coast, J.
Year: 2014
Title: Defining criteria and resource use for high dependency care in children: an observational economic study.
Publisher: Archives of Disease in Childhood doi:10.1136/archdischild-2013-305133.
Summary: Objectives: Internationally there is no consensus on defining and funding paediatric high dependency care (HDC). This study tested whether a new UK Healthcare Resource Group (HRG) classification for HDC, with two categories (basic and advanced HDC), can identify children who consume greater staff resource. It also explored change in basic HDC HRG criteria introduced in April 2011. Design: observational study of medical and nursing staff resource use. Setting: 16 paediatric wards across 6 regional hospitals; 1one tertiary children's hospital (November 2010 to March 2011). Participants: 1098 infants and children admitted to paediatric wards. Main outcome measures: children meeting criteria for basic and advanced HDC HRGs; care in a cubicle; medical and nursing staff costs, extrapolated from time spent at patient bedside. Results: 223 (20.3%) children met original HDC criteria (15.9% basic, 4.4% advanced). This fell to 88 (8.0%) with the change in basic HDC definition (3.6% basic, 4.4% advanced). Children who met original HDC criteria consumed greater bedside staff resource than those not meeting criteria (cost ratio 1.0:1.75:2.96 (non-HDC:basic HDC:advanced HDC)), with revised criteria identifying a (smaller) basic group with greater staff resource use (cost ratio 1.0:2.35:2.76). Being cared for in a cubicle was not associated with greater staff costs. Conclusions: HDC HRG criteria identify children who consume significantly greater staff resources. Revised definitions have resulted in a large reduction of cases meeting the criteria but identifies a group consuming greater staff resources.

Key words: HRGs; children's wards; staffing; costs; dependency/acuity.

N

Author(s): National Health Service Benchmarking Database.
Year: 2016
Title: National Health Service Benchmarking Database.
Publisher: keithhurst.research@yahoo.co.uk
Summary: The NHS Benchmarking Database is hosted by West London University and funded by NHS England. The Database is used to profile NHS Trusts; e.g., pointing out where a provider's indicators (such as staff to bed ratios) are high or low outliers. The Database is an alternative to the Workforce Assurance Database. There are 1400 workforce-related datasets grouped into 40 categories (a list summarising each dataset can be supplied). Each dataset belongs to an acute, community, mental health/learning disability and specialist trust, independent provider or local authority. Often, the same dataset features in all providers; e.g., staffing. Each organisation is tethered to coterminous services, so that acute trust managers, for example, can see if they're supported by high- or under-performing local authority and GP services. This tethering makes the database unique. Datasets come from HSCIC, CQC, Monitor, DH, NHS England, ONS, etc. The Database was created in 2005, so trend analyses are possible. About 50 datasets are added to the Database or are refreshed each week. The database exists in Excel and SPSS formats. The former is more user friendly, while the latter allows sophisticated statistical analyses. The main database can be filtered; e.g.: into high- and low-quality trust groups (in 2008, for example, Mid Staffordshire Trust consistently sat in the lower quartile); whether providers sit in affluent and deprived, rural and urban localities, etc. Service managers attend workshops that run up to four times yearly at West London University. In the workshops, managers generate their trust's profile; i.e., whether the organisation is an outlier on any dataset. Managers, for example, have explored: Why some staff are more productive. Is it, for example, because job satisfaction is higher? Why some patients more satisfied and why they more likely to complain. Why some providers have higher running costs? Tested, why their organisation is a Keogh trust (high death rate acute trusts always have lower staff to occupied bed ratios). Why staff turnover is a high outlier (e.g., because appraisals and staff development were being neglected). New intelligence is easily generated from service quality, patient safety, management, job satisfaction, staffing and cost data.
Key words: benchmarking; profiling; workload quality and staffing.

Author(s): Needham, J.
Year: 1996
Title: Balancing skill mix - future paediatric healthcare provision.
Publisher: Journal of Nursing Administration, 4, pp.127-131
Summary: Examines the relationship between nursing grade-mix/skill mix, nursing efficiency and effectiveness.
Key words: Grade-mix.

Author(s): Needleman, J. Buerhaus, P. Mattke, S., Stewart, M. and Zelevinsky, K.
Year: 2002
Title: Nurse staffing levels and quality of care in hospitals.

Publisher: New England Journal of Medicine, 346, 22, pp.1715-1722.
Summary: Large-scale, empirical study involving medical and surgical nursing staff and patients in 799 hospitals. There were significant relationships between registered nurse headcounts and mix in the workforce and positive patient outcomes such as rescuing medical patients from life-threatening conditions (cardiac arrest and shock). Equally positive outcomes were recorded in surgical wards. In short, richer grade-mixes led to better care.
Key words: Quality; staffing; mix, KPIs

Author(s): National Institute for Health and Care Excellence (NICE).
Year: 2014
Title: Safe staffing for Nursing in Adult Inpatient wards in Acute Hospitals.
Publisher: http://www.nice.org.uk/ guidance/sg1/resources, accessed September 2016.
Summary: NICE's SNCT endorsement.
Key words: methods.

Author(s): Nicholson, P.
Year: 1998
Title: Managing workload. Skill mix: a pilot study within a health visiting team.
Publisher: Community Practitioner, 71, 5, pp.175-176.
Summary: Examines paediatric nurses' contribution to community nursing particularly health visiting.
Key words: Staff mix; outreach.

Author(s): Northern Neonatal Network.
Year: 1993
Title: Measuring neonatal nursing workload.
Publisher: Archive of Diseases in Childhood, 68, pp.539-543
Summary: Sets out neonatal unit staffing ratios (now dated).
Key words: Neonatal staffing; historical.

Author(s): Nuffield Institute for Health.
Year: 2003.
Title: Selecting and Applying Methods for Estimating the Size and Mix of Nursing Teams.
Publisher: Leeds University: Nuffield Institute for Health.
Summary: Comprehensive systematic literature review commissioned by the DH, which describes five main WP&D methods applicable to all clinical specialties. Strengths and weaknesses are summarised. Dated, but format can be used to update and workforce review.
Key words: Methods; dependency; acuity; time out; quality; NPOB; professional judgement; regression; time-task.

Author(s): Nursing Standard.
Year: 2011
Title: Children's nurse shortage 'extremely concerning'.
Publisher: Nursing Standard 26(9): 8-8.

Summary: An inquiry into children's surgery and patient outcomes found that 8 per cent of 275 hospitals that carried out surgery did not have at least one children's registered nurse on non-critical wards each shift.
Key words: Nursing shortage; staffing; children's wards; staff mix.

O

Author(s): Odgaard, E., Duedahl, V. and Nielsen, M.H.
Year: 2011
Title: From ward round to family-centred patient conference.
Publisher: Sygeplejersken / Danish Journal of Nursing (SYGEPLEJERSKEN), 8/12/2011; 111(13): 66-69.
Summary: Focuses on a paediatric unit in which traditional ward rounds were substituted with family conferences in a meeting room, the aim being to improve cooperation between medical staff, children as inpatients and their families. The aim was to highlight nurses' perception of their own role in the family conference and how they adapted to the role. The method involved qualitative triangulation involving observation and interviewing three nurses in the unit. Results suggest that role perception and role performance are characterised by tradition-bound role and workplace cultures, which do not automatically change when working methods and tasks are altered. Consequently, the first and most important step toward a ward round modernisation occurs by renewing the frameworks and introducing family conferences, but one should continue working towards clarifying attitudes and roles within interdisciplinary cooperation, such that information and professional opinions from all professional groups are included in decisions made about, and with, the admitted child and his or her family.
Key words: Family centred care; patient rounds; parents; children's wards.

Author(s): Oliver, A., Powell, C., Edwards, D. and Mason, B.
Year: 2010
Title: Observations and monitoring: routine practices on the ward.
Publisher: Paediatric Nursing, 22(4): 28-32.
Summary: 2010 Aim: to review routine observations on all children admitted to the Children's Hospital for Wales and the feasibility of implementing an early warning score for children developing critical illness. Method: nursing staff, while performing their routine duties, recorded temperature, heart rate, respiratory rate and blood pressure, and identifying airway threat, recording oxygen saturation levels, and consciousness level using the AVPU scale (alert, responds to voice, responds to pain, unresponsive) and identifying on a new paediatric observation chart if they had concerns about a child. The clinical care policy for each ward determined the recording observations frequency. Results: data were collected for 1,000 patients on whom 9,075 observations were performed. Of those 9,075 sets, temperature was the most frequently recorded observation at 88.4% (95% CI 87.7-89), followed by heart rate at 86.8% (95% CI 86.1-87.5), respiratory rate at 79.7% (95% CI 78.9-80.5), AVPU at 36.4% (95% CI 35.4-37.4) and blood pressure at 25.1% (95% CI 24.2-26.0). Complete observations needed for the Cardiff and Vale Paediatric Early Warning System to trigger effectively were only recorded in 52.7% (95% CI 52.4-53.1) of patients. Conclusion: there were variations in observation recording frequency and type. This issue needs to be addressed if scoring systems are to be

implemented. This observational study suggest that acutely ill children basic observations are not being carried out.
Key words: Children's wards; monitoring; dependency/acuity; reliability.

P

Author(s): Paediatric Nursing
Year: 2003
Title: Wide variation in staffing of paediatric wards: report on nursing numbers, costs and quality.
Publisher: Paediatric Nursing, 15(1): 5-5.
Summary: Weak national guidance on staffing levels is to blame for the unexplained variance in Scotland's nursing establishments on paediatric wards. According to a report from Audit Scotland published in December 2002 'Planning Ward Nursing: legacy or design?' examined six ward types in trusts across Scotland and found that the variation was unlikely to be caused by differing patient need. Compared with other ward types, such as gynaecology and orthopaedics, there was more variance in paediatric wards and it was the differences in total nurses, grade mix, bank and agency staff use, which explained similar variation in costs. Other key findings include significant variability in the information available at trust and ward level to help managers establish whether nursing staffing is cost effective. There was also a need to improve workforce planning and to develop and agree service quality measures that focus on continuous improvement rather than service failures, such as patient accidents.
Key words: children's wards; staffing; Scotland; dependency; acuity; service quality.

Author(s): Parry, G.J., Tucker, G.S., Tarnow-Mordi, W.O.
Year: 2005.
Title: Relationship between probable nosocomial bacteraemia and organisational and structural factors in UK neonatal intensive care units.
Publisher: Quality & Safety in Health Care. 2005 Aug. 14(4). pp. 264-9.
Summary: Research by the UK Neonatal Staffing Study Group into the relationship between hospital acquired infections in neonatal intensive care units and factors which may affect hand hygiene. A prospective observational study was undertaken in 54 units, and data on average floor space and hand-basins per cot, whether an infection control nurse was present, and quality of hand-washing signs was collected and evaluated.
Key words: Neonatal staff mix.

Author(s): Pelander, T. Leini-Kilpi, H. and Katajisto, J.
Year: 2008
Title: The quality of paediatric nursing care: developing the Child Care Quality at Hospital instrument for children.
Publisher: Journal of Advanced Nursing, 65, 2, pp.443-453.
Summary: Develops and tests a new paediatric nursing quality questionnaire. Could be used alongside nurse staffing studies. Children's rights are important. Need to listen to them. They have something to say about care planning and implementation. Medical rather than nursing care has been measured in the past. Triangulation used to develop the CCQH. Three main domains measured: (i) Nurse Characteristics: humanity, competence, sense of humour, trustworthiness;

(ii) Nursing Activities: entertainment, caring and communication, supporting initiatives, education, physical care and treatment; (iii) Environment: physical, social. No satisfaction data presented.
Key words: Quality.

Author(s): Platt, M. and Brown, K.
Year: 2004
Title: Evaluation of advanced neonatal nurse practitioners: confidential enquiry into the management of sentinel cases.
Publisher: Archives Disease in Childhood: Foetal & Neonatal Edition, 89, 3, pp. F241-F244.
Summary: Research to evaluate the neonatal care provided by advanced neonatal nurse practitioners at Ashington Hospital, Northumberland, a site with no resident paediatric medical staffing. With methods based on the Confidential Enquiry into Stillbirth and Death in Infancy (CESDI), the research covered neonatal deaths, neonatal seizures, and transfers to specialist intensive care as markers.
Key words: Neonatal staffing, service quality.

Author(s): Priddis, L. and Shields, L.
Year: 2011
Title: Interactions between parents and staff of hospitalised children.
Publisher: Paediatric Nursing, 23(2): 14-20.
Summary: The Platt report (Ministry of Health 1959) recommended that hospitals provide for parents to stay with sick children. This review, how hospital managers have or have not followed this guidance, assesses the literature and includes insights into research on attachment theory. The authors conclude that, although parents are commonly found in wards with sick children, this is not often systematically encouraged or even understood. However, recent initiatives to improve communication between staff and parents are encouraging.
Key words: Professional-family relations; Family centred care.

Author(s): Pronovost, PJ. Angus, DC. Dorman, T. Robinson, K.A. Dremsizov, T.T and Young, T.L.
Year: 2003
Title: Physician staffing patterns and clinical outcomes in critically ill patients: a systematic review.
Publisher: Journal of the American Medical Association, 288, 17, pp.2151-62.
Summary: Intensive care unit (ICU) physician staffing varies widely, and its association with patient outcomes remains unclear. Objective: To evaluate the association between ICU physician staffing and patient outcomes. Data sources: We searched MEDLINE (January 1, 1965, through September 30, 2001) for the following medical subject heading (MeSH) terms: intensive care units, ICU, health resources/utilization, hospitalization, medical staff, hospital organization and administration, personnel staffing and scheduling, length of stay. We also used the following text words: staffing, intensivist, critical, care, and specialist. To identify observational studies, we added the MeSH terms case-control study and retrospective study. Although we searched for non-English-language citations, we reviewed only English-language articles. We also searched EMBASE, HealthStar (Health Services, Technology, Administration, and Research), and HSRPROJ (Health Services Research Projects in Progress) via Internet Grateful Med and The

Cochrane Library and hand searched abstract proceedings from intensive care national scientific meetings (January 1, 1994, through December 31, 2001). Study selection: We selected randomized and observational controlled trials of critically ill adults or children. Studies examined ICU attending physician staffing strategies and hospital outcomes and ICU mortality and LOS. Studies were selected and critiqued by two reviewers. We reviewed 2590 abstracts and identified 26 relevant observational studies (one included two comparisons), resulting in 27 comparisons of alternative staffing strategies. Twenty studies focused on a single ICU. Data synthesis: We grouped ICU physician staffing into low-intensity (no intensivist or elective intensivist consultation) or high-intensity (mandatory intensivist consultation or closed ICU [all care directed by intensivist]) groups. High-intensity staffing was associated with lower hospital mortality in 16 of 17 studies (94%) and with a pooled relative risk estimate for hospital mortality (0.71, 95% CI, 0.62-0.82). High-intensity staffing was associated with a lower ICU mortality in 14 of 15 studies (93%) and with a pooled relative risk estimate for ICU mortality of 0.61 (95% CI, 0.50-0.75). High-intensity staffing reduced hospital LOS in 10 of 13 studies and reduced ICU LOS in 14 of 18 studies without case-mix adjustment. High-intensity staffing was associated with reduced hospital LOS in two of four studies and ICU LOS in both studies that adjusted for case mix. No study found increased LOS with high-intensity staffing after case-mix adjustment. Conclusions: high-intensity vs. low-intensity ICU physician staffing is associated with reduced hospital and ICU mortality and hospital and ICU LOS.
Key words: CrCU, PICUs

R

Author(s): Rassin, M. and Silner, D.
Year: 2007
Title: Trends in nursing staff allocation: the nurse-to-patient ratio and skill mix issues in Israel.
Publisher: International Nursing Review, 54, pp.63-9.
Summary: Case study about Israeli nurse staffing trends. Argues that rising patient dependency patient should be matched with appropriate staffing changes (p.63). Describes California's and Victoria's mandatory minimum nurse to patient ratios (p.63). Staff mix isn't easy to monitor as intermediate grade RNs (LPNs) are phased out and RN degree nurses and healthcare assistants increase (p.63). Consequently, RN workload is increasing (p.63). Explains that the driver behind these changes is cost savings (p.63). However, this workforce redesign appears to be false economy. Dilute staff mix and lower staffing ratios lowers quality, increase untoward incidents, mortality and malpractice claims. Job satisfaction and staff retention are affected (pp.64, 67). The literature is unclear on appropriate staffing ratios not least because ratios aren't the only factor. Education and training are big factors (p.64). Suggest nurse to patient ratios for several care groups and suggests gross and net figures (pp.64-5, 68). Also provides Theatre (5.5 nurse for each room); OPD (1:8065); A&E (1:2419); midwifery (1:161 births) ratios (p.66). Shows that children's wards had a 0.75 nurse to bed ratio, midway in the speciality league table. Children's wards in their study had an 80:20 RN to SW ratio.
Key words: Nurse per bed; retention; staff mix; quality; children's wards.

Author(s): Read, C.
Year: 2016
Title: It's time to call on the A-team.

Publisher: Health Service Journal, 126, 6377, pp.18-19.
Summary: Questions whether AHPs are used to their potential especially when service managers are expected to do more with less. Allied health professionals are an untapped resource and can used to reduce trust deficits. Twelve disciplines come under the AHP banner, ranging from life-saving emergency service practitioners to professionals who can significantly improve patients' quality of life: paramedics; radiographers; occupational therapists; speech and language therapists; prosthetists; orthotists; podiatrists; physiotherapist; orthoptists; dieticians; art and music therapists. Allied health professionals, although representing 6% of the NHS workforce, are usually overlooked as a workforce solution and consequently they are undervalued. In turn, skill mix reviews within each occupational group can improve service efficiency and effectiveness.
Key words: AHPs, skill mix, assistant practitioners.

Author(s): Royal College of Nursing.
Year: 2010
Title: Guidance on Safe Nurse Staffing Levels in the UK.
Publisher: Royal College of Nursing.
Summary: Comprehensively reviews the latest nursing WP&D evidence. Notes that average occupancy in 124 children's wards is low (80%) and that wards are small; there were 3.6 RNs and 0.8 SW per shift; RN to SW ratio was 83:17; one nurse looked after 3.8 patients per shift. Underlines the broader staff mix in children's wards. Highlights key staffing indicators funded and actual staffing; RN to SW ratio; RN to population ratio; staff to patient ratio; turnover; time out. Recommends for children under two years, 1:3; other ages day time, 1:4; and 1:5 at night. Recommends higher ratios for PICUs. Reviews workload based staffing methods including their strengths and weaknesses.
Key words: Occupancy; staff mix; NpOB;

Author(s): Royal College of Nursing
Year: 2013
Title: RCN guidance defines children's ward safer care levels.
Publisher: Nursing Children and Young People, 25, 6, p.5.
Summary: Updates the RCN's C&YP's staffing policy originally published in 2003. The RN to SW ratio shouldn't fall below 70:30. Each ward should have a supernumerary nurse to oversee staff training and management. There should be two registered children's nurses on each shift. Access to senior children's nurse always. Parents are likely to need more support in children's wards.
Key words: Staff mix; children's wards; parents.

Author(s): Royal College of Nursing.
Year: 2013
Title: Defining staffing levels for children and young people's services.
Publisher: London: RCN.
Summary: The political and policy backdrop for public sector services across all four UK countries is increasingly marked by uncertainty and complexity. Children and young people have a right to be cared for by nurses who have the right knowledge and skills to meet their needs. There have been numerous public inquiries that have highlighted key issues related to the impact

of inadequate nurse staffing levels or an inappropriate mix of skills. Most recently the Francis Inquiry highlighted the need for staffing levels to be appropriate and for all staff to be properly educated, trained and regulated to meet patients' needs. The RCN has repeatedly called for improved staffing levels across all service areas. Workload within all services and across all settings continues to increase because of medical advances, changes in primary care out-of-hours provision and increased public expectation. In many areas, this has resulted in increased attendance at emergency care departments, with more children requiring assessment, observation and short stay, in acute settings. Evidence indicates that many could be managed in the community if there were sufficient community children's nurses (CCNs) to provide care and support at home. CCN team inconsistency and adequate availability across the country is a key factor inhibiting care at home or closer to home, particularly for those children with minor acute illnesses and long-term conditions, and those needing continuing care and end of life care support. The standards contained in this document apply to all areas in which babies, children and young people receive care, and all service types and provision commissioned by the NHS including the acute and community, and third sector and independent sector providers. The standards are the minimum essential requirements for all service providers for babies, children and young people. Individual children's nurses, managers and health care providers must take responsibility to ensure safe staffing levels and skill-mix. Workforce plans should be reviewed annually and more frequently in response to any known service pressures such as increased clinical acuity and seasonal activity. Senior nurses are advised to audit against the standards within this document and to highlight deficiencies or variation to their senior management teams and the organisation's board. A full risk assessment should be undertaken and escalation to senior management or executive team level in all cases where staffing and skill-mix deficiencies continue and are deemed unacceptable against the standards. The Francis Inquiry recently recommended that boards must take notice nurse staffing levels and seek nurse directors' views about any proposed major change's potential impact, including changes to nurse staffing or facilities, which could affect patient care fundamental standards and quality (Mid Staffordshire NHS Foundation Trust Public Inquiry, 2013). Workforce planning considerations, patient acuity and workload measures are highlighted. From April 2013, Nursing and Midwifery Workload Workforce Programme tools incorporating professional judgement are mandatory for the NHS in Scotland.
Key words: Children's services; dependency/acuity.

Author(s): Royal College of Nursing.
Year: undated
Title: Staffing Issues in Paediatric Nursing.
Publisher: London: RCN.
Summary: Reviews paediatric patient dependency systems.
Key words: Children's wards; dependency**.**

S

Author(s): Scaife, C., October, M. and Kellett, V.
Year: 2014
Title: Development of Competent Ward Coordinators.
Publisher: Nursing children and young people, ISSN: 2046-2336, Vol: 26, Issue: 6, Page: 16-21.

Summary: Managing a clinical shift on a ward is daunting for newly qualified staff nurses. This article describes the co-ordinators competency pathway, written to guide and assess band 5 ward nurses, and a co-ordinators development day, which is a simulation-based training day developed by a senior nursing team to prepare band 5 nurses to become competent children's ward co-ordinators. Two groups - either experienced or less experienced band 5s - starts with the training day followed by 12 to 18 months in-work training. A new job description matching the trust's workforce reorganisation enabled band 5 nurse's roles to be developed. A service evaluation has found staff were more competent and confident after the initiative.
Key words: Competency; children's wards.

Author(s): Smith, S. Casey, A. Hurst, K, Fenton, K., Scholefield, H.
Year: 2009
Title: Developing, testing and applying instruments for measuring rising dependency-acuity's impact on ward staffing and quality.
Publisher: International Journal of Healthcare Quality Assurance, Vol. 22, No 1, pp.30-39.
Summary: Purpose – Explains how relatively simple nurse staffing formulas from 'best practice' ward dependency-acuity data can be used for nursing workforce planning and development. Method – Combines literature, detailed ward surveys, workshop and expert group/stakeholder information to generate and test care levels/nurse multipliers for setting ward establishments. Findings – Professional-judgement based ward staffing can be abandoned, while complex acuity-quality, timed-task and regression-based nurse staffing algorithms for setting ward establishments may be unnecessary since the new multipliers, underpinned by robust validity and reliability testing, seem to be remarkably accurate nurse-staffing determiners at low cost. Practical implications – Users, at a minimum, can adopt care level data and multiplier staffing recommendations for benchmarking purposes. Ultimately, the algorithms can be used to: (a) adjust ward establishments according to workload; or (b) set staffing for new inpatient services. Limitations - As care levels and multipliers stand they are suitable only for United Kingdom National Health Service acute wards. Primary care, mental health, learning disability and other specialist group care levels and multipliers need developing. Originality/value – Offers a simple system for assessing patients' nursing needs and setting ward staffing accordingly.
Key words: Nurse staffing; dependency-acuity; quality indicators; UK.

Author(s): Stegenga, J. Bell, E. and Matlow, A.
Year: 2002
Title: The role of nurse understaffing in nosocomial viral gastrointestinal infections on a general paediatrics ward.
Publisher: Infection Control & Hospital Epidemiology, 23(3): 133-136.
Summary: Objective: to examine the relationship between nurse staffing levels and nosocomial viral gastrointestinal infections (NVGIs) in a general paediatric population. Design: retrospective descriptive study. Setting: a general paediatrics ward at The Hospital for Sick Children in Toronto, Ontario, Canada, a 320-bed, tertiary-care paediatric institution. Results: Forty-three NVGIs were detected in 37 patients (2,929 admissions) (1.3%). The monthly NVGI rate correlated significantly with the monthly night patient-to-nurse ratio ($r = 0.56$) and the monthly day patient-to-nurse ratio ($r = 0.50$). The nursing hours per patient-day during the pre-infection period (PIP) were significantly lower than the non-preinfection period (NPIP; 12.5 vs 13.0). There was no difference between the PIP and the NPIP day patient-to-nurse ratios (3.31 vs 3.32),

but there was a significant difference between the PIP and the NPIP night patient-to-nurse ratios (3.26 vs 3.16). The NVGIs incidence in the 72-hour period after any day when the nursing hours per patient-day were less than 10.5 was 6.39 infections per 1,000 patient-days, compared with 2.17 infections per 1,000 patient-days in periods with more than 10.5 nursing hours per patient-day (rate ratio, 2.94; 95% CI, 2.16 to 4.01). Conclusion: nurse understaffing contributed to an increased NVGI rate in our general paediatrics population, and should be assessed as a risk factor in outbreak investigations.
Key words: Cross infection; risk factors; children's wards; understaffing; nurse-patient ratio.

Author(s): Stilwell, J.A. and Hawley, C.A.
Year: 1993
Title: Nursing dependency and the costs of patient care.
Publisher: Journal of Nursing Management, 1, pp.113-117
Summary: The observable costs or nursing care for individual patients are compared with their dependency levels. The dependency group average cost rises with dependency, but there are large overlaps between the dependency group distributions. This systematic method for allocating extra staff to wards illustrates the difficulty matching staff to labour demand, especially owing to ward size. Nurses are warned against the consequences of inefficiency.
Key words: Nursing costs; dependency; staffing; ward size.

Author(s): Stratton, K.M.
Year: 2008
Title: Paediatric nurse staffing and quality of care in the hospital setting.
Publisher: Journal of Nursing Care Quality, 23(2), pp.105-114.
Summary: Quality and nurse staffing indicators in paediatrics are distinct from adults. A retrospective, correlational, linear mixed model design was used to describe relationships between paediatric nurse staffing and five quality indicators from a convenience sample drawn from seven academic children's hospitals. Key findings supported a strong inverse relationship between paediatric nursing care hours delivered by registered nurses and central line ($p < .001$) and bloodstream infections ($p < .05$). Supplemental nurse staffing hours also demonstrated relationships between bloodstream infections and parent/family complaints.
Key words: Children's wards, quality, staffing.

T

Author(s): Tarnow-Mordi, W.
Year: 2000
Title: Risk adjusted and population based studies of the outcome for high risk infants in Scotland and Australia.
Publisher: Archives Disease in Childhood, 82, 2, pp. F118-23.
Summary: Research comparing outcomes of neonatal intensive care units, including differences in nurse staffing as factors.
Key words: Neonatal staffing.

Author(s): Telford, W.A.
Year: 1979

Title: A method of determining nursing establishments.
Publisher: Hospital Health Services Review, 5, 4. pp. 11-17.
Summary: Compares the dependency-acuity and professional judgement based ward staffing methods. Questions the objective, scientific approach and recommends a simple, three-step professional judgement method. Each step is described with examples. Instruments and specimen data are given. Honestly reports professional judgement method weaknesses and how they can be overcome. Care quality measure to evaluate establishments are available.
Key words: Professional judgement; review; quality.

Author(s): The Paediatric Intensive Care Society.
Year: 2010
Title: Standards for the care of critically ill children.
Publisher: The Paediatric Intensive Care Society
Summary: Comprehensive account covering all PICU aspects. Standard 73 recommends that HDUs should 0.5:1 or 1:1 if child is in a cubicle. Standard 83: nursing staff mix should include RN specially educated and trained in critical care children's nursing. Appendix 13 explains how to calculate the FTEs required to provide one RN per bed. Recommends 7.06 FTEs per occupied bed.
Key words: PICU; NpOB; skill mix.

Author(s): Tucker J. Tarnow-Mordi W. Gould C. Parry G. and Marlow N.
Year: 1999
Title: UK neonatal intensive care services in 1996. On behalf of the UK Neonatal Staffing Study Collaborative Group.
Publisher: Archives of Disease in Childhood Foetal & Neonatal Edition, 80, 3, pp.233-4.
Summary: An activity and staffing level census in 1996 was conducted in UK neonatal units and achieved a 100% response from 246 units. Among the 186 neonatal intensive care units, median (interquartile range) total cots was 18 (14-22); level 1 intensive care cots 4 (2-6); total admissions 318 (262-405); very low birth weight admissions 40 (28-68); and the number ventilated or given CPAP by endotracheal tube 52 (32-83). Forty-six (25%) intensive care units lacked the recommended minimum of one consultant with prime responsibility for neonatal medicine. As a conservative estimate 79% of ICUs had a lower nursing provision than that recommended in previously published guidelines. There was substantial variation in activity and staffing levels among units.
Key words: Neonatal staffing.

U

Author(s): University of West London.
Year: 2015
Title: Time out in the NHS.
Publisher: West London University, Brentford.
Summary: NHS workforce planners were surveyed to breakdown time-out in the trusts. Averages were: annual leave 14.8%; sickness 3.8%; maternity leave 1.8%; study leave 1.9%; other 1.3%).
Key words: Time-out.

Author(s): Uys, D.L., Chipps, J., Kohi, T., Makoka, D. and Libetwa, M.
Year: 2013
Title: Role analysis of the nurse/midwives in the health services in Sub-Saharan Africa.
Publisher: Journal of Advanced Nursing, DOI: 10.1111/jan.12087.
Summary: Aim: To describe nurse and midwife tasks and roles in Sub-Saharan African health services. Background: The current roles in the African region have not been empirically established, with only studies from two countries found (South Africa and Mozambique). This makes it difficult to establish whether current nursing/midwifery education programmes and regulations adequately address the needs in the health services. Design: A descriptive quantitative study. Methods: A survey questionnaire was administered to ambulatory and hospital service staff. Data were collected between June–December 2010, with completed responses from 734 nurses from nine African countries (five Anglophone and four Francophone). Results: the highest reported role functioning in both settings was for 'General Care and Treatment'. The lowest role functioning reported in both settings was 'Maternal and Child Health' and in 'The Provision of Mental Health Care'. The reported role performance in Anglophone countries was significantly greater than in Francophone countries. Conclusion: developing competency in nursing/midwifery roles other than medical surgical (general assessment and care) should receive more attention in the curricula. Special attention needs to be given to Francophone countries, where nursing and midwifery are poorly developed.
Key words: Africa; midwifery; nurses; nursing; roles; task analysis.

Author(s): UK Nursing Database.
Year: 2016
Title: UK Nursing Database
Publisher: Hurst Research Ltd, <keithhurst.research@yahoo.co.uk>.
Summary: Contains seven datasets collected systematically in 2800 UK wards. Includes C&YP's general and hospice wards; The database is confidential, but it can be interrogated without breaching anonymity.
Key words: Staffing; dependency/acuity; quality; costs; time out.

V

Author(s): Virtanen, M., Kurvinen, T., Terho, K., Oksanen, T., Peltonen, R., Vahtera, J., Routamaa, M., Elovainio, M. and Kivimäki, M.
Year: 2009
Title: Work hours, work stress, and collaboration among ward staff in relation to risk of hospital-associated infection among patients.
Publisher: Medical Care, 47(3): 310-318.
Summary: Objectives: to examine the association between work hours, work stress and collaboration among the ward personnel, and the hospital-associated infection risk among patients. Design: cross-sectional data on hospital infections were collected between March and June 2004. Data were linked with ward-level responses to a personnel survey collected during the same time. Setting: Medical records in 60 non-psychiatric bed wards in 6 Finnish hospitals. Participants: One thousand ninety-two patients and 1159 staff survey responses. Measurements: prevalence surveillance was performed by four infection control nurses, using standard criteria.

Data on several potential risk factors for infection were collected: sex, age, patient type (surgical vs. other), hospital type (university vs. regional hospital), unit type, occupancy, exposure to invasive devices, International Classification of Diseases version 10 diagnosis, chemotherapy, radiotherapy and corticosteroid use. Staff working conditions were measured by survey scales. Results: Ninety-nine hospital-associated infection cases (9.1%) were found. Multilevel logistic regression analyses, adjusted for hospital factors and patient-related risk factors, showed that long work hours among staff were associated with increased risk of infection [odds ratio (OR) 2.74, 95% confidence interval (CI): 1.07-7.04]. Other staff-related correlates were high work stress, as indicated by high imbalance between efforts and rewards (OR: 2.47; 95% CI: 1.38-4.42), low trust between work unit members (OR: 2.37; 95% CI: 1.27-4.43), injustice in work distribution (OR: 1.81; 95% CI: 1.04-3.16), and poor collaboration between ward supervisors (OR: 2.46; 95% CI: 1.38-4.38). Conclusions: long work hours, high work stress, and poor collaboration among ward staff are associated with hospital-associated infection among patients.
Key words: Workload; children's wards; adult; infection; quality.

W

Author(s): Williams, C.
Year: 2012
Title: A background report on nurse staffing in children's and young people's health care.
Publisher: Royal College of Nursing, London
Summary: Workload-based staffing methods not widely used in the NHS. Sets standards for: staff mix; student nurse training places; dependency/acuity assessment; quality indicators. Recommends 80:20 RN: SW mix and a 1:4 ratio throughout 24 hours in general wards rising to 1:2 in HDUs. Accepts the BPAM's neonatal unit staffing ratios: 1:1 to 1:4 and the 7.06:1 in PICUs. Reviews staffing methods and gives their strengths and weaknesses. Triangulation is recommended.
Key words: Dependency/acuity; time out; staff mix; NpOB; Professional judgement; children's wards.

Author(s): Williams, S., Whelan, A., Weindling, A.M. and Cooke, R.W.I.
Year: 1993
Title: Nursing requirements for neonatal intensive care.
Publisher: Archive of Diseases in Childhood, 68, pp.534-538.
Summary: Sets out neonatal unit staffing ratios (now dated). Compared how nurses spent their time with neonates. Staffing formula is acuity-quality based. Findings were endorsed in a similar study by American Academy of Paediatrics (2002). Dependency categories: Level A: 1:1. Level B: 0.66 FTE to one baby. Level C: 0.5 FTE Level D: 0.4 FTE. Vague category descriptions
Key words: Neonatal staffing, dependency/acuity; NpOB.

Author(s): Williams, G., Nizamoglu, M. and Williams, E.,
Year: 2013
Title: Paediatric in patient setting: an evaluation of parental perspectives.
Publisher: British Journal of Nursing, 22(11), pp.630-633
Summary: The Nursing and Midwifery Council (2008) defines conduct standards, ethics and performance for nurses and midwives currently practicing in the UK. The Code places emphasis

on core nursing principles: kindness, respect, dignity and support for patients and relatives while under nursing care. A prospective study was conducted using a validated questionnaire to assess adherence to these core nursing principles using parental assessment in an orthopaedic paediatric inpatient unit at University Hospital Coventry and Warwickshire (UHCW). Core nursing standards were highest in respect to 'kindness' and 'respect' shown for patients (96% and 98% positive scores) and lowest for 'support' offered to their parents (89% positive scores). Lower 'support' scores possibly relate to information provision or emotional support. Improvement may be achieved via providing additional time to identify parental concerns, which may be non-medical. The results demonstrate that parents perceive core nursing principles to be strongly adhered to on the UHCW orthopaedic paediatric unit.
Key words: children's wards; quality

Author(s): Wilson, L.
Year: 1983
Title: GRASP - for high quality patient care
Publisher: Health Care, September, pp.21-24
Summary: Describes the GRASP timed-task/activity nursing workload measure and how it was successfully implemented in one unit. The potential pitfalls are explained and how to overcome them. Patients are assessed individually using their care plans. Daily updating required. Reliability is checked by the matching patient care hours' form with care plans. Manual system; but computerisation is possible. From where do the PCH come?
Key words: Timed-task/activity; reliability.

Author(s): Wyatt, M. and Healey, K.
Year: 2005
Title: Managing capacity and workload in children's services.
Publisher: Paediatric Nursing, Vol. 17 Issue 6, p31-34. 4p.
Summary: Abstract: Describes the System to Escalate and Monitor (STEAM), a paper-based tool that enables staff nurses to record care intensity for each patient within a department and use the measurement as the basis for the department's clinical capacity risk assessment. Information on clinical scoring that must be considered when taking assessments; benefits that have been identified by using STEAM; Effectiveness when it was introduced in a neonatal unit. Uses a five-group dependency-acuity system; but no CHpPD data are provided. Reporting system uses RAG + Black to indicate at risk wards. Designed for NICUs, but works in children's wards.
Key words: Children's wards; Intensive care; Neonatal; Risk management; Staffing levels.

Y

Author(s): Yeadon, A. and Mannion, J.
Year: 2015
Title: Location of care for teenagers in hospital: a staff perspective.
Publisher: Archives of Disease in Childhood, 100(Suppl. 3), pp. A67-A68.
Summary: Deciding whether a young person should be admitted to a paediatric or adult ward is not always an easy judgement. In a district general hospital, with a flexible admission policy, which includes living an 'adult lifestyle 'as suggesting admission to an adult ward, we sought

referring and receiving staff views. This wider project aims to encourage patient choice when determining where care is located.
Key words: Teenagers; ward design.