ORIGINAL ARTICLE

Standards for head injury management in acute hospitals: evidence from the six million population of the Eastern region

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Objectives: To develop standards of care for head injury and thereby identify and prioritise areas of the service needing development; to report the findings from a survey of compliance with such standards in the Eastern region of UK.

Methods: The standards were collaboratively developed through an inclusive and iterative process of regional surveys, multidisciplinary conferences, and working groups, following a method similar to that used by the Society of British Neurological Surgeons. The standards cover seven topics relating to all aspects of service delivery, with standards within each objective. Each standard has been designated a priority level (A, B, or C). The standards were piloted using a self-assessment questionnaire, completed by all 20 hospitals of the Eastern region.

Results: Full compliance was 36% and a further 30% of standards were partially met across the region, with some areas of service delivery better than others. Seventy eight per cent of level A standards were either fully or partially met. Results were better in the north of the region compared with the south.

Conclusion: A survey of compliance with the head injury standards indicate that, with their whole systems approach and subject to further refinement, they are a useful method for identifying deficiencies in service provision and monitoring for quality of care both within organisations and regionally.

Head injury affects all ages, and survivors have a near-normal life expectancy. It is a major cause of long term disability in the community with consequences for the family, earning capacity, and for the patient's quality of life. A million patients with head injuries attend accident and emergency (A&E) departments every year in the UK and Eire; 150 000 will need hospital admission and one study estimates an incidence of 45–48% moderate or severe disability in those surviving admission.¹

National reports and reviews such as those on children's heart surgery,² heart and lung transplantation,³ and paediatric care/pathology^{4–5} have highlighted the need for quality of health care to be guided by agreed, coherent, and coordinated standards, compliance with which is regularly monitored. Standards provide a framework for assessing performance in all areas of service provision, including improvement, access, effective delivery, efficiency, and health outcomes, and standards of care are being developed in a number of specialties, including cancer,⁶ heart and lung transplantation and pulmonary hypertension,⁷ and burns.⁸ Recent reports from a number of sources, including the newly published *National Service Framework* (NSF) for long term disability,⁹ have indicated the need for guidelines for head injury and make recommendations concerning standards of care and service provision.^{10–19}

On the basis of these reports, the Eastern Head Injury Working Group (EHIG) has developed head injury standards from admission through to final outcome for acute trusts. The aims were to give guidance to trusts, commissioners, and clinicians on standards of head injury care and service delivery,

and to enable identification and prioritisation of areas that need further development by auditing the baseline of some of these recommendations. We piloted these standards in the 20 hospitals of the Eastern region during 2004.

METHODS

Development and structure of standards

We developed the standards collaboratively through an inclusive, iterative process of surveys conducted in all 20 acute trusts in the six counties of the Eastern region between 2000 and 2003 by the EHIG, and ensuing regional multidisciplinary conferences and working groups between 2000 and 2004.^{20–21} Our methodology was similar to that developed by the Society of British Neurological Surgeons (SBNS) in their document setting out standards for neurosurgical services and facilities, published in August 2002.²² Since the publication of these standards, the SBNS has surveyed over half the regional neurosurgery units in the UK on general topics such as organisation of provision for neurosurgical care, communication between primary, secondary and tertiary services, access, neuro-critical care, and neuro-rehabilitation.^{23–24} The survey also covered standards for specific clinical conditions from the neurosurgical perspective such as head injury, neuro-oncology, neurovascular services, spinal disease, and functional neurosurgery.

Abbreviations: A&E, accident and emergency; EHIG, Eastern Head Injury Working Group; RNU, regional neurosurgery unit; SBNS, Society of British Neurological Surgeons

Standard	Level	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
(1) RESOURCES																					
Adequate facilities	1.1	A																			
Alternative facilities	1.2	A																			
Urgent RNU advice	1.3	A																			
Non-urg. RNU advice	1.4	C																			
Cons. in HI training	1.5	A																			
(2) DELIVERY AND ORGANISATION																					
PCT lead in HI	2.1	B																			
Trust clinical lead in HI	2.2	B																			
Named RNU	2.3	A																			
RNU clinical lead in HI	2.4	B																			
Leads: defined roles	2.5	B																			
Leads organise MDTs	2.6	B																			
Patient focused service	2.7	B																			
Effective commun.	2.8	C																			
(3) NETWORKING																					
DGH MDT care	3.1	A																			
RNU MDT	3.2	A																			
MDT meetings	3.3	A																			
CME for MDT	3.4	A																			
MDT annual meeting	3.5	B																			
(4) COMMUNICATION																					
T'mt plans cons-led	4.1	A																			
Discharge info	4.2	A																			
Written patient info, diag/t'mt	4.3	B																			
Patient info. support	4.4	B																			
Patient access to MDT	4.5	B																			
(5) FACILITIES																					
Approp fup/care rev	5.1	A																			
Approp fup clinics	5.2	B																			
Neurorehab teams	5.3	B																			
Community links	5.4	B																			
(6) GUIDELINES																					
NICE, RCS, BAEM, SBNS	6.1	A																			
Review/audit	6.2	B																			
(7) AUDIT																					
Patient progress report	7.1	B																			
Clin. lead ensures audit	7.2	B																			
Referrals	7.3	B																			
Patient outcome	7.4	C																			
1 audit project p.a.	7.5	A																			
Risk assessment	7.6	B																			
Reg. M/M MDT meeting	7.7	A																			
Clinical governance	7.8	B																			
IT: performance rpts.	7.9	B																			

Figure 1 Results for head injury standards in 20 acute hospitals (nos. 1–20) in the Eastern region (black, standard not fulfilled; light grey, standard partially met; dark grey, standard fully met). The data provide the background to figs 1–4 in the study. Abbreviations: MDT, Multi-disciplinary Team; Reg. M/M, Regional Morbidity and Mortality; BAEM, British Association of Accident and Emergency Medicine; SBNS, Society of British Neurosurgeons; CME, continuing medical education; clin., clinical; cons., consultants; diag., diagnosis; DGH, district general hospital; fup, follow up; HI, head injury; info., information; IT, information technology; non-urg., non-urgent; p.a., per annum; PCT, primary care trust; RNU, regional neurosurgery unit; rpts, repeats; t'mt, treatment.

The standards we have developed cover head injury only and are intended for acute hospitals offering head injury care, and they both complement and refine the SBNS standards. They are set out in a manner consistent with the Royal College of Surgeons' Galasko Report,¹⁰ and the recently published National Institute for Clinical Excellence (NICE) guideline for the early management of head injury.¹⁵ A common approach was necessary to ensure consistent application and assessment of agreed national standards. They are structured into two tiers—objectives and levels of standards, with each standard made as explicit as possible to ensure that interpretation is clear. They cover seven topics relating to effective service delivery: resources, delivery and organisation, networking, communication, facilities for follow up, guidelines, and audit. Specified within each topic are the standards needed to be met in order to achieve the objectives. Figure 1 shows all 38 standards and their levels in summary form. Appendix 1 (published online; see <http://www.emjonline.com/supplemental/>) explains in details the seven topics and the 38 standards piloted.

One of the aims of the standards is to enable both clinicians and commissioners of care to identify standards in all the areas needed to ensure service consistency and coordination regionally, and prioritise those which need further development within individual trusts, hence each standard has been

designated one of three levels: level A indicates the highest priority that trusts should give to compliance and to emphasise the direction for service improvement requiring immediate implementation. Levels B and C are set to allow time for plans for improvement to be put in place and implemented, with level B having a one year timescale and level C to be met over a two year period. There are 15 level A standards, 20 level B standards, and 3 level C standards.

Level A standards correspond to the “core” standards and levels B and C are roughly equivalent to the “developmental” standards of the Department of Health's standards setting within the National Health Service (NHS).²⁵ Core standards set out the minimum level of service required, and developmental standards indicate the direction for improvement, providing a framework for planning and delivery of services that continue to improve quality.

Statistical methods

We analysed the data with the χ^2 test. This test was chosen to analyse and determine any significant differences within the region and within the seven topic areas of service provision.

Survey

The standards were surveyed throughout the 20 acute hospitals in the east of England in 2004. A survey method

was used as the most appropriate and efficient at this stage of the collaborative development process, based on knowledge gained from previous surveys and interviews in 2000 and 2002. We followed the method used by the SBNS: a self-assessment questionnaire was sent to all medical directors together with a letter explaining the background and development of the standards. They were asked to identify the lead clinician for head injury care in their trust and forward it to them for completion. A copy was also sent to all A&E consultants for information purposes.

All of the 20 hospitals (1–20) participated in this pilot. Fifteen of the questionnaires were completed by A&E directors or consultants, four by medical directors and one by a service improvement manager. (See fig 1 for a detailed breakdown of answers given by the 20 hospitals.) All nine hospitals (1–9) in the north of the Eastern region use the Addenbrooke's neurosurgical unit for referrals of head injuries. Three neurosurgical units serve the remaining 11 hospitals in the south of the region: Oldchurch in Essex serves six hospitals, the Royal Free Hospital serves four, and the Queen's Square Hospital serves one hospital.

Feedback was given to each trust about the level of its compliance with the standards and how it compared with other trusts in the Eastern region. Each was invited to contribute to the further development and refinement of the standards by answering a set of questions based on the Department of Health consultation document on standards for better health.²⁵

The results were also presented at a multidisciplinary regional conference in September 2004 for collaborative discussion to agree service level agreements based on a common service specification to promote regional consistency.

RESULTS

We recorded compliance with the standards using a "traffic light" system developed by Mr Barrie White,²⁴ green indicating standard fully met (dark grey in fig 1); yellow, standard partially met and/or plans in process (light grey in fig 1); and red indicating an unmet standard (black in fig 1). This format was chosen as the best management tool in planning and monitoring progress, as it can immediately reveal trends and problem areas, both geographically in each hospital and in areas of provision.

The analysis of the results is shown in figs 2–4. Figure 2 shows overall compliance with all standards (A, B, and C) in each hospital. Figure 3 shows the compliance in the seven

Figure 2 Overall compliance (%) with head injury standards for each of the 20 hospitals (nos. 1–20). Total number of standards is 38.

Figure 3 Overall compliance in each topic of the head injury standards.

Figure 4 Full or partial compliance for level A standards within each topic, comparing the north (N) and south (S) of the Eastern region. Numbers in parentheses indicate the number of standards within each topic. *Statistically significant.

broad topics of service provision and delivery. Figure 4 analyses compliance with level A standards and their geographical distribution—in the north or south of the region. Full compliance for all the standards across the region was 36%, and a further 30% of standards were judged to have been partially met. In the north of the region, overall compliance was higher (46%), than in the south (28%) and analysis of compliance by topic area showed a similar geographical difference (see figs 3 and 4). With regard to level A standards, 78% were either fully or partially met in the region: 68% in the south and 91% in the north.

Overall compliance (standards either fully or partially met) in some areas of service delivery was better than in others. For instance, results show that areas relating to specific resources, guidelines, and written communication were better met than those relating to follow up systems, monitoring, and coordination (fig 3). An analysis of unmet level A standards revealed significant differences between the north and south of the region (fig 4) in the areas of resources ($p = 0.025$) and networking ($p = 0.0045$).

Box 1: Key points from this study on the uses and benefits of standards

- Service specifications and framework
- Facilitates “whole systems thinking”
- Monitoring and evaluation of provision of services and care
- Facilitating informed commissioning
- More efficient and evidence based service planning
- Enables prioritisation—revealing key issues
- Gap analysis against standards
- Trend analysis
- Identifies deficits in resources and areas for urgent investment
- Assists in linking workforce plans
- Assists in creating networks and partnerships between the NHS, public, professionals, patients, and their carers

DISCUSSION

The questionnaire was disseminated as a working document as part of the collaborative development process to test its usefulness as a management tool in service planning and to modify the standards following feedback and further discussion.

The results highlight underlying issues which may be unrelated to lack of resources/facilities/funding: they are related to “systems” and strategies; some standards do not need funds to implement but require leadership, change of practice, and better communication and coordination systems to be put in place. For example, the appointment of leads in head injuries by all stakeholders (primary care trusts, acute trusts, regional neurosurgery units (RNUs) with defined roles and responsibilities has resulted in improvements in communication, networking, delivery, and organisation especially in the north of the region (topics 2–4 of our standards, north v south of region). We have found evidence in our studies over the last five years that the presence of “champions” or leads in hospitals, encouraging change and organising multidisciplinary care for patients with head injuries, results in better implementation of national guidelines,^{19 20 25} especially when supported by an interested regional neurosurgical unit. In hospitals where head injury care has been concentrated in one place, for example an observation or admission ward, the expertise of the multidisciplinary team and the communications with the RNU improve and changes are implemented.^{20 26}

The standards identify the lack of adequate resources in critical care beds and rehabilitation facilities and highlight the consequences, both direct and indirect, of such deficiencies for other areas of service provision. In the north of the region, where the Cambridge RNU has a higher number of neuro-critical care beds for its catchment population compared with the south, implementation of level A standards for resources, networking, and auditing (fig 4) is significantly better. Rehabilitation facilities are inadequate in the whole of the region and both north and south perform poorly.

One weakness of the self-assessment questionnaire method is the lack of external validation: the response is subject to the perceptions of the respondent and therefore dependent on the knowledge or lack of knowledge of that person or persons. For instance, in a factual standard such as 2.3, concerning the existence of a named lead clinician in head injury in the RNU for the north of the region, there were

three negative responses. This highlights miscommunication and coordination between hub and spoke, both within and between individual organisations. As in other areas of medicine, a standards process such as we describe here should assist in improving the quality of care and thus outcomes. It enables identification of deficiencies in both resources and systems organisation and helps healthcare professionals and managers to jointly try to target some of these areas.

The Department of Health is currently paying particular attention to the development of standards for better health. The core standards are coming into effect after publication and health providers will have a duty to take them into account in establishing, running, and commissioning of health services.²⁵ The Healthcare Commission will have responsibility for developing the detailed criteria that will underpin each standard and using these criteria for monitoring delivery and performance against both core and developmental standards.

Perhaps the time has come to create machinery for implementation of standards similar to that provided for cancer, children, the elderly, diabetes and cardiovascular medicine, to assist the implementation of national standards and guidelines on such an important and debilitating condition as head injury.

Conclusions and recommendations (see box 1)

Each trust is responsible for implementing clinical governance and enhancing standards and quality of care in the light of reports such as *Learning from Bristol*, the Department of Health's *Standards for Better Health*, and the recent reports and initiatives relevant to head injury care.

The application of these head injury standards to the six million population of the Eastern region indicates that the standards are a useful methodology for monitoring standards of care and service provision both within individual organisations and regionally. Their strength lies in their whole systems approach. There must also be a mutual commitment to using them on the part of all stakeholders if an equitable and coordinated service provision is to be achieved, a process that should be catalysed by the recently published NSF for long term conditions, a point emphasised in a recent discussion in the *Health Service Journal*.²⁷

The next steps of our group in implementation will include work on addressing the gaps in the service that this study has identified by continuing to work closely with the local specialist commissioning groups of the Eastern region and individual leads in head injury care at acute and primary care trusts. We would also recommend rigorous audit on head injury *outcomes* to ensure that the implementation of the NSF for long term conditions and the head injury standards is translated into patient benefits.

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AUTHORS' CONTRIBUTIONS

All authors contributed in the development of the standards. HMS, CM, and JDP devised the questionnaire, and HMS and CM organised the collection and analysis of data and were the main authors of the paper. The guarantor of the paper is JDP.

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Competing interests: none declared

The following hospitals in the Eastern region participated in the regional study:

North of region: Addenbrooke's Hospital, Cambridge, Cambridgeshire; Hinchingsbrook Hospital, Huntingdon, Cambridgeshire; Peterborough District Hospital, Peterborough, Cambridgeshire; James Paget Hospital, Gorleston, Great Yarmouth, Norfolk; Queen Elizabeth Hospital, King's Lynn, Norfolk; Norfolk and Norwich University Hospital, Norwich, Norfolk; Ipswich District Hospital, Ipswich, Suffolk; West Suffolk Hospital, Bury St Edmunds, Suffolk; Bedford General Hospital, Bedford, Bedfordshire.

South of region: Luton and Dunstable Hospital, Dunstable, Bedfordshire; Hemel Hempstead Hospital, Hemel Hempstead, Hertfordshire; Lister Hospital, Stevenage, Hertfordshire; Queen Elizabeth II Hospital, Welwyn Garden City, Hertfordshire; Watford General Hospital, Watford, Hertfordshire; Basildon Hospital, Basildon, Essex; Broomfield Hospital, Chelmsford, Essex; Colchester General Hospital, Colchester, Essex; Princess Alexandra Hospital, Harlow, Essex; Southend General Hospital, Westcliff on Sea, Essex; Oldchurch Hospital, Romford, Essex.

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