Stroke Education for Healthcare Professionals: Making it Fit for Purpose

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No of words: 5,287 excluding tables

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ABSTRACT

Title

Stroke Education for Healthcare Professionals: Making it Fit for Purpose

Research Questions

1. What are healthcare professionals' (HCPs) educational priorities regarding stroke care?
2. Do stroke care priorities vary across the primary and secondary sectors?
3. How do HCPs conceive stroke care will be delivered in 2010?

Study Design

This was a two-year study using focus groups and interviews for instrument development, questionnaires for data collection and workshops to provide study feedback. Data were collected in 2005-06.

Study Site

One Scottish health board.

Inclusion Criteria

All National Health Service healthcare professionals working wherever stroke care occurred.

Population and Sample

Participants were drawn from four university teaching hospitals, 2 community hospitals, 1 geriatric medicine Day Hospital, 48 General Practices (GPs), 12 care homes and 15 community teams. The sample comprised 155 doctors, 313 nurses, 133 therapists [physiotherapists, occupational therapists, speech and language therapists], and 29 'other HCPs' [14 dieticians, 7 pharmacists, 2 podiatrists and 6 psychologists].

Results

HCPs prefer fact-to-face, accredited education but blended approaches are required that accommodate uni and multidisciplinary demands. Doctors and nurses are more inclined towards discipline-specific training compared to therapists and other healthcare professionals (HCPs) HCPs in primary care and stroke units want more information on the social impact of stroke while those working in stroke units in particular are concerned with leadership in the multidisciplinary team. Nurses are the most interested in teaching patients and carers.

Conclusions

Stroke requires more specialist stroke staff, the upskilling of current staff and a national education pathway given that stroke care is most effectively managed by specialists with specific clinical skills. The current government push towards a flexible workforce is welcome but should be educationally-sound and recognise the career aspirations of healthcare professionals.

This paper

• provides an evidence-based description of healthcare professionals' educational needs in stroke

• argues the case for a specific career framework in stroke for healthcare professionals.

• establishes an argument for a national career pathway in stroke education.

UK stroke services are required to deliver standards of care (SIGN 2002; The Royal College of Physicians 2004) in line with specific stroke strategies (Scottish Executive Health Department 2002). Delivery of clinically effective care to meet these standards relies on a workforce equipped with the right knowledge, skills and experience (Craig & Smith 2007)

European and UK health policy have recognised the increasing impact of stroke on health care budgets leading to the publication of specific stroke strategies such as the 'NHS R&D Strategic Review: Coronary Heart Disease and Stroke' (Department of Health 1999) and 'The Coronary Heart Disease and Stroke Strategy For Scotland' (Scottish Executive Health Department 2002) Postgraduate training in stroke care (UK) is limited with inadequate training opportunities for doctors in stroke medicine (Intercollegiate Stroke Working Party 2004) and the educational preparation of nurses for their role in stroke rehabilitation minimal, largely ineffective (Booth et al. 2005). The current focus on rehabilitation and empowerment of individuals with chronic diseases (Scottish Executive 2007) makes stroke education a priority area for all health and social care staff working in rehabilitation teams and in the community. Studies have shown stroke education to be effective in improving knowledge and understanding, changing attitudes and creating a more organised approach to stroke care (Forster et al. 1999; Gibbon ; Langhorne & Pollock 2002). It has been noted elsewhere that questions remain unanswered regarding the provision of stroke education to healthcare professionals including how much education is needed, what is its optimal nature and what is the most appropriate content in order to bring about a beneficial effect on patient outcome (Booth et al. 2005).

However while the importance of stroke education has been highlighted by policy makers (Craig & Smith 2007) little has been done to establish a strategic UK approach to stroke education. Instead the provision of stroke education has been left to the discretion of the health service, consortia and higher education wherein stroke education competes for finite training resources with other UK health priorities such as cancer and heart disease.

This study set out to map educational needs in three areas - stroke, multidisciplinary working and user issues in the community - and to comment on the shape of future stroke services.

Research Questions
1. What are HCPs' educational priorities regarding stroke care?
2. Do stroke care priorities vary across the primary and secondary sectors?

3. How do HCPs conceive stroke care will be delivered in 2010?

METHODS

Study Design

This was a two-year study using focus groups and interviews for instrument development, questionnaires for data collection and workshops for study feedback. Data were collected in 2005-06. Only the primary and secondary sector data are reported in this paper.

A multidisciplinary 'Project Management Group' (PMG) was established comprising seven stroke specialists (two doctors, four nurses, one therapist) working in different stroke settings across the study area. Its remit was to stimulate ideas for study recruitment, aid questionnaire development and monitor study progress.

Population and Sample

The study inclusion criteria were all National Health Service (NHS) HCPs working wherever stroke care occurred in one Scottish health board. Participants were drawn from four university teaching hospitals, 2 community hospitals, 1 geriatric medicine Day Hospital, 48 General Practices (GPs), 12 care homes and 15 community teams.

The Health Board provided a list of all General Practices (n=216) from which a stratified random sample was drawn based on practice size in terms of patient numbers [<2,500; 2,500-6000; >6,000] and postcode location to ensure a geographic spread.

Sample Size and Access

Potential study participants comprised 155 doctors, 313 nurses, 133 therapists [physiotherapists, occupational therapists, speech and language therapists] and 29 'other HCPs' [14 dieticians, 7 pharmacists, 2 podiatrists and 6 psychologists] (Table 1).

Participants were accessed in different ways. All staff from acute and rehabilitation stroke units were accessed via staff lists and medical secretaries. All medical and nursing staff from medical units and accident and emergency were sampled randomly from staff lists. This random sampling prevented the over-representation of professionals working in non-stroke areas (Oppenheim 1992). Practice nurses (PNs) were accessed via the Primary Care Division. We sampled one seventh of PNs using simple random sampling and ensured they came from both participating and non-participating study General Practices.

Recruitment
Interest in the study was generated by consistent contact with managers through the Stroke Managed Clinical Network (MCN), conferences, study days and seminar programmes. The PMG identified wards/teams providing stroke care. Snowballing was used whereby individuals were asked to provide the names of other staff members who met the study criteria. This process continued until saturation of contacts was reached (Oppenheim 1992). Focus groups were arranged with nurses and AHPs to inform and then invite them to participate in the study but also allowed study information to be dispersed and interest generated (Gould et al. 2004).

Ethics Approval
Ethics approval was sought from the Local Research Ethics Committee (LREC) who decided after considerable debate that approval was not required. The PMG did not share this view but recognised that it is unclear whether needs analyses should be regarded as research, audit or service evaluation (Gould et al. 2004). A decision was taken to treat the study as research. Permission to access staff was granted in writing via relevant managers. All participants received an invitation letter guaranteeing anonymity and confidential handling of data along with a study information sheet with an email address for further information. Return of a completed questionnaire was interpreted as consent. A database of study participants and contact details was created specifying that permission to store personal details had been agreed in line with the Data Protection Act 1998 (Great Britain 1998). Project results and HCPs' educational profiles were posted and/or emailed to all participants on study completion.

Data Collection Tools
Questionnaires ensured coverage of a large geographic area, limited data collection costs and avoided interviewer bias (Oppenheim 1992). To inform questionnaire design, unidisciplinary focus groups of various sizes were held with staff from different professional grades with field notes taken with permission: these were often integrated into NHS meetings (Sofar 2002). A thematic analysis of stroke guidelines (SIGN 1997a; SIGN 1997b; SIGN 1997c; SIGN 1998; SIGN 2002; The Royal College of Physicians 2004), professional recommendations and stroke literature provided additional questionnaire items thus contributing to content validity (McKenna et al. 2003).

The same questionnaire content was used for all HCPs across health sectors with forms colour-coded to aid data sorting. The questionnaire and project information sheet were piloted with HCPs and educators in two health boards and required only minor alterations. Predominantly closed questions were employed to encourage a good response rate and to

facilitate data analysis given the volume of data requested (Bowling 1997; Oppenheim 1992). Most questions contained a free-text box for comment. There were three sections. The first collected personal [e.g. age, sex, marital status, education level], professional [e.g. place of work, length of time in stroke care] and educational data [e.g. availability, access, preferred modes of delivery to courses]. The second section focused on knowledge requirements for the delivery of quality care (19 questionnaire items), effective multidisciplinary team working (14 questionnaire items) and advising patients/carers on lifestyle issues (15 questionnaire items). Lastly respondents were invited to speculate on stroke care in the next decade.

Data Collection
Personally-addressed questionnaires were posted or hand-delivered to potential respondents' workplaces to be completed and returned in the pre-paid envelope within three weeks. Written reminder letters and where possible email alerts were sent to all non-responders requesting questionnaire return by a new date. Second reminder letters were targeted at professional groups with a response rate of <50%.

Data Analysis
Data were analysed using SPSS V12 and SAS v8.02. In formal tests of association, missing data were assumed to be absent and were excluded in statistical testing. The chi-squared (χ2) test of association was replaced with Fisher's Exact Test where assumptions were violated in a 2x2 table. The significance level was set at 0.0001 due to the large number of statistical tests conducted. Field notes and open-ended questions were analysed using content analysis. As part of routine quality assurance procedures at the Robertson Centre for Biostatistics, a second independent statistician verified all statistical analyses undertaken and presented in this paper.

RESULTS

Response Rate
Table 1 shows the overall response rate of 56% [354/635]. Twenty-two questionnaires were returned uncompleted for reasons including 'illness' [3] and 'no longer working in stroke care' [9] while four General Practices declined as a matter of policy. Statistical analysis excluded the 22 non-completions.

Demographics
While there were some differences in age percentages between the primary and secondary sectors, overall the majority [in both sectors] were aged 31-50 years, female, worked full-time, spent up to 50% of their time working in stroke and held an undergraduate degree (Table 2). Hence primary and secondary sector data were aggregated for this paper.

Nineteen (5.7%) HCPs stated they had accredited stroke education with 211 (63.6%) having undertaken non-accredited stroke study in the last five years. HCPs believed that a manager's decision to fund training was determined first by cost (77.4%; 257) and thereafter by duration of training (56.9%; 189), skill deficit (51.2%; 170) and knowledge acquisition required by medical advances (50.0%; 166). It was reported by 24.7% (82) that staff shortages made it difficult to undertake training.

All HCPs other than doctors preferred part-time study (p<0.0001). Stroke education was seen as pivotal to improving patient care and job performance but it was also important that courses be accredited (Table 3). Training could be higher education based but needed to be workplace oriented. While web-based education was acceptable, only 26.5% wanted distance education. Therapists (68.0%) and 'other HCPs' (62.5%) were more likely to see education as a career advancement route than nurses (49.6%) and doctors (56.9%) although these differences were not statistically significant (p=0.077). External funding was more important to nurses (62.0%) and 'other HCPs' (63.6%) than for therapists (51.4%) and doctors (50.9%).

When asked about multidisciplinary training, 53.6% (178) were in favour but a substantial minority (21.7%; 72) wanted unidisciplinary training while almost 25% (82) failed to specify a preference. Nurses (34.8%) and doctors (38.8%) were more likely to want discipline-specific training compared to therapists (12.5%) and 'other HCPs' (22.7%) (p=0.005).

Clinical Stroke Requirements

When ranked by profession a number of similarities in knowledge requirements across groups emerged (Table 4); e.g. acute interventions were a priority for doctors, nurses and 'other HCPs'. A majority of all HCPs considered that continence was either not in their remit or that they had sufficient knowledge while moving and handling was a low priority for all HCPs other than nurses and therapists (p<0.0001). Doctors (48.2%), irrespective of their workplace, were less likely to report the assessment and management of depression as a knowledge need compared to nurses (71.3%), therapists (75.0%) and 'other HCPs' (64.3%) (p=0.0017). Therapists were the group most likely to identify a need for additional information related to rehabilitation and prevention of disability (75.9%; p=0.008) and diagnostic tests (65.8%; p=0.002).

When knowledge requirements were cross tabulated with place of work (stroke unit care, other hospital care, primary care) both primary care and stroke unit HCPs were significantly more likely to want information regarding the social impact of stroke (p<0.0001) compared to

HCPs working in other areas. Neither years spent working in stroke or the current percentage of time spent working with stroke patients was associated with knowledge requirements.

Multidisciplinary Team Working
Given that multidisciplinary working is a key tenet of stroke care (SIGN 2002) we wanted a greater understanding of what that meant to HCPs. It was only in relation to conducting audit/research that therapists and 'other HCPs' were significantly more likely to want further information compared to nurses and doctors (p<0.0001). However other trends emerged and while not significant statistically they may be important to the effectiveness of the MDT. e.g., therapists (77.3%) and 'other HCPs' (77.8%) wanted more information on goal setting than nurses (57.8%) or doctors (56.9%) (Table 4). Doctors seemed the most comfortable with their role in the MDT. A greater proportion of nurses, therapists and 'other HCPs' than of doctors reported concern regarding how their role was viewed (p=0.076) and how career advancement could be managed (p=0.005) within the MDT. While most HCPs identified a need to know more about ethical decision making in the MDT, a lower proportion of doctors rated this a requirement (49.0%; p=0.008) than other professions. However when doctors were analysed further, a greater proportion of General Practitioners professed a need for MDT knowledge including taking ethical decisions than hospital doctors.

When MDT working was cross-tabulated with work area, more of those in stroke unit care were concerned with leadership within the MDT (p<0.0001) and conducting audit/research (p<0.0001) than those in primary or other hospital care and this was independent of all other MDT working. HCPs saw MDT working as an opportunity for joint treatment sessions and used words like *"partnership, working with, role blurring"*. HCPs believed that in the future there would be increased collaboration between professions and across sectors.

Lifestyle Issues
When HCPs were asked if they felt sufficiently prepared to enable stroke patients and their carers to manage at home, 48.2% felt prepared, 29.8% felt unprepared and 16.6% were unsure. When asked specifically what they needed to know in order to advise patients and families on stroke-associated lifestyle issues, nearly 45% felt satisfied with their existing levels of knowledge.

Those that did want more information demonstrated considerable consistency; e.g. stroke resources in the community, advising on personality changes, communication with dysphasic patients (Table 4). Understanding how to assess a patient's capacity to learn was a higher priority for therapists (78.1%) than doctors (49.0%) (p=0.006). Therapists (80.8%) expressed

the greatest need to know how to monitor psychosocial needs (p=0.004). A majority of all HCPs (67.8%; 225) wanted to communicate better with dysphasic patients. Doctors however most often reported a learning need in this area although this was not a significant difference (p=0.110).Nurses (73.1%) were the group most interested in advising carers on how to manage (p=0.0015) and in teaching patients and carers generally (67.4%; p=0.007).

The Future of Stroke Care
HCPs were asked to speculate on their role in stroke care in 2010. Generally it was thought that patients, families and carers would be more empowered and involved in care. Carers would *"be legitimate referrals in their own right as opposed to now when referrals are limited to people with stroke only – there is no specialist input to their families, even if carers are desperate for support"*. Patients would spend less time in hospital as a result of early supported discharge schemes, improved early intervention and changes in care patterns such as the *"expansion of chronic disease management increasing GP involvement with stroke patients"*. Some HCPs noted that *"less stroke patients [would be] nursed in hospital due to better resources and funding in the community"* and that improved prevention reduce the number of hospitalised stroke patients.

"Stroke [would be] seen as an emergency" requiring a more responsive service with earlier intervention. This would involve *"more thrombolysis resulting in more specialist training and on-call commitment"*. New technologies and approaches in treating stroke would relate directly to evidence-based practice (EBP): e.g. *"We will only be using assessments and treatments that we have an evidence base for"*. HCPs were prepared to adopt extended roles in stroke care with both nurses and therapists expecting more consultant roles in the future. For some, while there would be new interventions and drug therapies, the implications for patient prognosis, disability and their professional role were unclear.

DISCUSSION

Educating for the Future
In this study there were few differences between those working in primary and secondary care. Healthcare professionals (HCPs) supported the government's modernisation agenda of placing the patient and carer at the heart of health delivery services and recognised the importance of incorporating Evidence Based Practice (EBP) in [stroke] education programmes (Porter et al. 2005).

The lack of a stroke career pathway was evident in this study when attempting to distinguish levels of competency and skill base within healthcare professionals groups. One of the

challenges therefore for all HCPs is defining stroke clinical competencies and how these should be developed, assessed, implemented, monitored and maintained in clinical practice. However arguably government policy is in the process of re-interpreting the concept of 'flexibility' vis a vis the NHS workforce; that is the future Healthcare Professional will possess a range of skills that allows movement across traditional, professional boundaries. In so doing flexibility may be redefined as 'care delivered by any appropriately skilled Healthcare Professional on the basis of patient need' rather than the current arrangement of 'individual patient care delivered by appropriate HCP groups'. This is an important shift whose evolution can be located in UK National Occupation Standards with the effect that skills-based training is encouraged but implementation is not standardised, may not be supported financially or be formally accredited (Department of Health 2007).

It is therefore noteworthy that overwhelmingly in this study face-to-face, accredited education was preferred. HCPs were open to blended approaches incorporating online technology (e.g. web-based virtual learning environments such as 'blackboard' and 'moodle'), face-to-face interaction, grounded in the workplace but for which should carry credit towards postgraduate education.

Clinical Knowledge in Stroke
This study found similarities in Healthcare Professional's educational needs regardless of health sector or profession. It is therefore likely that generic skills and knowledge exist in some areas as identified in this study and that these could benefit from multidisciplinary training: e.g. principles in rehabilitation, psychological implications in stroke. Equally the sizeable minority who preferred unidisciplinary training could be accommodated within a blended learning approach where the range and/or depth of knowledge would vary according to need. It is also likely that in this study, some HCPs wanted particular knowledge to be informed rather than necessarily requiring it for clinical care; e.g. therapists' desire for drug therapy information (Table 4).

Given that cognitive problems in stroke survivors are both diverse and complex, it was not surprising that managing cognitive difficulties was the highest ranked need for all HCPs (Table 5). The lack of evidence to support the benefits of cognitive rehabilitation may limit HCPs' capacity to deal effectively with cognitive difficulties (SIGN 2002; The Royal College of Physicians 2004). Nevertheless, the ability to detect cognitive problems, to refer to appropriate MDT members and to deliver appropriate information to stroke survivors and families is important to avoid misconceptions and anxiety (Rodgers et al. 2001).

In this study 68.4% of HCPs identified a need to know more about advising carers and/or relatives on personality changes. This is in line with research elsewhere that has found that personality changes in the post stroke survivor often make relatives feel as if they are *"living with a stranger"* (Smith et al. 2004) We are unclear why more HCPs than doctors wanted further knowledge on the assessment and management of post-stroke depression. Perhaps doctors felt confident in managing depression or they may have seen it as another HCP's role. However depression is a prominent feature post-stroke (Caeiro et al. 2006; SIGN 2002) which frequently goes undiagnosed or misdiagnosed (Hackett et al. 2005) and therefore it is a concern that depression was not identified more frequently as needing educational input.

Generally nutrition and swallowing were not areas seen as requiring additional educational input and yet patients have been described as being 'poorly fed' and dysphagia is a post-stroke complication (SIGN 2002). Moving and handling and continence were less likely to be regarded as educational priorities. Moving and handling training is compulsory, is usually provided by the workplace and is not a stroke-specific requirement. Therefore it may have been considered as a generic skill (McGuire & Dewar 1995; Mitchell et al. 2005) not necessitating stroke education intervention. It is likely that stroke-related continence was viewed similarly with management handled in the same way as continence associated with other conditions. However both dysphagia (Smithard et al. 2007) and incontinence (Turhan et al. 2006) are associated with poorer stroke outcome. Additional research would be required to identify whether the association of continence and moving and handling with poorer outcome, is as a direct outcome of the stroke process or as a result of care delivery.

Multidisciplinary Working
Overall HCPs believed that their educational needs lay more in clinical stroke knowledge than in multidisciplinary issues. Respondents may have considered that they were already working in an effective multidisciplinary team (MDT) and that organisational elements of a stroke MDT – such as making referrals - were not a major concern.

Nevertheless therapists and nurses wanted other MDT members to have a clearer understanding of their role within the team and wanted to know how to extend their role within the team. Such aspirations have the potential to increase the responsiveness stroke service delivery and to overcome misconceptions regarding professional responsibility in some areas of stroke rehabilitation (Arias & Smith 2007; Gompertz et al. 2002).

Lifestyle Issues

While nearly 45% of healthcare professionals were content with their provision of information to patients concerning lifestyle issues, nearly one third (31.6%) were not.

Given a context of changing NHS policies where knowledge of community infrastructure needs frequent updating, with the move to supported early discharge in stroke (Langhorne et al. 2005) and that planned discharge increases patient satisfaction (Parkes & Shepperd 2002), it is not surprising that HCPs reported a need for better skills in relation to advising families on personality changes and on accessing community stroke resources. Perhaps what is more challenging are the areas HCPs identified where they needed more knowledge [e.g. setting realistic goals, advising on secondary prevention, teaching carers to manage] that might reasonably be expected to constitute part of the 'usual' care package for stroke survivors. Communication skills for working with dysphasic patients should be a core development area for staff working in stroke care.

Implications for Multidisciplinary (MDT) Stroke Education

In this study cognitive difficulties, personality changes, advising families on stroke prevention, self-management and realistic goal setting were all identified as areas requiring specific, additional education input across disciplines. While there was a majority in favour of multidisciplinary learning, more than 25% wanted some uni-disciplinary teaching. We also found support for work-based learning but this was not simply the acquisition of non-accredited skills. Rather it was learning in the workplace developed through tri-partnerships between health boards, the clinical environment and educational institutions that was accredited and transferable. Arguably the establishment of coherent national and/or regional educational consortiums could strategically set a benchmark for stroke education and could address current gaps in provision such as in generic and community care settings allowing for different professional and local needs.

Limitations

Given the volume of data, only the results related to doctors, nurses, therapists and other AHPs have been presented with other papers to follow. In this paper we highlight key points to inform educationalists and clinical managers. A variety of strategies were employed to ensure we accessed those whose primary work was in stroke care as well as those whose work involved stroke patients. This partnership probably contributed to the 56% response rate achieved and facilitated the development of new relationships for future regional and/or national work. However only one health board was involved in the study. Reminder letters and email communication had a positive impact on questionnaire return and were useful in maintaining interest in the project. Although the questionnaire was long it was usually

completed in its entirety although some respondents ticked only certain boxes in a particular section - this was not related to any HCP group. While the HCP feedback profiles sent to participants, and workshops conducted post study completion, found a resonance with staff, we recognise we may have captured only the views of those more interested in continuing professional development.

Project Outcomes
One outcome has been the formation of the West of Scotland Stroke Education Consortium (WoSSEC) comprising the Stroke Managed Clinical Networks of four health boards and other key stakeholders with a remit to work in partnership with Workforce Development Boards, NHS Education For Scotland (NES) and voluntary organisations to make strategic decisions regarding the provision of stroke education to HCPs. This consortium has the potential to be a stakeholder in establishing a national, post-registration, multi-disciplinary curriculum for stroke services.

CONCLUSIONS

Stroke, as a national priority (Department of Health 2005; Scottish Executive Health Department 2002), requires more specialist stroke staff, the upskilling of current staff and arguably a national stroke education pathway as stroke care is more effectively managed by specialists with specific clinical skills (Department of Health 2005; SIGN 2002). The commitment and capacity of educational consortiums such as WoSSEC to deliver structured and well-managed clinical education deserve further consideration and financial support to test their effectiveness. This study provides evidence of interest and motivation for stroke education among HCPs working in stroke. Furthermore it provides a basis for debate regarding cross-discipline training, the balance between specific skills training and accredited stroke education and highlights cross and specific discipline educational needs.

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Table 1　　　　**Response Rates**

Professional group	Sent (n)	Overall Response n (%)	Response n(%) For Data Analysis
Doctors	155	66 (43%)	59 (38%)
Nurses	313	167 (53%)	157 (44%)
Therapists	133	92 (69%)	87 (65%)
Other HCPs	34	29 (85%)	29 (85%)
Total	635	354 (56%)	332 (52%)

Table 2   Respondents' Profile

	Demographics	n (%)
Division	Primary	95 (28.6%)
	Secondary	237 (71.4%)
Age*	21-30	96 (28.9%)
	31-50	190 (57.5)
	>51	39 (11.7%)
Profession	Dietician	14 (4.2%)
	Doctor	59 (17.8%)
	Nurse	157 (47.3%)
	Occupational Therapist	32 (9.6%)
	Physiotherapist	38 (11.4%)
	Psychologist	6 (1.8%)
	Pharmacists	7 (2.1%)
	Speech and Language Therapist	17 (5.1%)
	Podiatrist	2 (0.6%)
Employment Status**	Full-time	234 (70.5%)
	Part-time	81 (24.4%
	Job Share	7 (2.1%)
	Other	3 (0.9%)
Education Attainment***	Diploma/pre-registration	78 (23.5%)
	Undergraduate degree	167 (50.3%)
	Master's degree	19 (5.7%)
	PhD/Doctorate	6 (1.8%)
	Medical Doctorate	13 (3.9%)
	Post-graduate medical qualification	19 (5.7%)
	Other; PG diploma, enrolled nurse training	14 (4.2%)
Area of Work		
Stroke unit	Acute Stroke Unit	60 (18.1%)
	Combined Units	32 (9.6%)
	Stroke Rehabilitation	41 (12.3%)
Other hospital care	Accident and Emergency	22 (6.6%)
	Day Hospital	11 (3.3%)
	Medical Elderly	37 (11.1%)
	Medical Receiving/Ward	23 (6.9%)
	Outpatients	2 (0.6%)
Primary	Community	69 (20.8%)
	General Practice	35 (10.5%)

Missing data: *7 (2.1%); ** 7 (2.1%); ***16 (4.8%)

Table 3   Respondents' Views of Stroke Training

		n (%)
Preferred type of delivery	Accredited study days	278 (83.7%)
	Workplace training programme	264 (79.5%)
	Work-based learning	231 (69.6%)
	Web-based learning	151 (45.5%)
	Distance education	88 (26.5%)
Reasons to undertake further training	*Impact on clinical practice*	
	If I believe it means I can do my job better	298 (89.8%)
	If I can see it benefiting patients/or carers	284 (85.5%)
	If it directly affects my current clinical practice	266 (80.1%)
	If it lets me learn what I really want to know	230 (69.3%)
	Training requirements	
	If it is accredited in some way	197 (59.3%)
	If it leads to a recognised qualification	145 (43.7%)
	If it gets me away from work	27 (8.1%)
	If someone else pays for it	152 (45.8%)
	Career aspiration	
	If it lets me alter my clinical role	230 (69.3%)
	If it leads to career advancement	158 (47.6%)
	If it means I can move to a job elsewhere	42 (12.7%)

Table 4   **Stroke Knowledge Priorities**

		Need for Clinical Stroke Knowledge (n %)	Multidisciplinary (MDT) Working (n %)	Advising on Lifestyle Issues (n %)
Ranked Highest Priorities	Doctors	Stroke assessment tools (40; 71.4%) Complications (39; 69.6%) Acute interventions (38; 66.7%)	Setting and evaluating MDT goals (29; 56.9%) The role of clinical governance = Introducing new technologies/treatments (28; 56.0%) Taking ethical decisions (24; 49.0%)	Better communication with dysphasic patients (48; 90.6%) Stroke resources in the community (39; 73.6%) Advising on changes in personality (35; 68.8.%)
	Nurses	Acute interventions (113; 79.6%) Pain assessment & management (106; 75.7%) Drug therapies (103; 74.6%)	Introducing new technologies/treatments (93; 72.1%) The role of clinical governance (83; 65.9%) Taking ethical decisions in the MDT (81; 63.3%)	Stroke resources in the community (115; 83.3%) Advising on changes in personality (109; 80.1%) Better communication with dysphasic patients (102; 77.3%)
	Therapists	Cognitive difficulties (73; 89.0%) Stroke assessment tools (70; 86.4%) Pain assessment & management (63; 81.8%)	Doing audit/research within the MDT (66; 85.7%) Introducing new technologies/treatments (58; 80.6%) Taking ethical decisions in the MDT (56; 78.9%)	Stroke resources in the community (68; 86.1%) Advising a carer on personality changes (65; 85.5%) How to monitor psychosocial needs (63; 80.8%)
	Other HCPs	Cognitive difficulties (24; 88.9%) Drug therapies (24; 85.7%) Acute interventions=Risk factors: management & assessment (21; 77.8%)	Setting and evaluating MDT goals (21; 77.8%) Doing audit/research within the MDT (20; 74.1%) Taking ethical decisions in the MDT (17; 68.0%)	Stroke resources in the community (22; 91.7%) Better communication with dysphasic patients (21; 77.8%) Advising on changes in personality (18; 75.0%)
Ranked Lowest Priorities	Doctors	Moving and handling (12; 21.4%) Continence (21; 37.5%) Pathophysiology of stroke (22; 39.3%)	Getting others to understand my role (9; 18.4%) How to advance career within MDT (10; 20.4%) How I can extend my role in the MDT (16; 32.7%)	Accessing patient information leaflets (7; 16.3%) Advising on primary prevention (17; 34.0%) Advising on secondary prevention (20; 39.2%)
	Nurses	Moving and handling (64; 47.8%) Continence (66; 49.6%) Nutrition and swallowing (72; 54.1%)	The role of other professions in the MDT (50; 39.7%) Making referrals (55; 44.0%) How to advance career within MDT (59; 47.6%)	Accessing patient information leaflets (15; 13.9%) Discharge planning within the MDT (61; 49.2%) How to encourage patient independence (72; 55.4%)
	Therapists	Continence (26; 34.2%) Nutrition and swallowing (42; 57.5%) Risk factors (45; 60.0%)	The role of other professions in the MDT (20; 30.3%) Making referrals (26; 39.4%) MDT clinical decision making (31; 44.9%)	Accessing patient information leaflets (5; 9.6%) Teaching stroke patients and carers generally (30; 44.8%) How to encourage patient independence (31; 46.3%)
	Other HCPs	Moving and handling (3; 12.0%) Continence (4; 16.0%) Specific diagnostic tests (15; 55.6%)	The role of other professions in the MDT (8; 33.3%) How to advance career within MDT (9; 34.6%) MDT clinical decision making=Making referrals (9; 37.5%)	Teaching stroke patients and carers generally (12; 48.0%) How to monitor psychosocial needs = How to encourage patient independence (12; 50.0%) Teaching carers how to manage (13; 54.2%)

Table 5 - HCPs' Clinical Stroke Requirements

Clinical Stroke Requirements	n (%)*
Cognitive difficulties	237 (71.4%)
Current acute stroke interventions	235 (70.8%)
Stroke assessment tools	224 (67.5%)
Pain assessment and management	220 (66.3%)
Drug therapies	219 (66.0%)
Complications: prevention /treatment	209 (63.0%)
Assessment / management of depression	207 (62.3%)
Sensory loss (e.g. sight, hearing)	203 (61.1%)
Communication and speech problems	200 (60.2%)
Rehabilitation and prevention of disability	186 (56.0%)
Specific diagnostic tests	183 (55.1%)
Cultural issues	182 (54.8%)
Pathophysiology of stroke	182 (54.8%)
Assessment /management of risk factors	178 (53.6%)
Social impact and consequences	177 (53.3%)
Secondary prevention	176 (53.0%)
Nutrition and swallowing	157 (47.3%)
Moving and handling	131 (39.5%)
Continence	117 (35.2%)

* percentages include missing data in the