Interprofessional team-work across stroke care pathways: outcomes and patient and carer experience

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**Scientific Summary**
Government policy advocates interprofessional care for people with long-term conditions and stroke in particular. However, there is a lack of evidence about the effectiveness and impact of interprofessional teamwork on outcomes and experience of care as patients make transitions from acute care to care closer to home. Therefore the aim of this study is to investigate the impact and effectiveness of team-working on a range of patient outcomes and experience of care for stroke survivors and their carers at different points in their pathway of care from hospital admission through the rehabilitation phase to discharge home or a care home. This study will be carried out in two stroke units and the associated Primary Care Trusts. We will work with a service user reference group, with membership drawn from the stroke units own user groups, to ensure that the study is grounded in patients’ and carers’ perspectives. The
user group will influence the research by contributing to conceptual development, advising on the methods, providing feedback on the analysis and dissemination.

The study will draw on a realistic evaluation framework to explore the interaction between the contexts and mechanisms of interprofessional teamwork that influence patients and carers experience of care and clinical outcomes. It will use mixed methods and be carried out over 30 months in five phases: Phase 1) The organisational and service delivery context will be mapped within the acute and primary and social care sectors. Information will be collected by interviewing key staff (30) on organisational structures, care pathways, governance and incentive mechanisms for team work using the McKevitt et al (2000) model. Phase 2) Anonymised data from 400 patients will be retrieved from the hospital stroke registers to include information on: demography, risk factors for stroke, stroke sub-type, outcomes at 3 and 12 months for functional independence, anxiety and depression, mortality, recurrence and reintegration to normal living. The stroke teams will complete the Aston Team Performance Inventory to assess team function. Phase 3) A sub sample of 60 patients and 60 family carers will be recruited and interviewed about their experience using a critical incident technique (Redfern and Norman 1999). This interview will be repeated on two further occasions during rehabilitation and on returning home. Phase 4 will comprise interviews with professionals working in hospital and community stroke teams (60) about their experience of teamwork using the critical incident technique with selected observations of team meetings (18). Finally in phase 5) Accumulative data analysis across the phases will analyse multiple sources of data using appropriate qualitative and quantitative methods to interrogate associations between the nature of teamwork with the severity of stroke, the progress of rehabilitation and the quality of the patient and carer experience. We will produce preliminary theoretical propositions for feedback to the stroke teams and will use the findings to promote better understanding of how teams influence stroke outcomes through publications, conferences and dissemination to service user groups.

Lay Summary
Government policy advocates that teams of health and social care professionals should provide care for people with strokes. Despite some evidence that teams contribute to recovery following stroke, no research has investigated whether teamwork affects health, recovery and patients’ and carers’ experience of care. This study, in two stroke units and surrounding communities, aims to investigate the impact and effectiveness of teamwork on a range of patient outcomes and the experience of care for people who survive a stroke and their carers while in hospital and later at home or in another community setting. We will work with a service user reference group who will provide advice on the methods, feedback and relevance of the research. We will undertake the research in five phases: 1) We will describe the types and characteristics of teams providing stroke services in hospital and community; 2) Anonymised routinely collected information on 200 patients held on stroke registers in each site will be made available to the researchers. The stroke teams will complete questionnaires about how they work together;
3) 60 patients and their family carers will be recruited and interviewed about their experience. This will be repeated on two further occasions during rehabilitation and on returning home; 4) this phase will include interviews with professionals working in hospital and community stroke teams about their views on teamwork with selected observations of team meetings. Finally in phase 5) the information on teamwork from the above sources will be analysed and examined for associations between the nature of teamwork with the severity of stroke, the progress of rehabilitation and the quality of the patient and carer experience. We will provide feedback to the stroke teams and use the findings to promote better understanding of how teams influence stroke outcomes.

Details of research proposal
Introduction, aims and objectives
This proposal examines the effectiveness of interprofessional team-working in a clinical priority area: the treatment and care of people who have had a stroke. Key policies in the UK NHS modernisation agenda have highlighted the importance of teamwork in health and social care to respond to the changing needs of health care provision and to achieve high quality, efficient patient care. Consequently, interprofessional teamwork has become a crucial element of care delivery specified in most national service frameworks and in particular the policies for treatment and care of people with strokes. Despite extensive literature defining and describing effective teamwork, there remains a lack of robust evidence of the impact of interprofessional teamwork on patient outcome and a continued need for applied research to inform the management and development of healthcare teams (Mickan and Rodger 2005). There is also a lack of literature that explores the effectiveness and impact of interprofessional team-working on outcomes as patients make transitions from acute care to care closer to home. In the care of people with a stroke transitions are made between types of teams: from well defined and organised hospital-based stroke teams to looser, extended teams in primary care with input from general practitioners, rehabilitation specialists, community matrons and social care, often working out of separate agencies. In part this dearth of evidence is due to the methodological challenges of separating the effect of interprofessional team-working from other contextual factors, such as level and availability of commissioned services.

The aim of this study is to investigate the impact and effectiveness of team-working on a range of patient outcomes and experience of care for stroke survivors and their carers at different points in their pathway of their care from hospital admission, through the rehabilitation phase to discharge home or care home.

The objectives for the study are:
1. To investigate clinical outcomes of care using data collected for hospital based stroke registers and the statistical associations between team characteristics and functioning, patients’ experience of care quality, patients’ clinical outcomes of care by:
   a) describing how stroke teams and services within the acute hospital and community health and social care are organised and supported
b) examining the mechanisms that support team-working and the facilitators and barriers to effective team-working in care of people with stroke

c) conducting multivariate statistical analysis to explore relationships between patients outcomes and team attributes.

d) exploring staff experience of team-working and their understanding of what makes an effective team.

e) exploring patient and carer experience of care in the context of their understanding of what makes an effective team along the pathway of their stroke care from admission to hospital to 90 days post discharge.

2. To develop hypotheses about which aspects or features of teams and team-working are effective in improving patient clinical outcome and experience of care

This proposal draws on a realistic evaluation approach in a multi-method design to explore these issues in settings where the acute phase service delivery are nationally recognised as centres of excellence.

Background, including NHS context and relevant literature

The use of health care teams working across professional and organisational boundaries to achieve care delivery of high quality and efficiency is now an integral feature of health care delivery in acute, rehabilitation and primary care settings and enshrined in healthcare policy (DH 2000, 2001, 2005, 2007). Patients frequently have conditions that have multiple causes and require multiple treatments from a range of health professionals with different skills and expertise. Good quality patient care depends upon a range of skilled professionals collaborating together in teams since it is very unusual that one professional can deliver a complete episode of care. Although definitions of teams can differ, there is general consensus that teams are comprised of a small, manageable number of members, with an appropriate mix of skills and expertise, all committed to a meaningful purpose and have collective responsibility to achieve performance objectives or outcomes. Each team member should have a distinctive and necessary role (Michan & Rodgers 2000). A large proportion of research to evaluate team performance and output has used a systems model of teamwork examining the main inputs or contextual factors including the structure of the team and team and leadership processes (Michan 2005). Hackman’s (Hackman 1987, Wageman et al 2005) influential model of team effectiveness describes 5 conditions that influence team performance: a) that the people responsible for the work are a real team not a team in name only, b) the team has a compelling direction for its work, c) the team’s structure facilitates collective work, d) the organisational context within which the team works provides support for task activities, and e) the team has access to ample hands-on coaching to help members maximise their performance within the work circumstances. Shea & Guzzo (1987) identify the concept of potency characterised by a team sense of ability to meet challenges and likely success as important to team effectiveness. However, West (1996a) has proposed the need for models of teamwork to become more dynamic and take into account that teams are increasingly made up of professionals from diverse backgrounds and are working in challenging and changing environments. West (1996b) proposes that task team reflexivity where teams reflect upon their objectives, strategies,
processes and environment and adapt these to their work situations is an overarching factor that influences team effectiveness. There has been considerable change in the way health and social care is organised and this change will certainly have had an impact on the composition and functioning of teams. Furthermore, interprofessional team-working is becoming more complex; the nature of interprofessional teamwork is developing to accommodate changes in service delivery, the roles of the healthcare workforce and health technologies with increased flexibility and diversity of the structure and process of team-working.

However, despite the centrality of teamwork to healthcare delivery, organization and patient safety, there are a number of issues that are not fully understood (Infante 2006). In particular, what is the impact of team-working on patient outcomes and their perceptions of care. Research has tended to evaluate team effectiveness on the basis of productive output, team processes e.g. team cohesion and individual team member outcomes e.g. staff satisfaction and well-being (Michan 2005). However, team effectiveness may be perceived differently by team members, health care organizations and patients and their carers (Lemieux-Charles et al 2002) and therefore while staff satisfaction and well-being are important they do not necessarily reflect effective teamwork. Similarly patient and carer satisfaction may not necessarily indicate team effectiveness as it may be difficult for patients and carers to separate the effect of teamwork from the effect of clinical intervention. The links between improved patient outcomes and patient’s perspectives remain unestablished (Zwarenstein & Reeves 2000, 2006). The importance of evaluating patient outcomes is emphasised in a number of high-profile reviews of healthcare workforce (Car-Hill at al 2005, Hewitt et al 2005) and organisational effectiveness (Sheaff et al 2003). Another important area of investigation is the impact of multiple membership of teams on team-working and effectiveness. Team boundaries are often fluid with some members belonging to several work groups, for example uniprofessional teams working within a wider interprofessional team. Lemieux-Charles & McGuire (2006) suggest that teams might be composed of core and extended team members, which can change over time. Furthermore, in some health care services e.g. stroke care, patients are cared for by several teams during their recovery trajectory: acute care, inpatient rehabilitation and community health and social care. Interprofessional teams are examples of multiteam systems as described by Marks et al (2005). They assert that multiteam systems are not simply large teams but that their component teams are distinct entities with specific goals capable of independent actions. Moreover, they suggest that interdependence of members is higher within component teams than between component teams within the multiteam system.

There are two key reasons for selecting stroke pathways to investigate the relationship between interprofessional team-working and patient experience and outcomes. Firstly, there is strong evidence that patients who receive care from multiprofessional specialist teams in stroke units are more likely to be alive, independent and living at home one year after stroke (Stroke Trialists’ Collaboration 2001). Furthermore, early supported discharge by specialist multidisciplinary stroke teams is associated with improved patient outcome
and satisfaction (Early Supported Discharge Trialists 2005). The contribution of the team to these favourable outcomes is unclear and there is a need to know what aspects of the team and team-working influence patient outcome to enable further development of stroke services (Kalra et al 2000). Thus, stroke care offers an ideal area within which to investigate the mechanisms of effective teamwork. Secondly, stroke is a common health problem that causes considerable disability and frequently requires acute, rehabilitative and long-term care input in both hospital and community settings. Stroke affects between 174 and 216 people per 100,000 population in the UK each year (Mant et al 2004) and this is expected to rise in future decades (Young and Forster 2007) which will increase the need for effective care and treatment. Further development of teamwork is an important feature of both the stroke standard in the National Service Framework for Older People (DH 2001) and a current consultation document on a new national strategy for stroke ‘An ambition for stroke’ (DH 2007).

Plan of investigation

Approach and conceptual framework
There are significant methodological issues inherent in exploring the impact of teamwork, operating in different contexts and modes of service delivery, with varying membership across different professional groups and agencies on outcomes for patients with stroke. There is a need to explore a range of factors and causal mechanisms for the outcomes with sufficient validity and precision to develop quantitative models. Therefore we will draw on Realistic Evaluation (Pawson & Tilley 1997), which provides a framework to explore the interaction between the contexts and mechanisms of team-working that influence patients and carers experience of care and clinical outcomes. Our conceptual framework and study design are informed by ideas from Lemieux-Charles & McGuire (2006) who draw on the healthcare and organisational studies literature to develop the Integrated (Health Care) Team Effectiveness Model (ITEM) (see figure 1) depicting the complex interactions between task design, team processes, team psychosocial traits and team outcomes.

We are working from the premise that team-working is a complex element of service delivery that influences and is influenced by a vast array of factors. Therefore, a research approach that addresses the ‘whole system’ or ‘whole service’ is required (Infante 2006). With that in mind the study design proposed is longitudinal and will use multiple methods including qualitative and quantitative methods. A key task will be the synthesis of the various strands of data to explore trends and associations, over time, between service structure and interprofessional team-working (service mapping and team profiling), patient outcomes (from the stroke registers) and patient experiences (critical incident interviews). Exploratory hypotheses will be proposed and tested using multivariate statistical analysis to explore and develop an explanatory model of the impact of teamwork on patient outcomes.

The study will take place within two world class tertiary referral stroke care centres, and within the Primary Care Trusts to which patients are discharged. Examining the links between the process of team-working and patient satisfaction, treatment and outcome.
outcomes within consistently high performing service delivery centres is a strength of the study. We have agreement in principle from senior clinicians. This study will draw from data held locally in stroke registers in both stroke care centres. Both centres employ standardised data collection methods for identification of demographic, clinical, physical and psychosocial outcomes of all patients who have a stroke. This important resource enhances the potential for generalisability of the study and its value for money.

Methods (including the plan of analysis)
A literature review will be conducted to identify a priori theories of what constitutes good teamwork. Literature about the management of acute, rehabilitation and continuing care health and social care needs will be specifically targeted. This literature review will be guided by principles of realistic synthesis (Pawson et al 2005) to provide an explanatory analysis aimed at discerning what aspects of interprofessional teamwork work for whom, in what circumstances, in what respects and how. From this preliminary analysis we will construct an analytical framework to support and inform data analysis and interpretation.

Data for all patients admitted to each centre and discharged to one PCT within each centre’s local area for the duration of the study will be accessed in an anonymised form from the stroke registers (approximately 200 per year at each site). A subsample of up to 60 patients will be recruited from both sites to explore their experience of care and their informal carers experience of their care throughout the recovery trajectory from acute to community care. This subsample will be purposively selected to represent population characteristics in terms of, for example, age, gender, ethnicity and stroke aetiology. Existing data held on stroke registers will be used to refine sampling criteria. The subsample will include people with mild, moderate and severe stroke although higher numbers of patients with moderate stroke as their recovery is likely to be most sensitive to the organisation of stroke services (Kalra et al 1994). It is inevitable that the sample will include people with communication difficulties. The study team have considerable experience of undertaking research with people who have had a stroke and furthermore researchers will undergo specialist training provided by Connect about how to include people with communication difficulties as a result of having a stroke in research.

Data collection and analysis will be conducted in 5 phases:

**Phase 1**
*Understanding the organisational and service delivery context (to address objectives 1a & 1b)*
A detailed contextual and organisational map of each of the stroke services within the acute hospitals and community health and social services will be constructed. This map will include organisational structure and processes, contract and service specification, finance, human resources management, team composition and organisation, current workforce establishments, role responsibilities, use of integrated care pathways, team structures, agreed objectives, defined roles/boundaries, governance and incentives arrangements, pooled resources, shared learning opportunities and wider support mechanisms drawing on methods developed by McKevitt et al (2000).
To generate this profile individual semi-structured interviews will be conducted with key members of staff in person or by telephone; lead clinicians, service managers, PCT commissioners and providers and local authority commissioners and providers (n = up to 30 across up to 6 organisations). These audiotaped interviews will comprise both fact-finding questions and open-ended questions relating to the day-to-day experience of directing care in hospital and community settings. The data will be analysed to produce a detailed description of the stroke pathway that will enable direct comparison with the structure and implementation of other stroke services. This will support generalisation of findings. From this detailed analysis we begin to generate preliminary theories of how context and team-working in stroke care interact positively or negatively (Pawson & Tilley 1997). The value of conducting an analysis of costs was discussed with a health economist and considered to add little value to this study, which is an exploratory study of the value of teamwork rather than testing teamwork as in an intervention study.

### Phase 2

**Exploring the relationship between team working and patient outcome (to address objectives 1, 1b, 1c, 1d)**

This phase will explore statistical relationships and associations between quantitative team performance measures and patient clinical outcomes. Patient data will be retrieved from stroke registers held at both sites. This will include a wide range of demographic data and outcomes, for example, sociodemography, risk factors for stroke, stroke subtype, outcome at 3 months in the areas of functional independence (Barthel Index, Modified Rankin score), anxiety and depression (Hospital and Depression Scale), mortality, stroke recurrence and Reintegration to Normal Living Index. It is proposed that patient outcome data will be obtained from the stroke registers to prevent overburdening participants by duplicating collection of these data.

Detailed team working profiles of each of the teams within the trajectory of stroke care will be conducted using a series of tools to measure important aspects of team functioning e.g. Aston Team Performance Inventory (ATPI) (West et al 2005) and Work-Related Quality of Life scale (WRQoL) (Van Laar et al 2007). The ATPI is one of the most comprehensive team measurement tools available to study team effectiveness and includes assessment of team processes, group potency, team leadership and reflexivity. The ATPI will be completed to examine team-working in interprofessional teams. Data will be analysed by Aston Organisation Development, the company who developed the ATPI and a detailed report will be provided for the research and the teams. Raw data will also be provided for statistical analysis. Feedback will be given to teams about performance and further development.

An exploration of relationships and associations between patient outcome measures and team structure, characteristics and team performance measures will be undertaken. In the first instance descriptive statistics will be employed to report on the organisation of interprofessional teams in stroke care as well as staff experience of working in these groups. However when it comes to modelling clinical outcomes and experience of care on service delivery and teamwork, appropriate multivariate statistical analysis will be

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undertaken using the stroke register data and team measures as explanatory variables. Hierarchical linear models will be used to assess the effectiveness of teamwork. In this way, for example, person-specific longitudinal data and within-person covariances can be appropriately modelled. Research has shown how this technique also handles differential attrition, which may be present in this study. Standard tests for regression weights and significance will be performed (using a 0.05 significance level). Additionally, a comparison between linear models and Bayesian methods will be investigated. Often Bayesian methods provide for simpler interpretations on the outcomes of a study such as this - the stroke register database can be used to develop informative priors and clearly sceptical priors can be used.

**Phase 3**

*Exploring patient and carer experience of team working (to address objective 1e)*

In-depth data on the provision and quality of patient care will be collected from the subsample of patients and their informal carers to explore their experience of care provided by an interprofessional team. The critical incident technique (Flanagan 1954) was developed by Redfern and Norman (1999) to capture patient-derived measures of the quality of care and found to be useful for enabling vulnerable patients to express negative as well as positive views focussed on specific incidents they experience or observe. Audiotaped semi-structured interviews will be conducted with patients and carers separately and at three time points, where possible, within the trajectory of care – within acute care, inpatient rehabilitation and three months after discharge and receiving community health and social care. Patients (n=up to 60) and carers (n=up to 60) will be asked to describe incidents they experienced that they considered to be significant examples of high or low quality teamwork e.g. “Can you think of an example of when you were impressed with how the staff here worked together as a team?” or “Can you think of any examples of when you felt the different professionals involved in your care didn’t work so well as a team?” Each response will be probed for more information about why care in each incident was considered good or not-so-good to find out “what occurred and why?” Specific probing questions about the contribution of the team will be asked to find out how team working influenced their experience.

The analysis of the transcribed interviews will be conducted as outlined in Redfern & Norman (1999), to identify positive and negative quality indicators. These data will be subjected to thematic qualitative analysis guided by the analytical framework developed for the study and will give considerable insight into the experience of receiving care. Professor Redfern is a member of the expert advisory group.

**Phase 4**

*Exploring professional experience of team working (to address objectives 1b, 1d)*

The professionals’ experience of working as a member of an interprofessional team will be explored using critical incident technique as described above in

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phase 3. They will also be asked about their views and experience of being a member of both a unidisciplinary team and a multidisciplinary team and whether this affects the way the interprofessional team works together. Semi-structured interviews with a sample of staff (n=up to 60) working in the 2 acute teams and the community based teams. The sample will be purposefully selected to include all professions and grades of staff. The data will be subjected to thematic analysis guided by the analytical framework to explore their experience of team-working and views of what constitutes effective teamwork.

Non-participant observation of team working will be also be undertaken at interprofessional team meetings and other key times of interaction identified in the contextual team profiling in phase 1 (n=3 for each team, up to 6 teams), to explore information sharing, team roles and processes of decision making.

Phase 5

*Accumulative data analysis across the phases (to address objective 2)*

Each phase of the study generates data which gives a different perspective of interprofessional team-working and these data will be analysed to produce preliminary theoretical propositions of the effect of teamwork on clinical outcomes and patient and carer experience of stroke care. These findings will be considered against the findings from other phases to increase our understanding of how context, team performance and characteristics, professional experience of working in an interprofessional team, patient and carer experience of care and patients outcomes are connected. Therefore it is envisaged that the combination of the multiple methods used will enable the thematic analysis or ‘theory’ of the qualitative data and context mapping to explain, interpret and refine the findings of the statistical analysis. Data will be scrutinised for patterns of congruence and discordance to develop an overall picture of what aspects of teamwork work for whom and in what circumstances.

**Benefits of research to NHS**

This research will benefit the NHS both locally and nationally. Locally the trusts will work in partnership with the research team and study findings will be fed back to contribute to service development thus providing a powerful direct benefit. Furthermore, by exploring which aspects of teamwork influence patient outcomes and experience of care the research will contribute to understanding how teamwork can be developed to maximise benefits to patients and their carers.

**Proposals for the involvement of stakeholders**

We will conduct the whole research study in partnership with service users, NHS staff and managers and commissioners building on methods developed by Ross et al (2005) and evidence-based approaches (Smith et al 2006). This will be facilitated through the user reference group, expert advisory group and regular feedback to clinical staff in the acute unit and community. This strategy will contribute to research capacity building, service and team development and dissemination. This collaborative work will enhance the
focus of the research and facilitate learning within study sites and the
research team.

A user reference group will be established whose purpose is to work with the
research team to ensure that the project is grounded in the patients’ and
carers’ perspectives. The group membership will be representative of stroke
survivors and carers in terms of characteristics e.g. age and gender and for
stroke survivors, level and type of disability. The group will meet three times
during the project and will be chaired by Sally Brearley. Meetings will be
arranged at venues, times and dates as convenient as possible for group
members. All expenses will be met, support will be available for
communication needs and a fee for participation will be paid. A key role for
this group is to contribute to data analysis and dissemination. Service users
will influence the research by contributing to developing concepts and
principles during the contextual and team profiling activities; to advise on the
approach to interviews conducted with patients and carers; to provide first
level analysis of the interview data using anonymised excerpts from
transcripts; to connect the study with specific patient concerns, issues and
perspectives during the analysis and interpretation of the data; and to provide
advice about the best ways of disseminating findings to service users.

Plans for dissemination of results
The team will disseminate findings within a planned programme including:
• final and interim reports to SDO
• feedback to user participants and the user reference group
• a stakeholder consultation day held at the end of the study involving
  the user reference group, expert advisory group, NHS senior
  managers, policy makers, funder representatives and key personnel of
  other inner city stroke units to present the study findings and
  conclusions
• feedback of teamwork profiling and observation to clinical staff
• papers submitted to peer review and professional journals and
  presented at scientific and professional meetings
• website dissemination and short briefing papers for national and
  international dissemination
• presentation of findings to inform methodological developments in
  workforce and stroke research.

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