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Interprofessional Education

Introduction

Dear Student

Welcome to the four interprofessional education sessions. It is our pleasure to introduce you to collaborative practice as it is seen internationally. We as educators strive to provide you with the relevant information and learning experiences so that you can make meaning of the experience and construct your own knowledge for future use in different settings. As collaborative practice is all about working in a team, your team is composed of the various health professions in our Faculty of Health Sciences. You will remain in the team for the duration of the Interprofessional Education sessions. Teamwork is the core of collaborative practice and therefore it is essential that you are honest and just when you evaluate team member's contribution and participation in this module.

Poor teamwork is often the result of communication breakdowns (Anderson, Manek & Davidson 2006). Olenick and Allen (2013) confirm these findings by ascribing the lack of interprofessional collaboration and lack of communication as the cause of as many as 98 000 preventable deaths in the USA per year. Up to 10% of patients admitted to hospitals in Australia may suffer adverse events due to poor teamwork (Armitage, Connolly & Pitt 2008). No similar data could be found for South Africa, but it stands to reason that it might be much worse due to the multiple languages (11) and the inability of most healthcare professionals to express themselves fluently in more than two or three of the eleven languages. Poor patient outcomes, for example, delays in patient care, wasted staff time, and serious adverse events result from poor interprofessional communication (Olenick & Allen 2013).

Interprofessional education and collaborative practice can improve:

- access to and coordination of health services offered by the spectrum of healthcare providers, individuals and their families;
- appropriate use of specialist clinical resources;
- health outcomes for people with chronic diseases (World Health Organisation 2010);
- patient care and safe health systems that are responsive to the needs of the population (Craddock, O'Halloran, McPherson, Hean & Hammick 2013); and
- job satisfaction with reduced stress and compassion fatigue of health professionals (World Health Professions Alliance 2013).

The World Health Professions Alliance (WHPA) (2013) that speaks on behalf of the International Council of Nurses, the International Pharmaceutical Federation, the World Confederation for Physical Therapy, the World Dental Federation and the World Medical Association supports interprofessional collaborative practice that builds on interprofessional education.

Healthcare reform initiatives drive the redesign in education of the health professions to integrate the concepts of interprofessional care (Casimiro, MacDonald, Thompson & Stodel 2009). In South Africa, the re-engineered Primary Healthcare (PHC) strategy (2011) emphasises a team approach to healthcare and states that the education should be relevant. Leadership, specifically in PHC, depends on circumstances and frequently shifts from one

member to another, consequently causing ambiguities regarding tasks, roles, leadership and decision-making. Baldwin and Baldwin (2007) are of the opinion that interprofessional relationships should not be left to chance; they should be an integral part of the curriculum. Interprofessional education takes place when “members or students of two or more professions associated with health or social care, engage in learning with, from and about each other” (Bridges, Davidson, Odegard, Maki & Tomkowiak 2011: online).

The contact details of the educators that are responsible for IPE per school are listed below. Please feel free to contact the educators, should you experience any challenges with regard to IPE. Please make an appointment, as the educators might not be able to see you immediately due to other academic commitments.

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Competence

At the end of the four Interprofessional Education (IPE) sessions, you will be able to develop a plan to promote collaboration among healthcare professionals based on the six key domains of collaborative practice in order to improve health outcomes.

Programme

Table 1 shows the learning outcomes with their deliverables, as well as the dates and venues.

Table 1: Timetable with outcomes and deliverables

Date	Outcome	Deliverable	Venue
25 Feb	Clarify collaborative practice and establish shared values	Visual representation of collaborative practice Shared value statement	Please check the group allocation to find out in which venue you should convene
4 March	Demonstrate shared decision-making and shared power through effective communication and collaboration among all healthcare professionals	Role establishment Footage of simulation	Please check to which simulation laboratory your group is allocated to
18 March	Demonstrate shared decision-making, shared power, collaborative leadership through effective communication and collaboration among all healthcare professionals, patient and significant others	Self-evaluation (footage previous session) Footage of simulation	
8 April	Compile a plan to establish a collaborative practice according to the underpinning principles in a	Self-evaluation (footage previous session)	Same venue as on 25 Feb

Date	Outcome	Deliverable	Venue
	multidisciplinary healthcare setting	Assignment	

Assessment

Formative assessment will take place throughout the four sessions by means of peer/self-assessment. You will assess the teamwork at the beginning of session three.

The summative assessment is a group assignment and individual peer assessment. The mark for each individual will be based on the average of the group assignment and the peer assessment.

Full instructions for the assignment are provided under session four.

Session 1

Outcome 1: Clarify collaborative practice and establish shared values.

Activity 1.1: Completion of the questionnaire [5 minutes]

Please complete the Readiness of Interprofessional Learning Scale (RIPLS) questionnaire (Addendum IV) anonymously. It will not take more than 5 minutes and will be used for research purposes. Completion of the questionnaire is voluntarily. There will be no retribution if you decide not to complete the questionnaire. We shall disseminate findings by means of conference papers and articles in professional journals. You will be asked to complete the questionnaire on completion of the IPE sessions again. Therefore, two copies of the questionnaire are at the back of the workbook.

Thank you in advance for completing the questionnaire. It is much appreciated.

On completion, remove the page from this study guide and hand it to the facilitator.

Activity 1.2: Get to know your group members [15 minutes]

All group members sit in a circle. We are having a party and everyone has to bring something that begins with the same first letter as their name to the party. For example, a person will say, "My name is JANINE, and I am bringing a bag of JELLYBEANS." The person to his/her right says his/her name and item, and then repeats the leader's name and item, "My name is ERIK, I am going to bring EGG SALAD. This is JANINE, who is bringing JELLYBEANS." Each person in turn introduces himself/herself, announces his/her item, and repeats the name and item of **everyone** who preceded them. This means that the last person has to remember everyone's names in the group, or at least try. You may help with verbal or pantomimed clues if participants get stuck on someone's name or item.

Activity 1.3: Orientation [10 minutes]

Now that you know with whom you are going to develop a collaborative practice, a facilitator will give you an overview of Interprofessional Education and Interprofessional Collaborative Practice. He/she will also orientate you regarding the workbook and inform you about your responsibilities and the expectations of the educators.

Activity 1.4: Visual representation of IPP [30 minutes]

Discuss Figures 1, 2 and 3 and draw a single visual representation of collaborative practice. It is important to keep this information, as it will come in handy for the summative assignment. Also read Addendum A on the core competences as formulated by the HPCSA (2014)



Use the page from the flip chart and crayons provided to create the visual representation collaboratively.

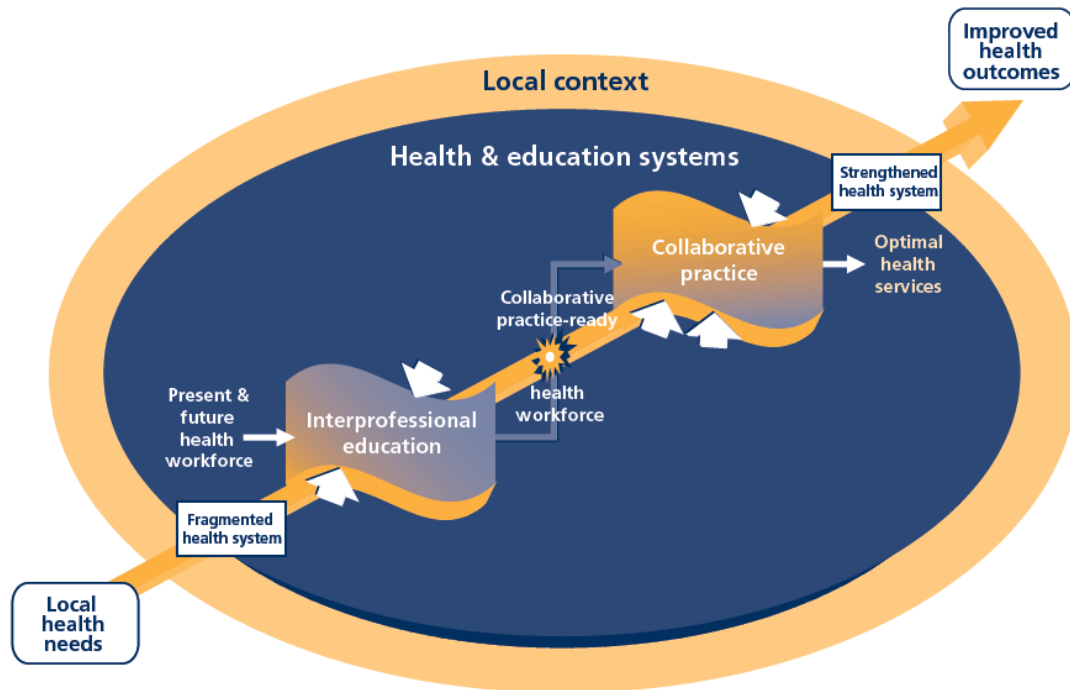


Figure 1: Framework for Action on Interprofessional Education and Collaborative Practice (Adopted from WHO 2010)



Figure 2: Core competences for students in healthcare (Adopted from HPCSA 2014)

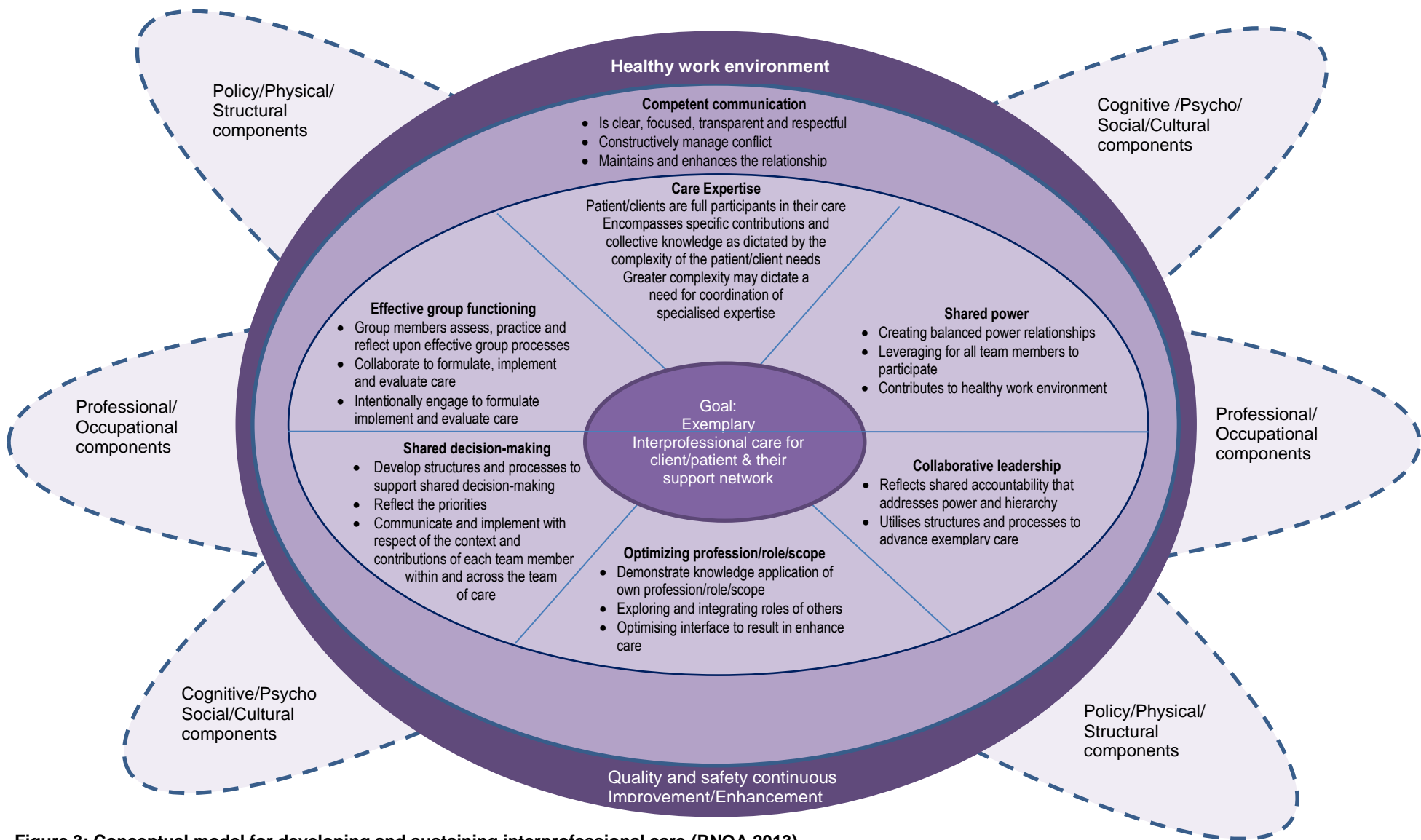


Figure 3: Conceptual model for developing and sustaining interprofessional care (RNOA 2013)

Activity 1.5: Value clarification [20 minutes]



- 1.5.1 Each one tear an A4 page in 5 equal sized horizontal strips. Think for 2 minutes on the values that guide healthcare professionals. Write one value per strip of paper during the next minute.

Put all the small pieces of paper in the middle of the group and mix them thoroughly.

Use Round robin to discuss all the values.

Compile value statements for the group.

- 1.5.2 Watch the video on professional attributes (CANMED) and evaluate your statements against the information in the video.



Session 2

Outcome 2: Demonstrate shared decision-making and shared power through effective communication and collaboration among all healthcare professionals.



Pre-reading

Read the Evidence Best Practice guidelines (Addenda B-E) as well as the information on the patient.

Patient information

A 65-year-old Caucasian patient who lives in Brandfort was seen at the National District Hospital Casualty Department 48 hours ago and was admitted to the high-care unit. The patient is a pensioner and was accompanied by a significant other who has stayed with the patient since admission. He/She was transferred to the ward where you meet him for the first time during your grand round.

Current history

Patient developed a sudden onset right hemiplegia and an inability to speak while gardening. The patient was rushed to the National District Hospital.

Previous medical history

Known with atherosclerosis and previous atheroma with left carotid endarterectomy done in 2007
Ischemic heart disease complicated by coronary artery bypass graft (CABG) done 12 years ago and metal stents in 2007

Essential hypertension

Smoker 20 cigarettes per day from the age of 20 years

Diabetes Mellitus non-insulin dependent on *Metformin* oral treatment

Current findings on examination

Vital signs

Blood pressure $^{130}_{/74}$ mmHg

Pulse rate 72/minute,

PO₂ 92% on low flow oxygen,

Respiratory rate 18 breaths/minute,

Serum glucose 6.5 mmol/l

Temperature 36.3°C

Cardio-vascular System

Regular, regular pulse palpated

Normal heart sounds

No bruits heard over carotid arteries

Respiratory system

Coarse crepitations bilateral basal segments

No diaphragmatic breathing present

Gastro Intestinal System

The abdomen is soft with no distension

No organomegaly

Neurological examination

Global dysphasia is present with a Glasgow Coma Scale (GCS) of e-4 m-5 V-1
(e=eye opening response; m=motor response; v=verbal response)

Cranial nerves

Pupils are reactive and equal with no disc swelling

Gaze palsy to the right is present

Right upper motor neuron Cranial Nerve VII palsy is present

Cranial N IX affected – (Cannot swallow, no gag reflex, tongue weak to the left)

Motor examination:

The tone is decreased in the right arm and leg

The power in the right arm is 1/5 and leg 3/5

Decreased reflexes right with a neutral plantar response

Sensory examination:

Moves all limbs on pain stimulation – see motor fallout above

Cerebellar examination:

No nystagmus, rest could not be tested

Diagnosis

Left middle cerebral artery infarction

Management in ward

Intravenous Saline 1ℓ 8-hourly

Nasogastric tube in situ (free drainage)

Urinary catheter in situ – intake 2 400 ml/24 hours – output 1 800 ml/24 hours

Metformin 1 tab 2 x day per os

Enalapril 5 mg/d per os

$\frac{1}{2}$ Disprin daily per os

Zocor 20 mg nocté per os

Chest X-ray done, showed bilateral infiltrates

Augmentin 1.2g 8-hourly intravenous

Glucose monitoring q 6-hourly

Barthel Index of Activities of Daily Living

Instructions: Choose the scoring point for the statement that corresponds the closest to the patient's current level of ability for each of the following 10 items. Record actual, not potential functioning. Information can be obtained from the patient's self-report, from a separate party who is familiar with the patient's abilities (such as a relative), or from observation. Refer to the guidelines section on the following page for detailed information on scoring and interpretation.

Bowels

0 = incontinent (or need to be given enemata)

1 = occasional accident (once/week)

2 = continent

Patient's score: 1

Bladder

0 = incontinent, or catheterised and unable to manage

1 = occasional accident (max once/24 hours)

2 = continent (for over 7 days)

Patient's score: 1

Grooming

0 = needs help with personal care

1 = independent face/hair/teeth/shaving (equipment provided)

Patient's score: 0

Bathing

0 = dependent

1 = independent or in shower

Patient's score: 0

Toilet use

0 = needs help with personal care

1 = needs some help, but can do something alone

2 = independent (on and off, dressing, wiping)

Patient's score: 0

Dressing

0 = dependent

1 = needs help but can do almost half unaided

2 = independent (including buttons, zips, laces, etc.)

Patient's score: 0

Transfer

0 = unable – no sitting balance

1 = major help (1 or 2 people, physical) can sit

2 = minor help (verbal or physical)

3 = independent

Patient's score: 0

Mobility

0 = immobile

1 = wheelchair independent, including corners, etc.

2 = walks with help of 1 person (verbal /physical)

3 = independent (but may use aid, e.g. stick)

Patient's score: 0

Feeding

0 = unable

1 = needs help cutting, spreading butter, etc.

2 = independent (food provided within reach)

Patient's score: 0

Stairs

0 = unable

1 = needs help (verbal, physical, carrying aid)

2 = independent up and down

Patient's score: 0

Total score: 2

Scoring: sum the patient's scores for each item. Total possible scores range from 0 to 20, with lower scores indicating increased disability. If used to measure improvement after rehabilitation, changes of more than two points in the total score reflect a probable genuine change, while change on one item from fully dependent to independent is also likely to be reliable.

Sources

Collin C, Wade DT, Davies S, Horne V. The Barthel ADL Index: a reliability study. *Int Disabil Stud.* 1988;10(2):61-63

Mahoney FI, Barthel DW. Functional evaluation: The Barthel Index. *Md State Med J.* 1965;14:61-65

Wade DT, Collin C. The Barthel ADL Index: a standard measure of physical disability? *Int Disabil Stud.* 1988;10(2):64-67

Activity 2.1: Role clarification (25 minutes)

Because it is the first time that all of you are working collaboratively it is important to identify the professional roles and responsibilities of each one. The group will conduct team interviews with representatives of a profession until the group has interviewed everybody.



Steps

1. The topic is the role and responsibilities of the profession.
2. The representatives of the profession stand ready to be interviewed by the teammates.
3. Teammates interview the standing participants, asking open-ended and true questions.
4. After three (3) minutes, the teammates thank the participants who may then sit down.
5. In turn, remaining professions stand and are interviewed by the teammates for three minutes.

Activity 2.2: Briefing [10 minutes]

Your group constitutes a healthcare team that is doing a grand round.

Your next patient is a standardised patient representing a patient who lives in Brandfort and was seen at the National District Hospital Casualty Department 48 hours ago. The patient was hospitalised in the high-care unit. The patient is a pensioner and a significant other accompanied him to the hospital. This person stayed with the patient since admission. The patient was transferred to the ward this morning.

A standardised patient with a stroke will be lying in the bed. The patient is conscious but unable to speak. Some of the professionals may have met the patient but others have not met the patient yet. You have read the most recent information pertaining to the patient. Additional information i.e. results of investigations, is in the file at the patients' bedside. It is not necessary to perform a physical examination. A person representing each of the professions has to present their findings (provided under patient information) and proposed treatment plan (your own). Develop a collaborative treatment plan for the patient.

Activity 2.3: SP simulation [15 minutes]

You should demonstrate the application and integration of the core elements of collaborative practice while developing a collaborative treatment plan for the patient.

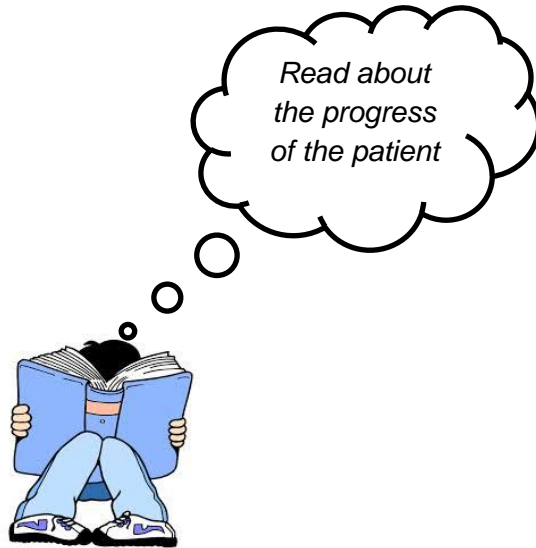
Activity 2.4: Debriefing [45 minutes]

Steps to follow during the debriefing

1. Each participant briefly states how he/she felt during and directly after the simulation. Please explain why you think you experienced that specific emotion.
2. What was the simulation all about?
3. Do you think you achieved the outcome?

4. How did the patient experience the simulation and what would he/she advise?
5. What went well
6. What do you want to improve?
7. What do you need to do to improve on your performance?

Please note that the SP will give feedback specifically from the patient's perspective, with emphasis on communication between the healthcare providers and patient/family.



Session 3

Outcome 3: Demonstrate shared decision-making, shared power, collaborative leadership through effective communication and collaboration among all healthcare professionals, patient and significant others.

Activity 3.1: Peer evaluation [10 minutes]

Complete Addendum III while you reflect on your practice in session 2.



Pre-reading

It is the same patient two weeks later.

Patient information

Diagnosis: Left middle cerebral artery infarction

Current findings on examination

Blood pressure $125/65$ mmHg

Pulse rate 85/minute,

Respiratory rate 16 breaths/minute

Serum glucose 6.2 mmol/l

Temperature 36.0 °C

Cardio Vascular System

Regular, regular pulse palpated

Normal heart sounds.

No bruits heard over carotid arteries

Respiratory system

Normal breathing sounds

Gastro Intestinal System

The abdomen is soft with no distension

No organomegaly

Gastrostomy for feeding

Nappies used for excretion

Neurological examination

Global dysphasia is present with a Glasgow Coma Scale (GCS) of e-4 m-6 V-2
(e=eye opening response; m=motor response; v=verbal response)

Cranial nerves:

Pupils are reactive and equal with no disc swelling
Gaze palsy to the right is present.
Right upper motor neuron Cranial Nerve VII palsy is present
Cranial N IX affected – swallow small amounts of fluid
Motor aphasia

Motor examination:

The tone is increased in the right arm and leg
The power in the right arm is 3/5 and leg 3/5
Limited active movement on the right side

Sensory examination:

Intact

Skin

Reddish area under R buttock and R heel (Braden score)

Management in ward:

Gastrostomy tube in situ
Metformin 1 tab 2 x day per os
Enalapril 5 mg/d per os
1/2 Disprin daily per os
Zocor 20 mg nocté per os
Glucose monitoring q 6-hourly

Rehabilitation

Physiotherapy

Walks with a quadropod
Short distances only (+10 m)
Still struggling with a step
Able to bridge, roll and sit up

Occupational therapy

Needs assistance with toilet transfer
Full assistance with hygiene
Able to do basic self-care functions with the left hand
Still needs assistance with dressing
Still uses a communication board

Dietetics

Gastrostomy in situ (PEG)
Bolus feeding with standard formula for diabetics
Wife has been trained to administer feeds

Barthel Index of Activities of Daily Living

Instructions: Choose the scoring point for the statement that most closely corresponds to the patient's current level of ability for each of the following 10 items. Record actual, not potential, functioning. Information can be obtained from the patient's self-report, from a separate party who is familiar with the patient's abilities (such as a relative), or from observation. Refer to the guidelines section on the following page for detailed information on scoring and interpretation.

Bowels

0 = incontinent (or need to be given enemata)

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2 = continent

Patient's score: 1

Bladder

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1 = occasional accident (max once/24 hours)

2 = continent (for over 7 days)

Patient's score: 1

Grooming

0 = needs help with personal care

1 = independent face/hair/teeth/shaving (implements provided)

Patient's score: 0

Bathing

0 = dependent

1 = independent or in shower

Patient's score: 0

Toilet use

0 = needs help with personal care

1 = needs some help, but can do something alone

2 = independent (on and off, dressing, wiping)

Patient's score: 1

Dressing

0 = dependent

1 = needs help but can do almost half unaided

2 = independent (including buttons, zips, laces, etc.)

Patient's score: 1

Transfer

0 = unable – no sitting balance

1 = major help (1 or 2 people, physical) can sit

2 = minor help (verbal or physical)

3 = independent

Patient's score: 1

Mobility

0 = immobile

1 = wheelchair independent, including corners, etc.

2 = walks with help of 1 person (verbal /physical)

3 = independent (but may use aid, e.g. stick)

Patient's score: 0

Feeding

0 = unable

1 = needs help cutting, spreading butter, etc.

2 = independent (food provided within reach)

Patient's score: 0

Stairs

0 = unable

1 = needs help (verbal, physical, carrying aid)

2 = independent up and down

Patient's score: 0

Total score: 5

Scoring: sum the patient's scores for each item. Total possible scores range from 0 to 20, with lower scores indicating increased disability. If used to measure improvement after rehabilitation, changes of more than two points in the total score reflect a probable genuine change, and change on one item from fully dependent to independent is also likely to be reliable.

Sources

Collin C, Wade DT, Davies S, Horne V. The Barthel ADL Index: a reliability study. *Int Disabil Stud.* 1988;10(2):61-63

Mahoney FI, Barthel DW. Functional evaluation: The Barthel Index. *Md State Med J.* 1965;14:61-65

Wade DT, Collin C. The Barthel ADL Index: a standard measure of physical disability? *Int Disabil Stud.* 1988;10(2):64-67

Home assessment

Patient comes from a low socioeconomic environment. He lives with his wife who is 70 years old. She is very involved in the patient's care and is healthy. They live in a 3 bedroom house with 1 bathroom that only has a bath. Loose carpets cover the wooden floors. There is one step to the front door. The patient enjoys gardening and enjoys working in his vegetable garden. Once a month the patient sells his vegetables at the town market. They are both pensioners and their children both work overseas.

The patient was functionally independent before this incident and still drove his car. His wife cleans the house but they have a domestic worker who comes in once a week to help with the ironing.

The patient is diabetic and hypertensive and has a history of heart disease.

The patient wants to go back home as his wife can help him with easy tasks (not transfers). His name has however been put on the waiting list for the Old age home in Brandfort. His wife assists with feeding. They are encouraged to make contact with the community service OT and Physiotherapist in Brandfort to determine the need for assistive devices.

He can walk short distances (20 m) only with a quadripod as his exercise tolerance is reduced.

Activity 3.2: Briefing [10 minutes]

You have read the updated patient information. The same patient, as in the previous session, is in a bed in a private hospital. It is now two weeks later and the patient is haemodynamically stable. The patient's medical aid requested the hospital to discharge the patient because he is stable. Each profession has to either support or reject the proposal for discharge. As a collaborative practice group, you must reach consensus on the way forward.

Activity 3.3: SP simulation [15 minutes]

You should demonstrate the application and integration of the core elements of collaborative practice while reaching consensus on the way forward with the patient. Compile a conclusive document to include in the patient's file.

Activity 3.4: Debriefing [45 minutes]

Steps to follow during the debriefing

1. Each participant briefly states how he/she felt during and directly after the simulation. Please explain why you think you experienced that specific emotion.
2. What was the simulation all about?
3. Do you think you achieved the outcome?
4. How did the patient experience the simulation and what would he/she advise?
5. What went well
6. What do you want to improve?
7. What do you need to do to improve on your performance?

Please note that the SP will give feedback specifically from the patient's perspective, with emphasis on communication between the healthcare providers and patient/family.

Session 4

Outcome 4: Compile a plan to establish a collaborative practice according to the underpinning principles in a multidisciplinary healthcare setting.

Activity 4.1: IPP plan [60 minutes]

You are all working at the same healthcare institution and want to improve the collaboration among yourselves. Design a plan on the page from the flip chart on how you should go about developing a collaborative practice. Use the knowledge gained from the previous IPE sessions. You may want to consult the work you did during the first session.

Hand the final product to the facilitator for marking. The mark obtained for this assignment in combination with the peer evaluation of performance and participation will be used in your profession specific module. The calculated mark will be recorded per student as explained in the specific module guide.

Activity 4.2: Completion of the RIPLS questionnaire [5 minutes]

Please complete the Readiness of Interprofessional Learning Scale (RIPLS) questionnaire in Addendum II anonymously. It will not take more than 5 minutes. Completion of the questionnaire is voluntarily. There will be no retribution if you decide not to complete the questionnaire. Data will be used for research purposes such as dissertations, articles and conference proceedings.

Thank you in advance for completing the questionnaire. We appreciate your collaboration.

On completion, remove the page from this study guide and hand it to the facilitator.

Activity 4.4: Peer evaluation [5 minutes]

The facilitator wrote the names of the group on pieces of paper. Each student draws a name from the container. Ask the facilitator to put your name back into the pool should you per chance take the piece of paper with your own name on it. Complete the form in Addendum I in which you evaluate the member's participation and contribution. Tear the completed form from the book and hand it to the facilitator before departure.



Thank you for your participation. We hope you have enjoyed the Interprofessional education sessions and that you will reap the benefits of having attended these sessions in future. We wish you success with your studies and professional endeavours.

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OF THE HEALTH PROFESSIONS COUNCIL OF SOUTH AFRICA**



**Core competencies* for undergraduate students in clinical
associate, dentistry and medical teaching and learning
programmes in South Africa**

Developed by the Undergraduate Education and Training Subcommittee of the Medical and Dental Professions Board in collaboration with training institutions and the South African Committee of Medical and Dental Deans.



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1 ROLE: HEALTHCARE PRACTITIONER

As *healthcare practitioners*, healthcare professionals integrate all of the graduate attribute roles, applying profession-specific knowledge, clinical skills and professional attitudes in their provision of patient/client-centred care. The *healthcare practitioner* is the central role in the framework of graduate attributes.

1.1 KEY COMPETENCY

Function effectively as entry-level healthcare practitioners, integrating all graduate attribute roles to provide optimal, ethical, comprehensive and patient/client-centred care in a plurality of health and social contexts.

1.1.1 ENABLING COMPETENCIES

- a) Perform a consultation or facilitate a structured clinical encounter effectively, including thorough documentation of assessments and recommendations.
- b) Identify and respond appropriately to relevant ethical issues arising in patient/client care and clinical decision-making.
- c) Prioritise professional duties effectively and appropriately when caring for multiple patients/clients and being challenged to address their healthcare needs holistically.
- d) Provide compassionate, empathetic and patient/client-centred care.
- e) Demonstrate a commitment to work in primary healthcare settings (urban and rural), and find professional and personal satisfaction in it.

1.2 KEY COMPETENCY

Acquire and maintain knowledge, skills, attitudes and character appropriate to their practice.

1.2.1 ENABLING COMPETENCIES

- a) Reflect on, integrate, apply and evaluate core knowledge, skills, attitudes and character acquired during undergraduate training in:
 - the application of appropriate academic literacy, numeracy and information technology skills;
 - natural sciences;
 - normal human structure;
 - normal biological, psychological, social and spiritual development and functioning of the individual in the context of family and community;
 - the pattern, aetiology and history of common human disease processes and mechanisms;
 - physical, psychological, social and spiritual determinants of health and disease;
 - the principles of drug action and use;

- the efficacy of various therapies;
- the holistic management of functional and structural impairment, activity limitations and participation restrictions, all with reference to personal and environmental risk factors;
- the interdependence between health and education systems; and
- the ethical, human rights and legal principles embedded in healthcare.

b) Apply life-long learning skills to keep up to date and to enhance professional competence.

1.3 KEY COMPETENCY

Perform comprehensive assessments of patients/clients.

1.3.1 ENABLING COMPETENCIES

- Effectively identify and explore issues to be addressed in a patient/client encounter, including the patient/client's context and preferences.
- Elicit a history of the patient/client that is relevant, concise and accurate to context, for the purposes of disease prevention, health promotion, diagnosis and/or management.
- Perform a holistic and focused examination that is relevant and accurate, for the purposes of disease prevention, health promotion, diagnosis and/or management.
- Select appropriate investigative methods in a resource-effective and ethical manner.
- Demonstrate effective problem-solving and judgement to address patient/client problems, including interpreting data and integrating information to make differential diagnoses and propose holistic management plans.
- Demonstrate increasing proficiency in clinical decision-making.

1.4 KEY COMPETENCY

Use preventive, promotive, therapeutic and rehabilitative interventions effectively.

1.4.1 ENABLING COMPETENCIES

- Demonstrate effective, appropriate and timely application of therapeutic interventions.
- Include prevention and health promotion in the management plan.
- Consider the range of solutions that have been developed for treatment and prevention of health problems, taking into consideration all ages and diverse communities.
- Formulate and implement appropriate holistic, cost-appropriate and effective management plans in collaboration with patients/clients and their families, emphasising the importance of healthy behaviour and the patient/client's right to choice.
- Ensure that appropriate informed consent is obtained for interventions and that patients/clients' needs and rights are respected.

- f) Appropriately utilise clinical-care and patient-care guidelines and protocols, and demonstrate the ability to adapt these to local settings.
- g) Develop and deliver appropriate follow-up and ongoing care beyond the immediate consultation and short-term management plan.
- h) Recognise acute life-threatening emergencies, and initiate appropriate treatment and referral.
- i) Take cognisance of the structure, organisation and functioning of the South African healthcare system in compiling the patient/client care plan.

1.5 KEY COMPETENCY 1.5

Demonstrate efficient and appropriate use of procedural skills, both diagnostic and therapeutic.

1.5.1 ENABLING COMPETENCIES

- a) Demonstrate effective, appropriate and timely performance of diagnostic, therapeutic and rehabilitative procedures.
- b) Appropriately document and disseminate information related to procedures performed and their outcomes.
- c) Ensure adequate follow-up care and care continuity for procedures performed.

1.6 KEY COMPETENCY 1.6

Seek appropriate consultation from other healthcare professionals, recognising the limits of their own and others' expertise.

1.6.1 ENABLING COMPETENCIES

- a) Demonstrate insight into own limitations of expertise.
- b) Demonstrate effective, appropriate and timely consultation of other healthcare practitioners as needed for optimal patient/client care.

2 ROLE: COMMUNICATOR

As *communicators*, healthcare professionals effectively facilitate the carer-patient/carer-client relationship and the dynamic exchanges that occur before, during and after interventions.

2.1 KEY COMPETENCY 2.1

Develop rapport, trust and ethical therapeutic relationships with patients/clients, families and communities from different cultural backgrounds.

2.1.1 ENABLING COMPETENCIES

- a) Demonstrate a both patient/client-centred and community-centred approach in interactions with patients/clients and their families.
- b) Practise good communication as a core clinical skill, recognising that effective communication between the healthcare professional and the patient/client can foster patient/client and professional satisfaction, as well as adherence and improved clinical outcomes.
- c) Establish positive therapeutic relationships with patients/clients and their families characterised by understanding, trust, respect, honesty, integrity and empathy.
- d) Respect patient/client confidentiality, privacy and autonomy.
- e) Motivate patients/clients and their families and communities to take personal responsibility for their health.
- f) Demonstrate flexibility in the application of communication skills.

2.2 KEY COMPETENCY 2.2

Accurately elicit and synthesise relevant information and perspectives of patients/clients and families, communities, colleagues and other professionals.

2.2.1 ENABLING COMPETENCIES

- a) Gather information about health conditions and functioning, as well as about a patient/client's beliefs, concerns, expectations and illness experience.
- b) Seek and synthesise appropriate information from relevant sources, such as a patient/client's family, community, caregivers and other professionals.
- c) Communicate effectively by listening, clarifying uncertainties, probing sensitively, and being aware of, and responsive to, non-verbal cues.

2.3 KEY COMPETENCY 2.3

Convey relevant information and explanations accurately and effectively to patients/clients, families, communities, colleagues and other professionals as well as statutory and professional bodies.

2.3.1 ENABLING COMPETENCIES

- a) Retrieve patient/client-specific information from a clinical data system.
- b) Deliver information to a patient/client and family, communities, colleagues and other professionals in a humane manner and in such a way that it is understandable, and encourages discussion and participation in decision-making.
- c) Present well-documented assessments and recommendations effectively in written and/or verbal form in response to a request from another healthcare professional.
- d) Compile accurate reports as needed and required for statutory and professional purposes.

2.4 KEY COMPETENCY 2.4

Develop a common understanding of issues, problems and plans with patients/clients, families, communities, colleagues and other professionals, to develop a shared plan of care/action.

2.4.1 ENABLING COMPETENCIES

- a) Identify and explore problems to be addressed effectively from a patient/client encounter, including the patient/client's functioning, context, responses, concerns and preferences.
- b) Respect diversity and difference and the influence of ethnicity, gender, religion, education and culture on decision-making.
- c) Encourage discussion, questions and interaction.
- d) Engage patients/clients, families, communities and relevant healthcare professionals in shared decision-making to develop a plan of care/action.
- e) Effectively address challenging communication issues, such as obtaining informed consent, delivering bad news, and addressing anger, confusion and misunderstanding.
- f) Communicate effectively with patients/clients and their families about costs and risks implicit in clinical interventions and care, in order to minimise potential medico-legal issues.

2.5 KEY COMPETENCY 2.5

Convey effective and accurate oral and written information about a clinical encounter.

2.5.1 ENABLING COMPETENCIES

- a) Maintain clear, accurate and appropriate records (written or electronic) of all clinical encounters and plans, within systems that allow for the dependable and rapid retrieval of such information.
- b) Present effective oral and written reports of clinical encounters and plans, using language, visual, information technology and numeracy skills.
- c) Recognise ethical and legal issues in compiling patient/client documentation.

3 ROLE: COMMUNICATOR

As collaborators, healthcare professionals work effectively within a team to achieve optimal patient/client care

3.1 KEY COMPETENCY 3.1

Participate effectively and appropriately in multicultural, interprofessional and transprofessional teams, as well as teams in other contexts (the community included).

3.1.1 ENABLING COMPETENCIES

- a) Describe their own roles and responsibilities to other professionals.
- b) Recognise and respect – irrespective of profession, status, age, gender, race, class or beliefs – the diversity of roles, responsibilities and competencies of other team members. Appreciate diversity, and demonstrate the ability to adapt. (Healthcare team members may include other professionals, community workers and practitioners of alternative, complementary and cultural/traditional healthcare practice).
- c) Work interdependently and share tasks with others to assess, plan, provide and integrate quality care for individual patients/clients (or groups of patients/clients).
- d) Collaborate with others, where appropriate, to assess, plan, provide and review other tasks, such as research problems, educational work, programme review or administrative responsibilities.
- e) Participate effectively in interprofessional team meetings, respecting team ethics, including confidentiality, resource allocation and professionalism.
- f) Demonstrate appropriate leadership in a healthcare team.

3.2 KEY COMPETENCY 3.2

Work effectively with other healthcare professionals to promote positive relationships and prevent, negotiate and resolve interpersonal conflict.

3.2.1 ENABLING COMPETENCIES

- a) Demonstrate a respectful attitude towards other team members, and work with other professionals to promote positive relationships and prevent conflict.
- b) Employ collaborative negotiation skills to achieve consensus and/or resolve conflict.
- c) Recognise differences, misunderstandings and limitations in other professionals, and acknowledge their own differences, misunderstandings and limitations that may contribute to interpersonal tension.
- d) Reflect on improving interprofessional and transprofessional team function.

4 ROLE: LEADER & MANAGER

As *leaders and managers*, healthcare practitioners are integral participants in healthcare organisations, organising sustainable practices, making decisions about allocating resources, and contributing to the effectiveness of the healthcare system.

4.1 KEY COMPETENCY 4.1

Participate in activities that contribute to the effectiveness of the healthcare organisations and systems in which they work.

4.1.1 ENABLING COMPETENCIES

- a) Work with others in their organisations, understanding the structure and functioning of the healthcare systems as these relate to their practice.
- b) Demonstrate the competence to work in home and community-based care settings, with insight into the potential contributions of community support groups.
- c) Participate in the quality process evaluation and improvement of systems, such as practice audits, mortality and morbidity meetings and patient/client safety initiatives, integrating the available best evidence and practice.
- d) Demonstrate problem-solving enterprise and creativity in improving and managing a healthcare system, and by providing advice to relevant authorities, with support from superiors.

4.2 KEY COMPETENCY 4.2

Manage their practice and career effectively.

4.2.1 ENABLING COMPETENCIES

- a) Set priorities and manage time to balance patient/client care, practice requirements, outside activities and personal life.
- b) Manage their professional practice, including finances, human resources and effective record keeping.
- c) Implement processes to ensure personal practice improvement.
- d) Use information technology effectively in managing healthcare environments.

4.3 KEY COMPETENCY 4.3

Utilise finite healthcare resources appropriately.

4.3.1 ENABLING COMPETENCIES

- a) Utilise healthcare resources under their control carefully and fairly.
- b) Apply evidence and good management to achieve cost-appropriate care.

4.4 KEY COMPETENCY 4.4

Serve in administration and leadership roles, as appropriate.

4.4.1 ENABLING COMPETENCIES

- a) Participate effectively in committees and meetings, as the need arises.
- b) Participate in implementing change, where necessary, in the healthcare organisation in which they are serving.
- c) Plan relevant elements of healthcare delivery (e.g. duty rosters).

4.5 KEY COMPETENCY 4.5

Provide effective healthcare to geographically defined communities.

4.5.1 ENABLING COMPETENCIES

- a) Play a constructive, critical and creative role in the organisation, management and provision of healthcare, in the community, hospital and other facilities where profession-specific services are rendered.
- b) Evaluate the burden of disease within the community using local, regional, national and global data.
- c) Identify the health determinants of the population, such as genetic, demographic, environmental, socio-economic, psychological, cultural and lifestyle-related determinants.
- d) Evaluate existing primary healthcare practice and community health programmes.
- e) Evaluate the elements of the local health system, taking into consideration the economic and practical constraints within which the service is delivered and the audit process to monitor its delivery.
- f) Collaborate with other professionals, relevant organisations and the community to draw up a plan to manage the identified health priorities and to collectively promote health.
- g) During planning, take cognisance of the functional links between primary healthcare and public health, the interface between hospital and home-based care, and the principles of ethics and human rights in community-oriented healthcare.

5 ROLE: HEALTH ADVOCATE

As *health advocates*, healthcare professionals responsibly use their expertise and influence to advance the health and well-being of individuals, communities and populations.

5.1 KEY COMPETENCY 5.1

Respond to individual patient/client health needs and related issues as part of holistic care.

5.1.1 ENABLING COMPETENCIES

- a) Identify the health needs of an individual patient/client, taking into consideration his/her culture.
- b) Identify and use opportunities for health promotion and disease prevention with individuals to whom they provide care, incorporating ethical and human rights principles.
- c) Act as advocates for patient/client groups with particular health needs (including the poor and marginalised members of society).

5.2 KEY COMPETENCY 5.2

Respond to the health needs of the communities that they serve.

5.2.1 ENABLING COMPETENCIES

- a) Familiarise themselves with the communities they serve by obtaining insight into the functioning of the local health system, barriers to access care and resources, and other factors not directly part of healthcare.,
- b) Identify vulnerable or marginalised populations and respond appropriately, with a commitment to equity through access to care and equal opportunities.
- c) Identify opportunities for health promotion and disease prevention within the context of promoting a healthy environment and lifestyle.
- d) Communicate effectively with communities, and enable them to identify, prioritise and address healthcare needs specific to them.
- e) Recognise and respond to competing interests within the community being served by reporting these to the relevant stakeholders in the community.
- f) Apply the ethical and professional principles inherent in health advocacy, including altruism, social justice, autonomy, integrity and idealism, appreciating the possibility of conflict inherent in the role of *health advocate*.

6 ROLE: SCHOLAR

As *scholars*, healthcare professionals demonstrate a lifelong commitment to reflective learning as well as the creation, dissemination, application and translation of knowledge.

6.1 KEY COMPETENCY 6.1

Maintain and enhance professional competence through ongoing learning, both as healthcare professionals and as responsible citizens, locally and globally.

6.1.1 ENABLING COMPETENCIES

- a) Reflect on and acknowledge the strengths and limitations of their knowledge and skills.
- b) Commit to maintaining and enhancing knowledge and skills using a personal development plan.
- c) Use appropriate strategies and utilise opportunities for continued professional development and lifelong learning.
- d) Be able to maintain comprehensive, complete and accessible records for the purposes of good practice and the facilitation of audits and healthcare research.
- e) Reflect on, and learn from, challenges that are experienced in practice by posing appropriate questions, accessing and interpreting relevant evidence, integrating new learning with practice, evaluating the impact of change in practice, and documenting the learning process.
- f) Know the requirements of the regulations regarding continuous professional development (CPD), as specified by the Health Professions Council of South Africa.

6.2 KEY COMPETENCY 6.2

Ask questions about practice, locate relevant evidence, critically evaluate and interpret information and sources, and consider the application of the information.

6.2.1 ENABLING COMPETENCIES

- a) Phrase clear, answerable, relevant questions related to practice.
- b) Utilise knowledge gained through the critical evaluation of health-related literature to keep up to date with new developments.
- c) Use appropriate techniques to effectively and efficiently access relevant research findings from reliable sources.
- d) Critically appraise retrieved evidence for quality and relevance, and interpret the findings.
- e) Consider the applicability of research findings to own setting.
- f) Understand the basic principles of quantitative and qualitative research design and analysis as well as research ethics.
- g) Respect and comply with laws pertaining to plagiarism, confidentiality and ownership of intellectual property when accessing and using information and conducting research.

6.3 KEY COMPETENCY 6.3

Facilitate the learning of patients/clients, families, students, other healthcare professionals, the public, staff and others, as appropriate.

6.3.1 ENABLING COMPETENCIES

- a) Identify collaboratively the learning needs and desired learning outcomes of others.
- b) Select effective teaching strategies and content to facilitate others' learning.
- c) Reflect on teaching encounters and seek feedback to guide their development as effective facilitators of learning.
- d) Create an enabling and supportive learning environment that is sensitive to issues that can influence learning.
- e) Listen and provide feedback.
- f) Seek and utilise opportunities to develop their skills as facilitators of learning and as mentors.

6 ROLE: PROFESSIONAL

As *professionals*, healthcare professionals are committed to ensure the health and well-being of individuals and communities through ethical practice, profession-led self-regulation and high personal standards of behaviour.

7.1 KEY COMPETENCY 7.1

Demonstrate commitment and accountability to their patients/clients, other healthcare professions and society through ethical practice.

7.1.1 ENABLING COMPETENCIES

- a) Exhibit and promote appropriate professional behaviour, including honesty, integrity, commitment, compassion, respect for life, accessibility and altruism.
- b) Demonstrate a commitment to delivering the highest quality care and maintenance of professional competence according to the values of the profession.
- c) Recognise and appropriately respond to ethical, legal and human rights issues and dilemmas encountered in practice and not be influenced by political pressure.
- d) Recognise and appropriately manage conflict of interest in practice.
- e) Recognise the principles and limits of patient/client confidentiality as defined by professional practice standards and law.
- f) Maintain appropriate professional relations with patients/clients, healthcare professionals and communities.

7.2 KEY COMPETENCY 7.2

Demonstrate a commitment to their patients/clients, healthcare professionals and society through participation in profession-led self-regulation.

7.2.1 ENABLING COMPETENCIES

- a) Adhere to the appropriate professional, legal and ethical codes of practice of the profession.
- b) Recognise and interrogate public health policy in terms of ethics and human rights.
- c) Demonstrate accountability and fulfil the regulatory and legal obligations required by the regulatory bodies of the health professions.
- d) Recognise, address and report unprofessional behaviour encountered in healthcare training and practice.
- e) Maintain professional competence through ongoing self-reflection and peer review.

7.3 KEY COMPETENCY 7.3

Demonstrate a commitment to own health and sustainable practice.

7.3.1 ENABLING COMPETENCY

- a) Make informed choices for their own future career development based on an understanding of the nature and scope of various professions.
- b) Recognise and balance personal and professional priorities to achieve personal health and a sustainable and effective practice.
- c) Demonstrate insight into personal and professional problems, and develop strategies to address them effectively with the aim to maintain own physical, psychological, social and spiritual well-being.
- d) Recognise other professionals in need, and respond appropriately.

STROKE BEST PRACTICES: A TEAM APPROACH TO EVIDENCE-BASED CARE

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Reducing the high morbidity and mortality associated with stroke continues to be a major healthcare challenge in the United States. Recent advances in the management and prevention of atherothrombotic events are significant; however, the clinical application of evidence-based “best practices” is lagging in many hospitals across the country. The “Stroke Best Practices” program was designed to assist institutions that lack established stroke centers integrate recent evidence-based recommendations into individualized, in-hospital initiatives to optimize the management of acute stroke, prevent secondary vascular events, and enhance the quality of care for patients with established cerebrovascular disease. Programs that bridge the gap between evidence-based medicine and clinical practice can improve patient outcomes. (*J Natl Med Assoc.* 2004;96:S1–S24.)

Key words: stroke ♦ prevention ♦
management ♦ best practices ♦ hospitals

Each year, approximately 700,000 strokes and 500,000 to one million transient ischemic

attacks (TIAs) occur in the United States.¹ The total direct and indirect costs of stroke in 2004 are estimated at \$53.6 billion.¹ Of the approximately 4.7 million stroke survivors, 90% suffer from long-term functional limitation and restriction of daily activities.¹ Besides motor or sensory deficits, stroke victims may experience cognitive decline, dementia, and depression.

While recent advances in the management and prevention of atherothrombotic events are significant, the clinical application of evidence-based “best practices” is lagging in many hospitals across the country, including those in the so-called “stroke belt”—a region

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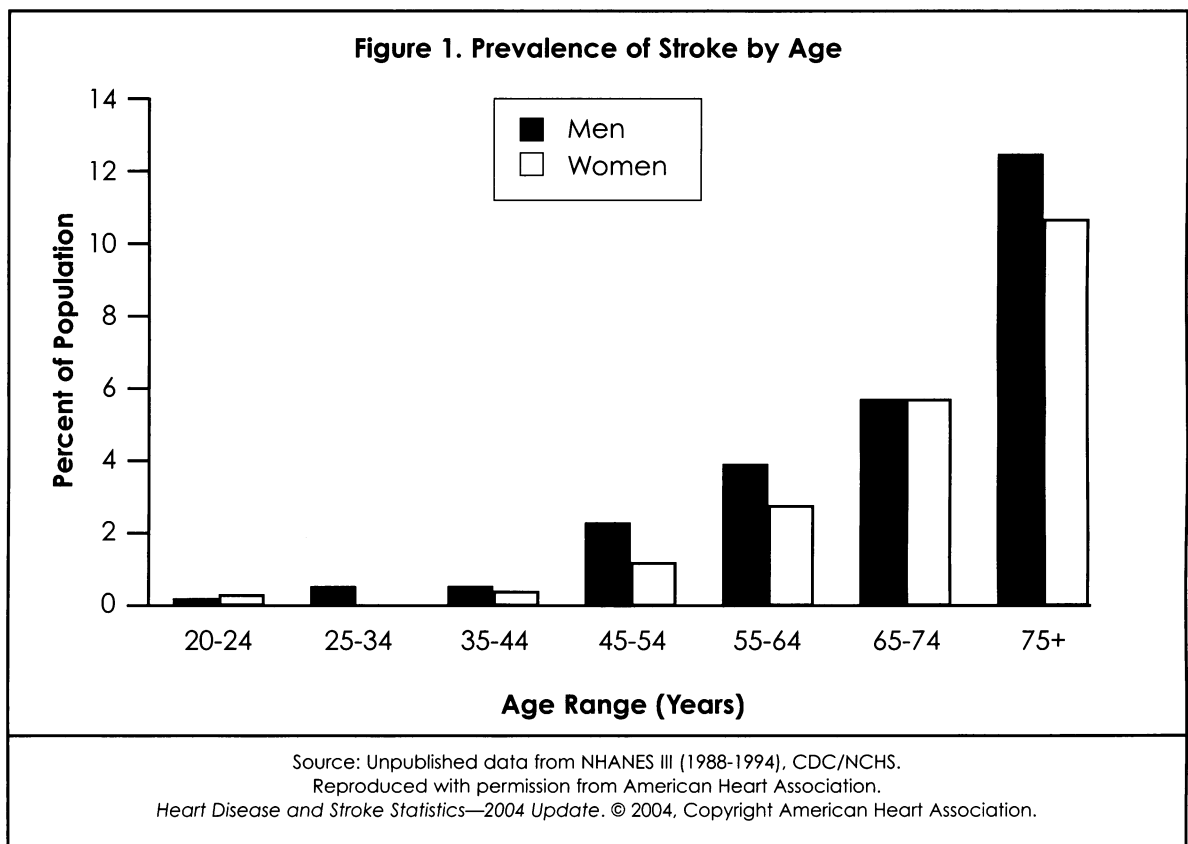
comprising 11 southeastern states with stroke death rates more than 10% higher than the national average.²

Programs that implement widely accepted guidelines drawn from evidence-based medicine contribute to the prevention and treatment of cardiac and vascular diseases.³⁻⁹ “Stroke Best Practices: A Team Approach to Evidence-Based Care,” a program developed by the Network for Continuing Medical Education (NCME), was designed to help hospitals that do not have established stroke centers integrate recent evidence-based recommendations into customized, in-hospital initiatives for optimizing the management of acute stroke, preventing secondary events, and

enhancing the quality of care for patients with established cerebrovascular disease. The program comprised a series of live workshops, held in various regions of the country, and offered continuing medical education credit for physicians and continuing education credit for nurses. Following is a summary of the core content from the program, which includes current prevention and management strategies for acute ischemic stroke.

Risk Factors for Stroke

Nonmodifiable risk factors for stroke include age, gender, race/ethnicity, and heredity.¹⁰ Stroke prevalence rises progressively with age; 12.5% of men and 10.7% of women aged 75 or



older have experienced at least one stroke (Figure 1).¹ Annually, approximately 40,000 more women than men have a stroke.¹ In 2001, the incidence of new and recurrent attacks was 373,000 for women compared with 327,000 for men.¹ More women than men die of stroke each year because women live longer than men. In 2001, women accounted for 61.4% of U.S. stroke deaths.¹ Non-Hispanic black females, the most susceptible population, have more than twofold the prevalence of stroke of white females (3.2% versus 1.5%). Blacks, in general, have almost twice the risk of whites of a first-ever stroke¹ and are more than twice as likely as whites to die of a stroke.¹¹

Modifiable risk factors for stroke are divided into lifestyle factors, such as cigarette smoking, excessive alcohol intake, physical inactivity, obesity (body mass index >30 kg/m²), oral contraceptive use, and drug abuse, and medically or surgically treatable conditions, such as hypertension, dyslipidemia, ischemic or hypertrophic heart disease, atrial fibrillation, diabetes (types 1 and 2), carotid artery disease,

and hematologic disorders (e.g., elevated red-blood-cell count, sickle cell anemia).^{10,12} Stroke is highly preventable, as suggested by the analysis in Table 1 of the effects of intervention and lifestyle modification.¹³

Risk Stratification for Acute Ischemic Stroke

About 80% of strokes are ischemic (atherothrombotic or embolic), 13% are caused by intracerebral hemorrhage (ICH), and 7% result from subarachnoid hemorrhage.¹⁴ Rapid differentiation between ischemic and hemorrhagic stroke is imperative because the therapies are markedly different.¹⁵

Noncontrast-enhanced computed tomography (CT) of the brain parenchyma is the imaging modality of choice.¹⁵ Atherothrombotic and embolic strokes (cardioembolic, artery-artery, or cryptogenic) appear on the scans—often after several hours—as areas of hypodensity.¹⁶ Intraparenchymal and subarachnoid hemorrhagic strokes are seen as areas of hyperdensity.

Table 1. Modifiable Risk Factors and Preventable Strokes

	Percent Exposed	Relative Risk	Population-Attributable Risk (Percent)	Projected Strokes Prevented*
Hypertension	56	2.7	49	360,000
Smoking	27	1.5	12	90,000
Atrial fibrillation	4	3.6	9.4	69,000
Heavy alcohol consumption	7	1.7	4.7	34,000
*Based on 731,000 strokes.				
Adapted with permission from Gorelick PB. Stroke prevention. An opportunity for efficient utilization of health care resources during the coming decade. <i>Stroke</i> . 1994;25:220-224.				

Magnetic resonance imaging (MRI) of the brain may be considered for initial diagnostic imaging at qualified centers; however, MRI is limited by the potential difficulty in reliably identifying acute intracranial hemorrhage.¹⁵ Other potential limitations of MRI in the acute setting include cost, lack of availability, and patient contraindications (e.g., claustrophobia, cardiac pacemakers, metal implants).¹⁵ However, diffusion-weighted MRI is exquisitely sensitive to early ischemic changes, even if small or in the brain stem.^{17,18}

Other Tests

All suspected stroke patients should be examined clinically to detect head trauma and other possible causes of symptoms. Blood pressure

measurement is important because blood pressure may be acutely elevated in stroke patients, even in those without a prior history of stroke. The patient's history may be revealing. Embolic strokes generally produce abrupt neurologic dysfunction that is maximal from the onset, while atherothrombotic strokes have a more gradual or intermittent onset.¹⁶ A 12-lead electrocardiogram (ECG) is mandatory because acute myocardial infarction (MI) and atrial fibrillation produce embolic stroke; mitral stenosis and prosthetic valves are among the other potential sources of emboli.^{15,19} Carotid Doppler ultrasonography, magnetic resonance angiography, CT angiography, and cardiac echocardiography can add to the diagnostic information.¹⁵ Test selection should be tailored to the individual patient and the clinical setting.¹⁵ Routine blood

Table 2. Diagnostic Testing for Suspected Acute Ischemic Stroke

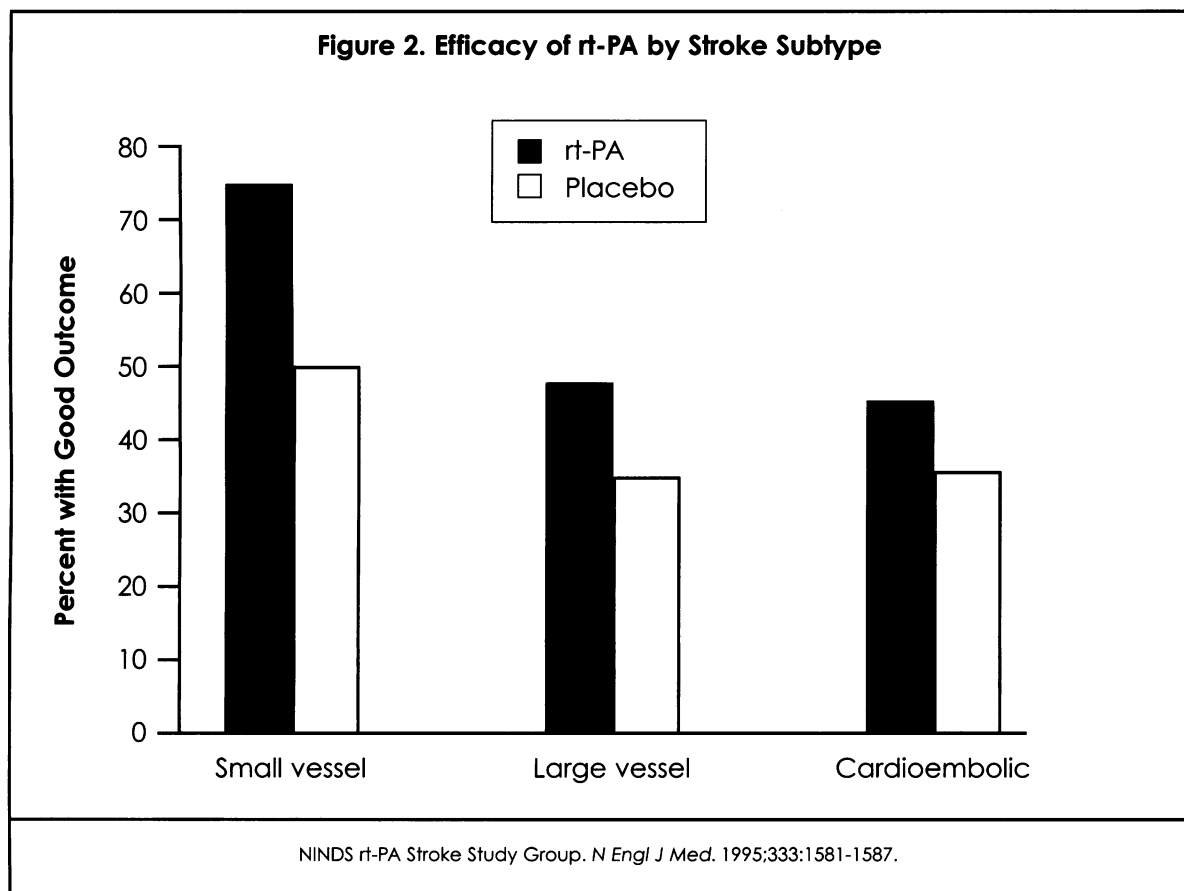
<p><i>Immediate Testing</i></p> <p>Brain CT</p> <p>Brain MRI (may be considered at qualified centers)</p> <p>Electrocardiogram</p> <p><i>Ancillary Imaging</i></p> <p>Cardiac echocardiography (either TTE or TEE)</p> <p>Carotid Doppler ultrasonography</p> <p>Magnetic resonance angiography</p> <p>CT angiography</p> <p>Chest x-ray</p>	<p><i>Routine Blood Tests</i></p> <p>Blood glucose</p> <p>Electrolytes</p> <p>Complete blood count with platelets</p> <p>Prothrombin time</p> <p>Activated partial thromboplastin time</p> <p>Renal and hepatic function</p> <p><i>Additional Tests</i></p> <p>Lipid profile</p> <p>Homocysteine</p> <p>Hemoglobin A_{1c}</p> <p>hs-CRP</p> <p>ESR</p> <p>Urinalysis</p>
<p>CT = computed tomography; MRI = magnetic resonance imaging; TTE = transthoracic echocardiography; TEE = transesophageal echocardiography; hs-CRP = high-sensitivity C-reactive protein; ESR = erythrocyte sedimentation rate</p> <p>Adapted with permission from Adams Jr HP, Adams RJ, Brott T, et al. Guidelines for the early management of patients with ischemic stroke. A scientific statement from the Stroke Council of the American Stroke Association. <i>Stroke</i>. 2003;34:1056-1083.</p>	

tests should always be performed to exclude systemic conditions. The key measurements are glucose, electrolytes, complete blood count with platelets, prothrombin time, activated partial thromboplastin time (aPTT), and renal and hepatic function. Measurement of fasting lipids, homocysteine, hemoglobin A_{1c}, high-sensitivity C-reactive protein, and erythrocyte sedimentation rate also is important. Diagnostic studies obtained in patients with suspected acute ischemic stroke are listed in Table 2.

Acute Care of Stroke Patients

Patients with acute stroke or TIAs (if multiple or occurring within the past 48 hours) should

be admitted to a stroke unit.²⁰ Strokes occur in 10% of patients in the first 90 days after a TIA, with half occurring within 48 hours of the TIA.²¹ An ideal facility is staffed by a multidisciplinary team that includes a neurologist available 24 hours a day. It should be equipped with stroke care maps, telemetry monitoring, and well-trained nurses. Precautions should be taken to avoid aspiration pneumonia, deep vein thrombosis (DVT), and infection. Prompt access to neurosurgery should also be provided. A meta-analysis of 23 trials with approximately 4,900 participants in the United Kingdom, Sweden, and the United States compared care in a stroke ward with that given by a mobile team or a generic disability service and found a



lower risk of death within one year, death or institutionalization, and death or dependency in a stroke ward (unit).²²

Thrombolytic Therapy for Acute Ischemic Stroke

Because most strokes are caused by thrombotic or embolic occlusion, prompt revascularization is a rational therapeutic strategy.¹⁵ The National Institute of Neurological Disorders and Stroke (NINDS) rt-PA Stroke Study, on which FDA approval of intravenous (IV) recombinant tissue-type plasminogen activator (rt-PA) for acute ischemic stroke is based, demonstrated that patients treated with rt-PA within three hours of onset had a 12% absolute increase in the likelihood of minimal or no disability after three months.^{15,23} The overall benefit outweighed the risk of a symptomatic ICH, which occurred in 6.4% of patients who received rt-PA compared with 0.6% of those who received placebo.²³ Intervention after three hours yielded no benefit and increased the risk of ICH. The sooner rt-PA was given within the three-hour time window, the better the outcome.²⁴ Stroke subtype affected efficacy, with a better outcome in small vessel (lacunar) strokes than in large vessel or cardioembolic strokes (Figure 2).²³

The recommended dose of rt-PA is 0.9 mg/kg, with a maximum total dose of 90 mg; higher doses increase the risk of ICH.¹⁵ To date, no other thrombolytic agent has been approved for this indication. Unfortunately, only about 2% to 4% of patients with ischemic stroke are being treated with IV rt-PA, although a wide variation (0% to 10%) has been reported.²⁵ The main reasons for the low rate are patients presenting beyond the three-hour time window, the lack of a medical

infrastructure, and concerns among some physicians about the safety and efficacy of rt-PA.

Other Acute Medical Care

Management of blood pressure is important in the management of acute stroke, where a balance needs to be maintained between hypertension control and avoidance of cerebral hypoperfusion.¹⁶ The need for this delicate balance is based on the hypothesis that while a central core of brain tissue undergoes infarction within minutes of severe ischemia, a penumbra of surrounding tissue initially is only subtotally ischemic. Unless ischemia is reversed, the penumbra will progress to infarction in minutes or hours. Because salvage of the at-risk penumbra is the goal of emergency treatment and a fall in systemic blood pressure is reflected in hypoperfusion, it is essential not to lower the patient's blood pressure during the acute period after an ischemic stroke. In general, the blood pressure should not be lowered unless it is >210 mm Hg systolic or >120 mm Hg diastolic. For patients who are to receive rt-PA, the parameters are >185 mm Hg systolic and >110 mm Hg diastolic.¹⁵ Labetalol and nicardipine are the preferred agents, but nitroprusside should be used if the diastolic pressure is >140 mm Hg.¹⁵

Hyperglycemia should be treated aggressively if present.¹⁵ Excess glucose is metabolized into lactic acid in patients with cerebral ischemia, and the lactic acidosis is extremely toxic to neurons. Studies have shown that outcome worsens as blood sugar levels increase.^{26,27} Treatment with IV or subcutaneous insulin is warranted if necessary.

Acute therapy with aspirin within 48 hours is recommended for most patients with ischemic

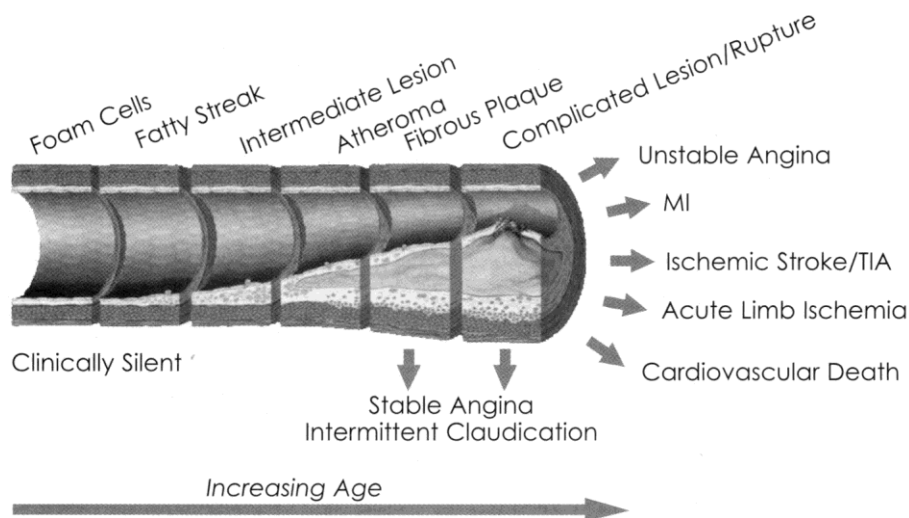
stroke but should not be given within 24 hours of rt-PA administration.¹⁵ The value of other antiplatelet agents during the acute period has not been proven. Routine emergent anticoagulation with heparin or heparinoids is not recommended because of the high risk of hemorrhagic transformation or ICH, and is contraindicated within 24 hours of rt-PA administration.¹⁵ Subcutaneous administration of heparin or heparinoids is recommended, however, in preventing DVT and pulmonary embolism in bedridden patients with recent stroke.¹⁵

Secondary Prevention

Atherosclerotic vascular disease is a generalized and progressive process (Figure 3).²⁸ Over half of patients who survive a hospitalization for a first stroke and/or cerebrovascular disease are likely to die within five years.²⁹⁻³¹ Although the risk of death is greatest

during the first 30 days following a stroke, increased risk of mortality persists for several years. Hardie and colleagues²⁹ showed that death due to cardiovascular disease is more likely to occur over the long term than is death due to a second ischemic stroke in patients surviving more than one year after a stroke (Figure 4). This may be secondary to the large, diffuse atherothrombotic burden present in this population. The data in Figure 5 show that stroke victims are at greatly increased risk for subsequent events, including death, recurrent stroke, or MI and further suggest that clinical risk, as well as atherosclerotic profile, is predictive of subsequent stroke.³² This diffuse atherothrombosis was demonstrated in a retrospective analysis of more than 1,800 geriatric patients in a hospital-based geriatrics practice that identified 56% of patients with ischemic stroke as having coexistent coronary artery disease.³³

Figure 3. Atherothrombosis: A Generalized and Progressive Process

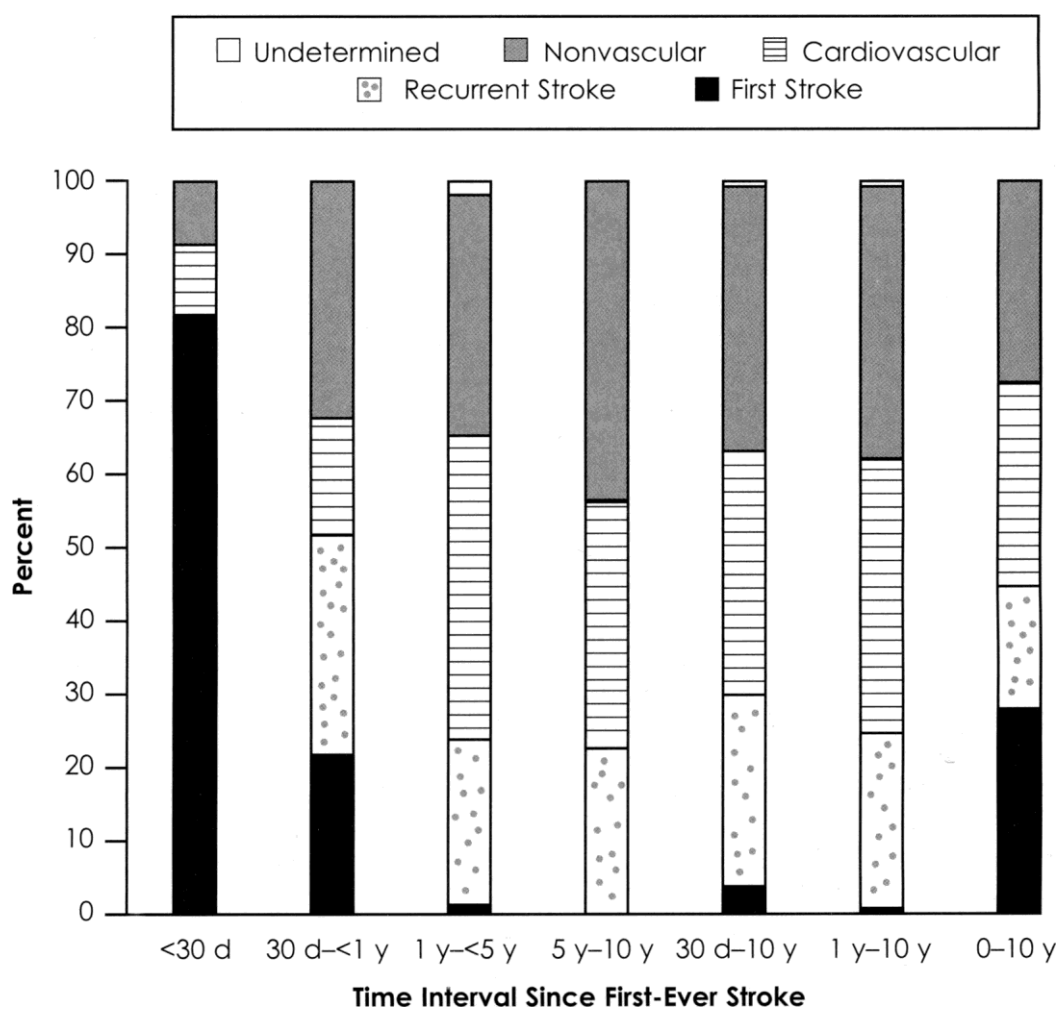


Adapted from Stary HC, Chandler AB, Dinsmore RE, et al. *Circulation*. 1995;92:1355-1374.

Initiating lifestyle changes can make a difference in reducing the risk of subsequent vascular events.¹² Measures such as smoking cessation, a healthy diet, exercise, weight reduction, and moderate alcohol consumption can help reduce the risk of vascular disease in patients who have experienced a stroke.¹²

Medical and surgical treatments are key components of secondary prevention. They are particularly cost-effective in patients with a history of stroke or TIAs because the absolute risk reductions are substantially higher and the numbers needed to treat are substantially lower than in individuals who have not had an event. The rel-

Figure 4. Histogram Showing Proportion of Patients Dying from Different Causes During Different Time Intervals from Onset of First-Ever Stroke

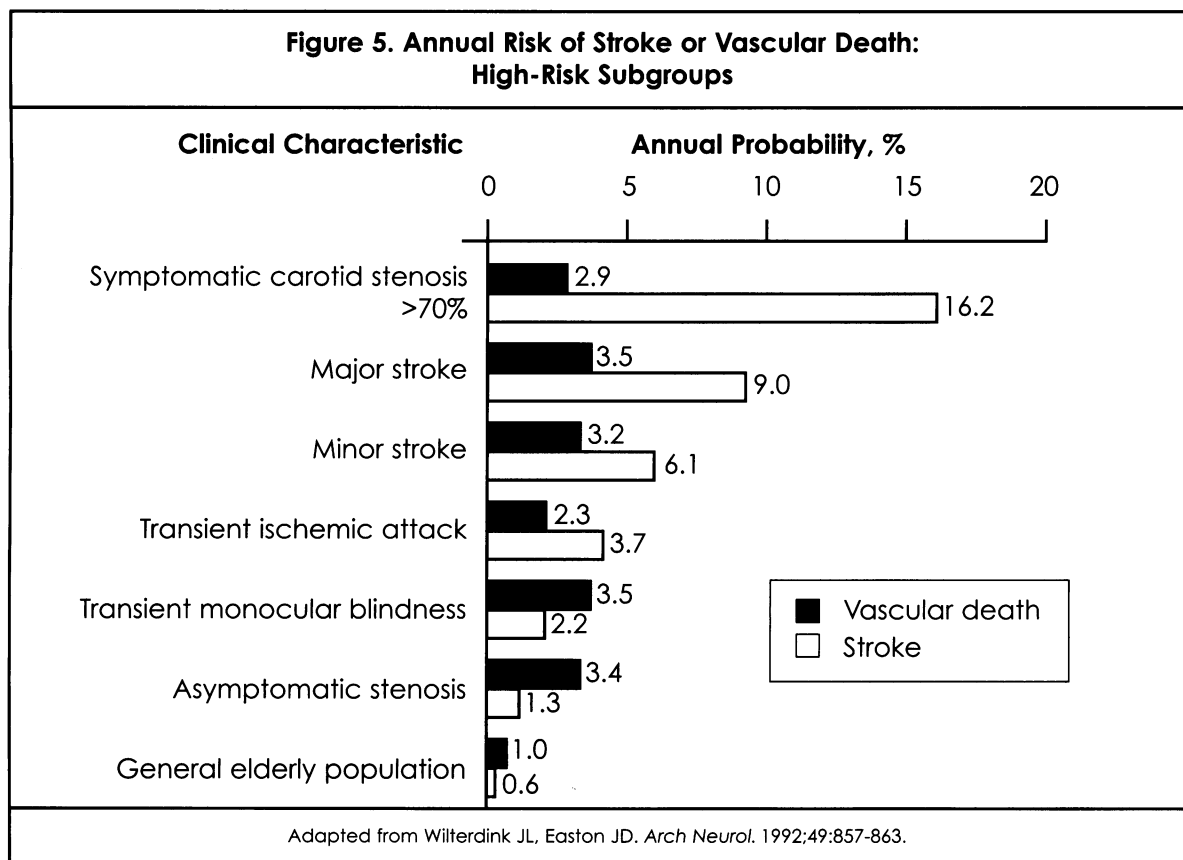


Reprinted with permission from Hardie K, Hankey GJ, Jamrozik K, et al. Ten-year survival after first-ever stroke in the Perth Community Stroke Study. *Stroke*. 2003;34:1842-1846.

ative risk reduction and the number needed to treat associated with six secondary prevention strategies are summarized in Table 3.³⁴

Hypertension is a highly significant risk factor in patients who have had a cerebrovascular event, and antihypertensive therapy addresses the directly proportional relationship between blood pressure level and the risk of stroke.³⁵ In particular, isolated systolic hypertension in older patients should be treated. However, blood pressure lowering should be gradual to avoid symptoms related to overly aggressive blood pressure reduction, such as cerebral hypoperfusion.³⁶ The use of an angiotensin-converting-enzyme (ACE) inhibitor, and/or a diuretic, has been shown to reduce recurrent stroke rates.³⁷⁻³⁹

Lowering elevated cholesterol levels is prudent because it helps protect against diffuse vascular disease and decrease the risk of cerebrovascular and coronary events. Aggressive efforts should be made to lower low-density lipoprotein (LDL)-cholesterol levels to <100 mg/dL with statin therapy in patients who have experienced an ischemic stroke or a TIA.⁵ The effectiveness of statin therapy in reducing the rate of ischemic (nonembolic) stroke in treated cardiac patients has been demonstrated in the Scandinavian Simvastatin Survival Study (4S trial),⁴⁰ the Cholesterol and Recurrent Events (CARE) trial with pravastatin,⁴¹ and the Long-Term Intervention with Pravastatin in Ischaemic Disease (LIPID) trial.⁴²



Aspirin, the thienopyridines, and a combination of aspirin and extended-release dipyridamole are recommended for secondary prevention of recurrent stroke in patients who have had a noncardioembolic stroke.¹⁹ Aspirin is the most widely studied antiplatelet drug and is the standard of care for secondary prevention of vascular complications after ischemic stroke. The Antithrombotic Trialists' Collaboration summarized the results of antiplatelet trials and found that long-term antiplatelet therapy was associated with a 23% reduction in the risk for nonfatal stroke in patients with a history of stroke or TIA.⁴³

In the second European Stroke Prevention Study (ESPS-2) trial,⁴⁴ the combination of extended-release dipyridamole plus aspirin produced a statistically significant 37% reduction in the risk of stroke versus placebo; however, statistically significant reductions were not demonstrated for stroke and/or death, MI, or death versus aspirin. The ongoing European/

Australian Stroke Prevention in Reversible Ischaemia Trial (ESPRIT) is comparing the benefits and risks of the combination of dipyridamole plus aspirin with aspirin alone in patients with a TIA or a minor ischemic stroke.⁴⁵

The antithrombotic effects of clopidogrel were compared with those of aspirin in the Clopidogrel versus Aspirin in Patients at Risk of Ischemic Events (CAPRIE) study.⁴⁶ Patients treated with clopidogrel demonstrated an 8.7% relative risk reduction for the outcome cluster of ischemic stroke, MI, or vascular death compared with aspirin ($P=0.043$). In the Clopidogrel in Unstable Angina to Prevent Recurrent Events (CURE) trial, the combination of clopidogrel with aspirin produced a 20% relative risk reduction for vascular events in patients with acute coronary syndromes compared with aspirin alone.⁴⁷ The results of the recent Clopidogrel for the Reduction of Events During Observation (CREDO) trial showed that long-term therapy consisting of clopidogrel plus

Table 3. Secondary Prevention of Stroke by Treatment

Treatment	RRR	NNT (One Stroke/Year)
Antihypertensive	28%	51
Statins	25%	57
Aspirin	28%	77
Thienopyridine versus aspirin	13%	64
Smoking cessation	33%	43
Carotid endarterectomy	44%	26
RRR = relative risk reduction; NNT = number needed to treat to prevent one stroke per year		
Adapted with permission from Straus SE, Majumdar SR, McAlister FA. JAMA. 2002;288:1388-1395. Copyrighted © 2002, American Medical Association. All rights reserved.		

aspirin significantly reduced the risk of ischemic events at one year compared with aspirin alone in patients undergoing elective percutaneous coronary intervention (PCI).⁴⁸ The Management of Atherosclerosis with Clopidogrel in High-Risk Patients with Recent Transient Ischaemic Attack or Ischaemic Stroke (MATCH) trial is comparing the efficacy of clopidogrel plus aspirin with that of clopidogrel alone for preventing stroke, MI, and death in high-risk patients with a recent TIA or ischemic stroke.⁴⁹

Warfarin is recommended for both primary and secondary prevention of cardioembolic stroke in patients with atrial fibrillation.¹⁹ A meta-analysis of 16 randomized trials of warfarin versus aspirin or placebo in patients with atrial fibrillation indicated that warfarin was associated with a lower risk of stroke.⁵⁰ In the Warfarin-Aspirin Recurrent Stroke Study (WARSS), warfarin was not superior to aspirin in patients with a recent history of *noncardioembolic* ischemic stroke for prevention of the combined primary endpoint of recurrent ischemic stroke or death.⁵¹

Carotid Endarterectomy to Prevent Stroke

Patients with symptomatic carotid stenosis are at high risk for stroke: the risks are 13% per year in those with 70% to 99% stenosis and 7% per year in those with 50% to 69% stenosis.⁵² Endarterectomy plus medical therapy produces threefold greater reductions than medical therapy alone in the risk of ipsilateral stroke within five years in patients with symptomatic 70% to 99% stenosis, and the benefit is realized quickly. However, the

benefit is diminished in those with 50% to 69% stenosis, and there is no benefit if the stenosis is <50%. The American Heart Association guidelines for carotid endarterectomy point out that there are intraoperative and perioperative risks associated with the procedure.⁵³ Endarterectomy may be considered for asymptomatic carotid stenosis, provided the stenosis is ≥60%. The perioperative complication rates (morbidity or mortality) should be <6% for symptomatic stenosis and <3% for asymptomatic stenosis.

Preliminary data suggest that balloon angioplasty with stent placement, perhaps with the addition of distal protective devices, may be considered when surgical risks are too high because of congestive heart failure, chronic obstructive pulmonary disease, severe coronary heart disease, or previous carotid endarterectomy, radical neck surgery, or radiation therapy.⁵⁴ Randomized trials comparing stenting with carotid endarterectomy in patients with symptomatic carotid stenosis are currently in progress.⁵⁵

Implementing Stroke Best Practices: Providing a Continuum of Care for Enhanced Patient Outcomes

The continuum of care for stroke patients consists of acute care, critical pathways (a.k.a. care maps, protocols) for in-hospital management, and discharge planning. Initiation of secondary prevention while the patient is still hospitalized for the initial ischemic stroke requires the creation of care management teams functioning with preprinted orders and testing per protocol. Several examples of ongoing educational programs are cited below.

AHA "Get with the Guidelines" (GWTG) Stroke Program

The AHA-sponsored GWTG program focuses on care team protocols to ensure that patients with ischemic stroke are treated with the proper medications and discharged appropriately.⁹ In the acute stage, emphasis is placed on improving timeliness by obtaining answers to the following questions:

- When did the symptoms begin?
- How long did it take for emergency medical services to arrive after receipt of a call?
- How long did it take for the patient to arrive at the emergency department?
- Is this the patient's first neurologic deficit?
- When was CT scanning begun?
- What was the timing of thrombolytic therapy (if applicable)?

After immediate laboratory sampling (e.g., blood glucose), blood pressure measurement, and noncontrast cranial CT, in-hospital management continues with:

- a decision to administer thrombolytic therapy based on the timing of the symptoms and the nature of the insult
- maintenance of appropriate blood pressure, hydration, and airway adequacy
- other medical management (e.g., aspirin, heparin)
- planning for physical, speech, and other adjunctive therapy as necessary

All of the following secondary stroke prevention measures are addressed in the hospital and then followed through appropriately after discharge:

- appropriate antiplatelet therapy

- smoking cessation counseling
- moderation of alcohol consumption
- lipid-lowering therapy
- blood pressure control
- diabetes management
- weight and exercise management
- atrial fibrillation management
- a strategy to assess and treat carotid artery stenosis

The GWTG program advocates mobilizing hospital- and community-based physicians, as well as other healthcare professionals, into a cohesive and motivated team. The program focuses on care team protocols to ensure that patients are treated with and discharged on appropriate medications and with risk-modification counseling. "Champions" from the hospital staff are identified to lead, develop, and mobilize teams to implement treatment and discharge guidelines for stroke patients in their respective institutions.

UCLA Stroke PROTECT Program

The Stroke PROTECT (Preventing Recurrence of Thromboembolic Events through Coordinated Treatment) program⁸ developed at the University of California, Los Angeles (UCLA) Medical Center, was designed to reduce the incidence of stroke—and, simultaneously, MI and peripheral arterial occlusion—by integrating proven prevention measures into standard hospital care. It operates at the community level and involves interaction of the patient, family, and primary care physician with the hospital staff. Its elements consist of preprinted orders, simple guidelines, education, discharge treatment, and prospective monitoring of treatment use. All patients admitted with a diagnosis of ischemic stroke or TIA participate to a degree

depending on their stroke subtype. PROTECT has eight goals—four therapeutic and four behavioral—to be accomplished before discharge (Table 4).

The most visible effect of PROTECT has been the greatly increased utilization of statins and ACE inhibitors/angiotensin-II receptor blockers at discharge. Parallels may be drawn with the American College of Cardiology's Guidelines Applied in Practice (GAP) program and UCLA's Cardiac Hospitalization Atherosclerosis Management Program (CHAMP).^{6,7} Both of these programs significantly increased utilization of antiplatelets, lipid-lowering drugs, and other appropriate agents and behavior modifications in patients discharged after acute MI. The programs used customized guideline-oriented tools designed to facilitate adherence to evidence-based therapy.^{6,7}

Summary

Reducing the high morbidity and mortality associated with stroke continues to be a major healthcare challenge in the United States. Pro-

grams that bridge the gap between evidence-based medicine and clinical practice can improve patient outcomes. The "Stroke Best Practices" workshops developed by NCME were designed to assist institutions that lack stroke centers in implementing the latest evidence-based practices for in-hospital stroke management. The importance of postdischarge continuum of care was emphasized throughout the program. Lectures covering the topics addressed in this article were delivered by national experts in neurology, emergency medicine, and vascular surgery. Formal presentations were followed by individual working discussions among healthcare professionals attending from local institutions. Sample pathways and implementation tools from successful stroke programs across the country were shared during breakout sessions and used as templates for the creation of best practices suited to the infrastructure and resources of each hospital. Short-, intermediate-, and long-term goals were set by each institution during the breakout sessions. Each hospital also nominated a "champion" to sustain the momentum of the best practices program and to facilitate follow-up with NCME.

Table 4. Goals of the UCLA Stroke PROTECT Program

Therapeutic Goals	Behavioral Goals
<i>Appropriate hospital initiation and maintenance of:</i>	
<ul style="list-style-type: none"> • Antithrombotic therapy • ACE inhibitor/ARB • Statin • Thiazide diuretic 	<ul style="list-style-type: none"> • Exercise education • Diet education • Smoking cessation • Awareness of stroke warning signs and the need to call 911
ARB = angiotensin-II receptor blocker	
UCLA Stroke PROTECT Program. Available at: http://www.strokeprotect.mednet.ucla.edu .	

By employing a team approach and implementing stroke best practices, institutions without stroke centers may use evidence-based best practices to bridge the gap between guidelines and clinical practice to optimize the management of acute stroke, prevent secondary vascular events, and enhance the quality of care for patients with established cerebrovascular disease.

Outside the hospital, primary care physicians are the first line of defense against stroke. Valuable, evidence-based interventions, such as identifying and treating atrial fibrillation and carotid stenoses, rushing stroke patients to rt-PA therapy within the three-hour time window, and ensuring that patients are treated in a stroke unit, can be easily implemented in clinical practice. Evidence also supports the need for rigorous blood pressure control and appropriate antiplatelet and statin therapy. In addition, all patients should be counseled about lifestyle modification for stroke prevention and instructed to dial 911 if they experience the warning signs of a stroke. If these important stroke prevention measures are followed, stroke morbidity and mortality may be reduced.

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Stroke Assessment Across The Continuum Of Care

Summary of recommendation

RECOMMENDATION		* ¹ LEVEL OF EVIDENCE
Practice Recommendations		
Secondary prevention	1.0 Nurses in all practice settings should screen clients for risk factors related to stroke in order to facilitate appropriate secondary prevention. Clients with identified risk factors should be referred to trained healthcare professionals for further management.	IV
Stroke recognition	2.0 Nurses in all practice settings should recognise the new onset of the signs and symptoms of stroke as a medical emergency to expedite access to time dependent stroke therapy, since <i>"time is brain"</i> .	IV
Neurological assessment	3.0 Nurses in all practice settings should conduct a neurological assessment on admission and as soon as there is a change in client status. This neurological assessment, facilitated with a validated tool (such as the Canadian Neurological Scale, National Institutes of Health Stroke Scale or Glasgow Coma Scale), should include at minimum: <ul style="list-style-type: none"> ■ Level of consciousness; ■ Orientation; ■ Motor (strength, pronator drift, balance and coordination); ■ Pupils; ■ Speech/Language; ■ Vital signs (TPR, BP, SpO₂); and ■ Blood glucose. 	IV
	3.1 Nurses in all practice settings should recognise that signs of decline in neurological status might be related to neurological or secondary medical complications. Clients with identified signs and symptoms of these complications should be referred to a trained healthcare professional for further assessment and management.	IV
Practice Recommendations		
Complications	4.0 Nurses in all practice settings should assess the client's risk for pressure ulcer development, which is determined by the combination of clinical judgement and the use of a reliable risk assessment tool. The use of a tool that has been tested for validity and reliability (such as the Braden Scale for Predicting Pressure Sore Risk) is recommended.	IV
	4.1 Nurses in all practice settings should assess the stroke client's	

RECOMMENDATION		*1 LEVEL OF EVIDENCE
Practice Recommendations		
	fall risk on admission and after a fall, using a validated tool (such as the STRATIFY or timed “Up and Go”).	
Pain	5.0 Nurses in all practice settings should assess clients for pain using a validated tool (such as the Numeric Rating Scale, the Verbal Analogue Scale or the Verbal Rating Scale).	IV
Dysphagia	6.0 Nurses should maintain all clients with stroke NPO (including oral medications) until a swallowing screen is administered and interpreted, within 24 hours of the client being awake and alert.	Ila
	6.1 Nurses in all practice settings, who have appropriate training should administer and interpret a dysphagia screen within 24 hours of the stroke client becoming awake and alert. This screen should also be completed with any changes in neurological or medical condition, or in swallowing status. This screening should include: <ul style="list-style-type: none"> ■ Assessment of the client’s alertness and ability to participate; ■ Direct observation of signs of oropharyngeal swallowing difficulties (choking, coughing, wet voice); ■ Assessment of tongue protrusion; ■ Assessment of pharyngeal sensation; ■ Administration of a 50 ml water test; and ■ Assessment of voice quality. <p>In situations where impairments are identified, clients should be referred to a trained healthcare professional for further assessment and management.</p>	IV
Nutrition	7.0 Nurses in all practice settings should complete a nutrition and hydration screen within 48 hours of admission, after a positive dysphagia screen and with changes in neurological or medical status, in order to prevent the complications of dehydration and malnutrition. In situations where impairments are identified, clients should be referred to a trained healthcare professional for further assessment and management.	IV
Practice Recommendations		

RECOMMENDATION		* ¹ LEVEL OF EVIDENCE
Cognition/ Perception / Language	<p>8.0 Nurses in all practice settings should screen clients for alterations in cognitive, perception/perceptual and language function that may impair safety, using validated tools Language (such as the Modified Mini-Mental Status Examination and the Line Bisection Test). This screening should be completed as follows: Within 48 hours of regaining consciousness:</p> <ul style="list-style-type: none"> ■ Arousal, alertness and orientation; ■ Language (comprehensive and expressive deficits); and ■ Visual neglect. <p>In addition, when planning for discharge:</p> <ul style="list-style-type: none"> ■ Attention; ■ Memory (immediate and delayed recall); ■ Abstraction; ■ Spatial orientation; and ■ Apraxia. <p>In situations where impairments are identified, clients should be referred to a trained healthcare professional for further assessment and management.</p>	IV
Activities of daily living	<p>9.0 Nurses in all practice settings should assess stroke clients' ability to perform the activities of daily living (ADL). This assessment, using a validated tool (such as the Barthel Index or the Functional Independence Measure™), may be conducted collaboratively with other therapists, or independently when therapists are not available. In situations where impairments are identified, clients should be referred to a trained healthcare professional for further assessment and management.</p>	IV
Bowel and bladder function	<p>10.0 Nurses in all practice settings should assess clients for faecal incontinence and constipation.</p> <p>10.1 Nurses in all practice settings should assess clients for urinary incontinence and retention (with or without overflow).</p>	<p>IV</p> <p>IV</p>

RECOMMENDATION		*1LEVEL OF EVIDENCE	56
Depression	<p>11.0 Nurses in all practice settings should screen clients for evidence of depression, using a validated tool (such as the Stroke Aphasia Depression Questionnaire, Geriatric Depression Scale, Hospital Anxiety and Depression Scale or the Cornell Scale for Depression in Dementia) prior to discharge throughout the continuum of care. In situations where evidence of depression is identified, clients should be referred to a trained healthcare professional for further assessment and management.</p> <p>11.1 Nurses in all practice settings should screen stroke clients for suicidal ideation and intent when a high index of suspicion for depression is present, and seek urgent medical referral.</p>	IV	
Practice Recommendations			
Caregiver strain	12.0 Nurses in all practice settings should assess/screen caregiver burden, using a validated tool (such as the Caregiver Strain Index or the Self Related Burden Index). In situations where concerns are identified, clients should be referred to a trained healthcare professional for further assessment and management.	III	
Sexuality	13.0 Nurses in all practice settings should screen stroke clients/their partners for sexual concerns to determine if further assessment and intervention is necessary. In situations where concerns are identified, clients should be referred to a trained healthcare professional for further assessment and management.	IV	
Client and Caregiver readiness to learn	14.0 Nurses in all practice settings should assess the stroke client and their caregivers' learning needs, abilities, learning preferences and readiness to learn. This assessment should be ongoing as the client moves through the continuum of care and as education is provided.	IV	
Documentation	15.0 Nurses in all practice settings should document comprehensive information regarding assessment and/or screening of stroke clients. All data should be documented at the time of assessment and reassessment.	IV	
Education Recommendations			

RECOMMENDATION		*1 LEVEL OF EVIDENCE 57
16.0	Basic education for entry into practice should include: <ul style="list-style-type: none"> ■ Basic anatomy and physiology of the cerebrovascular system; ■ Pathophysiology of a stroke; ■ Risk factors of a stroke; ■ Signs and symptoms of a stroke; ■ Components of a client history and assessment specific to stroke; ■ Common investigations (tests); and ■ Validated screening/assessment tools. 	IV
16.1	Nurses working in areas with a focus on stroke should have enhanced stroke assessment skills.	IV
Organisation & Policy Recommendations		
17.0	Organisations should develop a plan for implementation that includes: <ul style="list-style-type: none"> ■ An assessment of organisational readiness and barriers to education. ■ Involvement of all members (whether in a direct or indirect supportive function) who will contribute to the implementation process. ■ Ongoing opportunities for discussion and education to reinforce the importance of best practices. ■ Dedication of a qualified individual to provide the support needed for the education and implementation process. ■ Opportunities for reflection on personal and organisational experience in implementing guidelines. <p>Nursing best practice guidelines can be implemented successfully only where there are adequate planning, resources, organisational and administrative support, as well as appropriate facilitation. In this regard, RNAO (through a panel of nurses, researchers and administrators) has developed the <i>Toolkit: Implementation of Clinical Practice Guidelines</i> based on available evidence, theoretical perspectives and consensus. The <i>Toolkit</i> is recommended for guiding the implementation of the HSFO-RNAO best practice guideline <i>Stroke Assessment Across the Continuum of Care</i>.</p>	IV
18.0	Organisational policy should clearly support and promote the nurses' role in stroke assessment, either independently or in collaboration with other members of the interdisciplinary team.	IV

Interpretation of evidence

Levels of Evidence

- Ia Evidence obtained from meta-analysis or systematic review of randomised controlled trials.
- Ib Evidence obtained from at least one randomised controlled trial.
- IIa Evidence obtained from at least one well-designed controlled study without randomisation
- IIb Evidence obtained from at least one other type of well-designed quasi-experimental study without randomisation.
- III Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies.

IV Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities. 58

Role of occupational therapy after stroke

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abstract

Internationally recognized best practice care in the early management and rehabilitation of individuals following stroke includes multidisciplinary assessment and treatment by a coordinated team of health care professionals that includes occupational therapists. Occupational therapists assess the impact of changes in motor function, sensation, coordination, visual perception, and cognition on a person's capacity to manage daily life tasks. Intervention improves participation in meaningful roles, tasks, and activities; remediates deficits; minimizes secondary complications; and provides education and support to the patient and caregivers. Occupational therapists' focus on independence and function, individual goal-setting, and their specialist skills in task adaptation and environmental modification underpin the profession's contribution to the multidisciplinary stroke rehabilitation team. The aim of this paper is to provide an overview of occupational therapy practice in stroke patients.

Keywords

Assessment, intervention, occupational therapy, role, stroke

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After stroke, occupational therapists work to facilitate and improve motor control and hand function in the stroke-affected upper limb; to maximize the person's ability to undertake his or her own personal self-care tasks and domestic tasks; to help the patient learn strategies to manage the cognitive, perceptual, and behavioral changes associated with stroke; and to prepare the home and work environment for the patient's return.

Internationally recognized best practice care in the early management and rehabilitation of individuals following stroke includes multidisciplinary assessment and treatment by a coordinated team of health care professionals, including occupational therapists.^[1] Occupational therapists work collaboratively with the patient to establish the impact of stroke on the performance of daily tasks, including personal cares, domestic tasks, and work and leisure activities, and develop a goal-focused program to develop the required skills for participation in daily life. The aim of this paper is to provide an overview of occupational therapy practice in stroke.

The Clinical Guidelines for Acute Stroke Management^[2] and Stroke Rehabilitation and Recovery^[3] provides a framework that is based on the best available evidence. There is a growing research evidence base in support of the benefits of occupational therapy management following stroke.

There are 15 occupational therapy education centers in India that are recognized by the All India Occupational Therapists' Association (AIOTA) and the World Federation of Occupational Therapy (WFOT). The International Journal of Occupational Therapy is an official publication of AIOTA.^[4]

Occupational Therapy Assessment after Stroke

Assessment is conducted to understand the impact of changes in motor function, sensation, coordination, visual perception, and cognition on the stroke victim's capacity to manage daily life tasks. Assessment is used to identify areas of individual and environmental difficulties and to enable patient-centered goal-setting with the participation of both the patient and the family members. Table 1 lists the core areas of occupational therapy assessment, summarized according to the International Classification of Functioning (ICF) terminology.^[5] Occupational therapists endeavor to set rehabilitation goals related to activity and participation that are specific, measurable, attainable, realistic, and relevant to the individual person.

Table 1: Core areas of occupational therapy assessment

ICF dimension	Body function and structure	Activity	Participation	Environment
Occupational Therapy Terminology Assessment Areas	Occupational Performance Components <ul style="list-style-type: none"> • Vision • Visual perception • Memory • Cognition • Executive function • Sensory motor changes • Psychosocial adjustments 	Occupational Performance <ul style="list-style-type: none"> • Upper limb function • Personal self care tasks • Domestic or instrumental activities of daily living • Leisure activities • Driving 	Occupational Performance Roles <ul style="list-style-type: none"> • Occupational roles • Community integration 	Environments and Contexts <ul style="list-style-type: none"> • Physical (e.g. home work) • Social • Cultural

Activities of Daily Living (ADL)

The initial process of occupational therapy assessment involves interviews with the patient and the carer to establish previously held life roles and the tasks and activities that were completed within these roles. Observational assessment is undertaken of personal self-care tasks, including showering, dressing, toileting, grooming, and eating, and domestic or instrumental tasks, including meal preparation, shopping, cleaning, laundry, and management of finances and medications. Standardized measures may include the Functional Independence Measure (FIM),^[6] the Modified Barthel Index (MBI),^[7] the Assessment of Motor and Process Skills (AMPS),^[8] the Assessment of Living Skills and Resources (ALSAR),^[9] and the Reintegration to Normal Living Index.^[10] Understanding the level of assistance needed in each of these areas and the priorities of the individuals helps the occupational therapist target rehabilitation interventions appropriately and to measure progress towards individual goals. Observation of activity limitations allows the occupational therapist to identify the impairments that underpin these limitations, including the motor, sensory, cognitive and/or perceptual sequelae of stroke. These will now be described in more detail.

Vision and Visual Perception

Screening of primary visual skills, including visual acuity, visual fields, and visual tracking are undertaken by the occupational therapist before examining for changes in visual perception.^[11] Routine occupational therapist assessment for impairments of perception are integral to the rehabilitation of patients following stroke^[12] and are prerequisites to the overall goal of optimizing functional independence.^[13] Standardized assessment tools used in this area include the Occupational Therapy Adult Perceptual Screening Test (OT-APST),^[14] the Rivermead Perceptual Assessment Battery (RPAB),^[15] the Behavioral Inattention Test (BIT),^[16] and the Ontario Society of Occupational Therapists Perceptual Evaluation (OSOT).^[17] Following stroke, occupational

therapists routinely screen for visual-perceptual impairments such as agnosia; visuospatial relations problems, eg, figure-ground, body scheme disorders, depth perception, and unilateral neglects, and impairments in constructional skills.^[14] Other neurobehavioral changes, including praxis and acalculia, are commonly assessed in conjunction with visual-perceptual screening following both right and left hemisphere stroke. A more detailed summary of the visual-perceptual and motor planning changes that are screened for by occupational therapists is shown in Table 2.

Memory and Cognition

The occupational therapist conducts initial screening, and more detailed assessments if indicated, in the areas of memory, cognition, and executive functioning to determine the impact of changes in these areas on the ability to resume daily function. The occupational therapist uses standardized measures in addition to structured observational techniques, and the results are then used in treatment planning and outcome measurement. These measures may include the Mini Mental State Examination (MMSE),^[18] the Cognitive Assessment of Minnesota (CAM),^[19] the Rivermead Behavioral Memory Test (RBMT),^[20] and the Assessment of Motor and Process Skills (AMPS).^[8] Unless identified and addressed, impairments in memory, cognition, and executive skills can impact significantly upon a person's ability to participate in a rehabilitation program and to complete personal, domestic, leisure, and work-related tasks.^[21] Difficulty in initiating regular tasks such as preparing breakfast, impaired capacity to plan in advance to attend an appointment or take medication appropriately, reduced attentional capacity to attend to a task such as using the computer, or impulsiveness that poses safety risks for the individual are practical examples of the effects of these impairments.

Sensory, Motor, and Upper Limb Function

Occupational therapists conduct detailed assessment of the motor and sensory changes following stroke, with

Table 2: Classification of terminology for visual perceptual impairments and apraxia.^[14]

Areas of Impairment	Specific Impairments
Agnosias (visual perceptual impairments, visual discrimination)	Visual object agnosia Defective visual analysis and synthesis <ul style="list-style-type: none"> • Figure-ground discrimination • Simultanagnosia • Visual closure Shape and size constancy (form constancy) Facial agnosia (prosopagnosia) <ul style="list-style-type: none"> • Recognition of familiar and unfamiliar faces Color agnosia Alexia
2. Visuospatial Impairments (spatial perception, spatial disorientation, visuospatial agnosia, spatial relations syndromes)	Judgment of direction, distance, position in space and the perception of depth Topographical disorientation Unilateral neglect <ul style="list-style-type: none"> • Sensory, motor, or representational neglect • Personal or spatial neglect (peripersonal or extrapersonal) Body scheme disorders <ul style="list-style-type: none"> • Somatognosis • Finger agnosia • Left / right discrimination • Anosognosia Line orientation
3. Constructional skill impairments (visuoconstructional ability visuoconstructional praxis, visuomotor integration*) tasks	Defective assembling performance on two and three-dimensional <ul style="list-style-type: none"> • Two-dimensional constructional impairments • Three-dimensional constructional impairments Defective graphomotor performance (agraphia)
4 Apraxias	Buccofacial/oral apraxia <ul style="list-style-type: none"> • Ideational apraxia • Ideomotor apraxia • Gait apraxia Dressing apraxia
5 Acalculia	

*Alternative terms included in parentheses

particular emphasis on upper limb and hand function. Occupational therapy interventions then address changes in motor power, muscle tone, sensory loss, motor planning/praxis, fine motor coordination, and hand function, with the aim of regaining upper limb control and function. Standardized assessment methods may include Manual Muscle Testing,^[22] grip and pinch strengths,^[23,24] Nine Hole Peg Test,^[25] Modified Ashworth Scale (MAS),^[26] and Modified Tardieu Scale (MTS).^[27] Functional upper limb ability measures are taken throughout the rehabilitation program to assess progress towards individual goals and for further treatment planning. These measurements supplement the measures of impairment by identifying how stroke-related deficits impact on the ability to use the upper limb in activities of daily living. Measures of upper limb ability may include the Action Research Arm Test (ARAT),^[28] Wolf Motor Function Test (WMFT),^[29] Arm Motor Ability Test (AMAT),^[30] Upper Limb-Motor Assessment Scale (UL-MAS),^[31] Chedoke Arm and Hand Activity Inventory (CAHAI),^[32] Motor Activity Log (MAL),^[33] and ABILHAND.^[34] Currently, there is no single upper limb assessment method that is universally accepted.^[35]

and the choice of the method may be influenced by the level and pattern of motor control available to the patient, the clinical setting, the time available to administer the test, the resources available, and the intended use of the results.

Home Assessment

During the rehabilitation phase of stroke, and close to the time of hospital discharge, the occupational therapist will examine the patient's capacity to complete their usual activities, to manage safely in their own home environment, and to access the community. The occupational therapist will evaluate the need for a home assessment, taking into consideration the environmental barriers, specific impairments, risk of falls, and the needs of the patient/carer. The purpose of the assessment is to establish whether it is safe for the stroke patient to return to their pre-stroke environment or if alternate accommodation will be required. A home assessment involves the occupational therapist observing the patient's ability to physically negotiate their environment and perform their usual activities. For instance, the occupational therapist may assess the patient's ability to safely transfer from their

bed or toilet. The occupational therapist will also assess a patient's ability to plan, implement, and problem-solve tasks like making a simple meal, safely administering medications, using the telephone to call for assistance, or paying bills.

Illustrative Case Study

A 69-year-old retired male with a middle cerebral artery stroke on CT scan presented with a dense left hemiplegia, severe left-sided neglect, and cognitive changes.

During the initial ADL shower assessment, Mr S required prompting to locate and identify the items needed for showering, cueing and physical assistance to dress, one-person assistance for all transfers, and cueing to sequence the tasks. Mr S achieved a score of 48/135 using the Functional Independence Measure (FIM) (26/91 motor and 22/35 cognitive scores), indicating moderate to full assistance with self-cares.

Initial cognitive screening using the MMSE revealed impairment of basic level cognition (score of 22/30). The CAM identified moderate deficits in the areas of attention, visual and auditory memory and sequencing, mental manipulations relating to money use, foresight/ planning, concrete problem-solving, and severe visual neglect. On the ward Mr S needed significant cueing to locate items. His poor problem-solving skills and planning were evident in the incorrect use of switches in the kitchen to turn on/off appliances and inability to recognise an item burning on the stove top, along with inability to problem-solve how to correct this. He was also unsafe at attempting to cross the road, and slow and inaccurate in handling money.

Visual perceptual screening using the OT-APST revealed agnosia, unilateral neglect, impairments in constructional skills, and impairment on the functional skills subscale of this assessment. Figure 1 shows the OT-APST items on initial assessment, where Mr S attempted to draw a clock and copy the picture of a house. He lacked insight into the errors of performance that he made on the OT-APST and his speed of information processing was slow.

Upper limb assessment revealed weak active movement in left shoulder elevation and internal rotation, mild increase in tone in biceps and elbow flexors, and absent protective and discriminative sensation.

Occupational Therapy Intervention after Stroke

Rehabilitation following stroke should begin as soon as the medical condition is stable. Occupational therapy intervention improves participation in meaningful roles, tasks, and activities. A recent systematic review of randomized trials found that stroke patients who receive occupational therapy focused on personal activities of daily living, as opposed to no occupational therapy, are more likely to be independent in those activities.^[36]

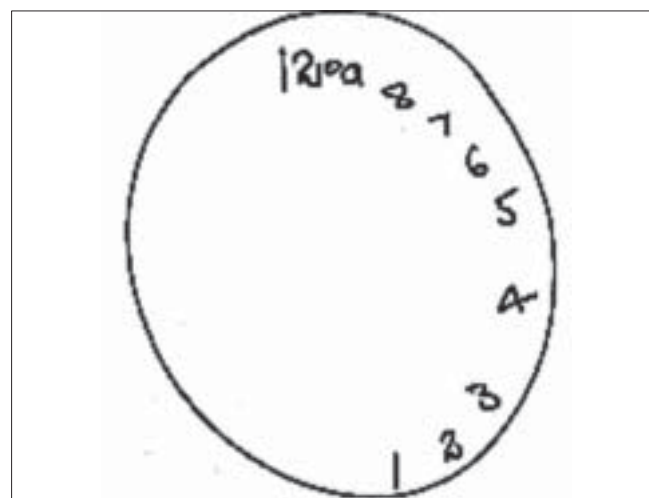


Figure 1a: Mr S OT-ASPT clock drawing item on admission

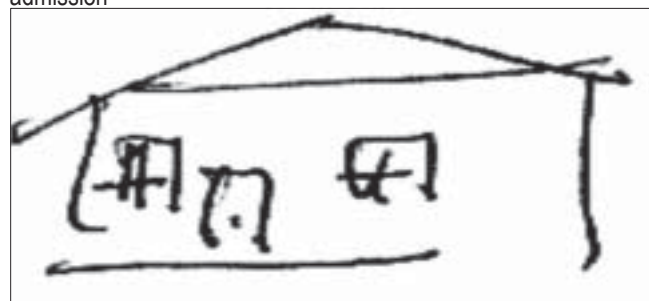


Figure 1b: Mr S OT-ASPT house copy item on admission

Treatment, including individually selected and graded tasks and activities, involves retraining motor, sensory, visual, perceptual, and cognitive skills within the context of functional activities; minimizing secondary complications; and providing education and support to the patient and caregivers.^[11]

Occupational therapy interventions may include methods aimed at maintaining or improving soft tissue properties of the upper limb. For example, techniques that may be used to reduce spasticity include stretching^[37] and static or dynamic splinting^[38] either alone or in combination with the use of medically administered botulinum toxin therapy.^[39] Other methods employed to prevent contracture or dependent edema may include education for the patient and family in ways to support and position the stroke-affected upper limb. For patients who have developed contractures, management may include electrical stimulation^[40] or casting.^[41] The occupational therapist may prescribe a firm support device to reduce the risk of shoulder subluxation or prevent further subluxation.^[42-45] Upper limb positioning, bandaging, compression garments,^[38] retrograde massage, and electrical stimulation^[46] are some of the techniques that may be employed by the occupational therapist.

to prevent or reduce the hand edema that may occur after a stroke. Active therapy and graded task selection is used to encourage sensorimotor return; the therapy may include muscle facilitation and strengthening, in conjunction with everyday activities to develop reach, grasp, and object manipulation skills. Specific techniques include functional electrical stimulation,^[47] constraint-induced movement therapy,^[48] progressive resistive exercise^[49] and sensory-related training,^[50] and avoidance of movements that reinforce the synergistic movement patterns of the upper limb that limit function. Patients are encouraged to continue activities outside of therapy time and are prescribed a task-specific^[51-53] rehabilitation program, encouraging as much practice as possible.^[54] This is achieved by loaning therapy kits to enable self-directed practice. Examples of practice tasks include: using a keyboard, mobile phone, television remote, or calculator to practice fine motor skills; opening a range of jars and containers of varying sizes and weights and with different types of lids; turning the pages of books, magazines, and newspapers; and managing fastenings of clothing items with different-sized buttons, zippers, Velcro, clips, and laces. The occupational therapist reviews and upgrades the therapy program on a daily basis.

Visual and perceptual impairments are minimized by retraining in specific skills, teaching compensation techniques, substitution of unimpaired skills, or adapting the task or environment.^[1] Methods include visual scanning training^[55] to assist a person with a hemianopia or neglect to locate items more accurately in their environment. A person with depth perception problems may be encouraged to hold the handrail for additional proprioceptive cues to safely negotiate stairs, as well as to pace themselves and go more slowly down a flight of stairs. A person with praxis^[56] or motor planning problems affecting one upper limb may initially practice a range of remediation techniques involving feedback, cueing, and functional repetitive practice to overcome the impairment. If the impairment of the stroke-affected hand is resistant to remediation methods, the occupational therapist may teach the patient to compensate by using the other, unaffected, upper limb for tasks requiring greater precision such as shaving, thus increasing the patient's level of independence.

Cognitive therapy may be used in rehabilitation of attention and concentration impairments.^[57] For patients with memory difficulties, external cues may help prompt their memory,^[58] for example, using a diary, visual prompts, or an alarm. An external cue, for example a pager,^[58] may help patients with impaired executive functioning to initiate tasks.

Occupational therapists will establish how tasks can be adapted or the environment changed to improve the patient's level of independence. For the physical environment, the occupational therapist may prescribe assistive equipment or home modifications to enable task performance with greater ease or safety.^[59] For example, installing grab rails near steps, raising the chair height, or prescribing a wheeled mobility tray for transporting meals.

The occupational therapist liaises with the discharge planner, patient, and caregivers to establish the anticipated frequency, duration, intensity, and type of carer support required for return home.^[33] For instance, the patient may need supervision with medications because of memory difficulties, assistance for dressing because of dyspraxia, or help with the laundry because of balance problems. The occupational therapist may train carers to use assistive equipment or modifications safely with the patient.^[60] When a patient returns home without the capacity to get out of bed themselves, the occupational therapist trains relatives to safely operate an electric hoist or wheelchair. Continual education of the patient and family, and participation of the family in a treatment program, is essential for the smooth transition to discharge, carry-over of skills learnt to the home environment, and for facilitating psychosocial adjustment.

Case Study Continued

Daily occupational therapy treatment involved improving awareness of the impact of left neglect on daily tasks, systematic visual scanning training, and practical strategies for daily task completion to overcome the impact of neglecting behavior. These included tasks and strategies of graded complexity including dressing, meal preparation, money management and, eventually, crossing the road and shopping. Feedback was provided continually and consistently by occupational therapy and other staff to facilitate increased insight and awareness of deficits and to facilitate anticipatory use of left-sided visual scanning to help achieve 'over learning' of this skill. Perceptual and cognitive retraining was undertaken to achieve a level of safety and independence in the personal care tasks of dressing, showering, toileting, grooming, and eating, as well as in the domestic tasks of meal preparation and shopping.

Daily upper limb movement facilitation and positioning, massage, elevation, and compression were employed to address muscle weakness and edema of the left upper limb. Education was provided for safety in the care of his arm and practical training in one-handed methods of completing daily tasks, including dressing, grooming, and eating.

Occupational Therapy Post-discharge

Intervention after Stroke

Outpatient services

When patients return home, referral to outpatient or community occupational therapy is sometimes required.^[61] Either hospital or center-based rehabilitation services or therapy provided in the home can be used; the aim is to enable independence in the activities of daily living.^[62] Rehabilitation is equally effective if delivered in the hospital as an outpatient, in a day hospital, or in the community, and should be offered to all stroke patients as needed.^[61-63] Economic evaluations of community rehabilitation are limited to cost description studies.^[3] In India, community-based rehabilitation is described as a strategy within general community development for rehabilitation, equalization of opportunities, and social inclusion of people with disability.^[64]

Residential care

If a stroke patient is unlikely to benefit from active rehabilitation and requires residential care, the occupational therapist may be involved in training the carer of the facility to manage the patient's functional difficulties and enabling maximum patient participation.^[65] For instance, this may involve proper positioning for eating tasks or visual scanning strategies for reading. The occupational therapist may suggest equipment to enable the patient to participate in their cares or return to leisure activities.^[66] For instance, custom clothing^[67] for easier toileting or modifying the television on-off switch to assist the patient regulate their environment.^[68] The occupational therapist may provide advice on pressure-relieving mattresses and cushions for patients managed in bed and seated in wheelchairs, or education regarding positioning for comfort and prevention of deformity.^[69]

Return to driving services

For patients who drove before their stroke, the occupational therapist provides information and advice on their post-stroke driving responsibilities.^[70] In Australia, it is recommended that the patient should not drive for a minimum of 1 month after stroke or transient ischemic attack (TIA), and perhaps longer if there is significant neurological, perceptual, or cognitive deficit, depending on medical advice.^[71] In addition to a medical examination, the patient may be referred to an occupational therapy driver assessor for off-road and on-road driving assessment.^[72] Off-road assessment includes an evaluation of skills such as scanning, attention, visual perception, hazard perception, executive function, reaction time, and knowledge of road law. This assessment is also designed to identify patients not suitable for on-road assessment. On-road assessment evaluates driving performance in a dual-

control vehicle with a driving instructor.^[72] Examples of recommendations from this assessment include the need for specialist equipment or vehicle modifications, need for rehabilitation or retraining, review of license conditions, or need for reassessment. When patients are unable to return to driving, they are commonly provided with information regarding transport subsidies or their local community transport schemes.

Return to work services

For the patient in paid employment before their stroke, assessment regarding return to work commences in the acute setting. The occupational therapist gathers a history of the patient's occupation, i.e., job duties (frequency and duration) and work conditions (hours, environment, etc.). Using the results of assessment of the sensorimotor, cognitive, visual-perceptual, and psychological abilities of the patient, the occupational therapist considers the feasibility of return to work. Often the patient is referred to an occupational therapist specializing in occupational rehabilitation^[70] to conduct a workplace assessment and negotiate a graded return to work hours and duties.^[68]

Case Study Continued

An occupational therapy home assessment was conducted prior to discharge. Recommendations included the installation of grab rails in the shower and toilet, removal of a shower screen that limited safe access, purchase of a shower stool for seated showering as his balance remained impaired, and purchase of a lounge chair of a suitable height.

Mr S's functional improvements included independence with dressing, showering, toileting, mobilizing with a single stick, and preparing breakfast. His performance on standardized cognitive and perceptual assessments improved; however, he continued to require close supervision for outdoor mobility, kitchen tasks requiring use of electrical appliances, and management of his medications and finances. Safety concerns in the kitchen at time of discharge included the need for cueing to turn off the hot plate of the stove after use, turning off the tap before the sink overflowed if distracted by another task, and shutting cupboards and drawers after use. His wife participated in many occupational therapy sessions to gain an understanding of the type of supervision and assistance her husband would need upon return home.

Cognitive reassessment on discharge revealed an MMSE score of 27/30 (which is within the normal range for his level of education), and Montreal Cognitive Assessment (MoCA) score of 25/30 (normal = 26 and above), revealing ongoing impairment, particularly in the areas of executive functioning. The OT-APST on discharge continued to show evidence of agnosia and neglect and impairment of constructional skills and functional skills,

although gains were made in each of these areas since admission. Figure 2 demonstrates changes in his visual perceptual abilities at the time of discharge and also the presence of ongoing visual neglect. His discharge FIM score of 94/135 (68/91 motor, 26/35 cognitive) also revealed improvement since admission in his level of functioning, but reflects an ongoing need for supervision and assistance from his wife in daily living tasks. Mr S was not able to return to driving due to the impact of his perceptual and cognitive impairments on safety and judgment and therefore disability parking and transport subsidies were organized.

Mr S did not regain functional use of his left upper limb and continued to use the one-handed dressing and daily living techniques. Community-based occupational therapy and physiotherapy was organized for follow-up care.

Summary

The occupational therapist's focus on independence and

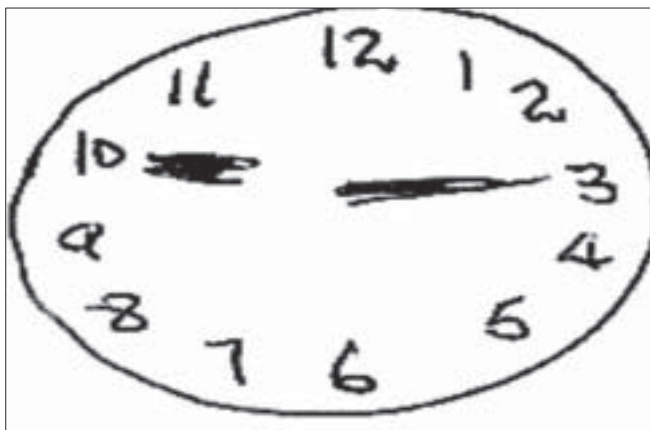


Figure 2a: Mr S OT-ASPT clock drawing items on discharge



function, individual goal-setting, and specialist skills in task adaptation and environmental modification underpin the profession's contribution to the multidisciplinary stroke rehabilitation team. Assessment of important roles and stroke deficits such as sensorimotor, musculoskeletal changes (biomechanical), cognition, perception, and psychosocial adjustment assist with planning restorative and compensatory intervention plans and measuring the patient outcomes. Occupational therapists' treatment contributes to both the quality of life for survivors of stroke and their families and to timely evaluation of clinical outcomes for the multidisciplinary rehabilitation team.

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Ballinger, et al.: Role of occupational

Unpacking the black box of therapy – a pilot study to describe occupational therapy and physiotherapy interventions for people with stroke

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Objective: To describe the components used in the practice of occupational therapy and physiotherapy for people with stroke and to examine variability between services.

Design: A time-sampling strategy in which therapists recorded their face-to-face interventions with stroke patients during 12 weeks over a total of 17 months.

Settings and subjects: Six occupational therapists and seven physiotherapists from four services (three day hospitals and one domiciliary stroke rehabilitation service) recorded interventions with 89 stroke patients recruited to a larger randomized controlled trial.

Main outcome measures: Frequencies of use of interventions, together with other details about delivery of therapy, were recorded using a data collection booklet and coding system designed by the participating therapists.

Results: The median treatment time for a session was 45 minutes. The most frequently recorded components of physiotherapy intervention were 'walking', 'standing balance' and 'upper limb movement pattern', and of occupational therapy 'physical function', 'social and leisure activities' and 'other'. There was variability between the services in terms of median treatment time, use of intervention codes, frequency of treatment sessions, amount of time spent working with assistance and amount of group work.

Conclusions: The findings support the view that occupational therapy and physiotherapy with people with stroke are not homogeneous activities, and vary between therapists and services.

Recommendations include further development of the tool, and use of other methodologies to explore the process and nature of stroke rehabilitation.

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Introduction

Treatment of people with stroke forms a large proportion of the workload of occupational therapists and physiotherapists working in rehabilitation settings. Whilst the majority of patients admitted to hospital with stroke receive physiotherapy and occupational therapy,^{1,2} there is little information available about what constitutes optimum treatment, skill level and experience of therapists providing treatment or detail about components of treatment.³ There is a growing body of literature suggesting that programmes of focused stroke rehabilitation may improve functional performance for some patients,³⁻⁵ and that improvement may be related to early initiation of treatment, but there are inconclusive findings about where rehabilitation should take place⁶⁻⁹ and which characteristics are important to the success of treatment. To date, no single therapy approach has been identified as preferable^{3,10} and the description of therapy content has received scant attention.

Methodological weaknesses of research studies have been highlighted as key contributors to the lack of clear findings from efficacy studies in this field. In many studies neither the aims nor the components of treatment are documented, with the outcome measures being poorly linked to the aims.³ The content of therapy input needs to be understood before outcomes can be truly interpreted and measured. The complexities and variability of therapy input have added to the problems of unravelling the process of intervention.

In recent times there has been a growing interest in exploring the nature of therapy and the mapping of patient activity. The solitary behaviour of patients in hospital units has been noteworthy with long periods of inactivity.¹¹⁻¹³ Observation studies have shown that formal therapy occupies a small proportion of inpatient time. Researchers have found that the lengths of therapy sessions have varied. Newall *et al.*¹⁴ recorded a mean of 43 minutes, Lincoln *et al.*¹⁵ found that patients on medical wards received on average 21 minutes while those on the stroke unit received 36 minutes of therapy and Wade *et al.*¹⁶ recorded 45 minutes as the mean time for a therapy session per day. Gladman *et al.*¹⁷ found that out-

patient sessions varied from 30 minutes in the day hospital to 90 minutes in the outpatient department for physiotherapy and from 60 minutes in the day hospital to 120 minutes in the outpatient department for occupational therapy.

The study described in this paper was considered to be exploratory and the aims were:

- 1) to design a tool for recording interventions of occupational therapists and physiotherapists with people with stroke;
- 2) to examine variability of therapy input between centres; and
- 3) to reflect critically on both the recording tool and process of data collection.

Method

This small-scale study (referred to hereafter as the 'Therapy inputs' study) took place within the context of a larger randomized controlled trial, designed to compare domiciliary treatment for people with stroke with that provided in day hospitals, along similar lines to the study described by Young and Forster.⁶

Participants

Entry criteria for patients were as follows:

- diagnosed with stroke
- need further rehabilitation in day hospital
- able to attend day hospital
- resident in area of study
- over 55 years of age
- no advanced dementia
- no barriers to rehabilitation from previous disabilities.

The participating therapists and services are profiled briefly below:

- *Service A:* A day hospital where staff treat around 20 patients with varied diagnoses daily. Staffing comprised a full-time senior physiotherapist, two assistants and two part-time senior occupational therapists plus a helper.
- *Service B:* A day hospital providing rehabilitation for around 15 patients per day, with a variety of diagnoses. The full-time physiotherapist was also the day hospital manager. The senior occupational therapist worked vir-

tually full-time and there were four whole-time equivalent generic helpers.

- *Service C:* The full-time head occupational therapist was also the manager at this day hospital that provided for around six patients each day, with different diagnoses. Other staff included a healthcare assistant. There was access to an occupational therapy helper and part-time senior physiotherapy cover.
- *Service D:* A domiciliary stroke rehabilitation service comprising a full-time senior physio-therapist and a part-time senior occupational therapist was set up specifically for the purposes of the main trial.

During the 17-month project there were changes in staff and organization of the service. These changes mean that it is hard to describe the sample with absolute accuracy but it does reflect the reality of clinical practice.

Design

A time-sampling strategy was employed, in which two-week periods were identified within each three-month block for the purposes of data collection. Whilst these weeks were not selected randomly, they were considered to reflect therapy delivered throughout the year, thus precluding the need to collect data continuously over the 17 months of this project.

Measures

The data collection tool was designed specifically for this study, and the participating therapists were closely involved in the design of the booklet used, and the identification of the coding system. Each therapist received one booklet for each two-week period of data collection, comprising brief instructions for completion, codes plus definitions and one page per day from Monday to Friday over the two-week period for recording (totalling 10 sheets). Each daily sheet was broken down into 15-minute periods between the hours of 8.00 am and 6.00 pm, and the therapist was required to allocate one code to each period of 15 minutes face-to-face contact with stroke patients. The occupational therapists identified 12 codes and the physiotherapists 14 codes (see Appendix 1). This tool was piloted by the therapists over a two-week period, and the final version included space to record trial num-

ber of patient, whether the intervention was with a group or individual, whether the therapist was working with assistance and if the treatment was carried out in the home.

Procedure

Participating therapists recorded details of their face-to-face contacts with stroke patients involved in the main trial for a total of six two-week periods over a 17-month period. Informal interviews focusing on patient load, referral rates and service policies were carried out with the therapists at their place of work towards the end of the data collection period to add depth to the interpretation of the results.

Results

In the following presentation of results, all frequencies are in multiples of 15 minutes because of the way in which the data were collected.

Sample characteristics

Eighty-nine out of 138 patients with stroke recruited to the main randomized controlled trial were recorded as receiving rehabilitation either in the day hospitals (services A, B and C) or at home (service D) during the study period. The average age of these patients was 78 years (range 60–94, SD 7.0); 36 were right hemispheric and 47 left hemispheric (six unknown); 39 were male and 50 female. Forty-six patients (average age 77 years, SD 6.5) were treated by the domiciliary service and 43 (average age 79 years, SD 7.5) were treated in the day hospitals. Thirteen therapists were involved in treatment, ranging from senior II to head/superintendent III.

Total treatment time recorded by physiotherapists was 235 hours, and by occupational therapists, 153 hours and 15 minutes.

Table 1 illustrates the median time of treatment sessions for patients seen during the study in the different services. The median duration of combined occupational therapy and physiotherapy given in a day was 60 minutes.

As can be seen from Table 1, the median treatment time of an occupational therapy session in service C was 210 minutes, over three times that of the second highest ranked duration. This was

Table 1 Median physiotherapy and occupational therapy treatment time in minutes per patient per day

Therapy	Time (min)			
	Service A	Service B	Service C	Service D
Physiotherapy				
Median	30	45	45	60
Range	15–75	15–90	15–75	30–105
Occupational therapy				
Median	30	45	210	45
Range	15–60	15–90	120–270	15–105

explained by the fact that in describing her practice, this therapist tended not to view therapy as occurring in discreet sessions, but saw it extending into activities such as tea breaks and traveling to and from the unit, accompanying patients on the transport provided. Hence the lengthy duration of occupational therapy sessions in this service. When the extreme data for occupational therapy in service C were removed, the median combined treatment time was 45 minutes.

Therapy provided in the day hospitals was often divided into more than one session in a day. Thirty-seven per cent of patients receiving physiotherapy and 49% receiving occupational therapy had their treatment divided into more than one session during the day. This did not occur in the domiciliary service.

Tables 2 and 3 show the overall frequencies and percentages of use of the 12 occupational therapy and 14 physiotherapy intervention codes. The 'home visit' code was not used by the domiciliary therapists, as all their interventions were carried out in the patients' homes. (See Appendix 1 for descriptions of codes.)

The three most frequently recorded activities for occupational therapy were 'physical function', 'social/leisure activities' and 'other', whilst for physiotherapy the most frequently used codes were 'walking', 'standing balance' and 'upper limb movement patterns'.

Forty-five minute treatment sessions

Individual treatment were examined more closely to investigate the content of treatment sessions of similar length. The therapy components uses in all 45-minute occupational therapy and physiotherapy sessions were extracted. In each 45 minute session there were three 15

minute periods during which the main treatment component was recorded. Sixty-three physiotherapy sessions of 45 minutes were identified and

Table 2 Frequencies and percentages of occupational therapy intervention codes

Code no.	Frequency (15-min periods)	Percentage of total
1	73	12
2	32	5
3	159	26
4	7	1
5	11	2
6	9	1
7	141	23
8	23	4
9	13	2
10	3	1
11	25	4
12	117	19

Table 3 Frequencies and percentages of physiotherapy intervention codes

Code no.	Frequency (15-min periods)	Percentage of total
1	53	6
2	15	2
3	66	7
4	177	19
5	70	7
6	205	22
7	22	2
8	21	2
9	161	17
10	75	8
11	8	1
12	25	3
13	0	0
14	42	4

out of those, 36 had different combinations of treatment components, suggesting different objectives and goals. For example, one combination indicated 30 minutes were spent primarily on the control of pain and 15 minutes on upper limb activities while another combination indicated 15 minutes were spent primarily on positioning and passive movements, 15 minutes on sitting to standing and 15 minutes on walking. Interestingly more than half of the sessions were different in content although similar in length. The remaining sessions were repetitions of 15 of the different combinations of components.

Forty-three occupational therapy sessions of 45 minutes were identified and 21 of those sessions had different combinations of treatment components. For example, one combination indicated that 15 minutes were spent on patient education and 30 minutes on carer education, while another combination indicated that for 45 minutes the prime activity was domestic activities of daily living. The remaining half of the 40 sessions were made up of repetitions of four combinations of treatment components. One combination was used 14 times and represented social or leisure activities carried out in a group.

Variability of treatment delivery

Table 4 illustrates findings relating to frequency of therapy, and mode of working. Most patients received therapy once a week in the day hospitals. This was also true for the patients receiving domiciliary occupational therapy. However, 66% of patients receiving domiciliary physiotherapy were seen more than once a week. Qualified therapy staff primarily worked alone,

an exception being the occupational therapist in service B, who spent just over half the recorded treatment time working with assistance.

Most of the patients received treatment individually and services A and D did not use group activities at all during the data collection period. Group work tended to occur more in occupational therapy, with just over half of the occupational therapy interventions in service C being delivered in group settings. A small percentage of treatment time was not categorized as within-group or individual settings by the occupational therapists, primarily in service C.

Discussion

Eighty-nine patients were seen during the sampling period. The average age of the patients was 78 years (domiciliary group 77 years, day hospital group 79 years) which meant that the sample was older than that reported by Young and Forster⁶ and Gladman *et al.*¹⁷ In the former study

Clinical messages

- The data collection tool developed for this study was simple and practical to use.
- Stroke rehabilitation varies according to setting, and cannot be described in terms of duration of treatment.
- The data collection tool alone does not reflect the complexity of rehabilitation or the process of therapy.

Table 4 Percentages of patients receiving therapy once a week, time therapists spent working alone and interventions delivered in group settings

	Service A	Service B	Service C	Service D
% of patients receiving physiotherapy once a week	63	60	83	33
% of patients receiving occupational therapy once a week	90	74	66	98
% of time physiotherapists spent working alone	97	92	78	100
% of time occupational therapists spent working alone	96	44	89	94
% of physiotherapy interventions delivered in group settings	0	46	12	0
% of occupational therapy interventions delivered in group settings	0	38	57	0

those treated in the day hospital averaged 72 years whilst those treated at home had an average age of 70 years. In the study by Gladman *et al.*,¹⁷ those treated in the day hospital were on average 75 years while those treated in the outpatient department, 60 years. There were slightly more women than men and slightly more individuals with left than right hemispheric lesions.

The median duration of a treatment session in the study was 45 minutes which reflects that found by previous researchers who have investigated day hospital, outpatient and domiciliary rehabilitation.^{14,16,17} The overall treatment times recorded by the day hospital therapists were smaller than those by the domiciliary therapists. In addition most patients were treated once a week in the study, except patients receiving physiotherapy at home. This finding conflicts with those of Young and Forster⁶ who reported that day hospital patients received more total hours of treatment in their study than domiciliary patients and Gladman *et al.*¹⁷ who found most patients in their study received treatment twice a week in day hospitals. However, Gladman *et al.*¹⁷ found that day hospital patients received a lower average treatment time than those individuals who were treated in the outpatient department. One reason for the contrast in findings could be the exclusive nature of the domiciliary service in the present study. It was created for the main randomized controlled trial and so the therapists had no other workloads or demands to compete with the needs of patients with stroke. The difference between the frequencies of occupational therapy and physiotherapy treatment sessions in the domiciliary service may be explained by the fact that the physiotherapist was full-time whilst the occupational therapist was part-time. Therapists in the day hospitals continued to work with patients with other diagnoses and disabilities attending the day hospitals during the study periods, although this activity was not recorded for the purposes of this study.

The number and type of intervention categories identified in the study (12 for occupational therapists and 14 for physiotherapists) seemed appropriate: all occupational therapy codes and all but one physiotherapy code were used during the study. The interventions carried out most frequently by the physiotherapists ('walking',

'standing balance' and 'upper limb movement pattern') reflect those found by others.^{5,18} However, the most frequently used occupational therapy interventions were more unexpected ('physical function', 'social/leisure activities' and 'other'), and the relatively small amount of time devoted to activities of daily living and equipment provision was interesting, and in contrast to other findings.^{18,19} Similarly, the low frequency of perceptual activity warrants further investigation. The occupational therapists commented that they had included assessment, transfers and handwriting in the 'other' category, perhaps suggesting that further refinement and piloting of the occupational therapy categories would be useful.

It is noteworthy that physiotherapists in the day hospitals did not use the intervention 'educating carers'. The absence of this component could reflect the difficulties carers can experience in travelling to hospitals, the need to plan such events or the limitations of the time-sampling strategy. The lack of the use of 'social/leisure activities' by the occupational therapist in the home was also of note. This therapy may best be delivered through group work in which case the individual sessions of the domiciliary service could be a deterrent. Alternatively such input may be considered inappropriate in the home.

The examination of all 45-minute treatments revealed a wide variation in the content of occupational therapy and physiotherapy sessions. These findings suggest that duration of therapy alone is inadequate in determining equity of treatment and highlights the error in assuming that objectives of therapy sessions for people with stroke are the same. Knowledge of the composition of the treatment session is essential.

The majority of patients in the day hospital received treatment once a week, although this was sometimes split into two or more sessions during the day's attendance. The majority of patients receiving physiotherapy were treated more than once a week, although this was not the case for the domiciliary occupational therapy service, perhaps explained by the fact that the occupational therapist was part-time.

It was more common for therapists to work alone than with assistance during the study. Occupational therapists worked with help more often than physiotherapists. The physiotherapist

in service C and occupational therapist in service B appeared to be more reliant on additional help in carrying out their work than other therapists. No other study could be found describing therapists working with assistance during treatment sessions.

Group work was used in two of the day hospitals and more so by occupational therapists than physiotherapists. Researchers such as Young and Forster⁶ have reported on group work in day hospitals before, but because their methodology differed, it is difficult to compare the findings to those in this current study.

The challenge of representing 15 minutes of treatment by just one code was an issue. In reality, both therapists and patients may be working on combinations of different activities to meet multiple goals (e.g. in working with a patient to make a cup of tea, the therapist could be focusing on perceptual, physical, activities of daily living and social objectives simultaneously). For the purposes of the study, the therapists were directed to record the primary activity or goal for the 15-minute period, although it is recognized that this may not adequately capture the complexity of the intervention.

The tool designed for this study is crude, and provides a simplistic picture of the work that therapists do, but it is in the first phase of development. Whilst the therapists participating in this study found the method and procedure feasible, it may be that in simplifying practice to such an extent, the complexity of stroke rehabilitation and the skill required to facilitate it are misrepresented. This tool does not, for example, record the processes that are involved in treatment, such as assessment, problem solving, clinical reasoning and decision making. Whilst this tool and study make a contribution to the understanding of therapy for people with stroke, this needs to be supplemented with studies utilizing methods which explore other dimensions of stroke rehabilitation.

Conclusions and recommendations

This paper describes an opportunistic pilot study designed to explore the content of stroke rehabilitation. The tool developed for this study provides a practical and simple way of recording

components of therapy intervention in stroke rehabilitation. This study has demonstrated that stroke rehabilitation is not a homogeneous activity and varies according to the service and therapists providing the treatment. It may be influenced by such factors as individual patient needs and goals, ethos of unit, constraints on therapists and interests and expertise of therapists. The authors believe that an understanding of therapy and collaboration with therapist participants is both important and necessary in any study attempting to describe or measure therapy intervention.

Recommendations for further work arising from this study include the following: further reliability testing and refinement of the data collection tool; repeated use of the tool and method across a greater number of services providing stroke rehabilitation, to include more hours of treatment time; use of qualitative methodology and complementary methods such as semi-structured interviews, observation and single-case experimental design to explore other aspects of stroke rehabilitation; focus on patient perspective and understanding of therapy intervention and comparison of therapy interventions with people with stroke with interventions with other people with other conditions/impairments.

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Appendix 1 – Details of occupational therapy and physiotherapy intervention codes

Occupational therapy codes

- 1) Personal activities of daily living, e.g. washing, dressing, feeding, toilet.
- 2) Domestic activities of daily living, e.g. cooking, cleaning, bedmaking.
- 3) Physical function, e.g. mobility, balance, grip, muscle tone (i.e. priority over functional application).
- 4) Perception, i.e. perceptual assessment and treatment.
- 5) Cognition/mood, e.g. memory, raising mood.
- 6) Home visit, i.e. general home assessment *with patient and carer present*.
- 7) Social activities/leisure, e.g. social groups, hobbies.
- 8) Education of patient, i.e. rather than treatment.
- 9) Education of carer.
- 10) Wheelchair/seating, e.g. assessment, practise *with patient*.
- 11) Aids and equipment (*when used with patient*).
- 12) Other.

Physiotherapy codes

- 1) Positioning/passive movements, i.e. for normalizing position and range of movement.
- 2) Bed mobility, e.g. bridging and rolling.
- 3) Sitting balance, i.e. static and dynamic.
- 4) Standing balance, i.e. static and dynamic.
- 5) Sit to stand/transfers, i.e. practising skill.
- 6) Walking, i.e. all aspects of skill acquisition.
- 7) Stairs, i.e. patient practise.
- 8) Control of pain, e.g. handling, ultrasound.
- 9) Movement patterns of upper limb, i.e. relearning movement.
- 10) Movement patterns of lower limb, i.e. relearning movement.
- 11) Aids and equipment, e.g. walking aids, wheelchair use.
- 12) Education of carer.
- 13) Home visit.
- 14) Other.

Addendum I

Peer Evaluated: _____

Date: _____

Rate a team member on a 4 point scale on the following items. For each item, select the score that fairly represents that person's efforts and contributions to the project.

Cooperative Learning Peer Assessment Rubric

	Seldom or Never Demonstrates 1	Sometimes Demonstrates 2	Frequently Demonstrates 3	Always Demonstrates 4	Score
Responsibilities					
<i>Fulfills Team Role & Duties</i>	Does not perform any duties of assigned team role	Performs some duties	Performs all duties	Performs all duties & helps others	
<i>Participates in Action Planning</i>	Does not participate in planning even after encouragement	Participates in planning after encouragement	Participates in planning without encouragement	Participates in planning & encourages others	
<i>Shares Responsibilities</i>	Does not fulfil responsibilities & relies on others to do their work	Fulfills some responsibilities	Fulfills responsibilities	Fulfills responsibilities & helps others	
Contributions					
<i>Researches & Gathers Information</i>	Collects information that does not relate to the topic	Collects very little information which relates to the topic	Collects some basic information which mostly relates to the topic	Collects a lot of information that relates to the topic	
Share Information					
<i>Upholds Team Action Plan</i>	Doesn't follow the team action plan	Follows the team action plan some of the time	Follows the team action plan	Follows the team action plan & helps others stay on track	
Interactions with Teammates					
<i>Listens to Others</i>	Always talks & does not listen to	Usually does most of the	Listens to other's ideas,	Listens to others' ideas &	

	Seldom or Never Demonstrates 1	Sometimes Demonstrates 2	Frequently Demonstrates 3	Always Demonstrates 4	Score
	other's ideas	talking & listens to some teammates ideas	but sometimes talks too much	speaks when appropriate	
<i>Cooperates with Others</i>	Does not cooperate & argues with teammates	Cooperates sometimes & argues with some teammates	Cooperates with teammates & sometimes argues	Cooperates well with others & never argues	
<i>Respects Others' Opinions or Decisions</i>	Usually does not respect opinions or decisions of others & wants things his/her way	Usually sides with someone who has a similar opinion or decision as his/her own	Usually respects opinions of teammates & supports their decisions	Respects opinions of teammates & supports their decisions	
<i>Asks & Discusses Questions with Team Members</i>	Does not ask or discuss questions with teammates	Asks questions to some teammates	Asks & discusses questions with some teammates	Asks & discusses questions with all teammates	

Comments:

Total Score: _____

Created and Modified using www.rubistar.4teachers.org

Addendum II

Readiness for Interprofessional Learning Scale (post)

You are consenting to participate in the research by completing this questionnaire

Tick the professional group you belong to:

Medicine ☐ 1 Nursing ☐ 2 Physio ☐ 3 Dietetics ☐ 4 OT ☐ 5 Optom ☐ 6 Biokinetics ☐ 7

Please indicate the degree to which you agree or disagree with the statement by drawing a circle around the number of the response that best expresses your feeling.

The scale is as follows: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree

- | | | | | | |
|---|---|---|---|---|---|
| 1. Learning with other students will help me become a more effective member of a healthcare team | 1 | 2 | 3 | 4 | 5 |
| 2. Patients would ultimately benefit if healthcare students worked together to solve patient problems | 1 | 2 | 3 | 4 | 5 |
| 3. Shared learning with other healthcare students will increase my ability to understand clinical problems | 1 | 2 | 3 | 4 | 5 |
| 4. Learning with healthcare students before qualification would improve relationships after qualification | 1 | 2 | 3 | 4 | 5 |
| 5. Communication skills should be learned with other healthcare students | 1 | 2 | 3 | 4 | 5 |
| 6. Shared learning will help me to think positively about other professionals | 1 | 2 | 3 | 4 | 5 |
| 7. For small-group learning to work, students need to trust and respect each other | 1 | 2 | 3 | 4 | 5 |
| 8. Teamwork skills are essential for all healthcare students to learn | 1 | 2 | 3 | 4 | 5 |
| 9. Shared learning will help me to understand my own limitations | 1 | 2 | 3 | 4 | 5 |
| 10. I do not want to waste my time learning with other healthcare students | 1 | 2 | 3 | 4 | 5 |
| 11. It is unnecessary for undergraduate healthcare students to learn together | 1 | 2 | 3 | 4 | 5 |
| 12. Clinical problem-solving skills can only be learned together with students from my own department | 1 | 2 | 3 | 4 | 5 |
| 13. Shared learning with other healthcare students will help me to communicate better with patients and other professionals | 1 | 2 | 3 | 4 | 5 |
| 14. I would welcome the opportunity to work on small-group projects with other healthcare students | 1 | 2 | 3 | 4 | 5 |
| 15. Shared learning will help to clarify the nature of patient problems | 1 | 2 | 3 | 4 | 5 |
| 16. Shared learning before qualification will help me become a better team worker | 1 | 2 | 3 | 4 | 5 |
| 17. The function of nurses and therapists is mainly to provide support to doctors | 1 | 2 | 3 | 4 | 5 |
| 18. I am not sure what my professional role will be | 1 | 2 | 3 | 4 | 5 |
| 19. I have to acquire much more knowledge and skills than other healthcare students | 1 | 2 | 3 | 4 | 5 |

Addendum III

Interprofessional care

Complete the questionnaire by ticking the appropriate box next to the statement indicating the frequency of the occurrence of the statement

Indicator		Never	Rarely	Sometimes	Almost always	NA
Care Expertise						
1.	Discipline specific care was provided in collaboration with the <i>patient</i>					
2.	Discipline specific care was provided in collaboration with the <i>healthcare team</i>					
3.	Specialized care was well coordinated					
4.	Role differentiation was clear					
5.	Perform own roles in culturally respectful way					
6.	Access others' skills and knowledge appropriately through consultation					
7.	Demonstrate knowledge application of own profession/role/scope					
Shared power						
8.	All team members contributed to the treatment					
9.	A psychological safe environment existed where you could voice diverse opinions					
Collaborative leadership						
10.	Reflected shared accountability					
11.	Work with others to enable effective patient/client outcomes					
12.	Facilitation of team processes occurs spontaneously					
13.	Utilize structures and processes known to team members to advance exemplary care					
Shared decision making						
14.	Communicate with respect with team members					
15.	Group agrees on care priorities					
16.	Recognize and respect each other's knowledge and expertise, regardless of occupation and formal position					
17.	Create common understanding of care decisions					
Quality of care						
18.	Duplication of work has been reduced					
19.	Patient experience was positive					
20.	Holistic care that addressed all facets of a human being was rendered					
21.	A positive work environment exists					

We did best at _____

Next time we could improve at _____

Readiness for Interprofessional Learning Scale (pre)

By completing this questionnaire, you are consenting to participate in the research

Tick the professional group you belong to:

Medicine ☐ 1 Nursing ☐ 2 Physio ☐ 3 Dietetics ☐ 4 OT ☐ 5 Optom ☐ 6 Biokinetics ☐ 7

Please indicate the degree to which you agree or disagree with the statement by drawing a circle around the number of the response that best expresses your feeling.

The scale is as follows: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree

1. Learning with other students will help me become a more effective member of a healthcare team 1 2 3 4 5
2. Patients would ultimately benefit if healthcare students worked together to solve patient problems 1 2 3 4 5
3. Shared learning with other healthcare students will increase my ability to understand clinical problems 1 2 3 4 5
4. Learning with healthcare students before qualification would improve relationships after qualification 1 2 3 4 5
5. Communication skills should be learned with other healthcare students 1 2 3 4 5
6. Shared learning will help me to think positively about other professionals 1 2 3 4 5
7. For small-group learning to work, students need to trust and respect each other 1 2 3 4 5
8. Teamwork skills are essential for all healthcare students to learn 1 2 3 4 5
9. Shared learning will help me to understand my own limitations 1 2 3 4 5
10. I do not want to waste my time learning with other healthcare students 1 2 3 4 5
11. It is unnecessary for undergraduate healthcare students to learn together 1 2 3 4 5
12. Clinical problem-solving skills can only be learned together with students from my own department 1 2 3 4 5
13. Shared learning with other healthcare students will help me to communicate better with patients and other professionals 1 2 3 4 5
14. I would welcome the opportunity to work on small-group projects with other healthcare students 1 2 3 4 5
15. Shared learning will help to clarify the nature of patient problems 1 2 3 4 5
16. Shared learning before qualification will help me become a better team worker 1 2 3 4 5
17. The function of nurses and therapists is mainly to provide support to doctors 1 2 3 4 5
18. I am not sure what my professional role will be 1 2 3 4 5
19. I have to acquire much more knowledge and skills than other healthcare students 1 2 3 4 5

