INSTRUCTOR RESOURCES

THE UNIVERSITY OF NEWCASTLE AUSTRALIA

AUSTRALIAN LEARNING & TEACHING COUNCIL

University of Western Sydney
Bringing knowledge to life

TABLE OF CONTENTS

THE AIMS OF THIS RESOURCE PACKAGE

The aims of these resources are to:

- Define the process of clinical reasoning
- Explain and justify why nursing students need to learn clinical reasoning
- Describe and exemplify the process of clinical reasoning

WHAT IS CLINICAL REASONING?

In the literature the terms clinical reasoning, clinical judgment, problem solving, decision making and critical thinking are often used interchangeably. In this learning package we use the term clinical reasoning to describe the process by which nurses (and other clinicians) collect cues, process the information, come to an understanding of a patient problem or situation, plan and implement interventions, evaluate outcomes, and reflect on and learn from the process (Hoffman, 2007; Kraischsk & Anthony, 2001; Laurie et al., 2001). The clinical reasoning process is dependent upon a critical thinking 'disposition' (Scheffer & Rubenfeld, 2000) and is influenced by a person's attitude, philosophical perspective and preconceptions (McCarthy, 2003). Clinical reasoning is not a linear process but can be conceptualised as a series or spiral of linked and ongoing clinical encounters.

WHY IS CLINICAL REASONING IMPORTANT?

Nurses with effective clinical reasoning skills have a positive impact on patient outcomes. Conversely, those with poor clinical reasoning skills often fail to detect impending patient deterioration resulting in a "failure-to-rescue" (Aiken, Clarke, Cheung, Sloane, & Silber, 2003). This is significant when viewed against the background of increasing numbers of adverse patient outcomes and escalating healthcare complaints (NSW Health, 2006). According to the NSW Health Incident Management in the NSW Public Health System 2007 (2008) the top three reasons for adverse patient outcomes are: failure to properly diagnose, failure to institute appropriate treatment, and inappropriate management of complications. Each of these is related to poor clinical reasoning skills. The Quality in Australian Healthcare Study (Wilson et al, 1995) found that "cognitive failure" was a factor in 57% of adverse clinical events and this involved a number of features including failure to synthesise and act on clinical information. Education must begin at the undergraduate level to promote recognition and management of the deteriorating patient, the use of escalation systems and effective communication (Bright, Walker, and Bion, 2004).

Contemporary learning and teaching approaches do not always facilitate the development of a requisite level of clinical reasoning skills. While universities are committed to the education of nurses who are adequately prepared to work in complex and challenging clinical environments, health services frequently complain that graduates are not 'work ready'. A recent report from NSW Health Patient Safety and Clinical Quality Programme (2006) described critical patient incidents that often involved poor clinical reasoning by graduate nurses. This report parallels the results of the Performance Based Development System, a tool employed to assess nurses' clinical reasoning, which showed that 70 per

cent of graduate nurses in the United States scored at an 'unsafe' level. Although these nurses had good content knowledge and adequate procedural skills, they frequently lacked the clinical reasoning skills needed to respond appropriately in critical situations (del Bueno, 2005). In Australia results are not dissimilar. The Australian Nursing and Midwifery Council (ANMC, 2005) Competency Standards for the Registered Nurse list "*critical thinking and analysis*" as one of its four key domains and nursing students are assessed against these standards. At the University of Newcastle results collated over a four year period (2004-2007) indicate that only a small number (< 15 per cent, *n* = 162) of 1086 third year nursing students demonstrated appropriate clinical reasoning and critical thinking skills during clinical competency assessment. The reasons for this are multidimensional but include the difficulties beginning nurses encounter when differentiating between a clinical problem that needs immediate attention and one that is less acute (del Bueno, 1994); and a tendency to make errors in time sensitive situations where there is a large amount of complex data to process (O'Neill, 1994).

In clinical practice experienced nurses engage in multiple clinical reasoning episodes for each patient in their care. An experienced nurse may enter a patient's room and immediately observe significant data, draw conclusions about the patient and initiate appropriate care. Because of their knowledge, skill, and experience the expert nurse may appear to perform these processes in a way that seems automatic or instinctive. However, clinical reasoning is a learnt skill (Higuchi & Donald, 2002; Kamin, O'Sullivan, Deterding & Younger, 2003). For nursing students to learn to manage complex clinical scenarios effectively, it is essential to understand the process and steps of clinical reasoning. Nursng students need to learn rules that determine how cues shape clinical decisions and the connections between cues and outcomes (Benner, 2001). Clinical reasoning is challenging and requires a different approach to that used when learning routine nursing procedures. Learning to reason effectively does not happen serendipitously. It requires determination and active engagement in deliberate practice for continued learning; it also requires reflection, particularly on activities designed to improve performance (Ericsson, Whyte and Ward, 2007).

> '*Thinking like a nurse' is a form of engaged moral reasoning. Educational practices must help students engage with patients with a deep concern for their well being. Clinical reasoning must arise from this engaged, concerned stance, always in relation to a particular patient and situation and informed by generalised knowledge and rational processes, but never as an objective, detached exercise* (Tanner, 2006, p.209).

THE CLINICAL REASONING PROCESS

A diagram of the clinical reasoning framework is shown in *Figure 1*. In this diagram the cycle begins at 1200 hours and moves in a clockwise direction. The circle represents the ongoing and cyclical nature of clinical interventions and the importance of evaluation and reflection. There are eight main steps or phases in the clinical reasoning cycle. However, the distinctions between the phases are not clear cut. While clinical reasoning can be broken down into the steps of: *look, collect, process, decide, plan, act, evaluate* and *reflect*, in reality, the phases merge and the boundaries between them are often blurred. While each phase is presented as a separate and distinct element in this diagram, it is important to remember that clinical reasoning is a dynamic process and nurses often combine one or more phases or move back and forth between them before reaching a

decision, taking action and evaluating outcomes. It is also important that students learn to recognise, understand and work though each phase, rather than making assumptions about patient problems and initiating interventions that have not been adequately considered. In *Figure 2* the phases of the clinical reasoning process are described in more detail and in *Table 1* examples of the process are provided.

QUESTIONING ASSUMPTIONS

Preconceptions and assumptions such as "most indigenous people are alcoholics"; Middle Eastern women tend to have a low pain threshold"; and "elderly people often have dementia", can influence the clinical reasoning process (Alfaro-LeFevre, 2009). McCarthy's (2003) theory of situated clinical reasoning explains how nurses' personal philosophies about aging influence how they manage older hospitalised patients experiencing symptoms of delirium. In McCarthy's study nurses' beliefs caused them to process clinical situations and act in particular ways. Their overarching philosophies served as perspectives that conditioned the ways in which they judged and ultimately dealt with older patients experiencing acute confusion. In another study by McCaffery, Rolling Ferrell and Paseo (2000) nurses' opinions of their patients and their personal beliefs about pain significantly influenced the quality of their pain assessment and management. Thus, **in preparation for clinical reasoning** nursing students must be provided with opportunities to reflect on and question their assumptions and prejudices; as failure to do so may negatively impact their clinical reasoning ability and consequently patient outcomes.

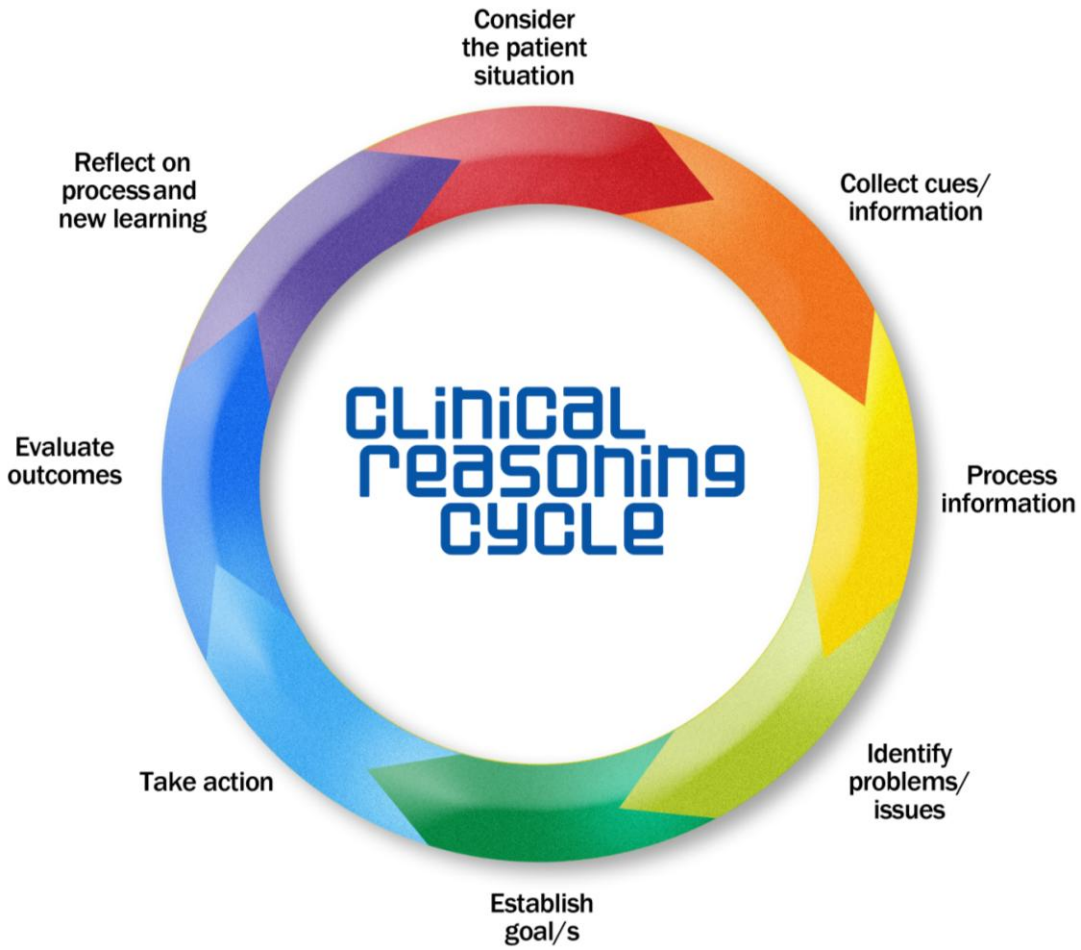

Figure 1: The clinical reasoning cycle

Figure 2: The clinical reasoning process with descriptors

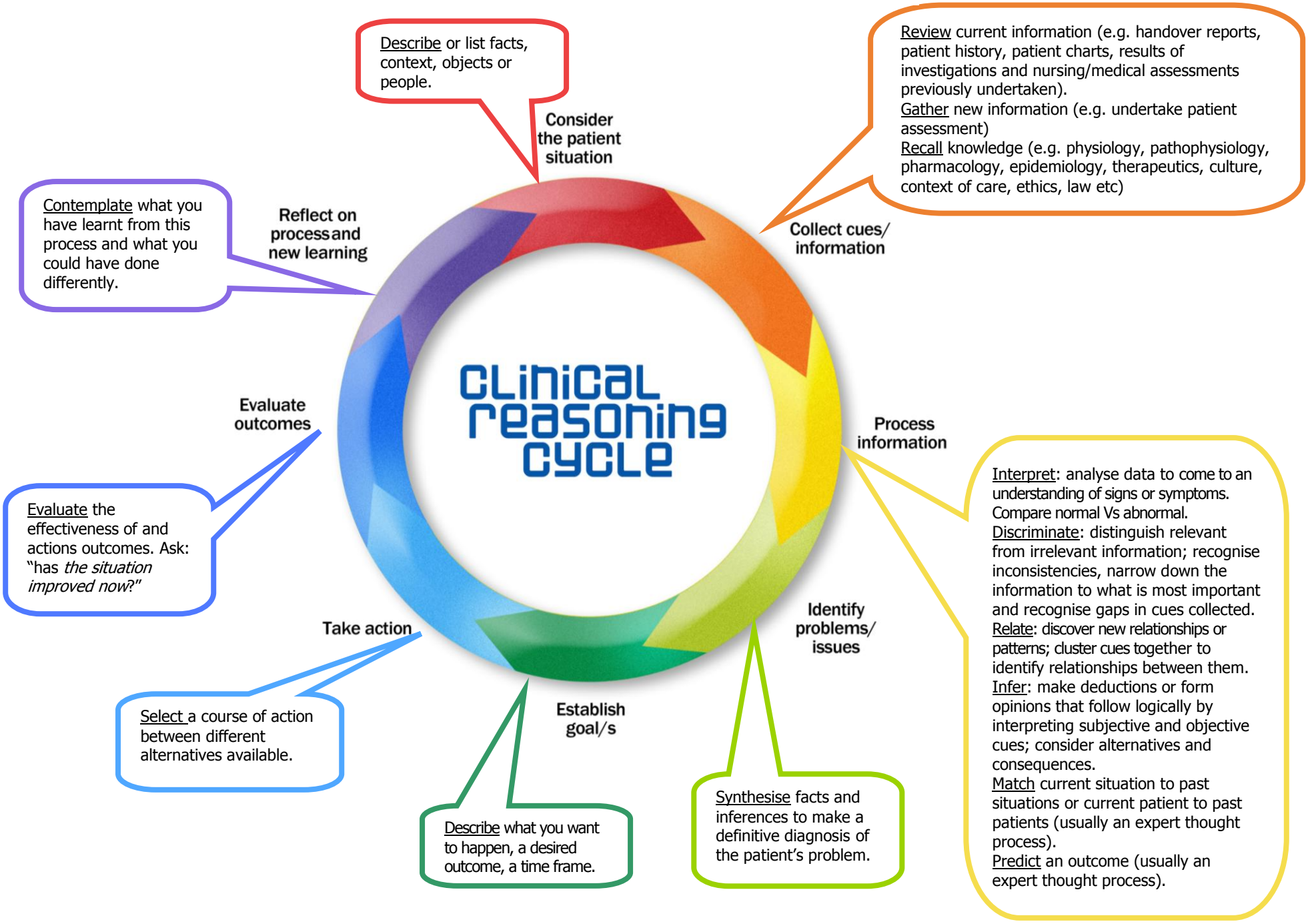

TABLE 1: THE PHASES OF THE CLINICAL REASONING PROCESS WITH EXAMPLES

Process	Description	Example
Consider the patient situation	Describe or list facts, context, objects or people.	This 60 year old patient is in ICU because he had an abdominal aortic aneurysm (AAA) surgery yesterday.
Collect cues/ information	Review current information (e.g. handover reports, patient history, patient charts, results of investigations and nursing/medical assessments previously undertaken)	He has a history of hypertension and he takes betablockers His BP was 140/80 an hour ago
	Gather new information (e.g. undertake patient assessment)	I've checked his BP and it is now 110/60, Temp 38^4. Epidural running @ 10ml/hr
	Recall knowledge (e.g. physiology, pathophysiology, pharmacology, epidemiology, therapeutics, culture, context of care, ethics, law etc)	BP is related to fluid status. Epidurals can drop the BP because they cause vasodilation. In ICU we have standing orders for epidural management.
Process information	Interpret: analyse data to come to an understanding of signs or symptoms. Compare normal Vs abnormal.	His BP is low, especially for a person who is normally hypertensive.
	Discriminate: distinguish relevant from irrelevant information; recognise inconsistencies, narrow down the information to what is most important and recognise gaps in cues collected.	His temp is up a bit but I'm not too worried about it – I'm more concerned about his BP and pulse. I'd better check his urine output and his O_2 sats.
	Relate: discover new relationships or patterns; cluster cues together to identify relationships between them.	His hypotension, tachycardia and oliguria could be signs of impending shock. His BP went down after we increased the epidural.
	Infer: make deductions or form opinions that follow logically by interpreting subjective and objective cues; consider alternatives and consequences.	His BP could be low because of blood loss during surgery or because of the epidural.
	Match current situation to past situations or current patient to past patients (usually an expert thought process)	AAAs often have hypotension post op
	Predict an outcome (usually an expert thought process)	If I don't give him more fluids he could go into shock.

Identify problem / issue	Synthesise facts and inferences to make a definitive diagnosis of the patient's problem.	He is hypovolaemic and the epidural has worsened the BP by causing vasodilation.
Establish goals	Describe what you want to happen, a desired outcome, a time frame.	I want to improve his haemodynamic status – get his BP up and urine output back to normal over the next hour.
Take action	Select a course of action between different alternatives available	I will ring the doctor to get an order to increase his IV rate and to give aramine if needed.
Evaluate	Evaluate the effectiveness of outcomes and actions. Ask: "has *the situation improved now*?"	His BP is up for now but we will need to keep an eye on it as he may still need aramine a bit later. His urine output is averaging > 30mL/hr now.
Reflect on process and new learning	Contemplate what you have learnt from this process and what you could have done differently.	Next time I would … I should have … If I had … I now understand …

Adapted from Hoffman (2007); Alfaro-LeFevre (2009); Andersen (1991)

Responses from educators that can be used to encourage, facilitate and promote effective clinical reasoning:

Let's explore this.
Let's think this through.
Now let's consider all the possible options/solutions/outcomes.
Show me how you came to that decision
Walk me through your thinking about this.
That is one option; let's explore some others.
What are some possible outcomes of this approach?
That is a good thought/answer/response/idea … let's expand on it.
Let's consider some alternatives
Let's figure this out.
Tell me about what you've leant so far.
Great question!
Where would we find the answer to that?
Let's try that one again.
Why don't you lead us through that process?
It's not just about the right answer it's about learning the process
Good try … have another go.
Now that you've worked that out let's try ….
OK. You are on the right track. Let's try something a little more challenging now.
Have you considered what could happen if …
That is correct in this situation and for this person but what if …
What do you think about ….
How do you know that to be true … on what do you base your answer?

Adapted from Rubenfeld and Scheffer (2006, p. 82)

TABLE 2: Critical Thinking – 'Habits of the Mind'

The clinical reasoning process is dependent upon a critical thinking 'disposition' (Scheffer & Rubenfeld, 2000). The table below lists the attributes needed for clinical thinking and clinical reasoning.

Habit	Description	Example
Confidence	Assurance of one's reasoning abilities	My thinking was on track; I reconsidered and still thought I'd made the right decision; I knew my conclusion was well-founded.
Contextual perspective	Considerate of the whole situation, including relationships, background, situation and environment	I took in the whole picture; I was mindful of the situation; I considered other possibilities; I considered the circumstances.
Creativity	Intellectual inquisitiveness used to generate, discover or restructure ideas; the ability to imagine alternatives	I let my imagination go; I thought 'outside of the box'; I tried to be visionary
Flexibility	Capacity to adapt, accommodate, modify or change thoughts, ideas and behaviours	I moved away from traditional thinking; I redefined the situation and started again; I questioned what I was thinking and tried a new approach; I adapted to the new situation.
Inquisitiveness	Eagerness to learn by seeking knowledge and understanding through observation and thoughtful questioning in order to explore possibilities and alternatives	I burned with curiosity; I needed to know more; My mind was racing with questions; I was so interested.
Intellectual integrity	Seeking the truth through sincere, honest processes, even if the results are contrary to ones assumptions or beliefs	Although it went against everything I believed I needed to get to the truth; I questioned my biases and assumptions; I examined my thinking; I was not satisfied with my original conclusion.
Intuition	Insightful patterns of knowing brought about by previous experience and pattern recognition	I had a hunch; While I couldn't say why, I knew from last time this happened that …
Open-mindedness	Receptiveness to divergent views and sensitivity to ones' biases, preconceptions, assumptions and stereotypes	I tried not to judge; I tried to be open to new ideas; I tried to be objective; I listened to other perspectives.
Perseverance	Pursuit of learning and determination to overcome obstacles	I was determined to find out; I would not accept that for an answer; I was persistent.
Reflective	Contemplation of assumptions, thinking and action for the	I pondered my reactions, what I had done and thought;

	purpose of deeper understanding and self-evaluation.	I wondered what I could have/should have done differently; I considered what I would do differently next time; I considered how this would influence my future practice.

(Adapted from Scheffer and Rubenfeld, 2000, p. 358; Rubenfeld and Scheffer, 2006, p. 16-24)

GLOSSARY OF TERMS

Term	Definition
Analyse	Separation into components: the breaking down of the whole into its parts (deductive reasoning).
Clinical reasoning	The process by which nurses (and other clinicians) collect cues, process the information, come to an understanding of a patient problem or situation, plan and implement interventions, evaluate outcomes, and reflect on and learn from the process.
Critical thinking	A complex collection of cognitive skills and affective habits of the mind
Cues	Identifiable physiological or psychosocial changes experienced by the patient, perceived through history or assessment and understood in relation to a specific body of knowledge and philosophical beliefs. Cues also include the context of care and the surrounding clinical situation.
Data	A piece or pieces of information about health status
Discriminate	To use good judgement ; to note or observe a difference accurately; to distinguish relevant from irrelevant information; to recognise inconsistencies; to narrow down the information to what is most important and recognise gaps in cues collected
Evaluate	To make a judgement about the worth or value of something
Facilitator	A person who guides the learning experience
Fidelity	Degree of realism
'Failure to rescue'	Mortality of patients who experience a hospital acquired complication
Goals	A desired outcome and a guidepost to the selection of nursing interventions
High fidelity Human patient simulation (HPS) manikins	Realistic with embedded software that can be remotely controlled by computer to allow for individualised, programmed scenarios, real-time interactions and cue response. They allow the operator to set physiological parameters and respond to students' interventions with changes in voice, heart rate, blood pressure and other physiological signs. Examples include Laerdal SimMan™ and METI™ manikins.
HPS	human patient simulation
Information and Communication Technology (ICT)	Any technology that has the capacity to accumulate, retrieve, control, convey or accept information by electronic means
Inconsistency	Something that contradicts something else or that is not in keeping with it; not regular or predictable
Infer	To make deductions or form opinions that follow logically by interpreting subjective and objective data; to consider alternatives and consequences
Interpret	Analyse data to come to an understanding ; to explain or tell the meaning of; present in understandable terms

Low fidelity HPS manikins	Simple task trainers such as IV arms and resuscitation torsos, and anatomically correct full body static manikins that replicate the external anatomy and joint movement of humans, but have no interactive capacity
Match	Information or cues that correspond to each other or cluster together naturally
Medium fidelity HPS manikins	Full body manikins that have embedded software that is controlled by an external, hand held device. They have the capacity to have set breath sounds, heart sounds, pulse and blood pressure, and are also capable of coughing, moaning or basic verbal communication. An example is Laerdal's Nursing Anne™ with VitalSim capability.
Outcome	A measurable change in a client's status in response to nursing care
PDA	Personal digital assistant (handheld computer)
Predict	To envisage or foresee something that may happen
Recall	To remember or recollect a past situation or piece of knowledge
Reflection	A critical review of practice with a view to refinement, improvement or change; the process of looking back and the careful consideration of an experience; to explore the understanding of what one did and why and the impact it has on themselves and others
Relate	To connect or link ; to discover new relationships or patterns; to cluster cues together to identify relationships between them.
'Rescue'	The ability to recognise deteriorating patients and to intervene appropriately
Simulation	An attempt to replicate, to varying degrees, a clinical situation, in order to teach or assess nursing skills and knowledge
Synthesis	The putting together of parts into the whole (inductive reasoning). The integration of new knowledge with previous knowledge, to form a 'new whole'

CLINICAL REASONING ERRORS

Error	Definition
Anchoring	The tendency to lock onto salient features in the patient's presentation too early in the clinical reasoning process, and failing to adjust this initial impression in the light of later information. Compounded by confirmation bias.
Ascertainment bias	When a nurse's thinking is shaped by prior assumptions and preconceptions, for example ageism, stigmatism and stereotyping
Confirmation bias	The tendency to look for confirming evidence to support a nursing diagnosis rather than look for disconfirming evidence to refute it, despite the later often being more persuasive and definitive.
Diagnostic momentum	Once labels are attached to patients they tend to become stickier and stickier. What started as a possibility gathers increasing momentum until it become definite and other possibilities are excluded.
Fundamental attribution error	The tendency to be judgemental and blame patients for their illnesses (dispositional causes) rather than examine the circumstances (situational factors) that may have been responsible. Psychiatric patients, those from minority groups and other marginalised groups tend to be at risk of this error.
Overconfidence bias	A tendency to believe we know more than we do. Overconfidence reflects a tendency to act on incomplete information, intuition or hunches. Too much faith is placed on opinion instead of carefully collected cues. This error may be augmented by anchoring.
Premature closure	The tendency to apply premature closure to the decision making process, accepting a diagnosis before it has been fully verified. This error accounts for a high proportion of missed diagnosis.
Psych-out error	Psychiatric patients are particularly vulnerable to clinical reasoning errors, especially fundamental attribution errors. Co-morbid conditions may be overlooked or minimalised. A variant of this error occurs when medical conditions (such as hypoxia, delirium, electrolyte imbalance, head injuries etc.) as misdiagnosed as psychiatric conditions.
Unpacking principle	Failure to collect all the relevant cues in establishing a differential diagnosis may result in significant possibilities being missed. The more specific a description of an illness that is received, the more likely the event is judged to exist. If an inadequate patient history is taken unspecified possibilities may be discounted

Adapted from Croskerry, P. (2003). The importance of cognitive errors in diagnosis and strategies to minimize them. *Academic Medicine*. 78(8), 1-6.

.

REFERENCES

Aiken, L.H., Clarke, S.P., Cheung, R.B., Sloane, D.M. and Silber, J.H. (2003) Educational levels of hospital nurses and surgical patient mortality. *JAMA. 290* (12), 1617–1620.

Alfaro-LeFevre, R. (2009). Critical thinking and clinical judgement: A practical approach to outcome-focused thinking. (4th ed.). St Louis: Elsevier.

Andersen, B. (1991). Mapping the terrain of the discipline. In G. Gray and R. Pratt (eds). Towards a discipline of nursing. (Pp. 95-124) Melbourne: Churchill Livingstone

Australian Nursing and Midwifery Council (ANMC) (2005) National Competency Standards for the Registered Nurse, accessed at http://www.anmc.org.au on 28 November 2008.

Benner, P. (2001). *From novice to expert: Excellence and power in clinical nursing practice*. Upper Saddle River, N.J. Prentice Hall.

Bright, D., Walker, W. and Bion, J. (2004). *Outreach - a strategy for improving the care of the acutely ill hospitalized patient. Critical Care Medicine*, 2004. 8(1), pg. 33-40.

del Bueno, D. (2005) A crisis in critical thinking. *Nursing Education perspectives. 26,* (5), 278-283.

del Bueno, D. (1994). Why can't new grads think like a nurse? *Nurse Educator*. 19, 9-11.

Ericsson,K., Whyte, A. and Ward. J. (2007). Expert performance in nursing: reviewing research on expertise in nursing within the framework of the expert-performance approach. *Advances in Nursing Science*. 30 (1), 58-71.

Higuchi Smith, K.. and Donald, J. (2002).Thinking processes used by nurses in clinical decision-making. *Journal of Nursing Education, 41*(4), 145–154.

Hoffman, K. (2007).Unpublished PhD thesis, *A comparison of decision-making by "expert" and "novice" nurses in the clinical setting, monitoring patient haemodynamic status post abdominal aortic aneurysm surgery.* University of Technology, Sydney.

Incident Management in the NSW Public Health System 2007 July to December. (2008). *Clinical Excellence Commission*. NSW Health.

Kamin, C., O'Sullivan, P., Deterding, R. and Younger, D. (2003). A comparison of critical thinking in groups of third-year medical students in text, video and virtual case modalities. *Academy of Medicine, 78*(2), 204–211.

Kraischsk, M. and Anthony, M. (2001) Benefits and outcomes of staff nurses' participation in decision-making. *The Journal of Nursing Administration, 31*(1), 16–23.

Lauri, S., Salantera, S., Chalmers, K., Ekman, S., Kim, H., Hesook, S., Kapelli, S. and MacLeod, M. (2001). An exploratory study of clinical decision-making in five countries. *Image–Journal of Nursing Scholarship. 33*(1), 83–90.

McCaffery, M., Rolling Ferrell, B. and Paseo, C. (2000). Nurses' personal opinions about patients' pain and their effect on recorded assessments and titration of opioid doses. *Pain Management Nursing*. 1(3, 79-87.

McCarthy, M. 2003. Detecting Acute Confusion in Older Adults: Comparing Clinical Reasoning of Nurses Working in Acute, Long-Term, and Community Health Care Environments. *Research in Nursing and Health* 26, 203–212

NSW Health (2006) *Patient Safety and Clinical Quality Program: Third report on incident management in the NSW Public Health System 2005-2006*, NSW Department of Health. Sydney.

O'Neill, E. 1994. The influence of experience on community health nurses' use of the similarity heuristic in diagnostic reasoning. *Scholarly Inquiry for Nursing Practice*, 8, 261-217

Rubenfeld, M. and Scheffer,B. (2006). *Critical Thinking Tactics for Nurses*. Boston: Jones and Bartlett

Scheffer, B. and Rubenfeld, M. (2000). A consensus statement on critical thinking in nursing. *Journal of Nursing Education*, 39, 352-359

Tanner, C. (2006). Thinking like a nurse: A research-based model of clinical judgement in nursing. *Journal of Nursing Education*, 45(6), 204-211

Wilson, R. (1995). *The Quality in Australian Health Care Study. Medical Journal of Australia.* 163, pg. 458-471.

RESOURCES

Alfaro-LeFevre, R. (2009). Critical thinking and clinical judgement: A practical approach to outcome-focused thinking. (4th ed.). St Louise: Elsevier.

Foundation for Critical Thinking

http://www.criticalthinking.org/starting/nurse_health.cfm

http://www.criticalthinking.org/courses/Youtube_critical_thinking.cfm

Paliadelis, P. *Developing clinical judgment: A case scenario approach.* Melbourne: Cengage.

Rubenfeld, M. and Scheffer,B. (2006). *Critical Thinking Tactics for Nurses*. Boston: Jones and Bartlett

Teaching Smart Learning Easy Web Site - Alfaro-LeFevre

http://www.AlfaroTeachSmart.com/

ACKNOWLEDGEMENTS

Support for the development of this resource has been provided by the Australian Learning and Teaching Council Ltd, an initiative of the Australian Government Department of Education, Employment and Workplace Relations. The views expressed in this resource do not necessarily reflect the views of the Australian Learning and Teaching Council.

This project was also funded by a University of Newcastle Teaching and Learning Grant.

Project Team

Associate Professor Tracy Levett-Jones, PhD, RN, MEd & Work, BN, DipAppSc(Nursing), Senior Lecturer, Deputy Head of School (Teaching and Learning), The University of Newcastle

Dr Kerry Hoffman, PhD, RN, MN, Grad.Dip. Ed, Dip. HlthSc (Nursing), BSc, Lecturer, University of Newcastle.

Dr Sharon Bourgeois, Sharon Bourgeois, PhD, RN, MEd, MA, BA, FCN, FCRNA, Senior Lecturer and Associate Head of School, University of Western Sydney.

Raelene Kenny, RN, MN, Grad Dip. Nursing (Critical Care), Grad Cert Ed (Adult & Org Learning), Grad Cert TerTeach, PhD candidate, Lecturer, The University of Newcastle.

Dr Jennifer Dempsey, Doctor of Nursing, RN, RPN, MNurs. Studies, GradDip(Nursing), Lecturer, Director of Clinical Education, The University of Newcastle.

Noelene Hickey, RN, BHlthSc(Nurs), GDipContEd, MN, MPET. PhD candidate, Lecturer, Site co-ordinator of the BN Program at Ourimbah Campus, Liaison Officer for the Indigenous BN students at The University of Newcastle.

Dr Sharyn Hunter, PhD, RN, BSc (Hons), Grad Cert Advanced Practice Aged Care and Tertiary Teaching, Lecturer, Student Academic Conduct Officer, The University of Newcastle.

Dr Sarah Jeong, PhD, RN., MN, BN, Grad. Dip. Adv. Prac., Lecturer, Master of Nursing Advanced Practice Program Convenor, International Student Liaison Officer, The University of Newcastle.

Carol Norton, RN, CM, BHSc(Nursing), MMid, Lecturer, The University of Newcastle.

Jan Roche, RN, BHlthSc(Nurs), Grad Cert ICU**,** Lecturer, clinical assessor and Master Philosophy (Nursing) candidate, The University of Newcastle.

Carol Arthur, BN, Dip App Sc (Nursing) RN, ICU/CCU Cert, Master Philosophy (Nursing) candidate, Lecturer and clinical assessor, The University of Newcastle.

Samuel Lapkin, BN (Hons), PhD candidate, The University of Newcastle.

Karen Jeffrey, Honours student, The University of Western Sydney.

Expert Panel

Jennifer Burrows, Clinical Nurse Consultant, Stroke, NSCCAHS

Jaqueline Colgan, Clinical Nurse Consultant, Cardiac Services, NSCCAHS

Linda Ritchard, Clinical Nurse Consultant, Hunter Integrated Pain Service, HNEASH

Alex Keene, graduate, The University of Newcastle

Gemma Carty, graduate, The University of Newcastle

Kylie Dunstan, graduate, The University of Newcastle

Thomas Quinn, graduate, The University of Newcastle

Rachel Craig, graduate, The University of Newcastle

Reference Group

Geoff Wilson, Chair Network of Clinical Coordinators (NCC), Director of Clinical Schools, Department of Nursing and Midwifery/Faculty of Science, University of Southern Qld.

Professor Gerry Farrell, Representing the Council of Deans of Nursing and Midwifery (Australia and New Zealand), Head, Division of Nursing and Midwifery, Faculty of Health Science, La Trobe University

Professor Leanne Aitken, Professor of Critical Care Nursing, Griffith University and Princess Alexandra Hospital.

Professor Tracy Bucknall, Chair in Nursing, Cabrini-Deakin Centre for Nursing Research.

Roy Brown, Senior Lecturer, Bachelor of Nursing Programme Coordinator, School of Nursing, Midwifery and Indigenous Health, University of Wollongong.

Associate Professor Anthony Williams, Head of School, School of Architecture & Built Environment, University of Newcastle.

Michelle Kelly PhD candidate**,** Lecturer, Program Manager, Curriculum Technologies Integration, The University of Technology

Clint Moloney, PhD Candidate**,** Lecturer University of Southern Qld , Associate Director, Australian Centre for Rural and Remote Evidence Based Practice, Toowoomba and Darling Downs Health Service District.

Dr Ashley Kable, Deputy Head of School (Research), School of Nursing and Midwifery, The University of Newcastle.

Professor Christine Duffield, Centre for Health Services Management, University of Technology

Dr Kerry Reid-Searl, Senior lecturer at CQUniversity Australia in the Department of Health Innovation.

Dr Mee Young Park, International Student Support Coordinator, Division of Nursing and Midwifery, School of Health Sciences, RMIT University

Professor Elaine Duffy, Professor/Head of School, School of Nursing & Midwifery, Charles Sturt University.