

University of Windsor

Scholarship at UWindor

OSSA Conference Archive

OSSA 8

Jun 3rd, 9:00 AM - Jun 6th, 5:00 PM

Argument and Medicine: A model of reasoning for clinical practice

Kara Gilbert
Monash University

Gordon Whyte
Monash University

Follow this and additional works at: <https://scholar.uwindsor.ca/ossaarchive>



Part of the [Philosophy Commons](#)

Gilbert, Kara and Whyte, Gordon, "Argument and Medicine: A model of reasoning for clinical practice" (2009). *OSSA Conference Archive*. 51.

<https://scholar.uwindsor.ca/ossaarchive/OSSA8/papersandcommentaries/51>

This Paper is brought to you for free and open access by the Conferences and Conference Proceedings at Scholarship at UWindor. It has been accepted for inclusion in OSSA Conference Archive by an authorized conference organizer of Scholarship at UWindor. For more information, please contact scholarship@uwindsor.ca.

Argument and Medicine: A model of reasoning for clinical practice

KARA GILBERT and GORDON WHYTE

*Centre for Medicine, Nursing and Health Sciences Education
Monash University
PO Box 3A VIC 3800
Australia
Kara.Gilbert@med.monash.edu.au*

*Faculty of Medicine, Nursing and Health Sciences
Monash University
Building 15, Clayton Campus, Monash University
Wellington Road
Clayton, VIC 3800
Australia
Gordon.Whyte@med.monash.edu.au*

ABSTRACT: In a doctor-linguist collaboration, a framework of reasoning in clinical contexts is presented. Arguments used for inquiry, justification and persuasion are sketched in diagnosis, counselling, and management settings integral to everyday clinical practice thereby extending the diagnostic function typically associated with clinical reasoning *per se*. A system of logic, a method of persuasive orientation, and a synthesis of negotiation in dialogue are then elaborated to illustrate the complexity of argument practice in medical culture.

KEYWORDS: clinical communication, clinical decision-making, clinical reasoning counselling, diagnostic reasoning, medical discourse

1. INTRODUCTION

Clinical reasoning is a complex phenomenon invariably defined in terms of the cognitive processes that doctors and other aligned health professionals employ to analyse and interpret patient information with reference to their prior knowledge and experience. Health professionals use clinical reasoning in order to reach a diagnosis, *viz.* diagnostic reasoning, and thence determine appropriate treatment and management, *viz.* therapeutic reasoning (Barrows and Tamblyn 1980; Norman 2005; McColl 2008). Clinical reasoning is best regarded as an iterative process in which judgements and decisions are adjusted in response to observations of intervention and the gathering of new information in the ongoing therapeutic relationship between a doctor and a patient

2. TRADITIONS OF ARGUMENT AND REASONING IN MEDICINE

In the emerging scientific and medical culture of the Latin world, the intellectual and university-taught component of medicine was grounded in Islamic and Greek thought,

Gilbert, K. and G. Whyte (2009). Argument and Medicine: A model of reasoning for clinical practice. In: J. Ritola (Ed.), *Argument Cultures: Proceedings of OSSA 09*, CD-ROM (pp. 1-20), Windsor, ON: OSSA.

Copyright © 2009, the author.

whereas the practical skills were taught by formal and informal apprenticeship (Siraisi 1990, p. 48ff), much as today, although the scientific theory has changed dramatically. The theoretical component of medicine at that time was still embedded in the humoral theory of disease and in natural philosophy originating in ancient Greece. However, in the high middle ages, the Aristotelian principles led to an increasing focus on precision of empirical description and measurement and a decreasing reliance on authority. Thus, humanist traditions led to the growth of the empirical scientific method but did not change the way in which medicine was taught and how observed pathologies were rationalised.

As a result of these traditions, although the scientific paradigms of medicine have changed dramatically, there remains a very strong belief by the profession that all doctors should know the empirical nature of the body and its components, as deduced by the scientific method, in sufficient detail to be able to explain findings and prognosis and treatments in those terms. Hence, the construction of Flexnerian medical curricula is based around the theory and practice of a body of knowledge (Flexner 1910). This set of beliefs underpins the process of clinical reasoning that commences as a hypothetico-deductive process in the novice practitioner and eventually develops into the pattern recognition of the expert clinician.

There has been an evolution in understanding the process of clinical reasoning over the last four decades Norman (2005). While an expert clinician will rely on pattern recognition and recipe management for solving most cases, demonstration of hypothetico-deductive reasoning and communication skills provides evidence of their clinical expertise. The task of the clinician is therefore not just to reach the correct diagnosis, but also to convince their colleagues as well as their patients that they understand and can communicate the rationale for that diagnosis or management plan, using their scientific knowledge and reasoning.

3. CLINICAL REASONING VERSUS REASONING IN CLINICAL CONTEXTS

The authors of this paper promote a communicative function of reasoning which expands on the diagnostic function typically associated with clinical reasoning *per se*. The use of logic in communication with patients and peers is presented by Jenicek and Hitchcock (2005) who astutely detail the important role of reasoning and arguments in clinical decision-making processes. Their philosophy rests in the application of best evidence to develop conclusions and recommendations through organised reasoning, evaluation and decision-making for making treatment and prevention successful.

Yet, the sociologist, Paul Atkinson challenges decision-making models that assume professional actions primarily evolve from processes of mental acts (Atkinson 1995, p. 151). Atkinson encourages consideration of the social influences on medical discourse, emphasising the relationship between uncertainty and technicality of knowledge, the co-existence of the personal knowledge of the clinician and the depersonalised knowledge of medical science, and the contrasting orientations to knowledge that exist in medical work and medical culture (Atkinson 1995, p. 150). Consequently, the notion of 'correctness' assumes fuzziness in the real world of clinical practice and decision-making. Even Jenicek and Hitchcock acknowledge the complexity

of uncertainty and probability in medicine in their discussion of “fuzzy reasoning in fuzzy logic” (2005, 87).

Contemporary contexts of medical practice demand clinicians to manage a variety of socio-cultural complexities. Culture assumes a prominent role in rational synthesis and interpretation and whether or not an argument is truly fallacious depends upon the underlying beliefs, values and assumptions used as the basis for the construction of the argument (Stapleton 2001; Gilbert 2004). Most cross-cultural training in medical education emphasises the linguistic and ethnic disparities of patient populations which stand in apparent apposition to the culture of medicine. Fadiman (1997) comments on the tendency of doctors to regard cross-cultural medicine as an assault on their rationality, which rests in a biomedical culture that inspires myopic overreliance on their own set of interests, emotions and biases.

Roberts *et al.* (2000), like Atkinson (1995), focus on the sociocultural complexities of professional identity to identify three discourse types that influence language, grammar and argument in key domains of clinical practice: personal experience discourse, professional discourse, and institutional discourse. They extend the dilemma of ethnic and linguistic disparity of the patient to the dilemma of ethnic minority medical graduates operating in potentially discriminating assessment processes. As in many contemporary academic and professional settings, the complexities of everyday practice and the increasing diversity of both client and professional bodies mean that logic and critical thinking are challenged by the interactions of linguistic, cognitive and social traditions (*cf.* Gilbert 2004).

The authors of this paper propose a framework of reasoning to support effective communication for clinical practice. Essentially, the framework rests on the premise that the selection and skilful arrangement of arguments depends on the purpose of the message, the socio-cultural demands of the context, and the knowledge and expectations of the audience.

4. ARGUMENTATION IN CLINICAL PRACTICE

In the model that is proposed in Figure 1, clinical practice falls into diagnostic and therapeutic domains and is defined in terms of the core skills of diagnosis, management and counselling. Diagnosis, management and counselling are each typified by primary communicative goals. Arguments are used to generate reasons that support the communicative goals associated with the essential skills of clinical practice. Figure 1 delineates the relationship between clinical domains and practice, communicative goals and argument function. Discourse scenarios/samples (from examples 1 to 5) are selected to illustrate various aspects of the model, which will be elaborated on during the course of the paper.

4.1. *Formative and definitive arguments*

Formative arguments are those arguments used to evolve a position on a question or problem, typically associated with inquiry. In the clinical context, inquiry is employed in the cognitive processes associated with ‘classic’ diagnostic reasoning and in the negotiations associated with therapeutic decision-making. The type of inquiry associated

with diagnostic reasoning relies on cognitive processes to structure problems and their language in a way that helps retrieve pertinent information to consider an appropriate differential diagnosis. Such inquiry rests in a biomedical paradigm of rationality. In contrast, the type of inquiry associated with therapeutic decision-making in negotiation with a patient relies on using arguments in a dialogic interaction for exploring plausible options for negotiating agreements (*cf.* Blair 2004, p. 24).

In the model of reasoning for clinical practice, inquiry is considered to be a process reducible to justification, as reasoning shifts from formative to definitive outcomes (*cf.* Blair 2004). Definitive arguments are those arguments used to defend or promote a particular position. In the clinical context, definitive arguments are the arguments used to defend or promote a diagnosis *after* a degree of diagnostic certainty is established or to defend or promote a therapeutic decision *after* it has been reached. In other words, definitive arguments are used to communicate the outcomes of inquiry, namely the articulation of diagnostic and management decisions.

The articulation of the judgements or decisions arrived at the end of cognitive deliberation or negotiated inquiry is of particular interest to the authors of this paper, especially with respect to improving the effectiveness of clinical communication of doctors with their patients (client-professional interaction) and their peers (intra-and inter-professional interaction).

4.2. Justification

In justification, arguments are used to show why the presenter believes the claim in question, even if the arguments do not persuade the audience of the truth of the claim (Blair 2004, p. 23). Articulating the salient elements of data acquisition (i.e. premises)—the history, physical examination findings, and test results—that support the diagnostic decision (i.e. conclusion) confirms the construction of medical knowledge and opinion and contributes to the effective communication of a diagnosis.

Reasoning from one or more premises to a conclusion is, according to Jenicek and Hitchcock (2005), the basic model of medical reasoning and argument. Example 1 is drawn from a medical student's oral case presentation (Gilbert, forthcoming). In Example 1, the descriptors of symptoms and signs specify the salient features of the diagnosis. The articulation of reasoning rests in the general model of clinical problem-solving that relies on a hypothetico-deductive formulation of diagnosis, based on traditions of designing a deductively valid classical categorical syllogism combined with evidence-based practice, even if the cognitive processes used to reach the diagnostic decision are non-analytical (e.g. pattern recognition of expert clinicians). The reasons leading to the conclusion may be represented as a classical categorical syllogism, as follows:

Premise A (p1):

The set of symptoms A* and signs B** are typical of acute cholecystitis

Premise B (p2):

The patient presents with the set of symptoms A and signs B

Conclusion (C):

Therefore, the patient has (acute) cholecystitis

*Symptoms A: colicky, right upper quadrant pain, which radiates to the right subscapular region and is worse with meals

ARGUMENT AND MEDICINE

****Signs B:** bile-stained vomiting and pale stools; fever and Murphy's sign

Figure 1
Uses of Argument in Clinical Communication

<i>Clinical Domain</i>	<i>Practice</i>	<i>Clinical Skill</i>	<i>Communicative Goal</i>	<i>Argument Function</i>	
				<i>Formative</i>	<i>Definitive</i>
Diagnostic		Diagnosis	Construct a diagnostic formulation <ul style="list-style-type: none"> to specify the most likely diagnosis 	INQUIRY	JUSTIFICATION
			Convey a diagnostic fact <ul style="list-style-type: none"> to educate or inform about the nature of an illness and how it relates to symptoms 		PARTIAL EXPLANATION
Therapeutic		Management/Therapy	Prioritise therapeutic options <ul style="list-style-type: none"> to facilitate decision-making in management concordance 	INQUIRY (+/- Persuasion)	JUSTIFICATION
		Counselling	Recommend a course of therapeutic action <ul style="list-style-type: none"> to ameliorate a patient's condition or to achieve optimal outcome 		PERSUASION

Gilbert, K. and G. Whyte (2009). Argument and Medicine: A model of reasoning for clinical practice. In: J. Ritola (Ed.), *Argument Cultures: Proceedings of OSSA 09*, CD-ROM (pp. 1-20), Windsor, ON: OSSA.
Copyright © 2009, the author.

Discourse/Scenario Samples

Example 1

Discourse type: Diagnosis (Justification), Intra-Professional

Oral case presentation (from data collected as part of a Monash University Standing Committee on Ethics in Research Involving Humans (SCERH) approved project, *Applying Discourse Analysis to Intra-Professional Communication Skills Training*)

1 [problem representation] Mrs CM, she's a twenty-seven year old lady who presented to the ED on the first of April with
2 a three month history of progressively worsening right upper quadrant pain.

13 [presenting complaint] So what happened on that day was there was ongoing right upper quadrant pain for three months
14 but last night, the pain became worse, ten out of ten in severity. And the pain was described as a colicky pain with a
15 constant background pain, which radiates to the back. The pain is aggravated by food intake and is relieved by lying still.
16 The pain was also associated with bile-stained vomit, fevers and chills and pale stools. She denied any diarrhoea, dark
17 urine or jaundice.

20 [on examination] the patient was alert, orientated to time, place and person. Her obs was stable, except that she was
21 mildly febrile. Her cardiovascular system and respiratory examination was unremarkable. On examination of the
22 abdomen, there was voluntary guarding and tenderness in the right upper quadrant, and she has a positive Murphy's sign.
23 There was no palpable organomegaly.

32 In summary, Mrs MC is a twenty-seven year old lady who presented with a three month history of progressively
33 worsening, colicky, right upper quadrant pain with a past history of gallstones. The pain radiates to the right subscapular
34 region and was worsened with meals. It was associated with bile-stained vomit and pale stools. She was mildly febrile
35 and had a positive Murphy's sign on examination.

36 [provisional diagnosis] Both the signs and symptoms coincide with acute cholecystitis secondary to cholelithiasis.
37

Example 2

Discourse type: Diagnosis (Justification), Client-Professional

Simulated general practice consultation (from an educational DVD resource, *Consultation Skills in General Practice*, used with permission from the Victorian Metropolitan Alliance)

1 Doctor: Hi Kevin, how are you doing today?
2 Patient: Oh, look, Doc, I've really come along for the results of my colonoscopy
3 Doctor: Well, as I told you the last time we met, that the blood in your stool worry me
4 Patient: Hmm
5 Doctor: Well there are so many things that can cause that
6 Patient: Right, mm, so I thought it was just the haemorrhoids that I've had
7 Doctor: Well, one of them is haemorrhoids but sometimes there are what we call polyps or little growths
8 Patient: Hmm
9 Doctor: on the wall of your colon that can bleed ... and if they're left for a long time they can change into
cancer
10 Patient: Oh, I've had the haemorrhoids for quite a long time, yes ...
11 Doctor: Well, you know, we ask for a colonoscopy and you know the results are of the colonoscopy show that
there is a growth
12 Patient: Really ...
13 Doctor: yeah, coming out of the wall of your intestine
14 Patient: Do you think this has been causing the bleeding I've been having for the last few days?
15 Doctor: Absolutely
16 Patient: Oh ...
17 Doctor: Now, ah, how much about the results are you aware of?
18 Patient: Well, nothing at all really, I came because of the bleeding and I'm just here to find out what really the
results are..
19 Doctor: Well, you see, the last time you did the colonoscopy, we did a biopsy ... a biopsy is taking a piece of
the growth
20 Patient: hhmhmm
21 Doctor: and examining it
22 Patient: Yes, I remember
23 Doctor: Okay, whatever I'm going to tell you in a moment, I'd like to say that the situation is serious

Discourse/Scenario Samples

- 24 Patient: Oh
25 Doctor: But, we have so many things to work out together...you see, the biopsy results showed cancer
26 Patient: Oh ...
27 Doctor: in the wall of your bowel
28 Patient: Really?
29 Doctor: yes, but the good thing is this cancer is confined to the wall of your colon
30 Patient: But I mean cancer spreads, doesn't it?
31 Doctor: Yes but you really didn't reach that stage yet
32 Patient: Ok
33 Doctor: The tumour you have or the growth you have is two centimetres in size
34 Patient: Two centimetres!
35 Doctor: Yes, and it's confined to the wall, it did not break through the wall and it's not spread so there are good things to think about.
36 Patient: I can't think of any good things right now

Example 3

Discourse type: Diagnosis (Partial Explanation), Client-Professional

Simulated general practice consultation (from an educational DVD resource, *Consultation Skills in General Practice*, used with permission from the Victorian Metropolitan Alliance)

- 1 Doctor: Hi Brian, how are you going?
2 Patient: I'm a bit worried about that test
3 Doctor: You've had the fasting blood glucose level done during the week
4 Patient: Yeah, that's the second one
5 Doctor: Well, last week you had one and that was the random blood glucose, it was 11.7. I actually got the result back here today of your fasting one and it was 7.6, okay ...
6 Patient: Sounds better
7 Doctor: Well it is better but actually by definition you do actually have diabetes ... it's a bit of a shock to have to tell you that news because you came in last week and I guess you were healthy and not expecting it
8 Patient: Yeah, well you said the examination we did was all normal
9 Doctor: Well ...
10 Patient: Could that be right?
11 Doctor: It's abs...
12 Patient: I mean don't eat sugar or anything
13 Doctor: It's absolutely correct—the definition for diabetes is to have these two results above these levels so I'm confident that you do in fact have non-insulin dependent diabetes mellitus. Do you .. have you heard of that before, at all?
14 Patient: I mean I've heard of diabetes, is that the same as sugar diabetes?
15 Doctor: Yes, you've got sugar diabetes.
16 Patient: Because one of the fellows at work, his mum had it.
17 Doctor: So, what happens is you've got the pancreas here on this side
18 Patient: You..you only did the two tests...I mean can you be sure?
19 Doctor: Look, I'm absolutely sure and I'll tell you what diabetes is and then you'll have a better understanding
20 Patient: But, shouldn't we do another test to be sure but I can't understand why, because I don't have, ... I don't eat sugar

Example 4

Scenario type: Management (Justification), Client-Professional

General practice consultation (based on educational materials provided in the Monash University Department of General Practice *Consulting Skills Teacher Manual*)

Anna is a 17 year old VCE student [final year of high school] who has just been diagnosed by her GP as 10 weeks pregnant. Anna experiences conflict between her religious beliefs regarding termination and her desire not to continue with the pregnancy. In determining a management plan, her GP discusses future options.

[Option 1] Anna decides to continue with the pregnancy [justification] because her GP can offer her support regarding helping her to tell family and arranging financial aid and time off school.

[Option 2] Anna could have considered continuing with the pregnancy because she could offer the baby for adoption.

[Option 3] Anna might have chosen termination because she would receive support and counselling from her GP or from an experienced pregnancy counsellor, and ongoing support with continuing contraception.

Discourse Scenario/Samples

Example 5

Discourse type: Counselling (Persuasion) in Assessment Context (OSCE), Client-Professional and Intra-Professional
Simulated general practice consultation—summary of moves/stages (from data collected as part of a 2006 Monash University Arts-Medicine Small Grant Scheme Project, *Intercultural Oral Examinations in Medicine: Understanding the Communicative Skills of International Medical Graduates in Australian Objective Structured Clinical Examinations*)

- *STAGE ONE: Greeting and introduction* (turns 1-4)
 - *STAGE TWO: Establishing purpose of consultation* (turns 5-10)
 - *STAGE THREE: History Taking* (turns 11-19)
[In this particular assessment of counselling skills, although the history-taking component is not assessed, the candidate emphasizes to the examiner his awareness of the relevance to the management decision of knowing if herpes is either primary or recurrent with antibodies and so this move is directly relevant to the Recommendation that is subsequently advanced by the candidate]
12 Doctor *okay* so first er I want to learn\ more about this condition SO HOW many ti:mes you have thIS attack
13 Patient Oh/um . I don't know how many TI:mes I guess it's about a year and a hA:lf
14 Doctor [the other half ,of. before/]
15 Patient [since the first]
16 Doctor Okay first and/
17 Patient And I guess over that time I may have had about six/ .. seven/ episodes . they seem to be getting less severe.
18 Doctor Getting less severe/ okay\
19 Patient Okay, so you see the doctor and ,then . you get the treatment/
• *STAGE FOUR: Establishing patient's level of knowledge* (turns 20-30)
 - *STAGE FIVE: Recommendation (Advice)* (turns 31-35)
[The candidate recommends pregnancy and normal vaginal delivery for the patient]
34 Doctor yeah is good thing is when it recur is more mild less severe, these are good things and if you have low symptom you can expect to have the pregnancy and have the vagina delivery
• *STAGE SIX: Dialectic Address (1) ANTICIPATED (self-initiated)* (turns 36-40)
[The candidate acknowledges the potential complication of infection at the time of delivery which would contraindicate the recommendation for a normal vaginal delivery]
36 Doctor [yeah] so/ but, ah we need to be careful avoid a recur during the delivery\
37 Patient Ok[a:y]
38 Doctor [other]wise we may need to choose other ah such as ah cesar section
39 Doctor Otherwise you can expect just the normal the normal people
40 Patient Right o[kay]
• *STAGE SEVEN: Dialectic Address (2) ANTICIPATED (self-initiated)* (turns 41-48)
[The candidate acknowledges the need to assess the infection status of the patient during the pregnancy, as the recommendation is susceptible to challenge if there is a high risk of neonatal infection during pregnancy and at delivery]
41 Doctor [so] ah . so if now we can ah make a test for yOU and your pARTner
42 Patient yep
43 Doctor Test if there is any . virus . or ah any SYMptoms because IF you have the virus it will live in your body all the time
44 Patient Yea:h [yeah]
45 Doctor But [ah] when you have some stress, some weakness in your body ... can trigger factor
46 Patient Yeah [yeah]
47 Doctor Yeah [so] we if don't find any symptom . that's okay we can prepare well for your pregnancy/
48 Patient Yep
• *STAGE EIGHT: Routine pre-natal counselling* (turns 49-99)
[Routine pre-natal counselling supports the Recommendation]
 - *STAGE NINE: Dialectic Address (3) NON-ANTICIPATED (auditor initiated)* (turns 100-113)
A challenge to the candidate's Recommendation is initiated by the (simulated) patient; the patient is seeking clarification of the impact of infection at the time of delivery on the Recommendation (raised in Dialectic Address 1) and this demands that the candidate elaborate appropriate evidence to support the Recommendation.
103 Patient .. it's just that when I'm actually having the baby if if I get a flare-up of herpes then that's that's a problem ... is that right?
104 Doctor Ah if usually if Occurs BEFORE the seventh day of deliver of delivery, if the seven days before delivery or if you have rupture of membranes before the delivery, the situation maybe you come and [have] caesarean section or induce [deliver] because this abnormal .. OTHERWISE usually you can expect it's a vaginal delivery yeah ... otherwise all normal
105 Patient *ri:ght*
-

Example 2 shows how similar reasoning is employed in the lay language a doctor uses to inform a patient of a diagnosis. The discourse sample is drawn from a recorded scenario on managing a patient with bowel cancer. The formulation of reasoning may be similarly presented as:

Premise A (p1):

The set of signs A* are typical of a local bowel tumour

Premise B (p2):

The patient presents with the set of signs A

Conclusion (C):

Therefore, the patient has a (local) bowel tumour

**Signs A:* tumour is small-sized, localized to bowel mucosa i.e. has not infiltrated deeper bowel layers, and has not spread to other parts of bowel or regional lymph nodes

Significant in a doctor's declaration of a diagnostic decision to a patient is the tendency for a doctor to explicitly convey information on the prognostic outlook, as this is relevant information important to developing the patient's understanding of the implications of a diagnosis. In Example 2, the doctor couches the information that the cancer is confined to the wall of the colon as a "good thing." In contrast, implications of diagnosis for prognosis are not always explicitly articulated in intra-professional interactions, illustrated in Example 1, as prognostic knowledge implicitly follows on from the diagnostic determination, reliant on medical knowledge and clinical experience.

Blair (2004) points out that supplying the justifications for decisions contributes to the legitimacy of the decisions (Blair 2004, p. 23). Therefore, the use of justifications for supporting therapeutic decisions reached in clinical consultation processes promotes concordance by helping both the patient and doctor understand the implications of their choices. Example 4 illustrates the application of justification for legitimising the decision reached on the management of a patient with an unplanned pregnancy. The reason why the patient, Anna, will proceed with the first management option is stated. In addition, the elaboration of alternative options and the reasons for why they might be considered are also stated.

In both instances of justification (i.e. diagnosis and management/therapy), articulation of the dialectical tier (Johnson 2000) is regarded essential for effective communication of clinical knowledge, problem prioritisation and decision determination, although to differing extents in client-professional and intra- and inter-professional contexts. The role of the dialectical tier will be discussed shortly.

4.3. Partial explanation

Explanation is presented in the model as a kind of argument even though this is contentious (Govier 1987, pp. 159-176). Hammerstrom (1986, 1987) contends that complete explanation denotes the discourse of description that functions with precision for specification of fact in support of claims with truth value held to be accepted and uncontested; partial explanation denotes the discourse of reason that functions for generating hypotheses in support of claims that hold facts susceptible to interpretation so making the claims challengeable or questionable.

The status of ‘medical’ fact or knowledge may be either contested or uncontested depending, to some extent on the impression that it makes on the recipient of the discourse. Given that the very same statements can constitute either arguments or explanations (refer to Govier 1987, p. 164), the ‘taken for granted’ facts that are proffered by doctors to their patients to explain the basis of an illness may not necessarily be interpreted as plausible explanations by their patients who may rely on different knowledge constructs for illness definition or may simply be reluctant to receive the bad news associated with a diagnosis. The statements may be interpreted as fact by one participant in the interaction but not by the other. The conclusions become questionable or challengeable, thereby making the doctor’s explanations partial rather than complete. Hence, the term partial explanation in the model denotes explanation with potentially two interpretations.

An example of how a medical explanation may not accord with a patient’s interpretation of reality is illustrated in Fadiman’s account of the experiences of a Hmong child, Lia, and her parents with the American medical system (1997). A family practice resident diagnosed Lia’s illness as epilepsy, the most common of all neurological disorders. Lia’s family diagnosed her illness as soul loss, the most common cause of illness in Hmong faith and traditional beliefs. The example, though an extreme situation of cross-cultural mismatch, clearly illustrates how differing belief systems influence individual perceptions of so-called fact. Contextualising the social and humanistic perspectives on illness with a biomedical frame of reference is becoming recognised as fundamentally important to the clinical reasoning process (Clark 2000).

In a less extreme scenario, a patient’s reluctance to receive bad news may prompt him/her to challenge the doctor’s presentation of diagnosis as irrevocable fact. Example 3 illustrates such a case in point. One can also consider the factual statements of novice practitioners to their peers or supervisors to be interpreted as partial explanations in the learning context where novices are obliged to demonstrate the grounds for their knowledge of facts and understanding of disciplinary theory and practice. Their clinical supervisors want to “be sure that reasoning rather than luck brought the diagnosis to light” (Bowen 2006, p. 2220) or that the student’s factual knowledge is supported by understanding of the application of disciplinary knowledge and experience.

4.4. Persuasion

Persuasion is the use of arguments to make the receiver believe a certain position and so adopt some attitude or decision to do something (Blair 2004, p. 23). In contemporary Western concepts of patient-centredness, it is considered unethical for doctors to impose their decisions on patients. The consultation process requires doctors to engage with patients in order to reach a mutual position of concordance rather than compliance in patient management. This may require both parties to concede some aspects of their original position in the process of inquiry via negotiation where each party will employ “arguments to persuade the other party to adjust its position, although not to any specific alternative position” (Blair 2004, p. 24).

The use of arguments for persuasion in the process of inquiry is distinct from the use of arguments to persuade another party to adhere to a pre-determined (or definitive) attitude or action. In situations that impose ethical challenges, doctors may resort to

persuasion to recommend a singular, pre-determined course of action that they firmly believe will ameliorate the patient's condition or circumstances. A doctor's steadfast resolution to adhere to a pre-determined standpoint may be inspired by their Hippocratic commitment to preserve the patient's life and/or physical well-being or by their consideration of the quality of life, even if this will override a patient's autonomy. A recent example of persuasive appeal employed by doctors was the High Court ruling in the UK that gave doctors the right, against the parent's wishes, to turn off the life support machine of a seriously ill baby (Daily Mirror Reporter, 21 March 2009; Baklinski 2009). Apparently, the doctors' quality-of-life arguments persuaded the court to reach the decision.

Yet, even in lesser circumstances of demanding management, doctors may sometimes impose expectations on their patients about therapeutic options, which entail their unconscious use of persuasion, reflecting their presumption (and often the patient's assumption) of authoritarian stance in the doctor-patient setting (Fisher 2001). Fisher links the selection of communication strategies to specific (desirable) end-of-treatment decisions and distinguishes between 'presentational' and 'persuasive' strategies of providing information during the counselling process. She claims that many health professionals integrate their social values in the decision-making process, where persuasive linguistic strategies influence negotiations and decision-making.

The functional framework for reasoning in clinical contexts, in which the roles of inquiry, justification, explanation and inquiry are specified in domains of clinical practice, establishes the uses of argument for reasoning beyond mere diagnostic deliberation. The following sections will show how the essential elements of logic, dialectic and rhetoric are accommodated in the model to support the analysis and articulation of biomedical and socio-cultural determinants of reasoning in clinical communication.

5. MUTUAL INTELLIGIBILITY AND A SYSTEM OF LOGIC

If reasons are to be used for building effective and purposeful communication in the clinical context, then the interlocutors must share a common reference of argument standard. Johnson and Blair present a framework of criteria for assessing arguments, which they refer to as the RSA Triangle (1994, p. 55). The three criteria that they specify may be summarised, as follows:

a. Standard of sufficiency

The premises of an argument must have the appropriate types and amounts of evidence to support the conclusion

b. Standard of relevance

The premises of an argument must bear adequate reference to the conclusion

c. Standard of acceptability

The premises must be acceptable to the audience for the conclusion to be true and hence worthy of the audience's belief

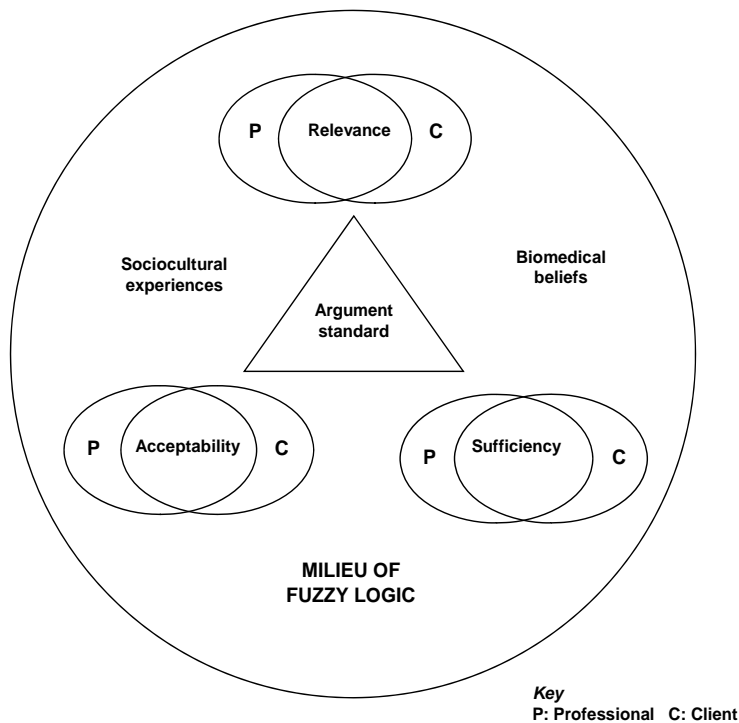
When biomedical knowledge interacts with sociocultural experience in the clinical encounter, there is potential for the interlocutors to bring together different standards of sufficiency, relevance, and acceptability. Effective communication will rely

on the interlocutors recognising and addressing conceptual similarities as well conceptual differences in the three criteria of sufficiency, relevance, and acceptability. A common set of argument standards is determined by the integration of the socio-cultural values as well as biomedical beliefs of the interlocutors, which will influence argument construction, interpretation and evaluation. The goal, therefore, is for the interlocutors to reach a mutual understanding on what qualifies as rational evidence in the communicative encounter, what will be referred to in this paper as a *mutual intelligibility* of argument standard. Often, lack of mutual intelligibility prevails as a source for potential conflict or misunderstanding, as has already been illustrated in some of the preceding examples with problematic premises. For instance, with respect to the reasons provided for the diagnosis of Lia's illness (Fadiman 1997), a conflict concerning the criteria of acceptability was generated by different belief systems held by the doctors and Lia's family concerning the cause of illness; Example 3 illustrated a conflict concerning the criteria of sufficiency as the patient was not convinced of the diagnosis of diabetes on the basis of merely two test results.

Figure 2 outlines the three argument standards, their location in the world of fuzzy logic where sociocultural experiences influence biomedical beliefs and the potential zones of difference and the overlap that may be achieved between the interlocutors in a communicative encounter. The interlocutors presented in the figure are the Professional (P) and the Client (C) but could just as well be presented as the Expert (E) and the Novice (N) or the Teacher (T) and the Learner (L).

Figure 2:

Defining Mutual Intelligibility in the RSA Triangle: The Criteria of Argument Standard (adapted from Johnson and Blair 1994, p. 55)



6. THE SYNTHESIS OF A DIALECTICAL TIER

Johnson and Blair (1994, p. 77) point out that effective justification of a claim (e.g. diagnostic decision) relies on more than merely articulating the evidence that leads one to accept the claim, the so-called illative core of the argument. To be convincing, one must also articulate responses to potential alternative positions or objections to the conclusion being advanced. This material forms the second tier of the argument, the dimension that Johnson calls the dialectical tier (Johnson 2000, p. 165). Defining the content of the dialectical tier is sometimes problematic but is contingent on the expectations of the audience and disciplinary conventions of structuring knowledge (Ohler 2003; Gilbert 2005). In articulating a diagnosis, if the intention of the clinician is to explain the grounds for knowledge by demonstrating the diagnostic decision evolved from a systematic process of inquiry, then he or she would need to integrate not only the defining features of the diagnosis but also the discriminating features that ruled out other diagnostic possibilities (*cf.* Bowen 2006, p. 2221).

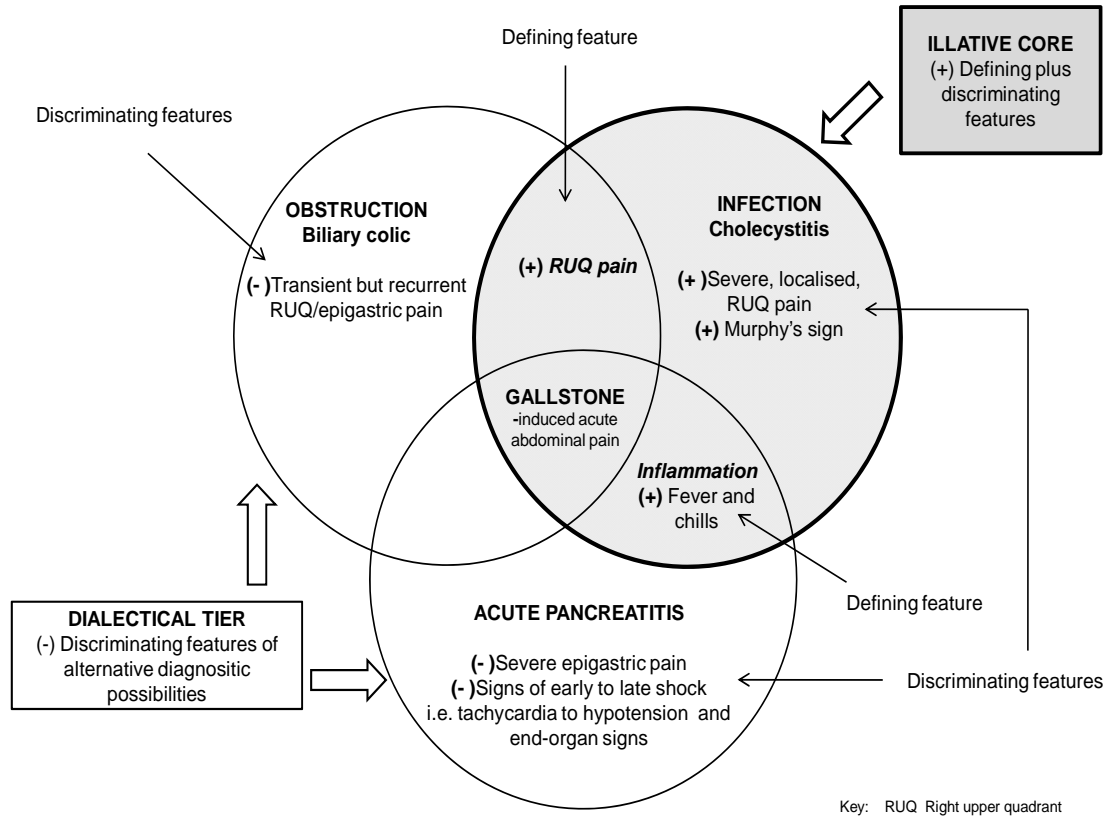
The dialectical tier of argument is subtly constructed in medical discourse, reliant on the use of semantic qualifiers to articulate clinical reasoning by comparing and contrasting diagnostic considerations which potentially challenge the ultimate diagnostic decision with a differential diagnosis (Bowen 2006, p. 2219). Descriptors used to characterise the diagnosis are referred to as defining features and descriptors used to distinguish the diagnoses from one another are referred to as discriminating features. Semantic qualifiers are, therefore, important in articulating the differential diagnoses, essentially contained in the dialectical tier which may be considered to consist of the potential challenges considered while formulating the most-likely diagnosis during the clinical reasoning process. Note that the “most likely” may also sometimes mean “least risky” if action has to be taken in the face of uncertainty.

The process of differential diagnosis is purportedly poorly understood in terms of logic and critical thinking (Jenicek & Hitchcock 2005, p. 193) but the authors of this paper suggest that it may be understood if considered as a process of inquiry that stimulates a dialectic tier that informs a defence of the diagnostic conclusion reached as a result of the inquiry in a context of incomplete information.

In a diagnostic justification, the illative core (i.e. the initial premise-conclusion structure) may be represented by the most likely diagnosis (i.e. claim) supported by the evidence of positive symptoms and signs (i.e. premises). The dialectic tier is represented by the use of semantic qualifiers to distinguish between the defining and discriminating features of a set of hypotheses for acute cholecystitis (*cf.* Bowen 2006). The excerpts of discourse taken from a medical student’s oral case presentation, in Example 1, illustrate how the student articulates the grounds on which the diagnostic decision is made. The illative core and the accompanying dialectic tier associated with the provisional diagnosis of cholecystitis, outlined in Example 1, is represented in a Venn diagram, as shown in Figure 3.

Figure 3

The illative core and dialectical tier associated with a provisional diagnosis of acute cholecystitis (based on Bowen, 2006)



In doctor-patient settings, the dialectical tier is not necessarily articulated by the doctor to the patient, as patients rely principally on the illative basis of reasoning for declaration of the diagnosis. The prognostic forecast, as illustrated earlier in Example 2, is usually more significant than consideration of alternative diagnostic hypotheses, and so the diagnostic conclusion is invariably linked to a statement of prognosis qualified by the sufficiency of knowledge available.

The dialectical tier of therapeutic decision-making is somewhat different to the dialectical tier of diagnostic determination. In therapeutic settings, the dialectical tier is important for articulating the factors that are considered in facilitating management concordance, not for the purposes of establishing the decision as correct but for the purposes of demonstrating that a range of options have been offered to the patient and duly considered. A usual therapeutic problem is lack of patient compliance, usually because the patient does not interpret the information in the same way as the practitioner or has not been convinced of its importance.

In therapeutic decision-making in Western contexts, where the patient is assumed to have rights of negotiation, the doctor must meet his or her dialectic obligations in order to ensure that the patient receives objective and impartial information that will support

the patient's ability to make an informed choice. Informed consent is a process bound up with legal and ethical codes of professional conduct, institutionally sanctioned but subject to social and political influences (Goodnight 2006). Goodnight emphasises the subtle disparity between 'convincing' and 'persuading' a patient similar to Fisher's distinction between 'presentational' and 'persuasive' strategies of presenting information (Fisher 2001; Goodnight 2006). Additionally, Goodnight questions the feasibility of laying out the field of alternative therapeutic options in the real world of clinical practice where deliberative processes may be "cumbersome even wholly unnecessary." Yet, doctors and health care providers could render themselves susceptible to accusations of imposing their own biases on therapeutic decision-making if they do not disclose all of the alternative positions available to their patients. Several years ago, in the State of Victoria, Australia, the government-funded pregnancy counselling hotline was accused of not providing advice on all three unwanted pregnancy options, i.e. keeping the baby, adoption, and abortion (Stott Despoja, 2006). The service, which was managed by an arm of the Catholic Church, was accused of not giving information about the option of abortion because the religious views of the counsellors were influencing the information provided to women accessing the service. The service provider was not promoting transparency and the full range of therapeutic options to women. Parliament was forced to address the issue and now the service must not withhold such advice. Constructing the dialectic tier appears essential in ethically transparent practice and is therefore regarded to be an important component in the articulation of therapeutic decision-making.

7. INTERLOCUTOR DEFERENCE AND THE LOCUS OF PERSUASIVE APPEAL

Interlocutor deference is used to refer to the stance assumed by the interlocutors towards each other in the communicative interaction. Maynard (2004) describes a communication strategy for developing respectful authority in professional-client encounters. Maynard proposes that in establishing rapport and agreement, clinicians will be more likely to cite the evidence on which a diagnosis is based before proclaiming the diagnosis officially to the patient. Implicating the diagnosis establishes mutual intelligibility of the diagnostic pronouncement which helps to secure acceptance or, at least, a degree of acceptance of the diagnostic proposal. Conversely, asserting the condition without recourse to evidence introduces a potentially confrontational encounter while making the proffered diagnosis more susceptible to challenge. Argumentation theory supports Maynard's appraisal of discourse; in their handbook, Eemeren *et al.* (1996) refer to the work of Aristotle, who promoted similar philosophy by stating that deductive reasoning is best reserved for discourse directed to experts while inductive reasoning is better suited for discourse intended for "an unlettered multitude" (Eemeren *et al.* 1996, p. 43). Example 2 illustrates the strategy of citing evidence to infer a diagnosis, which Perakyla (2006) posits is likely to be employed when there is temporal separation of testing or examination and delivery of diagnosis. The diagnosis—"the biopsy results showed cancer"—is stated only after the citing of clinical evidence, which is supported by statements from the patient as well as the doctor—"the blood in your stool," "I've had the haemorrhoids for quite a long time," "sometimes there are what we call polyps or little growths," "there is a growth coming out of the wall of your intestine." As previously mentioned, the diagnosis consists of

elaboration of the illative core of the diagnostic argument which is supported by prognostic indicators (i.e. size and spread of the tumour).

The *locus of persuasive appeal* is used in this paper to refer to the interlocutory orientation of the participants in the clinical encounter. Clinical settings often consist of two, three or more interlocutors. In addition to a senior physician and a patient, there may also be present a junior resident or medical student, family members of the patient, allied health care professionals, and perhaps even a medical interpreter. Communication may be charged by the complex demands of simultaneously having to communicate different messages effectively to two or more participants. Interlocutors may find themselves having to manage the three dimensions of discourse outlined earlier—personal, professional and institutional—resulting in their negotiation of a hybrid discourse (Roberts *et al.* 2000).

Reference is made to a medical oral exam in order to illustrate this complexity of communication in the clinical context. An Observed Simulated Clinical Examination (OSCE) purports to provide a standardised clinical situation, usually highly simplified and somewhat stylised, that can be used to test a student's performance in clinical skills, including clinical reasoning. In practice, an actor is provided with an illness scenario and a biography to adopt a character that will respond to a student's questions in a brief (about 8 minutes) interview. The performance is observed and assessed by an experienced clinician according to a schedule of marks. The student is usually given a short time to read a brief description of the clinical situation before entering the OSCE room. The student is expected to demonstrate several components correctly:

- data gathering from a simulated patient, based on presenting symptoms described from a scenario
- construction of appropriate medical illness narrative and defensible diagnostic or therapeutic probabilities and possibilities
- refinement of the diagnostic or management probability by further questioning, physical examination and diagnostic testing
- induction of prognosis by severity of consequence and
- deriving appropriate management options by risk of non-intervention.

Example 5 (refer to the discourse scenario and samples) shows the type of organisational structure a candidate may employ in an objective structured clinical examination (OSCE). The key moves in the discourse event are summarised and elaboration of the discourse provided when it bears relevance to the argumentation strategy supporting the recommendation advanced by the candidate (doctor).

The candidate in the case of Example 5 was an international medical graduate (IMG) participating in a mock OSCE assessment involving Australian Medical Council experienced assessors and trained simulated patients. The IMG candidate, in this case, scored well, suggesting he deployed an effective communication strategy to support his articulation of clinical knowledge and experience. The standards of reasoning that students employ in the examination context must simultaneously bridge two goals: first, communicate clinical knowledge (i.e. diagnosis and management decision-making) effectively to the examiner, and second, communicate diagnosis, management or counselling decisions effectively to a simulated patient. The skilful candidate links the

principles of argumentation outlined in this paper into a cohesive discourse structure. In this case, the IMG employed lay language and included prognostic implications into the counselling recommendation, typical of the structures of reasoning reserved for communicating decisions or recommendations to patients. He also integrated a dialectical tier that simultaneously addressed the communicative expectations of the patient while satisfying the competency demands of the expert clinician assessing the student's performance. The components of the dialectical tier were initiated by the candidate in two instances (self-initiated, anticipated) and by the simulated patient in one instance (auditor-initiated, non-anticipated). In clinical assessments, communication skills of candidates are usually rated in terms of descriptors referring to 'empathy, comfort, consideration,' 'language that the patient understands, no jargon,' checks for patient understanding,' and 'answers patient questions.' However, successfully integrating and responding to potential challenges to the recommendation promoted in a counselling consultation appear to be important communicative features of the clinical discourse associated with every-day counselling practice and also important indicators of exam success. The locus of persuasive appeal is reflected in the linguistic realisations of both logical (including notions of relevance, sufficiency and acceptability) and dialectical parameters designed to address the communicative requirements of the audience. The use of lay or technical language, the selection of evidence and the consideration of alternative diagnostic or therapeutic decisions assume important roles in the discourse, as much as attention to strategies that accommodate empathy, clarification of patient understanding, and appropriate response to questions. Establishing a dialectical tier specifically targeted to audience demands is an important rhetorical strategy for effective communication.

8. CONCLUSION

In the proposed model, arguments used for inquiry, justification and persuasion have been sketched in diagnosis, counselling, and management settings that are integral to everyday clinical practice. Thus, a concept of reasoning is posited that expands on the diagnostic function typically associated with clinical reasoning *per se*.

This functional model is intended to support the articulation of reasoning in existing decision-making models, as these typically form the basis for effective communication in medical assessment and intra-professional settings (and knowledge of the conventions helps to make the professional and institutional cultures of medicine more accessible to novices). Our model also accommodates the various potential sociocultural interpretations of logic in doctor-patient interactions. The authors contend that a functional approach to logic and argument in medicine permits novices, as well as experts, to appreciate strategies for designing the purpose of their communication in interactions with their peers and patients

Our emphasis on argumentation for promoting effective communication encourages practitioners to consider new strategies for appropriating medical and lay knowledge that move beyond merely de-technicalising vocabulary or sorting information into discrete units to facilitate comprehension. The medical encounter is complex. It accommodates personal, professional and institutional conventions of discourse in a variety of doctor-patient as well as peer-to-peer settings which demand the strategic orientation and structuring of messages to patients and peers for communication to be

effective. A model of reasoning (Figure 1) that includes consideration of argument standards (Figure 2) permits accommodation of sociocultural difference and promotion of conventional norms in communication strategies. The applications of logic, dialectic and rhetoric to the analysis and interpretation of medical discourse have been discussed, emphasising the role of argument and reasoning in developing an effective clinical communication strategy.

Our model is useful because it outlines a strategy for using arguments and reasons to achieve communication goals that are directly related to clinical skills in practice and aligned with intended or desirable clinical outcomes. We believe that the model offers a new approach to clinical communication skills training and assessment in clinical reasoning.

ACKNOWLEDGEMENTS:

The authors would like to thank Dr Mark Rowe (CEO, Victorian Metropolitan Alliance, General Practice Training) for his permission to use excerpts from the Victorian Metropolitan Alliance DVD educational resource, *Consultation Skills in General Practice* (produced by the Joint Universities Centre for the Victorian Metropolitan Alliance, 2006).

[Link to commentary](#)

REFERENCES

- Atkinson P. (1995). *Medical Talk and Medical Work: The liturgy of the clinic*. London: Sage Publications.
- Baklinski, T.M. (2009). UK parents told by court their baby must be allowed to die. Britain: LifeSiteNews.com. Accessed March 2009 at: www.lifesitenews.com/ldn/2009/mar/09032301.html
- Barrows H.S. and R.M. Tamblyn (1980). *Problem Based Learning: An approach to medical education*. New York: Springer.
- Blair, J.A. (2004). Arguments and their uses. In: T. Suzuki, Y. Yano and T. Kato (Eds.), *Proceedings of the 2nd Tokyo Conference on Argumentation: Argumentation and Social Cognition* (pp. 21-27), Tokyo: The Japan Debate Association.
- Bowen, J.L. (2006). Educational strategies to promote clinical diagnostic reasoning. *New England Journal of Medicine*, 355(21), 2217-2225.
- Clark, T.A. (2000). Clinical reasoning. In: J. Kasar and E. N. Clark (Eds.), *Developing Professional Behaviours* (pp. 91-101, Ch. 10), Thorofare, NJ: Slack Inc.
- Daily Mirror Reporter, 21 March 2009. Baby OT dies hours after judge rules his life support should be switched off against his parents' wishes. Accessed March 2009 at: www.dailymail.co.uk/news/article-1163363/Baby-dies-hours-judge-rules-life-support-switched-parents-wishes.html
- Eemeren, F. H. van, R. Grootendorst, F. Snoeck-Henkemans, J.A. Blair, R.H. Johnson, E.C.W. Krabbe, C. Plantin, D.N. Walton, C.A. Willard, J. Woods and D. Zarefsky (1996). *Fundamentals of Argumentation Theory: A Handbook of Historical Backgrounds and Contemporary Developments*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Fadiman, A. (1997). *The Spirit Catches You and You Fall Down: A hmong child, her American doctors, and the collision of two cultures*. New York: Farrar, Straus & Giroux.
- Fisher, S. (2001). Doctor talk/patient talk: How treatment decisions are negotiated in doctor-patient communication. In: D.D. Oaks (Ed.), *Linguistics at Work: A Reader of Applications* (pp. 99-121), Cambridge, MA: Heinle & Heinle.
- Flexner, A. (1910). Medical education in the United States and Canada: a report to the Carnegie Foundation for the Advancement of Teaching. *The Carnegie Foundation Bulletin*, 4.

- Gilbert, K. (2004). The Sociocognitive complexity of argument construction: an investigation of Australian and Japanese students' academic writing in English. In: T. Suzuki, Y. Yano and T. Kato (Eds.), *Proceedings of the 2nd Tokyo Conference on Argumentation* (pp. 52-58), Tokyo: The Japan Debate Association.
- Gilbert, K. (2005). Argumentation in students' academic discourse. In: D. Hitchcock (Ed.), *The Uses of Argument: Proceedings of a conference at McMaster University, 18-21 May 2005* (pp. 129-138), Ontario, Hamilton: OSSA.
- Gilbert, K. (forthcoming). Applications of discourse analysis in medical education: a case of the oral case presentation. *Monash University Linguistics Papers (MULP)*, 6(2).
- Goodnight, G.T. (2006). When reasons matter most: Pragma-dialectics and the problem of informed consent. In: P. Houtlosser and A. Van Rees (Eds.), *Considering Pragma-Dialectics* (pp.75-85, Ch. 7), Mahwah: Lawrence Erlbaum Associates.
- Govier, T. (1987). *Problems in Argument Analysis and Evaluation*. Dordrecht: Foris Publications.
- Jenicek M. and D.L. Hitchcock (2005). *Logic and Critical Thinking in Medicine*. American Medical Association Press.
- Johnson R.H. (2000). *Manifest Rationality: A pragmatic theory of argument*. New Jersey: Lawrence Erlbaum Associates.
- Johnson R.H. and J.A. Blair (1994). *Logical Self-Defense* (United States Edition). New York: McGraw-Hill.
- Hammarstrom, G. (1986). Explanation in linguistics. In: B. Narr and H. Wittje (Eds.), *Spracherwerb und Mehrsprachigkeit (Language Acquisition and Multilingualism): Festschrift fur Els Oksaar zum 60. Geburtstag* (pp. 289-302), Tübingen: Gunter Narr Verlag.
- Hammarstrom, G. (1987). Partial explanation in linguistics. In: D.C. Laycock and W. Winter (Eds.), *A World of Language: Papers presented to Professor S.A. Wurm on his 65th Birthday*. (pp. 227-231), Pacific Linguistics.
- Maynard D.W. (2004). On predicating diagnosis as an attribute of a person. *Discourse Studies*, 6(1), 53-76.
- McColl, G. (2008). *Diagnostic Reasoning Teaching: An analysis of expert teacher behaviour in a clinical setting*. Unpublished Master of Education thesis. Melbourne: Melbourne University.
- Norman, G. (2005). Research in clinical reasoning: past history and current trends. *Medical Education*, 39(4), 418-427.
- Ohler, A. (2003). A dialectical tier within reason, *Informal Logic*, 23, 65-75.
- Perakyla, A. (2006). Communicating and responding to diagnosis. In: J. Heritage and D.W. Maynard (Eds.), *Communication in Medical Care: Interaction between physicians and patients* (pp. 380-440), Cambridge: Cambridge University Press.
- Roberts C., S.Sarangi, L. Southgate, R. Wakeford and V. Wass (2000). Oral examinations—equal opportunities, ethnicity, and fairness in the MRCGP. *British Medical Journal*, 320(7231), 370-74.
- Siraisi, N.G., 1990. *Medieval and Early Renaissance Medicine: An Introduction to Knowledge and Practice*. Chicago: University of Chicago.
- Stapleton, P. (2001). Assessing critical thinking in the writing of Japanese university students. *Written Communication*, 18(4), 506-548.
- Stott Despoja, N. (2006). Making counselling honest on the abortion option. *The Age* 22 February (Melbourne newspaper). Accessed March 2009 at: www.democrats.org.au/articles/index.htm?article_id=66