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Commentary on Gilbert & Whyte

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Commentary on Kara Gilbert and Gordon Whyte's "Argument and Medicine: A model of reasoning for clinical practice"

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1. INTRODUCTION

In their fascinating and ambitious paper, Kara Gilbert and Gordon Whyte propose a comprehensive model for clinical reasoning by medical professionals and para-professionals in their clinical engagement with patients and others. Gilbert and Whyte's model is proposed to us as a model of argumentation and reasoning over the whole process of medical care, hence beyond diagnosis only. This is a welcome initiative which will be certainly followed by many refinements as a whole and at each step of clinical care: patient initial evaluation, assessment of risk, diagnosis, treatment, prognosis and outcomes evaluation. Their current model distinguishes four types of clinical reasoning, among which the clinician may go back and forth. In *inquiry*, the clinician arrives at a diagnosis on the basis of the patient's signs, reported symptoms and test and imaging results. In *justification*, the clinician tells the patient why it is reasonable to believe the diagnosis or to follow a particular management plan for the diagnosed condition;[1] in the

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[1] Gilbert and Whyte cite Blair (2004a, p. 23) as an authority for a conception of justification as a use of arguments to show why the presenter believes the claim in question. Arguments can be used for this purpose, which is often signaled by qualifying their conclusion by the introductory phrase 'I think'—as when someone says, "I think it's going to rain, because those clouds in the western sky look very threatening." But it is not usual to call such a use 'justification'; rather, it is a kind of explanation (of one's reasons for holding a certain belief or making a certain decision). Further, Blair does not use the term 'justification' for this use. What he writes is that in using an argument for justification "the claimant gives arguments designed to show why *it is reasonable* for him or her to believe the claim in question, even if the arguments do not persuade some other person that the claim in question is true, or that he or she ought to believe it too." (2004a, p. 23; italics added)

process, the clinician may communicate a prognosis. In so-called *"partial explanation,"* the clinician communicates to the patient a questionable hypothesis about the underlying condition responsible for the patient's signs and symptoms. In *persuasion*, the clinician uses arguments to get the patient to believe the diagnosis and to agree to the treatment; persuasion may shift into *negotiation*, which Gilbert and Whyte construe as a process in which each interlocutor attempts to persuade the other.

As their normative model for inquiry, justification and persuasion, Gilbert and Whyte adopt Johnson and Blair's triad of acceptability, relevance and sufficiency (Johnson and Blair 1983, p. 34), along with Blair's taxonomy of uses of argument (Blair 2004a, 2004b). They also adopt Johnson's notion of a dialectical tier, with particular reference to the requirement to bolster an argument for a conclusion with a consideration of alternative conclusions, which in the clinical setting are alternative diagnoses and alternative management plans. A key premise of their framework is 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 (p. 3).

2. ADMIRABLE FEATURES

Gilbert and Whyte's paper is a sign of a growing recognition that medical practice centrally involves the use of reasoning and argument. Jenicek and Hitchcock (2005) produced the first textbook on logic and critical thinking in medicine, a textbook to which Jenicek (2006a, 2009) has written two user-friendly successors, with vignettes, exercises and examples. Both the present paper and the textbooks can be regarded as attempts to make explicit what is already implicit in the standard definition of so-called "evidence-based medicine" as

> the conscientious, explicit, and judicious use of current best evidence in making decisions about individual patients" (Sackett, Rosenberg, Gray, Haynes and Richardson 1996).[2]

Proponents of evidence-based medicine, which has become orthodoxy in contemporary medicine, acknowledge that judicious use of current best evidence requires "integration of the best research evidence with clinical expertise and patient values" (Sackett, Straus, Richardson, Rosenberg and Haynes 2000). Yet, although the refinement of techniques of meta-analysis and systematic review of published research has produced an impressive systematic framework for working out what constitutes the "current best evidence," there has been no systematization of how to integrate that evidence with clinical expertise and patient values, including the socio-cultural factors to which Gilbert and Whyte rightly draw our attention. Since integration of the current best evidence, clinical expertise and patient values involves taking into account possibly competing considerations relevant to a decision about the patient, the process is best conceived as one of inter-personal argumentation. Thus we can envisage an incorporation of evidence-based medicine into what we might call '*argument-based medicine.*'[3]

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[2] This definition is excellent as a motivator, but is not usable for such operational purposes as distinguishing who is an evidence-based medicine practitioner and who is not. Later definitions are no better. (Jenicek 2006b)

[3] Our paper covering this topic is currently under review.

Theoretical reflection on argument and argumentation obviously has a role to play in the development of argument-based medicine. Those of us who engage in such theoretical reflection should however be appropriately cautious about prescribing for a field about which we know little or nothing. Those who know and practise medicine must have a leading role in appropriating the insights of argumentation theory for their discipline, as is the case with the present paper and with the textbooks mentioned previously.

There is much to praise in the paper by Gilbert and Whyte, besides the fact that it involves collaboration between a linguist and a physician. It makes use of actual and simulated communications in a clinical setting. It usefully distinguishes diagnostic reasoning from reasoning about management and therapy, and talks about both. It recognizes a variety of uses to which premise-conclusion structures can be put in the clinical context. It recognizes the way in which there can be iteration of reasoning processes, a process for which Harald Wohlrapp has coined the term 'retroflexive argumentation' (Wohlrapp 1998). In this connection, the paper's distinction between formative and definitive reasoning is very useful. The paper manifests an admirable commitment to a goal of concordance between patient and attending physician on the plan for managing the patient's condition, as opposed to compliance with a more or less coercively prescribed treatment; the goal of concordance implies a greater role for back-and-forth communication between physician and patient. The paper recognizes that socio-cultural factors are relevant both to acceptance of the diagnosis and to the working out of a management plan, and that they can affect standards for evaluating reasoning. The paper highlights the importance of considering alternatives, with respect both to arriving at a differential diagnosis and to considering management options.

3. SOME CAVEATS

At the same time, as is to be expected with a pioneering attempt, there are reservations, corrections and suggestions to be made. In the first place, one may question the wisdom of proposing a general model of clinical reasoning that is merely schematic, without the detailed development and testing of specific criteria, with attention to the rich multi-disciplinary scholarly literature on argumentation. For example, Gilbert and Whyte might find it helpful to consult some of the literature on dialectical and dialogical argument, such as Nicholas Rescher's *Dialectics* (1977), Van Eemeren and Grootendorst (1984), Walton and Krabbe's *Commitment in Dialogue* (1995), and McBurney, Hitchcock and Parsons' work (2007) on deliberation dialogue.

Gilbert and Whyte might also devote more explicit attention to prognosis and risk assessment, which are reasoning tasks distinct from diagnosis and working out a management plan. Far more attention has been devoted so far to critical thinking and argumentation in the domain of diagnosis than in the domains of treatment, prognosis and risk assessment. A current example from community medicine, care and public health is the Type A H1N1 influenza infection and disease. The *diagnosis* made in this case is that this is H1N1 flu and it's a potential pandemic. As '*treatment*,' processes and procedures are proposed for its control. Finally, *prognosis* means here continuing current surveillance and forecasting of the disease trend to evaluate the effectiveness of interventions and further need for the control of this disease.

There also needs to be more clarification of how the different uses of argument for inquiry, justification and persuasion affect the "selection and skilful arrangement" of arguments. The paper does not explain how the triad of acceptability, relevance and sufficiency needs to be adjusted for these three uses. In fact, this triad is better adapted to the evaluation of arguments already produced than it is to the selection and arrangement of arguments. The rhetorical (speech communication) tradition in fact has more to say about the production of arguments than the informal logic tradition.

For consideration of the logic of cross-cultural argumentation, it would be useful to consider the informal logic literature on deep disagreement, exemplified in the special issue of *Informal Logic* on the topic (volume 25, issue 1, 2005) and in a follow-up paper by Dana Phillips (Phillips 2008).

For hypothetico-deductive reasoning from signs, symptoms and results of tests and imaging to a diagnosis, which is a process of inference to the best explanation, Ennis (1996, pp. 198-199) has proposed the following criteria:

1. The hypothesis would explain some facts, in the sense that they are what we would expect, given reasonable assumptions, if the hypothesis were true.
2. All other explanations of these facts are inconsistent with some facts, given reasonable assumptions
3. There are no facts inconsistent with the hypothesis
4. The hypothesis is plausible.[4]

As Gilbert and Whyte point out, this sort of hypothetico-deductive reasoning comes into play in the thinking of novices and in difficult cases where a differential diagnosis needs to be arrived at. In routine and uncomplicated cases, experts arrive at a diagnosis by a quick and reliable process of pattern recognition (Norman 2005). According to current research in medical education (Norman 2005, Bowen 2006), the most effective way for novices to become expert at diagnosis is through guided practice with many cases, as a result of which they develop illness scripts with a definite structure. Learning abstract structures in which pattern recognition using these scripts can be formulated is apparently of little help in becoming good at diagnosis.

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[4] The abductive argumentation scheme in Walton, Reed and Macagno (2008, pp. 329-330) concludes that an account is the most plausible hypothesis on the basis that it explains a set of data (supposed facts) more successfully than other accounts that explain the data. The "critical questions" associated with this argumentation scheme concern how satisfactory the favoured account is in itself as an explanation of the data, how much better an explanation it is than the other accounts, how thorough the investigation of the case has been, and whether it would be better to continue the investigation further rather than drawing a conclusion. In contrast to Ennis's criteria, Walton, Reed and Macagno do not give the reader criteria for deciding how "satisfactory" or "successful" or "good" an account is as an explanation of data, or for determining how thorough the investigation has been and what are the advantages and disadvantages of continuing the investigation further.

4. THE EXAMPLES[5]

If we do formulate such an abstract structure, however, it should both correspond to the mental process of pattern recognition and be interpreted accurately. Unfortunately, Gilbert and Whyte seem to fall short on both counts in their representation of the logic implicit in pattern recognition. They represent the logic in example 1, an oral case presentation by a medical student to fellow professionals, as having the following form:

> *Premise A*: The set of symptoms A and signs B are typical of condition C.[6]
> *Premise B*: The patient presents with symptoms A and signs B.
> *Conclusion*: The patient has condition C.

What is missing in this representation is the implicit assumption of completeness: no symptom other than those in the set A is typical of condition C, nor is any sign other than those in the set B typical of condition C. A more accurate substitute for premise A might therefore be the following:

> *Premise A1*: The symptoms typical of condition C are symptoms A.
> *Premise A2*: The signs typical of condition C are signs B.

In either formulation, however, the argument form is not that of a classical categorical syllogism, nor is it deductively valid. To be a deductively valid classical categorical syllogism, the argument would need as its first premise: Everyone who presents with symptoms A and signs B has condition C. This proposition is not equivalent to premise A or to the combination of premise A1 and premise A2, nor is it implicit in diagnosis through pattern recognition. Pattern recognition is not foolproof, even if the symptoms are accurately reported, the signs are accurately observed, and together they constitute the whole set of perceptible features typical of the condition. For pattern recognition to be foolproof, the typical signs and symptoms must never be due to some other condition or combination of other conditions. For this reason, for some conditions pattern recognition is not enough: a test or imaging is needed for differential diagnosis.[7]

Gilbert and Whyte represent the diagnostic reasoning in example 2, which is a recorded simulation of a consultation in general practice, as having the following form:

> *Premise A*: The set of signs A are typical of a local[8] bowel tumour.

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[5] The discussion in this section comments on the proposed analysis of the reasoning and argument in the examples as they occur in Gilbert and Whyte's paper. It is not a review of the examples from a clinical standpoint.

[6] For the uninitiated, *signs of disease* are what the physician sees, listens, smells, tastes (eventually and historically) or palpates. *Disease symptoms* are what the patient communicates to us as perceptions, such as pain, malaise, feeling down, etc.

[7] An example is dyspnea (difficulty breathing, shortness of breath), which can be due either to chronic obstructive pulmonary disease or to congestive heart failure (Mahler and O'Donnell 2005). For a review of studies of criteria for diagnosing congestive heart failure in patients with dyspnea, see (Wang, Fitzgerald, Schulzer, Mak and Ayas 2005).

[8] More precisely, the tumour is localized. The simulated consultation does not use the words 'local' or 'localized,' but speaks in lay language of the tumour being "confined to the wall" of the colon.

Premise B: The patient presents with the set of signs A.
Conclusion: The patient has a local bowel tumour.

In this case, however, the signs A coincide with the diagnosis. The colonoscopy has discovered a small-sized tumour, two centimetres in diameter, confined to the wall of the colon. A biopsy has determined that the tumour is malignant (cancerous). So there is no reasoning from signs to diagnosis. Example 2 is not an example of pattern recognition of a condition but of a further determination of whether the condition is present, following an initial suggestive test result, through imaging (the colonoscopy) and testing (the biopsy). There is reasoning involved in the interpretation of the images produced by the colonoscopy and in the interpretation of what was directly observed in the biopsy. But that reasoning is "off stage"; in the simulation itself, the attending physician is not reasoning to a definitive diagnosis.

Example 3 involves a challenge by a simulated patient to a diagnosis of diabetes. Gilbert and Whyte refer to the discourse in which the physician gives reasons for a challenged, or potentially challenged, diagnosis as "partial explanation." The terminology is confusing, and the discourse in which the diagnosis is defended against a challenge might more perspicuously be called a justification, since it is an argument that the diagnosis is correct. The physician appeals, twice, to the definition of diabetes mellitus as having results on a random glucose test and on a fasting blood glucose test above certain levels, which he does not in fact specify. The physician clarifies for the patient that diabetes mellitus is the same as the sugar diabetes of which the patient has heard. The patient asks if the physician is sure of the diagnosis, and if another test shouldn't be done, because the patient does not eat sugar. Evidently the patient is assuming, perhaps because of the name 'sugar diabetes,' that people who don't eat sugar don't get sugar diabetes. The physician proposes to tell the patient what diabetes is, starting with information about where the pancreas is and what it does. But what the patient needs at this stage, it seems, is to be given authoritative information, in lay language, about what causes sugar diabetes, and in particular to be told that you can get "sugar diabetes" even if you don't eat sugar. An excellent source of health information in lay language is the health information section of the Web site of the National Institutes of Health (NIH) in the United States: http://health.nih.gov/. The goal of concordance between patient and attending physician implies encouragement of patients to consult such sources, in an endeavour to become what Mark Battersby calls "the competent layperson" (2001, 2003). Aware of cases in their own circle of family and friends of missed diagnosis or incorrect diagnosis, patients may well ask, "What else can it be?" Patients should be encouraged to ask this question. Physicians should be encouraged to treat such questions as a stimulus to their own further reflection, not as challenges to be brushed aside as impertinent. In the simulation in question, for example, our patient might discover on consulting the NIH Web site that the threshold for a working or presumptive diagnosis of diabetes is 7.0 mmol/l on a fasting blood glucose test.[9] Given that the patient's fasting blood glucose

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[9] http://diabetes.niddk.nih.gov/dm/pubs/overview/index.htm#diagnosis ; accessed 2009 05 20. The page describes the threshold as 126 mg/dL, which is equivalent to 7.0 mmol/l. According to the same page, a random blood glucose level above 11.1 mmol/l is an indicator for diabetes mellitus only when accompanied by diabetes symptoms, which the patient does not have. So the patient's random blood glucose level of 11.7

level is 7.6 mmol/l, only slightly above the threshold, and given that the patient's consultation of the Wikipedia article on diabetes would provide the information that "a positive result, in the absence of unequivocal hyperglycemia, should be confirmed by a repeat of any of the above-listed methods on a different day,"[10] the patient's suggestion of another test is reasonable. A physician should also be prepared to explain to a persistent sceptical and intelligent patient how the threshold was arrived at, or to refer the patient to a source that can explain it, especially since such thresholds vary over time as the results of ongoing medical research are integrated into official definitions and guidelines.[11]

Example 4 is a description of a scenario in which a general practitioner informs a 17-year-old high school student that she is pregnant and discusses management options with her. The student experiences a conflict between religious beliefs that prohibit termination and her desire not to continue the pregnancy. The scenario describes the option chosen by the student, with her reasons for choosing it, along with the other options that she might have chosen, with possible reasons for doing so. Gilbert and Whyte classify the student's statement of her reasons to continue the pregnancy as a justification, in their sense of an argument used to show why the arguer believes a claim—or, in this case, makes a certain decision. The scenario also provides an opportunity to illustrate a form of inquiry, specifically, deliberation about what to do in a situation of conflicting goals and constraints (McBurney, Hitchcock and Parsons 2007).

Gilbert and Whyte provide a sensitive description of example 5, which is a transcript of a conversation between an international medical graduate and a simulated patient in a mock objective structured clinical examination (OSCE). They note that the communication skills of candidates taking such examinations are usually rated in terms of four criteria: empathy and consideration, understandable language free of jargon, checking for patient understanding, answering patients' questions. They make a reasonable proposal to add as a fifth criterion integration of and response to potential challenges to a counsellor's recommendation. Whether or not conceptualized as belonging to a dialectical tier, the consideration of alternative management plans is clearly a part of good decision-making when the right decision is not immediately obvious.

Examples like the five in Gilbert and Whyte's paper are a rich source of data for generalizing about communication strategies and for arriving at normative recommendations. It would be desirable to have more examples, ideally recordings of actual clinician-client communications, ethically obtained, such as those made in the study (cited by Gilbert and Whyte) conducted by Peraklya (2006) of communications to parents of diagnoses of the disability from which their children suffered, where the common communicative strategy of presenting the evidence before the statement of the child's condition coincided with greater acceptance of the diagnosis.

Any step in clinical care is more complex than as presented in this discussion. For example, diagnosis is not only a matter of pattern recognition or a result of hypothetico-

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mmol/l is only a weak indicator of diabetes. Diagnosing diabetes is more complicated than example 3 indicates.

[10] http://en.wikipedia.org/wiki/Diabetes_mellitus ; accessed 2009 05 20.

[11] A synchronic example relating to treatment rather than diagnosis is the variation across countries in the guidelines on statin treatment for preventing deaths from coronary heart disease (Manuel, Kwong, Tanuseputro, Lim, Mustard, Anderson, Ardal, Alter and Laupacis 2006)

deductive reasoning. Current methods of diagnostic reasoning and final formulations are matters of additional various models and techniques, such as acquisition of clinical information, i.e. qualification and classification by probabilistic reasoning, pattern recognition (already mentioned), steepest ascent diagnosis making, arborisation and multiple branching (diagnostic algorithms and other prescriptive guidelines), induction, hindsight reasoning, abduction and other initiatives at various states of basic development and usability in medical practice or research. (Jenicek 2003)

5. CONCLUSION

In short, Gilbert and Whyte have made a useful start on broadening the existing literature on clinical reasoning to include reasoning about therapy and management as well as diagnostic reasoning. They have made good use of theoretical work on argumentation to distinguish different uses of argument in clinical contexts and to emphasize the important for both diagnosis and management of considering alternatives. Their use of simulated scenarios and conversations is commendable, and should ideally be followed up with attention to real clinical conversations. Their work could also benefit from attention to more of the scholarly literature on argumentation.

Link to paper

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