Reviewer's report

Title: The Reliability of the Ankle-Brachial Index in the Atherosclerosis Risk in Communities (ARIC) Study and the NHLBI Family Heart Study (FHS)

Version: 2  Date: 14 October 2005

Reviewer: Ann M O'Hare

Reviewer's report:

General
This is an important manuscript that demonstrates considerable within-person variation in ABI measurement in a subgroup of ARIC participants selected for the Family Heart Study. The clinical relevance of this finding could be presented more clearly and the methods and results presented more succinctly.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

In general, the authors should revise the introduction, methods and discussion to make clearer the clinical relevance of their findings. They found considerable within-person variation in ABI measurement in the setting of carefully designed study protocols using the same technique, same technician pool and same method for calculating ABI. What does this imply about expected reliability of this measure in the clinical setting where none of these things are likely to be standardized? Surely we should think about this fundamental methodologic issue before recommending ABI measurement in the clinical setting. In their study, how much misclassification of peripheral arterial disease would have occurred using the standard ABI cut point of 0.9? Presenting this information might help to clarify the clinical importance of their finding. Can they present more clearly the difference between within person variation at individual ARIC and FHS visits compared with variation between the two visits. Why do the authors think the reliability would be lower between two different visits less than a year apart? In general, why do they think that ABI measurement has poor reliability? This seems to be driven more by ankle than arm blood pressure measurements?

I was also curious about the factors that seem to influence reliability. This is a real contribution to the field and should be emphasized more in the results and discussion. For example it was not apparent to me initially why they described patient characteristics in the methods section until they later presented the results of sub-group analyses. They could have explained this objective earlier in the introduction and methods section and highlight in the discussion. Have other studies looked at this? The reported impact of choice of leg on reliability is extremely important. Perhaps this could discussed in the context of the various different ways in which ABI is reported in different studies, e.g. mean (in ARIC) but lowest leg (cardiovascular health study) and even highest leg (e.g. Resnick et al Strong Heart Study) in some instances. I was also curious about the impact of ABI level on the reliability of this measurement. They cite at least one study in which reliability seemed lower for patients with lower AAI measurements. They examine measurements above and below the median of 1.15. Do they have the ability to look at above and below a more conventional cut point, e.g. 1 or 0.9? In general, I think the authors need to spend more time translating their findings for a clinical audience. To this end, it might be reasonable to abbreviate the methods and results sections to focus on clinically relevant findings. I am concerned that their overall message may be missed by a clinical audience due to an overly technical and detailed methods and results section and limited discussion of the clinical importance of their finding.
Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

Discretionary Revisions (which the author can choose to ignore)

**What next?:** Accept after discretionary revisions

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No

**Declaration of competing interests:**

'I declare that I have no competing interests'