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PART 1:

Journal Name:	**Advances in Research**
Manuscript Number:	**2014_AIR_13219**
Title of the Manuscript:	**Investigation of Diagnostic Test PerformanceUsing Receiver Operating Characteristic AndFundamental Concepts Of Information Theory**
	Original Research Article

PART 2:

FINAL EVALUATOR'S comments on revised paper (if any)	**Authors' response to final evaluator's comments**
This third version has little improvement over the second version. Many of my criticisms of the second version are still valid. This third version simply has a citation to try to address my concerns in the second version. This is not satisfactory. If it were satisfactory, then the manuscript makes no new original contribution. My criticisms below remain. I think the authors simply do not understand mutual information, because they have never directly addressed my concerns below that I have expressed since the first version. I think the third version makes claims that are simply wrong. The fundamental logic of the manuscript is wrong and the main points of the paper are weak. **Most importantly I quote from my previous review, "First, any general claim concerning the relationship between mutual information and AUC could and should be proven or disproven by a mathematical proof, not by one example as the submitted manuscript offers." The authors' response to this comment was unsatisfactory. The revised manuscript still suffers from the flawed argument of using one example to claim in its Abstract that "**it can be verified that mutual information value is parallel to AUC value**". This is simply flawed logic. To change the word "parallel" to some other equally vague word is not a solution to the flawed logic. One example does not prove a mathematical fact. Only a mathematical proof proves a mathematical fact. I completely disagree with the claim that "**Based on these results, it can be verified that mutual information value is parallel to AUC value." **Second-most importantly, I quote again from my previous review, "Second, I think that investigation of the mathematics will reveal that the claim is simply wrong. AUC measures whether a diagnostic test is accurate, summarized over multiple thresholds. I think mutual information does not measure accuracy. The mutual information when a test is perfectly correct is equal to the mutual information when a test is perfectly wrong. In other words, a perfectly correct test has the same mutual information as a perfectly wrong test. I consider myself an expert on ROC but not on information theory. So if the authors think that I am wrong in my second point, then they should explain why." Again, the authors' response to this comment was unsatisfactory, because the authors' response never explained why. They simply offered to change the word "parallel". I am now more convinced concerning my initial claim that "a perfectly correct test has the same mutual information as a perfectly wrong test". ROC distinguishes between a perfectly correct test and a perfectly wrong test. Therefore, ROC does not measure the same thing as Mutual Information. Therefore, the thesis of the entire revised manuscript is mathematically wrong.** **The manuscript has additional problems. The title concerns the theory of two methods of measurement, but the Conclusion concerns Turbidimetric tests. The manuscript is trying to pursue two points. One point concerns the relationship between ROC and**	

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Information Theory, which requires a mathematical discussion. The other point concerns a particular medical test, which requires a medical discussion. The brief manuscript is convincing on neither point. **The manuscript still lacks clear arguments above and below all Sigma summation symbols. It is no excuse to cite the sloppy work of others.** **Definitions of D+ and D- are not clear.** **I completely disagree with the following sentence in the manuscript "**Therefore, mutual information value has an advantage to AUC value.**" The purpose of AUC is to summarize over all the various thresholds. Mutual Information does not summarize over all thresholds. The structure and purpose of the two measurements are different. I do not see how one measurement has an advantage over the other, especially for the reason the manuscript states.** **The Conclusion section justifies the endorsement of Information Theory based on the claim that Information Theory has the largest percent correct. If the goal is to maximize percent correct, then percent correct is the relevant measurement, in which case we do not need ROC or Information Theory, in which case the manuscript has no point.**	

Reviewer Details:

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