Reviewer's report

Title: The Cost-Effectiveness of the Argus II retinal prosthesis in Retinitis Pigmentosa patients

Version: 1 Date: 26 December 2013

Reviewer: Paul Yang

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This is a well-written well-thought out manuscript using a statistical model to mimic extremely complicated real world events. However, any model is only as good as its assumptions, and some of the clinical assumptions require additional support or discussion to convince the reader that the model's conclusions might be believable.

Major Compulsory Revisions

1) Background, 2nd paragraph, 3rd sentence. "In patients who have lost their sight, admission to nursing homes occurs three years earlier." Please qualify this statement. Clearly, not all patients have the same level of vision loss, and not all patients require nursing home care.

2) Materials and Methods, 2nd paragraph. If the average age of diagnosis is 35.1 years, why did the authors choose a hypothetical cohort aged 46 years?

3) Model Structure, 2nd paragraph, 4th sentence. "The reference hypothetical cohort...remained in the state of legally blind RP with no light perception for the entire model time horizon." From personal experience and the experience of my colleagues, the majority of patients with RP age 46 years of age have much better vision than "no light perception." If the data exists to back up the author's assumption, then it should be referenced here. Just one longitudinal study of x-linked RP (Grover, et al., 2000. Ophthalmology 107(2):386-396), reveals that these patients have much better vision than no light perception.

4) Costs, 2nd paragraph, 3rd paragraph. "...reduction in depression/anxiety..." Has it been shown that the Argus II implant can reduce depression and anxiety?

5) Costs, 2nd paragraph, 4th paragraph. "...there is no robust data available regarding reduction in cost...we assumed a stepped reduction in cost of care..." I applaud the author's frank declaration of these uncertainties and assumptions, and understand that these are highly complex issues not previously studied. However, the assumed cost savings of 20-40% seem to be pulled out of thin air, and this casts serious doubt regarding any cost saving conclusions based on these unsupported assumptions.

6) Utility Values and QALYs, 1st paragraph, 7th sentence. "Patients who experienced SAEs after the Argus II implantation were assigned...equivalent to...severe dry eye..." I would argue that post operative complications after lensectomy, vitrectomy, scleral dissection, and implantation of artificial material
into the eye is not an equivalent lost utility value to that of severe dry eye.

7) Discussion, 6th paragraph, 1st sentence. "Markov model...begins at the age of 46 years as most of the RP patients are legally blind by this age." Just because patients are legally blind, does not mean they are eligible for the Argus II prosthesis. A more accurate model is to use the average age at which patients become eligible for the Argus II.

8) Discussion, 7th paragraph, 3rd sentence. "...explantation...return to legally blind Markov state..." Aren't all health states legally blind, whether it's no LP, LP, or CF?

9) Discussion, 7th paragraph, 5th sentence. "This may not happen in practice....most of the patients are expected to adapt to the device and explantation would be a rare event..." Even if patients do adapt to the device, this is an independent variable to the causes of explantation that have to do with extrusion, infection, or infection risk. Implanted artificial material within the eye, even when initially judged to be stable, have a low but indefinite risk that they may migrate, extrude, or become infected. Examples include scleral buckles and glaucoma implant devices.

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

**Quality of written English:** Acceptable

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**

I declare that I have no competing interests.