PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Jurisdictional, socioeconomic and gender inequalities in child health and development: Analysis of a national census of 5 year olds in Australia.
AUTHORS	Brinkman, Sally ; Gialamas, Angela; Rahman, Azizur; Mittinty, Murthy; Gregory, Tess; Silburn, Sven; Goldfeld, Sharon; Zubrick, Stephen; Carr, Vaughan; Janus, Magdalena; Hertzman, Clyde; Lynch, John

VERSION 1 - REVIEW

REVIEWER	Nazeem Muhajarine Professor and Chair, Community Health and Epidemiology Research Faculty, Saskatchewan Population Health and Evaluation Research Unit (SPHERU) College of Medicine University of Saskatchewan, Saskatoon Canada
REVIEW RETURNED	19-Jun-2012

RESULTS & CONCLUSIONS	Page 25--The statement, “Worth noting is also the finding that inequality in vulnerability is higher for girls than boys, even though boys on average have poorer outcomes.” on page 25 is surprising as I don’t see the data presented in the paper to back up this claim. Further later in the same para, the statement “In this study, income was more strongly associated with cognitive development for girls, who, when annual income increased by $10,000, experienced a larger improvement in cognitive scores than boys." is not based on results that I can see reported in the paper.
GENERAL COMMENTS	What is a SEIFA indicator? A definition is given on bottom of page 12, but the acronym is used much earlier in the paper. Define it when it is first used. Bottom page 9-top of page 10: Please report the total expected denominator comprising children of 5-years of age, and express your participant rates, retention rates (in the analysis) as a percentage of the total expected denominator of 5 year olds. Top of page 13. We need much more details of the unit(s) of the geospatial area used to define a child location (geographical location) in this data and then in analysis. For example, what is a ‘suburb’ or neighbrouhood of residence? How big are these units? How meaningful are these units for populations living within them. For rural and remote residents, how does the geospatial unit work? What are these units called? How comparable are they with suburban/city geospatial units? (in terms of density, etc). Are there any adjustment methods operationalised when developing SEIFA indicators for rural/remote and suburban/urban units (given their

	obvious differences)? Small point, nonetheless worth a mention. Is English as a second language (especially for kids from Aboriginal and Torres Strait Islander populations) the same as English as an alternate language? How do you classify kids from ethnocultural and migrant groups who speaks neither English nor any of the indigenous languages as their primary or mother tongue? Page 14—Equation 2. I am surprised that age of the child appears to have not been taken into account in this multilevel fixed-effects logistic models. When children are as young as in kindergarten age, a few months difference in age (ie, children born earlier versus later in their birth cohort year) normally do have a measurable impact on their developmental outcomes at school transition age. Also, specifically state that these are sex-specific models. Also, can the authors comment on whether the data matrix for covariates ATSI and ESL are completely exchangeable, meaning that whether these two covariates demonstrate any degree of overlap between their categories. The Slope Index of Inequality (SII) median values shown in Fig 2 are different for males and females. Was SII calculated for male and female children separately? If so, this very important detail need to be reflected in the description given on page 14 detailing how the SII was calculated. Need to mention how SII values would be interpreted, for example, what in Fig 2 what does a SII value of 18 or 22 mean? (Is the SII values similar to a Gini coefficient?) Need to state in Fig 2 and in the accompanying explanation in the body of the paper what the adjusted variables were when an 'adjusted predicted average levels of vulnerability' for each state/territory were derived. The description of targeted maternal and child health services in jurisdictions such as in SA, given in page 24, is not reflected in table 5.

REVIEWER	Prof Helen M Keleher School of Public Health and Preventive Medicine Monash University, Australia
REVIEW RETURNED	12-Jul-2012

THE STUDY	no supplemental documents provided
GENERAL COMMENTS	Thank you for your article which makes an important contribution to the literature. There are some minor revisions which I am recommending. Please check the use of SEIFA in your tables and in the text. SEIFA is first mentioned on p9 without explanation and then on Table 1. Then on p12, you introduce the IRSAD as if it is the SEIFA and throughout the paper, you use SEIFA rather than IRSAD. This needs to be corrected as the SEIFA is more than the IRSAD as you are no doubt aware. P 53, line 12, has a sentence that begins 'The index...' - I suggest this should be 'The IRSAD...' Then on p13, you make reference to the overall scoring system used by SEIFA as if it is the same as IRSED.

	P 13, line 40, delete comma after 'Children who were identified....''. That said, it would be helpful to clarify that age range that is acceptable for the AEDI. The school entry age in Australia varies but I would not have thought children would be at school at age three years. Were there formal exclusion criteria for the 2009 survey? P 15, Results: Please clarify whether IRSAD and SEIFA are used interchangeably eg, 'for every decile increase in SEIFA there was a decreasing odds of being developmentally vulnerable ' - do you mean IRSAD or SEIFA? P 16, Table 2 and p 18 table 3 and p19 table 4: both tables use the words 'Socioeconomic advantage & disadvantage index (SEIFA)' - do you mean the IRSAD or the SEIFA?

VERSION 1 – AUTHOR RESPONSE

First Reviewer:
1) Page 25--The statement, “Worth noting is also the finding that inequality in vulnerability is higher for girls than boys, even though boys on average have poorer outcomes.” on page 25 is surprising as I don’t see the data presented in the paper to back up this claim. Further later in the same para, the statement “In this study, income was more strongly associated with cognitive development for girls, who, when annual income increased by $10,000, experienced a larger improvement in cognitive scores than boys." is not based on results that I can see reported in the paper.

The reviewer is correct. The sentence above actually referred to the Patterson reference preceding it, not the results of the current study. Further, our results do not consistently support Patterson’s results. For clarity, we have deleted the entire paragraph.

2) What is a SEIFA indicator? A definition is given on bottom of page 12, but the acronym is used much earlier in the paper. Define it when it is first used.

A clearer definition of SEIFA is also the main point of concern for reviewer 2. We have provided a clearer definition of SEIFA in the methods section sub-titled Covariates starting on page 12. We have amended the paper to ensure that we have not referred to SEIFA prior to this description.

3) Bottom page 9-top of page 10: Please report the total expected denominator comprising children of 5-years of age, and express your participant rates, retention rates (in the analysis) as a percentage of the total expected denominator of 5 year olds.

We have included additional figures to show the expected denominator, participation rate and the percentage of the total population for which we have analysable data. The paragraph now reads:
“As shown in Figure 1, information for 261,147 children (approximately 97.5% of the estimated five-year-old population) in their first year of full-time school was collected by 14,628 teachers across Australia. This number of children represents a 97.5% participation rate when compared to the expected population of 5 year olds. The number of children we were expecting (267,843) was based on the Australian Bureau of Statistics Estimated Resident Population for five-year-olds, 31 March 2009 [29]. Of those children that did participate in the AEDI data collection, 89.6% (n=233,960) contributed to the analysis with 117,937 males and 116,023 females, and their characteristics are provided in Table 1. The sample analysed thus represents 87.3% of the total population.”

4) Top of page 13. We need much more details of the unit(s) of the geospatial area used to define a child location (geographical location) in this data and then in analysis. For example, what is a ‘suburb’ or neighbrouhood of residence? How big are these units? How meaningful are these units for populations living within them. For rural and remote residents, how does the geospatial unit work?

What are these units called? How comparable are they with suburban/city geospatial units? (in terms of density, etc). Are there any adjustment methods operationalised when developing SEIFA indicators for rural/remote and suburban/urban units (given their obvious differences)?

Further detail regarding the geospatial units are provided, including a new reference that will help people who wish to know further about SEIFA and the influence of different sized geographies and population density. The AEDI does not collect any individual level or family level data to be able to determine a socio-economic indicator and therefore SEIFA, applied on the basis of residence, is the best that we can do. However as the reviewer mentioned, it's important to provide further detail regarding this issue to assist the reader's interpretation of results.
Specifically we have added a new sentence defining SEIFA at the bottom of page 12:
The SEIFA indices are generally known as an indicator of people's "access to material and social resources and their ability to participate in society; relative to what is commonly experienced or accepted by the wider community" [36].
Additionally we have included the following new paragraph on page 13:
"The index reflects the average socio-economic status of people and households in the area. SEIFA IRSAD has been applied to the AEDI data file on the basis of the child's suburb (neighbourhood) of residence [28]. A suburb is determined by the Local Council and helps define a household's address. Suburbs vary widely in population density, depending on the housing types and distance from the central city. In general, when a person is asked where they live by another person residing within that same State, they generally respond to the question with their suburb of residence. In the rural and remote areas where suburbs do not exist, SEIFA IRSAD was applied at the smallest level of geography on the basis of their address details provided by the teacher upon completing the AEDI [28]. Where possible the Australian Bureau of Statistic's Geospatial unit called Collection Districts were assigned to the address details of the child. Collection Districts have no meaning to people as they are simply the collection district in which a census collector works. The geographical size of Collection Districts (CDs) varies across Australia particularly in the rural and remote areas; however a technical report published by the Australian Bureau of Statistics shows the robustness of SEIFA [37]."

5) Small point, nonetheless worth a mention. Is English as a second language (especially for kids from Aboriginal and Torres Strait Islander populations) the same as English as an alternate language? How do you classify kids from ethnocultural and migrant groups who speaks neither English nor any of the indigenous languages as their primary or mother tongue?

English as a Second Language and Aboriginal and Torres Strait Islander background are separate variables. To minimise the potential confusion we have separated out the definition and description of the two sub-population groups in the methods section. To clarify English could be a third or fourth language etc. However as English is the language of instruction in the school setting, all children who do not have English as their first language are considered ESL and all children independent of their language background/s will be at some stage of learning English.
Specifically, on page 14 we have amended the section to the following:
"Aboriginal and Torres Strait Islander and English as a Second Language.
Aboriginal and Torres Strait Islander (ATSI) background and English as a Second Language (ESL) are is collected with the AEDI. ATSI was recorded on the basis of school enrolment records, and thus reflects the parent/guardian's report of their child's ATSI status. Teachers classified children as having English as a Second Language where English was not their first language and where they needed additional instruction in English or where their English was not yet proficient."
"English as a Second Language.
Teachers classified children as having English as a Second Language (ESL) where English was not their first language and where they needed additional instruction in English or where their English was not yet proficient."

6) Page 14—Equation 2. I am surprised that age of the child appears to have not been taken into account in this multilevel fixed-effects logistic models. When children are as young as in kindergarten age, a few months difference in age (ie, children born earlier versus later in their birth cohort year) normally do have a measurable impact on their developmental outcomes at school transition age.

The AEDI is age standardised. The classification of developmentally vulnerable is on the basis of age specific cut for 4 year olds, 5 year olds and 6 year olds. A full year age standardisation method (rather than by month or day) is appropriate for the AEDI as children enter school on the basis of their age as defined by a full birth year cohort and the school entry age is different in the different States. We have added the following sentence to this effect in the methods section under the sub-section titled "Outcome" on page 12:
"The classification of developmentally vulnerable is age standardized, with the 10th percentile calculated for 4 year olds, 5 year olds and 6 year olds separately."

7) Also, specifically state that these are sex-specific models.

In the middle of page 15 within the section titled Statistical Analyses, we state:
"All models are estimated separately for males and females."

8) Also, can the authors comment on whether the data matrix for covariates ATSI and ESL are completely exchangeable, meaning that whether these two covariates demonstrate any degree of overlap between their categories.

We have added the following paragraph at the bottom of page 28 within the Discussion:
"It is worth mentioning that the covariates ATSI and ESL do not show significant overlap. Of those children who are defined as ATSI, only 20% are classified as ESL. Whereas, of those children classified as ESL by the teacher, only 7% are defined as having ATSI status. In total less than 1% of the entire sample were both of ATSI decent and classified by the teachers as having English as a Second Language."

9) The Slope Index of Inequality (SII) median values shown in Fig 2 are different for males and females. Was SII calculated for male and female children separately? If so, this very important detail need to be reflected in the description given on page 14 detailing how the SII was calculated.

On page 16, after bullet point 4 we have added the sentence:
"The SII was calculated separately for males and females."

10) Need to mention how SII values would be interpreted, for example, what in Fig 2 what does a SII value of 18 or 22 mean? (Is the SII values similar to a Gini coefficient?)

The SII is interpreted as the absolute difference in proportion vulnerable from the bottom to the top of the SEIFA IRSAD decile. To aid interpretation we have included some additional explanation in the results section. The SII is not directly related to the Gini coefficient (a univariate inequality measure), but it is directly related to the concentration index (a bivariate inequality measure) which is also based on the Lorenz curve.
We have added the following sentence to the first paragraph on page 22:
"A slope index of inequality (SII) figure of say 22 indicates that there is an absolute difference of 22 percentage point in developmental vulnerability from the lowest to the highest SEIFA IRSAD decile. Thus the higher the SII value the greater the absolute level of inequality within the State."

11) Need to state in Fig 2 and in the accompanying explanation in the body of the paper what the

adjusted variables were when an adjusted predicted average levels of vulnerability' for each state/territory were derived.

The predicted average levels of vulnerability were adjusted by ATSI, ESL and SEIFA IRSAD. This has been clarified in both the results section of the manuscript and as a footnote to Figure 2.
Specifically, on page 22 we have added the sentence:
"The predicted average levels of vulnerability were adjusted by ESL, ATSI and SEIFA IRSAD."
The same statement is added as a footnote to Figure 2.

12) The description of targeted maternal and child health services in jurisdictions such as in SA, given in page 24, is not reflected in table 5.

We have added a comment in table 2 that indicates that mother can attend a child health nurse upon request. In the discussion, we have further highlighted that the SA child health schedule moves into an active targeted service after the initial home visit.

Second Reviewer:
1) Reviewer 2 is primarily concerned with the use of the SEIFA index IRSAD and our reference in the paper to this index as SEIFA, rather than being specific to which of the 4 indices we use.

SIEFA has 4 different indices that you can use. For the purposes of this paper, we used the SEIFA index called the Index of Relative Socio-economic Advantage and Disadvantage (IRSAD). Specifically we used this index as it is the only one of the four that doesn't include the proportion of the population that are Aboriginal in its computation. Considering that we have included Aboriginal children as a covariate in the models, IRSAD was the most appropriate of the 4 SEIFA indices to use. To be more specific, throughout the paper we now refer to this index as "SEIFA IRSAD" so that readers are more aware of the SEIFA index we used.

2) P 13, line 40, delete comma after 'Children who were identified....''. That said, it would be helpful to clarify that age range that is acceptable for the AEDI. The school entry age in Australia varies but I would not have thought children would be at school at age three years. Were there formal exclusion criteria for the 2009 survey?

There were no exclusion criteria for the 2009 AEDI survey. The survey should have included all children in their first year of full time schooling, however 3 year old children should not be attending full time schooling.
On Page 14, under the section titled "Statistical Analyses" the paragraph in question now reads:
"Children, were excluded in the calculation of developmentally vulnerable on one or more domain if they were; who were identified as having special needs, were recorded as three years old, or had less than four valid domain scores (n=11,484) were not included in the calculation of developmentally vulnerable on one or more domain [18 39]. In Australia, children should not be attending full time schooling if they are only three years old, and were therefore excluded."

Again we thank the reviewers for their feedback, and hope that our revisions address their concerns and comments suitably.

Yours sincerely,
Sally Brinkman for all coauthors