

# Do Abstracts Accurately Reflect the Paper? An Examination of the Built Environment and Physical Activity Literature

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# Contents

- Why abstracts are important.
- Previous evidence of presence of inaccuracies in abstracts.
- Our study: article selection.
- Our study: methods and approach.
- Findings regarding inaccuracy in abstracts.
- Predictors of inaccuracy in abstracts.
- Some Suggestions.

# The Importance of Abstracts...

- Abstracts are likely to be the most widely read part of a paper.
  - “Except for the title, the part of a scientific article that will be **seen and read** by the most people is the abstract” (1)
  - “The abstract is also the **most easily accessed portion** of an article reporting original biomedical research” (2)
  - “Abstracts are the **only substantive portion of the article indexed** in many electronic **databases**, and the only portion many readers read”; “...provides an irreplaceable resource for **busy clinicians, researchers, and authors** searching for pertinent material in...databases” (2,4,6)
  - “(There is a) high likelihood of only the abstracts being read **to form opinion...**”(3)

1. Pitkin, Roy M (1987). The Importance of the Abstract (editorial). *Journal of the American College of Obstetricians and Gynecologists*. Vol.70, No.2, August 1987, P. 267

2. Winker, M.A. (1999). The Need for Concrete Improvement in Abstract Quality. *JAMA*, March 24/31, 1999 – Vol. 281, no. 12. P. 1129 - 1130

3. Pitkin, Roy M., Branagan, Mary A. and Burmiester, Leon (1999). Accuracy of Data in Abstracts of Published Research Articles. *JAMA*, March 24/31, 1999 – Vol. 281, no. 12. P. 1110 – 11.

4. International Committee of Medical Journal Editors (ICJME) note on Abstracts, Accessed online on 6/9/2012, URL : [http://www.icmje.org/manuscript\\_1prepare.html](http://www.icmje.org/manuscript_1prepare.html)

6. Winker, M.A. (1999). The need for concrete improvement in Abstract Quality, *JAMA*. 1999;281(12):1129-1130

# The Importance of Abstracts

- Arthur Amman, President of Global Strategies for HIV Prevention (<http://www.globalstrategies.org>): “I recently met a physician from southern Africa, engaged in perinatal HIV prevention, whose primary access to information was abstracts posted on the Internet. Based on a **single abstract**, they had **altered** their perinatal **HIV prevention program** from an effective therapy to one with lesser efficacy.
- “....Had they read the full text article they would have undoubtedly realized that the study results were based on short-term follow-up, a small pivotal group, incomplete data, and unlikely to be applicable to their country situation. **Their decision to alter treatment based solely on the abstract's conclusions may have resulted in increased perinatal HIV transmission.**”

# ....The Abstract is Often Neglected

- Opinions expressed in published editorials, anecdotal evidence from colleagues and our own experience suggests:
  - Abstracts are often the most neglected part of the paper by the author.
  - May be assigned to one of the more junior members of the research team to write.
  - May not be revised when the manuscript goes through a revise and resubmit.
  - And may contain inaccuracies, fail to capture the final reported findings of the study, or contain inappropriate conclusions.

“In view of the importance of the abstract, it is surprising how little attention or thought the authors seems to give this portion of a scientific paper. During our experience as an author, the abstract was often put together in haste, just before the manuscript was sent off to a journal. By contrast, the rest of the paper had been drafted and redrafted.....But then this most important part was slapped in place as an afterthought.”

Editorial

Roy M Pitkin

Obstetrics and gynecology 70(2), 1987

# Examples of Previous Evidence on Misleading/Incorrect Abstracts

- A 1999 study in JAMA reported that 18% to 68% of abstracts in *Annals of Internal Medicine*, *BMJ*, *CMAJ*, *JAMA*, *Lancet* & *New England Journal of Medicine* had data in the abstract that were inconsistent with or absent from the main body of the article.
- A 2001 study reported that almost 25% of abstracts surveyed in the journal *Clinical Chemistry* had data that were inconsistent with or missing from the main study.
- A 2012 study in surveying articles in rheumatology reported that almost 25% of RCTs in rheumatology reported results of those RCTs inaccurately.

Ref:

Pitkin, Roy M., Branagan, Mary A. and Burmiester, Leon (1999). Accuracy of Data in Abstracts of Published Research Articles. *JAMA*, March 24/31, 1999 – Vol. 281, no. 12. P. 1110 – 11

Siebers, Robert (2001). Data Inconsistencies in Abstracts of Articles in Clinical Chemistry. *Clinical Chemistry* 47, No. 1, 2001. P- 149.

Mathieu et al (2012). Misleading abstract conclusions in randomized controlled trials in rheumatology: Comparison of the abstract conclusions and the results section. [Joint Bone Spine](#) [Volume 79, Issue 3](#), May 2012, Pages 262–267

# Our Study

- To review the accuracy of abstracts of papers examining the relationship between built environments and physical activity (PA) and/or obesity risk using quantitative empirical methods.
- We searched all the major databases including MEDLINE, CINAHL Plus, Econlit, PsycINFO, and Sociological Abstracts.
- Each article had to include a) a built environment component AND b) physical activity or obesity component.
- Included English language articles published from January 1990 – April 2011.
- Of 169 articles that fit our criteria, we were able to access to **151** full papers.



# Method & Approach

- Created a code sheet specifically for this study to determine:
- **If results were handled inappropriately**
  - Non-significant results implied as significant in the abstract?
  - A key result reported in the abstract was nowhere in the body of the paper?
- **If abstract had inappropriate interpretation of results**
  - Causality was implied with study designs that could only reveal associations.
  - Results generalized inappropriately.
  - Authors proceeded to make recommendations not supported by study results.

# Method & Approach

- We hypothesized that certain study characteristics might predict misleading abstracts, and collected information on them for each article:
  - Non-academic authors
  - Time period of publication
  - Study funding sources
  - Structured abstracts.
  - Journal abstract word limits
  - Number of authors
  - Location of study (U.S. state, U.S. nationwide, foreign)
  - ‘Beneficial’ relationship between built environment and PA/obesity.

# Method & Approach

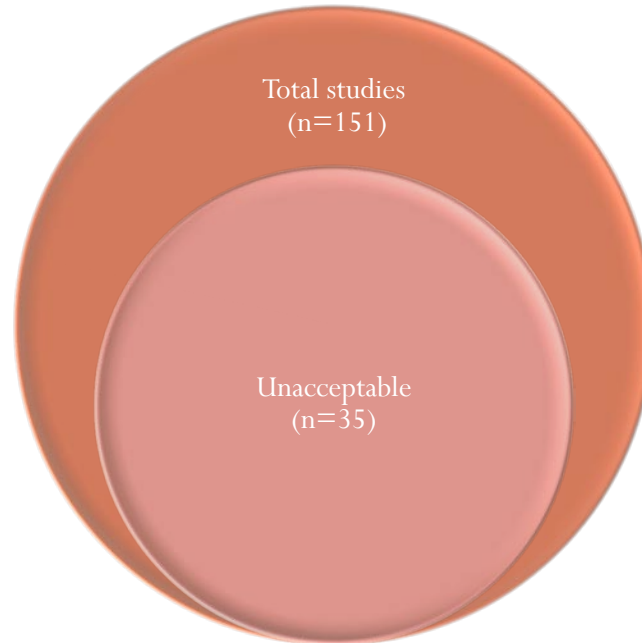
- To determine validity and congruence in data collection, 3 authors (one faculty member, two senior doctoral students with prior publications) independently coded the first 25 articles, compared results, and resolved discrepancies.
  - Guidelines on what constituted ‘causal language’ or ‘inappropriate generalization’ were laid out over several meetings.
- The two senior doctoral students coded all remaining papers, and checked for consensus.
- Any disagreements/uncertainty were reconciled by group discussion with the faculty member.

# Outcome

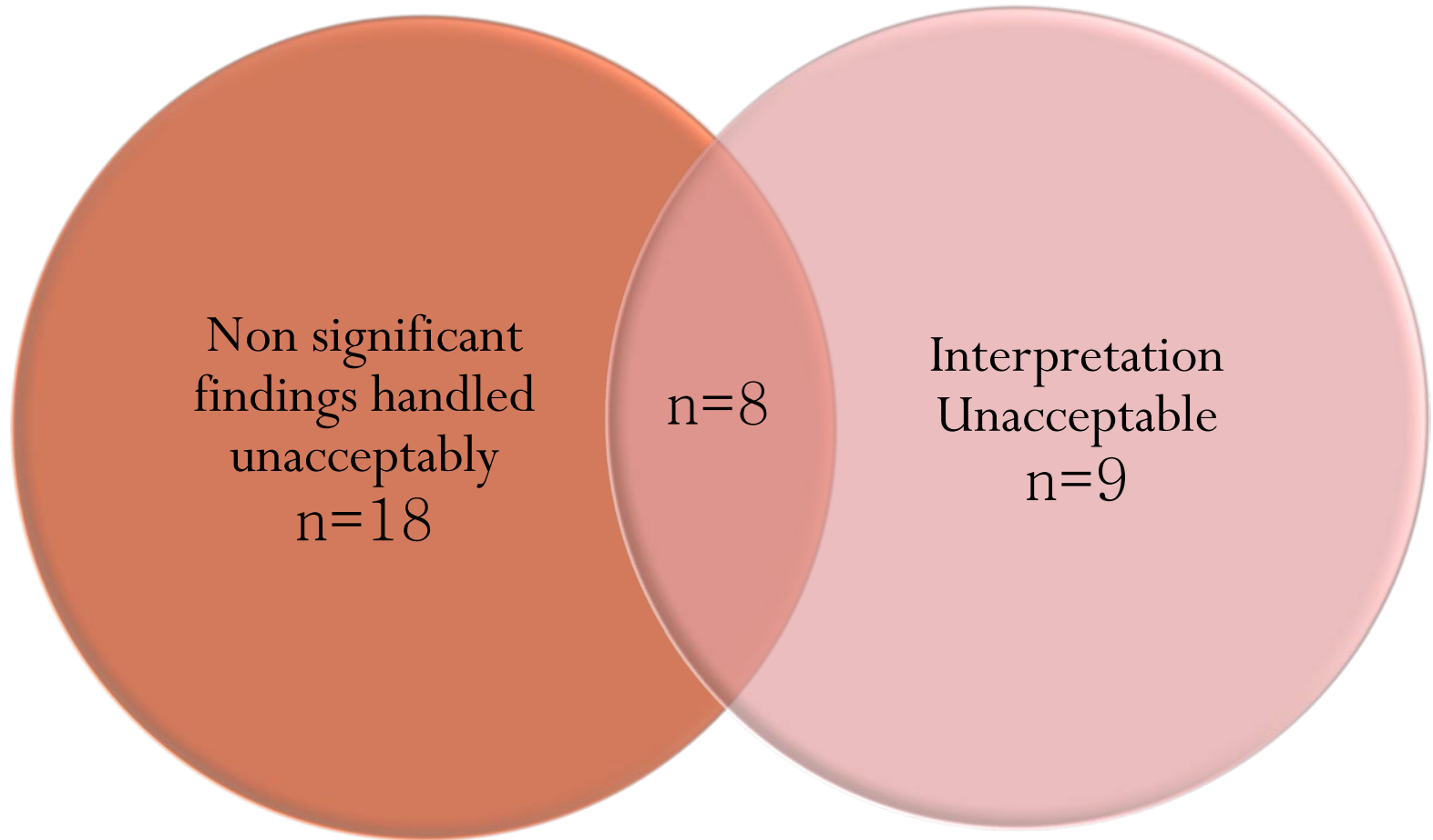
- The outcome variable of key interest was “Unacceptable”.
- “Unacceptable” was coded as a dummy variable with 1 being unacceptable and 0 being acceptable.
- Articles were unacceptable if:
  - The articles handled non significant results inappropriately
  - OR
  - The articles interpreted results inappropriately

# Results

- Of the 151 studies evaluated 35 (or 23.2%) were found to be **unacceptable** based on at least one criterion.



# Break up of Overall Unacceptable



# Example of 'Unacceptable' Abstract

- For example, one article in our review (American Journal of Preventive Medicine, 2003) was unacceptable on the following grounds:
  - Predictors reported as 'significant' in abstract (95% CI of OR from main text in parenthesis) Marital status (C.I. = .80, 1.64), having lower 'social role strain' (C.I. = 0.72, 1.75), the presence of sidewalks (C.I. = 0.70, 1.65), the presence lighter traffic in the neighborhood (C.I. = 0.81, 2.24).
  - Study is observational, cross-sectional. However, abstract concludes that multiple factors influence physical activity.
    - Also, generalized recommendations made based on limited sample (African-American women from 2 counties in one southern state).

# Potential Predictors of Unacceptable Abstracts

- We examined the following predictors
  - Funding source
    - NIH
    - Other US Government (Federal and State)
    - Foundations (RWJF, AHA etc.)
    - Foreign
    - All other (including none, academic, industry and in-kind support)
  - Number of authors
    - 3 or less
    - 4-5
    - 6 or more
  - Abstract word-limit of the journal
    - Unknown
    - <200 words
    - 200-250 words
    - >250 words



# Potential Predictors (cont)

- Year of publishing.
  - 2000-2005 and 2006-2011
- First author is academic.
  - 1:Yes, 0: No.
- Location of the study
  - All U.S.
  - Non-US
  - Southern states in U.S.
  - Other states in U.S.
  - Not specified.
- Journal requires structured abstract
  - 1:Yes, 0: No.
- 'Desirable' outcome was found.
  - 1:Yes, 0: No.

# Descriptive Statistics

	Full Sample	Overall Unacceptable
Funding Source		
All other	25.83	34.29
NIH	23.18	11.43
US Gov	20.53	17.14
Foreign	35.76	34.29
Foundations	17.88	17.14
Number of authors		
3 and below	23.84	28.57
4 to 5	46.36	40.00
6 and above	29.80	31.43
Study Location		
Nationwide	12.58	8.57
Non-US	34.44	31.43
Other States	15.23	17.14
Southern States	15.57	17.14
Unknown	23.18	25.71

# Descriptive Statistics

	Full Sample	Overall Unacceptable
Year		
2000–2005	19.87	20.00
2006–2011	80.13	80.00
Desirable Outcome	90.73	88.57
Abstract Wordlimits		
Unknown	5.30	8.57
Less than 200	15.89	17.14
200 – 250	62.25	62.86
Greater than 250	16.56	11.43
Structured Abstract	70.20	71.43
First author Academic	86.09	85.71

# Results for outcome 'overall unacceptable.'

- We estimated univariate logistic models for the binary outcome of unacceptable abstracts and each set of predictors. Virtually all predictors yielded statistically insignificant results, with only NIH funding (compred to base category of 'all others') being a significant predictor of overall unacceptability at the 90% confidence level ( $OR: 0.264$ ,  $p=0.058$ ).
- Hence, very little evidence to indicate that any of the 'measured' article or author characteristics that we used predict the likelihood that abstracts will be 'acceptable'.

# Results for outcome ‘non-significant findings handled inappropriately’

- Most predictors yielded statistically insignificant results.
- NIH funding (compared to base category of ‘all others’) was significant predictor of lower odds of inappropriate reporting of findings (*OR: 0.14, p=0.04*).
- More than 250 word limit in abstract (compared to base category of ‘unknown’) was predictor of lower odds of inappropriate reporting at 90% confidence (*OR: 0.15, p=0.63*).

# Results for outcome

## ‘interpretation unacceptable

- None of our measured characteristics were significant predictors of unacceptable interpretations in the abstract.
- Thus, it seems that ‘unacceptable interpretations’ are a fairly random occurrence, or at least not predicted by any article characteristics that we measured.

# So, what can we conclude?

- More than 23% of abstracts we reviewed in the literature on built environment and PA/obesity-risk were unacceptable based on our criteria.
  - Reported non-significant results as significant, or had 'significant' findings in abstract which were not in text, were problems in majority of cases.
  - However we could identify only limited measured characteristics that significantly identified what sort of articles would be at a 'higher risk' of unacceptable abstracts
    - NIH funding and higher abstract word limits reduced odds of reporting non-significant results inappropriately.
    - However, no measured variables were significant predictors of inappropriate interpretation.
- Thus, our recommendations are based more on intuition rather than by results of our statistical analyses.

# Recommendations for Improving Abstracts are also not new!

From: **The Need for Concrete Improvement in Abstract Quality**

JAMA. 1999;281(12):1129-1130. doi:10.1001/jama.281.12.1129

## **Table.** Quality Criteria

1. Abstract headings are consistent with structured abstract format.
2. Data in abstract are consistent with text, tables, and figures.
3. Data or information in the abstract are presented in the text, tables, or figures.
4. Years of study and length of follow-up are provided.
5. Results for Main Outcome Measures are presented in Results section (avoid selective reporting).
6. Results are quantified with numerators, denominators, odds ratios, and confidence intervals where appropriate.
7. Absolute differences rather than relative differences are presented wherever possible (eg, "Mortality declined from 6% to 3%" rather than "Mortality declined 50%").
8. For randomized trials, analysis is identified as intent-to-treat or evaluable patient analysis.
9. For surveys, response rate is provided in Results or Design.
10. For multivariate analysis, factors controlled for in model are briefly summarized.
11. Conclusions follow from information contained within the abstract.

**Figure Legend:**



# Recommendations

- What **we think won't work**.....
  - Appealing to the 'better nature' of authors: it is quite unlikely that any researcher is not aware of the fact that abstracts should accurately reflect the results.
    - Continued emphasis during research training on the difference between 'associations' and 'causality' and language implying the former versus the latter may be of value.
  - Leaving it to the editorial staff.
    - Most journals unlikely to have editorial staff with necessary resources or expertise.
  - Telling readers to go beyond the abstract and actually read the main paper!
    - Though it still might be worth emphasizing when training students!

# Recommendations

- What **we hope will work**.....
  - Making accuracy of abstracts a concrete part of the review process.
- Some suggestions to journal editors.
  - ‘Instructions to Authors’ should inform that the accuracy of the abstract will be one criterion on which submitted manuscripts will be judged.
  - ‘Revise & Resubmit’ instructions should include a specific reminder that the abstract must be updated to reflect changes in findings and conclusions resulting from the revision.
  - Lead/Corresponding author should be required to include statement in cover letter taking responsibility for accuracy of abstract.

OR

- Along with signing disclosure statements and copyright statements, lead author should sign a statement verifying accuracy of abstract.

# Recommendations

- More (equally important) suggestions to journal editors.
  - Explicitly instruct reviewers that the accuracy of the abstract should be a criterion on which they should make recommendations about the manuscript.
  - If journals require reviewers to explicitly ‘score’ manuscripts on criteria like ‘innovation of idea’ and ‘empirical methods’, then include ‘accuracy of abstracts’ as an added criterion.
  - Overturn, or encourage authors to ignore, reviewer suggestions to incorporate any statements in the abstract’s conclusion that conflicts with the paper’s findings.
- **Over-arching suggestion: foster an academic culture where researchers do not have to worry about ‘statistically insignificant’ or ‘unpopular’ findings (which might increase proclivity to ‘disguise’ them in the abstract) as long as the study design and empirical approach is of sound quality!**