Does social disadvantage affect the validity of self-report for cervical cancer screening?

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Objective: The aim was to review the international literature on the validity of self-report of cervical cancer screening, specifically of studies that made direct comparisons among women with and without social disadvantage, based on race/ethnicity, foreign-born status, language ability, income, or education.

Method: The databases of Medline, EBM Reviews, and CINAHL from 1990 to 2011 were searched using relevant search terms. Articles eligible for data extraction documented the prevalence of cervical cancer screening based on both self-report and an objective measure for women both with and without at least one measure of social disadvantage. The report-to-record ratio, the ratio of the proportion of study subjects who report at least one screening test within a particular time frame to the proportion of study subjects who have a record of the same test within that time frame, was calculated for each subgroup.

Results: Five studies met the extraction criteria. Subgroups were based on race/ethnicity, education, and income. In all studies, and across all subgroups, report-to-record ratios were greater than one, indicative of pervasive over-reporting.

Conclusion: The findings suggest that objective measures should be used by policymakers, researchers, and public-health practitioners in place of self-report to accurately determine cervical cancer screening rates.

Keywords: vulnerable populations, early detection of cancer, vaginal smears, Pap test, reproducibility of results, validity

Introduction
Detection of invasive cervical cancer by screening confers a better prognosis and improved survival compared with cervical cancer being detected symptomatically.1 This effect is not attributable to lead-time bias, and is largely due to screen-detected cancers being found at earlier stages than symptomatic cancers.1 Due to the clear benefits of cervical cancer screening, and the potential harms when screening is inadequate, policy makers, researchers, and public-health practitioners need valid methods of determining Papanicolaou (Pap) test rates. Underestimation of rates could lead to policies and programs that make inappropriate use of resources, and overestimation could lead to missed opportunities to increase screening.2,3 Self-report of previous tests is a commonly used and relatively easy method to determine prevalence of cancer screening for policymakers and knowledge users, but its validity has been questioned in the literature.4–7

Women with certain sociodemographic characteristics have been found to be underscreened for cervical cancer, including racial/ethnic minorities, immigrants, women of
low income, and those with low educational attainment.8–15
The determination of accurate screening rates is of particular
importance for women in these groups, to allow for accurate
monitoring and evaluation of targeted interventions.16–18
However, the validity of self-report may be of particular
concern for these same groups, and the literature is not clear
on the subject. For example, the tendency to give socially
desirable responses may be higher among those with less
education and among non-White survey respondents, but
lower among the unscreened.19 As well, previous reviews
of the literature have suggested that Hispanic and African-
American women disproportionately over-report Pap test
screening compared with their White counterparts,5,7 and
contradictorily, that minority or low socioeconomic status is
not associated with accuracy of Pap test recall.8 The purpose
of this study is to review the international literature on the
validity of self-report of cervical cancer screening, with a spe-
cific focus on studies that make direct comparisons of validity
among women with and without social disadvantage.

Methods
The databases of Medline, EBM Reviews, and CINAHL
from 1990 to 2011 were searched using the search terms
“self-report,” “cancer screening,” “early detection of cancer,”
vaginal smears,” “Pap test,” “reproducibility of results,” and
“validity”. The search was limited to articles published in
English. The reference lists of previous literature reviews3,6,7,20
were also searched to identify studies that may have been
missed. This strategy produced 114 unique articles. After
review of the titles and abstracts, the authors were left with
24 studies that appeared to validate self-report of cervical
cancer screening against an objective measure. The full text
of the articles was then reviewed to determine which were eli-
gible for data extraction. Articles eligible for data extraction
had to: (1) include the prevalence of cervical cancer screening
based on both self-report and an objective measure, ie, medi-
cal charts, administrative data, laboratory reports, and/or a
cytology registry, for the same women within the same time
frame, and (2) had to do so for both women with and without
at least one of the chosen measures of social disadvantage.
Specifically, social disadvantage was defined based on any
of the following: income, education, race/ethnicity, language
ability, and foreign-born status. No geographic limitations
were set on the literature search.

Five studies met the extraction criteria.21–25 Of note, one
study in the literature search26 compared self-report of cervi-
cal cancer screening with medical records for women from
each of five racial/ethnic groups; however, the study sample
only included women who reported a Pap test, meaning the
prevalence of positive self-report was artificially set at 100%.
Therefore, this study was excluded from this review. The follow-
ing data were extracted from all studies meeting the selection
criteria: setting, number and age range of women in the valida-
tion sample, objective measure used, time frame for recall, and
the sociodemographic groups that were compared.

The report-to-record ratio, the ratio of the proportion of
study subjects who report at least one screening test within
a particular time frame to the proportion of study subjects
who have a record of the same test within that time frame, is
frequently used as a measure of net bias of self-report, with
values greater than one indicating over-reporting and values
less than one indicating under-reporting.27 Therefore, for
each study subgroup, a report-to-record ratio was calculated.
SAS version 9.3 (SAS Institute, Cary, NC) was used for all
confidence interval calculations.

Results
The five included studies varied widely in the setting, num-
ber and age range of included women, and time frame for
recall21–25 (Table 1). Four were performed in the US, and one
was conducted in Ontario, Canada.24 One study was done at
the population level,24 whereas the remainder had sample
sizes ranging from 251 to 4784 women. Three studies21,23,25
compared self-report with medical charts and two22,24 with
administrative data. Four studies21–23,25 created subgroups
based on race/ethnicity, one21 categorized based on educa-
tional attainment, and one26 on neighborhood income quintiles
(one study25 examined both race/ethnicity and education). No
studies examined language ability or foreign-born status.

In all studies, and across all subgroups, report-to-record
ratios were greater than one, indicative of pervasive over-
reporting (Figure 1). Over-reporting was especially high
in the study with the oldest population, which also had the
lowest screening rates.22 Confidence intervals for women
with social disadvantage frequently overlapped with con-
fidence intervals for those without, with one exception:22
where minority women had much higher report-to-record
ratios. In general, the highest report-to-record ratios were not
associated with any particular subgroup, but were associated
with low values for the denominator (objective records of
Pap tests). The considerable heterogeneity between the five
studies precluded meta-analysis.

Discussion
In this review of studies that allowed for direct comparison
of self-report validity of cervical cancer screening for
women with and without social disadvantage, it was found that over-reporting of screening is widespread, regardless of sociodemographic characteristics. The small number of heterogenous studies eligible for review precludes firm conclusions about differential rates of over-reporting by sociodemographic status. Of note, the study that was excluded\textsuperscript{26} similarly found that only 69.4\% of self-reported Pap tests were validated in medical records, with a range of 65.9\% for Latina women to 85.1\% for White women. These findings suggest that health equity researchers, public-health
practitioners, and policymakers must interpret the accuracy of screening rates and screening gaps based on self-report with caution. The finding of widespread over-reporting, particularly when prevalence was low,\(^2\) is likely applicable to other kinds of cancer screening and preventive health maneuvers, and this possibility should be explored in similar reviews of the literature.

This review makes several contributions to the literature. To the authors’ knowledge, this review is the first to identify studies that made direct comparisons of cervical cancer screening validity for women with and without social disadvantage. The study reviewed the international literature and investigated measures of social disadvantage beyond race/ethnicity. It has also highlighted gaps in the literature that need to be addressed. Only a small number of studies were found, most of which had small sample sizes of disadvantaged women. These small sample sizes may in some cases have led to wider and overlapping confidence intervals. There were no studies assessing self-report validity for foreign-born women. Considering the ethnically and socioeconomically diverse nature and the high population of immigrants in many countries, more research studies need to be done to validate self-report for this vulnerable group, especially as known screening inequities may be larger than what would be suggested by self-report.

This review also has limitations. Two different objective measures were used in the included studies, and neither are necessarily perfect gold standards. Medical charts may miss some screening tests, as health care providers may not always record them properly,\(^2\) and administrative data also may not capture all screening tests.\(^2\)\(^4\)\(^2\) As well, socially disadvantaged women may be more likely to visit health centers where physicians are salaried and have less motivation for accurate administrative documentation.\(^3\)\(^2\)\(^2\)\(^6\) However, as these measures are recorded at the time of screening, they are still expected to be more accurate, and more appropriate gold standards, than self-report. As well, the findings held regardless of the type of objective measure used. There were only a small number of studies in the review, with noticeable heterogeneity, precluding a meta-analysis. However, it was possible to calculate report-to-record ratios and confidence intervals for all studies. The paucity of available literature suggests that more studies need to be conducted to address this important research question.

Despite these limitations, the findings suggest that objective measures, such as medical charts, administrative data, laboratory records, or cytology registries, may be better than surveys or questionnaires to more accurately determine both cervical cancer screening rates and the magnitude of screening inequities. Using objective measures also circumvents the issue of response bias. Self-report rates can only be provided for women who agree to report. In situations where there is funding available and support at the policymaker level, organized screening programs linked to complete population-level cytology registries could lead to both more accurate determination of screening rates and gaps, and greater opportunities to increase screening for disadvantaged women. Where such organized programs exist, the infrastructure should be put in place to ensure that screening rates for the general population and for particular subgroups are determined directly from objective measures provided by the program itself. Such programs would also allow for true gold standards for determining screening rates. Of note, neither of the two countries where the included studies took place currently have national organized screening programs.

Where funds for such programs may not be available, and where self-report may be the method chosen due to feasibility or cost, especially when there is limited access to administrative data, ways of improving the accuracy of self-report through improving the wording and structure of surveys needs to be explored.\(^3\)\(^2\)\(^4\) When possible, researchers should conduct validation studies aimed at determining the requisite mathematical correction factors for various jurisdictions and sociodemographic groups if applicable. With more accurate measures of cervical cancer screening, researchers, primary-care providers, and policymakers will better be able to efficiently and effectively address the screening inequities that exist for disadvantaged women.

**Disclosure**

The authors report no conflicts of interest in this work.

**References**