

UP IN SMOKE

Measuring the effect of a ban on tobacco advertising near parks and schools in Chicago, IL using GIS procedures: A pilot evaluation

Introduction

Increased smoking prevalence among youth is associated with the increased presence of tobacco advertising near their schools and areas of play^{1,2,3}. A ban on point-of-purchase tobacco advertising within 1000-ft distances to schools and parks has been proposed to the FDA, but was not passed into law due to the presentation of research demonstrating the ban's effect on 85-95% of the land area in more than a dozen U.S. cities⁴. The conclusions of this research led to the court ruling that the ban restricted commercial speech, and was thereafter considered unconstitutional. The only estimate of the potential impact of a 1000-ft ban has been based on land area. This analysis aims to understand how a ban on tobacco advertising within a 1000-ft distance to schools and parks would affect the number and proportions of tobacco retailers in Chicago, to explore whether the constitutionality of the law changes depending on the method of analysis. A pilot evaluation of the proposed procedures will be used to determine how useful the results of this analysis are as a contribution to the debate on the constitutionality of the ban.

Methods

- 1) Data was obtained from the Chicago Data Portal and imported into ArcMAP.
- 2) 1000, 500, 350, and 100 foot buffers were created surrounding schools and parks.
- 3) Buffers were merged and dissolved to portray one single buffer including distance to schools and parks criteria.
- 4) The number and proportion of tobacco stores within the distances to school and parks was calculated.

Results

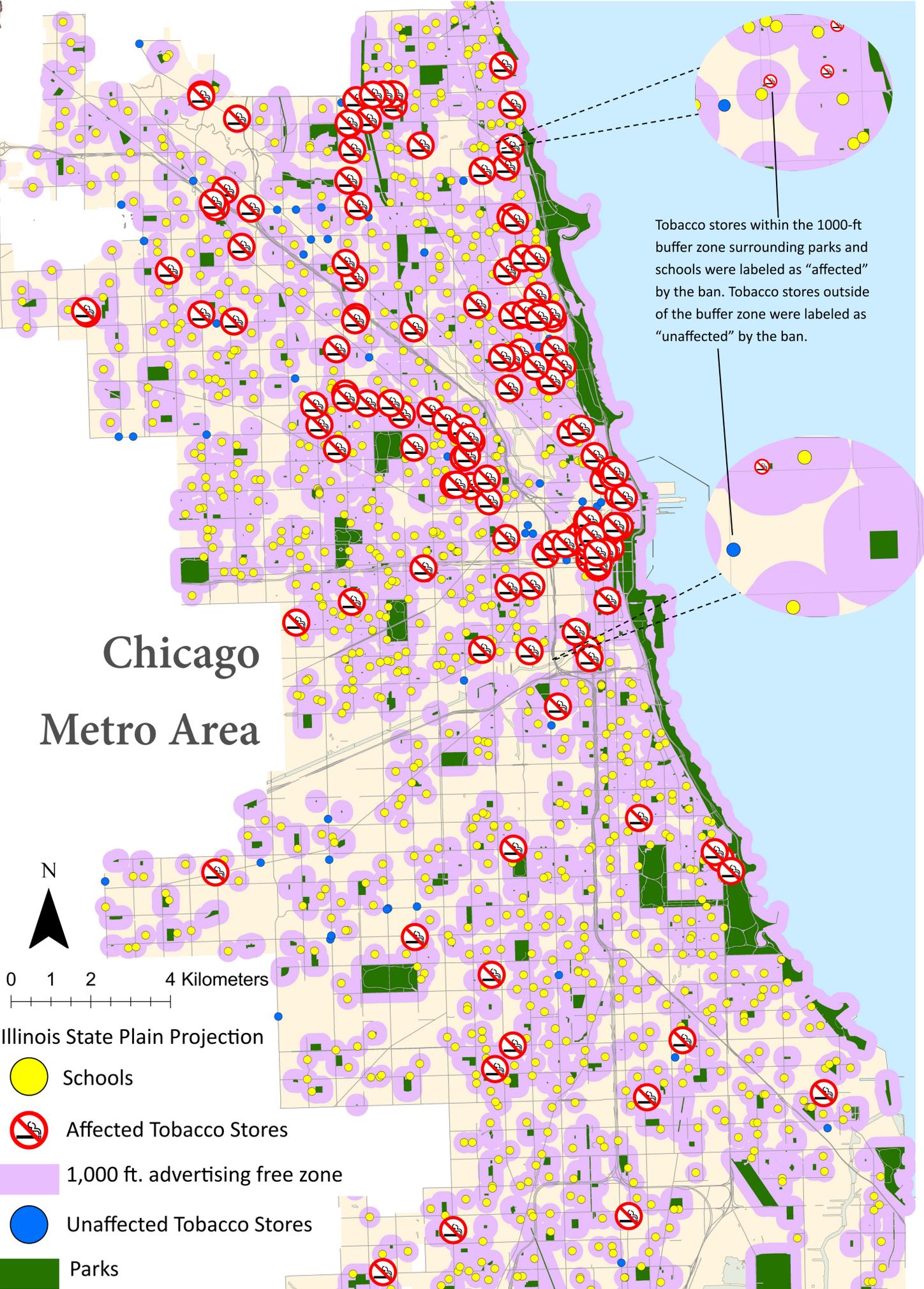
68% of tobacco retailers in Chicago, documented in the ReferenceUSA dataset, are within 1,000 ft distances to the portrayed schools and parks and are therefore considered "affected" by the ban. Less than half of these retailers would be affected by a 500 foot ban (25%). Less than half of these retailers would be affected by a 350 ft ban (12%), and less than 1% of total retailers would be affected by a 100 ft ban.

Table 1:

Distance from parks and schools	Number of retailers	Proportion of retailers
1,000 ft	175	68%
500 ft	64	25%
350 ft	30	12%
100 ft	1	>0.01%

Discussion

Depicted on this map is an illustration of the GIS procedures and datasets used to estimate the number and proportion of tobacco retailers in Chicago that would be affected by this ban if it were enacted. The retailer data were considered "affected" by the law if their centroid was contained inside of the buffer zone representing the advertising-restricted area, based on its proximity to schools and parks. One key limitation of this analysis is its use of imperfect data, which may not accurately represent the schools, parks, and tobacco retailers as they exist in reality. The tobacco retailer dataset, for example, is likely to underestimate the true number of retailers to be affected by the ban, as it includes only establishments primarily engaged in tobacco products and supplies, and would therefore not include establishments that advertise and sell tobacco products but are primarily engaged in other activities, like gas stations. The public and private school



datasets are also likely to underestimate the number of schools that would affect the nearby retailers, as they do not include charter schools and other special education facilities. Lastly, the parks dataset is likely to misrepresent the actual number of parks given that it only includes parks managed by the Chicago Park District, and therefore may include cemeteries and forest land while omitting parks that are managed by anyone other than the Chicago Park District (e.g. the state of IL). In a comparison with the ESRI aerial photograph, the majority of the parks contained in the Chicago dataset appeared to also be parks in the photograph, however, there was some discrepancy between the two data sources as areas that appeared to be parks in the ESRI photograph were not documented in the Chicago parks dataset. Given that both the parks and schools are likely to be underrepresented in this analysis, I expect this model to

underestimate the actual effects of the proposed ban. Overall, the results of this analysis suggest that a ban of this nature has the potential to reduce the amount of tobacco advertising near schools and parks, which could result in reduced youth exposure to advertising. Because FDA has considered weakening the advertising restriction to smaller buffer zones, including that of 1 city block from schools and parks (approximately 350 feet), sensitivity analysis was executed by creating smaller buffers and re-calculating the proportion of retailers. These findings suggest that smaller restriction zones result in a decreased proportion of retailers affected by the ban (12% of retailers for the 350-ft ban compared to 68% of retailers for the 1000-ft ban). This analysis also demonstrates that the use of the proportion of retailers to measure the effect of the ban rather than land area results in a decreased proportion of affected parcels (68% of retailers vs. 85-95% of land area). The results of the analysis could be helpful in contributing to the debate on the constitutionality of the ban, however, an on-the-grounds analysis of the parks, schools and tobacco retailers in Chicago would improve the accuracy of this analysis.

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Data Sources: Cook county—public schools, August 2011, Cook County; published by Chicago Data Portal, accessed April 17, 2018, Cook county—private schools, August 2011, Cook County; published by Chicago Data Portal, accessed April 17, 2018, Chicago parks, May 2017, Chicago Parks District; published by Chicago Data Portal, accessed April 17, 2018, Tobacco stores, April 2018, ReferenceUSA; published by ReferenceUSA, accessed April 17, 2018

1. Leatherdale, S.T., & Strath, J.M. (2007). Tobacco retail density surrounding schools and cigarette access behaviors among underage smoking students. *Annals of Behavioral Medicine*, 33(1), 105-111.

2. Pokorny, S.B., Jason, L.A., & Schoeny, M.E. (2003). The Relation of Retail Tobacco Availability to Initiation and Continued Smoking. *Journal of Clinical Child & Adult Psychology*, 32(2), 193-204.

3. Mackintosh, A.M., Moodie, C., Hastings, G. (2012). The association between point-of-sale displays and youth smoking susceptibility. *Nicotine & tobacco research: Official Journal of the Society for Research on Nicotine & Tobacco*, 14(5), 616-20.

4. Comments of Brown & Williamson Tobacco Corporation, Liggett Group Inc., Lorillard Tobacco Company, Philip Morris Incorporated, R. J. Reynolds Tobacco Company, & Tobacco Institute Inc. Comments on FDA's Proposed Regulations Part 897, Subpart D—Labeling and Advertising (Volume VII)