

Supplementary material

Kamiński M, Nowak JK, Kręgielska-Narożna M, Bogdański P. Effect of the introduction of pictorial cigarette pack warnings in Poland: a retrospective analysis of the market sales data of a large convenience store franchise. *Pol Arch Intern Med.* 2021; 131: 90-92. doi:10.20452/pamw.15677

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Statistical analysis

We performed the visualization and statistics using the R-programming language (R 3.6.1., R Foundation, Vienna, Austria). We performed data analysis in June 2020. The distribution of the sales index was found to be normal (Shapiro-Wilk $p=0.22$). We checked changes of sales indexes before the introduction of pictorial warnings, comparing mean sales indexes between the first, second and third year before intervention using the t-test. We compared the mean sales index in the three years before obligatory pictorial warnings (June 2014-May 2017) vs. one year (June 2017-May 2018), and two years (June 2017-May 2019) after the intervention using t-test. Moreover, we calculated change in yearly mean sales in the first and the second year after implementation in proportion to the year before the intervention. We extracted months with the highest and the lowest sales index using the Seasonal Decomposition of Time Series by Loess (Local Polynomial Regression Fitting). We analyzed the effect of intervention using Type II Sum Squares ANCOVA using R package *its.analysis*¹. The model is optimal for time trends with a limited number of data points (below 50). The dependent variable was the cigarette sales index. We coded the intervention period (pictorial warnings) as one and the time preceding the intervention as null. Other covariates were: time (coded as consecutive numbers from 1 to 60), season (spring, summer, autumn, winter), the percentage of non-domestic packs of cigarettes in each quartile of year, cumulative inflation relative to 2014 (coded as 1), and weighted average retail selling price of cigarettes. The last tobacco excise increase was dated 1st January 2014, and until 2020 the tax rates on cigarette packs

were not changed. For this reason, we did not include taxation on tobacco products as covariate.

The data analyzed fulfills assumptions of the ANCOVA.

We also performed a sensitivity analysis. We repeated t-tests comparing index sales before the introduction of pictorial warnings, vs. one year and two years after intervention, but we excluded a transitional period when the Directive was introduced, yet the pictorial warnings were still not obligatory (August 2016 to May 2017). Finally, we recalculated ANCOVA model using bootstrapping with 1,000 repetitions.

1 English P. The its.analysis R Package – Modelling Short Time Series Data. *SSRN Journal*

Published Online First: 2019. doi:10.2139/ssrn.3398189