

# BMJ Open Study protocol: assessing the association between corporate financial influence and implementation of policies to tackle commercial determinants of non-communicable diseases: a cross-sectional analysis of 172 countries

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## ABSTRACT

**Introduction** There are many case studies of corporations that have worked to undermine health policy implementation. It is unclear whether countries that are more exposed to corporate financial influence are systematically less likely to implement robust health policies that target firms' financial interests. We aim to assess the association between corporate financial influence and implementation of WHO-recommended policies to constrain sales, marketing and consumption of tobacco, alcohol and unhealthy foods.

**Methods and analysis** We will perform a cross-sectional analysis of 172 WHO Member States using national datasets from 2015, 2017 and 2020. We will use random effects generalised least squares regression to test the association between implementation status of 12 WHO-recommended tobacco, alcohol and diet policies, and *corporate financial influence*, a metric that combines disclosure of campaign donations, public campaign finance, corporate campaign donations, legislature corrupt activities, disclosure by politicians and executive oversight. We will control for GDP per capita, population aged >65 years (%), urbanisation (%), level of democracy, continent, ethno-linguistic fractionalisation, legal origin, UN-defined 'Small Island Developing States' and Muslim population (%) (to capture alcohol policy differences). We will include year dummies to address the possibility of a spurious relationship between the outcome variable and the independent variables of interests. For example, there may be an upward global trend in policy implementation that coincides with an upward global trend in the regulation of lobbying and campaign finance.

**Ethics and dissemination** As this study uses publicly available data, ethics approval is not required. The authors have no conflicts of interest to declare. Findings will be submitted to a peer-reviewed journal for publication in the academic literature. All data, code and syntax will be made publicly available on GitHub.

## INTRODUCTION

Non-communicable diseases (NCDs) such as cancer, heart disease, diabetes and chronic obstructive pulmonary disease cause the

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ We will use a range of robust measures and transparently report all findings.
- ⇒ Our work is based on an underlying literature review.
- ⇒ The concept of corporate financial influence is difficult to neatly define.
- ⇒ Robust data are not widely available for clandestine activities like bribery and lobbying.

majority of death and disability worldwide.<sup>1</sup> This disease burden is largely preventable and in 2013 WHO identified a set of highly cost-effective policies and public health interventions that can be used to tackle common NCD risk factors.<sup>2</sup> The full set of 'Best Buy' policies that target tobacco, alcohol and diet are presented in online supplemental appendix 1. This list of policies was endorsed by the 194 WHO Member States in 2013, and again in 2017.<sup>3</sup> However, to date many countries have not implemented these policies.<sup>4</sup> It has been hypothesised that one reason may be the influence of corporations, particularly on those policies which seek to limit the consumption of unhealthy goods.<sup>5-7</sup> Indeed, a growing body of work describes the myriad channels through which corporations seek to undermine effective public health measures in this way.<sup>5 6 8 9</sup> In 2016, Kickbusch *et al* defined the 'commercial determinants of health' as "strategies and approaches used by the private sector to promote products and choices that are detrimental to health".<sup>10</sup> Although case studies are plentiful,<sup>8 9</sup> there has been a paucity of empirical research to quantify the association between corporate influence and policy implementation.

**Box 1 Globally endorsed commercial policies from the WHO 'best buys'****Tobacco**

- ⇒ Tobacco tax
- ⇒ Smoke-free places
- ⇒ Plain packaging and graphic warnings
- ⇒ Tobacco advertising bans
- ⇒ Tobacco mass media campaigns

**Alcohol**

- ⇒ Alcohol sales restrictions
- ⇒ Alcohol advertising bans
- ⇒ Alcohol tax

**Diet**

- ⇒ Salt reduction
- ⇒ Fat reduction
- ⇒ Child marketing restrictions
- ⇒ Restrictions on the marketing of breast milk substitutes

Among the WHO Best Buy policies are 12 policies that target tobacco, alcohol, foods high in fats and salt, child-focused junk food marketing and marketing of breast milk substitutes.<sup>3</sup> These policies designed to tackle the commercial determinants of NCDs were first endorsed in 2013.<sup>11</sup>

WHO monitors the implementation of these commercial policies through regular NCD country capacity surveys, completed by national ministries of health.<sup>12</sup> WHO has produced three global progress monitor reports—in 2015,<sup>13</sup> 2017<sup>14</sup> and 2020<sup>15</sup>—providing country-level assessments of whether each of the 12 commercial policies has been 'fully implemented', 'partially implemented' or 'not implemented'. Global reviews have found that while implementation is rising over time, over half of all NCD policies remain unimplemented.<sup>4,16</sup>

This WHO data on commercial policy implementation provide a unique opportunity to examine whether indicators of corporate influence over policy-making processes are associated with implementation of key commercial policies, according to the three policy clusters delineated in [box 1](#).

To elucidate the association between corporate influence and the implementation of commercial policies, in this exploratory analysis we will perform three sets of analyses:

1. To characterise implementation trends over time for tobacco, alcohol and food-related policies using descriptive statistics, with sub-analysis by geographical region and World Bank income group.
2. To assess the association between implementation of commercial policies (aggregate score) and a newly developed measure of corporate financial influence, controlling for a range of geopolitical variables using random effects generalised least squares (GLS) regressions. Sub-analyses will assess the association between

- a. Country-level implementation of each of the three clusters (tobacco, alcohol, food) and corporate financial influence.
  - b. Country-level implementation of each individual policy and corporate financial influence.
3. To identify countries with commercial policy implementation levels that are higher or lower than would be expected given their geopolitical characteristics; evaluated using our baseline regression model and a modified Bland-Altman chart.

We hypothesise that countries with the highest levels of corporate financial influence will have the lowest levels of policy implementation.

In a secondary analysis, we also aim to test whether the prevalence of smoking, alcohol use, hypertension, and adult and child obesity are respectively associated with implementation of tobacco, alcohol, salt, fat, and child marketing policies.

**METHODS AND ANALYSIS**

This cross-sectional study will use observational data from a range of publicly available sources for the 194 WHO Member States for the years 2015, 2017 and 2020. All WHO Member States for which data were available will be included. This protocol has been prepared in alignment with the SPIRIT 2013 checklist for trial protocols.<sup>17</sup>

**Commercial policy implementation scores**

Data on the implementation status of the 12 commercial policies (outlined in [box 1](#)) for all 194 Member States will be extracted from the 2015, 2017 and 2020 WHO NCD Progress Monitor reports and transcribed into a csv spreadsheet. Data will be double-checked by two authors. Full descriptions of each policy are available in online supplemental appendix 1. Following the approach of WHO and Allen *et al*,<sup>4</sup> we will construct policy scores for each country, according 1 point for each fully implemented policy, 0.5 points for each partially implemented policy, and 0 points for non-implemented policies and those for which no data are available. We will construct an overall aggregate score for each country, ranging from 0 to 12, as well as policy cluster scores for tobacco (range 0–5), alcohol (range 0–3) and food (range 0–4).

**Commercial financial influence**

We aim to assess whether direct commercial financial influence—that is, payments to politicians and their parties (independent variable)—is associated with implementation of commercial NCD policies (dependent variable). While there are myriad examples of corporate actors using their financial clout to undermine NCD regulations,<sup>9</sup> it is important to note that policy-making is a complex process and corporations do not universally seek to undermine effective NCD policies.

This analysis will focus on a narrow conceptual space concerning whether corporate actors wield outsized financial influence over policy-makers, meaning that the

arguments and lobbying efforts of other non-commercial actors (such as public health advocates) are marginalised.<sup>18</sup> The political science and global health literature consistently identify four regulatory areas in this space<sup>5 7 9 19–27</sup>:

1. *Campaign financing*: Are there limits on campaign donations from companies and/or a requirement to publicly disclose the source and amount of donations whether there are limits on campaign donations from companies and/or a requirement to publicly disclose the source and amount of those donations?
2. *Business and financial interests of politicians*: Are there mandatory public disclosures of politicians' financial and business interests?
3. *Lobbying transparency*: Are there mandatory public disclosures of lobbyists activities?
4. *Enforcement*: Is there an independent administrative or judicial body that has the capacity to enforce the above-listed financing limits and disclosure requirements?

As far as we are aware, there is not a single globally comparable indicator that combines these four domains to quantify the level of *corporate financial influence* in each country. As such, we performed a literature review to identify the most robust, globally comparable and conceptually aligned metric to use as the independent variable, reported in online supplemental appendix 2. The closest—Lima and Galea's Corporate Permeation Index (CPI)—includes a wide variety of input variables, meaning that the scope of that metric extends well beyond the ability of corporations to directly influence the policymaking process.<sup>28</sup> Rather, CPI captures “the extent to which corporations are embedded in the political, legal, social, economic and cultural fabric of a given society”. Furthermore, their CPI metric only covers 146 countries.<sup>28</sup> While there was not a single composite indicator that captured commercial financial influence, our review did identify six individual proxies that were well aligned with three of the four regulatory areas (we were unable to identify an indicator of lobbying transparency with sufficient country coverage). These items all conceptually map to the political-commercial nexus, have strong internal and external validity, and cover 172 countries (22 microstates are excluded; see online supplemental appendix 3 for list).

Building on the work of Lima and Galea, we will use structural equation modelling (with full information maximum likelihood) in Stata to identify the latent factor underlying the six input indicators listed in **box 2**. This will enable us to create a new *Corporate Financial Influence Index* (CFII) that focuses on the interaction between politicians and commercial actors. While there are no direct indicators for lobbying currently available, it is reasonable to expect that the latent factor (the single underlying factor picked out by the factor analysis) behind the six included variables will capture lobbying activities. Having identified a single underlying factor, we will generate an index score for each country, ranging from zero (lowest level of corporate financial influence) to 100 (highest).

## Box 2 Indicators that capture different aspects of corporate financial influence

- ⇒ **Disclosure of campaign donations**: Are there disclosure requirements for donations to national election campaigns? (Source: V-Dem dataset V.11.1)
- ⇒ **Public campaign finance**: Is significant public financing available for parties' and/or candidates' campaigns for national office? (Source: V-Dem dataset V.11.1)
- ⇒ **Corporate campaign donations**: Is there a ban on donations from domestic or foreign interests to political parties or candidates? (Source: IDEA. Political Finance Database, 2020 update)
- ⇒ **Disclosure by politicians**: Do the law or regulations of the country require politicians to provide either financial and/or business interests disclosures and are the disclosures publicly available? (Source: Djankov *et al*<sup>36</sup>)
- ⇒ **Legislature corrupt activities**: Do members of the legislature abuse their position for financial gain? (Source: V-Dem dataset V.11.1)
- ⇒ **Executive oversight**: If executive branch officials were engaged in unconstitutional, illegal or unethical activity, how likely is it that a body other than the legislature, such as a comptroller general, general prosecutor or ombudsman, would question or investigate them and issue an unfavourable decision or report? (Source: V-Dem dataset V.11.1)

We describe the latent factor analysis procedure in more detail in online supplemental appendix 4.

### Control variables

In assessing the association between CFII and commercial policy implementation, we will control for the following economic, cultural, historical, geographical and population factors: GDP per capita, population aged >65 years (%), urbanisation (%), level of democracy, continent, ethno-linguistic fractionalisation, legal origin, Small Island Developing States and Muslim population (%) (to capture alcohol policy differences)—control variables derived from earlier work on international NCD policy implementation.<sup>4</sup> We will include year dummies to address global trends in terms of the outcome variable and the independent variables of interest. For example, there may be an upward global trend in policy implementation that coincides with an upward global trend in the regulation of lobbying and campaign finance.

### Statistical analyses

We will use descriptive statistics to characterise implementation trends over time for the commercial policies. We will present mean implementation scores for each WHO geographical region and World Bank income group.

We will perform the following three regression analyses:

#### Ia: Aggregate policy score

Total commercial policies (aggregate score for all 12 policies) regressed on CFII.

#### Ib: Policy clusters

Each commercial policy cluster (tobacco, alcohol, food) separately regressed on CFII.

#### Ic: Individual policies

All 12 individual commercial policies separately regressed on CFII.

Our data set will span 3 years and up to 194 countries. Our regression analyses will use a random effects GLS specification in order to take into account variation both between and within countries over time; specifically, a matrix-weighted average of the between and within results. This will be implemented using the `xreg`, `re` command in Stata. We will perform each regression with and without controls.

### Identification of outliers

We will use the results from Ia and Ib to construct prediction-based Bland-Altman plots for 2020, plotting each country's WHO-ascertained policy implementation score on the x-axis, and predicted score on the y-axis, based on the regression equation. We will set 95% limits of agreement to identify overperforming and underperforming countries.

### Additional model

#### Risk factor prevalence and policy implementation

We will use the random effects GLS model to test whether commercial policy implementation is associated with the prevalence of the following risk factors at the national level:

- i. Tobacco cluster aggregate score versus total smoking prevalence (ages 15+).<sup>29</sup>
- ii. Alcohol cluster aggregate score versus alcohol consumption per capita (ages 15+).<sup>30</sup>
- iii. Salt reduction policy score versus hypertension prevalence (ages 18+).<sup>31 32</sup>
- iv. Fat reduction policy score versus prevalence of body mass index (BMI >30 (ages 18+)).<sup>33 34</sup>
- v. Child food marketing policy score versus prevalence of BMI >30 (ages <18).<sup>33 34</sup>

### Sensitivity analyses and robustness checks

We will repeat the three regression models using Lima and Galea's CPI,<sup>28</sup> a version of CFII that includes the registration of lobbying activities (only available for 127 countries), and a further version of CFII that drops Djankov's 'disclosures by politicians' data (only available for 2010). We will also repeat the three regression models and the additional risk factor prevalence regression using multiple imputation to address missing data, using Stata's `mi impute mvn` and `mi est` commands.

We will repeat the regression models including level of corruption as a control variable as it is a potential confounder for CFII. We will use the *Political Corruption Index* from the V-Dem dataset, V.11.1. We will perform multiplicity tests for all regression models using Stata's `wyoming` module.

We will produce variable and coefficient matrices for regression model Ia in order to check for collinearity, using Stata. Finally, we will perform the Robust

Hausman test for random vs fixed effects using Stata's `rhausman` module.

### Data management and statistical principles

All raw data used in the study will be uploaded to GitHub and made publicly available. All analyses will be performed on Stata V.14.1 and R V.4.1.0. We will use a 0.05 level of statistical significance, cluster-robust standard errors, and report 95% CIs. We will follow the statistical analysis plan in online supplemental appendix 5, which was developed in line with the DEBATE reporting guidelines for observational studies.<sup>35</sup> We will upload our syntax online (<https://github.com/drlukeallen/CDOH-policy-implementation>)

### Patient and public involvement

No patient involved.

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**Contributors** LNA and SW conceived the study, based on previous work by LNA, SW and HH. SW developed the methods. LNA and SW performed the literature review and analysis. LNA wrote the first draft. HH reviewed the methods and findings. LNA, SW and HH revised drafts and approved the final version. All authors had access to and reviewed all data.

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