

The global geography of scientific articles on alcohol for the period 2010–2021: A bibliometric analysis

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Abstract

Introduction. Local research is critical to support the local implementation of global policies. This study explores the status and trends on research related to alcohol consumption, its determinants, governance, harm, and control policies in terms of the countries studied, affiliations of authors, funding, and research themes using bibliometric analysis.

Methods. Research papers published between 1 January 2010 and 31 December 2021 were searched using Web of Science and PubMed using a predefined search strategy and keywords, regardless of article type. All items that met the inclusion criteria were included in quantitative content analysis and deductive thematic analysis. Keywords were used to cluster articles by five main research themes and six subthemes related to policy interventions. The funding sources for the 100 most-cited articles were analysed.

Results. A total of 4,553 articles were included in the analysis. Half (53.1%) studied a single country and, of these, 77.0% were high-income countries (HICs). Australia, the United States, and the United Kingdom were the most studied countries and together accounted for 44.9% (975/2,172) of country-specific articles. Three out of four articles (3,479/4,553, 76.4%) were authored solely by authors affiliated with HIC institutions. One in five articles (906/4,553, 19.9%) had at least one author affiliated to an institution from an upper-middle, middle, or low-income country context. Governments, followed by research institutions, were the predominant funding source. Articles varied by theme: consumption (39.8%), policy response (31.0%), governance (26.9%), alcohol-related harm (26.7%), and determinants (12.6%). Across all subthemes of policy responses, articles were predominately conducted in HIC contexts.

Conclusion. Although the attributable harm of alcohol is known to affect more significantly lower and middle-income countries, scientific publications primarily report on HIC contexts by authors from HICs. Themes of research reflect known cost-effective policy actions, though skewed towards HICs and a focus on consumption. The implementation of context-specific alcohol control policies requires addressing the determinants of the uneven geographical and thematic distribution of research to close the current publication gaps.

Key questions

What is already known?

Introduction

Eight thousand deaths daily, three million deaths annually¹; these are the estimates of alcohol-attributable deaths, attesting to the significant effect of alcohol on people's lives around the globe. Alcohol consumption is widespread and broadly accepted but has negative implications beyond health, affecting sustainable social and economic development. Notably, the harm caused by drinking is

disproportionately greater for individuals with lower socioeconomic status. Alcohol consumption increases inequalities between and within countries and the toll is greater for low-income countries²⁻⁶.

At the same time, in 2019, alcohol consumption in the world, measured in litres of pure alcohol per person of 15 years of age or older, was 5.8 litres, a 5% relative decrease from 6.1 litres in 2010⁷. In this global trend, significant relative increases in drinking are observed in countries of the Western Pacific and South-East Asia. This pattern can be explained by increased affordability in this fast-growing economies, new consumers traditionally abstaining and aggressive marketing campaigns¹. A total of 2.3 billion people, or 43% of the population aged 15 years and older, are considered current drinkers, i.e. people who have consumed alcohol in the past 12 months¹. The highest per capita consumption of alcohol is recorded among European countries (e.g., Latvia, Czechia). However, consumption is also relatively high in countries of Africa (e.g., Uganda, Tanzania), the Americas (e.g., Argentina, United States) and the Western Pacific (e.g., Australia, Laos)⁷.

In 2010, the Global strategy to reduce the harmful use of alcohol⁸ adopted by the World Health Assembly⁹ proposed a variety of policy interventions to curb alcohol consumption and reduce harms. This international commitment to reduce alcohol consumption was further strengthened with the adoption of the Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020¹⁰ and its monitoring framework¹¹ where alcohol reduction was included as one of the voluntary targets, as well as the adoption of the 2030 Sustainable Development Goals, specifically target 3.5¹². A global action plan for the 2022–2030 period will be considered at the Seventy-fifth World Health Assembly in May 2022 to accelerate progress in implementing high-impact interventions for alcohol control¹³. The global action plan includes knowledge production as one of the five key action areas.

The production and dissemination of research are critical for effectively designing and implementing policy interventions¹⁴⁻¹⁶. Scientific publications are critical in creating linkages between evidence (knowledge production) and practice (use)¹⁷. In various areas of health research, concerns about diversity in the geography and country income-level of scientific publishing have been raised^{18,19}. This is especially concerning in low and middle-income countries, as research shows the uptake of evidence can depend on the context in which it has been produced^{20,21}. In effect, the inequitable production of research poses a significant obstacle for the effective implementation of alcohol control policies, their applicability, translation into the local context and, overall, response to local needs²². As the global community works to accelerate the implementation of policy interventions to help countries achieve the set alcohol targets, a rigorous overview of the geography of research on the topic is of paramount importance to guide future research priorities.

This study explores the status and trends in scientific publications on alcohol consumption, its determinants, harms, governance and control policies. An overview of the available research's geographic, thematic and resource distribution was pursued using bibliometric analysis. Similar studies have been conducted on tobacco²³ and addiction in Europe and the United States²⁴ and, in the sphere of alcohol

research, related to specific regions (e.g., Africa)²⁵ and topics (e.g., binge-drinking)²⁶. In this study, four key questions for exploring the global scientific literature landscape on alcohol were defined: (i) what countries and regions are studied? (ii) where is this research produced and by whom? (iii) what are the predominant research funding sources? and, (iv) what are the predominant research themes?

Methods

Study design

This study adheres to the protocol for conducting bibliometric analysis detailed by Donthu *et al.*²⁷. It follows the Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines²⁸ for reporting eligibility criteria, search strategy, article screening process, data collection variables and data management plan (Supplementary file 1). Bibliometric analysis was selected for its rigorous handling of large volumes of scientific data and its potential for statistical and thematic analysis. The multidisciplinary study team consisted of complementary quantitative/qualitative research, policy, and subject matter expertise.

Data sources

Published papers were searched via a keyword search of title/abstract in PubMed and Web of Science, following a predefined search strategy. The inclusion of other databases was explored, specifically Scientific Electronic Library Online and Russian-language databases e-Library, Kiberleninka, and DissersCat. These tests confirmed PubMed and Web of Science together produced the largest output (Supplementary file 2). Only two databases were selected to reduce possible (human) errors resulting from the consolidation of multiple smaller search outputs and possible duplicates.²⁷

Eligibility criteria and study selection

The topics of articles within scope were defined as scientific publications focusing on alcohol consumption, its determinants, harms, governance and control policies. The search was restricted from 1 January 2010 until 31 December 2021 to reflect the period following the publication of the global strategy to reduce the harmful use of alcohol⁸. Only indexed scientific articles were included (i.e. no grey literature) though no restrictions were placed on the type of articles included (i.e. systematic reviews, original research, case studies.). Only English keywords were used for the search, though articles in all languages were considered. An exploratory analysis showed that including French and Spanish keywords did not significantly increase the results since the databases provided an English abstract for articles in those languages. Hence, a search of the abstract includes such articles, even if the main text is a non-English language.

Search strategy

An initial keyword search was developed by deriving possible search terms from the focus of the study. The study team then identified a set of publications expected to be within the study dataset

(Supplementary file 3). Multiple keyword searches that resulted in datasets including these publications were tested. Additionally, subsets of 100 randomly chosen articles of different resulting datasets were prepared by two authors (LJ, TD) and manually checked by four others (EB, CF, MN, JT) by title and abstract to confirm the validity of the search strategy. Five rounds of reviews were conducted and between each round, possible keywords triggering false positives were identified and excluded in subsequent searches. Through this iterative process, the keyword search was optimised. The keyword search was considered final when the resulting dataset included the sample of suitable publications and the rate of false positives was deemed acceptable by the study team. The final keywords used are shown in Table 1 and reported in full in the detailed search strategy (Supplementary file 1).

Table 1
Keywords used for searching articles in Web of Science and PubMed

Use of Boolean operator "and"/"not"	Search of	One of the terms (using Boolean operator "or")
Include ("and")	Title	alcohol
Include ("and")	Title/Abstract	harmful alcohol, alcohol control, alcohol consumption, alcohol use, alcohol policy, alcohol harm
Include ("and")	Title/Abstract	harm, burden, alcohol policy, alcohol regulation, alcohol marketing, alcohol industry, licensing, taxes, pricing
Exclude ("not")	Title/Abstract	rat, mice, brain, prenatal, foetal, suicide, liver, chemistry, polyvinyl, synthesis, gene, fermentation, trial, disorders, addiction, depression, anxiety, motive, Gels, fuel, algae, bio*

Analysis

All articles that met the inclusion criteria were included in quantitative content analysis and deductive thematic analysis²⁹. The category counts were performed in R. The article details in the dataset included title, author information, keywords, abstract, affiliations, citation count. Further additional features were derived, namely, the author's country and income group, the country of study (where applicable) and its corresponding income group. The categorisation of countries into income groups was conducted based on the World Bank 2019 classification as a high-income country (HIC), upper-middle-income country (UMIC), low- middle-income country (LMIC), or low-income country (LIC)³⁰. Spot-checks of added characteristics (e.g., country income level) were completed based on a randomised extract in Microsoft Excel. Citation counts were obtained from Web of Science and Crossref. The analysis of funding sources was carried out manually for the 100 most-cited papers. Manual analysis was necessary due to incomplete information about funding sources in the raw data extract.

The causative pathway linking proximal drivers of alcohol consumption with distal health and social outcomes by Martineau *et al.*³¹ was adapted to analyse the articles by research theme. Five research

themes were derived: determinants (political, economic); consumption (people, amount, frequency); governance (access to alcohol moderated by its acceptability, availability and affordability); policy response (interventions); and alcohol-related harm (consequences of drinking). Each research theme was assigned keywords for mapping the articles (Supplementary file 4). If one of the keywords appeared in the title of an article, the article was assigned to that theme. Articles could be assigned multiple times. Most articles (43.3%) were assigned to one main research theme. Less than two per cent of articles were assigned to four or five main themes.

Further analysis of the theme “policy response” was conducted for a detailed analysis of research available and identification of potential blind spots. Six subthemes were defined based on relevant WHO priority action areas, measurement and monitoring: health service response; community action and settings; drink–driving countermeasures; availability; marketing and labelling; tax and price policies (Supplementary file 5)^{32–34}. The areas also align with Martineau *et al.*'s framework.

Results

Publication output

The initial search resulted in a dataset with 5,747 articles, from which 1,081 duplicates and 113 articles without a publication year or publication year outside of the time span of the analysis were removed. In total, 4,553 articles were included in the final dataset (Fig. 1). Out of these, 513 were sole-authored and 4,026 are co-authored publications (no information available for 6 articles, another 8 listed as anonymous). The number of contributing authors was 24,757. Only over half of the articles (2,464/4,553, 54%) reported a funding source.

Citation information was available for 4,508 articles. Out of these, 3,530 (78.3%) had prior citations, for a combined total of 59,356. The average number of citations per cited publication is 17, with the most-cited article having 2,693 citations (Griswold *et al.*³⁵).

Country and region of study

Half of the articles in the dataset (2,172/4,553, 47.7%) study a specific country, the remainder studying either groups of countries or topics without a specific context (Fig. 2). Of the country-specific articles, three quarters study a HIC (75.5%), while one-quarter study a UMIC, LMIC or LIC (17.3%, 5.4% and 1.7%, respectively). Nearly half (45%) of country-specific research focuses on three HICs: Australia, the United Kingdom and the United States. As Fig. 2 illustrates, there is little or no research on many countries in Africa, the Middle East and Latin America (grey or lightly shaded areas). Of the 20 most studied countries, 19 are either HIC or UMIC, India being the only LMIC (Table 2). Only 154 articles (7.2%), focusing on a single country, studied a LIC or LMIC, of which 31.8% are on India (49/154 articles).

Note

Country of study available or applicable for 2,172 articles in the dataset (2,172/4,553, 47.7%).

Table 2
Top 20 most studied countries in the dataset

Rank	Country	# of articles	Income group
1	Australia	382	HIC
2	United Kingdom	348	HIC
3	United States	245	HIC
4	Canada	103	HIC
5	Sweden	63	HIC
6	Russian Federation	59	UMIC
7	South Africa	59	UMIC
8	New Zealand	57	HIC
9	Brazil	53	UMIC
10	China	53	UMIC
11	Finland	51	HIC
12	India	49	LMIC
13	Spain	42	HIC
14	Thailand	40	UMIC
15	Netherlands	33	HIC
16	Germany	31	HIC
17	Ireland	30	HIC
18	Norway	30	HIC
19	Denmark	28	HIC
20	Italy	21	HIC

Note: Country of study available or applicable for 2,172 articles in the dataset (2,172/4,553, 47.7%).

Author affiliation and research origin

Three out of four articles (3,479/4,553, 76.4%) were authored solely by authors affiliated with HIC institutions. One in five (906/4,553, 19.9%) had at least one author from a UMIC, LMIC or LIC. No information on authors was available for 168/4,553 articles (3.7%). 1.1% of the articles (51/4,553) had at least one author affiliated to a LIC institution, 3.7% (170/4,553) to an LMIC institution and 15.9%

(725/4,553) to a UMIC institution. Out of 149 author affiliations to a LIC institution, 64 (42.9%) are affiliations to one Ethiopian institution. Uganda had the second-highest number of affiliations, with 23 (15.4%).

Trends towards more research being (co-)authored by researchers with a UMIC, LMIC or LIC affiliation can be observed over time. Between 2010 and 2013, only 13.9–17.6% (in absolute numbers between 34 and 53 articles in the dataset) were co-authored by someone affiliated with a UMIC, LMIC or LIC institution. This share increased from 15–20% from 2014 until 2018 to 24–30% since 2019. The absolute number of articles increased as well. There were at least 117 articles per year co-authored by a researcher affiliated to a UMIC, LMIC or LIC institution since 2019. In 2021, 117 of 483 articles had at least one author affiliated to a UMIC, LMIC or LIC institution.

Authors with affiliation to HIC institutions produced 97% of articles studying HIC. These numbers are considerably lower for the other income groups: 60.2% for UMICs, 51.4% for LMICs and 45.7% for LICs. Half the authors publishing articles on LMICs and LICs were affiliated to institutions from other income groups, predominately to a HIC institution (and therefore also from other countries). For India, only 67.7% of the 49 articles were authored by researchers affiliated with an Indian institution. For Nigeria, 45.3% of the authors of the 18 articles were affiliated with an institution within the country.

Discussion

More than ten years from the release of the “Global strategy to reduce the harmful use of alcohol”, attention has turned to accelerating the implementation of its proposed policy options to reduce the harmful consumption of alcohol. This bibliometric analysis has studied scientific publications on alcohol consumption, its determinants, governance, harms, and control policies in the years since the global strategy was adopted. We observe the following main findings.

First, according to our dataset, the volume of research evidence clustered by research topics is sparse. A similar finding was described by Ghandour *et al.*³⁶ on scientific publications on alcohol consumption in the Arab region, reporting a total of 81 articles across 22 countries in two decades³⁶. Of importance in our findings is the observation that across research themes and subthemes on “policy response”, the little evidence available offers insufficient country-specific insights, particularly among LICs. Across the six policy responses analysed, UMIC, LMIC and LIC contexts were predominately less studied in all instances. In the case of “marketing and labelling” and “drink-driving countermeasures”, articles in the dataset were predominately classified as “no income group”. This finding suggests that research on these policy measures was primarily reviews or theoretical studies rather than applied, experimental study designs. Redressing this imbalance to increase local and context-based research is an issue of equity and a requirement for realising the acceleration of the effective implementation of policy measures sought.

Second, on the geographic distribution of authors, despite the positive trend towards more researchers from LICs, the overall proportion of authors remains limited (19.9% of all articles had at least one author

affiliated to an institution from a LIC context). This finding may reflect limitations in local research capacities and the imbalance of power structures, inequitable partnerships and systemic discrimination that has been described by others³⁷⁻³⁹. This finding may have several consequences on the potential uptake of available research results. For example, studies have shown that authors with different countries of origin than the country of study may influence the article's perceived relevance^{40,41}. Additionally, research produced by a peer is considered more credible and trustworthy to public health decision-makers in LMICs⁴². Fit-for-purpose research needs further prioritisation to effectively drive the implementation of alcohol control policies over the next decade. Mentorship schemes for early-career researchers, resources to support submissions of non-native English-speaking authors, and more ambitious expectations for diversity among author teams and editorial boards are some actions that need to be taken.

Third, regarding funding sources, our findings align with those of others that report a skewing towards institutions in HIC contexts⁴³. Funding sources are critical in alcohol control policies, as the alcohol industry often works through partnerships or foundations^{43,44}. There is a long history of lack of disclosure of industry funding by researchers⁴⁵. In our analysis of a subset of articles, we concluded for the 100 articles studied that the alcohol industry was not named as a funding source. Nonetheless, we find critical gaps in the reported funding sources in the databases used for this analysis. As greater attention is given to the commercial determinants of health⁴⁶ and the reported influence of corporations on alcohol-related research^{45,47}, further standardisation to ensure funding sources are explicitly and consistently stated, like author details, is needed.

Research limitations

In addition to those inherent to bibliometric studies, the findings should be considered in light of the following limitations. First, similar to other studies, the databases used are dominated by English-language articles⁴⁸. Second, despite the iterative methods to refine the search strategy, outliers in the dataset may account for 15.5% of articles, reflecting those assigned the category "other" in the thematic analysis. Third, inaccuracies in the assignment of categories to publications in the dataset, such as country of study and research themes, are possible. For example, some publications may cover more than one country and, in these cases, the country of the study was deducted from the first country mentioned in the title or its abstract. Studies covering broader regions were not assigned a country of study. A subset of 200 articles was inspected to gauge the robustness of the analysis. The false positivity rate with respect to the automated retrieval of countries was 6%. Similarly, the assignment of research themes was limited to a keyword search of the title only and may contribute to an underrepresentation of research themes had the abstract or full text been analysed. For the purposes of the study and its scope, the analysis by title to gauge the predominant research theme was considered sufficient.

Conclusion

Our study confirms a critical geographic imbalance in scientific publications skewed towards HIC contexts. Notably, the geographic distribution of publications does not correspond to countries with higher per capita consumption of alcohol globally, with a complete absence of LICs among the top twenty most studied countries. A similar finding is observed regarding funding sources and the country of affiliation for authors, though a positive trend for the latter is reported. The research themes are found to relate to alcohol consumption predominately and of those related to policy responses, these are mainly on health services responses rather than more population-wide and preventive interventions.

As a new global action plan for the current decade comes into effect, intentional investments in scientific research pertaining to LIC contexts are needed. Challenges to effectively implementing known, cost-effective and population-wide alcohol control policies are among the key barriers the new action plan sets out to address. Our findings call for country-specific studies, specifically in LIC contexts, and research themes beyond alcohol consumption and care. With the 2030 Sustainable Development Goals on the horizon of this decade, investments in fit-for-purpose scientific research on alcohol and alcohol control policies cannot wait.

Declarations

Contributions

LJ, CF, EB, RM, JT designed the study. LJ, CF, TD conducted data collection. All authors contributed the analysis of results. LJ prepared a first version of the manuscript. All authors provided feedback and contributed to the revising of the manuscript. All authors approved the final version.

Ethics and other permissions

Not applicable.

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Conflicts of interest and disclaimer

The authors declare that they have no competing interests. The authors alone are responsible for the views expressed in this article and they do not necessarily represent the views, decisions or policies of the

institutions with which they are affiliated.

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Data sharing

The full dataset can be made available upon reasonable request to the corresponding author.

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Figures

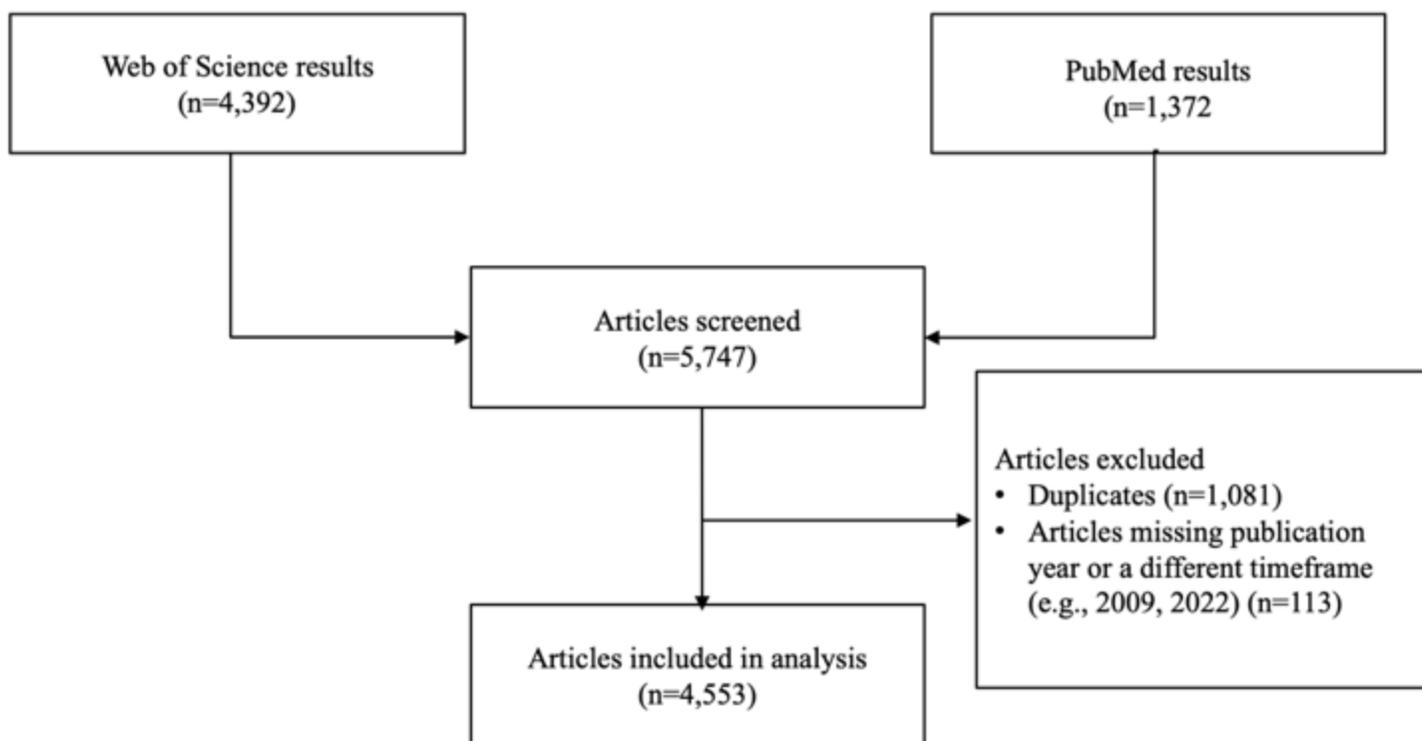


Figure 1

Flowchart for study selection

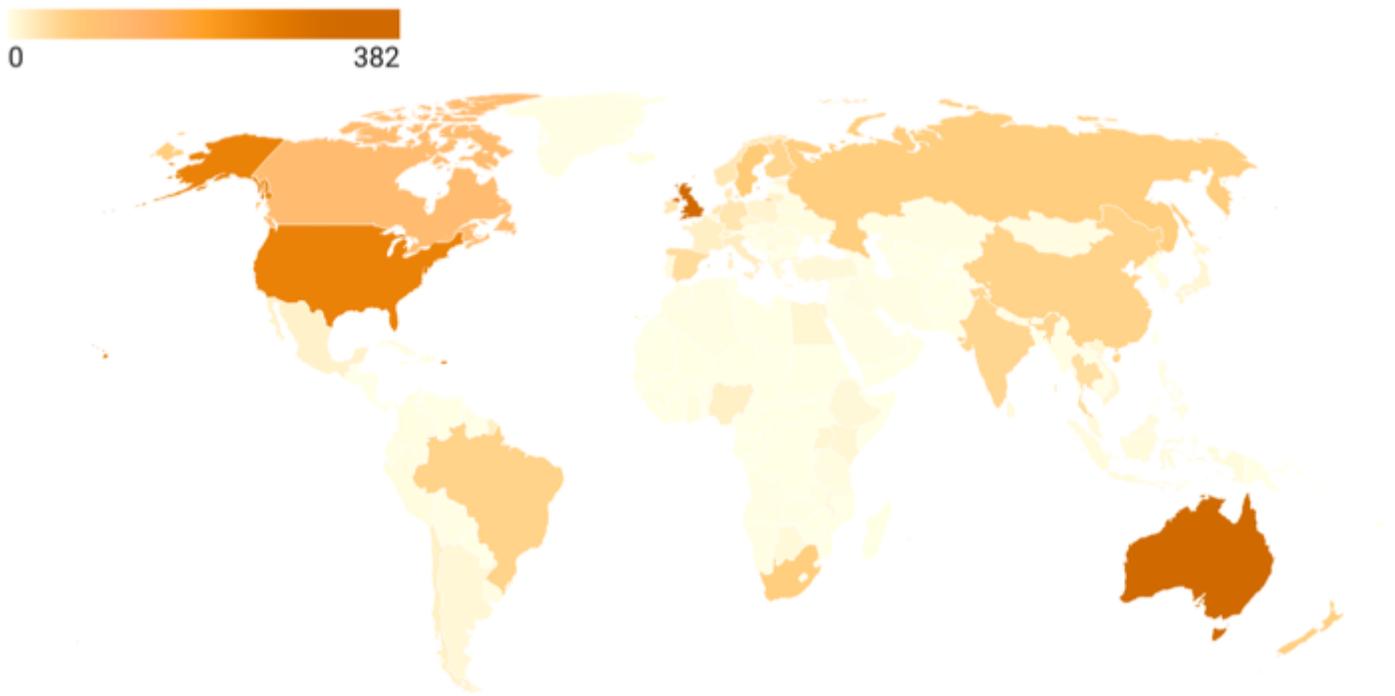


Figure 2

Distribution of country-specific studies in the dataset

Note: Country of study available or applicable for 2,172 articles in the dataset (2,172/4,553, 47.7%).

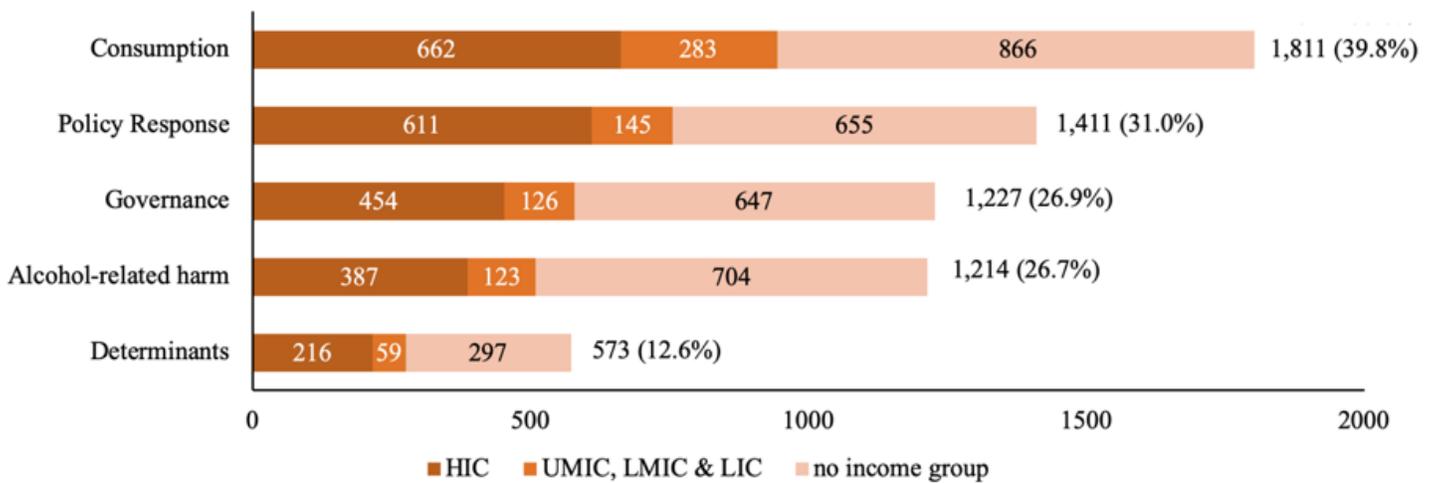


Figure 3

Distribution of research themes in the dataset by income group

Note: A particular article may have more than one theme. 3,845 (84.5%) articles have at least one theme.

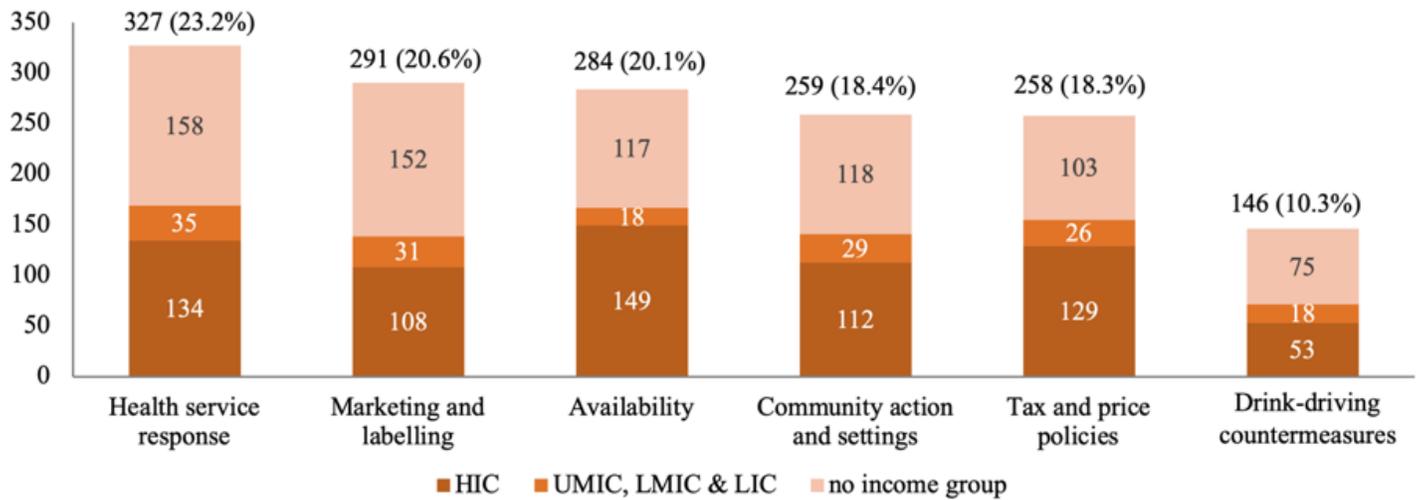


Figure 4

Articles on “Policy Response”: Distribution of subthemes by income group

Note: 1,411 articles are categorised into “Policy Response”. Multiple categorisations into the subcategories are possible; total number of categorisations: 1,565. The percentage shows the share of articles in the category “policy response” that are categorised into each subcategory.

Supplementary Files

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