

Reassessing the health impacts of trade and investment agreements: a systematic review of quantitative studies, 2016–20

Pepita Barlow, Rujuta Sanap, Amandine Garde, L Alan Winters, Mzwandile A Mabhala, Anne-Marie Thow



To ensure a high level of health protection, governments must ensure that health and trade policy objectives are aligned. We conducted a systematic review of the health impacts of trade policies, including trade and investment agreements (TIAs), to provide a timely overview of this field. We systematically reviewed studies evaluating the health impacts of trade policies published between Jan 19, 2016, and July 10, 2020. Included studies were quantitative studies evaluating the impact of TIAs and trade policies on health determinants or outcomes. We evaluated methodological quality and performed a narrative synthesis. 21 of 28 067 articles identified via searches met our criteria. Methodologically strong studies found reduced child mortality, deteriorating worker health, rising supplies of sugar, ultra-processed food, tobacco, and alcohol supplies, and increased drug overdoses following trade reforms, compared with the time periods before trade reform. However, associations varied substantially across contexts and socioeconomic characteristics. Our findings show that trade policies, including TIAs, have diverse effects on health and health determinants. These effects vary substantially across contexts and socioeconomic groups. Governments seeking to adopt healthy trade policies should consider these updated findings to ensure that opportunities for health improvement are leveraged and widely shared, while harms are avoided, especially among vulnerable groups.

Introduction

Ensuring healthy lives for all individuals is central to global efforts to improve population health, reduce health inequalities, and achieve the 2030 Sustainable Development Goals.^{1,2} To achieve these goals, WHO has called on governments to adopt a Health in All Policies approach that considers the health implications of policies outside of the health sector.³ This perspective is particularly important for governments seeking to ratify trade policies, including trade and investment agreements (TIAs). TIAs set rules governing trade between states to promote cross-border trade. On Sept 20, 2020, 307 TIAs were in force globally.⁴ TIAs are a mechanism of, and drive, globalisation and are often introduced in response to multiple political and economic changes, alongside other market-oriented reforms.⁵

TIAs are not designed to influence population health. However, the many possible effects of TIAs on health are well established.^{6,7} Potential consequences include improved child health due to income growth, reduced food insecurity as a result of food trade, and increased supplies of unhealthy commodities including tobacco, alcohol, and sugar-sweetened beverages (SSBs).^{8–11} WHO, politicians, civil society, and academics have called for increased attention to the synergies and tensions between trade promotion and the protection and promotion of health and health equity.^{12,13} Achieving this goal requires timely assessments of empirical evidence and the integration of findings from different disciplines.

Reviews of studies published up to 2016 identified associations between trade policies and harmful commodity sales, and called on scholars to examine a wider range of outcomes using methodological approaches that better account for concurrent economic and political

changes.^{14,15} Scholars have since examined additional outcomes and utilised quasi-experimental methods, which are suited to evaluating policies like TIAs which cannot be feasibly randomised.¹⁶ It is, therefore, necessary to provide an updated evidence review. The aim of this systematic review is to examine studies from 2016 to 2020 evaluating

Key messages

- We systematically reviewed high-quality studies published since 2016 assessing the effect of trade and investment agreements (TIAs) and related trade policies on a range of health outcomes and determinants.
- Methodologically strong studies found that TIAs and related trade policy reforms corresponded to reduced child mortality rates. However, these associations varied according to household and country characteristics.
- Trade policies and agreements were also associated with deteriorating worker health and rising rates of deaths from drug overdoses in regions heavily exposed to tariff changes within TIAs. In contrast, select health improvements were experienced among higher-skilled and socioeconomically advantaged workers.
- Strong studies also found that signing TIAs with the USA corresponded to increases in the supply, imports, and sales of ultra-processed foods, sugar-sweetened beverages, tobacco, alcohol, and sugar.
- TIAs have diverse effects on peoples' opportunities for living long and healthy lives, both for better and for worse, and these effects vary substantially across contexts and socioeconomic groups. A Health in All Policies approach to trade negotiations appears necessary to ensure that the harms we identify are mitigated and that the health improvements we identify are realised and widely shared.

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Department of Health Policy, London School of Economics and Political Science, London, UK (P Barlow DPhil, R Sanap MSc); School of Law and Social Justice, University of Liverpool, Liverpool, UK (Prof A Garde PhD); Department of Economics, University of Sussex Business School, Brighton, UK (Prof L A Winters PhD); Department of Public Health and Wellbeing, University of Chester, Chester, UK (Prof M A Mabhala PhD); Menzies Centre for Health Policy and Economics, School of Public Health, Charles Perkins Centre, University of Sydney, Sydney, NSW, Australia (A-M Thow PhD)

Correspondence to: Dr Pepita Barlow, Department of Health Policy, London School of Economics and Political Science, London WC2A 2AE, UK p.barlow@lse.ac.uk

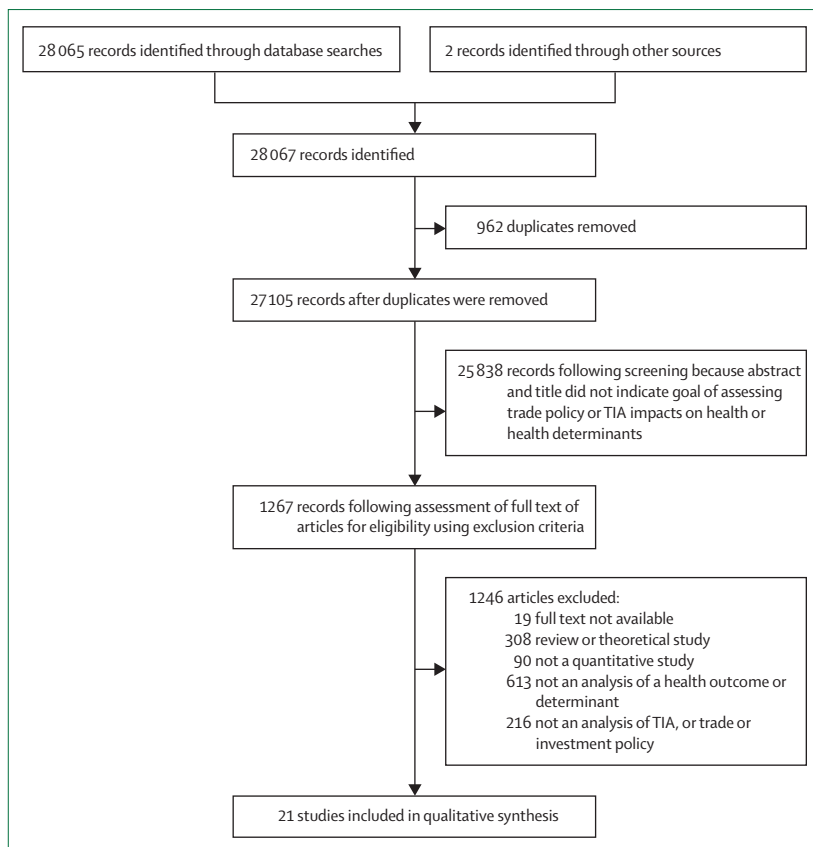


Figure 1: PRISMA diagram showing study identification procedures
PRISMA=Preferred Reporting Items for Systematic Reviews and Meta-Analyses. TIA=trade and investment agreement.

the effect of TIAs on the determinants of health and health outcomes.

Methods

Search strategy and selection criteria

We followed the procedures in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement set out by Moher and colleagues (figure 1; appendix pp 1–3).¹⁷

See Online for appendix

We searched Web of Science, Scopus, PubMed, Embase, Ovid, Global Health Online, EconLit, WestLaw, and Lexis on July 10, 2020, for studies assessing the impact of TIAs, and trade and investment policies that are common components of TIAs (eg, tariff changes), on health determinants and outcomes. We used various search terms (appendix p 4). We applied language and date restrictions to identify studies published in English from Jan 19, 2016 (the day after the previous search was completed), to July 10, 2020 (appendix p 2).¹⁴

Studies were eligible for inclusion if they were quantitative empirical studies evaluating the effect of TIAs, or a trade or investment policy that is typically incorporated within TIAs (eg, tariffs and quotas), on a health determinant or outcome (appendix p 5). Qualitative studies were excluded as our aim was to quantify policy

effects. Full-text eligibility assessment was performed by RS. PB independently assessed the eligibility of a sample of records (n=82) to ensure consistency in applying the exclusion criteria. We reviewed cited studies within included studies and consulted topic experts to identify additional articles (n=2).

Data extraction and synthesis

Two team members extracted the data and assessed risk of bias of included papers (RS and PB). The following information was obtained from each study following a predefined plan: study title, authors, journal, publication year, research question, study design, countries analysed, treatment and comparison groups, data sources, variable measurement, mediating or moderating variables, covariates, data analysis methods, results, and conclusions. We assessed scientific quality and risk of bias using the Effective Public Health Practice Project Quality Assessment Tool for Quantitative Studies.¹⁸ Methodological components and aggregated scores were categorised into three levels: strong, moderate, or weak (appendix p 6). We further analysed co-citation patterns. Co-citation patterns capture the extent to which sources are cited together by other documents and is a proxy for whether insights from different fields are being acknowledged collectively (appendix pp 7–9).^{19,20}

Data synthesis was performed after data extraction and quality rating. A meta-analysis was not possible due to heterogeneity of methods and measures studied. We therefore conducted a thematic analysis of included studies, with a greater weight given to studies with higher quality scores than those with lower quality scores.²¹ Note that risk of bias across studies could arise due to selective reporting and publication bias.

Results

Our searches identified 28 067 articles. After excluding duplicates and ineligible articles, we included 21 studies (figure 1; table).^{8,22–41}

Figure 2 shows the results from our quality assessment (appendix pp 9–12). Most studies controlled for relevant confounders (15 of 21 studies), and all used appropriate data analysis methods (21 of 21 studies). All scored moderate on study design, as papers were either quasi-random or non-randomised studies, rather than randomised controlled trials, limiting definitive causal conclusions. Additional weaknesses arose because studies did not report or comment on measurement validity (eg, content validity).

Figure 3 plots our co-citation analysis. There was a moderately weak tendency of studies to cite papers published in journals in different disciplines. These results are consistent across alternative network clustering specifications (appendix pp 13–14).

In terms of interventions, nine studies analysed the effect of TIAs, including three studies focused on the USA. Six studies assessed trade taxes (ie, tariffs);

	Country or countries	Years	Trade policy exposure	Outcome measure(s)	Outcome category
Son (2020) ²²	South Korea	2007–11, 2012–15	Korea–US FTA	Binary indicator of whether a drug approved in the USA was available in Korea; number of years between the US approval date and availability date on the Korean market	Health care and services: access to medicines
Panda (2020) ⁸	30 LMICs in sub-Saharan Africa	2000–08	African Growth and Opportunity Act	Binary indicator of whether a mother's child had died before their first birthday or not	Health outcomes: child mortality
Barlow (2020) ²³	65 LMICs	1996–2015	Tariff rate	Government spending on health care and services per capita, in US\$	Health care and services: health expenditure
Barlow et al (2020) ²⁴	132 LMICs and HICs	2014–17	KOF index of tariff and non-tariff trade policy liberalisation	Binary indicators of whether an individual experienced moderate or severe food insecurity, based on an eight-point questionnaire	NCD risks: diets and food environment
Fan et al (2020) ²⁵	China	1993–2011	WTO accession	Binary indicator of whether an individual has experienced illness or injury in the past 4 weeks or otherwise	Workers' health outcomes
Cowling et al (2020) ²⁶	10 LMICs and HICs with US FTAs	2002–16	US FTAs	Per capita sales of foods and beverages, in kg, grouped into three categories: ultra-processed, processed ingredients, minimally processed, and baby food	NCD risks: diets and food environment
Schram (2020) ²⁷	16 LMICs and HICs with Australian FTAs	1988–2016	Australian FTAs	Volume of imports of alcohol products from Australia; binary indicator of whether the country imports any alcohol from Australia	NCD risks: alcohol
Pierce and Schott (2020) ²⁸	USA	1990–2013	US Permanent Normal Trade Relations bill	Deaths per 100 000 inhabitants, in each county, disaggregated by cause, gender, and age group	Workers' health outcomes
Adjaye-Gbewonyo et al (2019) ²⁹	22 LMICs	1991–2010	Nominal Rate of Assistance to agricultural products that are considered tradable	Height-for-age BMI Z scores, weight-for-height BMI Z scores, and weight-for-age BMI Z scores	Health outcomes: child nutrition
Werner et al (2019) ³⁰	6 LMICs in Central America	1990–2010	Dominican Republic–Central America FTA	Imports of meats, cereals, processed vegetables, oils, and sweetened beverages; share of household expenditure on food and beverages; and index of food price changes across principal food categories compared with general price inflation	NCD risks: diets and food environment
Boysen et al (2019) ³¹	101 LMICs	2007–13	Tariff rate	Prevalence of obesity, measured as the proportion of the adult population who were 18 years or older with a BMI ≥ 30 kg/m ² ; prevalence of underweight, measured as the percentage of the adult population who were 18 years or older with a BMI ≤ 19 kg/m ²	Health outcomes: nutrition
Unar-Munguia et al (2019) ³²	Mexico	1961–2013	North American FTA	Per capita supply of sugar and sweeteners, in kcal per day; sugar and sweetener supply as a percentage of daily per capita food supplies	NCD risks: diets and food environment
Cowling et al (2019) ³³	47 LMICs, UMICs, and HICs	1980–2013	WTO accession	Per capita supply, in g or kg, per year, of tobacco, alcohol, fruits and vegetables, nuts, seeds and legumes, seafood, red meats and animal fats, sugars, starches, and edible oils	NCD risks: tobacco, alcohol, diets, and food environment
Barlow (2018) ³⁴	36 LMICs	1963–2005	Wacziarg and Welch's ³⁵ dichotomous indicator of trade liberalisation	Number of newborn babies per 1000 livebirths who died before age 5 years	Health outcomes: child mortality
Barlow et al (2018) ³⁶	Canada	1978–2006	Canada–US FTA	Per capita supply of caloric sweeteners including high-fructose corn syrup, in kcal per day; per capita supply of total sugars and sweeteners, in kcal per day.	NCD risks: diets and food environment
Olper et al (2018) ³⁷	41 LMICs	1960–2010	Wacziarg and Welch's ³⁵ dichotomous indicator of trade liberalisation	Number of newborn babies per 1000 livebirths who died before age 5 years	Health outcomes: child mortality

(Table continues on next page)

	Country or countries	Years	Trade policy exposure	Outcome measure(s)	Outcome category
(Continued from previous page)					
Appau et al (2017) ³⁸	39 LMICs in Sub-Saharan Africa	2007, 2010, 2012, and 2014	Import taxes, KOF index, bilateral investment treaties (with multiple countries)	Price of cigarettes, in \$; affordability of cigarettes, calculated using price data and proportion of GDP required to purchase 100 packs; investments in tobacco manufacturing by company; and foreign exports of tobacco products, in \$	NCD risks: tobacco
Barlow et al (2017) ¹⁴	Canada	1985–2000	North American FTA	Total supply of calories per capita, per day; imports of processed foods to Canada from the USA, in \$; and US foreign direct investment in the Canadian food and beverage sector, in \$	NCD risks: diets and food environment
Mendez Lopez et al (2017) ³⁹	44 LMICs	2001–14	Tariff rate	Per capita sales of sugar-sweetened beverages, in L; total imports of sugar-sweetened beverages, in \$	NCD risks: diets and food environment
Ofa and Gani (2017) ⁴⁰	11 Pacific Island countries	2003–13	WTO membership, tariff rate	Per capita imports of processed foods, in kg, from each trade partner	NCD risks: diets and food environment
Baker et al (2016) ³⁷	Peru and Bolivia	1990–2013	US–Peru FTA	Per capita foreign direct investment inflows, in \$; per capita soft drink imports, in L, and annual growth rate therein, in %; per capita sales of soft drinks, in litres, and annual growth rate therein, in %; and the volumes of sugar from soft drinks, in kg, and annual growth rate therein, in %	NCD risks: diets and food environment

BMI=body-mass index. FTA=free trade agreement. GDP=gross domestic product. HICs=high-income countries. LMICs=low-income and middle-income countries. NCD=non-communicable disease. UMICs=upper-middle-income countries. WTO=World Trade Organization.

Table: Studies on trade agreements and health meeting inclusion criteria

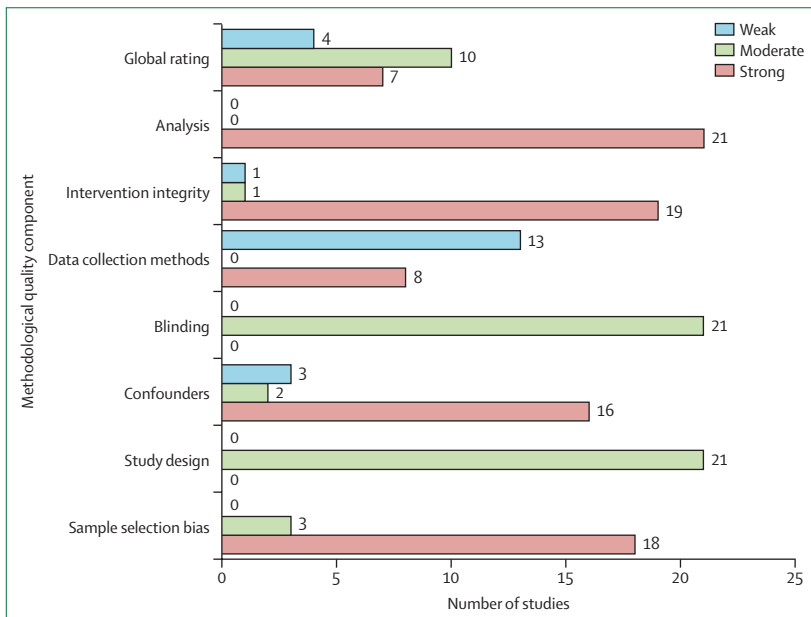


Figure 2: Quality assessment of studies chosen for systematic review. Category definitions are adapted from Thomas and colleagues.³⁸

two used binary indicators of trade liberalisation; two used composite measures of trade liberality; and one analysed a proxy for agricultural trade subsidies.

We discuss the studies in detail, grouped by outcome. Seven studies measured the direct effects of policies on

health outcomes, of which four assessed child health outcomes (child mortality and nutrition); two examined workers' health outcomes; and one assessed nutritive health among adults (overweight and obesity). 13 studies assessed indirect effects via changes to health determinants, including two on health care and access to medicines. 11 assessed non-communicable disease risks, with six focused on diets and food environments.

Turning first to child mortality, three strong documented decreases in child mortality following trade liberalisation or TIA ratification were recorded.^{8,34,37} One study analysing the effect of the African Growth and Opportunity Act in 2000–08, a US trade act affecting 30 sub-Saharan African countries, found that being born after the implementation of the act reduced the probability of infant and neonatal deaths by approximately 9–12%. The largest reductions were in countries with large exports of agricultural goods and mineral ores, in children who lived rurally, and in children whose mothers were uneducated and worked in agriculture or manual labour. Barlow³⁴ further assessed the relationship between trade liberalisation and country-level child mortality rates in 36 low-income and middle-income countries (LMICs) in 1963–2005, and documented “no universal association” between these variables, with post-liberalisation changes in child mortality varying by about 40% across liberalisation episodes. Olper and colleagues³⁷ similarly found that rates of child mortality varied substantially following liberalisation reforms.

Two strong studies assessed the relationship between trade policy and health outcomes related to nutrition, including in children.^{29,31} Adjaye-Gbewonyo and colleagues²⁹ analysed tariffs and subsidies, which can distort agricultural prices and are captured in the Nominal Rate of Assistance (NRA). The authors found that an increase in 5-year average NRAs was associated with improved child height-for-age and weight-for-age Z scores. Improvements were greatest among children with at least one parent earning wages in agriculture. Boysen and colleagues³¹ modelled the links between import tariffs on highly processed foods and the prevalence of both obesity and underweight among adults, finding that in middle-income countries in sub-Saharan Africa, a 1.00% increase in the tariff differential (larger tariffs on processed vs unprocessed foods) corresponded to a 0.18% decrease in obesity prevalence.

A further two strong studies assessed the effect of tariff changes on workers' health.^{25,28} Fan and colleagues³⁰ assessed changes in work-related injuries due to increased working hours as a result of expanding trade following China's World Trade Organization (WTO) accession. The authors calculated exposure to changes in the tariffs on inputs used by manufacturing firms, and found a 1.00 SD reduction in tariff exposure was associated with a 0.27 SD (7.6%) increase in the probability of reporting an illness or injury.²⁵ However, tariff exposure correlated with a reduced probability of reporting illness or injuries among high-skilled workers and workers with the highest educational attainment. Pierce and Schott²⁸ analysed changing county-level mortality rates in the USA due to import competition with China, which affected local employment rates. The authors compared mortality rates among US counties with different degrees of exposure to imports affected by the removal of uncertainty over tariffs. They found that moving from the 25th percentile to the 75th percentile of exposure was associated with an increase in the annual mortality rate from drug overdoses of two to three deaths per 100 000 people in each year after the policy.

12 studies evaluated the effects of TIAs and trade liberalization policies on non-communicable disease risk factors.^{26,30,32,36,39,40} Studies of strong quality showed that implementing US free trade agreements (FTAs) was associated with increased supply and sales of ultra-processed foods and sugars.^{32,33,39,40} For example, one study found that supply and apparent consumption of high-fructose corn syrup tripled in Canada after a 5% import tariff was abolished as part of the 1994 North American FTA.⁴¹ Another study found that the Canada-US FTA in 1989 was followed by a 170 kcal/person per day increase in the number of calories in the Canadian food supply.³⁶ However, there were three exceptions to a general pattern of increased availability of harmful foods. One study found that, following accession to WTO, member states experienced immediate increases in the domestic supply of fruits and vegetables of 55 g/person per day on

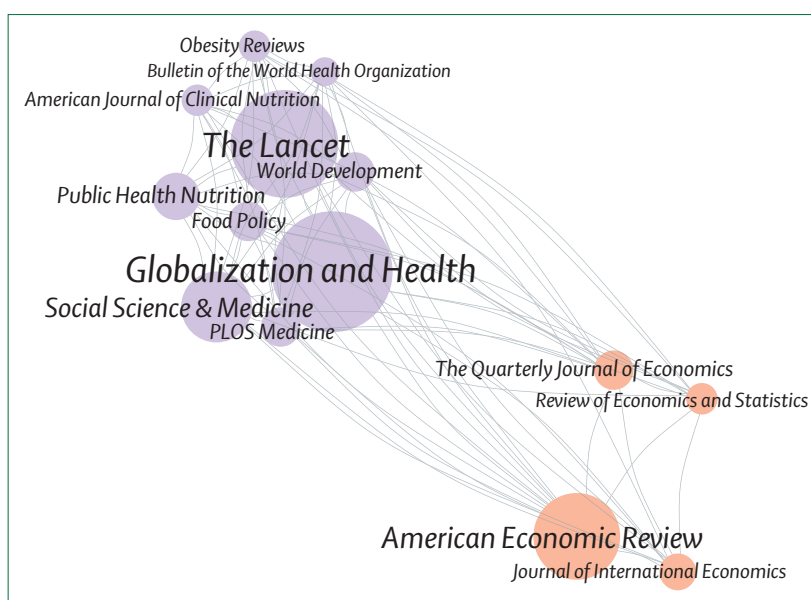


Figure 3: Co-citation analysis

Co-citation (tendency for sources to be cited collectively) of journals that were referenced at least 10 times across included studies. Each colour (purple and orange) corresponds to a co-citation cluster.²⁰

average, compared with non-member countries.³³ WTO membership was not associated with changes in supplies of red meats or edible oils, and changes in sugar availability were inconsistent across models. Another study identified a 122% increase in Peruvian soft-drink production after the US-Peru FTA, although overall sales of SSBs did not increase.⁴²

We identified one strong study which assessed the relationship between cross-sector trade liberalisation and food security and found that in high-income countries, liberalisation corresponded to reduced food insecurity, whereas in low-income countries, households in the lowest-income group were more likely to report food insecurity where trade policy was more liberal.²⁴ A study of the Dominican Republic also found that consumers faced increasing household food expenditures following the Dominican Republic-Central America FTA.³⁰

Three studies of mixed methodological quality identified effects on alcohol and tobacco associated with TIAs or trade liberalization policies. Schram and colleagues²⁷ found that implementing an FTA with Australia corresponded with a 65% increase in the share of Australian alcoholic beverage imports in partner countries' total alcoholic beverage import supply. Cowling and colleagues³³ further identified increases in the mean supply of tobacco per year (6.2%) and alcohol per year (3.6%) following WTO accession, compared with non-members. A further study by Appau and colleagues³⁸ found mixed effects of trade liberalisation on tobacco investments and supply in sub-Saharan Africa, in 1990-2013. Finally, two studies rated as weak analysed relationships between trade policy and outcomes related to health-care access and services. Son²² analysed the

association between the implementation of the Korea–US FTA and the time taken for new drugs approved in the USA to become available in Korea (the so-called drug lag). The study did not identify a statistically significant effect of the TIA on drug lag.²² A further study tested the hypothesis that tariff reductions correspond to declines in public-health expenditure via changes to government tax revenues. The authors found that tariff reductions corresponded to modest declines in government health expenditures in LMICs with a low capacity to levy alternative taxes, whereas health spending increased when countries had moderate to strong capacities to levy alternative taxes.²³

Discussion

This systematic review has identified considerable variation in the estimated effect of TIAs on health and health determinants across outcomes, socioeconomic groups, and country contexts. Several studies showed that individuals with a higher level of education, higher-income groups, and individuals working in export sectors had health gains (eg, reduced food insecurity, reduced child mortality, and reduced injuries), whereas lower-income households, workers with a lower level of education, or workers in less competitive industries did not have these gains and had some health deteriorations (eg, injuries, drug overdoses).^{8,25,28} Improvements in aggregate child mortality rates and food insecurity were also apparent primarily in high-income and democratic countries, whereas some households in lower-income countries did not experience these benefits.^{24,34,37} TIAs were also associated with increases in the supply of alcohol and tobacco, and rising supply, imports, and sales of ultra-processed foods, SSBs, and sugars. Overall, a majority of included studies was rated as either strong (35%) or moderate (45%), and there was a moderately weak tendency for studies to cite studies published in journals in different disciplines.

The inclusion of new evidence from recent, high-quality, quasi-experimental studies in this field has generated new conclusions regarding the relationship between TIAs and health. First, in contrast to previous reviews, we identified studies examining a wide range of outcomes.¹⁴ We found that whether TIAs yielded changes that were beneficial or deleterious to health varied markedly according to the outcome studied.¹⁴ For example, some studies identified improvements in child health following TIA implementation, whereas other studies identified increased tobacco, sugar, and ultra-processed food sales following TIA implementation, especially US FTAs.^{26,34} Second, studies examined socioeconomic disparities and contextual differences in the effects of TIAs. For example, several studies documented associations between trade liberalisation and improvements in health or health determinants in relatively advantaged socioeconomic groups (eg, those with a higher level of education or those with higher

income), whereas disadvantaged socioeconomic groups (ie, those with a lower level of education or those earning lower income) experienced harms.^{9,25,28} Each of these sources of heterogeneity shows that the nature, direction, and scale of TIAs and trade policy affect health determinants, and outcomes depend on the outcome under study, individual socioeconomic circumstances, and country context.

We acknowledge several limitations in this systematic review. First, meta-analysis was not feasible given the heterogeneity of methods, outcomes, and measures. Second, we restricted our analysis to quantitative studies. Qualitative studies have provided useful evidence on mechanisms underlying the effects of TIAs on health and health policy, including pressure to delay, change, or repeal various health policies to ensure alignment with trade obligations.^{43–46} Third, we measured transdisciplinary engagement using co-citation analysis, which might not fully capture the degree of interdisciplinary engagement. Fourth, our findings might not be fully representative due to publication bias.

For studies included in this Review, there were also methodological challenges. Researchers must necessarily rely on non-experimental observational analyses in the absence of feasible randomised experimentation of TIAs. Several studies exploited quasi-random trade policy assignment or exposure, or used other quasi-experimental methods to reconstruct counterfactual comparison units. Although these methods can address observed and sometimes unobserved confounding, they remain restricted in their capacity to account for all possible unknown factors (eg, coinciding policy changes).

There are also measurement challenges, even when stronger quasi-experimental designs are used. For example, some studies used sales indicators as proxy for consumption levels, and there are few cross-national comparative databases containing individual-level data. This challenge has limited studies' capacity to link macro-level trade policy changes to individual outcomes and inequalities therein. Furthermore, researchers have typically focused their studies on a restricted range of outcomes associated with specific components of TIAs. Although this focus helped identify quasi-random exposure to trade policy, it precludes holistic assessments of the TIAs in question. Thus, although import competition from Chinese manufacturers could be associated with drug overdoses as the USA liberalises trade with China, for example, there might be social benefits from expanding US service sector employment and exports to China that the same policy engenders.⁴⁷

The findings and limitations of this systematic review identify important areas for future research on TIAs and health. There is a need for further improvements in cross-disciplinary engagement in this field to ensure future research tests hypotheses that appropriately integrate and advance research. There is also scope in this field for quasi-experimental studies to evaluate individual-level changes

to a wider range of outcomes (eg, tobacco, alcohol, and health-care access). Notably, we did not identify any studies assessing the effects of TIAs or trade liberalisation policies on pollution and environment-related outcomes and pathways, although evidence elsewhere indicates possible effects.⁴⁸ Further research is also needed to identify policy-relevant sources of heterogeneity in TIA effects, to the TIA modifications or concurrent interventions that might realise TIA benefits while preventing harms.

Taken together, the findings of this systematic review show that TIAs can have diverse effects on health, both for better and for worse, and these effects vary across contexts and socioeconomic groups. Our findings emphasise that, for any specific TIA, expected benefits (eg, economic growth) must be weighed against this evidence base and the varying effects of TIAs across socioeconomic groups that we identify. The effects of a TIA depend, at a minimum, on the provisions the TIA contains and the nature of the trade it affects. There should be no general statements about the effects of TIAs and no alternative to a detailed analysis of specific agreements.

Nonetheless, the evidence provided in this Review can inform national and global strategies to ensure health and trade policy goals are aligned, as we have identified how TIAs can create both opportunities and harms for health promotion. This evidence, in turn, supports a Health in All Policies approach to trade negotiations. There are opportunities for policy makers to align TIAs with health goals, such as reductions in child mortality. However, the adverse effects we identified (eg, on worker health) can have long-term, harmful consequences and can lead to rising health-care costs.⁴⁹ Recognising the long-term economic effects of these harmful health consequences could provide an economic incentive for effective mitigation and could help to align the goals of trade policy making, which typically target economic outcomes, with health goals.

Action to raise the political priority and attention to health within trade policy will also be required. First, governance systems must ensure opportunities to protect and promote health are realised through cross-disciplinary engagement in trade policy scrutiny.^{27,50} Second, it might be fruitful to prevent adverse effects through changes to TIA design (eg, avoiding tariff reductions on unhealthy commodities) or policy mitigations (eg, increased access to social security). Third, reframing TIA evaluations using a human rights framework can draw attention to how the right to health under international law, including among children, can be either sustained or undermined by TIAs.

Contributors

PB, A-MT, AG, LAW, and MAM conceptualised the study and designed the methodology. RS conducted the literature searches, extracted the data, and conducted a preliminary analysis of the data. PB verified the literature searches, data extraction, and all data analysis. PB and RS wrote the initial draft of the paper. All authors reviewed and edited the final draft.

Declaration of interests

We declare no competing interests.

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References

- 1 Waage J, Yap C, Bell S, et al. Governing the UN sustainable development goals: interactions, infrastructures, and institutions. *Lancet Glob Health* 2015; **3**: e251–52.
- 2 UN. Resolution adopted by the General Assembly on 25 September 2015. A/RES/70/1. Geneva, Switzerland: United Nations, 2015.
- 3 WHO. The 8th Global Conference on Health Promotion, Helsinki, Finland, 10–14 June 2013: The Helsinki Statement on Health in All Policies. 2013.
- 4 World Trade Organization. Regional trade agreements. 2020. https://www.wto.org/english/tratop_e/region_e/region_e.htm (accessed Jan 26, 2022).
- 5 Dür A, Baccini L, Elsig M. The design of international trade agreements: introducing a new dataset. *Rev Int Organ* 2014; **9**: 353–75.
- 6 Blouin C, Chopra M, van der Hoeven R. Trade and social determinants of health. *Lancet* 2009; **373**: 502–07.
- 7 Gleeson D, Lexchin J, Labonté R, et al. Analyzing the impact of trade and investment agreements on pharmaceutical policy: provisions, pathways and potential impacts. *Global Health* 2019; **15** (suppl 1): 78.
- 8 Panda P. Does trade reduce infant mortality? Evidence from sub-Saharan Africa. *World Dev* 2020; **128**: 104851.
- 9 Barlow P, Loopstra R, Tarasuk V, Reeves A. Liberal trade policy and food insecurity across the income distribution: an observational analysis in 132 countries, 2014–17. *Lancet Glob Health* 2020; **8**: e1090–97.
- 10 Thow A-M. Trade liberalisation and the nutrition transition: mapping the pathways for public health nutritionists. *Public Health Nutr* 2009; **12**: 2150–58.
- 11 Ogunseitun OA, Schoenung JM, Saphores J-DM, Shapiro AA. Science and Regulation. The electronics revolution: from e-wonderland to e-wasteland. *Science* 2009; **326**: 670–71.
- 12 Smith BC, Mirza Z, Beyer P, Drager N. Trade and health: towards building a national strategy. World Health Organization, 2015. <https://www.who.int/publications/i/item/9789241565035> (accessed Jan 26, 2022).
- 13 McNeill D, Birkbeck CD, Fukuda-Parr S, Grover A, Schrecker T, Stuckler D. Political origins of health inequities: trade and investment agreements. *Lancet* 2017; **389**: 760–62.
- 14 Barlow P, McKee M, Basu S, Stuckler D. The health impact of trade and investment agreements: a quantitative systematic review and network co-citation analysis. *Global Health* 2017; **13**: 13.
- 15 Cowling K, Thow AM, Pollack Porter K. Analyzing the impacts of global trade and investment on non-communicable diseases and risk factors: a critical review of methodological approaches used in quantitative analyses. *Global Health* 2018; **14**: 53.
- 16 Craig P, Cooper C, Gunnell D, et al. Using natural experiments to evaluate population health interventions: new Medical Research Council guidance. *J Epidemiol Community Health* 2012; **66**: 1182–86.
- 17 Liberati A, Altman DG, Tetzlaff J, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *Ann Intern Med* 2009; **151**: W65–94.
- 18 Thomas BH, Ciliska D, Dobbins M, Micucci S. A process for systematically reviewing the literature: providing the research evidence for public health nursing interventions. *Worldviews Evid Based Nurs* 2004; **1**: 176–84.

- 19 Small H. Co-citation in scientific literature: a new measure of the relationship between two documents. Vol. 24. *J Am Soc Inf Sci* 1973; **24**: 265–69.
- 20 van Eck NJ, Waltman L. Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics* 2010; **84**: 523–38.
- 21 Baxter S, Killoran A, Kelly MP, Goyder E. Synthesizing diverse evidence: the use of primary qualitative data analysis methods and logic models in public health reviews. *Public Health* 2010; **124**: 99–106.
- 22 Son K-B. Do free trade agreements matter to drug lag? Recent evidence from Korea after the Korea-U.S. Free Trade Agreement. *Int J Health Serv* 2020; **50**: 147–55.
- 23 Barlow P. Global disparities in health-systems financing: a cross-national analysis of the impact of tariff reductions and state capacity on public health expenditure in 65 low- and middle-income countries, 1996–2015. *Health Place* 2020; **63**: 102329.
- 24 Barlow P, Loopstra R, Tarasuk V, Reeves A. Liberal trade policy and food insecurity across the income distribution: an observational analysis in 132 countries, 2014–17. *Lancet Glob Health* 2020; **8**: e1090–97.
- 25 Fan H, Lin F, Lin S. The hidden cost of trade liberalization: input tariff shocks and worker health in China. *J Int Econ* 2020; **126**: 103349.
- 26 Cowling K, Stuart EA, Neff RA, Vernick J, Magraw D, Pollack Porter K. The relationship between joining a US free trade agreement and processed food sales, 2002–2016: a comparative interrupted time-series analysis. *Public Health Nutr* 2020; **23**: 1609–17.
- 27 Schram A, Aisbett E, Townsend B, Labonté R, Baum F, Friel S. Toxic trade: the impact of preferential trade agreements on alcohol imports from Australia in partner countries. *Addiction* 2020; **115**: 1277–84.
- 28 Pierce JR, Schott PK. Trade liberalization and mortality: evidence from US counties. *Am Econ Rev Insights* 2020; **2**: 47–64.
- 29 Adjaye-Gbewonyo K, Vollmer S, Avendano M, Harttgen K. Agricultural trade policies and child nutrition in low- and middle-income countries: a cross-national analysis. *Global Health* 2019; **15**: 21.
- 30 Werner M, Isa Contreras P, Mui Y, Stokes-Ramos H. International trade and the neoliberal diet in Central America and the Dominican Republic: bringing social inequality to the center of analysis. *Soc Sci Med* 2019; **239**: 112516.
- 31 Boysen O, Boysen-Urban K, Bradford H, Balié J. Taxing highly processed foods: what could be the impacts on obesity and underweight in sub-Saharan Africa? *World Dev* 2019; **119**: 55–67.
- 32 Unar-Munguía M, Flores EM, Colchero MA. Apparent consumption of caloric sweeteners increased after the implementation of NAFTA in Mexico. *Food Policy* 2019; **84**: 103–10.
- 33 Cowling K, Stuart EA, Neff RA, Magraw D, Vernick J, Porter KP. World Trade Organization membership and changes in noncommunicable disease risk factors: a comparative interrupted time-series analysis, 1980–2013. *Bull World Health Organ* 2019; **97**: 83–96A.
- 34 Barlow P. Does trade liberalization reduce child mortality in low- and middle-income countries? A synthetic control analysis of 36 policy experiments, 1963–2005. *Soc Sci Med* 2018; **205**: 107–15.
- 35 Wacziarg R and Welch KH. Trade liberalization and growth: new evidence. *World Bank Econ Rev* 2008; **22**: 187–231.
- 36 Barlow P, McKee M, Stuckler D. The impact of U.S. free trade agreements on calorie availability and obesity: a natural experiment in Canada. *Am J Prev Med* 2018; **54**: 637–43.
- 37 Olper A, Curzi D, Swinnen J. Trade liberalization and child mortality: a synthetic control method. *World Dev* 2018; **110**: 394–410.
- 38 Appau A, Drope J, Labonté R, Stoklosa M, Lencucha R. Disentangling regional trade agreements, trade flows and tobacco affordability in sub-Saharan Africa. *Global Health* 2017; **13**: 81.
- 39 Mendez Lopez A, Loopstra R, McKee M, Stuckler D. Is trade liberalisation a vector for the spread of sugar-sweetened beverages? A cross-national longitudinal analysis of 44 low- and middle-income countries. *Soc Sci Med* 2017; **172**: 21–27.
- 40 Ofa S, Gani A. Trade policy and health implication for Pacific island countries. *Int J Soc Econ* 2017; **44**: 816–30.
- 41 Barlow P, McKee M, Basu S, Stuckler D. Impact of the North American Free Trade Agreement on high-fructose corn syrup supply in Canada: a natural experiment using synthetic control methods. *CMAJ* 2017; **189**: E881–87.
- 42 Baker P, Friel S, Schram A, Labonte R. Trade and investment liberalization, food systems change and highly processed food consumption: a natural experiment contrasting the soft-drink markets of Peru and Bolivia. *Global Health* 2016; **12**: 24.
- 43 Thow A-M, Jones A, Hawkes C, Ali I, Labonté R. Nutrition labelling is a trade policy issue: lessons from an analysis of specific trade concerns at the World Trade Organization. *Health Promot Int* 2018; **33**: 561–71.
- 44 Barlow P, Labonte R, McKee M, Stuckler D. Trade challenges at the World Trade Organization to national noncommunicable disease prevention policies: a thematic document analysis of trade and health policy space. *PLoS Med* 2018; **15**: e1002590.
- 45 Lencucha R, Drope J, Labonte R. Rhetoric and the law, or the law of rhetoric: How countries oppose novel tobacco control measures at the World Trade Organization. *Soc Sci Med* 2016; **164**: 100–07.
- 46 O'Brien P, Mitchell AD. On the bottle: health information, alcohol labelling and the WTO Technical Barriers to Trade Agreement. *QUT L Rev* 2018; **18**: 124.
- 47 Feenstra RC, Sasahara A. The 'China shock,' exports and US employment: a global input-output analysis. *Rev Int Econ* 2018; **26**: 1053–83.
- 48 Zhang Q, Jiang X, Tong D, et al. Transboundary health impacts of transported global air pollution and international trade. *Nature* 2017; **543**: 705–09.
- 49 Bloom DE, Cafiero ET, Jané-Llopis E, et al. The global economic burden of non-communicable diseases. Geneva: World Economic Forum, 2011. http://www3.weforum.org/docs/WEF_Harvard_HE_GlobalEconomicBurdenNonCommunicableDiseases_2011.pdf (accessed Jan 26, 2022).
- 50 Jarman H. Trade policy governance: what health policymakers and advocates need to know. *Health Policy* 2017; **121**: 1105–12.

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