Does ratification of human-rights treaties have effects on population health?

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Human-rights treaties indicate a country's commitment to human rights. Here, we assess whether ratification of human-rights treaties is associated with improved health and social indicators. Data for health (including HIV prevalence, and maternal, infant, and child [<5 years] mortalities) and social indicators (child labour, human development index, sex gap, and corruption index), gathered from 170 countries, showed no consistent associations between ratification of human-rights treaties and health or social outcomes. Established market economy states had consistently improved health compared with less wealthy settings, but this was not associated with treaty ratification. The status of treaty ratification alone is not a good indicator of the realisation of the right to health. We suggest the need for stringent requirements for ratification of treaties, improved accountability mechanisms to monitor compliance of states with treaty obligations, and financial assistance to support the realisation of the right to health.

Introduction

In 1948, the modern human-rights movement was launched. The Universal Declaration of Human Rights was developed with the goal of prevention of egregious human-rights abuses that were committed during World War 2.[1] Over the next 20 years, the International Covenant on Economic, Social and Cultural Rights (ICESCR), and the International Covenant on Civil and Political Rights (ICCPR) were adopted to increase the accountability of countries to ensure that basic needs of populations are met and respected. Article 12 of the CESCR explicitly addresses health: "The States Parties to the present Covenant recognize the right of everyone to the enjoyment of the highest attainable standard of physical and mental health".[2] Ratification of human-rights documents is a powerfully symbolic gesture. However, non-compliance with treaty obligations is rampant, and the world is replete with examples of countries that, despite their ratification of ICESCR and other treaties, have not honoured them.[3,4] Unsurprising, people have questioned the value and effects of ratification of human-rights treaties on health.[5,6]

Specific treaties are monitored by UN committees that review the state of human rights within countries and make recommendations for improvement. The committee for ICESCR issues non-binding general comments and reviews of state reports. This committee issued general comment 14,[7] whereby it assures that countries have core obligations to progressively realise the right to health and provide minimum levels of services to support each ICESCR commitment, including access to essential health care as defined in the Alma-Ata Declaration.[8] However, reports about country progress are generally sporadic and vary in quality.

If we are to achieve major advances in access to essential health services, particularly for the most disadvantaged populations, then states committing themselves to improving health care should make measurable efforts. Whether ratification of these important treaties has a major effect on the health and social status of populations in ratifying nations is still unclear despite various monitoring efforts undertaken by UN and non-governmental organisations. We aimed to find out whether ratification of human-rights treaties is associated with improved health and social indicators.

Data acquisition

We did several analyses to assess if health status differs significantly between countries that have ratified the treaties and those that have not, including assessment of changes before and after ratification. We obtained data for 170 independent countries that had ratified at least one major UN human-rights treaty, had a population size of more than 100 000 people, were sovereign states before June, 2006, and had available data for at least two of 11 health and social wellbeing indicators used (see below).[9] We excluded protectorates and non-sovereign countries because indicators and scores were gathered differently depending on the source (eg, often data were not available for protectorates or governed colonies such as Puerto Rico or western Sahara). We further excluded politically undetermined countries, such as Kosovo, or those that were newly independent, such as Montenegro, because of insufficient data.

We gathered widely reported source data for health indicators that might be expected to be improved by ratification of the obligations of the human-rights treaty, including HIV prevalence, maternal, infant (<1 year), and child (<5 years) mortality rates, and, life expectancy rates from UN and WHO data (WHO statistical information system or UNAIDS).[10] We also gathered data for social indicators, including child labour, complete human development index score, gender gap, corruption index, civil liberties, and political-rights scores from reputable third parties. Survey data for child labour were obtained from a report by UNICEF[11] about the proportion of children between the ages of 5 years and 14 years who were involved in economic activity and domestic work. Age and hours worked per week were taken into account for each child. Data for difference

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between sexes was obtained from the World Economic Forum report,[12] a private agency that used publicly available data to measure the size of the gap between sexes, which strongly correlated with reproductive health. Governance was assessed according to Transparency International's corruption perceptions index, which provides source data about corruption and governance.[13] Data for civil liberties and political rights were obtained from Freedom House, an international non-governmental organisation as a validated, multidimensional measure of individual experiences.[14] The chosen indicators measure the health and social aspects of human rights that are specifically protected by the chosen six key human-rights treaties (table 1).

To evaluate whether changes before and after ratification of health status differed, we chose four health indicators that have a long history of being measured—ie, mortality rates of mothers, infants, and children younger than 5 years, and life expectancy. We chose six international UN treaties (table 1) because they are legally binding with specific articles relating to health and social outcomes. We gathered the ratification status of these treaties for each country from UN source material.[9] Only legally binding ratifications or accessions were considered as countries agreeing to each treaty. Although signatures alone denote intent to ratify and are legally binding, we considered these as not ratified. To compare progress in health indicators over time between countries that had ratified a treaty and those that had not, the year of health status measurement of the non-ratifying country was taken according to the year of the nearest neighbouring country that had ratified the specific treaty. In the event that a non-ratifying country had more than one neighbouring country, we chose alphabetically, clockwise.

We also assessed whether regional location affected the probability of ratifying treaties. For our regional analysis, we used a previously described geographical classification.[15] All 170 countries were assigned to one of the following regions: established market economies; formerly socialist economies of Europe; India, China, other Asia and islands; sub-Saharan Africa; Latin America and the Caribbean; and middle Eastern crescent.

Analysis

The primary outcome in our first analysis was the association between number of treaties signed by each country, and the health and social indicators (1–6 treaties). Counties were classified as having ratified fewer than or all six treaties. We developed an explanatory logistic regression model to identify which social and health outcomes had the largest association with state ratification. We used a backward stepwise technique to select covariates. The area under the receiver operating characteristic curve was used to assess the model's ability to discriminate the primary outcome.[16] We evaluated categorical variables using χ^2 or Fisher exact test, and continuous variables using the Wilcoxon rank sum test. We used a proportional odds models and (unconstrained) partial proportional odds models, which is an extension of proportional odds models, to assess the effect of economic status on health.[17,18] We did a sensitivity analysis to find out whether the number of treaties ratified (<3, <4, or <5) changed our results.

In our second analysis, we investigated whether change in health status from the period before ratification to the present was significantly different. We used mixed-effects Poisson regression to model the values of the four health indicators, with the most current value available as the outcome. Poisson regression was done because the health indicators are rates, and a mixed-effects model was used to account for the fact that the values for health indicators from different health-indicator treaty match-ups for the same country will be from different years, but might be correlated.[19] Since we were interested in finding out whether or not treaty ratification changes the value of the health indicator, the value assigned to the

	Social indicator	Health indicator
Convention on rights of the child	Child labour (32.1,2)	Mortality rate for children <5 years (3.2, 3, 6.2, 24); maternal mortality rate (18.1,2; 27.3)
Convenant on economic, social, and cultural rights	Human development index (1.2, 11.1,2); political rights (1.1); civil liberties (1.1); child labour (7, 10.3)	Life expectancy (11.1); maternal mortality rate (10.1)
Convention on elimination of discrimination against women	Civil liberties (1.1, 3, 10a); political rights (1.1,7b); sex gap (10)	Maternal mortality rate (4.2, 5b); infant mortality rate (10h, 12, 14)
Convention against torture	Civil liberties (1.1, 6, 9, 10); political rights (1.1, 3.2, 2.2, 6.4, 13); corruption perceptions index (1.1, 3.2, 4)	Life expectancy (1.1)
Convention on elimination of racial discrimination	Civil liberties (1.4, 2.1, 4.1, 5d–f); political rights (1.4, 2.1, 5.1a–c); human development index (1.4, 5); gender gap score (5.1c)	Maternal mortality rate (5iv); life expectancy (5.2iv)
Convenant on civil and political rights	Civil liberties (1.1, 4.1, 8.3iv, 9, 25a); political rights (1.1, 1.2, 2.3a,b, 25b); gender gap score (3, 23); human development index (1.2)	Life expectancy (6); maternal mortality rate (23); infant mortality rate (6.1, 24); child (<5 years) mortality rate (24)

Indicators denote specific articles within the conventions that relate to health and social indicators.

Table 1: Human-rights treaties and health and social indicators

time that a treaty ratification took place was used as an offset in the Poisson regression model, and whether or not the treaty was in fact signed was an explanatory variable in the model. Since the times between the treaty ratification date (or date assigned from a neighbouring country's time of ratification) and the latest available data for health indicators vary, and could affect whether a change occurred in the value, the number of years from the date of ratification (or that assigned from a neighbouring country) to the latest available date were also taken into account. The third explanatory variable included in the model was the country's region.

We used SAS (version 9.1.3) for the analyses. Although implementation of proportional odds models is straightforward with the LOGISTIC procedure in SAS, fitting (unconstrained) partial proportional odds models requires the development of SAS macros, based mainly on the LOGISTIC and GENMOD procedures. GENMOD was used to do Poisson mixed-effects regression. χ^2 divided by its degrees of freedom was used to scale the variance parameter to allow for possible overdispersion. All p values are two-sided. We considered $p < 0.05$ as significant. Trained statisticians (KF, VL, LZ) did all analyses.

Findings

65% of countries had ratified all six treaties. Table 2 shows the association between ratification and health and social indicators. For most indicators, the differences between countries that signed fewer than six versus six treaties were not significant; scores for infant and child (<5 years) mortality rates, and civil liberties were lower for countries that had signed all treaties. However, we did not control for regional heterogeneity. When countries were grouped according to their global burden of disease, all regions were more likely to have signed six treaties than were India, China, other Asia and islands (table 2). After we controlled for heterogeneity between countries, our logistic analysis showed that none of the health and social indicators were associated with the number of treaties signed (data not shown). Table 3 shows the association between ratification of the treaties and health and social indicators stratified by global burden of disease region. Again, we did not note a difference for any of the indicators. Our sensitivity analysis of the number of treaties ratified did not show a significant change.

In our analysis of status before and after ratification, we did not note a difference in rate of change in health status between countries that did and did not ratify the treaties (table 4; figure) during 10 years. We did find an association between all four health indicators assessed and a country's region. After adjustment for other variables, sub-Saharan Africa did significantly worse than did the established market economies region for the health indicators. The formerly socialist economies of Europe region had 1·38-fold greater mortality rate for children younger than 5 years than did the

established market economies region, but rates were not significantly different for the other indicators (table 4). The region of India, China, other Asia and islands and that of middle eastern crescent had significantly higher mortality rates for infants and children (<5 years) than did the established market economies region (table 4). The Latin America and the Caribbean and established market economies regions were not significantly different for any of the health indicators (table 4). For every 10-year increase between the time associated with a country's or a neighbouring country's treaty ratification and the most recent timepoint, infant mortality rate decreased by 17% and life expectancy increased by 5% after adjustment for other variables (table 4).

Interpretation

In our analysis, ratification of primary human-rights treaties was not associated with a change in health status and was not significantly related to a change in positive social indicators. However, these findings should not be interpreted to mean that human-rights treaties have no effect on important health issues. Hogerzeil and colleagues[20] and Singh and co-workers[21] and their colleagues have shown the importance of such treaties in legal arguments for the right to essential medicines and public health. Important examples of access to health care based on the argument of the right to health, enshrined in several constitutions and in many international treaties, have been effectively used to reduce child labour, increase access to antiretroviral health care, promote care of people who are elderly and mentally ill,

	<6 treaties (N=59)	6 treaties (N=111)	p value
HIV prevalence	0·9 (0·2–2·9)	0·3 (0·1–1·6)	0·113
Maternal mortality	145·0 (44·0–550·0)	98·5 (24·0–540·0)	0·342
Infant mortality rate	42·0 (12·0–79·0)	23·0 (7·0–59·0)	0·029
Life expectancy	68·0 (56·0–73·0)	71·0 (56·0–77·0)	0·217
Child (<5 years) mortality rate	62·0 (18·0–120·0)	26·0 (7·0–78·0)	0·013
Human development index	95·5 (60·0–137·0)	83·0 (35·5–137·0)	0·181
Child labour	22·0 (8·0–28·0)	23·5 (11·0–33·5)	0·469
Sex gap score	0·7 (0·6–0·7)	0·7 (0·6–0·7)	0·105
Corruption	3·1 (2·5–4·6)	3·2 (2·6–6·0)	0·244
Political rights	4·0 (2·0–6·0)	3·0 (1·0–5·0)	0·068
Civil liberties	4·0 (2·0–5·0)	3·0 (1·0–5·0)	0·035
Global burden of disease region	4 (7%)	19 (17%)	0·027
Established market economies	3 (5%)	16 (14%)	..
Formerly socialist economies of Europe India, China, other Asia and islands	14 (24%)	11 (10%)	..
Sub-Saharan Africa	19 (32%)	26 (23%)	..
Latin America and Caribbean	10 (17%)	17 (15%)	..
Middle eastern crescent	9 (15%)	22 (20%)	..

Data are median (IQR) or number (%), unless otherwise indicated.

Table 2: **Health and social outcome scores for countries ratifying six or fewer principal human-rights treaties**

and improve the quality of public spaces.[21,22] These landmark cases provide strong evidence that the right to health as supported in international treaties is an important method for advocates using judicial strategies for particular individuals or groups. However, use of legal strategies requires access to legal representation and might not be useful in settings that do not permit open advocacy and access to courts or those in which injured parties are unable to afford legal action or the state cannot afford to provide health care even in the event of a successful court case. Our finding that countries did not differ shows that the legal community now has an important contribution to make towards initiating legal cases that should not simply be left to the hard work of pro bono groups or student projects. The right to health also provides opportunities for civil society to change health policy and programmes, independent of judicial systems, through advocacy and involvement of international partners.

Some people have recommended that health workers should be educated in international law and human rights.[22] Although few programmes provide education in international law related to health,[23] such education might assist in the development of communication between health workers and the legal community. Education could enable health workers to adequately interpret when abuses to patients can be challenged or when specific entitlements for patients and the public are not realised by local governments. Knowledge of health-related international law also might enable health workers to realistically interpret what international laws are prohibitive[24] and when they should make public demands for access to health care.

Paul Hunt, who was the UN Special Rapporteur on the Right to Health, has consistently pressed for the establishment of key indicators, national benchmarks, and the accurate monitoring of progress in countries by countries, UN agencies, and independent groups.[25,26] His consistent difficulties in convincing UN agencies to actively monitor progress might indicate the reticence of countries and agencies to be held accountable for their failures.

	Established market economies			Formerly socialist economies of Europe			India, China, other Asia and islands			Sub-Saharan Africa			Latin America and Caribbean			Middle eastern crescent		
	<6*	6*	p value	<6*	6*	p value	<6*	6*	p value	<6*	6*	p value	<6*	6*	p value	<6*	6*	p value
HIV prevalence	0·75 (0·60–0·90)	0·4 (0·2–2·4)	0·86	0·1 (0·1–0·1)	0·35 (0·2–1·6)	0·09	0·70 (0·1–1·7)	0·2 (0·1–0·4)	0·30	1·1 (0·5–3·7)	0·5 (0·3–2·0)	0·32	1·5 (0·2–1·8)	0·3 (0·1–1·1)	0·18	0·6 (0·1–6·1)	0·4 (0·1–3·3)	0·78
Maternal mortality	5·0 (4·0–13·0)	8·0 (5·0–17·0)	0·39	36·0 (3·0–49·0)	31·5 (14·5–48·5)	0·96	98·5 (42·5–400·0)	200·0 (92·0–450·0)	0·58	600·0 (300·0–1000·0)	935·0 (590·0–1100·0)	0·08	125·0 (60·0–160·0)	130·0 (84·0–240·0)	0·45	98·0 (37·5–355·0)	94·0 (41·0–140·0)	0·61
Infant mortality rate	4·5 (4·0–5·0)	4·0 (3·0–5·0)	0·37	7·0 (3·0–17·0)	8·0 (6·0–13·0)	0·85	41·0 (17·0–66·0)	27·0 (17·0–59·0)	0·73	89·0 (75·0–115·0)	93·5 (65·0–115·5)	0·88	18·0 (12·0–30·0)	23·5 (16·0–31·5)	0·44	32·0 (21·0–80·0)	28·5 (15·0–58·0)	0·79
Life expectancy	58·0 (52·0–69·0)	73·0 (68·0–79·0)	0·27	73·0 (68·0–74·0)	74·0 (67·0–75·5)	0·69	65·0 (48·0–73·0)	70·5 (64·0–75·0)	0·36	63·0 (53·0–71·0)	53·0 (45·0–72·0)	0·30	67·0 (63·0–78·0)	70·0 (54·0–74·0)	0·38	72·0 (70·0–74·0)	75·0 (65·0–78·0)	0·50
Child (<5 years) mortality rate	6·0 (5·5–37·0)	5·0 (4·0–6·0)	0·08	16·0 (8·0–19·0)	11·5 (7·0–16·0)	0·31	35·5 (18·0–74·0)	36·0 (15·0–74·0)	0·87	137·0 (120·0–205·0)	147·0 (112·0–195·0)	0·86	21·5 (15·0–31·0)	27·0 (19·0–37·0)	0·56	36·0 (24·0–99·0)	29·5 (12·0–67·0)	0·52
Human development index	18·5 (11·0–52·0)	12·0 (6·0–17·0)	0·35	60·0 (42·0–114·0)	58·0 (39·0–70·0)	0·78	78·0 (47·5–131·5)	109·0 (84·0–138·0)	0·28	147·0 (131·0–157·0)	162·0 (145·0–168·0)	0·07	90·0 (52·0–95·0)	77·0 (50·5–113·5)	0·94	83·0 (57·5–115·0)	86·0 (49·0–105·0)	0·86
Child labour	NA	57·0 (57·0–57·0)	NA	14·5 (1·0–28·0)	28·0 (17·0–38·0)	0·49	14·0 (7·0–24·0)	17·0 (4·0–30·0)	1·00	28·0 (22·0–56·0)	31·5 (24·0–43·0)	0·79	8·0 (2·0–9·0)	13·0 (6·5–22·5)	0·31	NA	11·0 (8·0–18·0)	NA
Score of overall mean sex gap	0·73 (0·69–0·73)	0·72 (0·69–0·75)	0·97	0·68 (0·68–0·71)	0·68 (0·67–0·70)	0·79	0·64 (0·62–0·66)	0·65 (0·63–0·70)	0·40	0·64 (0·60–0·69)	0·64 (0·59–0·67)	0·39	0·67 (0·66–0·69)	0·66 (0·65–0·68)	0·29	0·58 (0·53–0·64)	0·62 (0·59–0·67)	0·15
Corruption	7·1 (5·6–8·0)	8·6 (7·4–9·2)	0·07	3·2 (3·1–4·7)	3·9 (2·9–4·8)	0·80	3·3 (2·6–5·0)	2·6 (2·4–3·1)	0·38	2·5 (2·3–3·2)	2·6 (2·2–2·9)	0·69	3·1 (2·8–3·5)	3·1 (2·6–4·0)	0·89	3·0 (2·6–5·1)	3·2 (2·6–5·4)	0·80
Political rights	1·0 (1·0–1·0)	1·0 (1·0–1·0)	1·00	2·0 (1·0–3·0)	1·5 (1·0–3·0)	1·00	5·0 (3·0–7·0)	3·0 (2·0–6·0)	0·22	5·0 (3·0–6·0)	4·5 (3·0–6·0)	0·82	2·0 (1·0–3·0)	3·0 (2·0–3·0)	0·39	6·0 (5·0–6·0)	5·5 (5·0–6·0)	0·65
Civil liberties	1·0 (1·0–1·5)	1·0 (1·0–1·0)	0·25	2·0 (1·0–4·8)	2·0 (1·0–3·0)	0·82	4·5 (3·0–6·0)	3·0 (3·0–5·0)	0·14	4·0 (3·0–5·0)	4·0 (3·0–6·0)	0·43	2·0 (2·0–3·0)	3·0 (2·0–3·0)	0·77	5·0 (5·0–5·0)	5·0 (4·0–5·0)	0·52

Data are median (IQR), unless otherwise indicated. *Number of treaties. NA=not applicable.

Table 3: Health and social indicator outcomes by global burden of disease region

	Rate ratio estimate (95% CI)	p value*
Infant mortality rate (n=169)		
FSE	1·23 (0·95–1·50)	<0·0001
ICO	1·34 (1·10–1·58)	
LAC	1·21 (0·98–1·45)	
MEC	1·29 (1·05–1·52)	
SSA	2·16 (1·95–2·37)	
EME	1·00 (··)	
Increase†	0·83 (0·79–0·86)	<0·0001
Ratified *vs* not ratified	1·10 (0·96–1·24)	0·18
Life expectancy (n=169)		
FSE	0·97 (0·93–1·00)	0·001
ICO	1·01 (0·98–1·04)	
LAC	1·01 (0·99–1·04)	
MEC	1·01 (0·9–1·04)	
SSA	0·92 (0·87–0·96)	
EME	1·00 (··)	
Increase†	1·05 (1·04–1·06)	<0·0001
Ratified *vs* not ratified	1·00 (0·98–1·02)	0·96
Maternal mortality rate (n=168)		
FSE	0·74 (0·23–1·26)	0·008
ICO	1·06 (0·72–1·83)	
LAC	1·28 (0·95–1·61)	
MEC	1·20 (0·78–1·63)	
SSA	1·55 (1·27–1·83)	
EME	1·00 (··)	
Increase†	1·02 (0·80–1·24)	0·87
Ratified *vs* not ratified	1·10 (0·88–1·31)	0·41
Child (<5 years) mortality rate (n=169)		
FSE	1·38 (1·14–1·61)	<0·0001
ICO	1·35 (1·11–1·59)	
LAC	1·03 (0·72–1·34)	
MEC	1·28 (1·02–1·54)	
SSA	2·41 (2·21–2·62)	
EME	1·00 (··)	
Increase†	1·00 (1·00–1·00)	0·37
Ratified *vs* not ratified	0·94 (0·81–1·06)	0·30

FSE=formerly socialist economies of Europe. ICO=India, China, Other Asia and Islands. LAC=Latin America and the Caribbean. MEC=middle eastern crescent. SSA=sub-Saharan Africa. EME=established market economies. *For all regions. †During 10 years from treaty ratification to latest available data.

Table 4: **Preratification changes for countries that did and did not ratify treaties**
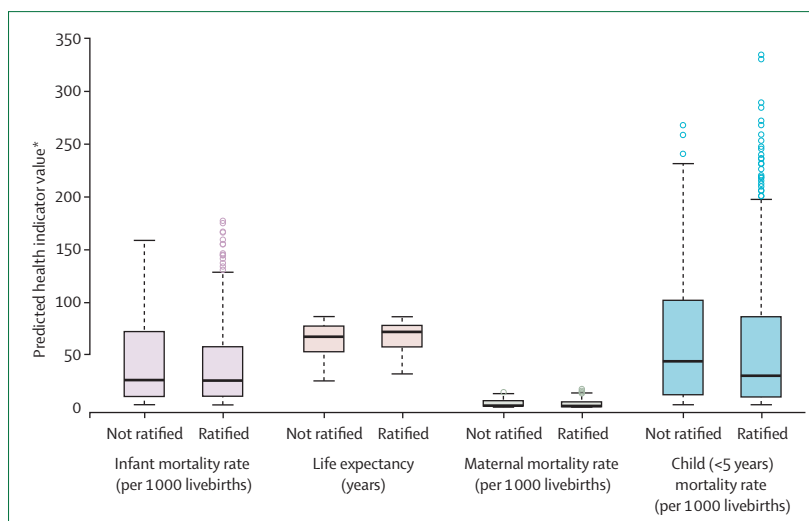

Figure: **Change in health status before ratification to present**
*For most recent data available.

Strengths of this study include our extensive searching and identification of health and social indicator outcomes for countries. However, our analysis was limited by power. In a post-hoc assessment, our initial analysis of countries that had and had not ratified treaties was more severely affected by power issues than the before and after assessments, which achieved power ranging from 96% to 100%. In our analysis, we chose to apply a backward-selection procedure based on the Akaike Information Criterion[27] to select the variables in the final multivariable models. Other options for model development exist and yield similar outcomes to the Akaike Information Criterion-based approach.[28] Our analysis was limited by the absence of clear indicators to measure the outcome of treaty ratification. The quality of health outcomes reported by countries is unsteady and does not account for within state heterogeneity. Similarly, indicators might be limited by transparency, and individual participation and accountability. Some data for national rankings are incomplete. For example, for child-labour rank we could only include 66 countries where child labour was reported. We excluded indices from our model when greater than 10% of data were absent. Our study was limited in comparator sample sizes between countries ratifying specific treaties or not. Most countries have, for example, ratified the convention on the rights of the child, thus making any comparison useless. Finally, we only considered complete ratification and did not include states that had partly ratified particular treaties (by making reservations or derogations that allow countries to suspend certain rights).

The findings of three other studies[29–31] assessing human rights outcomes, including civil liberties and oppression, are consistent with our conclusion that ratification by countries has little measurable effect on human-rights outcomes. These studies[29–31] have been criticised because human-rights issues were compared between countries at a specific timepoint, rather than before and after ratification. We assessed outcomes before and after ratification and were still unable to show substantial differences between ratifying and non-ratifying countries.

Absence of minimum criteria for ratification among member states could explain our findings. Hathaway[31] and Heyns and Viljoen[32] have assessed the reasons for ratification and suggest that countries that are not completely democratic are not more or less likely to ratify

human-rights treaties if they have poor human-rights records since there is little likelihood that the treaty will be enforced. Conversely, democratic countries might be reluctant to commit to ratification for precisely the opposite reason—ie, that monitoring of the treaty might result in change.[32]

The realisation of the highest attainable standard of health for all is subject to both progressive realisation and resource availability.[33] We did not note an association between health outcome improvements between ratifying and non-ratifying countries over 10 years, indicating that progress towards realisation is slow indeed. Moreover, although the realisation of the highest attainable standard of health is a progressive obligation, the realisation of a minimum, essential health care is an immediate one.[34] The fact that economic status was the greatest predictor of good health, but was not associated with likelihood of treaty ratification, emphasises the central role of financing in the realisation of the right to health.

Contributors
All authors participated in the concept, data abstraction, analysis, and writing of the report, and all have seen and approved the final version.

Conflicts of interest
We declare that we have no conflicts of interest.

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