"Profits before people"? A systematic review of the health and safety impacts of privatising public utilities and industries in developed countries

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Debates on government privatisation policies have often focused on the alleged effects of privatisation on health and safety. A systematic review (through Quality of Reporting of Meta-analysis) of the effects of privatising industries and utilities on the health (including injuries) of employees and the public was conducted. The data sources were electronic databases (medical, social science and economic), bibliographies and expert contacts. Experimental and quasi-experimental studies were sought, dating from 1945, from any Organisation for Economic Cooperation and Development member country (in any language) that evaluated the health outcomes of such interventions. Eleven highly heterogeneous studies that evaluated the health impacts of privatisation of building, water, paper, cement, bus, rail, mining, electric and gas companies were identified. The most robust study found increases in the measures of stress-related ill health among employees after a privatisation intervention involving company downsizing. No robust evidence was found to link privatisation with increased injury rates for employees or customers. In conclusion, public debates on the health and safety implications of privatisation have a poor empirical base, which policy makers and researchers need to address. Some evidence suggests that adverse health outcomes could result from redundancies associated with privatisation.

conducted a systematic review of the impacts of privatising publicly owned (or partly owned) utilities and industries on health and work-related injuries affecting employees and the public.

Systematic reviews are increasingly advocated as a tool for identifying and synthesising evidence on the impact of complex social interventions on both health and health inequalities,^{12 13} with work-related health highlighted as a policy area requiring more rigorous systematic reviews.¹³ However, this strategy depends on there being sufficient good-quality primary research to answer the questions of systematic reviewers.

To explore some of the issues involved in systematically reviewing the health impacts of complex interventions, we focused on privatisation because it represents an archetypal complex intervention cutting across economic and employment policies and frequently associated with a politically contested public health debate.

There is epidemiological evidence to suggest that redundancies, insecure employment and poor working environments (physical or psychosocial) can contribute to ill health and health inequalities.^{1 14} Critics of privatisation have accused the private sector of cost-cutting that results in redundancies and deteriorating working conditions (including health and safety standards): arguments summed up in the slogans "profits before people" and "profits before safety".^{2 7}

Privatisation has also been portrayed as a threat to the general public—for example, injuries and fatalities caused by recent train derailments in the UK have been linked by some commentators to the privatisation of British Rail.¹⁵ Supporters of privatisation have counter-claimed that health and safety standards have been maintained, or have even improved in privatised industries.^{2 3 7}

Numerous traditional literature reviews have either presented evidence on the health impacts of different workplace interventions^{16 17} or summarised the research literature on economic and labour market transitions.^{1 18} To our knowledge, this is the first systematic review to focus on primary studies that provide data on the health outcomes of privatising public utilities and industries in developed countries. The study is intended to aid decision makers, inform the public debate on privatisation and provide a case study illustrating the role of systematic reviews in identifying

Privatisation policies have played a prominent but controversial role in late 20th and early 21st century politics, and much of the controversy has centred on the alleged effects of privatisation on health and safety.^{1–9} This debate remains highly divisive, as numerous governments and the World Trade Organisation continue to solicit greater private sector involvement in public services such as health, housing and schools.^{10 11} An earlier wave of privatisation (broadly contemporaneous to, and to an extent personified by, Margaret Thatcher's UK tenure as Prime Minister during the 1980s and early 1990s) included privatisations of public utilities, and nationalised industries in sectors such as energy, transport and communications. These earlier privatisations can be considered as natural experiments that could shed light on the health impacts of current and future policies, provided their health and safety effects are robustly evaluated. We have therefore

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Figure 1 Flow chart (*electronic search + manual search).

and appraising evidence of the effects of complex social interventions on health and health inequalities.

METHODS

Searching

We searched the following databases, from 1945 or start date if later, to February 2003 (hosts given in parentheses): ASSIA (CSA), Business Source Premier (EBSCO), EU Community Research & Development Information Service, Dissertation Abstracts, European Commission Libraries Catalogue, Econlit (DIALOG), Embase (Ovid), Geobase (FirstSearch), HMIC (Webspirs), Index to Theses, International Bibliography of the Social Sciences (Bids), JSTOR, Medline (Ovid), PAIS (DIALOG), PapersFirst (FirstSearch), Planex, Psycinfo (Ovid), REGARD (ESRC), Research Papers in Economics, Social Science Citation Index (Web of Science) and Sociological Abstracts (CSA). A comprehensive list of search terms was devised, linking over 200 health and employment terms with terms associated with public and private investment, such as “deregulated”, “deregulation”, “financ*”, “invest*”, “nationalised”, “nationalized”, “outsourcing”, “privatised”, “privatisation”, “private finance initiative”, “PFI”, “public* owned”, “public ownership”, “public utilit*” (the full search strategy is available from the authors on request).

We manually searched bibliographies, reference lists and websites, and contacted experts for documents of any type and in any language, including conference papers, unpublished manuscripts and government-commissioned reports.

Selection

We included quantitative and qualitative experimental and quasi-experimental studies (including interrupted time series (ITS) analyses of routine data) that evaluated the health of populations before and after the privatisation of public sector industries and utilities—that is, enterprises that provide and maintain the infrastructure of public services (eg, common-carrier transportation, communication services, energy, water, sanitation, etc). We defined privatisation as transferring (or partially transferring) public assets and shares to private ownership and facilitating greater private sector investment in a business.¹⁹ Health outcomes eligible for inclusion included any measures (eg, physical or self-reported measures or routinely collected data) of physical health, mental health, and injuries or absenteeism.

Populations

We included studies of any population whose health might potentially be affected by privatisation (eg, employees, customers, general public, etc). We have focused on developed countries (defined by Organisation for Economic Cooperation and Development membership) because we aimed to identify interventions implemented within broadly comparable contexts and to avoid findings being confounded by the more fundamental socioeconomic and political transformations accompanying privatisation policies in former Communist countries.²⁰

Validity assessment

The lead reviewer (ME) excluded obviously irrelevant titles and abstracts from the initial literature search and retrieved full text copies of the remainder. Studies making any reference to health or well-being were independently appraised by at least two reviewers, who re-examined the papers jointly to resolve any disagreements.

Two reviewers assessed the validity of the included studies using criteria adapted from established checklists and previous systematic reviews of complex interventions.^{21–24} Our appraisal criteria for ITS studies were adapted from a checklist developed by the Cochrane Effective Practice and Organisation of Care Group.²⁵ We defined ITS as the reporting of two or more observations over time both before and after an intervention was implemented.

Data abstraction and synthesis

The lead reviewer extracted and plotted the data, which were checked by a second reviewer. There was a broad heterogeneity among the interventions, study designs, statistical techniques and outcome measures, and hence we used narrative synthesis rather than meta-analysis.^{21–22} Odds ratios (ORs) or exact *p* values were extracted or recalculated where possible (although the available data were often insufficient for this). When necessary, we contacted the authors for additional information and clarification.

RESULTS

Study characteristics

The search identified 13 532 titles including duplicates, from which 1103 documents were retrieved for further examination (see flow chart; fig 1). A total of 11 studies met our final inclusion criteria.^{26–39} Of these, 10 were from the UK and 1 was from Portugal.³³ Three were initially identified through electronic database searches,^{26–33} and eight through manual searching.^{34–39} Dates of publication ranged from 1995 to 2003.

Table 1 Privatisation (psychosocial health impacts)

First author and intervention	Study design	Reported outcomes
Ferrie, ²⁶⁻³⁰ London, UK Privatisation of a civil service department responsible for design and construction of public buildings (Property Services Agency) during the Whitehall II study of UK civil servants. Privatisation plans included large-scale redundancies. These plans were disseminated to PSA employees during the anticipation stage of the study. Change in public investment not reported Evaluation covers 1985-94. Intervention occurred in 1992	(A) Prospective controlled study of civil servants anticipating intervention. Three waves measuring a range of self-reported morbidity and physiological risk factors: 6 years (baseline), 3 years (anticipation), and 1 month (pretermination) before privatisation Methods appraisal*: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 (B) Cross-sectional study of the intervention's effects on employment status and health, using the fourth wave 18-24 months after after privatisation and redundancies Population: all employees aged 35-55 years. Total n = 14 121. Baseline response rate = 73%. Follow-ups = 79-81% of baseline. No control for wave 4 Methods appraisal*: 3, 4, 5, 6, 7, 8, 9, 10	(A) Waves 2 and 3: some self-reported morbidity and physiological risk factors increased in the intervention group relative to control—for example, wave 3, body mass index ($p < 0.001$); sleeping ≥ 9 h (OR = 1.88; 95% CI = 1.3 to 2.8; $p < 0.01$); ischaemia (OR = 1.45; 95% CI = 1.0 to 2.1). (B) For (1) insecurely employed (29%) and (2) job-seeking unemployed (19%), increased minor psychiatric morbidity (mean difference (1) 1.56; 95% CI = 1.0 to 2.2; (2) 1.25; 0.6 to 2.0) and >3 GP consultations in past year (OR (1) 2.04; 1.1 to 3.8; (2) 2.39; 1.2 to 4.7), relative to securely employed respondents (31%)
Nelson, ^{31, 32} UK Privatisation of most of the UK's water industry. Change in public investment not reported Evaluation covers 1989-91 Intervention occurred in 1989	Prospective cohort study of employees' self-reported health 1 month (T ₁) prior, 8 months (T ₂) and 20 months (T ₃) after Total pop. = 4501 Initial sample = 1500. Baseline response rate = 41%. Follow-ups = 79%, 64% of baseline Methods appraisal*: 1, 3, 4, 6, 7, 8, 10	OSI mean scores suggest worsening mental health for clerical and administrative staff at T ₂ compared with baseline ($p = 0.018$). Otherwise, little change in mean OSI scores for mental or somatic symptoms for clerical and administrative staff, manual workers or managers at either T ₂ or T ₃ . These figures are based on the final data reported from Nelson's thesis of 1999, ³⁹ rather than from the preliminary findings of 1995. ³⁸
Cunha, ³³ Portugal Privatisation of a paper factory and two cement companies Government shares floated = 44% (paper factory), 20% and 59% (cement companies) Evaluation covers 1994-96 Interventions occurred in 1994 (cement companies) and 1995 (paper factory)	(A) Repeat cross-sectional study with control group (paper factory employees, 1 year before and after). Total pop. = 2800. Initial sample = 1244. Achieved sample = 128. Response rate = 10% Methods appraisal: 1, 2, 3, 4, 8, 10 (B) Cross-sectional comparison of paper factory's employees before privatisation and cement companies' employees 18 months after privatisation. Total pop. = 5800. Initial sample = 2119. Achieved sample = 289. Overall response rate = 14% (paper factory = 10%, cement factories = 18% and 28%) Methods appraisal*: 2, 3, 4, 8, 10	(A) Paper factory: self-reported mental and physical health scores using the OSI were similar for intervention and control groups before and after privatisation ($F(1, 123) = 0$, $p > 0.05$) (B) Analysis of variance for mental and physical OSI symptom scores suggest positive relationship between ill health and the extent to which a company was privatised: mental ill health ($F(2, 285) = 6.3$, $p < 0.01$), and physical ill health ($F(2, 285) = 6.0$, $p < 0.01$)

PSA, Professional Staff Association; OSI, occupational stress indicator.

*Methods appraisal: 1 = prospective; 2 = appropriate comparison group; 3 = representative sample; 4 = all intervention groups exposed (uncontaminated control group); 5 = baseline response $\leq 60\%$; 6 = follow-up $\leq 60\%$; 7 = adjustment for non-response and dropout; 8 = appropriate statistical tests; 9 = exploration of and (if necessary) adjustment for confounding interventions; 10 = conclusions substantiated by data.

Three studies were prospective cohort studies,²⁶⁻³³ although two also had cross-sectional components.^{26-30, 33} The most robust study had a prospective controlled component that met all our appraisal criteria.²⁶⁻³⁰ Eight studies featured ITS analyses of routinely collected data.³⁴⁻³⁹ Six studies met fewer than half of the ITS appraisal criteria,³⁶⁻³⁹ and no study met all the appraisal criteria.

Hypotheses

How might privatisation affect health? Three included studies²⁶⁻³³ sought psychosocial explanations for health effects (table 1). Privatisation could be hypothesised as adversely affecting the psychosocial workplace environment (eg, by increasing the feelings of job insecurity), which might contribute directly or indirectly contribute to a range of physical and mental health problems.

In cases where privatisation led to redundancies, one study tracked the health of employees and ex-employees to explore how postintervention employment status (which could affect income, behaviour or psychosocial factors¹⁴) might mediate the health effects of privatisation.²⁶⁻³⁰

Eight studies explored the effects of privatisation on injury rates (table 2).³⁴⁻³⁹ However, few details were provided on the putative pathways linking privatisation to injuries. It has been argued elsewhere that the public sector might be a "model employer" with regard to employee welfare, being less

profit-driven and more responsive to employee and trade union concerns than the private sector.⁴⁰ It can be hypothesised that transitions from public to private sector could consequently lead to less favourable health and safety standards mediated by factors such as changing managerial approaches to health and safety, expenditure on training or equipment and workplace communication structures.^{5, 40}

Some workplaces are also public spaces, and workplace health and safety standards can at times present a combined risk to the public as well as to the employees (as in the case of rail or bus crashes, gas explosions, etc). We reviewed six studies of work-related injuries that can affect the general public^{34, 38} and employees, while two studies were focused on employee injuries only.^{38, 39}

It is recognised that there might be other putative pathways linking privatisation to health, besides those summarised above as relating to the studies we have identified.

Findings

Psychosocial factors and redundancies

The most robust evaluation of the psychosocial impacts of privatisation derives from the Whitehall II study of UK civil servants.²⁶⁻³⁰ Data on employees of a privatised civil service department responsible for public buildings were collected in three waves (6 years, 3 years, 1 month) before privatisation, and once (18 months) after privatisation. Employees learned of

Table 2 Privatisation-interrupted time series analysis

Author and intervention	Study design	Reported outcomes
Evans, ³⁴ UK Privatisation of UK rail industry Change in public investment not reported. Evaluation covers 1967–2002. Intervention occurred in 1996	ITS of routinely collected data on fatalities resulting from train crashes—that is, collisions, derailments and the run-overs—on national rail system (range 11–119 per 5 years). Note: Data exclude the larger number of fatalities that result from people being run over on train lines Methods appraisal*: 1, 4, 5, 6, 7, 8	Author states that no statistically significant change in fatalities from train crashes occurred after privatisation, but does not report details of statistical tests (ie, no CI or p values reported) (see fig 3)
Evans, ³⁵ UK Deregulation and privatisation of buses in UK, excluding London. Deregulation of buses in Scotland. Change in public investment not reported. Evaluation covers 1981–91. Intervention occurred in 1986	ITS of routinely collected data on injuries (all severities) involving buses outside London, including non-bus-users injured in bus accidents (n (raw figures)=9078–10 552 per annum). Data taken from the national road accident database Methods appraisal*: 2, 5, 6, 7, 8	Annual bus injuries (ie, number of people injured) decreased per 100 M vehicle km and increased per 100 M passenger journeys, reflecting an increase in buses, but a fall in passenger numbers. Author states statistically significant increase in the number of buses involved in multivehicle injury accidents (7.5%) and a decrease (5.6%) in the number of buses involved in single-vehicle injury accidents post-1987: no CI or p values reported (see fig 4)
Astrop, ³⁶ UK Deregulation and privatisation of buses in UK, excluding London. Deregulation of buses in Scotland. Change in public investment not reported Evaluation covers 1979–89. Intervention occurred in 1986	ITS of routinely collected data on number of injury accidents (all severities) involving buses (n (raw figures)=approx 12 000–15 000 per annum). Data taken from the national road accident database: estimated from charts. Includes London, which was not exposed to intervention Methods appraisal*: 2, 5, 6, 8	No statistical tests reported. Overall decline in incidence of bus injury accidents (ie, number of incidents causing injury to one or more people) per 100 M km before and after privatisation. Small increases in injury accidents per 100 M vehicle km immediately before and 3 years after intervention (see fig 5)
White, ³⁷ UK Deregulation and privatisation of buses in UK, excluding London. Deregulation of buses in Scotland. Change in public investment not reported. Evaluation covers 1966–90 Intervention occurred in 1986	ITS of routinely collected data on fatal/serious injury accidents involving buses in UK (n (raw figures)=approx 750–2100 per annum). Data taken from the national road accident database: estimated from charts. Includes London, which was not exposed to intervention Methods appraisal*: 2, 5, 6, 8	Authors state that no “significant” (p value not given) change in fatal/serious injuries (ie, number of incidents involving buses causing fatal/serious injury to one or more people) occurred per 100 M passenger km after intervention (see fig 6)
National Economic Research Associates, ³⁸ UK Privatisation and deregulation of British Gas. Change in public investment not reported. Evaluation period 1978–95. Intervention occurred in 1986	ITS of routinely collected data on gas explosions (range: 25–106 per annum) and fatalities (employees and public) due to gas explosions (range: 3–32 per annum). Data provided by employers Methods appraisal*: 1, 2, 5, 7	No statistical tests reported. No obvious change in trends on gas explosions and explosion fatalities associated with the company after privatisation. Apparent increase in the incidence of explosions and fatalities in the year before the intervention (see fig 7)
National Economic Research Associates, ³⁸ UK Privatisation of most of the UK’s water industry. Change in public investment not reported. Evaluation covers 1986–95. Intervention occurred in 1989	ITS of routinely collected data on major injuries to employees (range: 89–183 per 100 000 employees annum). Data supplied by employers Methods appraisal*: 1, 2, 6	No statistical tests reported. No obvious change in incidence of non-fatal major injuries per 100 000 employees following privatisation. Apparent decrease in injuries in the year before the intervention (see fig 8)
National Economic Research Associates, ³⁸ UK Privatisation of most of the UK’s electricity industry (excluding certain parts, notably nuclear power production). Change in public investment not reported. Evaluation covers 1983–95. Intervention occurred in 1990–1	ITS of routinely collected data on major injuries to employees (range 94–249 injuries; rate of 92–174 per 100 000 employees per annum). All injuries for general public involving electricity supply industry (range 288–494 per annum). Data supplied from Department of Trade and Industry and Health and Safety Executive Methods appraisal*: 1, 2, 6	No statistical tests reported. No obvious change in trends on injuries to public and injuries per 100 000 employees following privatisation. Note there was a 25% decrease in the number of employees during the 3 years following privatisation (see fig 9)
HM Inspectorate of Mines, ³⁹ UK Privatisation of 31 coal mines. Change in public investment not reported. Evaluation covers 1989–95. Interventions occurred 1993–5 (primarily 1994)	ITS of routinely collected data on workplace injuries reported by employers to the Health and Safety Executive (range 270–5358 per annum). Approx no. of employees ranges from 69 900 (in 1989/1990) to 12 000 (1994, including contractors) Methods appraisal*: 6, 7	No statistical tests reported. No obvious post-privatisation changes observable due to lack of data postintervention. Apparent increase in the incidence of major and fatal injuries per 1000 employees in the year before the intervention. Mass redundancies before and after privatisation (see fig 10)

ITS, interrupted time series.

*Methods appraisal: 1 = clearly defined intervention point; 2 = ≤ 3 data points before and after intervention; 3 = no concurrent interventions; 4 = intervention unlikely to affect data collection; 5 = objective/blinded outcome measurement; 6 = reliable/accurate outcome measurement; 7 = datasets describe $\leq 80\%$ of participants; 8 = rational explanation for intervention effect; 9 = rationale for the number and spacing of data points described; 10 = appropriate time series analysis.

privatisation plans (which involved redundancies) between waves one and two. Data from the first three waves were compared with those from a control group of civil servants from other departments.

The authors found statistically significant increases in some measures of self-reported morbidity and physiological risk factors, and some increases that were not statistically significant, but relatively few decreases relative to baseline and

control (table 3). In summary, these data could suggest an increase in measures of stress-related ill health, as employees anticipated privatisation and mass redundancies.

In total, 18 months after privatisation, the odds of long-standing illness were increased among unemployed respondents not seeking work (22% of respondents; OR = 2.25; 95% CI = 1.1 to 4.4) compared with those in secure re-employment (31% of respondents), possibly linked to retirement on health grounds (table 1). The two groups reported similar scores for other health measures. In comparison, respondents who were unemployed and seeking work (19%), or in insecure employment (29%), reported significant increases in GHQ 12 scores (mean difference 1.56 (95% CI = 1.0 to 2.2) and 1.25 (95% CI = 0.6 to 2.0), respectively) and were more likely to report >3 GP consultations in the past year (OR = 2.04 (95% CI 1.1 to 3.8) and 2.39 (1.2 to 4.7), respectively).

A prospective cohort study^{31 32} of the UK water industry employees experiencing privatisation found that at t_2 , 8 months after privatisation, occupational stress indicator (OSI) mean scores (higher = worse) for mental health among clerical and administrative staff had increased to 51.87, compared with 48.86 1 month before privatisation ($p = 0.018$). No significant changes in OSI mean score were found among manual workers

or managers over the same period, while there was little change in OSI mean scores for somatic symptoms among any occupational group. Further organisational changes appeared to have little effect on mental or somatic health scores for any occupational group after 20 months.³²

A controlled repeat cross-sectional study measured the effects of privatisation on employees of a Portuguese state-owned paper pulp company.³³ Postal surveys were completed approximately 1 year before and 1 year after the government sold 44% of its stock to private shareholders. The overall response rate was only 14%. Mental and physical ill-health symptom scores using the OSI, were similar for both intervention and control groups before and after privatisation ($F(1, 123) = 0.0, p > 0.05$). A cross-sectional study using baseline data from the paper factory and data from two privatised cement companies suggested a positive relationship between the degree of private ownership and employee ill-health indicated by OSI scores (table 1).³³

Privatisation and injuries

We identified eight studies of UK companies that involved ITS analyses of routinely collected data on injuries before and after privatisation.^{34–39} Because many of the studies relied on

Table 3 Effects of employment uncertainty before the privatisation of a civil service department, adjusted for age, employment grade, marital status and baseline value, relative to control³⁰

Outcome measure (gender)	Results: OR (95% CI), compared with T_1 (6 years before privatisation)	
	3 years before privatisation	1 month before privatisation
Poor self-rated health		
F	0.82 (0.5 to 1.3)	0.86 (0.5 to 1.4)
M	1.51 (1.2 to 2.0)	1.18 (0.9 to 1.5)
Longstanding illness		
F	0.79 (0.5 to 1.4)	0.80 (0.5 to 1.4)
M	1.22 (0.9 to 2.0)	1.13 (0.9 to 1.5)
Symptom score†		
F	0.47 (–0.0 to 1.0)	
M	0.35 (0.1 to 0.6)	
No of health problems†		
F	0.10 (–0.2 to 0.4)	
M	0.12 (0.0 to 0.2)	
GHQ caseness		
F	1.20 (–0.8 to 1.8)	1.06 (0.7 to 1.7)
M	1.11 (0.9 to 1.4)	1.16 (0.9 to 1.5)
GHQ depression		
F		0.75 (0.5 to 1.2)
M		1.07 (0.8 to 1.4)
Sleep ≤ 9 h per night		
F		1.36 (0.6 to 3.0)
M		0.99 (0.6 to 1.8)
Sleep ≥ 9 h per night		
F		2.22 (1.1 to 4.7)
M		1.82 (1.1 to 2.9)
Systolic blood pressure (mm Hg)†		
F		3.49 (1.2 to 5.7)
M		–1.03 (–2.1 to 0.0)
Diastolic blood pressure (mm Hg)†		
F		2.23 (1.7 to 2.8)
M		–0.10 (–0.9 to 0.7)
Possible/probable ischaemia on ECG or angina*		
F		1.60 (0.8 to 3.3)
M		1.41 (0.9 to 2.2)
Body mass index (kg/m ²)†		
F		0.65 (0.2 to 1.1)
M		0.30 (0.1 to 0.5)
Cholesterol concentration (mmol/l)†		
F		0.09 (–0.1 to 0.3)
M		0.07 (–0.0 to 0.2)

GHQ, General Health Questionnaire.

*Adjusted for age, employment grade and marital status only.

†Results show difference (95% CI) rather than ORs.

Figure 2 Graph showing the number of buses involved in accidents vs year.

graphical summaries, we have presented their findings as charts in figs 3–10.

One study analysed routine data on train crash fatalities between 1967 and 2002. The incidence of fatal train accidents per billion train-km declined by approximately 5.2% per year. This decline is observable for the three decades that preceded the privatisation of the UK rail network in 1996, and it continued after that date. The mean incidence of fatalities per fatal accident was higher in the postprivatisation period (1997–2002: $n = 11.6$) than in the entire period (1967–2002: $n = 4.1$).³⁴ However, this apparent increase in accident severity could be explained as the result of random clustering of relatively infrequent events, rather than as the effects of privatisation.

Three studies of bus privatisation/deregulation presented complementary findings.^{35–37} Data from the most robust study³⁵ showed that the average annual total of bus-related injuries decreased by 2.6% after the intervention, but this could have been influenced by secular trends. A more detailed analysis identified multidirectional effects rather than evidence of a clear step change in injury rates—for example, the number of buses involved in multi-vehicle accidents resulting in injuries increased (+7.5%), whereas the number of buses involved in single-vehicle injury accidents decreased (–5.6%) following the intervention (fig 2). Both were reported to be statistically significant, but no p values, CIs or other effect size data were reported. The authors also reported increases in injuries per passenger journey and decreases in injuries per estimated bus-km, possibly associated with decreasing passenger numbers and increasing bus journey miles after privatisation.

ITS studies showed no conclusive evidence that the privatisation of the UK water, gas, electricity and mining UK industries significantly affected the employee injury rates.^{38–39} Gas industry figures showed that mean annual fatalities from

Figure 3 Incidence of fatalities from train crashes (5-year intervals). IN, intervention.

Figure 4 Annual incidence of bus injuries per 100M vehicle km and per 100M passenger journeys. IN, intervention.

natural gas explosions were higher ($n = 15$) in the 8 years before privatisation, than in the 9 years after privatisation ($n = 8$).³⁸ Mean annual industry figures for fatal and non-fatal electrical injuries to the general public were lower in the 7 years before privatisation ($n = 392$) than in the 3 years after privatisation ($n = 429$), but mean annual non-fatal major injuries to electricity industry employees decreased during the same periods from 150 to 105 per 100 000 employees.³⁸ Non-fatal major injuries per 100 000 water industry employees decreased from an annual mean of 144 in the 3 years before privatisation to 114 during the 4 years that followed privatisation.³⁸ An annual mean of nine fatal and non-fatal injuries per 1000 coal industry employees were recorded over both the 5 years preceding coal privatisation and the 2 years after privatisation.³⁹ Graphical representations of these data presented in figs 3–10 illustrate that no clear trends were visible. The methodological quality of these studies and the reporting of data were poor (see Discussion).

DISCUSSION

We identified 11 studies that measured the effects of privatisation of industries on the health (including injury rates) of employees and the public. Considering the prominent role of health and safety in the public and academic debates on privatisation, our review suggests that much of this debate has been conducted in an empirical void. This makes the evidence that we identified all the more noteworthy, but our findings need to be framed within a wider discussion about the

Figure 5 Annual incidence of bus injury accidents per 100M vehicle km. IN, intervention.

Figure 6 Annual incidence of fatal and serious bus injuries per 100M passenger km. IN, intervention.

problems of using systematic reviews to inform decision makers about issues that have been poorly researched.

Findings

Privatisation and job insecurity

Privatisations are often associated with company downsizing and redundancies,^{1 26–32 38 39 41 42} and there is epidemiological evidence to suggest that redundancies can adversely affect physical and mental health.^{1 14 18 43} We identified one prospective controlled study that found evidence of health deterioration among employees who had to seek new work or take a less secure employment following redundancies linked to privatisation.^{26–30} Evaluations of future privatisations should be designed to explore the potentially adverse effects of redundancies and other factors on job insecurity (eg, use of outsourced/contracted labour).

Injuries

One study of bus-related injuries analysed comparatively large datasets and found no consistent evidence of a privatisation effect on overall injuries from bus accidents and no employee-specific data on workplace injuries (on or off buses).³⁵ Given the media and political interest in rail safety following the privatisation of the British Rail, we were particularly surprised by the lack of more specific and comprehensive evidence on injuries to employees and the public. The evidence that we identified on rail crash fatalities was insufficient to produce any useful findings (in common with the ITS studies we identified of privatised gas, electricity, water and coal industries). A Japanese study, excluded from this review because it did not report injury rates or health effects, found that rail privatisation did not seem to have an adverse effect on derailments and collisions.⁴⁴

Figure 7 Annual incidence of gas explosions and explosion fatalities. IN, intervention.

Figure 8 Annual incidence of non-fatal major injuries per 100 000 employees. IN, intervention.

Health inequalities

The Acheson inquiry on inequalities in health commissioned by the UK government recommended that all policies that are likely to have an impact on health should be evaluated in terms of their impact on health inequalities.⁴⁵ Our review supports concerns raised elsewhere that this recommendation has yet to be fully implemented.⁸ One study of a privatised public utility found that clerical workers experienced a broader range of adverse health outcomes than manual and managerial staff.^{31 32}

Research limitations

The complexities of privatisation interventions make robust evaluations of their health and safety effects difficult to conduct. For example, researchers face the problem of trying to obtain/record their baseline measures before employees are made aware of privatisation plans as knowledge of such plans can lead to stress-related ill health associated with job insecurity, as one of our studies suggests.^{26–30}

Routine data could help identify long-term preintervention trends, but are susceptible to other sources of bias. The ITS studies we identified are of little value for assessing the effects of privatisation on potentially high-risk groups such as unemployed, outsourced or contracted employees, because companies do not generally keep records on non-employees. Routine data on injuries from bus and train crashes failed to differentiate employees from the general public. Studies that measured infrequent events (eg, train crashes or gas explosions) over relatively short time frames were of little value as sources of data, especially when such events were caused by factors independent of the interventions. In such cases, better reporting of the causes and contexts of injury accidents is required.

Our study findings might, hypothetically, be affected by secular trends and other factors, such as the degree of public

Figure 9 Annual incidence of fatal/non-fatal injuries to the public and non-fatal major injuries to employees. IN, intervention.

Figure 10 Annual incidence of major and fatal injuries per 1000 employees. IN, intervention.

investment (both before and after privatisation), effects on labour demand, management–employee relations, health and safety regulations and practices, and out-sourcing etc. Better reporting of contextual data and of intervention implementation is essential if these factors are to be better understood.

Controlled study designs offer some safeguards against confounding, but randomised allocation of participants and even cluster trial controls can be difficult to incorporate into some natural experiments. Pragmatic or innovative approaches might be necessary, hence our decision to review studies with a range of study designs rather than limit ourselves to randomised controlled trials (of which there were none).^{46 47}

Other evidence

Although we planned this review, we held consultative workshops with senior public health researchers and policy makers.^{46 47} Attendees reiterated calls for more systematic reviews of interventions affecting the upstream (eg, socio-economic) determinants of health, but agreed that this constituted only one part of a broader “evidence jigsaw”. Like many other interventions affecting upstream health determinants, privatisation is not designed primarily to affect health, and different types of evidence are required to evaluate its broader impacts.

The task of identifying, appraising and synthesising this broader evidence base is beyond the scope of this already extensive systematic review (which took 18 months to conduct). Further work could involve ethnographic research on people’s understanding of privatisation and the way it affects them, while economic studies might provide more data on employment effects and income volatility. Evidence of this kind could help us better understand the human impacts of privatisation and suggest proxies for health effects in the absence of direct measures.

Evidence-based policy

Findings from this review support concerns raised by researchers and policy makers that the literature on public health

What this systematic review adds

- Privatisations that involve redundancies can worsen employee health, but the public debate on the health and safety effects of privatisation lacks a robust empirical basis, especially in terms of evidence on injury outcomes.

Policy implications

- Privatisation remains a highly contentious issue that cuts across many areas of public policy, including health. Given the negative health effects suggested by the best evidence identified in this systematic review, policy makers and researchers should work together to ensure that the health impacts of privatisation and related policies are more robustly evaluated so that this ideologically driven debate can benefit from more robust evidence.

research is often biased towards “what can be measured easily...rather than [than] on the immensely more complex issues of the broader social forces that also affect health, directly or indirectly, such as economic transitions.”⁴⁸ If researchers are deterred from conducting primary research on the health impacts of more complex interventions because of the difficulties involved, this absence of evidence will be reflected at the level of systematic review.

This hinders the current drive towards more evidence-based decision making. As one commentator has put it, “evidence-free policy” partly reflects “policy-free evidence”.⁴⁹ However, attempts to provide a timely research response to the current needs of policy makers might be frustrated by the different time scales that policy makers and researchers work to. For example, many of the ITS studies of injury rates we identified were published relatively soon after the privatisations occurred.^{38 39} This could have increased the political relevance of their findings, but they lacked sufficient follow-up to allow for robust statistical analysis of preintervention and postintervention trends, making many of those findings meaningless.

Nonetheless, we support the view that researchers, policy makers and practitioners need to establish closer links so that interventions and their evaluations can be planned and implemented together to provide better evidence to enable health impact predictions for future interventions, more effective deployment of scarce resources and (as a recent evaluation of a hospital-based private finance initiative concluded)⁹ the identification of adverse effects.^{46 47 49 50}

Recommendations

Evaluations of the health impacts of privatisation should include prospective and, where possible, controlled designs with sufficiently long follow-up to identify changing trends. Our review demonstrates that robust evaluations are possible in this field but are rarely conducted. Given the negative health effects suggested by the best evidence we identified,^{26–30} we recommend that more evaluations of the health impacts of privatisation and related policies be conducted, so that this ideologically driven debate can benefit from more credible evidence.⁵¹

What is already known on this topic

- Policy debates surrounding privatisation policies frequently centre on their alleged health and safety effects, but the evidence has not been systematically reviewed previously.
- Systematic reviews have been advocated (eg, by Wanless¹²) to facilitate evidence-based health policy and to practise by synthesising evidence on the health effects of complex social interventions such as privatisation.

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