Child maltreatment: variation in trends and policies in six developed countries

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We explored trends in six developed countries in three types of indicators of child maltreatment for children younger than 11 years, since the inception of modern child protection systems in the 1970s. Despite several policy initiatives for child protection, we recorded no consistent evidence for a decrease in all types of indicators of child maltreatment. We noted falling rates of violent death in a few age and country groups, but these decreases coincided with reductions in admissions to hospital for maltreatment-related injury only in Sweden and Manitoba (Canada). One or more child protection agency indicators increased in five of six countries, particularly in infants, possibly as a result of early intervention policies. Comparisons of mean rates between countries showed five-fold to ten-fold differences in rates of agency indicators, but less than two-fold variation in violent deaths or maltreatment-related injury, apart from high rates of violent child death in the USA. These analyses draw attention to the need for robust research to establish whether the high and rising rates of agency contacts and out-of-home care in some settings are effectively reducing child maltreatment.

Introduction

2 years ago, *The Lancet* published a Series of four reports on child maltreatment.[1–4] The Series was intended to provide professionals with a rigorous and up-to-date overview of the scientific evidence. 1 year on, *The Lancet* asked leading professionals in child health and welfare what question they most needed answered by the scientific published work. Their response, "Are trends in child maltreatment decreasing?", is addressed by this Review.

Whether trends in child maltreatment are changing is of great importance for children and their families, and for those whose job it is to reduce maltreatment and its consequences. Policy makers and professionals involved in child protection services will hope for a downward trend to vindicate the cost, effort, and painful media scrutiny that they have endured.[5] Public health practitioners will draw attention to the contribution of economic and welfare changes, legislation against corporal punishment, and initiatives to improve child wellbeing and parent functioning.[5–7] Over the past 30 years, developed countries' tolerance of child maltreatment has decreased sharply.[8] Another major shift has been the broadening of responsibility to all professionals to be alert to the possibility of child maltreatment and to act when they have concerns.[9]

However, increased responsiveness to child maltreatment inflates the number of reported cases throughout the system.[10] The result is more notifications to child protection agencies, more concerns recorded by professionals, and more interventions, including placement of children in care, than previously.[10,11] Expansion of definitions of maltreatment to include emotional abuse and witnessing of intimate partner violence, and changing thresholds for moving from recognition to recording and action, have further increased rates.[10,12–14] This report addresses these issues in three ways. First, we tried to minimise reporting biases by comparing trends with multiple measures of child maltreatment within a specific country. Second, we examined differences between six countries or states. Our underlying premise is that comparison of trends in countries with similar challenges but different policies provides a natural experiment that could provide insight into the effects of policies. Third, we used routinely recorded data sources and standardised definitions in each country and examined the extent to which variation in indices of child maltreatment is likely to be explained by true differences in occurrence—possibly linked to policy differences—or by random chance, data quality, or case mix.

Key messages

- We recorded no consistent evidence for a decrease or increase in all types of indicators of child maltreatment across the six countries or states (Sweden, England, New Zealand, Western Australia, Manitoba [Canada], and the USA) despite several policy initiatives designed to achieve a reduction.
- Large differences between countries in the rate of contacts with child protection agencies contrasted with little variation in rates of maltreatment-related injury or violent death. This discrepancy shows that governments' responses differ.
- Overall, one or more child protection agency indicators (notification, investigation, officially recognised physical abuse or neglect, or out-of-home care) increased in five of six countries and states, particularly in infants, possibly as a result of early intervention policies.
- Lower levels of maltreatment indices in Sweden than in the USA are consistent with lower rates of child poverty and parent risk factors and policies providing higher levels of universal support for parenting in Sweden.
- High and rising rates of out-of-home care affect a substantial minority of children, especially those of non-white or Aboriginal origin, despite no policy advocating this option and little evidence for its effectiveness.
- To improve the evidence base for child protection policies, governments should facilitate use of anonymised, linked, population-based data from health-care and child protection services to establish the effect of policy on trends in child maltreatment. Rising placements of children in out-of-home care demand urgent assessment with randomised controlled trials.

What is known?

Existing research of how child maltreatment is changing in developed countries is conflicting. Studies that rely on officially recorded or substantiated maltreatment measure

only a small part of the bigger picture—eg, in some settings as few as one in 30 of the children who experience physical abuse every year have their abuse officially recognised.[2,15,16] One reason is that most child maltreatment is hidden and not recognised by professionals dealing with children. Another reason is that health, education, and other community professionals in contact with children consistently report to child protection agencies only a proportion of children whom they recognise as being maltreated.[3,17] Therefore, studies based on self-reported or parent-reported incidents of maltreatment come closest to measurement of the occurrence of maltreatment, although these studies might still underestimate the scale of the problem.[2,18,19] However, many of the events identified in self-report studies might not be sufficiently severe to require intervention. So far only a few such studies have repeatedly asked the same set of questions in the same population using differing time frames, study designs, data sources, and definitions, as shown in panel 1.[25,26]

Our choice of six countries or states—Sweden, USA, Manitoba (Canada), Western Australia, England, and New Zealand—is based on the availability of data, with Manitoba and Western Australia included because of the longstanding availability of high quality, linked data for these states.[27,28] We also selected countries because of differences in welfare inequalities and support for parents, and in policies for child maltreatment.

Child maltreatment is affected by several factors, ranging from societal factors and neighbourhood and family factors, to parent–child interaction and characteristics of the child.[29–31] At the societal level, the six countries differ greatly in socioeconomic and health inequalities and child-care provision. In Sweden, only 7% of children live in poverty, compared with 22% in the USA, with the UK, Manitoba, New Zealand, and Western Australia ranging between these extremes (table 1). These relative positions have changed little over the past two decades (figure 1). Furthermore, rates of maternal employment are much higher in Sweden than in the other five countries, and there are far fewer teenage births. Paid parental leave and total parental leave allowances are far more generous in Sweden than elsewhere, and the USA and Sweden represent extremes of public expenditure on health and on preprimary child care and education (table 1).

Fewer standardised statistics are available for factors related to parenting capacity, such as parental alcohol and drug misuse, and rates of mental health problems and domestic violence. However, total alcohol consumption is highest in the UK and lowest in Sweden, and reported rates of partner physical or sexual assault are highest in New Zealand and lowest in Sweden (table 1). Indicators of early child health, such as total infant mortality and the proportion of preterm and low birthweight births, follow similar patterns to the markers of poverty: rates are lowest in Sweden, highest in the USA, and intermediate in England, Canada, Australia, and New Zealand (table 1).[36]

Since the 1960s when Henry Kempe raised awareness of the so-called battered child syndrome, each country developed their own strategies aimed at the recognition, intervention, and prevention of child abuse and neglect. Sweden typifies a child and family welfare approach in which child protection services focus mainly on the child's and family's needs and the support that they require. New Zealand and Western Australia have also favoured a child and family welfare approach. The USA and Canada operate a child safety approach based on statutory child protection investigation to establish the risk of harm before interventions are offered.[1,37] England has features of both approaches. Mandatory reporting does not define these broad policy approaches because Sweden, New Zealand, the USA, and Canada operate mandatory reporting.

After the establishment of child protection services in the 1960s and 1970s, tension grew over the next 30 years between the media, which focussed increasingly on child safety, and policy makers, who recognised the need to address broader child welfare issues.[38] The need for a

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Panel 1: **What is known about trends in child maltreatment?**

Self-report and parent-report studies tell us about child maltreatment that does not come to the attention of professionals. Two studies of parent-reported physical abuse span more than 25 years. In Sweden, serial surveys showed that physical punishment by parents in the previous year fell from 95% in 1965, to 50% in 1971, well before corporal punishment was banned in 1979 (figure 1), with subsequent decreases to 30% in 1980 and 2% in 2006.[8,22] By contrast, a series of four surveys in the USA of parents of children aged 3–11 years from 1975 to 1985, and 1995 to 2002, with the parent conflict tactics scale, showed no significant change in slapping or hitting with an object, after taking account of age and region (40–90% dependent on age).[23] A US study[22] showed that rates of self-reported maltreatment by carers remained stable when national samples (n=6076 in total) of children (aged 10–17 years) or caregivers (if aged 2–9 years) were asked similar questions 5 years apart (2003 and 2008). Reported exposure in the past year remained stable for any type of maltreatment (from 13·5% to 11·1%, p=0·13), physical abuse (from 3·4% to 4·2%, p=0·13), and neglect (from 1·4% to 1·6%, p=0·56). By contrast, repeated national surveys in the USA of around 10 000 professionals dealing with children showed a steep increase in the incidence of recognised maltreatment between 1986 and 1993, followed by a 32% decrease in 2005–06, mostly explained by reductions in physical and sexual abuse.[17]

Consistent evidence is emerging for a decrease in severe physical abuse. In the US series of self-report or parent-report studies,[23] significantly fewer parents reported severe physical punishment, such as beating up their child or hitting them repeatedly with a fist or object, in 1985–2002 than in 1975. The national US survey also showed a 60% decrease in the incidence of severe maltreatment between 1993 and 2003,[17] and one US hospital-based study showed a similar decrease in the incidence of admissions of children younger than 3 years with abusive fractures between 1979 and 2002.[23]

In the UK, a self-report study of young people (aged 18–24 years) in 1998 and 2009 reported decreases in harsh emotional, physical, and sexual abuse but no change in neglect.[22] In Sweden, parental reports of severe abuse of a child during the previous year (kicking, biting, hitting with fist, hitting with device, and beating up the child) decreased from 3·2% in 1980, to 0·2% in 2000 and 2006. Moreover, the proportion of 15-year-old adolescents who reported frequent and severe hitting by parents at any time decreased from 7% in 1994, to 3% in 2000, to 2% in 2006.[24]

	Sweden	UK	Australia	New Zealand	Canada (Manitoba)	USA
Economic						
Children (0–17 years) in poverty, 2008 (%; point change since mid-1990s)*†	7·0% (+4·4)	12·5% (–4·9)	14·0% (+1·0)	12·2% (–0·5)	15·1% (+0·7)	21·6% (–0·6)
Gini coefficient of income inequality late 2000s†‡	0·26	0·34	0·34	0·33	0·32	0·38
Public spending on family benefits in cash, services, and tax measures, 2007 (% of GDP)†	3·4%	3·6%	2·8%	3·1%	1·4%	1·2%
Maternal employment, 2008 (% of female employment)†	82·5%	61·4%	63·1%	64·6%	70·5%	66·7%
Family structure						
Births per 1000 women aged 15–19 years, 2008†	5·9	23·6	14·6	22·1	12·5 (30·1)§	35·0
Lone parent of households with children, 2005–06 (%)†	19·6%	26·4%	16·0%	22·0%	23·2%	28·3%
Cash and tax concessions to subsidise child care						
Maternity/parental paid leave, 2007–08 (% of full-rate equivalent)†	37·7%	12·8%	0·0	10·0%	27·5%	0·0
Maximum length of leave for mothers, 2006–07 (weeks)†	51·4	52·0	52·0	38·0	35·0	12·0
Support for parents						
Public expenditure, 2008 (% of total health expenditure)†	81·5%	82·4%	68·4%	80·3%	70·5%	46·0%
Public spending on child care plus preprimary education, 2007 (% of GDP)†	1·1%	1·1%	0·4%	0·8%	0·2%	0·4%
Risk factors for parenting capacity						
Total alcohol consumption, 2008 (L per person aged ≥15 years)†	6·9	10·8	10·3	9·5	8·2	8·8
Partner physical or sexual assault, 2005 (%)†	1·0%	1·6%	1·4%	2·4%	1·6%	1·1%
Child health						
Infant mortality per 1000 livebirths, 2008†	2·5	4·7	4·1	4·9	5·7	6·7
Births that are preterm (<37 completed weeks), 2004–05¶	6·3%	7·6%	8·1%	7·1%	8·2%	12·7%
Low birthweight births (<2500 g), 2008 (%)†	4·1%	7·1%	6·2%	5·9%	6·0%	8·2%

GDP=gross domestic product. *Proportion of families with income less than 50% of the median for the country. †Data from the Organisation for Economic Cooperation and Development (website accessed Nov 11, 2011). ‡Gini index measures the extent to which the distribution of income deviates from a perfectly equal distribution, with higher values corresponding to higher inequality. §Number in parentheses refers to Manitoba, where these data are available and differ substantially from overall rates for Canada. ¶Data for USA and Canada from Martin and colleagues.[35] Data for England and Sweden from Keller and colleagues.[33] Data for New Zealand from New Zealand Health Information Service.[34] Data for Australia from Laws and colleagues.[35]

Table 1: **Economic, health, and policy indicators related to child maltreatment and wellbeing in six countries**

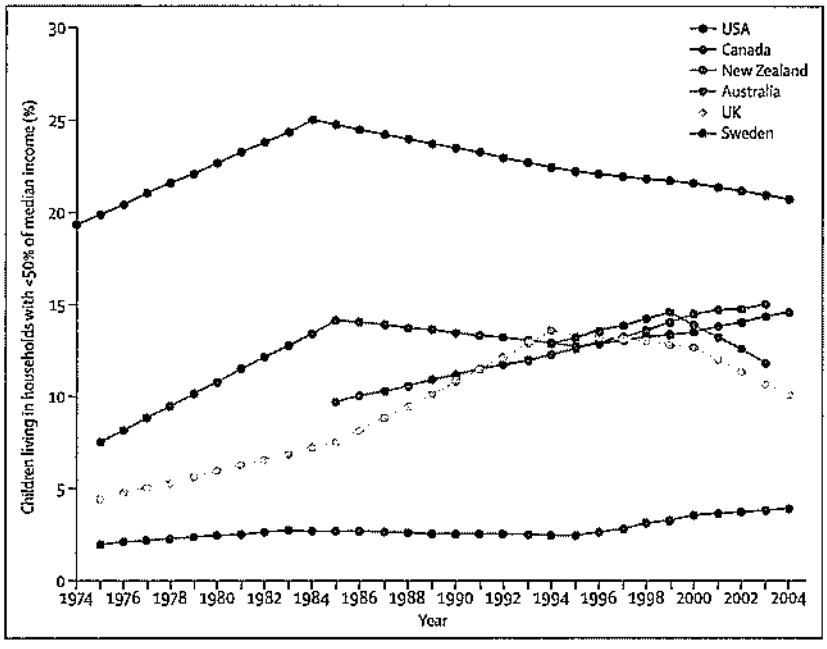

Figure 1: **Time trends in child poverty (proportion of children living in households with <50% of median income)**
Data from Organisation for Economic Cooperation and Development and Gapminder World.

preventive, public health approach to child maltreatment has been advocated since the 1970s.[37–41] However, high-profile deaths of individual children rather than population-based evidence has often been the driver for policy on child protection in all six countries.[42]

To provide an overview of government policies affecting child maltreatment, we summarised policy initiatives (including legislative acts, government coordination of systems and procedures, and screening and prevention initiatives) into four main themes: expanded definitions of child maltreatment; diverse policies that aim to improve recognition of child maltreatment; changes in response systems; and preventive policies (figure 2). Webappendix pp 2–7 describes these policy themes in each country.

Analyses of child maltreatment indicators

Case definitions

Child maltreatment refers to any act of commission or omission by a parent or other caregiver that results in harm, potential for harm, or threat of harm to a child.[2] Because this definition is broad and difficult to measure, we restricted our case definition to indicators of physical abuse or neglect that were likely to have been measured in a similar way over decades and that indicate sufficient

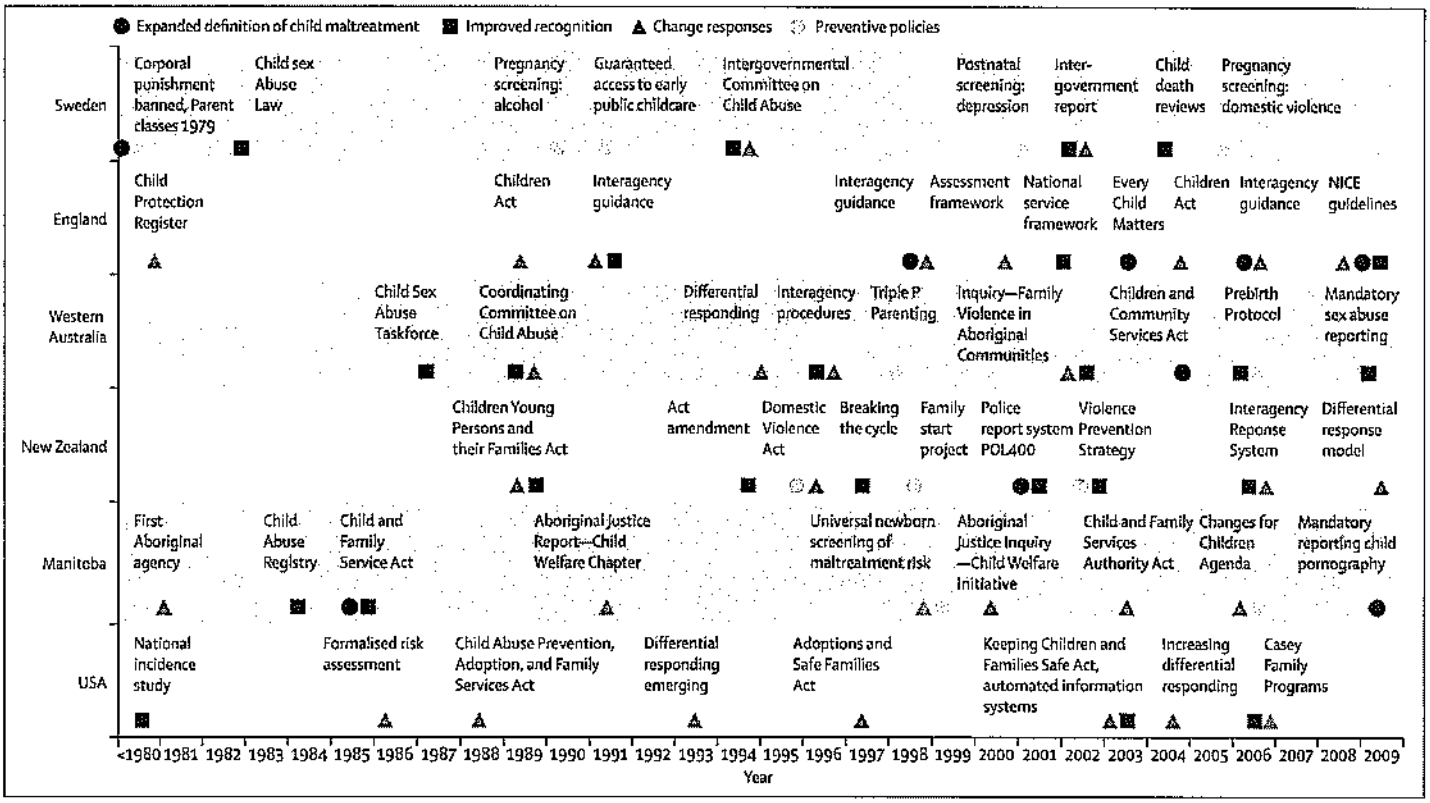

Figure 2: **Child protection policy initiatives in six countries**
NICE=National Institute for Health and Clinical Excellence.

professional certainty that child maltreatment has occurred to warrant recording.[43] Cases of emotional and sexual abuse are captured in some of the data from child protection agencies, but are not the focus of this report (panel 2 and webappendix p 10).

When data were available, we analysed trends from 1979 onwards, because this year marks the introduction of the International Classification of Diseases (version 9; ICD9) coding for deaths and follows the establishment of modern systems for child protection in the six countries. We confined our analyses to children younger than 11 years because injuries related to physical assault or neglect in older children are more likely to be due to peer, sibling, or stranger violence, or to adverse environments, than to be related to parental or carer violence or poor supervision.[44,45] We separately analysed results for infants (<1 year), preschool children (1–4 years), and school-aged children (5–10 years) because these categories are developmental phases. We grouped time-trend results for children 1 year and older because time trends were similar. For the three data sources (death registrations, admissions to hospital because of maltreatment-related injury, and data from the child protection agency), our main operational indicators for child maltreatment were fairly specific, but would have missed cases with a low level of concern and unrecognised cases.

We used ICD9 and ICD10 codes to capture child deaths due to violence (webappendix p 10). Data were extracted from tables published by WHO, updated by national statistics. Because of small numbers of deaths, we used national data for Canada and Australia, but checked consistency of trends against state data for Manitoba and Western Australia. Age groups reflected WHO categories, but were retained for consistency between countries. Some of the older children who died would have been subjected to violence by peers or strangers rather than by carers. We sought evidence of diagnostic transfer by comparing trends in violent deaths with accidental deaths that were not due to motor vehicles.

We used anonymised, individual patient data for all six countries to measure the incidence of acute, maltreatment-related injury admission owf any duration, including day-case admissions. We restricted analyses to hospital admission because these admissions are the only coded data that are widely available for whole populations. Hospital admissions do not capture the full range of injuries when maltreatment is suspected, but would capture those severe enough to require admission. All incidences counted hospital admissions, rather than children admitted once or more. However, very few children had multiple maltreatment-related admissions within the same calendar year (3% in Western Australia and England).

For the Organisation for Economic Cooperation and Development see http://www.oecd.org

For Gapminder World see http://www.gapminder.org

See Online for webappendix

Panel 2: Description of maltreatment indicators*

Deaths

Violent death

Due to homicide, inflicted injury, or injury of undetermined intent. Relates to physical abuse or assault. Violence may be perpetrated by carers (therefore physical abuse). If perpetrated by other adults or children violent death can, but not always, reflect inadequate supervision (neglect).

Maltreatment-related injury admission (four subcategories)

Maltreatment syndrome

Reflects physical abuse or neglect as the cause of injury.

Assault

Reflects assault by carers (physical abuse) or violence by others, which may be due to inadequate supervision (neglect).

Undetermined cause

Explicit uncertainty about the cause of injury, which is likely to reflect physical abuse or neglect.

Adverse social circumstances

Reflects concern about parenting, home environment, or child welfare. May reflect neglect or physical abuse as a factor in the child's injury.

Contact with child protection agency

Notification

Referral to child protection services. Notification can be from any professional or member of the public when any type of child maltreatment is suspected. Not specific to physical abuse or neglect.

Investigation

Investigation of child maltreatment allegation. Relates to any type of maltreatment, not specific to physical abuse or neglect.

Officially recognised maltreatment

Any official recognition or substantiation of an allegation. Reported separately for physical abuse and neglect.

Out-of-home care

Any removal from home by the child protection agency for any period. Can reflect any type of maltreatment not specific to physical abuse or neglect. In Sweden, England, Manitoba, and New Zealand, we could not separate care for maltreatment from other indications for out-of-home care.

*The term child maltreatment comprises physical, sexual, or emotional abuse; neglect; or witnessing of domestic violence.[3] Detailed definitions and codes for maltreatment indicators are given in webappendix p 10.

Maltreatment-related injury admission was defined by a cluster of ICD9 or ICD10 codes recorded in any of the external cause or diagnostic discharge codes in any acute injury admission to hospital.[46] The maltreatment-related cluster consisted of a descending hierarchy of: maltreatment syndrome (ie, codes directly referring to abuse or neglect or a perpetrator of abuse); assault; undetermined cause; and codes reflecting concern about adverse social circumstances that are indicators of neglect or broader welfare concerns (eg, problems related to the social environment, family support, upbringing, or lifestyle; webappendix p 10).[13,46] Data were continuous over time for five countries; however, in the USA, we used the largest available dataset, which consisted of 2521–3739 hospitals in 22–38 states derived from four 1-year periods (1997, 2000, 2003, and 2006).[47] We interpolated estimated incidences for the USA to measure time trends.

Secondary analyses explored time trends for the subcategories of maltreatment syndrome and assault, which are most specific for inflicted injury or injury attributed to neglect. We examined whether maltreatment-related codes showed increased rates in two marker conditions that are strongly associated with child maltreatment—intracranial injury and long bone fractures in infancy—and whether trends in all infants with these injuries deviated from those for maltreatment-related injuries (ICD codes in webappendix p 10).[48–50]

We used officially recorded or substantiated physical abuse or neglect as our primary indicator of maltreatment recorded by child protection agencies. When available, we also used data for total notifications, investigations, all officially recognised maltreatment, and out-of-home care, to provide an overview of trends throughout the system. Individual child data were available for the USA, Western Australia, Manitoba, Sweden, and New Zealand, but not for England. In Manitoba and Sweden, agency data were limited to out-of-home care. All results are yearly prevalences, meaning that a child is counted only once for each indicator during a 12-month period.

In the USA, we restricted analyses to the 20 states (making up about 38% of the child population) that contributed data from 2001 to 2007, with data from the National Child Abuse and Neglect Data System (webappendix p 11).[51] To avoid spurious undercounting of cases notified in 1 year but recorded as officially recognised or not in the following year for 2007, we applied a correction factor (about 13%) that was based on the proportion of such cases identified in each age group in 2004, 2005, and 2006 (details available on request).

Analytical approach

We measured time trends in the yearly incidence or prevalence of child maltreatment indicators within each country by fitting Poisson and negative binomial regression models. If counts in Poisson models were over dispersed, on the basis of the log likelihood ratio test ($p<0·05$), we fitted a negative binomial model. We compared continuous linear trends against change-point models with two slopes, including a parameter corresponding to the time at which the change of slopes occurred. We based our model selection strategy on Akaike's information criterion (AIC);[52] models with low AIC values were preferred. We judged p values less than 0·05 as significant. All graphs were plotted on a log scale to show proportionate change (plots on the linear scale are available on request). Trends were represented visually with Friedman's super-smoother.[53]

We assessed qualitatively consistency between rates within country and consistency of trends between countries. No formal statistical comparisons were done because of the few datapoints for the same calendar

period and the large number of multiple comparisons. Time-series analyses could not be done because of scarcity of data, multiple policy events, and uncertain timing of implementation.

We compared mean rates in each country for each indicator in 2005–06, with Western Australia as the reference category. Because absolute rates (although not trends) differed for children aged between 1 and 4 years compared with those aged between 5 and 11 years, we estimated rate ratios for each of the three age groups (<1 year, 1–4 years, and 5–10 years). Less than two-fold differences in rates are difficult to interpret because they are as likely to be related to chance, data quality, or case mix, but we judged that more than two-fold differences were likely to indicate differences in occurrence of maltreatment indices.

All calculations were done in R (version 2.12.1). We addressed overdispersion of counts and estimation of changes in trends including population denominators as an offset by adapting programs from the R libraries SiZer (version 0.1-4) and MASS (version 7.3-14), with change point regression models combined with Poisson and negative binomial generalised linear models.[54,55]

All analyses of anonymised individual child data were approved by the relevant research ethics committee (Manitoba, Western Australia, New Zealand, USA) or by the data providers (Manitoba, England, Sweden).

Variation in child maltreatment indicators within country

Figure 3 shows trends over time in maltreatment indicators. Agency indicators are confined to placement in out-of-home care in Sweden and Manitoba because no other agency data were available. Figure 4 shows rates of placement in out-of-home care for all six countries. Table 2 shows rate ratios resulting from the time-trend regression analyses, and webappendix p 12 shows actual rates and figures in 2005–06.

Sweden

In infants, rates of violent death and maltreatment-related injury admission did not change significantly, but the rate of placement in out-of-home care increased. In older children, injury admissions for maltreatment syndrome or assault and rates of violent death decreased significantly, but rates of out-of-home care increased marginally (table 2).

England

Trends in rates of maltreatment indicators in infants were not consistent across the three data sources. A significant decrease in violent deaths since 2000 coincided with no significant change in maltreatment-related admissions. However, we noted sustained and significant increases in rates of the primary agency indicator of officially recognised neglect (figure 3, table 2), and in any officially recognised maltreatment. Placement of infants in out-of-home care showed a small, non-significant increase (table 2).

Rates for children 1 year and older remained stable for violent deaths and maltreatment-related injury admissions but increased significantly for officially recognised neglect from 2002, when data for this category were first available. The overall rate of officially recognised maltreatment (referred to as subject to a child protection plan) decreased initially from 1988 and then increased, although not significantly, from 2005. The yearly rate of placements in out-of-home care decreased in the 1990s and then stabilised after 2001 for children 1 year and older (table 2).

Western Australia

In infants, rates for violent deaths remained stable but injury admissions due to maltreatment syndrome or assault increased significantly. Most agency indicators increased significantly since the 1990s (table 2). Rates of placement in out-of-home care increased substantially during the early 1990s (figure 4). Thereafter increases were smaller and not significant.

In children 1 year and older, rates of violent death and maltreatment-related injury admissions were stable. We recorded no significant changes in the rate of officially recognised physical abuse or neglect, but notifications did increase substantially during the early 1990s, followed by a significant decrease from 1994, which coincided with a sustained and significant increase in the yearly rate of placement in out-of-home care (table 2, figure 4).

New Zealand

In infants, rates of violent death and maltreatment-related injury were stable. By contrast, agency indicators increased significantly, apart from officially recognised physical abuse and out-of-home care (table 2). For older children, rates of most agency indicators increased whereas rates of placement in out-of-home care and violent deaths remained stable. We noted a significant increase in the rate of maltreatment-related injury from 1999 (table 2), which coincided with the change from ICD9 to ICD10 coding.

Manitoba

Trends in mortality rates for violent deaths decreased significantly for infants and older children. Similar decreases occurred for maltreatment-related injury, although not significantly in the older age group. Rates of placement in out-of-home care were stable in both age groups (table 2).

USA

Rates for infants showed an early increase in violent deaths, followed by stable rates from 1991, whereas hospital admission data from 1997 showed stable rates in maltreatment-related injury admissions. Recent increases in rates of agency indicators for infants were significant only for investigations (table 2).

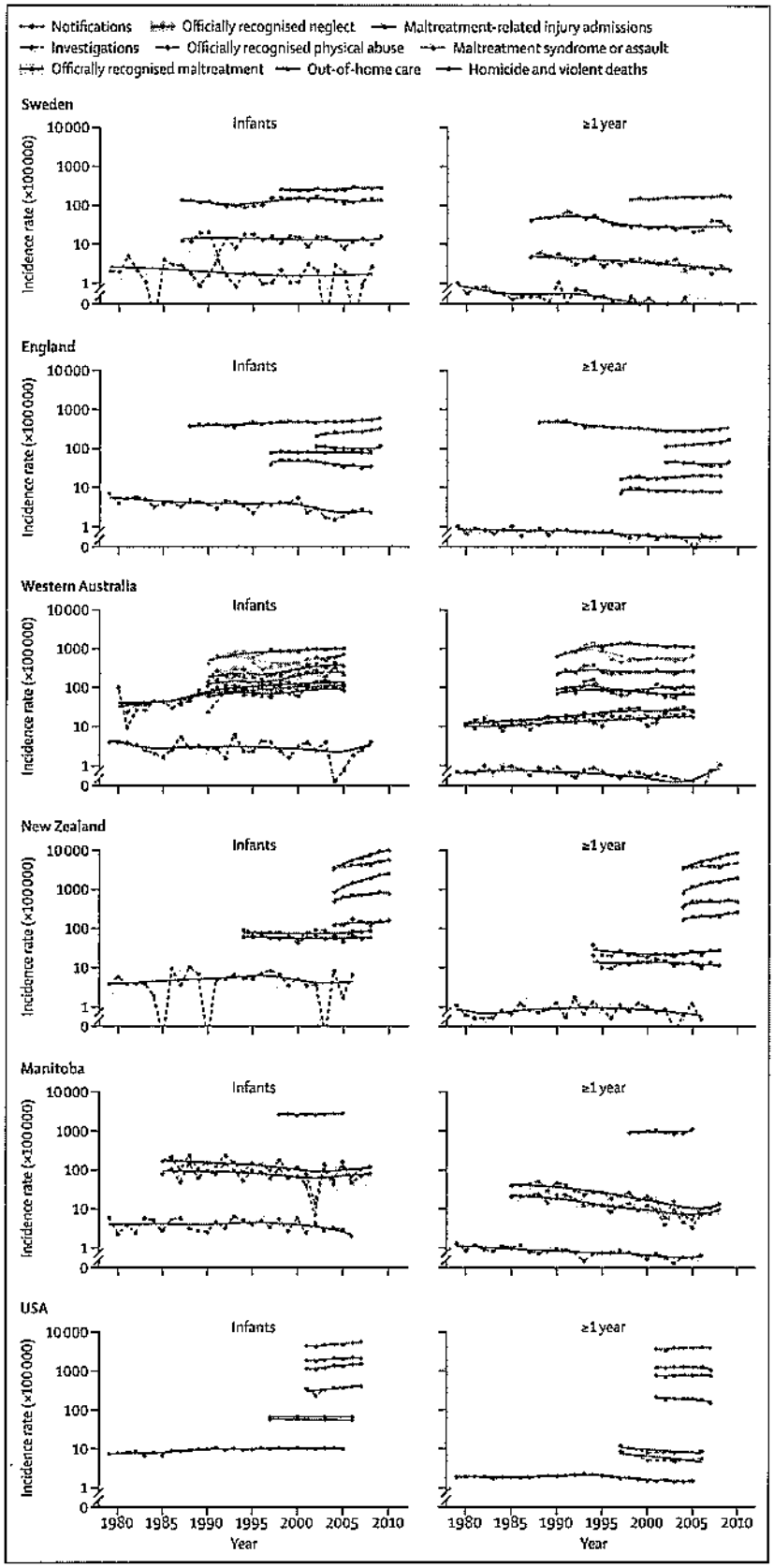

Figure 3: **Yearly rates for child maltreatment indicators**
Shaded blocks represent 95% Poisson CIs; lines represent trends with Friedman's super-smoother.[53]

In older children, we noted a small but significant increase in violent deaths before 1993, followed by a significant decrease. The rate of maltreatment-related injury admissions remained stable, as did officially recognised physical abuse, neglect, and total cases, but rates of investigations and placement in out-of-home care increased significantly (table 2).

Variation in trends between countries

After the mid-1990s, all countries showed stable or falling mortality rates, but these changes were significant in only five of 12 age and country groups (children 1 year and older in Sweden and the USA, both age groups in Canada, and infants in England; table 2). These downward trends are unlikely to be explained by violent deaths being labelled as accidents in recent years (diagnostic transfer), because the rate of non-motor vehicle accidents either paralleled trends in violent deaths or decreased more steeply with two exceptions (webappendix p 13). First, accidental deaths in children older than 1 year increased sharply in Sweden in 2004, because of deaths of Swedish tourists in the southeast Asian Tsunami. Second, in the USA there was a significant increase in non-motor vehicle accidental deaths in infants coinciding with stable rates since the 1990s for violent deaths, confirming an on-going problem in preventable deaths in infants (webappendix p 13).

Trends in the incidence of maltreatment-related injury admission were the most stable of all three primary indicators of maltreatment. Rates of the primary indicator, maltreatment-related injury, changed significantly in only two of 12 age and country groups (children ≥1 year in New Zealand and infants in Manitoba; table 2). Trends and absolute rates for the more specific subgroups of codes of maltreatment syndrome or assault were similar to the broader category. Three of 12 trends changed significantly: decreases in Sweden (children ≥1 year) and Manitoba (infants), and an increase for infants in Western Australia (table 2).

We recorded consistent trends between countries in maltreatment-related injury admissions for high-risk injuries. The rate of any admission for a fractured long bone in infancy was stable in all six countries, as were rates for maltreatment-related fractured long bones (webappendix p 15). Incidence trends for any admission for intracranial injury in infancy decreased sharply in the late 1990s in England, Western Australia, New Zealand, and Manitoba, whereas maltreatment-related intracranial injury remained stable in all six countries (webappendix p 16). These findings suggest that maltreatment-related codes were being used in the six countries to record a similar underlying entity.

Variation was greatest between countries for the child protection agency indicators. Our primary indicators,

officially recognised physical abuse or neglect, showed significant increases in only five age and country groups of a total of 16 comparisons (two indicators in two age groups in the four countries where these data were available; table 2). Three increases were in infants. Rates of notification, investigation, or any officially recognised maltreatment mostly increased in recent years. Trends increased in 12 and decreased in two of 18 age and country groups, with eight of the 12 significant increases being in infants (table 2).

We analysed trends in placement in out-of-home care for all six countries. Rates increased significantly in four age and country groups (table 2) and decreased in older children in England before 2001 (of 12 comparisons). With consideration of all agency indicators together, increases seemed to be more frequent and more substantial in infants than in the older age group in England, Western Australia, and the USA (table 2, figure 3).

Children recorded in multiple data sources

We measured the proportion of children identified by more than one data source in Western Australia and Manitoba, where contacts with child protection agencies, hospital admission records, and mortality data were linked. In both countries, a high proportion of children admitted to hospital with a maltreatment-related injury were in contact with the child protection agency at some point before the age of 11 years or the end of the data collection period. For example, in Western Australia between 1990 and 2005, 66% (868/1307) of children aged 0–10 years admitted for a maltreatment-related injury had a notification to the child protection agency. In Manitoba, this proportion was 44% (123/279; 1998–2005).

However, few children notified to child protection services had been admitted to hospital with a maltreatment-related injury. In Western Australia, of all children notified to child protection services only 3% (868/33 268; and 6% [634/10 131] for officially recognised maltreatment) were admitted for maltreatment-related injury at some point and 21% (7155/33 268) for an injury of any type. In Manitoba, 1% (123/11 094) of children in care were admitted for a maltreatment-related injury at some point (7% [723/11 094] for any injury). Lastly, with data for deaths only in Western Australia, few of the 47 children who died from violence were recorded in the other data sources: two (4%) had previously been admitted for a maltreatment-related injury and nine (19%) had been notified to child protection services.

These findings suggest that changes in the incidence of maltreatment-related injury admissions or violent deaths would have a marginal effect on the agency indicators. Conversely, official recognition by child protection agencies is unlikely to affect labelling of maltreatment-related injury because child protection data are not routinely accessible or screened by hospital clinicians admitting injured children.

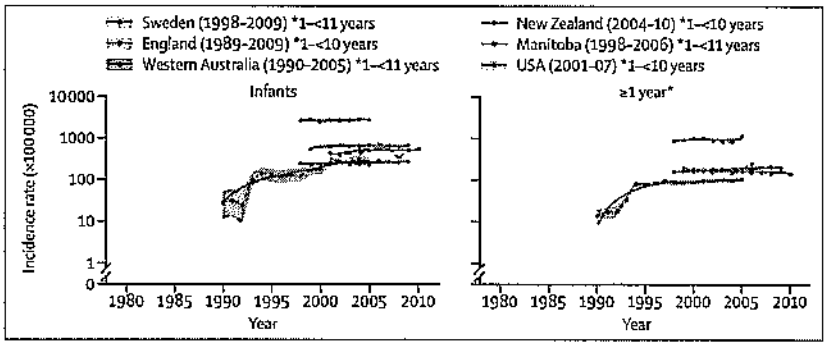

Figure 4: **Yearly rates of placement in out-of-home care by age group**
Shaded blocks represent 95% Poisson CIs; lines represent trends with Friedman's super-smoother.[53]

	Trend before change	Year of change	Overall RR or RR after change (95% CI)
Sweden			
Infants			
Out-of-home care	..	..	1·03 (1·02–1·06)*
Maltreatment-related injury	..	..	1·00 (0·99–1·01)
Maltreatment syndrome or assault	..	..	1·01 (0·99–1·03)
Violent deaths	..	..	0·98 (0·92–1·03)
≥1 year			
Out-of-home care	0·99 (0·89–1·03)	2004	1·03 (0·98–1·17)
Maltreatment-related injury	0·95 (0·92–1·18)	2004	1·03 (0·93–1·80)
Maltreatment syndrome or assault	..	..	0·96 (0·95–0·98)*
Violent deaths	..	..	0·96 (0·94–0·97)*
England			
Infants			
Officially recognised	1·01 (0·98–1·02)	2005	1·11 (1·01–1·31)*
Officially recognised neglect	..	..	1·07 (1·04–1·11)*
Officially recognised physical abuse	0·97 (0·86–1·13)	2008	1·17 (0·90–2·01)
Out-of-home care	1·04 (0·96–1·28)	2002	1·02 (0·89–1·75)
Maltreatment-related injury	..	..	1·01 (0·99–1·02)
Maltreatment syndrome or assault	1·08 (0·92–2·13)	1998	0·96 (0·93–1·28)
Violent deaths	0·98 (0·82–1·01)	2000	0·94 (0·84–0·99)*
≥1 year			
Officially recognised	0·96 (0·94–0·97)*	2005	1·09 (0·97–1·24)
Officially recognised neglect	..	..	1·05 (1·02–1·08)*
Officially recognised physical abuse	..	..	0·98 (0·94–1·01)
Out-of-home care	0·94 (0·83–0·99)*	2001	0·99 (0·95–1·35)
Maltreatment-related injury	..	..	1·01 (0·99–1·02)
Maltreatment syndrome or assault	1·02 (0·85–1·82)	1999	0·98 (0·96–1·04)
Violent deaths	0·98 (0·75–1·05)	1991	0·97 (0·94–1·03)
Western Australia			
Infants			
Notifications	1·18 (0·98–2·36)	1991	1·02 (1·01–1·05)*
Investigations	0·92 (0·73–0·99)*	1998	1·09 (1·03–1·24)*
Officially recognised	0·92 (0·73–0·99)*	1998	1·09 (1·03–1·24)*
Officially recognised neglect	0·98 (0·72–1·15)	1996	1·10 (0·93–1·21)
Officially recognised physical abuse	..	..	1·03 (1·00–1·07)*
Out-of-home care	1·59 (1·09–4·21)*	1994	1·09 (0·89–1·14)
Maltreatment-related injury	1·09 (0·30–1·19)	1992	1·02 (0·91–1·07)

(Continues on next page)

	Trend before change	Year of change	Overall RR or RR after change (95% CI)
(Continued from previous page)			
Maltreatment syndrome or assault	..	..	1·05 (1·03–1·08)*
Violent deaths (Australia)	..	..	0·99 (0·97–1·01)
≥1 year			
Notifications	1·23 (1·04–1·43)*	1994	0·97 (0·95–0·99)*
Investigations	0·94 (0·77–1·27)	2003	1·02 (0·90–1·49)
Officially recognised	..	..	0·99 (0·97–1·01)
Officially recognised neglect	0·96 (0·80–1·17)	1998	1·04 (0·96–1·09)
Officially recognised physical abuse	1·15 (0·94–1·62)	1993	0·96 (0·92–1·11)
Out-of-home care	1·63 (1·35–2·79)*	1994	1·02 (1·01–1·03)*
Maltreatment-related injury	1·06 (0·98–1·07)	1997	1·00 (0·86–1·06)
Maltreatment syndrome or assault	1·05 (0·96–1·08)	1983	1·02 (0·90–1·12)
Violent deaths (Australia)	0·99 (0·96–1·19)	1982	0·98 (0·79–2·62)
New Zealand			
Infants			
Notifications	..	..	1·22 (1·17–1·26)*
Investigations	..	..	1·11 (1·06–1·13)*
Officially recognised	..	..	1·22 (1·15–1·27)*
Officially recognised neglect	..	..	1·09 (1·04–1·15)*
Officially recognised physical abuse	1·16 (0·81–2·0)	2006	1·01 (0·01–3·00)
Out-of-home care	..	..	1·02 (0·94–1·08)
Maltreatment-related injury	0·96 (0·72–1·03)	2000	1·05 (0·96–1·30)
Maltreatment syndrome or assault	..	..	1·0 (0·98–1·02)
Violent deaths	..	..	1·0 (0·98–1·04)
≥1 year			
Notifications	..	..	1·17 (1·15–1·19)*
Investigations	..	..	1·05 (1·00–1·07)*
Officially recognised	..	..	1·14 (1·09–1·20)*
Officially recognised neglect	..	..	1·04 (0·99–1·09)
Officially recognised physical abuse	..	..	1·07 (1·02–1·09)*
Out-of-home care	..	..	0·99 (0·95–1·02)
Maltreatment-related injury	0·91 (0·41–1·01)	1999	1·04 (1·00–1·21)*
Maltreatment syndrome or assault	..	..	0·98 (0·96–1·02)
Violent deaths	1·03 (0·56–1·14)	1992	0·96 (0·62–1·03)
Manitoba			
Infants			
Out-of-home care	..	..	1·00 (0·98–1·03)
Maltreatment-related injury	..	..	0·96 (0·93–0·98)*
Maltreatment syndrome or assault	..	..	0·97 (0·94–0·99)*
Violent deaths (Canada)	1·01 (0·97–1·11)	2000	0·92 (0·80–0·99)*
≥1 year			
Out-of-home care	0·98 (0·90–1·18)	2004	1·13 (0·84–1·85)
Maltreatment-related injury	0·98 (0·90–1·16)	1991	0·90 (0·80–1·27)
Maltreatment syndrome or assault	..	..	0·93 (0·84–1·47)
Violent deaths (Canada)	..	..	0·97 (0·96–0·98)*
USA			
Infants			
Investigations	..	..	1·05 (1·03–1·09)*
Officially recognised	1·05 (0·81–1·19)	2006	1·03 (0·81–1·20)
Officially recognised neglect	1·04 (0·74–1·21)	2004	1·08 (0·94–1·22)
Officially recognised physical abuse	0·96 (0·27–1·84)	2003	1·09 (0·98–1·27)

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Variation in maltreatment indicators between countries

Figure 5 shows rate ratios for each maltreatment indicator compared with the mean yearly rate in Western Australia in 2004–06, where data were available for all indicators (webappendix p 12 shows actual rates). All countries apart from England exceeded a two-fold higher rate than Western Australia for at least some agency indicators (lower 95% CI excluded 2·0). In New Zealand and the USA, rate ratios for most child protection agency indicators exceeded a two-fold increase in most age groups (figure 5), with around 4% of children investigated every year in both countries.

Placement in out-of-home care was ten times higher in Manitoba (3% of all infants) than in Western Australia (<1%) across all age groups. In England, New Zealand, and the USA, rates of placement were about twice as high for infants than were those in Western Australia and Sweden. Rates of placement for older children were similar in the USA, England, Sweden, and New Zealand, but lower in Western Australia and much higher in Manitoba (figure 4, webappendix p 12).

Rate ratios for maltreatment-related injury admissions and violent death correlated more closely than did agency indicators, apart from in the USA (figure 5). Paradoxically, in the USA, rates of maltreatment-related injury admissions were less than half those in Western Australia for children 1 year and older (95% CI excludes 0·5), whereas rates of violent death were more than twice as high for two of the three age groups (figure 5). These contrasting findings could indicate lower rates of admission, possibly because of poor access to health care for deprived children in the USA. If only children admitted for injury were compared, the proportion categorised as maltreatment-related was twice as high in the USA as in Western Australia for children 1 year and older, and was similar for infants (webappendix p 12).

Summary of main findings

We examined variation in indicators of child maltreatment across six developed countries, with two approaches. First, we sought evidence for significant trends over time. We noted that after the mid-1990s, the rates of violent deaths and maltreatment-related injury admissions remained stable in most settings. Only in Sweden and Manitoba did decreases in violent deaths coincide with decreases in admission related to maltreatment injury. Officially recognised physical abuse or neglect mostly remained stable but other indicators of agency notification or investigation increased, particularly in infants. Rates for placement of children in out-of-home care increased in three of the six countries, with increases greatest for infants.

Second, we reported on variation between countries in mean yearly rates estimated for 2004–06. Violent deaths in the USA were more than five times higher than in Australia, which together with Sweden had the lowest

rates. We noted little variation between countries in the rate of maltreatment-related injury admissions and officially recognised physical abuse or neglect. However, other agency indicators were substantially higher in New Zealand and the USA than elsewhere, with child protection investigations affecting around 4–5% of infants every year. Placement in out-of-home care was ten times higher in Manitoba than in other countries, affecting 3% of infants every year, and twice as high for infants in England, New Zealand, and the USA than in Western Australia or Sweden.

What do the results mean?

Our analyses of routinely recorded indicators of child maltreatment represent an advance over previous patchy evidence because we used population-based, individual child-level datasets from several sources over many years. Policy makers need to know what the results mean, but inferences need to take into account the limitations of these observational data. Can we conclude that recorded variation is indicative of real variation (or absence of it) in maltreatment indicators? And can we infer that real variation or stability in these indicators reflects actual exposure of children to maltreatment?

Potential explanations for variation in indicators include random error, data quality, and case mix. Our criteria for limiting random error, a 5% significance level for trends and for exclusion of a two-fold variation for rate ratios, limited the power to detect changes when events or calendar years were sparse. Data quality has many elements and applies to the numerator and denominator and accuracy of linkage of individuals within the dataset, much of which could not be examined in this study. Insistence on counting children rather than contacts for each agency indicator had a profound effect on some measures, with notifications decreased by a third in New Zealand. Data quality also relates to coding artifacts, which we kept to a minimum by seeking consistent relations across several indicators and related groups. We recorded no evidence for a significant effect of transition from ICD9 to ICD10 coding, apart from possibly for injury admissions in children 1 year and older in New Zealand. With the assumption that reporting biases would have different effects on different indicators of maltreatment, we can be moderately confident that large, significant differences that are consistent across multiple indicators indicate true variation. However, stable rates could indicate insufficient power to detect small or moderate differences, which would be most likely to mask changes in the least common indicators (ie, violent deaths and maltreatment-related injury).

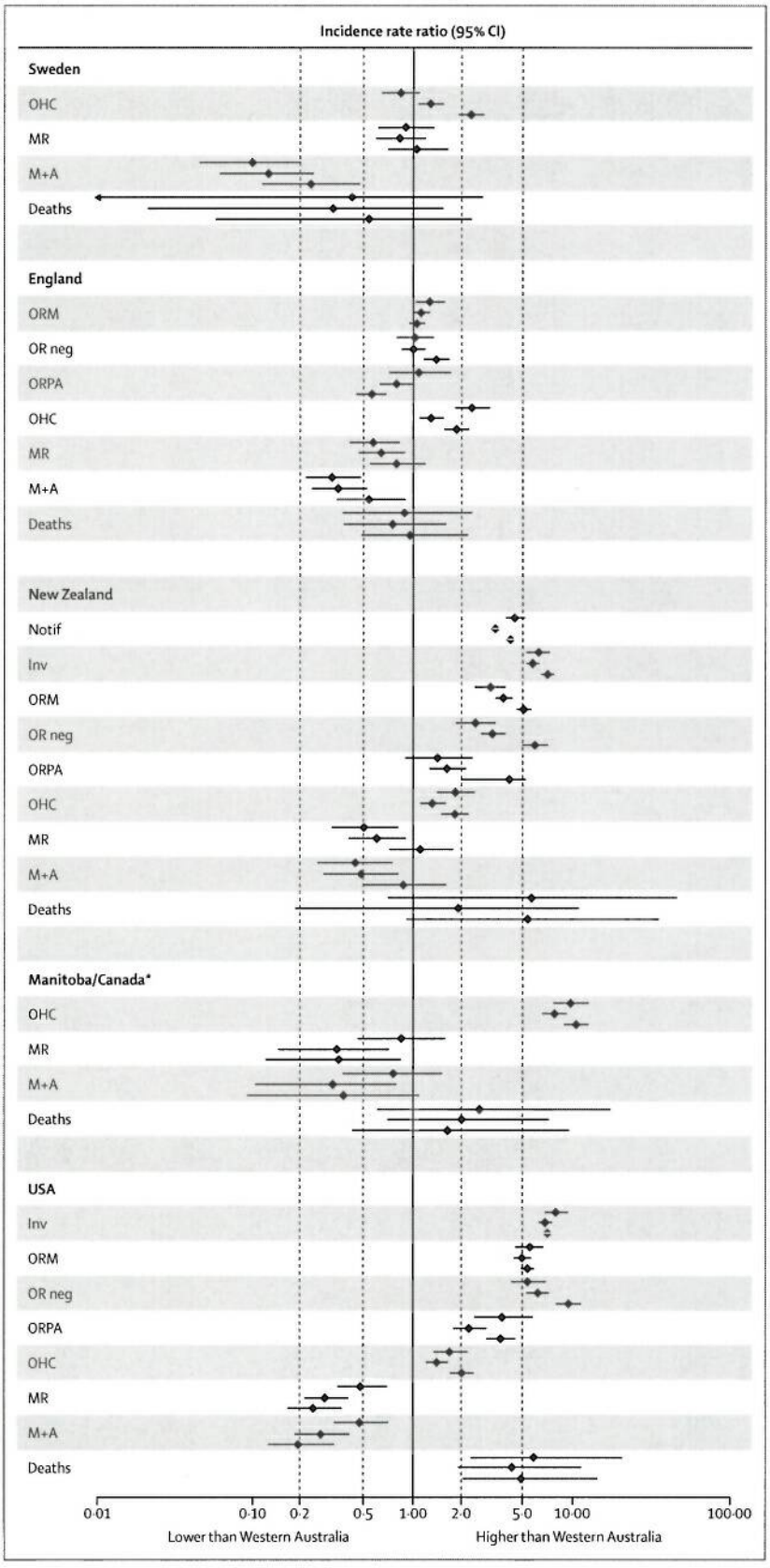
Having identified potentially real differences in maltreatment indicators, we need to address whether these differences indicate real variation in child maltreatment. We need to consider the specificity of our indicators for maltreatment, the timescale of any changes and link to potential policy effects, and the consistency of indicator trends with variation in risk factors for child maltreatment.

	Trend before change	Year of change	Overall RR or RR after change (95% CI)
(Continued from previous page)			
Out-of-home care	0·98 (0·51–1·30)	2003	1·12 (0·71–1·66)
Maltreatment-related injury	..	..	1·01 (0·99–1·03)
Maltreatment syndrome or assault	..	..	1·01 (0·98–1·03)
Violent deaths	1·04 (1·02–1·06)*	1991	1·01 (0·99–1·01)
≥1 year			
Investigations	..	..	1·03 (1·01–1·06)*
Officially recognised	1·02 (0·87–1·14)	2006	0·89 (0·58–1·06)
Officially recognised neglect	1·02 (0·79–1·16)	2006	1·00 (0·84–1·08)
Officially recognised physical abuse	0·98 (0·71–1·11)	2006	0·89 (0·68–1·03)
Out-of-home care	..	..	1·04 (1·00–1·14)*
Maltreatment-related injury	..	..	0·97 (0·88–1·05)
Maltreatment syndrome or assault	..	..	0·95 (0·84–1·06)
Violent deaths	1·02 (1·01–1·03)*	1993	0·97 (0·95–0·98)*

*p<0·05. †Year of change is given only if the change point model detected a deviation from a linear trend.

Table 2: Rate ratios (RRs) showing change in rates of child maltreatment indicators over time (with Poisson change point models)†

Our primary indicators for child maltreatment suggested sufficient professional concern to indicate an underlying problem, thereby minimising false-positive cases.[1] Specificity is likely to be high for violent deaths and injury admissions due to maltreatment or assault because these terms are perceived as stigmatising. They are likely to be reserved for severe or definite cases,[46,56,57] because false-positive classifications could have repercussions for both the family and clinician.[58–60] Trends in violent deaths and admissions for maltreatment-related injury showed fairly small changes over time (3–9%; table 2). We would expect these gradual rather than sudden large changes in the occurrence of child maltreatment at a population level, provided that children with maltreatment-related injuries continue to be admitted to hospital and that deaths and injuries continue to be coded in the same way. However, in Manitoba children with minor maltreatment-related injuries ceased to be routinely admitted from the early 1990s, potentially explaining the decreasing incidence of these injuries in hospital admission data (table 2). Decreases in admitting practices, rather than falling rates of presentation to hospital, could affect trends in the other five countries; two studies[61,62] of maltreatment-related injury in accident and emergency departments showed that fewer than half of children with these injuries were admitted (22% [39/177] in Western Australia, and 44% [23/52] in the Netherlands; Louwers E, University Medical Centre, Rotterdam, Netherlands, personal communication). However, we cannot exclude the possibility that stable trends could be explained by increased awareness among clinicians or coders of maltreatment-related injuries or violent deaths coinciding with a true decrease in occurrence.



Trends in agency indicators showed large fluctuations (2–65%; table 2), especially in New Zealand and Western Australia. Moreover, the large differences between countries in agency indicators—eg, the more than five-times higher rates of investigations and twice higher rates of infants entering out-of-home care in England, New Zealand, and the USA compared with Western Australia and Sweden—were not consistent with other indicators and did not correlate well with variations in risk factors (table 1). These inconsistencies suggest that agency indicators are highly affected by policy initiatives that shape recognition and response. Although they do occur, we would expect few false-positive cases in our primary indicators of officially recognised neglect or physical abuse. Few children would be placed in out-of-home care because of misdiagnosed child maltreatment; however, in some settings, our figures for out-of-home care included other indications (webappendix p 12).[63] Although these indicators show the true occurrence of maltreatment, so much child maltreatment goes undetected or not acted upon that improvements in recognition can cause large swings in notifications, with subsequent effects through the system.[10]

These caveats mean that we cannot establish whether child maltreatment occurs more frequently in the USA, New Zealand, and Manitoba, or whether the high rates simply show changes in indicators rather than in maltreatment itself. From a policy perspective, Sweden and the USA represent extremes in population risk factors such as child poverty, the proportion of lone or teenage parents, and access to child care. However, the indicators differ mainly for violent deaths, which are high in the USA relative to England, Australia, and Sweden. Such contrasts are less certain for New Zealand and Manitoba because of small numbers. Therefore, New Zealand might simply detect more of the maltreatment that occurs than do other countries. For example, in England, there is no nationwide system for collating and responding to police reports of incidents involving children, or for placing social workers in schools, as is done in New Zealand. If such systems were established in England, similar rates of notifications to social care services might be recorded. The question for policy makers is whether this strategy would be the most effective for children.

Figure 5: **Incidence rate ratios (and 95% CIs) for maltreatment indicators compared with Western Australia as reference country, based on 3 year average rate centred on 2005–06**
For each indicator, incidence rate ratio is presented for children aged younger than 1 year (top), 1–4 years (middle), and 5 years and older (bottom). OHC=out-of-home care. MR=maltreatment-related hospital admissions for injury. M+A=maltreatment syndrome or assault-related hospital admission for injury. Deaths=violent deaths. ORM=officially recognised maltreatment. OR neg=officially recognised neglect. ORPA=officially recognised physical abuse. Notif=notifications. Inv=investigations. *Data for deaths are for Canada; all other indicators are for Manitoba.

Effect of policy on child maltreatment

Our results indicate relative stability or increases in child maltreatment indicators over time with little evidence of a decline, apart from in Sweden and Canada where rates of violent deaths fell. Although insufficient power to detect change is one explanation for the apparent stability, another explanation is countervailing policy influences.

A key issue is whether we would expect to see an effect of the interventions promoted by these policies, on the basis of the available research evidence of effective interventions.[3,64] For simplification, policies can be grouped into universal child and family welfare, targeted maltreatment prevention, and policies aimed at identification of children exposed to maltreatment and intervening to prevent recurrence.[3] Effective preventive strategies might be expected to reduce all maltreatment indicators, whereas effective interventions to prevent maltreatment recurrence might increase child protection agency activity.

Universal child and family welfare policies

Because most child maltreatment is hidden, universal prevention of the underlying causes of child maltreatment would be expected to reach more maltreated children than would policies focused mainly on identification of maltreatment. Child poverty, lone parenthood, parental drug or alcohol dependency, domestic violence, and parental mental health problems are well established risk factors for child maltreatment. The most recent absolute levels of child poverty ranged from 7% in Sweden to 22% in the USA (table 1), but decreases were recorded during the 2000s in England, the USA, and Australia (figure 1). Additionally, early child-care provision increased substantially over the past 20 years in Sweden and England, but these improvements could have been dissipated by rising rates of alcohol and drug misuse and by a doubling in the proportion of lone parents in all six countries.[45,65] Universal early home visiting, implemented from 1999 in Manitoba, and early universal day care (started in the early 1990s in Sweden), is supported by moderate evidence of effectiveness from randomised controlled trials,[66,67] but time-trend analyses do not have power to establish the effect of these policies and could be confounded by other factors. For example, evidence for the effectiveness of banning corporal punishment in Sweden has been contested since trends show rates falling before the legislation.[20]

Targeted maltreatment prevention

Evidence from systematic reviews of trials[3,66–68] lends supports to the effectiveness of targeted child maltreatment prevention strategies, such as the Triple P parenting programme rolled out in Western Australia and Manitoba. Less evidence is available for differential response models that offer a focus on social welfare needs for vulnerable children not in need of protection, but effective service provision has been limited.[64]

Identification of maltreatment and intervention

Evidence for the effectiveness of policies for identification and intervention for physical abuse and neglect is scarce, both from controlled trials and observational studies,[3] although many practitioners will recall cases in which intervention made a difference. A few randomised controlled trials have shown some benefits for specific interventions of parent training or parent–child interaction therapy,[3,68–70] but none has assessed the effectiveness of the overall identification and intervention process—evidence that is considered a prerequisite before implementation of any screening programme in health care.[71–75]

Our findings show that child protection agency procedures affect a substantial and, in some settings, increasing minority of children. Every year one child in every 25 in New Zealand and the USA is investigated by child protection services. As might be expected, cumulative rates are much higher such that by age 15 years in South Australia one in five children was notified to child protection services, with more than 50% of Aboriginal children notified. Equivalent cumulative incidences for Western Australia are one in 11 children notified and more than 27% of Aboriginal children.

The increases in identification of and response to child maltreatment can be traced to policies designed to expand the definition of maltreatment, improve recognition, and change responses to child maltreatment (figure 2). In particular, the focus on early interventions, to identify and respond to vulnerable children early in infancy, is likely to partly explain rising agency indicators in infants alongside stable trends in older children in England, Western Australia, and the USA.

The rises in placement of infants in out-of-home care in four countries (Sweden, England, Western Australia, and the USA) are noteworthy for several reasons. First, increased out-of-home care was not advocated by any policy initiative, and some policies explicitly recommended against out-of-home care unless other interventions had failed.[9,76,77] Second, large numbers of children are affected.[78–80] For example, cumulative incidence estimates (to be reported elsewhere) show that by 7 years of age 1·5% of children have been placed in care in Western Australia, 7·5% in Manitoba, and 0·9% in Sweden.[81]

Third, although out-of-home care can be an effective intervention, there are no controlled trials comparing out-of-home care with intensive home support.[3,82] Fourth, placement in out-of-home care is often coercive, especially when placing infants.[83–85] Fifth, in some settings, the rise in out-of-home care might indicate a failure of adequate funding and provision of preventive or supportive interventions in the home, rather than an option of last resort after other interventions have been tried and failed.[64] Sixth, the high rates of out-of-home care raise questions about sustainable high-quality foster care in some communities. Lastly, there is evident

disruption and trauma, and potentially serious long-term harm for the child and their family.[85] Policy makers in partnership with researchers need to show the effectiveness of this practice.

Next steps

Our results show no clear evidence for an overall decrease in child maltreatment despite decades of policies designed to achieve such reductions. We urge caution in interpretation of these findings. Stable rates of officially recognised maltreatment could suggest that interventions are failing to achieve the reductions that were hoped for, or they could indicate improved recognition of maltreatment coinciding with decreases in the overall prevalence of maltreatment. Similarly, policies might be effective in protection of some vulnerable groups of children, while failing to reach others.

Although we support calls from others for a greater focus on universal and targeted preventive strategies—the public health approach to child maltreatment[5]—we also argue for improved research to underpin these very expensive policies that profoundly affect the lives of a substantial minority of children in our countries. Most urgent, in view of increases in out-of-home care, is the need for high-quality, randomised controlled trials to assess the effectiveness of this intervention.

A further priority is to improve the availability and quality of routine data for indicators of child maltreatment to ensure that future policy is based not on individual child deaths but on a population perspective of child maltreatment.[86] Additionally, existing data need to be improved through record linkage to population-based denominators: in our study such linkage was done only in Manitoba and Western Australia. Access to linked data of this type is crucial to understand whether the same children are presenting to several services, or, as in our analyses, there is little overlap. Most important, however, is the information that such data provide about the cumulative risk of maltreatment-related hospital admission, or contact with child protection agencies. Further research needs to use longitudinal data, taking into account immigration, errors in data linkage, and information about confounders and risk factors. Such issues will not be adequately addressed unless data providers allow researchers access to anonymised, record-linked datasets.

Although WHO requires external cause codes for injuries, our analyses show that these codes are variably used. Furthermore, codes need to be devised to reflect suspected and confirmed abuse, which could be achieved in the new version of ICD.

Another priority is for improved indicators of how child maltreatment is changing over time in different settings. Repeated self-report or parent-report surveys, with standardised assessment instruments, provide a sensitive indicator, which, if linked anonymously to the type of routine data used in our analyses, would start to bridge the gap in understanding of how much of the child maltreatment that occurs in the community is recognised and acted upon by professionals.

Contributors

RG conceived the study with input from all other authors and drafted the report. JF, MOD, MB, PG, AG-I, PS, and RG developed the analytical plan. JF, MOD, MB, PG, and AG-I did the analyses for specific countries, and AG-I did the statistical analyses. All authors contributed to the overview of policy, the interpretation of the results, and writing of the report.

Conflicts of interest

We declare that we have no conflicts of interest.

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