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Multi-sectoral action for child safety—a European study exploring implicated sectors

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Background: Injury to children in Europe, resulting in both death and disability, constitutes a significant burden on individuals, families and society. Inequalities between high and low-income countries are growing. The World Health Organisation Health 2020 strategy calls for inter-sectoral collaboration to address injury in Europe and advocates the whole of government and whole of society approaches to wicked problems. In this study we explore which sectors (e.g. health, transport, education) are relevant for four domains of child safety (intentional injury, water, road and home safety). **Methods:** We used the organigraph methodology, originally developed to demonstrate how organizations work, to describe the governance of child safety interventions. Members of the European Child Safety Alliance, working in the field of child safety in 24 European countries, drew organigraphs of evidence-based interventions. They included the different actors involved and the processes between them. We analyzed the organigraphs by counting the actors presented and categorizing them into sectors using a pre-defined analysis framework. **Results:** We received 44 organigraphs from participants in 24 countries. Twenty-seven sectors were identified across the four domains. Nine of the 27 identified sectors were classified as 'core sectors' (education, health, home affairs, justice, media, recreation, research, social/welfare services and consumers). **Conclusions:** This study reveals the multi-sectoral nature of child safety in practice. It provides information for stakeholders working in child safety to help them implement inter-sectoral child safety interventions taking a whole-of-government and whole-of-society approach to health governance.

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Introduction

Death or serious injury of a child from a preventable injury incident is a tragedy. Beyond the tragic loss of life, the burden extends from the individual to family, friends, community and society in general. Consequences include physical and mental discomfort and distress (e.g. pain, grief), direct and indirect

financial costs (e.g. medical costs, loss of productivity) and social impacts (e.g. increased fear of injuries).¹

Within the European Union in 2014 injury mortality rates for 0–19 year olds ranged from 4/100 000 in Spain to 19/100 000 in Lithuania.² However, mortality rates represent only a fraction of the problem. Estimates suggest that for each child death there are 129 hospital admissions, 1635 visits to emergency departments and

an unknown number of visits to general practitioners representing sizeable healthcare costs.³ Between 2000 and 2011 injury-related deaths among children (0–14) decreased by 44% in the WHO European region. However, relative inequalities between high and low-income countries have widened; the mortality rate ratio between the two groups of countries increased by 31%, from 4.3/100 000 in 2000–5.6/100 000 in 2011.⁴ Decreasing rates suggest that efforts to prevent these injuries are having a positive effect.⁵ The challenge now is to implement proven interventions effectively and more widely, particularly in low-income countries.⁴

Child injury is complex and has been described as a ‘wicked’ problem^{6,7} due to its multifaceted, and multi-levelled nature.⁸ Modern technology provides new tools to address wicked problems, such as social media networks, electronic patient records and improvements in data collection and utilization.⁹ Additionally, implementation and dissemination methodologies, such as the comprehensive dynamic trial design, offer ways to optimize strategies to complex local contexts.¹⁰ However, despite the opportunities offered by such advances, collaboration among diverse stakeholders remains vital to effectively manage the diverse upstream and downstream factors that play a role in child injury.^{7,11}

The Governance for Health in the 21st century approach proposes engaging stakeholders horizontally, across the whole of society (public sector, private sector and civil society) and vertically across the whole of government (local, subnational, national, international).^{12,13} This approach is also echoed in the United Nations sustainable development goal 17 ‘strengthen the means of implementation and revitalize the global partnership for sustainable development’.¹⁴

The WHO Health 2020 strategy states that the challenge for injury prevention lies in ensuring that responses to injury are placed high on the agenda of policy makers and practitioners from the health sector and other sectors (e.g. transport, education) to ensure action:

*“Preventing injury and violence is multi-sectoral, and governance mechanisms are needed for the health sector to engage with other sectors that are critical as partners in prevention, such as those responsible for justice, transport, education, finance and social welfare.”*¹⁵

However, despite awareness of the need to act across sectors,^{16–18} and international calls to do so; most notably by the WHO Regional committee for Europe resolution EUR/RC55/R9,¹⁹ the European Council Recommendation 2007/C164/01,²⁰ the WHO Health 2020 Strategy¹⁵ and The Minsk Declaration²¹ action is not occurring consistently nor uniformly across the region. This is exemplified by the increase in inequalities observed by Gopfert et al.⁴

The reality is that inter-sectoral collaboration is difficult.²² Factors that can hinder progress include challenges forging initial joint agreements and building trust, leadership and legitimacy across diverse sectors.^{23,24} A first step for effective inter-sectoral collaboration is to identify a need to work together—knowing who your partners should be and in which sectors and at what level they can be found.^{13,25}

General attempts have been made to identify the sectors implicated in child safety.^{17–19,26} However, we could not find any systematic analysis of which sectors actually participate in child safety interventions.

In this study, we explored which sectors (e.g. health, transport, education) are implicated in child safety. Our research questions were: Which sectors are relevant to each of the four domains in child safety (intentional injury prevention, water, road and home safety)? Which sectors had the most actors attributed to them? Which sectors are relevant across the four domains examined?

Methods

The methods used in this study built upon an existing methodology developed by Mintzberg and Van der Heyden known as

‘organigraphs’.²⁷ Organigraphs were developed to demonstrate *how* an organization works, as opposed to simply drawing its structure. Instead, these more complex visualizations depict both the interactions and the nature of those interactions between people, products, and information. In this study, we used organigraphs to examine child safety. Each organigraph focussed upon a single intervention and illustrated which actors were involved, the nature of their involvement and at which level of governance they operated.

In a departure from the original methodology our method involves arranging shapes (representing actors) and connectors (representing processes) onto a multi-level grid (representing four levels of governance: international, national, sub-national and local levels) to build a picture of the processes behind child safety interventions. Our decision to impose a minimum structure to the organigraphs by using the four-level grid was to reflect principles of a whole-of-government approach.¹² The shapes and connectors were pre-defined, tested and mutually agreed upon by partners of the project in the testing phase before the study started.

The study was part of the European project TACTICS (Tools to Address Childhood Trauma, Injury and Children’s Safety),²⁸ was focused on four domains of child safety; road, water and home safety and intentional injury prevention. These domains were chosen because they reflected the major causes of injury mortality.

Participants in the study were partners on the TACTICS project. They were practitioners working in the field of child safety in 24 countries in the WHO European Region who were also members of the European Child Safety Alliance. The participants were categorized into two groups due to the administrative and financial structure of the project and the role of the participants in other work packages. The first group ($n=6$) was asked to draw four organigraphs each, an intervention for each domain of child safety in the study. The second group ($n=18$) was asked to draw one organigraph each, for an intervention in a single domain of child safety. In addition, a European, Brussels-based NGO (The European Public Health Alliance), was asked to draw an organigraph for each of the four child injury domains from the European perspective, focusing on the European level.

The child safety interventions depicted in the organigraphs were systematically selected to ensure maximum coverage of injury issues and child age groups, and to broadly cover the different governance levels of implementation. One of the authors (MM) developed a matrix, which was subsequently reviewed by the TACTICS scientific committee, this was used to select the interventions to be included. Participants were asked to submit good-practice interventions from their countries (good practice as defined in the ECSA Child Safety Good Practice Guide.²⁹ Three of the authors (MM, JV and BS) made the final selection of interventions.

Participants drew their organigraphs in Microsoft PowerPoint® using a centrally issued template, pre-defined shapes and connectors (see figure 1) and pre-tested author instructions. The author instructions asked participants to consider three questions when drawing their organigraph:

- (1) Which institutions/actors were involved in the adoption, development, implementation, enforcement (as appropriate) and monitoring of the chosen intervention?
- (2) How do these institutions/actors relate to each other?
- (3) Which EU directives and/or national laws regulate or necessitated setting up the intervention? And which organizations are involved?

The author instructions encouraged participants to work collaboratively to draw the organigraphs or, if this was not possible, to do the necessary research to ensure that the organigraph was as accurate as possible.

All the participants in this study were signed partners on the TACTICS project. They all signed the TACTICS project agreement

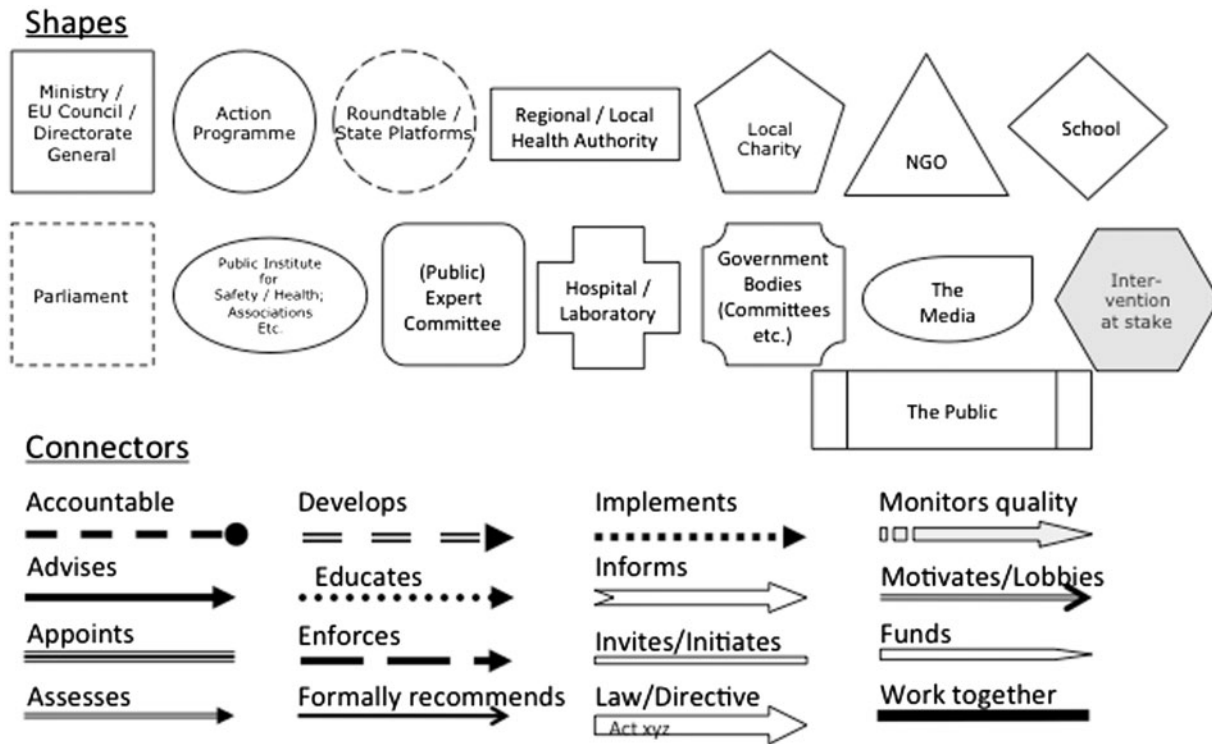


Figure 1 The meanings of connectors and shapes used in the organigraphs

Table 1 Analysis framework: List of sectors applicable to child injury prevention

| Sector name | Sub-sectors included within each sector |
|------------------------------|---|
| Advocacy | Advocacy organizations |
| Agriculture | Agriculture policy |
| Communications | Telecom, internet, IT, web security |
| Community development | Community and neighbourhood organizations, economic development (infrastructure, rural development programmes), town planning |
| Consumers | Consumer affairs, manufacturing standards, consumer protection |
| Culture | Visual arts, performing arts, literature, museums, galleries |
| Defence | Armed forces, military, navy, air force |
| Education | Primary, secondary, tertiary education, vocational training, adult and continuing education, driving instruction |
| Emergency services | Ambulance, fire service, coast guard, life guard, lifeboats |
| Employment | Employment legislation, health and safety at work |
| Environment | Environmental preservation, pollution control and prevention, natural resource conservation, environmental preservation, parks, open spaces |
| Finance | Taxation, economic policy |
| Food and drink industry | Restaurants, bars, cafés |
| Health | Primary, secondary and tertiary care, rehabilitation, mental health, crisis intervention (includes suicide prevention), public health, patient organizations |
| Home affairs | Internal security, immigration/asylum, border enforcement |
| Housing | Construction, management, architecture |
| Insurance | Health insurance, car insurance etc. |
| Justice | Police, legal services, court-related matters, crime prevention and public safety, rehabilitation of offenders, victim support |
| Maritime affairs | Fisheries, maritime policy |
| Media | Production and dissemination of information: Television, newspapers, magazines, radio |
| Philanthropic organizations | Non-subject specific grant making, foundations, fund-raising organizations e.g. lotteries |
| Recreation | Sport, playgrounds |
| Religion | Religious organizations |
| Research | Universities, research institutes |
| Social/welfare services | Social security, child welfare, child services, day-care, youth services, youth welfare, (youth clubs, delinquency/drop out prevention) family services (parenting courses, family violence shelter), services for disabled, services for elderly, children's ombudsman |
| Tourism | Tourism policy |
| Trade policy and regulations | Policies and regulation governing international trade |
| Transport | Mobility, road, rail, air, water, urban mobility, road safety |

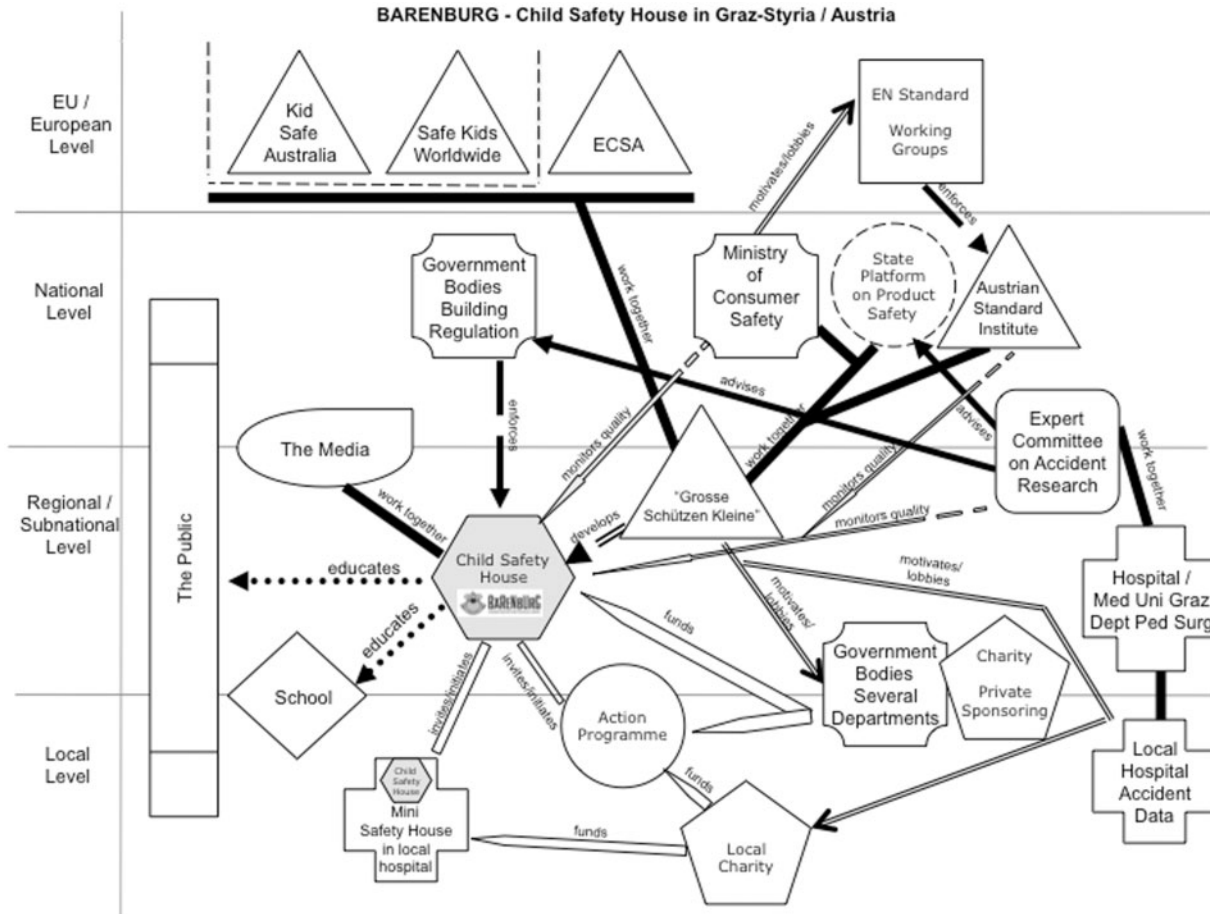


Figure 2 An example of an organigram from Austria: Barenburg–Child Safety House in Graz-Styria Austria

and self-governance rules in which aspects of publication and use of data were laid out. Both documents provided detailed information on the nature of the study thus no further ethical approval was sought.

Analysis framework

Our research questions required categorization of the actors depicted in the organigrams into sectors that would be relevant in an international context. In order to do this, we required a generic (internationally applicable) list of sectors to work as an initial framework for analysis. We were not able to find such a list in either academic or grey literature. Therefore, we developed an analysis framework by first conducting a preliminary exploration of the organigrams which was then supplemented by three articles^{30–32} and a list of directorate generals of the EU.³³ The final analysis framework used for the study is the combined result of the sectors identified during these two steps (see table 1).

Analysis

Two researchers, working together, divided the organigrams into the four injury domains and counted and categorized each actor depicted, into sectors based on the analysis framework (table 1). In an attempt to quantify the ‘importance’ of a sector we also noted how many actors were categorized to each sector. In the final stage of analysis, we grouped the data for each of the four domains and four of the authors assessed which sectors were relevant across all four injury domains to establish a group of sectors we termed ‘core sectors’.

Results

We received 44 organigrams (figure 2 provides an example of an organigram) from 24 countries; nine for intentional injury prevention, nine for water safety, 12 for road safety and 14 for home safety. The distribution of actors over the four governance levels were: 11.3% of actors located at European level, 55.5% at national level, 17.5% at sub-national level and 16% at local level. Using the analysis framework, we identified 27 different sectors across the four domains of child injury prevention (see table 2).

Sectors by injury domain

For the domain of intentional injury prevention, we identified 13 different sectors (% represents the proportion of total actors depicted in the organigrams and categorized to that sector): health (30%), social/welfare services (19%), justice (14%), education (9%), media (8%), research (6%), home affairs (4%) and recreation (2%). The remaining sectors (accounting for 8% of the actors) included; communications, culture, religion, employment and the food and drink industry sectors. Social/welfare services and justice had the highest representation in intentional injury prevention compared to the other injury domains. Combined with health these three sectors accounted for 63% of actors.

Within the water safety domain 23 sectors were identified. The health sector had the most actors attributed to it, accounting for 26% of actors, followed by emergency services (13%), maritime affairs (10%), consumers (8%), education (7%), recreation (6%) and environment (5%).

Table 2 Frequency (and proportion) of actors per sector by child safety domain

| Sectors | Intentional injury prevention | Water safety | Road safety | Home safety | Total |
|-----------------------------|-------------------------------|--------------|-------------|-------------|-------------|
| Advocacy | | | 1 (0.6%) | | 1 (0.2%) |
| Agriculture | | 1 (0.8%) | | | 1 (0.2%) |
| Communications | 5 (4.4%) | 1 (0.8%) | 1 (0.6%) | | 7 (1.2%) |
| Community development | | 1 (0.8%) | 2 (1.2%) | 3 (1.8%) | 6 (1.0%) |
| Consumers | | 10 (8.0%) | 10 (5.8%) | 13 (7.8%) | 33 (5.7%) |
| Culture | 1 (0.9%) | 1 (0.8%) | 1 (0.6%) | | 3 (0.5%) |
| Education | 10 (8.8%) | 9 (7.2%) | 13 (7.6%) | 7 (4.2%) | 39 (6.8%) |
| Emergency services | | 16 (12.8%) | | 3 (1.8%) | 19 (3.3%) |
| Employment | 1 (0.9%) | | | 3 (1.8%) | 4 (0.7%) |
| Environment | | 6 (4.8%) | 1 (0.6%) | 3 (1.8%) | 10 (1.7%) |
| Finance | | | 3 (1.7%) | | 3 (0.5%) |
| Food and drink | 1 (0.9%) | 1 (0.8%) | | | 2 (0.3%) |
| Health | 34 (30.1%) | 33 (26.4%) | 27 (15.7%) | 70 (42.2%) | 164 (28.5%) |
| Home Affairs | 4 (3.5%) | 3 (2.4%) | 8 (4.7%) | 3 (1.8%) | 18 (3.1%) |
| Housing | | 1 (0.8%) | 2 (1.2%) | 6 (3.6%) | 9 (1.6%) |
| Insurance | | 1 (0.8%) | 2 (1.2%) | | 3 (0.5%) |
| Justice | 16 (14.2%) | 2 (1.6%) | 12 (7.0%) | 4 (2.4%) | 34 (5.9%) |
| Maritime affairs | | 13 (10.4%) | | | 13 (2.3%) |
| Media | 9 (8.0%) | 4 (3.2%) | 17 (9.9%) | 16 (9.6%) | 46 (8.0%) |
| Philanthropic organizations | | 2 (1.6%) | 1 (0.6%) | 5 (3.0%) | 8 (1.4%) |
| Recreation | 2 (1.8%) | 8 (6.4%) | 4 (2.3%) | 3 (1.8%) | 17 (3.0%) |
| Religion | 1 (0.9%) | | | | 1 (0.2%) |
| Research | 7 (6.2%) | 3 (2.4%) | 10 (5.8%) | 5 (3.0%) | 25 (4.3%) |
| Social/welfare services | 22 (19.5%) | 2 (1.6%) | 6 (3.5%) | 16 (9.6%) | 46 (8.0%) |
| Tourism | | 1 (0.8%) | 2 (1.2%) | | 3 (0.5%) |
| Trade | | 4 (3.2%) | 2 (1.2%) | 6 (3.6%) | 12 (2.1%) |
| Transport | | 2 (1.6%) | 47 (27.3%) | | 49 (8.5%) |
| Total | 113 | 125 | 172 | 166 | 576 |

For the road safety domain 21 sectors were identified. In contrast to the other domains where the health sector had the highest proportion of actors, transport (27%) appeared most frequently, followed by health (16%), media (10%), education (8%), justice (7%), research (6%), consumers (6%) and home affairs (5%).

The role of the health sector was prominent in home safety, accounting for 42% of actors involved. After health, media (10%), social/welfare services (10%) and consumers (8%) had the highest proportions of actors attributed to them, followed by housing and trade (4% each).

Looking at the four injury domains together, the health sector had the highest number of actors attributed to it (28.5%), followed by transport (9%), social/welfare services (8%), media (8%), education (7%) justice (6%) and consumers (6%). The number of actors attributed to the sectors varied depending upon the injury domain in question. The health sector had the most actors attributed to it in: intentional injury prevention, water and home safety. For road safety most of the actors were attributed to the transport sector.

Core-sectors

Within the 27 sectors identified we found that eight sectors (education, health, home affairs, justice, media, recreation, research and social/welfare services) appeared in all four injury domains examined. Consumers was in the top six sectors (in terms of the number of actors categorized to it) of three of the four domains (water, road and home safety) and accounted for 6% of actors overall. Therefore, we judged that it was sufficiently relevant to be included in the core sectors.

The frequency of the core sectors compared to the other sectors varied between injury domains. In intentional injury prevention, the core sectors accounted for 92% of actors, in home safety the proportion was 83% and in road and water safety it was 62% and 59%, respectively.

Discussion

This study explored the sectors implicated in child safety overall and for each of the four child safety domains included in the study. We identified 27 sectors across the four domains. We attempted to quantify the prominence of each sector by counting the number of actors attributed to it in each of the organigraphs. The health sector was the most prominent overall and in all of the domains except road safety, where the most prominent sector was transport. Nine sectors were designated as core sectors (education, health, home affairs, justice, media, recreation, research, social/welfare services and consumers) due to their frequency and coverage across the domains.

The breadth of the 27 sectors identified in the organigraphs, points to the diversity of actors engaged in child injury prevention in general. The differences between the injury domains, both in the broad range of sectors represented and the differing prominence of the sectors as measured by frequency, suggests unique differences between the four domains. For example, in road safety 27% of actors were from the transport sector—but 73% of remaining actors come from 20 other sectors. This highlights that road safety, though transport focused, requires the involvement of many other sectors to ensure effective adoption, implementation and monitoring of evidence-based interventions.

Existing literature on sector relevance for child injury prevention is sparse, however general attempts to identify the pertinent sectors have been made, most prominently in large WHO reports. The European Report on Child Injury Prevention,³ which focused on unintentional child injury recommends that health ministries should involve ministries concerned with transport, health, planning, leisure, housing, consumer product safety, agriculture, education and law as well as research institutes and the media. The World report on Violence and Health,²⁶ which focused on violence prevention for all age groups, makes similar recommendations citing the following sectors: criminal justice, education, labour, health and social welfare. The findings from the current study lend support to the recommendations made in these reports. In addition,

we identified the following sectors not prominently mentioned in these reports: advocacy, communications, culture, environment, finance, food and drink industry, insurance, maritime affairs, philanthropic organizations, religion and trade.

The diversity of stakeholders identified across the 27 sectors recognized in our study is consistent with the whole-of-society approach to wicked problems, namely the importance of involving the public sector, private sector and civil society to address public health issues.¹² Additionally the whole-of-government approach advocating action at each level of governance, supports our findings regarding the position of actors over four levels of governance.

Limitations

There are a number of limitations to this exploratory study that should be considered. First, this research was part of a public health project and it is possible that a certain bias exists leading to an over-emphasis of the importance of the health sector (based on the number of actors) over the other sectors. However, even if the other sectors were underrepresented, the diversity across the 27 sectors identified indicates that the importance of inter-sectoral action for child injury prevention may be even greater than these findings suggest. Second, despite our efforts to ensure wide breadth and coverage of interventions it was not possible to map all child safety interventions and this may have led to the omission of some sectors relevant to child injury prevention. However, the breadth of interventions and coverage over the four domains achieved within the study suggests that, at least for the core sectors, the results are likely to be accurate. Third, the proportion of actors a sector represents provides only a rough indicator of its importance. Actors that crossed levels of governance were counted for each level they appeared on. This was only the case in very few instances (seven actors are counted more than once) so any effect should be minimal. However the percentage estimates should only be taken as a rough guide of the importance of sectors given the other limitations outlined above.

Conclusion

Child injury has been referred to as a wicked problem requiring inter-sectoral action to address its complexity. However, before the current study we found no attempt to systematically explore and quantify the multi-sectoral involvement in child injury prevention. With the contribution of participants from 24 countries, providing 44 cases, across 4 different child injury domains, we identified 27 sectors. Nine of these sectors (education, health, home affairs, justice, media, recreation, research, social/welfare services and consumers) were found to be relevant for the adoption, implementation and monitoring of evidence-based strategies for each domain of child injury prevention.

We hope that our identification of sectors relevant to child safety provides guidance and practical assistance for stakeholders by highlighting both the necessity for inter-sectoral collaboration and the perspective that good health governance requires action across the whole of society and the whole of government.

Further research in this field could look at the way these sectors interact. To explore issues such as the role of leadership in inter-sectoral collaborations and how the position of governance held by the sectors can affect collaboration. Additionally, it is important to explore opposing forces in the private sector such as the alcohol or automobile industries. To sensitize stakeholders to potential impact these conflicting interests may have on injury prevention efforts.

Key points

- Ensuring children's safety requires multi-sectoral action, across the whole-of-society and the whole-of-government.

- Twenty-seven sectors were found to be associated with four domains of child safety: intentional injury prevention, road, water and home safety.
- Nine core sectors were identified: education, health, home affairs, justice, media, recreation, research, social/welfare services and consumers.
- The health sector was the most prominent sector overall, accounting for 28.5% of actors.
- Stakeholders working in child safety should consider the breadth of these identified sectors when designing, planning and implementing child safety interventions.

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Conflicts of interest: None declared.

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Associations of unhappiness with sociodemographic factors and unhealthy behaviours in Chinese adolescents

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Background: Evidence on the effects of lack of physical exercise, alcohol drinking and smoking on happiness is limited and inconsistent. We examined the associations of unhappiness with sociodemographic factors and these unhealthy behaviours in Chinese adolescents. **Methods:** In a school-based survey in 2012–13 in Hong Kong, 45 857 secondary school students (mean age 14.8 years, 54.0% boys) reported their happiness level (not happy at all/not very happy/happy/very happy), frequency of physical exercise, alcohol drinking status, smoking status and sociodemographic factors. A main and a sensitivity analysis examined the associations of unhappiness with the study factors, treating unhappiness as a binary (combining 'not happy at all' and 'not very happy') and a four-level ordered variable, respectively. **Results:** The main and the sensitivity analysis both showed that unhappiness was associated with older age, very poor families, non-intact families, more co-residing smokers, lack of physical exercise and alcohol drinking; current smokers were unhappier than never and ex-smokers; unhappiness also increased significantly with the number of unhealthy behaviours (*P* for trend < 0.001). **Conclusions:** In Chinese adolescents, unhappiness levels were higher in those who had a very poor family, a non-intact family and more co-residing smokers, and in those who were physically inactive, drank alcohol and smoked.

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Introduction

Happiness is a global measure of subjective well-being and regarded as a fundamental human goal.¹ Although wealth,

social support and life events (e.g., marriage) are known to affect happiness,² the role of health-related behaviours is unclear. Lack of physical exercise, heavy alcohol drinking or alcohol dependence and smoking have been prospectively associated with mental