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REVIEW ARTICLE

A practical tool to assess the cross cutting nature of child injury prevention as a basis for policy making at the local level

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Abstract

Aim: Risk factors for child injury are multi-faceted. Social, environmental and economic factors place responsibility for prevention upon many stakeholders across traditional domains such as health, justice, environment and education. Multi-sectoral collaboration for injury prevention is thus essential. In addition, co-benefits for other sectors exist. However, multi-sectoral collaboration is often difficult to establish and maintain. We present a model for practitioners and policy makers at the local level to explore and address the multi-sectoral nature of child injury.
Methods: We combined elements of the Haddon Matrix and the Lens and Telescope model, to develop a new tool for use by practitioners and policy makers at the local level.
Results: This tool offers the opportunity for practitioners and policy makers, at the local level, from diverse sectors, to work together to identify their role in child injury prevention. Based on ecological injury prevention and life-course epidemiology it encourages multi-disciplinary team building from the outset. The process has three phases first, visualise the multi-sectoral responsibilities for child injury prevention in the local area; second, demonstrate the need for multi-sectoral collaboration and help plan prevention activities together; and third, visualise potential co-benefits to other sectors and age groups arising from child injury prevention initiatives.
Conclusion: The tool encourages inter-sectoral collaboration for child injury prevention at the local level. This tool is considered to be a useful addition for child injury prevention at the local level. However testing the practicality of the tool in a real-world setting would improve it further.

Keywords: co-benefits, inter-sectoral collaboration, prevention and control, wounds and injuries.

Introduction

It is far from trivial to reiterate how devastating child injury is to the individual, family and society. Among the measurable costs, are loss of life, long and short-term disability, psychological consequences, and financial costs (1). In addition, child injury remains the leading cause of death and a major cause of disability for children aged 5–19 in the European Region (2). Despite this varied and heavy burden, funding for prevention is comparatively low (3), and capacity and leadership resources, in terms of adequate numbers of personnel and availability of the relevant skills set, are limited (4).

The determinants of child injury are multiple, broad, and not limited to the health sector (2,5). Thus, in order to efficiently direct and fund child injury prevention, one must account for the cross-cutting, multi-sectorial determinants that result from a complex interplay between human factors and those in the physical and socio-cultural environments.

Since the multiple determinants of child injury cannot be addressed by the health sector alone, a whole-of-government approach is required—vertically, from international politics to local decision makers, and horizontally, across policy fields such as health, transport, housing, justice and education. Preventive action must also work across society, employing a whole-of-society approach engaging actors and stakeholders within government, civil society, research institutes and the private sector (2,6).

Though inter-sectorial co-operation is essential, it is notoriously challenging (7,8). It is often difficult to engage relevant stakeholders and maintain their co-operation throughout the process from policy making through to implementation and evaluation. Additionally, the complexity of government systems, where roles and responsibilities are divided into traditional silos (e.g., health, transport, education), and where responsibility and power are split between national, regional and local levels, can further hinder cooperation (9). Thus, due to its complexity, child injury is one of the so-called 'wicked' problems of public health (7). However, its cross-cutting nature offers broad scope for multi-sectoral co-benefits (10).

In this paper we focus on the role of regional or local level decision makers and propose a model to facilitate the decision making process for the cross cutting issue of child injury prevention.

Existing models for injury prevention

Several models to guide injury prevention have been proposed, including those addressing the multiple determinants of injury (11,12) intervention planning (13,14) and inter-sectoral collaboration (15). These models provide useful theoretical frameworks to address injuries and their prevention. However, they do not address the specific nature of child injury and in some cases may be challenging for use at the local level.

Child injury prevention requires specific, directed attention. Children participate in environments largely designed for adults where their physical and cognitive characteristics make them more vulnerable to injury. Physical and cognitive developmental stages precipitate different periods of injury susceptibility. Age is therefore an important factor in child injury prevention and models used must have the flexibility to address this heterogeneous group. Children are also highly dependent upon the care and protection of adults, so factors affecting an adult's capacity to supervise children can directly affect them. (16,17) General injury prevention initiatives, designed for adults, do not always protect children to the same extent (18,19).

In terms of governance for child injury prevention, a lack of leadership and capacity at the national level such as dedicated government departments or ministries or a lack of a specific focal point within key departments for child safety has been identified (20). It is likely that if

this is the situation at the national level that there is an even greater lack of capacity at the regional or local level where much decision making for health lies (21).

To our knowledge, no existing model or tool adequately addresses child injury, while simultaneously providing a practical, multi-sectoral tool for practitioners and policy makers at the local level. In order to adequately assess the specificities of child injury and its cross-cutting nature, as well as incorporate the potential co-benefits into prevention planning, practitioners and policy makers should be able to:

- Examine the issue and visualise the multi-sectoral responsibilities for child injury prevention in the local area
- Demonstrate the need for inter-sectoral collaboration and collective planning of prevention activities
- Identify the scope for co-benefits for other sectors, age groups or health issues arising from child injury prevention initiatives

In this paper we propose a model based upon aspects of the Haddon Matrix (22) and the Lens and Telescope model (23) providing a practical tool and process to meet these requirements for the local level.

The local level child injury prevention assessment tool

The traditional Haddon matrix depicts a time element in the first dimension (vertical axis), dividing factors associated with what Haddon termed the pre-event, event and post-event phases of an injury event. In the second dimension (horizontal axis), of the simplest form of the matrix, are the three vertices of the epidemiological triangle the host (human), the agent (vehicle/vector) and the environment, with environment often divided into social and physical. The Haddon matrix fits well into the traditional public health approach of primary, secondary and tertiary prevention and has been used to explore a variety of aspects of the public health process for injury prevention including assessing risk factors (5,24), identifying preventive strategies and assisting the decision making process (13) and for public health readiness and planning (25,26).

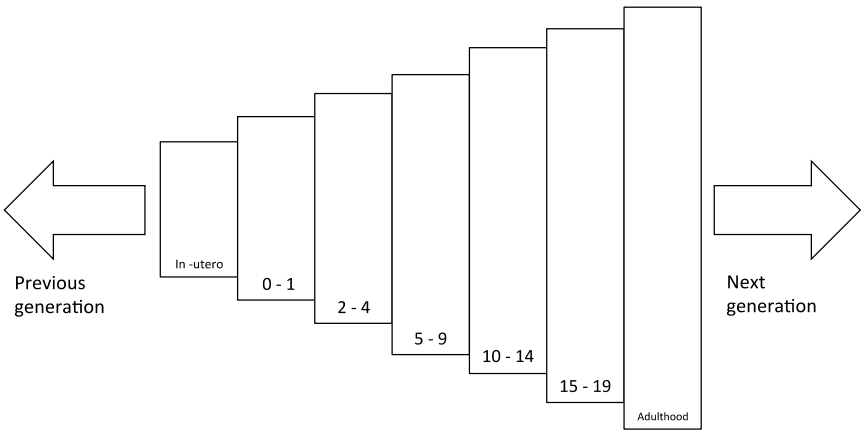
The traditional, nine cell, Haddon Matrix maybe less suitable for child injury prevention due to the separation between environment, host and agent. Children's dependence upon adult supervision to secure their environment and their lack of control over the environment is difficult to capture in this version of the Haddon Matrix. Therefore, when developing our tool, we sub-divided the columns, host and agent into factors for human, social and physical environment. This allows the table to capture more detail that maybe particularly relevant for preventing child injury such as factors affecting parental supervision.

The temporal element of injury prevention is well represented in the Haddon Matrix, however circumstances preceding the injury are limited to the pre-event phase. This makes it difficult to differentiate between long standing risk factors such as socio-economic status, and short-term factors such as bad lighting. A further reality of child injury is that the determinants of injury change with age. The inclusion of the life course approach developed in the Lens and Telescope model (23) is intended to provide a visual cue regarding the needs of the different age groups, encouraging one to think of enduring injury determinants such as socio-economic status and parental factors.

The life course aspect of our tool is divided into five specific age groups relevant to child injury, 0-1, 2-4, 5-9, 10-14, and 15-19; with general phases for the foetal phase, adulthood, previous and the next generation. The slices representing age get smaller towards the foetal stage, to illustrate a focus on the roots of the problem, and larger towards older age groups to illustrate the breadth of influence preventive measures could have.

The resulting tool (figure one) can be used to examine a specific injury event (e.g., a specific car - pedestrian collision) or a group of injuries (e.g. child pedestrian injuries). Further, in order to include and examine all relevant factors, the matrix (or matrices, if a separate matrix is needed) should be completed with factors relevant to each affected person in the injury event. For example, in the case of a car – pedestrian collision, a matrix should be completed accommodating the perspectives of the injured child, the driver, passengers in the car and any other relevant people.

Figure 1. Local level child injury prevention assessment tool



Age group	Host			Agent		
	Human	Social environment	Physical environment	Human	Social environment	Physical environment
Pre-event						
Event						
Post-event						

Using the local level child injury prevention assessment tool

This tool is intended for use by practitioners and policy makers at the local or regional level. It can be used in three ways: first, to examine and visualise the multi-sectoral responsibilities for child injury prevention in the local area; second, to demonstrate the need for inter-sectoral collaboration and collective planning of prevention activities and third to identify the scope for co-benefits for other sectors, age groups or health issues arising from child injury prevention initiatives.

Phase one – examining the issue and visualising multi-sectoral responsibilities

The tool is designed for use in a collaborative setting from the beginning. Relevant partners and stakeholders from multiple sectors should contribute throughout the process to map each of the factors that contributed (or could have contributed) to the injury event for each person involved in the injury. In line with concepts of life-course epidemiology, the factors should not be confined to the moment the injury occurred but should also include pre-existing factors. The process of eliciting each of these factors aims first, to draw all of the stakeholders together to come to a common understanding of the problem and potential

solutions (7) and second, to identify the many sectors implicated within child injury prevention.

Phase two - Demonstrating the need for multi-sectoral cooperation

Factors identified in the injury analysis should be examined including the identification of sectors implicated in prevention. Users can then propose evidence based interventions and policies that address these factors and identify the appropriate sectors that would need to be involved.

The life course approach serves as a prompt to ensure age is being taken into consideration as interventions are considered. Potential interventions could be inserted into an empty matrix in the same way as the factors were placed in phase one.

Phase three – Visualising the scope for co-benefits

The third use is to help identify potential co-benefits of child injury prevention strategies for other age-groups and issues within and outside the health domain. Co-benefits can be achieved as a result of child injury prevention measures in three ways. First are the physical, economic and societal benefits for the child, family and community as a result of a reduction in intentional and unintentional injury (1,3) Second are co-benefits arising as a result of injury prevention initiatives for the target population or other groups (e.g. the health benefits of swimming lessons); these are not dependent upon a reduction in injury incidence but are derived from the intervention itself. Third are co-benefits for other groups that can be achieved as a part of the process of implementation of injury prevention strategies (e.g. providing training and employment to distributers of safety equipment).

By reflecting on the age group segments of the tool, users are encouraged to consider the impact on other age-groups and identify which groups might directly and indirectly benefit from child injury prevention interventions and elaborate on these co-benefits. For example, an intervention to improve the walkability of an area surrounding a school would directly benefit age groups 5-9, 10-14 and 15-19 years, but may also benefit the elderly population of that area by providing a safer walking environment.

Discussion

Much responsibility for injury prevention lies with local practitioners and policy makers in terms of choice of intervention and process of implementation. However, for complex "wicked" problems such as child injury, the key stakeholders at the local level are often unaware of their responsibilities for public health and the potential impact of their participation (27) Local government officials have been found to lack awareness of the link between health and non-health sectors, and their experience of inter-sectoral collaboration is often limited (8). A key determinant of success for inter-sectoral collaboration, is the development of a multi-disciplinary team of multiple stakeholders (28,29) to first reach a common understanding of the problem and then, on that basis, to collaboratively design evidence based intervention that are specific and relevant to the needs of the target population (7).

A significant difference between our tool and existing tools for child injury prevention is its interactive and collaborative nature. It has been designed to provide a comprehensive approach to child injury prevention in a simple format to maximise output at the local level of governance. The tool provides a practical framework to engage diverse stakeholders from the outset. The exercise of mapping factors using a matrix that addresses the specific physical and social environments for host and agent separately helps identify the potential involvement for many sectors and the identification of roles and responsibilities as

interventions are selected. A limitation of this approach is that the tool is unable to quantify the comparative or cumulative impact of the identified risk factors in the local setting. Local knowledge of their relative importance in the target setting is therefore required to weight them appropriately, in terms of importance and prevalence, and to develop a suitable intervention. Additionally, the tool does not help researchers identify what interventions or policies are already in place or how to choose an intervention. However the third dimension of the Haddon Matrix as proposed by Runyan (13) could be used in conjunction with this model to aid intervention choice.

The opportunity offered with this tool, to identify the potential co-benefits of injury prevention initiatives, is particularly important in the context of advocacy and to secure funds for prevention activities. A lack of funding is a common barrier to adoption and implementation of public health interventions, particularly for complex or wicked problems. (8) If co-benefits of prevention activities outside the target group or health domain can be demonstrated, the chances of securing funding may be higher, particularly if the co-benefit addresses a priority area (e.g. obesity or healthy ageing). This tool provides a way of demonstrating the interconnectivity between sectors and therefore the secondary impact child injury prevention strategies may have beyond childhood or outside the injury domain. However, when identifying co-benefits this approach does not offer any economical or health benefit quantification should such a strategy be implemented.

The use of a life course approach is a central element of our tool. There are several advantages to this approach: first, it emphasises the importance of a child's age for injury susceptibility and acts as a lens through which to consider relevant factors, particularly when looking at an overall injury issue (e.g. child drowning); second, it accommodates age in the design or choice of preventive interventions; third, it allows analysis of risk factors related to parents or carers and underlying causes; and, fourth, it provides a frame to reflect upon potential co-benefits for other age groups arising from child injury prevention interventions.

Challenges in child injury prevention include possible long timeframes between intervention implementation and results, especially when addressing the more complex risk factors such as substance abuse and mental health. These are often incompatible with the short-term pressures on policy makers (30). Visualisation of co-benefits using a life-course approach could provide policy makers with solid arguments for the implementation of such interventions.

Conclusion

This tool, based on a model combining Haddon's matrix with a life course approach to injury prevention facilitates stakeholders in identifying risk factors across policy sectors. When done collectively, engaging multiple stakeholders, it could result in a better understanding of the multi-sectoral nature of child injury prevention and the potential roles and responsibilities for the stakeholders in the local area. This, in turn, could assist in the planning of tailored inter-sectoral child injury prevention activities. Further the broadened frame helps identify potential co-benefits across sectors, within and outside the injury domain, which may assist in gaining support for child injury prevention.

This tool has been designed to provide a practical and user-friendly methodology to address the inter-sectoral issue of child injury prevention at the local level. However it is yet to be tested in a real world setting and a study of its efficiency would be a useful addition to this research.

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