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REVIEW ARTICLE

A practical and applied approach to assessing 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 sectors such as health, justice, environment and education. Multi-sectoral collaboration for injury prevention is thus essential. In addition, co-benefits due to injury prevention initiatives exist. However, multi-sectoral collaboration is often difficult to establish and maintain. We present an applied approach for practitioners and policy makers at the local level to use 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 approach for practitioners and policy makers at the local level.

Results: The approach offers the opportunity for diverse sectors at the local level 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, visualising the multi-sectoral responsibilities for child injury prevention in the local area; second, demonstrating the need for multi-sectoral collaboration and helping plan prevention activities together; and third, visualising potential co-benefits to other sectors and age groups that may arise from child injury prevention initiatives.

Conclusion: The approach and process encourages inter-sectoral collaboration for child injury prevention at the local level. It is a useful addition for child injury prevention at the local level, however testing the practicality of the approach in a real-world setting, and refinement of the process 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-sectoral 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, and the private sector (2,6).

Though inter-sectoral 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 interventions to result in or contribute to 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 potential for lack of capacity at the regional or local level where much decision making for health lies (21).

To our knowledge, no existing model or approach adequately addresses child injury, while simultaneously providing a practical, multi-sectoral process for practitioners and policy makers at the local level to use to guide prevention efforts. 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 approach and process to meet these requirements for the local level.

The local level child injury prevention assessment approach

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).

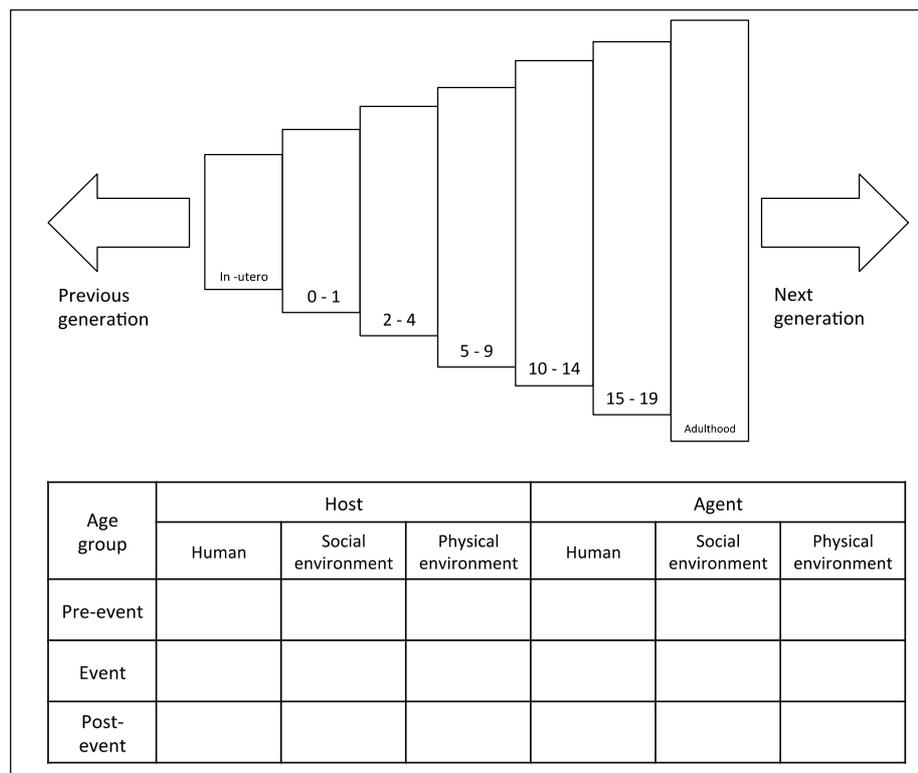
The traditional, nine cell, Haddon Matrix maybe less suited to child injury prevention due to the separation between environment, host and agent. Children's dependence upon adult supervision to secure their environment and their lack of control over the environment is difficult to capture in this version of the Haddon Matrix. Therefore, when developing our approach, 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 larger towards older age groups to illustrate the breadth of influence preventive measures could have.

The resulting approach (Figure 1) 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 to provide more space) 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 approach



Using the local level child injury prevention assessment approach and process

The approach and resulting process are intended for use by practitioners and policy makers at the local or regional level. They 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 approach and process are designed for use in a collaborative setting from the outset. Relevant partners and stakeholders from multiple sectors should contribute throughout the process to map each of the factors that contribute (or could contribute) 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

Once factors and involvement of sectors coming out of the injury analysis are identified, users can reflect on them and propose specific evidence based interventions and policies that address these factors and identify the appropriate sectors that would need to be involved. These specifics can then be used to make the case for investment and/or engage additional stakeholders. The integrated life course approach serves as a prompt to ensure age is being taken into consideration as interventions are considered. Potential interventions can then 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 phase is designed to help identify potential co-benefits of child injury prevention strategies for other age-groups and issues within and outside the health sector. 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 for the target population or other groups arising as a result of injury prevention initiatives (e.g., the health benefits of swimming lessons or environmental and health benefits of a safer walking environment in terms of a reduction in car use); 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 result of the *implementation* of injury prevention strategies (e.g., providing training and employment to distributors of safety equipment).

By reflecting on the age group segments of the approach, 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 interventions that are specific and relevant to the needs of the target population (7).

A significant difference between our approach and process and other existing models for child injury prevention is its interactive and collaborative nature. Our approach provides a practical framework to engage diverse stakeholders from the outset. It has been designed to provide a comprehensive approach to child injury prevention in a simple (and familiar) format to maximise output at the local level of governance. 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 it 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 approach does not help planners/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 to identify the potential co-benefits of injury prevention initiatives offered by this approach is particularly important in the context of advocacy and efforts 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 injury 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). Our proposed approach and process provide 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, it must be noted that when identifying co-benefits this approach does not offer any quantification of economical or health benefits associated with a given strategy.

The use of a life course model is a central element of our approach. There are several advantages to this: 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.

Additionally, some interventions in child injury prevention include longer 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 approach and three phase process to child injury prevention, based on combining Haddon's matrix with a life course model facilitates stakeholders identification of risk factors and solutions across policy sectors. When done collectively, engaging multiple stakeholders, it should result in a better understanding of the multi-sectoral nature of child injury prevention and the potential roles and responsibilities for the stakeholders at the local area. This, in turn, should 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 approach and process have 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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References

1. Lyons RA, Finch CF, McClure R, van B, Ed, Macey S. The injury List Of All Deficits (LOAD) Framework - conceptualising the full range of deficits and adverse outcomes following injury and violence. *Int J Inj Contr Saf Promot* 2010;17:145-59.
2. Sethi D, Towner E, Vincenten J. European Report on Child Injury Prevention. Geneva: World Health Organization, Regional Office for Europe; 2008.
3. Cohen L, Miller T, Sheppard MA, Gordon E, Gantz T, Atnafou R. Bridging the gap: Bringing together intentional and unintentional injury prevention efforts to improve health and well being. *J Saf Res* 2003;34:473-83.
4. Mackay JM, Vincenten JA. Leadership, infrastructure and capacity to support child injury prevention: can these concepts help explain differences in injury mortality rankings between 18 countries in Europe? *Eur J Public Health* 2010;22:66-71.
5. Peden MM, Oyebite K, Ozanne-Smith J. World report on child injury prevention. World Health Organization; 2008.
6. Kickbusch I, Gleicher D. Governance for health in the 21st century. World Health Organization, Regional Office for Europe; 2012.
7. Hanson DW, Finch CF, Allegrante JP, Sleet D. Closing the gap between injury prevention research and community safety promotion practice: revisiting the public health model. *Public Health Rep* 2012;127:147-55.
8. Hendriks A-M, Kremers SPJ, Gubbels JS, Raat H, de V, Nanne K., Jansen MWJ. Towards Health in All Policies for Childhood Obesity Prevention. *J Obes* 2013;2013:1-12.
9. Peake S, Gallagher G, Geneau R et al. Health equity through intersectoral action: an analysis of 18 country case studies. World Health Organisation (WHO)/Public Health Agency of Canada (PHAC); 2008.
10. Cohen L, Davis R, Lee V, Valdovinos E. Addressing the intersection: preventing violence and promoting healthy eating and active living. 2010.
11. Hanson D, Hanson J, Vardon P et al. The injury iceberg: an ecological approach to planning sustainable community safety interventions. *Health Promot J Austr* 2005;16:5-10.
12. Spinks A, Turner C, Nixon J, McClure RJ. The WHO Safe Communities model for the prevention of injury in whole populations. *Cochrane Database Syst Rev* 2009;3.

13. Runyan CW. Using the Haddon matrix: introducing the third dimension. *Inj Prev* 1998;4:302-7.
14. Sleet DA, Hopkins KN, Olson SJ. From Discovery to Delivery: Injury Prevention at CDC. *Health Promot Pract* 2003;4:98-102.
15. Cohen L, Swift S. The spectrum of prevention: developing a comprehensive approach to injury prevention. *Inj Prev* 1999;5:203-7.
16. Allegrante JP, Marks R, Hanson D. Ecological Models for the Prevention and Control of Unintentional Injury. In: Gielen AC, Sleet DA, DiClemente RJ, editors. *Injury and Violence Prevention: Behavioral Science Theories, Methods, and Applications*. Jossey-Bass Inc Pub; 2006. p. 105-26.
17. Towner E, Mytton J. Prevention of unintentional injuries in children. *Paediatr Child Health* 2009;19:517-21.
18. Bartlett S. Children's experience of the physical environment in poor urban settlements and the implications for policy, planning and practice. *Environ Urban* 1999;11:63-74.
19. McDonell JR. Neighborhood Characteristics, Parenting, and Children's Safety. *Soc Indic Res* 2007;83:177-99.
20. MacKay M, Vincenten J. *The Child Safety Report Card 2012*. Birmingham: European Child Safety Alliance, Eurosafe; 2012.
21. Ochoa A, Imbert F, Ledesert B, Pitard A, Grimaud O. Health indicators in the European Regions. *Eur J Public Health* 2003;13:118-9.
22. Haddon W. A logical framework for categorizing highway safety phenomena and activity. *J Trauma* 1972;12:193-207.
23. Hosking J, Ameratunga S, Morton S, Blank D. A life course approach to injury prevention: a "lens and telescope" conceptual model. *BMC Public Health* 2011;11:695.
24. Albertsson P, Björnstig U, Falkmer T. The Haddon matrix, a tool for investigating severe bus and coach crashes. *Int J Disaster Med* 2003;2:109-19.
25. Barnett DJ, Balicer RD, Blodgett D, Fewes AL, Parker CL, Links JM. The application of the Haddon matrix to public health readiness and response planning. *Environ Health Perspect* 2005;113:561-6.
26. Brand H, Schroder P, Davies JK et al. Reference frameworks for the health management of measles, breast cancer and diabetes (type II). *Cent Eur J Public Health* 2006;14:39-45.
27. Hendriks AM, Jansen MWJ, Gubbels JS, Vries NKD. Proposing a conceptual framework for integrated local public health policy, applied to childhood obesity-the behavior change ball. *Implement Sci* 2013;8.
28. Axelsson R, Axelsson SB. Integration and collaboration in public health—a conceptual framework. *Int J Health Plann Mgmt* 2006;21:75-88.
29. Warner M, Gould N. Integrating Health in All Policies at the local level: using network governance to create 'Virtual Reorganization by Design'. In: Kickbusch I, editor. *Policy Innovation for Health*. Springer; 2009. p. 125-63.
30. Exworthy M. Policy to tackle the social determinants of health: using conceptual models to understand the policy process. *Health Policy Plann* 2008;23:318-27.