Intentional and unintentional injuries

The text is divided under the following headings:
- Suicide
- Intimate partner violence
- Road traffic accident
- Burn injuries
- Drowning

Suicide

Description of the research

Suicide is a major public health problem worldwide and suicide research activities are therefore imperative. In Sweden, suicide research can be categorized into eight somewhat overlapping research areas: 1, epidemiology and register studies; 2, neurobiology and genetics; 3, suicide risk assessment, 4, treatment and care; 5, public health interventions; 6, suicide bereavement and euthanasia; 7, suicide in low- and middle-income countries (LAMIC); as well as the 8, suicidal experience and process in general. The description below is a short report of the Swedish suicide research produced from the early 1990’s, published in international scientific journals. The scope of this review was limited to studies with an exclusive focus on the topic of suicidality. Papers related to, for instance, the determinants of depression, schizophrenia, or other mental health problems without an explicit intent to investigate suicidality were not included. Over of 540 papers were reviewed (see appendix) of which approximately 130 are cited in this document as examples of Swedish suicide research.

Epidemiology and register studies

A large number of studies from Sweden have focused on identifying factors associated with suicide. The aim of this type of research is to identify factors that can be addressed to reduce suicidality and to improve suicide risk assessment. For example, research targeting different aspects of alcohol consumption such as the early studies by the research group of Wasserman et al. (e.g., Wasserman, Värick, & Eklund, 1994, 1998; Wasserman & Värick, 1998) and Berglund et al. (e.g., Berglund & Ojehagen, 1998; Berglund, 1984) have increased the knowledge about the association between harmful use of alcohol and the risk of suicide. These studies have had significant international impact. Similarly, a large number of studies have focused on the association of mental disorders to suicidality. These include research by the groups of Runeson et al. (e.g., Tidemalm, Långström, Lichtenstein, & Runeson, 2008), Wasserman et al. (e.g., Baláz et al., 2013; Bertolote, Fleischmann, De Leon, & Wasserman, 2003; 2004), Nordström et al. (e.g., Carlberg, Jokinen, Nordström, Jönsson, & Nordström, 2010; Carlberg, Winnerbäck, Jönsson, Jokinen, & Nordström, 2010) and Berglund et al (e.g., Bradvik & Berglund, 2010, 2011). In addition, research in Sweden has also been focused on understanding and identifying other individual risk factors that relate to suicidal behaviours. These include exposure to adversity (e.g., Söderberg, Kullgren, & Salander Renberg, 2004), personality traits (e.g., Allebeck, Allgulander, & Fisher, 1988; Hirvikoski & Jokinen, 2012), intelligence (e.g., Gunnell, Magnusson, & Rasmussen, 2005), and physical illness and features (e.g., Allebeck, Bolund, & Ringbäck, 1989; Jiang, Rasmussen, & Wasserman, 1999; Magnusson, Rasmussen, Lawlor, Tynelius, & Gunnell, 2006; Sundström et al., 2010), as well as research family, relationship, life-styles and other societal factors (e.g., Carli, Mandelli et al., 2014; Ferrada-Noli & Asberg, 1997; Durkee et al., 2012; Johansson, Sundquist, Johansson, Qvist, & Bergman, 1997; Kuramoto & Runeson, 2013; Magne-Ingvar, Ojehagen, & Träskman-Bendz, 1992; Mittendorfer-Rutz, Rasmussen, & Wasserman, 2004; Moniruzzaman & Andersson, 2004; Sarchiapone et al., 2014; Schmidtke et al., 1996). A number of studies in Sweden have also focused on understanding the prevalence, trends and patterns of suicide in Sweden, Europe and the world through epidemiological studies (e.g., Chotai & Salander Renberg, 2002; Cullberg, Wasserman, & Stefansson, 1988; Runeson, Tidemalm,
Dahlin, Lichtenstein, & Långström, 2010; Schmidtke et al., 1996; Schmidtke et al., 1999; Värnik & Wasserman, 1992; Värnik, Kölves, & Wasserman, 2005; Wasserman & Värnik, 1998a).

Although some risk factors for suicide are non-modifiable, such as gender, these can be useful in identifying risk groups. Selective suicide-prevention interventions can then target other modifiable risk factors, such as mental disorders, that may be present among a risk group. Research in Sweden concerning high risk groups has mainly focused on understanding suicidal behaviours among young people (e.g., Brunner et al., 2014; Carli, Hoven et al., 2014; Hawton et al., 1998; Hultén et al., 2001; Kosidou et al., 2013; Runeson & Beskow, 1991; Runeson, 1990; Mittendorfer-Rutz & Wasserman, 2004; Wasserman, Cheng, & Jiang, 2005) the elderly (e.g., De Leo et al., 2001; Fässberg et al., 2012; Rubenowitz, Waern, Wilhelmson, & Allebeck, 2001; Waern, Rubenowitz, & Wilhelmson, 2003; Waern, Rubenowitz, et al., 2002; Waern, Runeson, et al., 2002) and among immigrants and adoptees (e.g., Bursztein Lipsicas et al., 2012; Ferrada-Noli, Asberg, Ormstad, & Nordström, 1995; Hjern & Allebeck, 2002; Hjern, Lindblad, & Vinnerljung, 2002; Värnik, Kolves, & Wasserman, 2005) as well as the unemployed (Garcy & Vägerö, 2012; 2013; Lundin, Lundberg, Allebeck, & Hemmingsson, 2012).

Neurobiology and genetics

The risk of suicide can also be influenced by individual vulnerability or resiliency related to genetic and biological factors. For example, the role of genetics in suicidal behaviours has been investigated extensively by the research group of Wasserman et al. (e.g., Ben-Efraim, Wasserman, & Sokolowski, 2013; Geijer et al., 2000; Sokolowski, Ben-Efraim, Wasserman, & Wasserman, 2013; Sokolowski, Wasserman, & Wasserman, 2010; Wasserman, Terenius, Wasserman, & Sokolowski, 2010), with particular focus on gene-environment interactions regarding serotonergic as well as HPA-axis related genes. The group of Åsberg and Träskman-Bendz et al. has investigated genetic and also neurobiological markers of suicidal behaviour such as specific serotonergic, dopaminergic and HPA activity (e.g., Engström, Alling, Blennow, Regnéll, & Träskman-Bendz, 1999; Jones et al., 1990; Nässberger & Träskman-Bendz, 1993; Träskman, Asberg, Bertilsson, & Sjöstrand, 1981; Träskman et al., 1980), as has the research group of Nordström (e.g., Jokinen, Nordström, & Nordström, 2009; Jokinen & Nordström, 2009; Nordström & Asberg, 1992) but also others (e.g., Asberg, 1997; Lidberg, Åsberg, & Sundqvist-Stensman, 1984; Lidberg, Tuck, Åsberg, Scalia-Tomba, & Bertilsson, 1985). Suicidality has also been investigated in relation to the biology of mental disorders (Ekström, Lavebratt, & Schalling, 2012; Johansson et al., 2001) as well as inflammatory factors (Hallberg et al., 2010; Janelidze, Mattei, Westrin, Träskman-Bendz, & Brundin, 2011).

Suicide risk assessment

Suicide assessment for identifying individuals at suicide-risk through screening tools has also been studied extensively in Sweden. Focus has been on the development of new psychometric tools, as well as validating existing ones (Jokinen et al., 2010; Stefansson, Nordström, & Jokinen, 2012; Waern, Sjöström, Marlow, & Hetta, 2010). Psychological tests have also been developed for screening, such as those measuring participants reactions to subliminal exposures of clinically specific stimuli (Titelman, Nilsson, Estari, & Wasserman, 2004; Titelman, Nilsson, Ström, Karlsson, & Bruchfeld, 2011) as well as biochemical/biological tests looking at dexamethasone suppression or skin conductance (Jokinen et al 2008; Thorell et al 2013).

Treatment and care

The research in Sweden regarding the treatment of suicidality has mainly been focused on psychopharmacological treatment with antidepressants (e.g., Brädvik & Berglund, 2011a; Isaacs, Holmgren, Wasserman, & Bergman, 1994, 1995; Göran Isaacs, Rich, Jureidini, & Raven, 2010). Other studies researched the management, follow-up and care of suicidal people in both Sweden and Europe (e.g., Bursztein Lipsicas et al., 2014; Hultén et al., 2000; Runeson & Wasserman, 1994; Talseth, Lindseth, Jacobsson, & Norberg, 1999).

Public health interventions

A number of large-scale international randomised controlled trials (RCT) of awareness and coping skills increasing programmes among young people have been coordinated by the Swedish research group of Wasserman in collaboration with several EU countries but not in Sweden. These have investigated the effectiveness of suicide prevention programmes aimed at the specific subgroups of the general public, such as
adolescents (e.g., Balázs et al., 2013; Brunner et al., 2014; Carli, Hoven et al., 2014; Carli et al., 2013; Hoven, Wasserman, Wasserman, & Mandell, 2009; Kaess et al., 2013; Sarchiapone et al., 2014; C. Wasserman et al., 2012; D. Wasserman et al., 2010). In addition, early work by Rutz has investigated the effectiveness of programmes for training health workers (e.g., GPs) for suicide prevention (e.g., Rutz, von Knorring, & Wålinder, 1989; Rutz, Knorring, Pihlgren, Rihmer, & Wålinder, 1995) with influence to other European countries. Other research in Sweden regarding public health has been focused on understanding attitudes towards suicidal people across different groups (e.g., Renberg & Jacobsson, 2003; Samuelsson, Asberg, & Gustavsson, 1997), investigating the effects of alcohol-related policies for suicide prevention (e.g., Wasserman & Värnik, 1998b; Wasserman, Värnik, Kolves, & Toodling, 2007) and restricting access to common means of suicide (e.g., Beskow, Thorson, & Öström, 1994).

Suicide bereavement and euthanasia
Studies in Sweden have also focused on understanding the impact on friends and family of suicide attempters and completers (e.g., Magne-Ingvart & Öjehagen, 1999; Omerov, Steineck, Nyberg, Runeson, & Nyberg, 2013; Runeson & Beskow, 1991b; C. Wasserman et al., 2012) and euthanasia, (e.g., Wasserman, 1989).

The suicidal experience and process
Studies on the suicidal experience and process are important for increasing the knowledge about suicidality and the improvement of treatment, care and prevention of suicide. Although research focusing on the patients’ experience and the process of suicidality is generally limited, a number of Swedish studies have focused on understanding suicidality and provided insight into these issues (e.g., Hjelmeland et al., 2002; Omma, Sandlund, & Jacobsson, 2013; Runeson, Beskow, & Waern, 1996; Wasserman 1990a; 1990b).

LAMIC research
A number of studies in Sweden have carried out research regarding suicide in low- and middle-income countries. These include for example research regarding the prevalence, risk and protective factors, interventions, understanding the suicidal process and expression, and attitudes toward suicide in LAMIC countries (e.g., Ahmadi, 2007; Bertolote et al., 2005, 2010; Burrows & Laflamme, 2008; Fleischmann, 2008; Fleischmann et al., 2005; Mofidi, Ghazinour, Salander-Renberg, & Richter, 2008; Ovuga, Boardman, & Wasserman, 2005; Rodríguez, Caldera, Kullgren, & Renberg, 2006; Sundbom, Jacobsson, Kullgren, & Penayo, 1998; Thanh et al., 2005).

Impact, Strengths and weaknesses
Swedish suicide research using epidemiological, cohort and other designs, aimed at identifying correlates to suicidality has a significant impact on the general understanding of risk and protective factors in suicide. The research carried out using the numerous high quality registries in Sweden and findings have great synergistic potential with other international research. However it’s important to note that risk-and protective factors identified in high income countries might not be applicable or even valid predictors of suicide in LAMIC countries (due to contextual differences). Intercultural and international application of the epidemiologic findings can in this way be challenging.

Most epidemiologic, genetic neurobiological research programmes are aimed at identifying correlates to suicidal behaviour. Although this type of information is useful in screening programs, it is difficult to assess what actual role these correlates play in the causal process that precedes a suicide. Specific studies aimed at disentangling the relationship between correlates, causes and effects make up a small proportion of the research in suicide in Sweden and elsewhere.

Swedish research programmes aimed at the rigorous evaluation of suicide prevention activities on universal, selected or indicated populations appear to be high in quality even compared to other international research, but unfortunately low in quantity (perhaps reflecting a lack of research funding).

The National Centre for Suicide Research and Prevention of Mental Ill- Health (NASP), at the Karolinska Institute in Sweden, is unique in being the only in Europe WHO Collaborating Centre for Research, Methods
Development and Training in Suicide Prevention, active as an advisor both to the European Regional Office in Copenhagen, as well as the main WHO Office in Geneva, which is responsible for global activities.

NASP, the WHO Collaborating Centre at the Karolinska Institute, has a widely developed research and policy networks on all continents, which resulted in the prestigious publication of The Oxford Textbook of Suicidology and Suicide Prevention: A Global Perspective (2009 Oxford University Press) with 193 contributors from all continents.

Recommendations

The Swedish parliament and the Swedish government (Regeringsprop 2007/08:110) approved nine suicide preventive strategies in Sweden. For this reason there is a great need to strengthen implementation of those nine strategies through a systematic research, in collaboration with the global and National networks of suicide researchers, which NASP as the National Centre of Excellence and the WHO Collaborating Centre for Research, Methods Development and Training in Suicide Prevention, has developed since 1993 (www.nasp.se).

There is an excellent opportunity for maintaining and developing the research capacity in Sweden, focussing on Public Health Universal Suicide Preventive Interventions, utilising NASP’s capacity developed through the leadership of several European funded studies: SEYLE – Saving and Empowering Young Lives in Europe, WE-STAY - Working in Europe to Stop Truancy Among Youth and SUPREME, - Suicide Prevention through Internet and Media Based Mental Health Promotion, and as a contributor to the WHO Office in Geneva’s first ever World Suicide Report (2014): “Preventing suicide: a global imperative.”

Suicide research conducted in Sweden is of high quality and has a significant International impact. Research leaders have created a strong group of next generation researchers who provide a ground for the continuity and sustainability of future suicide research in Sweden. Current and new research collaborations within suicide prevention, between academic partners in Sweden and on other continents should be supported. A programme for Post-Doc academics from low and middle countries (LAMIC) as well as programmes to support Swedish Senior Researchers to develop research programmes on the five continents, should be developed and sustained.

Support of the following research is highly recommended:

- Intervention studies of universal suicide preventive methods in schools, workplaces and at the community level.
- Qualitative studies on how to improve the implementation of and the adherence to policies and guidelines on suicide prevention in public health and health care sectors.
- Studies regarding the effects of taboo and stigmatization surrounding suicide, in public health and health care sectors.
- Studies focused on anthropological and social aspects of suicidality and suicide prevention in the general population, minorities and in cross-cultural settings.
- Clinical treatment studies of well-defined (phenotype and genotype) psychiatric patient groups.
- Translation of existing evidence-based results in suicide preventive studies to new e-health technologies.
- Longitudinal studies on suicide risk and protective factors, as well as on treatment and preventive effects utilizing the information from high quality registers in Sweden.
- Continued development of research on neurobiological and genetic factors in suicidal behaviour.
- Continued development of research and new theories combining biological, psychiatric/psychological and social factors.
References


Intimate Partner Violence

Key words

Gender-based violence, violence against women, intimate partner violence, physical violence, sexual violence/coercion, psychological violence, controlling behavior, gender norms, intervention, prevention, collaborative research

Description of research in the field

Intimate partner violence (IPV) is a major global health problem and a human rights concern (Ellsberg et al., 2008; Garcia-Moreno et al., 2006; Krantz, 2002). IPV is embedded in the imbalance of power between men and women, and thus one form of gender-based violence. IPV is primarily perpetrated against women, and mortality is the most extreme outcome (Campbell et al., 2007). IPV exceeds the prevalence of all other forms of physical and sexual abuse in women’s lives, it has been on the research agenda for some time, and it shares many determinants with other forms of gender-based violence in terms of norms and institutional responses. It is an important entry point for interventions aiming to influence future generations attitudes and behaviors (Heise, 2011). Reducing IPV and violence against women in general is high on the political agenda worldwide, being included in the Millennium Development Goals and also in the policy for gender equality for the Swedish Sida 2010-2015 (Government Offices of Sweden, 2010). The Swedish policy puts strong emphasis on increasing women's agency and underlines the need to focus specifically on sexual and reproductive health and rights and tackle all forms of gender-based violence.

Swedish Universities have been involved in research on intimate partner violence in low-income countries since the mid 90’s. The research was initially mainly supported by the Sida/SAREC bilateral agreements. Within the Nicaraguan collaboration (Umeå University) Ellsberg and colleagues provided alarming prevalence figures of IPV against women as well as an understanding of the underlying contextual factors. The research group continued with studies of the health consequences of IPV for infant and child mortality as well as studies focusing on the methodological and ethical issues involved in research on violence. Experience from the Nicaraguan studies became crucial in the development of the WHO multi-country study on women’s life experiences, since members of the research team became part of its steering- and organizing committees. The multi-country study was a turning point for research on IPV internationally, being performed in 11 countries and the first study to use a standardized methodology allowing for comparisons between different settings (WHO, 2005). Swedish researchers (Umeå University) could together with their Ethiopian counterpart, utilize their long-term collaboration on reproductive health, to become part of the WHO study, which resulted in further studies on the association between IPV, maternal depression and child mortality. In Indonesia the STINT support for developing a demographic surveillance site became an entry point for studies on risk factors of IPV and for qualitative studies on coping with IPV as well as on norms regulating violent behaviour. Within the bilateral collaboration with Vietnam (Gothenburg University, KI, and Lund University) several studies on IPV have been performed with a focus on risk factors and health effects. In Sri Lanka the Sida support for capacity strengthening (Uppsala University) implied addressing risk factors and help seeking for IPV. In Bangladesh collaboration between Swedish researchers (Uppsala University) and ICDDR-B (International Centre for diarrheal disease research -Bangladesh) resulted in studies of IPV in relation to child malnutrition and infant morbidity. Researchers from KI and Lund University have also been involved in research in Bangladesh focusing on magnitude and risk factors as well as the association between IPV and water development. In Pakistan Swedish researchers (Gothenburg University, KI, and Umeå University) have collaborated around studies on gender norms and mental health effects of IPV and the relation to empowerment and contraception use. In Tanzania the bilateral collaboration within reproductive health (Uppsala and Umeå University) includes several studies on the role of health care in IPV response, child sexual abuse and rape. Researchers at KI have been active in utilizing the free access to data from DHS (Demographic health surveys) to make comparisons of exposure to, and risk factors and outcomes of IPV in sub-Saharan Africa. They have focused specifically on IPV in relation to attitudes, disclosure, pregnancy outcomes, and screening in Nigeria and on the connection to social inequalities in Kenya. KI researchers have also been involved in studies on IPV...
in Mozambique, Zambia, Uganda and South Africa looking at mental health, gendered sexuality norms and HIV. The collaboration with Nicaragua (Umeå University) has, in the field of violence, been extended to Ecuador focusing on the role of IPV in relation to unintended pregnancies, the health care response, changes in norms and attitudes against violence as well as new forms of masculinities that can reduce IPV. Lund University has in collaboration with Uganda on sexual and reproductive health and rights focused on sexual coercion and mental health in studies among university youth. There are also on-going studies in Rwanda (Gothenburg and Umeå University) and Cambodia (Lund University) focusing on gender-based violence and mental health in previous conflict areas, where the results have not yet been published. So far at least 20 doctoral theses have been defended at Swedish Universities where the focus has been on gender-based violence in low- and middle-income countries. In 2006 Swedish researchers (Linköping, Uppsala, and Umeå Universities) took an initiative to form a network for research collaboration around violence against women, the VAW network. The network, successively inviting researchers from other universities, brought together researchers from the north as well as their counterparts in the south to share research findings and to discuss methodological challenges. The last conference, held in 2013, focused specifically on linking research and practice, and initiated fruitful discussions on the need for contextualized interventions.

Strengths and weaknesses
The long-term bilateral collaborations between strong public health institutions have had great bearing on the research capacity in low- and middle-income countries. But the collaborations have also meant capacity strengthening for the involved Swedish institutions that often also are engaged in studies on IPV and other forms of gender-based violence in their own setting. Over the years we have seen an increase in networking and collaboration between researchers in Sweden (north-north) as well as between researchers in low-income countries (south-south) in this field. The Swedish involvement in the WHO multi-country study paved the way for methodological development and comparative studies. The strong Swedish policies on gender equality have directed research questions towards the role of gender-related attitudes and norms in regulating violent behaviors, on structural, community, and individual levels. The Swedish involvement in disseminating results, collaborating with local health authorities, and non-governmental organizations, has put pressure on policy change and has been important for raising awareness outside the scientific community, both nationally and internationally. The conferences and workshops organized by the VAW network assisted in increasing the visibility and urgency of the global health challenge that violence against women implies.

The overall decrease in funding for global health research is, however, challenging. Not only does it hinder reaching the Swedish development goals, but more importantly it hampers the possibility to continue established collaborations that have the potential to make a difference in developing the overall research area further. In addition, there is a fear, within the global health research community, that violence and gender equality will not be prioritized, and that the gender competence within several of the research council’s working groups is limited.

Trends, tendencies and prognosis for the future
While the interest in research on IPV and other forms of gender-based violence has been abundant within the bilateral collaborations, the support for the research field from Swedish research funders has been scarce. Between the years 2004-2013, 24 research applications, focusing on violence against women in a global perspective, were sent to Sida/VR. Apart from the VAW network (given support twice) only two applications, one for comparative IPV research between Nicaragua and Bangladesh, and one on violence and mental health in Cambodia were approved. Even if important research on IPV and gender-based violence has been catered for within the bilateral collaborations this shows that the support for research on gender-based violence, as an overall global health threat, is limited. Making less distinction between global health research and health research’ would imply more equal access to research funding on urgent global health problems, relevant both in high-income, and low and middle-income countries.

Today, much is known about the magnitude, risk factors and health consequences of men's violence against women (Abramsky et al., 2011; Campbell, 2002; Jewkes, 2002). There is however, more to be learned about
the knowledge base and competence of the health care systems to care for patients who have been exposed to violence. We need to develop contextualized studies about how masculinity norms can be influenced to create increased gender equality in low- and middle-income countries, and how feminist activism can be part of such change on a societal and community level. Thus, interdisciplinary studies involving, to a greater extent, researchers from social science research, are required. On the individual level there is a demand for cohort studies on the process of ending partner violence, as well as on the long-term consequences for children exposed to violence within the family. There is also a need for an increased understanding of violence as part of conflict solving within relationships, among both men and women in different settings. A recent review of non-partner sexual violence indicates the seriousness also of other forms of gender-based violence (Abrahams et al., 2014). We also need to acknowledge that there is limited knowledge, both nationally and globally about the gender asymmetry in violence perpetration, about the risk factors and mechanisms involved in women's violence against men, and violence within same-sex partnerships.

In the coming 5-10 years it is crucial to focus more on intervention research to assess the possibilities for prevention. Heise (2011), in her review of "What works to prevent partner violence", states that the current evidence base is skewed towards high-income countries and that there still is limited knowledge about how different types of interventions work in low- and middle-income settings. Thus, there is need for true collaborative studies comparing how norms and beliefs, social structures as well as individual pre-dispositions interact concerning different types of abuse, and influence intervention outcomes in different social contexts.

Recommendations

- Support long-term collaborations between committed research institutions in Sweden and low- or middle-income countries
- Make special calls for violence research that encourages participation from both health and social science disciplines
- Create twinning PhD and Post Doc opportunities for young researchers from high-, middle-, and low-income countries
- Build on existing links between Swedish research institutions and institutions in low- and middle-income countries, to encourage comparative studies evaluating different types of intervention strategies
- Fund national and global networks that aim to link research and practice in creating an evidence base for interventions

References


Road traffic injuries

Keywords
Injury prevention; Injury epidemiology; Surveillance; Road infrastructure; Road user behaviour; Sustainable environment; Urbanisation; Urban planning; Safety legislation; Social inequality; Vulnerable road users; Bicyclist; Motorcyclist; Pedestrian; Systems theory; Mobility; Trauma; Whiplash; PTSD

Description of the research
According to the World Health Organization, approximately 16,000 people die every day worldwide from all types of injuries. Injuries represent about 12% of the global burden of disease, making them the third most important cause of overall mortality. Road traffic injury (RTI) deaths account for 25% of all deaths from injury. The burden of RTIs is disproportionately borne by countries that can least afford to address the related health service, economic, and societal challenges.

Sweden has a very long tradition of RTI research and it is by far one of the countries in the world that has been most successful in identifying and implementing measures that help preventing the occurrence of both road traffic crashes (RTCs) and RTIs. Sweden benefits from research capacity in several disciplines (e.g., technology, medicine and social sciences) at a high academic level, allowing for advanced studies in a vast spectrum of risk and protective factors that include the planning and design of the road traffic environment itself, the design of motor vehicles and other safety devices, and human behaviour and needs, like driver education, the promotion of safe behaviour, and the protection of vulnerable road users (e.g., children and older people). At an early stage, Swedish road traffic safety research has endorsed the Haddon theory/model and adopted a system approach where road users, vehicle and road infrastructure are seen as interrelated risk factors. RTI prevention has also been a cross-sectorial effort.

Swedish RTI research is closely aligned to the Swedish development cooperation plan in at least four main domains. First, child safety and protection is a main focus of Swedish RTI research and development and children’s health and well-being is a central element of the goals for development cooperation. Sweden has indeed a lot to offer in intervention and implementation research dealing with the prevention of RTIs among children. Second, in the Swedish approach to RTI prevention, safety and mobility are regarded as each other’s prerequisite. Transport and environment issues are also important elements of the goals for development cooperation. Improved road infrastructure is usually seen as a way to improve poor people’s living conditions, but if the development of new roads does not consider the need of vulnerable road users, the introduction of rapid transport becomes an additional burden to the life of poor people. Third, Sweden is one of the few countries in the world with a strong research tradition in health equity studies focused on injury, and in particular RTIs. The challenges to country specific development goals posed by the unequal distribution of...
health between social groups are acknowledged in several key international documents and it is also well reflected in Swedish development cooperation. Fourth, health data quality and accuracy is put forward in the goals for development cooperation and it definitely is an essential element of road safety research, policy, and practice. Reliable data and evidence are essential when describing the burden of RTIs, assessing risk factors and establishing priorities for prevention. RTI registration has come a long way in Sweden. By linking together police and hospital data, the STRADA system (Swedish TRaffic Accident Data Acquisition) provides data that are more complete for a wider range of injury severity levels and more informative regarding the circumstances of occurrence – and consequences – of those injuries. The STRADA system is internationally seen as an example of best practice.

Sweden has research environments within several traffic safety areas, several with extensive international collaborations and researchers among the world leaders in their areas. The most important ones are listed below.

- Chalmers University (SAFER Vehicle and Traffic Safety Centre)
- Karolinska Institutet; Dept of Public Health Sciences; Rehabilitation/Spinalis; Traffic Medicine Centre)
- Linköping University (Dept of Science and Technology)
- Royal Institute of Technology (Transport research platform)
- Umeå University (Department of Applied Educational Sciences)
- VTI (the Swedish National Road and Transport Research Institute)

Besides the competences into place, there are some additional conceptual and methodological advantages of Swedish RTI research that put Sweden in a competitive position worldwide to deal with RTI prevention in a global perspective and enhance both research quality and its impact.

- It has a vision, the Vision Zero. The vision aims at a future in which no one is killed or seriously injured by traffic and roads should be designed accordingly. The vision is based on the principle that the traffic systems must be designed with the understanding that people make mistakes and that traffic crashes cannot be avoided completely.
- It acknowledges the interrelation between safety and mobility.
- It is inclusive in that it promotes the adoption of safety for all interventions rather than targeted ones.
- It gives priority to passive protection measures, when protection is “built in” the environment (e.g., traffic separation, physical measures for speed reduction) and vehicles (e.g. child restraint measures) – as opposed to imposed on individual (and children) behaviour and practice.
- It benefits from an advanced system for injury registration (STRADA).

Strengths and weaknesses

Swedish RTI research is multi-sectorial and this puts the country in a very good position to make a significant contribution when dealing with major challenges posed by this increasing public and global health problem. Swedish research can contribute with specific competences and also experiences of multidisciplinary work for each of the following challenges.

Rapid urbanization and motorization. Individual mobility often receives low priority in transport development, not least the mobility of children. There is a need for inclusive planning and design of the road traffic environment and Swedish research and development experiences can be a valuable contribution.

Social inequalities in RTIs. Better understanding of those disparities and appropriately responding to them in available evidence and prevention efforts are necessary. Social disparities in road accident arise across categories of road users but the mechanisms behind them can be different.

Safety of unprotected road users. Pedestrians and motorcyclists comprise the majority of road-traffic victims in LMICs, and consequently, the majority of the road-traffic victims globally. It is imperative not only to implement well-established measures to protect those victims but also to conceive additional ones that are contextually relevant (intervention and implementation research).

Know-do gap. Several measures have been put forward that can help preventing road traffic crashes (primary prevention) or reduce their consequences (secondary and tertiary prevention). There is a pressing need to
advance the knowledge regarding the implementation of those safety measures in new contexts and improve knowledge on how safety measures used in HICs can be implemented in LMICs.

**Incapacitating RTI morbidity.** An increasing number of people live with lasting impairments as a result of RTI, with consequences for their everyday life and challenges to their autonomy in society. The research needs in this area is diverse – from the need for tools (e.g., quality-of-life scales) to describe and compare the long-term impact of traffic injury to the need for well-adapted health care services.

**Completeness and accuracy of official road accident statistics.** Official road traffic accident statistics are incomplete and inaccurate in all countries. The level of reporting for injuries treated in hospitals is, on the average, less than 50%. Injuries are not always correctly classified by severity in police accident reports.

**Assessing costs.** Costs analyses are surprisingly few in RTI research. There is a need for guidelines regarding the estimation of the costs to society of traffic injury and also the cost-benefit of preventive interventions.

**Capacity building.** For road traffic injury research and prevention to be successful, it is important to develop local research capacity in LMIC and to establish global research collaborations.

**Trends, tendencies and prognosis for the future**

Road traffic safety is a global public and global health challenge. Sweden has several research environments with good critical mass of professionals. Several of those have high scientific credibility. International exchanges occur not only through research but also through a number of education programs and consultations in different countries and parts of the world.

**Recommendations**

*Incentives – create incentives to research and research collaborations for global health.* At present, there is no financing agency for road safety research that integrates road safety from a global or public health perspective. As a consequence, there is limited stimulation to the creation of short or long-term research collaborations with partners from LMIC’s.

*Positions – create academic positions.* Because of the above, and in face of the shift in generation that affects several research environments, a number of key academic positions could be created for specific scientific areas, aligned to the Swedish development collaboration goals (i.e. paediatric RTIs prevention; urbanization, mobility and safety; social inequality and road safety).

*Orientation – prioritize program and projects with a public health and cross-sectorial perspective to injury prevention.* The generic analytical framework used in public health is helpful in the analysis of risk factors, but also serves as a guide during the whole process, from identifying a problem to the implementation and evaluation of interventions.

**References**


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Burn Injuries and drowning

Keywords
Urbanization, social inequality, poverty, home safety, passive safety, education, implementation, child development, morbidity, mental health, family disruption, health system, mHealth, injury diagnostic and care, capacity building, disability

Description of the research
Injuries represent about 12% of the global burden of disease, making them the third most important cause of overall mortality. Burn injury deaths and drowning account for a substantially large proportion of all deaths from injury, in particular among children. As is the case for many other health outcomes and causes of injuries, the burden of burns and drowning is disproportionately borne by countries that can least afford to meet the related health service, economic, and societal challenges. There are also wide socioeconomic differences within countries, to the detriment of the poor.

Swedish research on burn and drowning injury care and prevention is closely aligned to the goals of the Swedish development cooperation plan in several ways, as is described below.

Burn injuries and drowning are a home health and safety issue. Burns and drowning are largely attributable to poor living conditions and occur very often in and around the home, during activities of the daily life. Not only are they a consequence of poverty, but they can also lead to it. Sweden has been successful in developing intervention strategies and means of prevention that promote home safety, in particular flame and scalding injuries and drowning, not least among young children.

Children and women are the most common direct and indirect victims of burn injuries and, to some extent drowning. Children and women are greatly affected by burns, both directly and indirectly. Children are at high risk of burns, in particular when they are very young (in cases of child abuse) and in their early years (as they begin to explore the world). Poor women and girls in particular have high rates of burn injuries, both as victims of domestic violence and due to incidents that occur as a result of the narrow environments in which they perform household chores, those typically falling under their responsibility. Suffering with the lifelong effects of poorly treated burn injuries in themselves or their children adds on to household responsibilities and limits opportunities for educational and economic development.

Social inequality in burn injuries and drowning. The challenges to country specific development goals posed by the unequal distribution of health between social groups are acknowledged in several key international documents and it is also well reflected in Swedish development cooperation.

Acute care is crucial and health care services are ill-prepared. In resource-poor settings where medical expertise is scarce, distance to/from healthcare services and knowledge/competence gaps pose enormous challenges to successful burns treatment. Low cost, timely and inclusive alternatives to burn injury control are, to say the least, a pressing need in many low- and middle-income settings and countries. Sweden has highly competent experts in that area.

Completeness and accuracy of official injury statistics. Official burn and drowning statistics are incomplete and inaccurate in all countries. Official burn mortality data for instance often are restricted to fire-related burns. Drowning on the other hand is underestimated due to the fact that a large number of cases never reach the
hospital and therefore are not reported in e.g. health statistics, the most common data sources for injury surveillance.

Assessing costs. Costs analyses are surprisingly few in injury research. There is a need for guidelines regarding the estimation of the costs to society of burn injury and drowning and also the cost-benefit of preventative interventions.

Strengths and weaknesses

Burn injuries

Swedish research puts the country in a very good position to make a significant scientific contribution in face of the various challenges posed by burns. As listed below, there are some universities that educate highly competent professionals and clinicians in burn injury treatment and care so as to achieve a reduction in burn mortality and morbidity through e.g., advanced healing processes like tissue engineering, pain management, or other rehabilitation processes. There are public health researchers with relevant epidemiologic expertise and experience of research in resource poor settings.

- Göteborg University Hospital
- Karolinska Institutet, Department of Public Health Sciences, Injury research group/ISAC
- Linköping University, Faculty of Health Sciences, Department of Clinical and Experimental Medicine, Burn Unit/Center
- Sahlgrenska University Hospital
- Uppsala University, Department of Surgical Sciences, Department of Medical Sciences, Department of Radiology, Oncology and Radiation Science

Drowning

Overall, research on drowning is relatively scarce in Sweden, with studies describing the size of the problem and very little on effective measures to decrease it.

In Sweden, the Swedish Contingency Agency (MSB) is responsible for issues concerning civil protection, public safety, emergency management and civil defence as long as no other authority has responsibility. MSB is a competent authority for, among other things, fire safety and sponsors Swedish but not international research in the injury field.

Trends, tendencies and prognosis for the future

Although Sweden has high-level epidemiological and clinical expertise in burn injury research, but the number of researchers involved in the field is relatively low. In the case of drowning, there is only a handful of academically active researchers.

Social inequalities in injuries. Better understanding those disparities and appropriately tackling them are challenging but imperative.

Know-do gap. Several measures have been put forward that can help to prevent burns and drowning (primary prevention) or reduce their consequences (secondary and tertiary prevention). There is a pressing need to advance the knowledge regarding the implementation of those safety measures in new contexts and improve knowledge on how safety measures used in HICs can be implemented in LMICs.

Incapacitating burn injury morbidity. An increasing number of people live with lasting impairments as a result of burns, with consequent challenges to their autonomy in society. The research needs in that area are diverse – from the need for tools (e.g., quality-of-life scales) to describe and compare the long-term impacts of burn injury to the need to put into place well-prepared health care services.

Low cost, timely and inclusive alternatives to burn injury control are indeed a pressing need in many resource poor settings and countries.

Child safety. Children are most vulnerable to burns and drowning in LMICs. It is imperative not only to implement well-established measures to protect them but also to conceive additional ones that are contextually relevant both in the situations and sources of danger they deal with and the manner in which they do so (intervention and implementation research).
Completeness and accuracy of official injury statistics. Official injury statistics are incomplete and inaccurate in all countries. The level of reporting for injuries treated in hospitals is, on the average, less than 50%.

Assessing costs. Costs analyses are surprisingly few in injury research. There is a need for guidelines regarding the estimation of the costs to society of injuries like burns and drowning and also the cost-benefit of preventative interventions.

Capacity building. For injury research and prevention to be successful, it is important to develop local research capacity in LMIC and to establish global research collaborations.

Recommendations

Incentives. Raise awareness about the added value of international collaborations in the field of burn or drowning injury care and prevention and create economic incentives to international academic partnerships.

Sustain and further develop capacity. Create strategic positions or platforms that have the potential to stimulate cross-disciplinary approaches (within Sweden and with other partner countries) and studies dealing with the epidemiology and prevention of drowning and burn injury.

Orientation – prioritize program and projects with a public health and cross-sectorial perspective to injury prevention. The generic analytical framework used in public health is helpful in the analysis of risk factors, but also serves as a guide during the whole process, from identifying a problem to the implementation and evaluation of interventions.

References


