Editorial

A Population Health Perspective on Suicide Research and Prevention

What We Know, What We Need to Know, and Policy Priorities

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The recently published WHO suicide report indicates that the global incidence of suicide is declining (World Health Organization [WHO], 2014. This is welcome news for all working in this field and for the vast number of people affected by the suicide of a family member, friend, or colleague. However, much remains to be done. The report shows that there are more than 20-fold differences in the rate of suicide between high- and low-incidence countries and threefold differences across low- and middle-income countries (LAMIC) in the different WHO regions (WHO, 2014). If all countries had the same incidence of suicide as LAMICs in the Americas, there would be over 300,000 fewer suicides worldwide every year. Nevertheless, the potential for suicide reductions is far greater in some countries (e.g., those where particular high-lethality methods such as pesticides or firearms are commonly used or with high levels of alcohol misuse) than in others.

This editorial summarizes, from a population (public health) and UK perspective, some thoughts about the contribution of suicidology to suicide prevention and, arising from this focus, some suggested priorities for research and policy over the next decade.

Suicidology and Suicide Prevention

Suicide is the fatal outcome of a behavior, rather than a single disease process. Suicidal behavior occurs in vulnerable individuals in the context of a range of different mental illnesses and social stresses and may be influenced by help-seeking behaviors and cultural attitudes. A range of different suicide methods, each of differing lethality, may be used. These factors make the study of suicide more complex than conditions such as stroke, depression, and cancer. Indeed, suicide is one possible outcome of each of these disorders. Furthermore, the epidemiology of suicide differs markedly from that of nonfatal suicidal behavior – most notably with regard to its age and gender profile as well as the methods used. Thus, studies of people surviving suicide attempts may be less informative than, for example, research involving individuals who survive a stroke or cancer.

Prevention strategies could potentially cover a wide range of areas, some of which may already have sufficient resource and policy focus for economic and broader health-related reasons, for example, tackling alcohol misuse or depression. Overlaps with such areas may lead to a loss of focus on important strategic areas unique to suicide that might not otherwise be prioritized. This is not meant to trivialize the major contributions to preventing suicide that can be achieved in the field of mental health simply by preventing mental illness and improving both the detection and treatment of the mental disorders that so commonly contribute to suicide. But such aspects are commonly included in national mental health, substance misuse, and other strategies, and so it is important that suicide prevention strategies complement rather than duplicate these.

So what aspects are specific to suicide and thus might form the basis of focused suicide research and prevention activity? A number of areas are important (see Table 1). First, the strongest risk factor for suicide is a previous episode of self-harm. Thus, an important focus of suicidology is in strengthening the evidence base around the assessment and treatment of people who self-harm, which may simply mean the better management of underlying mental illnesses.

Second, use of high-lethality suicide methods inevitably influences whether or not an act of self-harm results in death. Regional and national suicide rates vary in relation to geographic preferences for, and access to, high-lethality methods (Yip et al., 2012). Thus, restriction of access

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Table 1. Aspects of suicide and suicidal behavior that distinguish suicidology from the study of mental health disorders in general.

- Past self-harm is a key risk factor
- Access to and acceptability of lethal suicide methods influences the risk of suicide
- Media reporting of suicide and suicide methods influences risk
- Impulsiveness may contribute to suicidal behavior but not mental illness
- The profound impact of suicide on family, friends, colleagues, and those witnessing suicides in public places
- The medical management of people who have self-harmed may influence the likelihood of death – particularly the availability of antidotes to particular poisons
- Clustering of deaths from suicide and self-harm episodes can occur
- There is evidence that some neural pathways are specific to suicidal behavior
- The role of religious and cultural values in influencing the acceptability of suicide

to pesticides (Gunnell, Eddleston, Phillips, & Konradsen, 2007), firearms (Miller et al., 2013), sites from which jumping commonly occurs (Pirkis et al., 2013), and some medicines (Hawton et al., 2012) is likely to have a beneficial impact on suicide (WHO, 2014). However, it is important not to pursue such strategies too vigorously for methods associated with relatively low case fatality (e.g., paracetamol, case fatality < 0.5%), as this may lead to people switching to methods with higher case fatality.

Third, media reporting, as well as the fictional portrayal of suicide, may lead to rises in suicide. Of particular concern is reporting that focuses on suicide methods and celebrity suicides (Niederkrotenthaler et al., 2012; Stack, 2003), as this can lead to an increase in copycat suicide and the introduction of new high-lethality methods into populations (Chen et al., 2014). While media reporting can influence social attitudes and help-seeking behaviors for a range of mental health problems, its direct contributory role in suicide is relatively unique. Fourth, impulsivity is a feature of some episodes of self-harm and suicide, particularly among young people (Baca-García et al., 2001), whereas this is not a risk factor for mental illnesses. Fifth, suicide and suicidal behavior have a profound impact on family, friends, work colleagues, and those who witness the death; thus, prevention strategies increasingly include a focus on appropriate postvention approaches (Department of Health, 2012).

Sixth, suicides can occur in clusters, so the suicide of one individual may make the suicide of others in their social network more likely (Haw, Hawton, Niedzwiedz, & Platt, 2013); clustering/contagion of other mental illness – except via genetic links or shared environmental risk factors – is rare. Seventh, suicide prevention focuses not only on pathways leading to suicidal behaviors and the treatment of psychiatric disorders contributing to such behaviors, but also on the medical (and surgical) management of people who have self-harmed. The development of an antidote (*N*-Acetylcysteamine) to paracetamol poisoning in the 1960s appeared to halt the year-on-year rise in deaths from paracetamol poisoning in the UK (Flanagan & Rooney, 2002). The development of antidotes to the types of pesticide commonly taken in self-poisoning may have a profound impact on world suicides. Eighth, there appear to be specific neurobiological aspects to suicidal behavior, regardless of the underlying mental health problem (Mann, 1998), opening up the possibility of specific pharmacological approaches. Finally, while an individual's religion may not influence their risk of depression, different religions do vary in the extent to which they condone suicide and this may affect an individual's decision to take their life.

Taken together, these unique features of suicide and suicidal behavior underscores the need for the specific discipline of suicidology. The following sections outline, from a population health perspective, possible priorities for research and practice in the next decade.

Research Challenges Over the Next Decade

It is critical that suicide prevention efforts are underpinned by high-quality research evidence. Opportunities and challenges for population health research in the next decade include:

1. *The need for large-scale randomized trials of interventions for people who self-harm.* A high proportion of people who take their lives have previously self-harmed. This proportion varies from country to country. For example, in China, 25% of suicides have previously self-harmed (Phillips et al., 2002); in the West some studies report proportions in excess of 50%. Thus, presentation to health-care services following self-harm offers a key opportunity for intervention. It is noteworthy that despite many decades of research in this area, there is no evidence that the risk of suicide or repeat self-harm following self-harm is any lower in the 21st century than in the 1980s and 1990s (Carroll, Metcalfe, & Gunnell, 2014). Large randomized trials and well-conducted observational research are needed to improve the evidence base in this area.
2. *Ecological studies of suicide prevention policy.* There has been relatively little research into the impact of policy changes on the incidence of suicide. Recent studies have begun to address this gap but more are required (Gunnell et al., 2012; Knox et al., 2010; Matsubayashi & Ueda, 2011; Norström & Grönquist, 2015; Page et al., 2011; Stuckler, Basu, Suhrcke, & McKee, 2009; While et al., 2012). Findings from these studies have highlighted issues such as the potential benefits of the 24-hr availability of crisis care and of active labor market schemes in reducing the impact of unemployment on suicide rates. Some of the suicide research commu-

nity seems to view such ecological studies of policy interventions and of national-level exposures such as economic recession with skepticism. This is a pity. Ecological study designs and natural experiments are sometimes the only way to investigate the effects of population-level exposures, and if they follow agreed analytic approaches they provide important evidence (Craig et al., 2012).

3. *Understanding why some people act on suicidal thoughts, whereas others do not.* A better understanding of what causes some individuals to act on their suicidal thoughts and others not to is a potentially promising avenue of research (Klonsky & May, 2014). Large-scale cohort studies with psychological measures, as well as biological samples for genetic and risk marker analysis, may usefully contribute knowledge to this area. A challenge with much of the prospective research in this field is that studies are often too small and periods between follow-ups too long, and so have limited capacity to clarify links between suicidal thoughts and acts. The use of mobile technologies and follow-up targeted at high-risk individuals may overcome some of these limitations.
4. *Identifying individuals at greatest risk of suicide after self-harm.* In identifying individuals at greatest risk of suicide, we still rely largely on clinical history-taking and patient self-report, both of which are notoriously unreliable. Furthermore, many studies in this area use repeat self-harm rather than suicide as the relevant outcome. This leads to an underestimation of the importance of age, male gender, and the lethality of the method used in the index attempt as important markers of suicide risk. Current screening tools to identify self-harm patients who are at greatest risk of suicide lack the degree of specificity to make them clinically useful. With advances in psychological testing, research to discover novel approaches for identifying individuals at greatest risk of suicide among clinical populations would be of immense potential value.
5. *Increased application of genetic epidemiology, epigenetics, genomics, and proteomics.* The last decade has seen huge advances in the contribution made by genetic epidemiology to the understanding of causal associations and relevant targets for population health intervention (Davey Smith & Hemani, 2014). Genome-wide association studies (GWAS) may yield potential targets for future research into the etiology of suicidal behavior, but most are currently underpowered (Sokolowski, Wasserman, & Wasserman, 2014). Epigenetic studies of the impact of environmental exposures, such as childhood abuse, on specific genes show promise in elucidating pathways influencing risk (Turecki, Ernst, Jollant, Labonté, & Mechawar, 2012). Large international consortia bringing together studies with DNA, rich exposure information, and suicide-related outcomes are required for suicidology to capitalize on advances in this rapidly developing area of research.
6. *The psychology of suicidal behavior.* There are exciting developments in understanding the psychology of suicidal behavior (Barzilay & Apter, 2014; O'Connor & Nock, 2014). Harnessing these to develop novel interventions may provide new avenues to prevention.
7. *Using appropriate outcome measures in studies of people who self-harm.* Many trials of interventions for people who self-harm use repeat hospital attendance following self-harm as their primary outcome measure. Many episodes of self-harm do not present to hospital services; it is possible that people who receive poor hospital care are less likely to re-present to hospital as they are discouraged to do so by their previous experiences, whereas those who received high-quality care may feel more comfortable returning. In one recent trial of assertive outreach for self-harm, the direction of intervention effect differed depending on whether hospital re-presentation or self-report self-harm data were used (Morhorst, Krogh, Erlangsen, Alberdi, & Nordentoft, 2012). It is important that future trials include a range of patient-reported and objective outcome measures alongside repeat attendance with self-harm (Owens, 2010).
8. *Understand reasons for the recent large increases in suicide in Korea.* A number of Asian nations that have undergone rapid economic development in the last 30 years have also experienced marked rises in suicide. South Korea has been particularly affected and it now has one of the highest suicide rates in the world (WHO, 2014). A clearer understanding of the reasons for the marked increases in suicide and appropriate policy responses to them may be of value to the suicide prevention policies in other industrializing nations.
9. *Greater use should be made of qualitative research methods.* Qualitative research methods are under-used in suicidology. Such methods are needed if we are to better understand a range of issues crucial to suicide prevention. These issues include why suicidal individuals do not seek help and how people recognize and respond to at-risk individuals. Such research is challenging to conduct and requires careful analysis, but yields rich insights of relevance to prevention (Biddle, Donovan, Sharp, & Gunnell, 2007; Owen et al., 2011).

Policy Challenges for the Next Decade

To ensure suicide prevention policy is evidence based, strong links between researchers and policy makers are important. Close working between the International Association for Suicide Prevention and the WHO, such as occurred in the recent WHO suicide report (WHO, 2014), is important. Some key challenges over the next decade include:

1. *Reliable national suicide statistics*. Good-quality national and regional data on the age-, gender-, and method-specific incidence of suicide and its key risk factors are critical to inform national prevention strategy development. In the recent WHO report (WHO, 2014) only 60 of the 172 WHO member states were

deemed to have good-quality vital registration data. Data for Africa and South-East Asia are particularly poor. Even in high-income countries concerns are frequently raised about data quality and underestimation (Kapusta et al., 2011). It is important that systems continue to be developed to improve this situation.

2. *The Internet and social media.* Suicide researchers should keep abreast with the rapidly changing Internet and communication technology environment to ensure new platforms can be used to optimize information, treatment, and prevention opportunities as well as be monitored to reduce significant harm. These media offer a powerful opportunity to reach populations hitherto inaccessible to prevention efforts (Lai, Maniam, Chan, & Ravindran, 2014). But working in this environment is challenging (Lee, 2014) and the Internet poses significant hazards as well as opportunities for suicide prevention. A current concern is the ease with which information about helium and other high-lethality methods can be obtained by vulnerable individuals from sites such as Wikipedia.
3. *Pesticide suicides and managing conflicts of interest in collaborations with industry.* Perhaps the single most tractable issue in suicide prevention is the high incidence of deaths from pesticide self-poisoning in low- and middle-income countries. Pesticide ingestion accounts for approximately a third of world suicides (Gunnell, Eddleston et al., 2007). These deaths can be prevented by restricting the sale of the most toxic pesticides, as occurred in Sri Lanka (Gunnell, Fernando et al., 2007) and more recently South Korea (Cha, Khang, & Lee, 2014). It is disappointing that the pesticide industry still has a voice in suicide prevention activities – contributing funding to IASP and WHO initiatives. This may affect the vigor with which this issue is pursued by the suicidology community. Such close links would not be acceptable to most tobacco or alcohol researchers.
4. *Tackling firearm suicides in the US and elsewhere*. Firearms are a high-lethality method of suicide and probably contribute to the relatively high incidence of suicide in countries where firearms are easily accessible. This is particularly the case in the US where over half of all suicides are by firearm, and variations in the availability of firearms between states contribute to geographic variations in overall suicide rates (Miller et al., 2013). It is frustrating that despite decades of public health advocacy, gun control remains limited in the US. Continued policy pressure in this area should be a priority for the coming years.
5. *Surveillance for new methods of suicide*. National surveillance for the emergence of new methods of suicide should be undertaken to identify and facilitate a timely response. In some parts of Asia, rises in charcoal burning suicides contributed to increases in overall suicide rates in recent years (Chang et al., 2014).Widespread recognition of the rise in charcoal burning did not occur until several years into the epidemics. In the West there have been recent concerns about the use of helium for suicide, but comprehensive data from many countries are limited (Gunnell et al., 2015).
6. *Media reporting*. There is clear evidence that news reporting and fictional portrayal of suicide may lead to copy-cat suicides and the widespread adoption of new methods of suicide by exposed populations (Chen et al., 2014; Niederkrotenthaler et al., 2012). Excellent guidelines on media portrayal of suicide exist (see, for example, http://www.samaritans.org/media-centre/media-guidelines-reporting-suicide). It is critical that respectful regular dialogue is established with national media organizations to improve practice. Training courses for journalists should be encouraged to incorporate knowledge and best practice in this area. Following celebrity suicides or suicides using unusual methods, proactive contacts with media organizations may be helpful (Samaritans, 2011). While such approaches will not lead to reductions in suicide, they will prevent the rises that may accompany sensational reporting.
7. *Working with policy-makers to offset the impact of economic recession on suicide.* Periods of economic recession are often accompanied by rises in suicide. While the precise mechanisms are debated, these are likely to include the impact on mental health of financial hardship, job loss and prolonged unemployment, cuts in spending on health services, and government austerity measures. Research is providing pointers for the sort of policy responses that can offset the impact of recession on suicide rates and, by extension, population mental health (Norström & Grönquist, 2014; Stuckler et al., 2009). Researchers working in this area should ensure these findings are appropriately communicated to policy makers.

One of the joys of working in suicidology is its rich interdisciplinary nature. Contributions to the evidence base come from anthropologists, clinical toxicologists, economists, epidemiologists, geneticists, geographers, nurses, people bereaved by suicide, psychologists, psychiatrists, public health specialists, qualitative researchers, service users, sociologists, statisticians, third-sector organizations, and others. There has been a tendency for thinking in the field to be dominated by psychiatry; we need to remind ourselves that most people who take their lives are not in contact with mental health services and so some aspects of suicide prevention lie beyond the clinician's expertise. This underlines the importance of engaging with and respecting the contributions of the wide range of disciplines working in this area.

A sign of our success over the next decade will be further falls in suicide and better outcomes among people receiving care from mental health services.

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