

Impact case study (REF3)

Institution: University of Bristol		
Unit of Assessment: 2) Public Health, Health Services and Primary Care		
Title of case study: Preventing access to highly lethal pesticides and harmful media content to reduce suicides and self-harm worldwide		
Period when the underpinning research was undertaken: 2000 - 2019		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
David Gunnell	Professor of Epidemiology	07/1993 - present
Lucy Biddle	Senior Lecturer in Medical Sociology	07/2002 - present
Jenny Donovan	Professor of Social Medicine	10/1990 - present
Chris Metcalfe	Professor of Medical Statistics	01/2004 - present
Duleeka Knipe	Research Fellow	01/2017 - present
Becky Mars	Vice Chancellor's Fellow	11/2012 - present
Jon Heron	Senior Research Fellow	11/1998 - present
Period when the claimed impact occurred: 2014 - 2020		
Is this case study continued from a case study submitted in 2014? No		

1. Summary of the impact

Easy availability of the means of suicide and access to detailed information on suicide and self-harm are associated with high lethality suicide attempts and influence population suicide rates. University of Bristol (UoB) research has provided definitive evidence that bans on highly toxic pesticides (n=110,000 deaths/year) reduce suicide rates whilst alternative approaches to prevention are ineffective. UoB research also found that easy access to media reports and online discussion of suicide methods (viewed by around 1 in 4 adults with high suicide intent) increase suicide and self-harm rates. These findings have shaped global health, agricultural and media policy and guidance. Emerging evidence shows that pesticide bans are dramatically reducing the number of global deaths from pesticide poisoning.

2. Underpinning research

Restricting access to commonly used, highly lethal methods of suicide is one of the most effective approaches to preventing suicide. The risk of death varies enormously depending on the method used in a suicide attempt and most people do not make repeat attempts. 'Cognitive' as well as physical access is important. Widespread availability of information and dialogue about suicide and suicide methods on the internet and in other media increases the cognitive availability of suicide and choice of method [1].

Physical access to suicide methods: pesticide self-poisoning

Pesticide self-poisoning is one of the most frequently used suicide methods worldwide, accounting for over 110,000 deaths/year, i.e. one-in-seven of the world's 800,000 annual suicide deaths. The risk of death following an overdose of paracetamol or most antidepressants is under 1%, whereas after taking just a tablespoonful of the toxic weedkiller Paraquat it is over 50%. The pesticide industry's preferred approach to restricting access to hazardous pesticides is the use of lockable 'safe-storage' devices, rather than sales bans or regulation. Industry has promoted the 'safe-storage' approach in low-income countries. The University of Bristol (UoB) has conducted empirical and review-based research, in collaboration with colleagues from the University of Edinburgh, University of Copenhagen (Denmark), University of Peradeniya (Sri Lanka), the National Taiwan University, Korea University College of Medicine (South Korea); the University of Sydney (Australia) and the World Health Organization (WHO). This has demonstrated that 'safe-storage' of pesticides is ineffective, whereas pesticide sales bans are followed by falls in method-specific and overall suicide rates.

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UoB researchers used interrupted time series models to evaluate the impact on suicide rates of pesticide bans in South Korea, Sri Lanka, and Bangladesh (all summarized in [2]). In all cases the bans were followed by falls in pesticide suicide rates (ranging from 41% in Sri Lanka to 49% in South Korea) and overall suicides (ranging from 24% in Bangladesh to 8% in Sri Lanka). In an economic cost-effectiveness modeling study using data from 14 countries carried out in collaboration with WHO, UoB researchers found that banning hazardous pesticides could result in about 28,000 fewer suicide deaths each year at an annual cost of International (\$) \$0.007 per capita (95% Uncertainty Interval (UI) 0.006–0.008) [3].

In the world's largest randomised controlled trial of a suicide prevention intervention (56,000 households in rural Sri Lanka) UoB research found no evidence that providing lockable pesticide storage devices to farmers reduced the incidence of pesticide suicide [4]. After 3-years follow-up, the rate ratio (RR) for pesticide self-poisoning in intervention vs. control villages was 0.93, 95% Confidence Interval (CI) 0.80–1.08; $p=0.33$) and there was also no evidence of a reduction in the number of suicide deaths using all methods (RR 1.22, 95% CI 0.88–1.68).

Cognitive access to suicide and self-harm methods: media and online representations

UoB researchers have also shown that easily accessible high-lethality methods of suicide described or discussed in media reports, websites and other online spaces can influence uptake of suicide methods in populations – a process known as 'contagion'. For example, they found that rates of charcoal burning suicide in South Korea increased in the year following the extensively publicised suicide of a celebrity by charcoal burning, rising from <1% of suicides to 5%, possibly contributing to already rising rates of suicide in South Korea [5].

They have also demonstrated the ease of access to suicide and self-harm content on the internet. In a UK study [1], interviews with hospitalised patients who had attempted suicide showed that many had strategically researched suicide methods online. In the same study, young people with suicidal feelings or self-harm behaviour reported 'stumbling' across online information about suicide methods. Online help services, however, were mostly criticised by users for not meeting the specific needs of those experiencing suicidal thoughts. In a further study, UoB researchers found accessibility of information about suicide methods online increased markedly from 2007 to 2014 [6]. These findings indicated a need for further action to improve online safety and develop novel online help approaches.

3. References to the research

1. **Biddle L, Derges J, Goldsmith C, Donovan J, Gunnell D.** Using the internet for suicide-related purposes: Contrasting findings from young people in the community and self-harm patients admitted to hospital. *PLoS One*. 2018; 13, e0197712. DOI:[10.1371/journal.pone.0197712](https://doi.org/10.1371/journal.pone.0197712)
2. **Gunnell D, Knipe D, Chang S, Pearson M, Konradsen F, Lee W, Eddleston M.** Prevention of suicide with regulations aimed at restricting access to highly hazardous pesticides: a systematic review of the international evidence. *Lancet Global Health*. 2017; 5, e1026-e1037. DOI:[10.1016/S2214-109X\(17\)30299-1](https://doi.org/10.1016/S2214-109X(17)30299-1)
3. Lee YY, Chisholm D, Eddleston M, **Gunnell D**, et al. The cost-effectiveness of banning highly hazardous pesticides to prevent suicides due to pesticide self-ingestion across 14 countries: an economic modelling study. *Lancet Global Health*. 2020; 9, e291-e3000. DOI:[10.1016/S2214-109X\(20\)30493-9](https://doi.org/10.1016/S2214-109X(20)30493-9)
4. Pearson M, **Metcalfe C**, Jayamanne S, **Gunnell D**, Weerasinghe M, Pieris R, Priyadarshana C, **Knipe DW**, et al. Effectiveness of household lockable pesticide storage to reduce pesticide self-poisoning in rural Asia: a community-based, cluster-RCT. *Lancet*. 2017; 390, 1863-1872. DOI:[10.1016/S0140-6736\(17\)31961-X](https://doi.org/10.1016/S0140-6736(17)31961-X)
5. Chen Y-Y, Yip PSF, Chan CH, Fu K-W, ... **Gunnell D**. The Impact of a Celebrity's Suicide on the Introduction and Establishment of a New Method of Suicide in S. Korea. *Archives of Suicide Research*. 2014; 18: 221-226. DOI:[10.1080/13811118.2013.824840](https://doi.org/10.1080/13811118.2013.824840)

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6. **Biddle L, Derges J, Mars B, Heron J, Donovan J, Potokar J, Piper M, Wyllie C, Gunnell D.** Suicide and the Internet: Changes in the accessibility of suicide-related information between 2007 and 2014. *J. of Affective Disorders*. 2016; 190: 370-375. DOI:[10.1016/j.jad.2015.10.028](https://doi.org/10.1016/j.jad.2015.10.028)

Key Grants

- (i) **Biddle L, Gunnell D, Donovan J, Wyllie C, Potokar J.** Exploring the use of the Internet in relation to suicidal behaviour: identifying priorities for prevention. Department of Health Policy Research Programme, 2013 – 2015, GBP234,496
- (ii) Eddleston M, **Gunnell D, Metcalfe C**, Hawton K, Konradsen F, Dawson A, Jayamanne S Wickremasinghe A. A community trial to determine whether 'Safe Storage' reduces pesticide self-poisoning in rural Asia. Wellcome Trust. 2010-2014, GBP1,006,000

4. Details of the impact**A. Impact on international health and agricultural policies****Global pesticide guidance**

Suicide reduction is a target set by the UN's Sustainable Development Goals (SDGs) as an indicator of healthy lives and wellbeing (SDG 3). UoB research *"has been important in helping WHO formulate its strategy to attain the suicide reduction target"* (Head, Mental Health Unit, WHO) [A]. Notably, it has been influential to UN recommendations, made by WHO and Food and Agriculture Organisation (FAO), to ban highly hazardous pesticides. The WHO/FAO's joint guidance for pesticide regulators to prevent suicide (2019) [B] (commissioned from and co-authored by UoB researchers), draws on UoB's research findings to state: *"Regulatory action... indicates that many suicide deaths can be prevented by bans on specific pesticides. In Sri Lanka, for instance, bans are thought to have led to 93 000 fewer suicide deaths between 1995 and 2015"*. The guidance goes on to recommend: *"identifying highly hazardous pesticides for withdrawal"* and *"taking regulatory actions to phase out the most hazardous pesticides"*. Furthermore, the guidance cites UoB trial evidence [4] indicating that the industry-preferred alternative (lockable storage devices) is ineffective: *"The one randomized controlled trial that was large enough in scale ... to test the effectiveness of lockable household pesticide storage containers found no evidence of effectiveness"*.

Gunnell was a member of the WHO expert panel (2018-19) that worked with health economists to model the cost-effectiveness of pesticide regulation, concluding that *"national bans are cost-effective in countries where a high proportion of suicides are attributable to pesticide self-poisoning"* [A] [3]. Based on this analysis, pesticide bans were recommended by WHO as a 'Best Buy' (a cost-effective and feasible intervention) for non-communicable disease at the World Health Assembly in November 2020 [A].

UoB research on preventing pesticide suicide was included in the 2016 World Bank report on suicide prevention (six UoB research papers cited) [Ci]. In addition, the WHO World Suicide Report (2014) [Cii] cited UoB evidence that pesticide regulations would result in fewer suicide death, as well as UoB's recommendations to ban high lethality pesticides.

International pesticide bans and impact of bans on suicide rates

Governments/Ministries of Agriculture in several countries have banned highly hazardous pesticides in recent years [D]:

1. Taiwan banned paraquat in 2018 [Di, Dii].
2. Nepal banned aluminium phosphide and five other pesticides in 2019
3. Malaysia banned paraquat in 2020
4. India banned 12 highly hazardous pesticides in 2018 and a further six in 2020 [Dviii].

WHO health economists estimate that pesticide bans in the 14 countries they studied could result in an estimated 28,000 (95% UI 24,000–32,000) fewer suicide deaths each year [4]. Evidence supporting this claim is beginning to emerge. For example, in Taiwan, the annual number of suicide deaths from pesticide poisoning fell by 37% in 2019, almost 200 fewer deaths [Di]. Even larger declines have been seen in Sri Lanka [Div] and South Korea.

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B. Impacts on media practice and policy

UoB researchers have raised awareness among UK policymakers, UK news journalists, and the global online industry, of the risks of contagion arising from publicising suicide and self-harm methods. As a result, UoB researchers have shaped media policy debate, journalistic practices and online media policy. These steps all promote the safety of media users by limiting access to content that could lead to suicide.

UK policy: online suicide content and user safety regulatory proposal

Evidence from Biddle and colleagues, which scoped ‘encouraging or assisting suicide’ as a distinct form of online harm, fed directly into recommendations made to Government in order to moderate harmful content and support users. The Health Select Committee Report on Suicide Prevention (March 2017) “*urges the Government to closely examine the findings of that [UoB’s] research and to report back to us on the action that it proposes to take as a result*” [Ei p.35]. The 2018 All-Party Parliamentary Group on Social Media and Young People’s Mental Health and Wellbeing inquiry report, acknowledging Biddle’s contribution, recommends Government introduces a statutory code of conduct for social media providers to protect the mental health of UK users [Eii]. The UK Government White Paper on Online Harms (2019) [Eiii] subsequently proposed a new regulatory framework for online safety, which will establish “*a new statutory duty of care to make [online tech] companies take more responsibility for the safety of their users and tackle harm caused by content or activity on their services*” (p.7). Specifically addressing suicide, it states “*Companies will be required to take robust action to address harmful suicidal and self-harm content that provides graphic details of suicide methods and self-harming, including encouragement of self-harm and suicide*” (p.72).

UK media sector’s awareness of contagion

Working with Samaritans – a research/ policy active organisation and the only charitable provider of suicide support in the UK – UoB have delivered training sessions with local and national UK news editors and journalists to advise on how to report suicide to prevent method contagion [Fii-v]. This has included a presentation to the Independent Press Standards Organisation (IPSO) in 2016, which was reported by the Deputy Chair of IPSO in The Press Gazette [Fi], a publication for UK journalists (200,000 unique visitors to its website per month). In the article, the Deputy Chair remarks that speakers from UoB and Oxford University “*provided what was to my mind powerful evidence about the net increase in suicides due to excessive detail in both news reports and dramas*” before recommending “*Next time you’re running a story on suicide please stop and consider a simple equation: weigh up the potential benefits to anybody of including those details, and the possibility that by leaving them out you might, realistically, save a life.*” [Fi].

Global online provider guidelines: reducing access to suicide and self-harm content

In 2017, UoB and Samaritans co-hosted a series of awareness-raising engagements for the online industry including roundtable events held with safety and policy leads with jurisdictions encompassing the UK, Europe, the Middle East and Africa from Google, Twitter, Facebook, Wikimedia, Apple, YouTube and Instagram. This culminated in the establishment of a three-year strategic partnership between Samaritans, the online industry and the Department of Health and Social Care to improve management of suicide content online. A key output from this partnership is Samaritans’ guidelines for online providers published in 2020, with Dr Biddle as academic advisory panel member [G]. Aimed at policymakers and moderators of sites, platforms, forums and search engines hosting user-generated content, these guidelines are the first to provide best practice principles for managing self-harm and suicide content online [I].

Facebook and Instagram self-harm prevention policies

Biddle was consulted by Facebook and Instagram (over 2.7 billion and 1 billion monthly users, respectively) to provide expert input into their review of safety policies relating to self-harm content. This led to participation in an international expert roundtable and a subsequent change to Facebook’s [Hi] and Instagram’s [Hii] policies, published February 2019, and listing Dr Biddle as an advisor. Reflecting UoB’s research recommendations [1,6] the updated policies disallow users to share graphic content of self-harm. For instance, Instagram announced: “*following a*

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comprehensive review with global experts and academics on youth, mental health and suicide prevention... We will not allow any graphic images of self-harm, such as cutting" [Hii].

Improving online help

UoB findings [1,6] around suicidal individuals' preferences for live and immediate online help services were used to inform Samaritans' digital strategy, which has been fundamental to the establishment of an 'online chat' service now running three evenings a week [I]. Samaritans receive over 3 million requests for support annually.

5. Sources to corroborate the impact

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- [A] WHO (2020). Supporting statement – Head, Mental Health Unit, Department of Mental Health and Substance Use
- [B] WHO/FAO (2019). [Preventing suicide: a resource for pesticide registrars and regulators](#)
- [C] i) World Bank (2016). Mental, Neurological, and Substance Use Disorders: Disease Control Priorities, Third Edition (Volume 4). See: Chapter 9, Suicide
 ii) WHO (2014). [World Suicide Report](#) cites two UoB research papers on pesticide suicide
- [D] i) National Taiwan University (2021). Supporting statement - Associate Professor, Institute of Health Behaviors and Community Sciences
 ii) Chang S, **Gunnell D.** (2019). Banning paraquat would prevent nearly 200 deaths from suicide per year in Taiwan. *Taiwanese J. Psychiatry*. DOI:[10.4103/tpsy.tpsy.24.19](#)
 iii) Knipe *et al.* (**Gunnell**) (2017). Preventing deaths from pesticide self-poisoning - learning from Sri Lanka's success. *Lancet Global Health*, 5. DOI:[10.1016/S2214-109X\(17\)30208-5](#)
 iv) Ministry of Health and Welfare, Taiwan (2019) Correspondence - Director of the Department of Mental and Oral Health
 v) Nepali Times (2020). [Suicide by pesticide in Nepal](#)
 vi) MalayMail (2019). [Report: Govt to ban sales of paraquat from Jan 2020](#)
 vii) DownToEarth (2018). [India bans 18 pesticides, has many more to go](#)
- [E] i) Minutes and presentation from APPG sessions
 ii) House of Commons (2017). [Health Committee: Suicide Prevention](#)
 iii) All Party Parliamentary Group (2018). [#NewFilters to manage the impact of social media on young people's mental health](#)
 iv) HM Government (2019) [White Paper on Online Harms](#)
- [F] i) Press Gazette (2016). [How editors can save lives by taking special care when reporting on suicide](#)
- Presentations and training examples:
- ii) **10.10.17** - Invited talk (with Fraser, Samaritans) to Coalition Working Group on tackling Daesh/ISIS propaganda and use of media. **Foreign and Commonwealth Office.**
- iii) **24.04.17** - Media influence on Suicide. Invited presentation to UK News Editors meeting at University of Derby (invitation from IPSO vice-chair). Audience – approx. 50 news editors, journalism students and IPSO members (including chair).
- iv) **22.06.16** - Research and research presentation (with Hawton, Oxford, & Fraser, Samaritans) to **Independent Press Standards Organisation** (IPSO) Board and staff.
- v) **25.06.15** - Meeting with Editor, News Editor + 8 reporters and 4-5 editors from SW papers – Cheltenham / Yeovil / Torbay etc to discuss suicide reporting (with Fraser, Samaritans).
- [G] Samaritans (2020). [Online harms guidelines](#) *Acknowledges Biddle, p14.*
- [H] i) Facebook (2019). [Partnering with Experts to Protect People from Self-Harm and Suicide](#)
 ii) Instagram (2019). [Changes We're Making to Do More to Support and Protect the Most Vulnerable People who Use Instagram](#)
- [I] i) Samaritans (2020). Supporting statement - Assistant Director, Research & Influencing
 ii) **Biddle L et al.** (2020). Online help for people with suicidal thoughts provided by charities and healthcare organisations: a qualitative study of users' perceptions. *Social Psychiatry & Psychiatric Epidemiology*, 55, 1157-1166. DOI:[10.1007/s00127-020-01852-6](#)