

Institution: King's College London		
Unit of Assessment: 4		
Title of case study: Understanding behaviour during crises to inform national emergency preparedness and response		
Period when the underpinning research was undertaken: 2005-2020		
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:
James Rubin	Reader in the Psychology of Emerging Health Risks;	2000-to date
Louise Smith	Senior Research Associate;	2014-to date
Neil Greenberg	Hon. Professor of Defence Mental Health;	1996-to date
Simon Wessely	Regius Professor of Psychiatry	1991-to date
Period when the claimed impact occurred: 2014-2020		
Is this case study continued from a case study submitted in 2014? N		

1. Summary of the impact

King's research into understanding how people behave in a crisis has led to close collaboration with the UK Government and agencies at local and national levels, to help prepare for and respond to major incidents and emergencies. Since 2014 it has directly informed national contingency planning and policies, including the need for emergency response plans to consider mental health impacts, and effective public communication. This work, and real-time analyses by King's researchers, has been applied to emergency responses including flooding, terrorism, attempted assassinations and disease outbreaks. Most recently, King's have contributed evidence and expertise to the Government's scientific advisory committee (SAGE, and subgroup SPI-B) informing the UK's response to the COVID-19 pandemic.

2. Underpinning research

When disasters occur, people's behaviour plays a major role in determining the overall health and social impact. King's research, supported by a £8million Health Protection Research Unit (Emergency Preparedness and Response) grant from the National Institute for Health Research, has increased understanding of how people react in a crisis, explored ways to communicate effectively with the public during and after a major incident, and determined how to protect the mental health of the public and emergency responders.

King's found that the UK Government could be better prepared to understand public reactions during a crisis – and thereby effectively inform official communication – by improving their monitoring approach. During the 2009/10 'swine flu' pandemic, King's worked with the UK Department of Health (then DoH now DHSC) to analyse data from 39 nationally representative surveys (n=42,420) assessing how the UK public were reacting. A key finding was that the design of DHSC surveys could be improved, to more accurately capture public perceptions and levels of behaviour – for example, whether people felt at risk or were observing safety guidance including basic respiratory protection and hand hygiene. In 2012-13, we used NIHR funding to develop better survey tools, grounded in psychological theory, that could be rapidly deployed during a future pandemic. Using stakeholder workshops, qualitative interviews and two baseline national surveys, we designed, tested and refined a survey in collaboration with the DHSC and Public Health England (PHE) that provides a more accurate assessment of whether the public understand, and are following, official advice (1). NIHR awarded King's 'hibernating' funding to support deployment of this tool by DHSC.

King's evaluated likely public reactions during a crisis when monitoring is impossible. Disasters that disrupt infrastructure would prevent Government from effectively monitoring public responses – for example, a long-lasting, widespread power outage. In 2018, the Cabinet Office

commissioned King's to review evidence on how the public are likely to respond to such an event, in order to inform official planning. King's demonstrated that altruism, rather than panic or mass criminality, can be expected and promoted (2).

King's research demonstrated that official communication during a crisis needs to give information rather than reassurance. During the 2006 polonium-210 incident in London – following the poisoning of Alexander Litvinenko – King's conducted a rapid survey of a large representative sample of Londoners to identify how they were responding to the incident, involving the malicious use of radioactive material (3) (REF2014 case study). While only 12% thought their own health might be at risk, concern was higher among people who felt the underlying motive reflected terrorism rather than an assassination, and among those directly caught up in the incident who felt authorities attempted to "reassure," rather than inform, them.

King's highlighted the need to support the mental health of those affected by crises. King's research has explored the mental health impact of disasters on the community and emergency responders. We showed that in the immediate aftermath of disaster, mental health resilience can be supported within communities: A rapid response cross-sectional telephone survey of London inhabitants immediately after the 7 July 2005 bombings (n=1,010) showed that most people are resilient to a terrorist attack in their community, do not need psychiatric support, and can turn to their informal support networks for help (4). However, specific groups need more support: King's, in collaboration with The London School of Hygiene & Tropical Medicine and PHE, showed that severe flooding can have long term impacts on mental health. The English National Flooding Cohort study surveyed 2,126 people in areas affected by flooding across England in 2013/14. We found that 36% of those flooded suffered from probable post-traumatic stress disorder at 12 months, and that mental health impacts extended to people whose lives were disrupted by flooding even if no water entered their homes (5).

Improving the UK's public health response to COVID-19. For the first year of the COVID-19 pandemic, with no innate immunity, no vaccine and no specific treatment, prevention of the predicted worst-case scenarios required people to adhere to a challenging set of behaviours, and endure substantial social, economic and psychological costs. King's rapid and responsive research contributed in real time to the UK's public health response.

Implementing improved monitoring surveys to understand public behaviour in real time during the pandemic. In February 2020 DHSC asked King's to support the national COVID-19 response by activating the 'hibernating' pandemic research response plan (1) and provide advice and analysis using DHSC's weekly polling data (n=2,000 per week). By December 2020, this had become the CORSAIR (Covid-19 Rapid Survey of Adherence to Interventions and Responses) study, producing 28 data reports for DHSC (and later academic publications) on topics including: adherence to self-isolation; hand hygiene; levels of distress and stigma in the community; whether people understand the importance of ventilation; and barriers to NHS Covid App uptake. In a parallel cross-sectional population survey (May 2020) we identified 217 people who had experienced a cough or fever themselves, or where one or more household members had reported those symptoms. All participants were asked whether they had left their home in the past 24hrs: In the symptomatic group, only 54 out of 217 (25%) reported that they had not left their home (6). In our rolling analyses for the CORSAIR study (74,697 responses from 53,880 people), we also found that most people who reported symptoms were not fully adherent to self-isolation guidance. Both studies identified factors associated with non-adherence, including poor knowledge of guidance, lower socio-economic status, financial hardship, having to work and low mood.

Understanding the mental health impacts of isolation and quarantine. King's systematic review of evidence from past infectious disease outbreaks explored factors associated with the psychological impact of self-isolation (7). We found that self-isolation is potentially distressing, and that the impact can be reduced by good financial, practical and emotional support, and by helping people to understand the rules and reasons surrounding quarantine.

3. References to the research

1. Rubin GJ, Bakhshi S, Amlôt R, Fear N, Potts H, Michie S (2014). The design of a survey questionnaire to measure perceptions and behaviour during an influenza pandemic: The Flu Telephone Survey Template (FluTeST). *Health Services & Delivery Research*, 2 (41)

Impact case study (REF3)

2. Rubin GJ, Rogers MB (2019). Behavioural and psychological responses of the public during a major power outage: A literature review. *Int. J. Disaster Risk Reduct.*, 38, 101226
3. Rubin GJ, Page L, Morgan O, Pinder RJ, Riley P, Hatch S, Maguire H, Catchpole M, Simpson J & Wessely S (2007). Public information needs after the poisoning of Alexander Litvinenko with polonium-210 in London: cross-sectional telephone survey and qualitative analysis. *BMJ*, 335, 1143-1146.
4. Rubin GJ, Brewin CR, Greenberg N, Simpson J & Wessely S (2005). Psychological and behavioural reactions to the 7 July London bombings. A cross-sectional survey of a representative sample of Londoners. *BMJ*, 331, 606-611
5. Waite TD, Chaintarli K, Beck CR, Bone A, Amlôt R, Kovats S, Reacher M, Armstrong B, Leonardi G, Rubin GJ, Oliver I (2017). The English National Cohort Study of Flooding & Health: cross-sectional analysis of mental health outcomes at year one. *BMC Public Health* 17 129.
6. Smith LE, Amlôt R, Lambert H, Oliver I, Robin C, Yardley L, Rubin GJ. (2020). Factors associated with adherence to self-isolation and lockdown measures in the UK; A cross-sectional survey. *Public Health*; 187:41-52. Doi: 10.1016/j.puhe.2020.07.024
7. Brooks SK, Webster R, Smith LE, Woodland L, Wessely S, Greenberg N, Rubin GJ. (2020). The psychological impact of quarantine and how to reduce it: Rapid evidence review. *Lancet* 395:912-920.

4. Details of the impact

Since 2014 King's researchers have continued to help the UK Government prepare for potential emergencies and major incidents. Working to understand how the public behave in a crisis, they have considered both specific scenarios and broader principles. As a result they have also become 'go to' advisers when such events occur, and are called upon to support the national emergency response in real time, most recently during the COVID-19 pandemic.

Improving the UK Government's preparations: contingency planning and emergency response policy. King's expertise has been used by the UK Government, Local Authorities and Executive Agencies in developing policy and contingency plans that better prepare the country to handle major national incidents. Notably, this has led to the impact of emergencies on public behaviour and to mental health being considered more fully within this process.

(i) Advising the Civil Contingencies Secretariat (CCS). The CCS (an executive department of the Cabinet Office) is responsible for UK emergency planning, ensuring resilience in the face of major incidents and disasters. This includes risk assessment, contingency planning and the emergency response – supporting the Civil Contingencies Committee (COBR), formed during major incidents and national emergencies. King's worked with the CCS on the 2014-2017 National Risk Assessments, used to plan for future crises [A]. An Assistant Director said this input was “*crucial to ensuring that the government and local emergency responders are able to anticipate and plan for the behavioural impacts of emergencies*”, and explains that “*the work...has reached over 200 policymakers across HM Government, ranging from permanent secretaries and chief scientists of most government departments to specialists and analysts within executive agencies. Over 700 specialists from local authorities, police forces, fire and rescue services, ambulance services and utility providers have used (this) work to inform local preparations for dealing with emergencies; this figure equates to approximately 50% of all risk specialists in the local responder community*”.

(ii) Informing contingency planning for a [text redacted for publication]. King's review of how people were likely to respond to a [text redacted for publication] (2) informed contingency planning for this scenario, [text redacted for publication]. A CCS Assistant Director said this “*directly influenced the shape of work across government to improve the UK's resilience and preparedness for a [text redacted for publication]... Your findings on the value of early and consistent communication with the public in the wake of a [text redacted for publication] have been especially valuable, [text redacted for publication]...*” [B, C].

(iii) Ensuring emergency response policies include mental health support.

Flooding: Opening a 2017 House of Lords debate on climate change and health, Baroness Walmsley highlighted King's research (2): “*Although relatively few people die from drowning during UK floods, the psychological trauma and effects on mental health... are considerable. A UK study found that flood victims were more than six times more at risk of depression and anxiety and seven times more at risk of PTSD than the general population.*” [D1]. The Parliamentary Committee on

Climate Change progress report highlighted that *“successful flood recovery includes dealing with impacts on mental health and wellbeing... (which) are significant, prolonged, and extend beyond those whose homes are flooded”* [D2]. King’s collaborators at PHE briefed DEFRA, leading to a strategic commitment ‘to improve people’s understanding of the impact of flooding and coastal change and the need to take action’ in the Environment Agency’s 2020 Flooding Strategy [D3; E].

Fostering resilience: King’s finding that most people have considerable mental health resilience (4) was important in the immediate aftermath of the 2017 London Bridge terrorist attack. Southwark Council’s Humanitarian Assistance Steering Group coordinated support for those affected, with a subgroup focused on the multi-agency response for psychosocial and psychological interventions including public facing communications. The Consultant in Public Health Medicine for Southwark Council on mental health explained that King’s research *“informed and guided our thinking about managing the psychological sequelae of the major incident – both at population and clinical levels... (including) the decision to advise people to make active use of their existing social support networks”* – noting that this work has since been picked up nationally, and revisited locally to help mitigate mental health impact of the COVID-19 pandemic [F].

Helping public officials and emergency responders communicate more effectively during an emergency. The way that information is communicated in an emergency can influence how people behave and, if done effectively, can reduce the risk of harm to them.

(i) Giving information not reassurance. King’s findings on the counterproductive nature of reassurance (5) informed the public health response to the 2018 Novichok incident in Salisbury. It informed PHE communication to the public and *“training materials for PHE staff deploying into public spaces in Salisbury and Amesbury to answer questions and provide public health information related to the risks associated with the Novichok incident, for the general public”* [E,G]. The Government Office for Science turned to King’s for advice on framing communication about the incident, drawing on the polonium 210 research [C]. This work was also drawn upon after the fire at Grenfell Tower; the Government Chief Scientific Advisor (GCSA) explained: *“Dr Rubin was... a core contributor to the Scientific Advisory Group for Grenfell in 2019, which I chaired... (He) brought his expertise to bear in particular on the approach to community engagement taken by government departments on the Grenfell environmental testing programme... (He) provided valuable insight into the potential unintended effects of using ‘reassurance’ as the rationale for action, and promoted clarity in the communication of any technical results of this testing; this helped to inform messaging to local communities”* [C].

(ii) Monitoring public reactions effectively, in order to communicate better. Following King’s work with the DHSC (1), NIHR awarded the King’s team ‘sleeper’ funding to enable them to quickly activate and support deployment of this tool at DHSC’s request [H]. In 2018, DEFRA and PHE used an adapted form of the survey tool to inform their communication with the local community following the Novichok incident [E,G].

Pivoting to support the UK response to COVID-19:

Drawing on expertise to give scientific advice to Government. King’s researchers have been members of the Government’s Scientific Advisory Group for Emergencies (SAGE) for COVID-19, which considered the scientific evidence supporting the Government’s pandemic response, reporting to the GCSA; and of the New and Emerging Respiratory Virus Threats Advisory Group (NERVTAG). [text redacted for publication] [I]. The GCSA said: *“The scientific advice provided by these groups has been pivotal in informing the evidence base supporting policy decisions on the UK’s pandemic response”* [I].

Improving how the Government used data on public behaviour to inform its pandemic response. Following DHSC’s request in February 2020 to activate the pandemic response plan (1), King’s provided advice and analysis in real time using DHSC’s weekly survey data [H, I]. Reports were delivered weekly to DHSC, SPI-B and other Governmental agencies. The team took requests for analysis from SAGE and its subgroups; these informed SAGE papers – King’s work was cited in at least 50 [I] – [text redacted for publication], ultimately informing urgent policy decisions. PHE said SPI-B outputs *“have directly informed a range of policy areas, and specifically have informed how we write gov.uk coronavirus guidance, which receives many millions of unique hits during the pandemic”*; and that *“we have routinely briefed the internal... teams in the National Covid*

Response Centre (NCRC) morning Situational Awareness Meetings on the outcomes and implications of Prof Rubin's work across a range of policy and operational areas, including on symptom attribution/recognition, self-isolation adherence, vaccination uptake and public perceptions and behavioural intentions relating to the COVID-19 pandemic" [E]. We detail three specific significant policy and public health examples.

Providing analysis on improving adherence to self-isolation. Based on CORSAIR and other polling data, SAGE recommended multiple times that adherence to isolation must not be overlooked as the core aspect of any testing and contact tracing strategy. On 16 September 2020, SPI-B was commissioned to produce a report on how to improve rates of adherence to self-isolation which drew on our polling data and review [I]. The GCSA explained: "On September 17 SAGE endorsed a commissioned SPI-B report on improving rates of adherence to self-isolation, delivered immediately to Government Officials; this included a specific focus on the need for financial support, citing King's analyses. The Government announced new measures on September 19 including the provision of £500 grants to those on low incomes asked to self-isolate and this report continues to inform central Government discussions informing the ongoing UK response". [I]. PHE said this work "has been widely briefed across the public health system, and is being used to inform the development of pilots designed to improve testing uptake, and self-isolation adherence in a number of localities across England" [E].

Improving the mental health and welfare of those in quarantine or isolation. PHE requested Kings review (7) on the impact of self-isolation at an early stage to develop their principles for handling people placed into isolation, to reduce distress. The PHE Head of Behavioural Science said: "From early in the pandemic, Prof Rubin's rapid systematic reviews on the impact of quarantine on mental health was included in our briefings for staff running the Arrowe Park and Kent's Hill Park isolation facilities" [E]. It also informed online resources to support self-isolation, and public messages of thanks from the Chief Medical Officer and others to those isolating [I].

Informing the decision to place the UK into full lock-down. The GCSA explained: "Following the Prime Minister's March 16 2020 announcement that people should avoid non-essential travel and contact, a crucial question was whether this advice sufficiently changed public behaviour. King's evidence of 'room for improvement', along with similar findings from the ONS, were considered by SAGE on March 23rd and adopted as one of five essential findings subsequently reported to central government, and [text redacted for publication] the same day. This contribution from King's, along with expert input from Dr Rubin in the weeks preceding, contributed to the evidence base behind the decision that the UK would enter a full, compulsory lockdown" [I].

5. Sources to corroborate the impact

[A] Testimonial, CCS Assistant Director (National Risks) [PDF]

[B] Testimonial, CCS Assistant Director (Critical Sectors' Security and Resilience Policy) [PDF]

[C] Testimonial on responding to disasters, UK Government Chief Scientific Adviser

[D] Evidence of informing policy on mental health impact of flooding: D1. House of Lords climate change and health debate transcript (21 Dec 2017) [PDF]; D2. Parliamentary Committee on Climate Change progress report (2017) [PDF]; D3. National Flooding and Coastal Erosion Risk Management Strategy for England (EA, Published 2020) [PDF]

[E] Testimonial, Head of Behavioural Science, Public Health England [PDF]

[F] Testimonial, Consultant in Public Health Medicine at Southwark Council [PDF]

[G] Rubin GJ, et al. Public responses to the Salisbury Novichok incident. *BMJ Open* 2020. [PDF]

[H] Simpson et al. The UK hibernated pandemic influenza research portfolio: triggered for COVID-19. *Lancet Infectious Diseases* 2020. [PDF]

[I] I1. Testimonial on COVID-19 response, Patrick Valance, UK GCSA; I2. Details of COVID-SAGE, SPI-B, NERVTAG; I3. Summary of citations in SAGE papers; I4. Examples of PHE communication on self-isolation; I5. First CORSAIR study publication, on self isolation, Smith LE, et al. Adherence to the test, trace and isolate system in the UK. *BMJ* 2021; I6. SPI-B paper, Impact of financial and other targeted support on rates of self-isolation or quarantine (Sep 2020) [PDF]