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PERSPECTIVE

Running red lights: Risk recognition versus follow-up implementation in the case of Germany's pandemic preparation

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Abstract

The discrepancy between formal arrangements to ensure health security, as assessed in the Global Health Security Index, and COVID-19 outcomes points to a broader problem where formal risk recognition is de-coupled from potentially resource-intensive follow-up policy implementation. Germany is an extreme example of this. Pre-COVID-19, Germany's Federal Office of Civilian Protection conducted two pandemic preparation exercises based on scenarios which closely mirrored the current COVID-19 pandemic: (a) a multi-jurisdictional, multi-agency crisis management exercise assuming a global influenza pandemic and (b) a joint federal and expert-agency based risk-analysis assuming the outbreak of a modified severe acute respiratory symptom virus. While informing legal and institutional reforms, key recommendations on storing personal protective equipment (PPE) and disinfectants for front-line staff were subsequently ignored. PPE shortages initially put staff at risk, led to export restrictions on PPE, and later on hampered the country's ability to address a second wave of the pandemic. This short paper calls for a fuller exploration of factors which hinder ''implementation post-cognition.''

KEYWORDS
COVID-19, disaster preparedness, risk analysis

1 | INTRODUCTION

Borrowing part of its title from Wissema's now classical paper *Driving through red lights: How warning signals are missed or ignored* (2002), our paper argues that government failures in connection with the COVID-19 outbreaks are not necessarily due to lack of awareness of the possibility of such an event occurring, but rather due to failures of implementation of specific preparatory measures once the possibility of a catastrophic pandemic outbreak is recognized. In the case of Germany where such risks were formally identified by the nation's Federal Office of Civil Protection and Disaster Assistance [Bundesamt für Bevölkerungsschutz und Katastrophenhilfe—BBK henceforth the FOCP, for Federal Office of Civil Protection], these failures concerned the implementation of key physical preparatory measures such as the acquisition of personal protective equipment (PPE) and disinfectants. In this paper, we refer to these failures of implementation as missed 'follow-up' measures in order to reflect the self-admitted lack of further engagement with recommendations, following a large-scale exercise in 2007 (FOCP, 2022a) and a risk analysis report of 2012[1]. Significantly, these failures also entailed a lack of rigorous engagement with the *Action plan to improve public health preparedness and response in the WHO European Region* (WHO, 2018) and the absence of a thorough response to the Global Preparedness Monitoring Board's report on planning for emergencies (GPMB, 2019).

In parallel, researchers have questioned the accuracy of rankings such as the Global Health Security Index (GHSI) (Abbey et al., 2020; Boyd et al., 2020; Razavi et al., 2020). Implied in some of these criticisms is the idea that outcome of national crisis responses does not necessarily depend on the sum of certain predictable factors, but rather on what governments actually do at the implementation phase.

[1] According to the FOCP (2022), the 2007 pandemic scenario exercise, LÜKEX 07 which focused on a global influenza pandemic was followed by a ''terrorism/dirty bomb'' exercise in 2009/10, a "cyber-attack" exercise in 2011, a "bacterial biological attack" exercise in 2013, and a "natural gas shortage" exercise in 2018, and another "cyber-attack" exercise in 2021, illustrating the pre-occupation of the agency with tangible national security matters.

Pandemic preparation in Germany does not exhibit the systemic failures at the level of risk identification, joint and cross-institutional preparation or training, and institutional and organizational capacity creation. Unsurprisingly, the GHSI (2019) ranked Germany 10th in terms of "Early Detection & Reporting of Epidemic of Potential International Concern," 13th in terms of "Prevention of the Emergence of Release of Pathogens," and 14th out of 195 countries for its "Overall Score." Recent assessments confirm that shortcomings in Germany's pandemic preparation occurred downstream, where the failure to acquire, warehouse, and distribute PPE for emergency services, healthcare providers, and other relevant agencies led to delays in organizational responsiveness while increasing the COVID-19 exposure of patients and front-line care providers (Haffer et al., 2020; Nienhaus & Hod, 2020). Germany's response failed to deliver adequate supplies of PPE and disinfectants, and these failures had severe consequences. Yet, Germany had made extensive efforts at planning and rehearsing the possibility of a pandemic, and its planning efforts were generally regarded as good (see, e.g., OECD Toolkit for Risk Governance, 2019).

Specifically, Germany rehearsed two detailed pandemic-related scenarios. These included, in 2007, a large-scale civil protection exercise called LÜKEX 2007 (FOCP/BBK, 2008), which centered around a global influenza pandemic scenario. In 2012, a risk analysis on civil protection assuming the spread of a modified severe acute respiratory symptom (SARS) virus (Modi-SARS) was conducted. Findings from this multi-agency study were presented as a detailed briefing to the German parliament in January 2013 (FOCP, 2013). The Advisory Board of the German Federal Government for Civilian Crisis Protection noted in its July 2020 statement on *The Covid-19 Pandemic and its Impacts* that "However, their [the exercises'] crucial importance for civil protection was not taken sufficiently into account and political decisions to boost social resilience were not made" (Advisory Board of the Federal Government for Civilian Crisis Protection, 2020, p. 3)

An important implication of this is that contemporary views on crisis preparations are often out of balance: more attention is needed on the final stage(s), practical implementation of planning prescriptions, and follow-up to see that implementation occurs. Planning is usually not enough, and the plans and recommendations must actually be implemented. As such, the German example highlights the need to understand how a de-coupling of risk cognition and risk management can occur and, more generally, the need for research on the follow-up implementation stages of risk management measures.

2 | DISASTER PREPARATION AND PANDEMIC PLANNING IN GERMANY

Pandemic planning in Germany commenced in 2001 when representatives of state and federal health ministries agreed to develop a national pandemic plan (Schaade et al., 2010). This paralleled the creation of the German *Protection against Infection Act* [Infektionsschutzgesetz] in the same year, which replaced the older Federal Disease Act [Bundes-Seuchengesetz] of 1968. The creation of the new Act reflected concerns with new infectious diseases such as acquired immunodeficiency syndrome and bovine spongiform encephalopathy, as well as a 1994 report to parliament which identified weaknesses in the nation's system of disease reporting and prevention. Following the passage of the new Act, the federal ministry for Health tasked the government agency responsible for disease control and prevention—the Robert Koch Institute [RKI]—with the creation of an expert group which subsequently drafted a national pandemic plan. The plan was published online and in print form in 2005. These activities facilitated the implementation of the 2005 International Health regulations in Germany, which were given legal status in 2007.

Unified Germany initially scaled back civil defense and disaster relief operations. This was reversed following the events of 9/11 in 2001 in the United States and a major flood disaster in central Europe in 2002, which necessitated the evacuation of more than 30,000 people in the Dresden area alone. In response, the FOCP was created in May 2004 as central organizational unit for civil security with the mission to improve the coordination of federal and state population protection and relief resources such as fire brigades and aid organizations (FOCP, 2019a).

The FOCP conducted its first large-scale, cross-departmental crisis management exercise in 2004, focusing on a hypothetical large-scale power failure due to extreme winter weather conditions. Next, it conducted an exercise focusing on fictitious terrorist attacks during the 2006 World Cup (FOCP, 2019b). This was followed by similar biennial "interministerial and interstate crisis management exercises" [abbreviated as LÜKEX] which involved "the highest crisis units and crisis management structures at Federal Government and Federal State level, including critical infrastructures in the private sector" (FOCP, 2019b, p. 1).

Overall, the FOCP still saw itself primarily as an agency with core responsibilities for addressing security threats. This reflected both the origins of the agency, which centered on reducing the potential harm of these types of threats to civilians, as well as the prevailing view of these threats among key political circles. Given this background, some observers expressed surprise when the FOCP organized one of its largest exercises around a fictitious global influenza pandemic.

2.1 | Germany's 2007 influenza pandemic exercise—LÜKEX 2007

Influenced by a European report documenting limited pandemic preparedness among member states (ECDC, 2007), German government agencies prepared for a national emer-

gency exercise around the theme of an influenza pandemic. The resultant exercise commenced in November 2007 under the FOCP leadership, based on a global influenza pandemic scenario which had been developed over a 14-month period with the RKI. The exercise involved seven federal states, 11 federal ministries, key personnel from the Interior and Health ministries, various governmental agencies and about 50 companies, relief organizations and associations, with a total of about 3000 participants (FOCP, 2020b), making this the country's largest planning exercise of this kind. The exercise scenario assumed a pandemic of medium severity, during which phase 6 of a WHO-classified pandemic would be reached after 2 months. Day one of the field exercise related to conditions assumed to exist 1 week before the height of the pandemic, while day two related to those assumed for a time 3 months later. The thematic focus of day one was on immediate measures needed to address the acute crisis, with an explicit focus on personnel and supply requirements. Disease morbidity was to be 30% for the first wave of 8 weeks, which led to the assumption of 27 million cases, an increase in the number of General Practioner visits by 13 million, an increase in hospitalizations by 307,000, and 102,000 deaths. Day two assumed that the first pandemic wave had come to a close that and a second wave was about to commence. Thematically, workshops and focus groups at this stage focused on the distribution of scarce hypothetical vaccines and implications of the assumed pandemic in the areas of general supplies, medical care, and transport infrastructure. The 2008 summary evaluation of the exercise identified opportunities for improvement in the areas of IT system availability and the assignment of expert personnel to specific crisis tasks, as well as the need for a new uniform reporting system for informing the public being given special emphasis (FOCP/BBK, 2008).

Post COVID-19, the FOCP added a detailed set of comments to the coverage of the 2007 exercise under the section heading of "lessons learned from the 07 exercise" (FOCP, 2020b). These comments only appear on the German version of its webpage. The German language addendum, summarized here by the authors, noted that (1) adjustments had been made to the national pandemic plan in line with exercise recommendations with a revision in 2017 (RKI, 2018); (2) exercise recommendations that risk and crisis communication had to be consistent, transparent and prompt, now also had to be applied to new communications channels such as Warn-apps and social media; (3) personnel shortages which the exercise had identified as arising from increased demand, staff sickness, and transport problems had now indeed become a major issue; and (4) exercise recommendations had included a call to improve the provision and distribution of medical equipment and PPE. Interestingly, the last point was not further elaborated on, perhaps because this was now recognized as an area of discernable failure. A subsequent paragraph in the same FOCP (2020b) addendum suggested that the 2007 influenza scenario was based on greater levels of predictability than the ongoing COVID-19 pandemic. At this stage, the addendum referred to the FOCP's 2012 risk analysis study of a hypothetical outbreak of a Modi-SARS virus, which, somewhat surprisingly, is likewise described as being limited in its applicability to current events (FOCP, 2020b).

2.2 | Germany's 2012 Modi-SARS risk analysis study

The 2012 Modi-SARS study is the second major pandemic risk assessment exercise conducted by German government agencies. Although smaller in scale than LÜKEX 2007, the Modi-SARS risk analysis document has attracted considerable media attention on account of its assumed anticipation of COVID-19. The work was commissioned in 2012 by government as a "risk analysis report on matters concerning population protection" and was distributed in 2013 to all members of parliament as well as being made available online to the public (FOCP, 2013; Maisch & Dörr, 2020). The report was written by an expert group from the RKI in conjunction with representatives from federal ministries and agencies including the Federal Office for Building and Regional Planning, the FOCP, the Federal Office for Information Security, the Federal Office for Agriculture and Food, the Federal Office of the Agency for Technical Relief, the Federal Network Agency, the Paul Ehrlich Institute (an Agency of the German Federal Ministry of Health which researches and controls the quality, efficacy, and safety of biological medicinal products, including vaccines), and the Joint Support Service Command of the German Defence Forces. The report envisaged a global SARS outbreak, which the study described as a "moderately likely" event, implying occurrence in a period of 100–1000 years.

The scenario assumed that a "Modi-SARS" outbreak, originating in Asia, would be imported by a small number of individuals entering Germany before official WHO warnings had been received. The initial spread of the disease would be rapid due to high levels of transmissibility, although countermeasures such as school closures would have some positive effect, as would behavioral changes. Assuming it would require 3 years for a vaccine to be developed, the scenario suggested the occurrence of three peaks of gradually declining intensity (Figure 1).

When comparing this scenario with COVID-19, there are some differences and many striking similarities. By assuming that nearly 8% of the population (or approximately 6 million people) would be affected during the first wave, the scenario adopted a higher transmission rate and case number than has now been observed[2]. Another deviation is that scenario predictions suggested less pronounced second and third waves, while Germany's actual second COVID-19 wave was more pronounced than its first. The Modi-SARS scenario also assumed a greater lethality of about 10%, when figures for Germany have fluctuated between 1.5% and

[2] The total number of cases for the first wave in Germany amounted to about 180,000 (assuming a duration until the end of May 2020), while the total number of cases until mid-September 2021 is around 4 million (WHO, 2020).

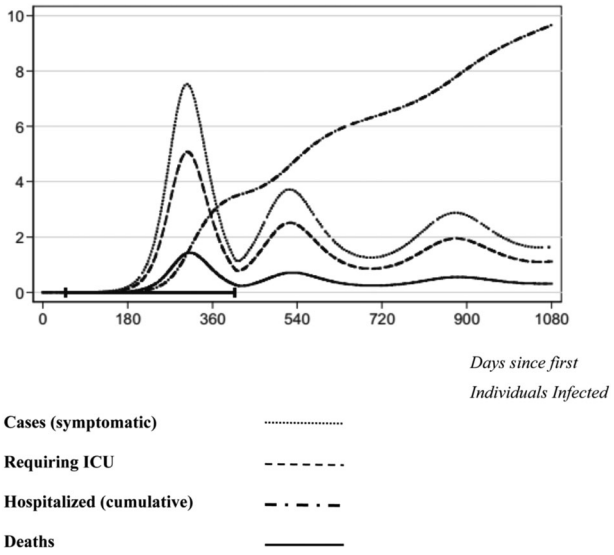

FIGURE 1 Assumed scenario outcomes over time. *Source*: German Parliament (2013, p. 62)

2.8% (WHO, 2020). Other scenario characteristics, including assumptions regarding incubation periods and symptoms, mirrored COVID-19 surprisingly closely.

Policy recommendations stressed a need to initiate risk and crisis management measures which were to be "underpinned by broad societal discussion" (FOCP, 2013, p. 12). While in this sense perhaps less concrete in its recommendations than the earlier LÜKEX 2007 pandemic exercise, the Modi-SARS risk analysis made explicit reference to increased demand for "medicines, medical equipment, PPE and disinfectants" by healthcare and care providers which would lead to potential shortages (FOCP, 2013, p. 73). An FOCP comment of March 2020 states that findings from the scenario were factored into updates of the national pandemic plan, and then notes that "whether or which measures were taken by individual states in response to the 2012 risk analysis, is not known …" to the organization since "the provision of requisite resources is the responsibility of agencies and also of enterprises which are part of critical infrastructures" (FOCP, 2020b, p. 1).

What is known is that suggestions for acquiring and storing protective masks, gloves, suits, and disinfectants in hospitals had been ignored. The president of the FOCP, Christoph Unger, said that "Unfortunately, this report, like some of the other annual risk analyses, has not been discussed in the desirable depth. The last, very important steps in the so-called risk management process were indeed missing" (Epoch Times, 2020). He added that Germany had 17 warehouses storing materials for the treatment of individuals in case of war, but none for the treatment of viral infections.

When asked why recommendations had been ignored, the Federal Ministry of the Interior and for Community [Bundesministerium des Innern] responded to a group of Berlin state news agency reporters that the 16 federal states were individually responsible for emergency management (Coll et al., 2020). The Ministry further stated that the National Pandemic Plan of 2017 included management advice drafted by the RKI which encouraged hospitals and retirement homes to store protective equipment. The Berlin reporters also conducted an interview with a state emergency official who argued that the main reasons for the non-implementation of recommended measures were concerns with their costs. The 2012/2013 risk analysis indeed coincided with a period when there was nation-wide concern with the increasing cost of health care and cost-reduction initiatives were pursued at several levels (Porter & Guth, 2012).

3 | ANALYSIS

German pandemic preparation entailed detailed planning processes and exercises but failed at the final stage of implementation when it came to the acquisition, storage, and distribution of PPE which prior exercises had identified as essential. In the first months of the COVID-19 outbreak, Germany blocked exports of masks to Italy and Spain, among other countries, then followed up with the creation of a "Task Force for the Production" of PPE and active ingredients for medical products (Feinman, 2020). The German export ban of March 4 included a long list of items ranging from masks to protective safety glasses, gloves, and garments (Global Trade Alert, 2020). It was heavily criticized amongst European politicians with one member of the European Parliament speaking of a "disgraceful preventive measure to allow an inventory for future use [which] ignored the immediate needs of other Member States currently facing extreme emergencies (including Italy)" (European Parliament, 2020). As it happened, Germany lifted its export ban on March 11, 2020, but then joined European export restrictions. The European Union imposed export authorization requirement on March 15, which it then lifted on May 26 (EC, 2020). Meanwhile, a black-market trade in medical protective equipment flourished, which was shown, among other incidents, in the seizure by the Viennese customs authorities on March 5, 2020 of 21,000 disposable face masks in a Turkish coach (which did not have CE certification).

The failure to store important equipment had considerable knock-on effects (including high numbers of infection and absence among health care personnel), and shortages continued to plague the country when the second and more severe COVID-19 wave materialized (Vierhahn, 2021). During the second wave, there were no immediate PPE shortages, but the country was plagued by high rates of sickness absence among health care personal (some due to past infection) as well as medication shortages.

The contemporary literature on planning offers little to explain these failures. One possible angle attributes failures to "black swan" effects. "Black swan" events typically are said to relate to phenomena that are completely unknown to scientifically informed decision-makers (unknown unknowns), or those conducting risk analyses but may possibly be known to outsiders (known unknowns). The concept has also been related to events judged to be of negligible likelihood (Aven,

2016). For German disaster planners, the COVID-19 pandemic did not fall into these categories. Other explanations for failure provided by the literature, relate to issues such as a lack of multi-agency or public–private cooperation (see, e.g., Boin & McConnell, 2007). This also does not readily apply to the planning stage of German disaster management, albeit that this problem is relevant to the implementation stage.

Plausible explanations for the implementation failures observed in Germany relate to coordination problems which arose on account of Germany's federal system (Hegele & Schabel, 2021), but it can again be argued that some of these issues had been rehearsed at least in some previous planning exercises. Time delays between the 2012 risk analysis and the outbreak of infections such as Ebola and the distraction caused by other disasters including floods and other climate-related threats may also have played a role.

What remains as perhaps the single most outstanding feature in the German case, however, is that national pandemic scenarios had anticipated COVID-19 type events, but the country was not much better prepared in terms of physical resources than its neighbors. Germany did perform relatively well during the first COVID-19 wave in terms of the management of health services, which is largely attributed to the country's tracking and tracing system, but there is also a possibility that awareness of coordination and logistical issues helped (Laffet et al., 2021). However, shortages experienced in Germany during the first wave, and the more severe second wave, caused significant problems and led to wide-spread criticisms of poor government preparation.

However, instead of pointing to failures to identify risks and rehearse for them across institutional boundaries, the German case points to what we would describe as a follow-up failure, that is, a failure to implement fully the measures needed to physically protect key human assets from the threats identified as being likely [FOCP/BBK, 2008] or moderately likely [Modi-SARS 2012] to materialize once the necessary risk and planning exercises have been conducted. We suspect such follow-up failure is more frequent and more significant in impact than some of the earlier stage failures identified by the literature. We also suspect that identifying the precise point at which risk management failures occur—in our case the follow-up stage—is useful, especially for environments where the early stages appear to have been robustly and competently managed.

The reason for this is we believe that when it comes to final-stage failures, the running of red lights when nearing the end of the journey, to use Wissema's (2002) metaphor again, important systemic factors can be at play. In summary, these include the following: (a) difficulties in estimating the extent and cost of required measures; (b) related difficulties in getting agreements on financing or cost sharing; (c) problems in convincing stakeholders and the public of the need to engage in these measures, especially when there are other pressing issues; and (d) the ease with which such tasks can be delegated to lower levels of governments such as states or provinces in federal systems.

Germany offers an intriguing example of a country where pandemics such as COVID-19 were anticipated and rehearsed for, but where this knowledge did not inform significant physical preparation. While further research will be needed to fully understand underlying events, we would suggest these experiences offer some preliminary lessons.

4 | RECOMMENDATIONS

When risk analyses point to the need for potentially costly and administratively complex follow-up steps, it is the full implementation of these measures that perhaps deserves the most attention of policymakers. Recent research indicates that in the German case, country-specific factors may have militated against the implementation of recommendations made by agencies involved in risk analysis, assessment, and management. These factors include the country's federal structure which gives far-reaching responsibilities to the 16 individual states (Hegele & Schabel, 2021). However, some of the interviews mentioned above indicate that state power was perhaps not as problematic as the, often all-too-convenient, reliance of federal authorities on state funding (Chadderton, 2015) or passing-the-buck mentality of some federal agencies.

Another more specific problem concerns mission overlap between the RKI and the FOCP (Scharte, 2021). The RKI views itself as Germany's central scientific institution in the field of biomedicine and "one of the most important bodies for the safeguarding of public health in Germany" (RKI, 2022), while the FOCP webpage describes the agency as being "in charge of civil defense" but then goes on to state that "The Federal States in Germany are in charge of disaster management…" For major disasters affecting several Federal States, the states can ask The Federal Republic for help. In this case, The Federal Office for Civil Protection moderates the coordination of the needed help" (FOCP, 2022b). A subsequent list of main task of the agency only increases the impression of overlap by listing the following tasks: "Warning, To promote preparedness, Risk management, Crisis management, Medical civil protection, Shelters, Protection of cultural properties according to the Hague Convention'' (FOCP, 2022b). The new "re-orientation" rubric on the FOCP webpage [in German only] lists as areas of planned change or development: a greater focus on health aspects of population protection, the creation of a joint competency center meant to foster inter-agency cooperation (presumably including the RKI), the creation of a warn-app, greater prominence of the FOCP in the creation of strategic reserves, and greater international cooperation (FOCP, 2022b).

In terms of general recommendations, a number of suggestions discussed in the relevant literature on national disaster management are relevant to the German case (see, e.g., Clark & Dercon, 2016). These include the need for:

- a clear *ab initio* assignment of responsibilities with regard to the implementation and financing of disaster

management and prevention measures (this includes the avoidance of ambiguous or contested responsibilities of buck-passing to lower level agencies or governmental levels, such as local authorities or as in the German case, individual retirement homes);
- the avoidance, further on, of "running out of steam" (due, e.g., to deadlines slipping, key staff departing, or agenda displacement) further on when concrete measures are to be implemented;
- the avoidance, throughout, of unfair blame when prepared-for risks do not materialize;
- the coordination, throughout, of activities among experts and expert agencies (as seems now envisaged in the planned competency agency).

In the German case, recommendations for the availability of equipment should have been followed through with clear instructions to federal and state agencies, allocating to them the ownership of the duty to finance, acquire, and store the required equipment together with responsibilities for ongoing inspection and, in times of crisis, distribution of these materials. Wissema (2002) identified some of these factors when he attributed "redlight-behaviors" to managers, including overestimating their competencies (instead of working with interdisciplinary teams, which is what some have accused the RKI of, see, e.g., Scharte, 2021), focus on a single problem or groups of problems (as applies to FOCP's emphasis of security issues), and unclear structure and mission (as exemplified by the RKI vs. the FOCP).

We suspect similar problems can be observed in other countries, although the level of awareness of pandemic threats may have been unusually high in the context of German disaster preparedness planning. Whatever the institutional arrangements, proactive implementation will be critical (and, perhaps, mechanisms for assuring it). Notwithstanding the actions of individual states, there are also questions about the appropriateness of national initiatives, which are of particular importance in the context of the European Union, with researchers having emphasized the need to move to a "federated agenda of health promotion in Europe" (Ippolito, et al., 2020, p. 365). Perhaps future lesson drawing can draw on the historical approaches of specific countries, while allocating budgetary resources to projects which transcend national boundaries.

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CONFLICT OF INTEREST

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