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Approaches to Plans in Public Health Emergency Preparedness and Response

by

Mark David Hunter

A dissertation submitted in partial satisfaction of the
requirements for the degree of
Doctor of Philosophy

in

Health Policy

in the

Graduate Division

of the

University of California, Berkeley

Committee in charge:

Associate Professor Ann Keller, Chair
Professor Chris Ansell
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Professor Nancy Van House

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Abstract

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Associate Professor Ann Keller, Chair

In public health emergency preparedness and response (PHEP), plans are a central matter of concern. Understanding plans' role in establishing, facilitating, or securing preparedness and response objectives is of enduring practical and theoretical warrant. Drawing from practice-based perspectives and treating plans as sociotechnical objects, this project aims to describe ways in which theoretical approaches to plans shape their use, meaning, and value in actual practice. Employing empirically-grounded and interpretative methods, it investigates divergent accounts of plans' role for the purpose of identifying assumptions about the mechanisms by which plans' achieve their practical effects. The consequences of these assumptions on how plans are written and used are explored in separate case studies. The first focuses on the modalities for coordinating functional response activities within local health departments' preparedness and response plans in the U.S. The second focuses on the modalities for coordinating information globally within the International Health Regulations (2005). Both cases demonstrate that the capacities of plans to realize functional or operational objectives i.e., the mechanisms of *how* plans work, depend on the dominant theoretical approaches in the relevant setting.

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¹Omissions, oversights, and errors, naturally remain my own.

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To Jenn

Who enables everything good

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Chapter 1

Prologue

Throughout history, few events have proved so calamitous as those associated with infectious disease outbreaks. The 14th century plague known as the “Black Death” is estimated to have taken up to 200 million lives. In Europe, 60% of the population perished during a single two-year period [Benedictow, 2005]. The 1918 “Spanish” Flu pandemic killed at a rate of 1,000,000 people per week, every week, over its first six months [Taubenberger and Morens, 2006]. More contemporary threats like Ebola, highly pathogenic influenza, and agents of bio-terror are situated in a world not only vastly more populated than it once was, but one more integrated, traversable, and therefore penetrable, than ever before. That society would invest in a class of professionals who take as their aim the prevention of public health catastrophes is a very obvious thing indeed. Those professionals operate in what has come to be called the field of Public Health Emergency Preparedness and Response (PHEP).

Public health emergency preparedness “is the capability of the public health and health care systems, communities, and individuals, to prevent, protect against, quickly respond to, and recover from health emergencies, particularly those whose scale, timing, or unpredictability threatens to overwhelm routine capabilities” [Nelson et al., 2007, p.S9]. If the response to an incident is an *event* then preparedness is a *process* that “develops, maintains, and uses a realistic preparedness plan, integrated with routine practices [that guide] pre-planned and coordinated rapid-response capability” [Nelson et al., 2007, p.S10]. As these influential and widely adopted definitions suggest, in PHEP the development and use of a plan is an absolutely central matter of concern. Plans are found within the filing cabinets, on the computers, and scattered across the conference tables of organizations in every corner of the globe. They are the object of considerable personal time, organizational attention, and

financial resources. They are developed, written, exercised, executed, updated, reconciled, pointed at, agonized over, carried around, tossed aside, praised, cursed, used, ignored. They seem so essential to what the field *does*, that judgments about the very worth of society's investments in preparedness are commonly made on the basis of plans' technical merits or sufficiency.

As a somewhat peripheral participant in this field for much of the past decade, I have observed that, despite so much of their work being “about” plans in some way, practitioners do not generally find plans particularly interesting. Consider the following vignette. During a roundtable discussion about pandemic planning in public health, the health officer of one California county was asked if there was anyone in her department that worried about how its PHEP plans were being implemented during emergencies. Not necessarily someone for whom this was their sole job, but someone who simply might find themselves in a position to give the matter some thought. Her initial response assumed the question was about plan initiation; she mentioned the defined roles of the Incident Commander and several other key positions, i.e., the people explicitly empowered to order the execution of a plan. When the query was refined and she was asked to instead identify anyone involved in the writing of plans, in their production, that would have given thought to how their colleagues would use or implement the plan during the course of the emergency response she replied, “Well, that's esoteric.”

Though obviously a single example, this response does suggest that, for practitioners, plans are in some ways self-explanatory. What they are, who they're for, how they work, what they accomplish: these are questions with straightforward answers. This senior official — intelligent, respected, well-trained, with roughly 30 years experience in medicine, outbreak investigations, and emergency management — is not naïve. She undoubtedly appreciates that knowledge of plans' capacities to inform preparedness and response is of enduring practical warrant for practitioners in PHEP. She, like virtually all of his colleagues, will expend much effort in improving plans and in assessing their performance during real and simulated events. And, she is not wrong. Questions about how plans work are, for her, esoteric. To real insiders they are, or at least appear, well-settled.

1.1 Approach and aims

This project realizes an approach to unsettling the question that perhaps summarizes them all: What is the role of plans in PHEP? The approach proceeds by two critical “moves.” The first move acknowledges that every account of plans’ role relies upon some framework against which the plans’ mechanisms, associations, or effects is recognized. A direct, theory-free, understanding of plans’ “actual” role is not possible. Only *accounts* of plans’ role are available, and these differ from plans’ “actual” role by whatever degree the theoretical approach to plans *in making the account* differs from the theoretical approach to plans *in actual use*, which is unknown. While in any given case these conceptually distinct approaches to plans may, in fact, be aligned, it is also possible that they may, in fact, diverge considerably. This possibility raises a practical concern and a conceptual difficulty. Practically, if the approach to plans within conventional accounts of plans in PHEP assumes, from the outset, a narrower range of roles and effects than does the approach to plans in actual practice, then some part of the plans’ import to the field may go unrecognized. Plans may actually be working better, worse, or perhaps just differently than is currently known. Conceptually, the project’s approach to the question “What is the role of plans in PHEP” must then in some way account for the role of potentially different theoretical approaches to plans in accounts of plans role.

The project’s second critical “move” addresses that conceptual difficulty by conceiving of potentially-different approaches to plans as expressions of the field’s “planning theory.” If the role of plans in PHEP is subject to different approaches *in* planning theory, what should be the approach *to* planning theory? Owing a debt to, and drawing an analogy from, literary theory, De Man supplies an answer. “Literary theory can be said to come into being when the approach to literary texts is no longer based on non-linguistic, that is to say historical and aesthetic, considerations or, to put it somewhat less crudely, when the object of discussion is no longer the meaning or the value but the modalities of production and of reception of meaning and of value prior to their establishment — the implication being that this establishment is problematic enough to require an autonomous discipline of critical investigation to consider its possibility and its status” [De Man, 1986, p.7]. In the analog of planning theory, the object of discussion is no longer plans’ meaning or value (i.e., their role) but the modalities of production and of reception of meaning and of value. That is, the form of the relationship between the features or capacities of the plan and the features or capacities of use — including the capacities of the user — that interact to create meaning in

a specific situation.¹ Moreover, not only will the approach to *plans* be based in a theory that accounts for the establishment of their role in light of their own modalities, the approach to different *approaches to the establishment of plans' role*, will be based in such a theory.

“What is the role of plans in PHEP?” proved too broad. To reach the question by a direct approach would require taking on too many obstacles and complications. The critical turns of this approach respond to the expanding theoretical abstraction of the complications by charting a narrower path to the investigation. After the first move, the object became two more tractable variants: “What is the role of the theoretical approach to plans in PHEP,” i.e., the role of the “actual” approach in effect, and “What is the theoretical approach to the role of plans in PHEP,” i.e., the effects of approaches to their role. It now becomes, after the second move, “What are the modalities of production and of reception of meaning and of value of plans and of approaches to plans that establish varieties of meaning and value?”

Stripped of its formal trappings, the aim of the study is to investigate the mechanisms by which plans and the ways of thinking about plans interact and seem capable of producing different accounts of their role. The chapters ahead explore an intuition that plans, in a direct and instrumental way, are an attempt to get specific actors in the field to do certain things and that assumptions about what the field does with, and as a result of, plans are necessarily embedded within them. By conceiving of these assumptions as products of theoretical approaches, and by drawing on practice-based perspectives to highlight by what unique modalities, arrangements, or capacities plans and theoretical approaches might interact, the project will investigate how plans and approaches are reflexively shaped.

While at several points I advance a critical argument that the field's current approach to planning has resulted in plans that are less useful than they perhaps could be, I generally do not make direct recommendations for their improvement. However, having poured through many plans, listened to those who make and use them, and observed them in action in a variety of settings, I believe a description of the current approach to plans — an approach which consequentially underestimates their role, their capacities to shape response, and the complexities of how they are used — implicitly calls out for a broader conceptual basis. My foremost interest is demonstrating what that basis may be. In “opening up” plans and

¹While other theorists express a similar critical “turn” that highlights the production of meaning more succinctly, De Man's version of “modalities” is particularly appealing because *a* modality is a theoretical relationship between capacities that allows for different varieties of meaning to be created. However, it is cumbersome. Usually shortened, in every case in which a truncated form of “modalities” appears, it always refers to “modalities of production and of reception of meaning and of value” with the emphasis that these are rooted in the plan.

PHEP to different avenues of analysis that are likely to help “explain” what now seems self-explanatory, my aim is to account, necessarily partially, for the existing relationship between plans, the people that use them, and the thinking that unites them. By specifically “foregrounding” and relating various plan modalities, I hope to be able to identify promising factors on which a broadened approach to plans in PHEP might be based.

1.2 Trailblazers

In its quality of attending to the role of plans so as to illuminate some phenomenon of interest, this project shares common ground with two major statements on plans,² Lee Clarke’s *Mission Improbable: Using Fantasy Documents to Tame Disaster* [Clarke, 1999] and Lucy Suchman’s *Plans and Situated Actions*³ [Suchman, 2006]. Clarke’s focus is on the processes by which organizations rationalize potentially catastrophic problems and transform their inherent uncertainties into politically acceptable risks. He argues these transformations are realized within plans for which there is little expectation of operational effectiveness and which misleadingly promote the fantasy of expert competence and control. Suchman’s focus is on the processes by which purposeful human activity, and interactivity, comes about and is made intelligible. She argues that a conception of activity based on a *planning model* that assumes all action can be characterized as following a plan, serves to obscure the real resources on which people draw to achieve *situated action*. What similarities and differences these approaches have with each other, and my own, is the question to which I now turn.

Plans as fantasy documents

Clarke approaches planning from the assumption that it has aspects of both functional and symbolic utility for organizations. By functional utility he means the largely common-sense view that planning reflects a course of action that is chosen to maximize interests. “Such planning is designed to accomplish a task, its function to accomplish an organizational goal” [p.7]. With a functional plan an organization creates “a blueprint that tells itself what to do”

²As will become apparent, one difficulty in this field is that theories of plans distinguish and relate “planning,” “plans” (in the sense of having or making plans), and “plans” (in the sense of a physical document) with varying degrees of precision. Although far from exclusive, I view Clarke as emphasizing planning, Suchman as emphasizing plans “in one’s head,” and myself as emphasizing plans as objects.

³In fact, the second and revised edition titled *Human-Machine Reconfigurations: Plans and Situated Action* although the original statement had the “Plans and Situated Action” first and carried the subtitle “The Problem of Human-Machine Communications.”

[p.8] where “planning and effective response are causally related” [p.56]. By symbolic utility he means that a plan is a form of rhetoric whose purpose is to convince some audience that the plan will unfold as the organization says that it will. While even highly functional, protocol-like, plans have symbolic utility to the degree that they are assumed to prove effective, Clarke thinks the “interesting things” about planning concern situations when the symbolic aspects of planning are likely to far outstrip the functional ones. Indeed, “some plans have so little instrumental utility in them that they warrant the label ‘fantasy document’” [p.2].

Clarke’s is a problem-centric view of planning. He agrees with the “usual presumption” of the social sciences that the character of the problem in some way affects any plan hatched to solve it. However, he thinks that the typical rational actor model of planning that ends with implementing a plan that will solve the problem really only describes conditions of “low uncertainty” where it is relatively easy to gather and make sense of information relevant to predicting future outcomes. With highly uncertain problems, by contrast, the character of planning changes completely. In conditions “when important aspects of the future are not or cannot be known, planning is shorn of its most functional aspects (knowing what “important” means is part of effective planning). This is not to say the planning under uncertainty can’t in principle *be* effective. It is to say that the ability to know what constitutes effectiveness is terribly low or nonexistent. The importance of planning’s symbolism then increases relative to a plan’s likelihood of being realized” [p.4].

Planning for catastrophic, rare, or highly-complex events, is problematic because organizations will have insufficient prior experience or lack appropriate “conceptual schemes” to allow for confidently transforming uncertainty into risk (where “risk is when you know the possible range of things that may happen following a choice; uncertainty is when you don’t” [p.11]). Thus, the resultant plans may appear (mainly to political stakeholders and the public but, also possibly, to the organizations themselves) to demonstrate a capacity for control that is belied by their having little claim to expected operational effectiveness. Clarke is particularly interested in the mechanisms by which organizations and their resident experts use “apparent affinities” between highly uncertain and more tractable events to create “symbolic links” and that express an “underlying sociological theory of events, meanings, and behaviors” [p.71]. This is the essence of a fantasy document: “rhetorical instruments that have political utility in reducing uncertainty for organizations and experts” [p.13] marked by easy and simplistic depictions of society and internal coordination “are entirely made up” fantasies in response to some imperative to be seen as *doing something* in the face of some threat.

I will critically highlight four related features of Clarke's approach before turning to Suchman and then returning to what I draw from and find valuable in both. The first difficulty of Clarke's perspective is that it rests on an *a priori* categorization of events or problems along a certainty continuum that assumes that uncertainty inheres in the environment and is determined independently by the analyst. Any reflexive role of the plan in shaping the conception of uncertainty is largely ignored and consideration of the rhetorical features or symbolic utility of planning is only warranted subsequent to the environment's having been judged to be highly uncertain. In that way he reinforces an emphasis not on *plans* but on *planning*. It is the mechanisms of planning (proceeding by apparent affinities) and the effects of planning (the creation of principally rhetorical plans) that distinguish planning in high uncertainty environments from planning in low uncertainty environments. Second, to the degree he has a theory about plans, per se, his approach treats their *effects* on different bases and time scales. In his view, a fantasy document is a plan that 1) effectively functions for political purposes now based on the (misguided) belief that the plan will effectively function for operational purposes later but 2) that should not be expected to effectively function for operational purposes later, so difficult is it for the plan to adequately address the uncertainties posed by important problems. And while all of that may be true, it serves to ensure that his analysis proceeds by attempting to explain effective (or realized) symbolic utility in terms of expected (or hypothetical) functional utility, thus avoiding the question of the contribution of rhetorical / symbolic aspects to actual functional effectiveness.

Third, because he treats the symbolic effects of plans as relevant only in the context of the specific repertoire of planning methods of high uncertainty environments, he introduces different *mechanisms* there, too. Whereas low-uncertainty plans achieve their (operational/functional) effects by producing delineated blueprints that create "favorable conditions" for the costing and allocation of resources by delineating wants, needs and gaps in the organization, the high-uncertainty plans achieve their (symbolic) effects "rhetorically." This analysis thus sidelines questions about how even functional plans operate rhetorically, e.g., questions about the ways in which functional plans manage to persuade audiences to follow them, or that following them is easy and will help the audience achieve its goals. Fourth, finally, in his conception the symbolic utility is always externally oriented while the functional utility is directed internally to the organization. He is interested in the plan as mediating the relationship between actors that never share the same organizational space. So it is a relationship between the organization and the public, the organization and political decision makers, the political and the public, and so on. While this profitably allows him to

cast the plan as site where different logics and interests interact, he is not interested in cases where it is the organization using these rhetorical techniques to convince itself. For fantasy documents, it is the outside audience's expectations that principally influence plans' form and content, not the organization's own.

Plans and situated action

Suchman views her project as part of an effort to “challenge to traditional assumptions regarding purposeful action and shared understanding” [Suchman, 2006, p.69]. From her design-centered perspective, all tools or objects rely upon and materialize “some underlying conception of the activity that it is designed to support” [p.31]. By this she does not principally mean the conception of the activity the tool is designed to support (e.g., the conception of what public health emergency response *is*) but, rather, the conception about the nature of that activity itself. Overwhelmingly, she finds, tools are designed to support activity under the assumption of the *planning model* that activity proceeds as if according to plans. N.B., that here she is neither specifically addressing, nor excluding, plans as physical documents. The model “treats a plan as something located in the actor's head, which directs his or her behavior” [p.31]. However, given that plans (as documents) are a type of tool or object that, like any other, relies on an underlying conception of human activity, they would be expected to be the tool that embeds the planning model of activity *par excellence*. Rather than viewing plans, as in the planning model of activity, as “cognitive control structures that universally precede and determine actions” her approach views plans as “cultural resources produced and used within the course of certain forms of human activity” [p.13]. The object is then to look at how actors use the resources available in any particular situation, including the resources of the planning model and any objectified plans, to achieve situated action. In this way, plans do not determine how action unfolds, they provide “resources for people's practical deliberations about action” [p.69] and formulate “antecedent conditions and consequences of action that account for action in a plausible way” [p.31].

In Suchman's view, the dominant way of thinking about how plans work to achieve their prescriptive aims is essentially circular. The degree to which a person encounters a plan and finds it self-explanatory “is just the extent to which someone examining the artifact is able to reconstruct the *designer's intentions* regarding its use” [p.43]. In the standard conception, that means the user and the designer share some background understanding of the situation of its use to begin with. But, to articulate what that common understanding is *of* will

reveal its “problem solving” character: the situation is figured in terms of goals and the preconditions and consequences of the actions necessary to achieve it. A plan then reduces to a detailed set of instructions that “becomes substitutable for the action, insofar as the action is viewed as derivative” [p.59] from the the planning model’s assumptions of shared understanding. This circularity demonstrates that “a problem that any account of human action must face [is] that an action’s significance seems to lie as much in what it presupposes and implies about its situation as in any explicit or observable behavior as such” [p.64]. For her, accounts that “characterize purposeful action as in accord with plans and goals is just to say again that it is purposeful and that somehow, in a way not addressed by the characterization itself, we constrain and direct our actions according to the significance that we assign to a particular context. How we do that is the outstanding problem. Plans and goals do not provide the solution for the problem, they simply restate it” [p.67].

Ultimately, Suchman’s view of plans is that plans (and planning model based accounts of action) objectify the action that they come to represent. In this way plans are most useful as resources when action does not proceed smoothly. When action “becomes in some way problematic rules and procedures [as preformatted in plans] are explicated for the purposes of deliberation and the action, which is otherwise neither rule based nor procedural, is then made accountable to them” [p.74]. But in every case in which plans serve this function, someone that “follows” a plan’s instruction is, by some process, grounding the significance of the instruction in particulars of the actual situation of its use [p.86].

Synthesis

My approach to plans heeds Suchman’s call for a research agenda focused on the “relation between the activity of planning and the conduct of actions-according-to-plan” [Suchman, 2006, p.21] with the caveat that I emphasize that, in some situations, the relation is mediated by (or at least includes) a formal document called a plan that is meant to guide actions-according-to-plan in both “according to the planning model” and “according to *this* plan” senses. In that way my approach differs from Clarke, who sets out to investigate the role of plans that, from the start, would not be expected to guide operations. In his terms, I think there is something very interesting about plans even when considering only aspects of their functional utility. While his approach usefully shows that “underlying sociological theory of events, meanings, and behaviors” [Clarke, 1999, p.13] are embedded in the planning practices that account for plans’ symbolic utility, I, following Suchman, assume that there are theories

underlying plans' functional utility as well. Those theories, at least in part, will be theories of how plans work.

I share Clarke's assumption that plans can have symbolic and functional utility in varying degrees although I reject an approach that accounts for plans' functional and symbolic features on different terms or levels of analysis. In my view, a properly plan-focused approach would instead attempt to describe plans' role — regardless of whether that be principally functional or symbolic — in a common lexicon of plans' capacities to produce effects of varying sorts, and by varying means, in varying situations. Clarke helpfully strides well beyond rational actor models of plans' capacities for effectiveness by introducing rhetorical features to plans' repertoire of mechanisms. But, he limits these modalities only to explanations of plans' symbolic effects and lets the traditional mechanisms of the rational model continue as sufficient explanations of plans' functional effects. In focusing on plans as objects, I assume that plans' design in both literal and metaphorical senses “tells” users how to interpret and use the object [Norman, 2002]. And, when the language the object is using to tell the user how to interpret the object is, also, literally telling them what to do, there is complicated and reflexive theoretical puzzle at hand.

In the project's final chapter, I return to both Clarke and Suchman. My findings in some ways amplify and in some ways diverge from their contributions for reasons that are due, in part, to differences in approach and, in part, to differences in the time and settings on which the projects have focused. For now, the next chapter begins a more thorough elaboration of the theory behind the approach to plans in PHEP that underlies the investigations in chapters 3 and 4.

Chapter 2

Theory & Methods

This chapter presents how the project’s aims will be investigated. Drawing directly from those aims, it begins from the perspective that a critical “planning theory” approach requires that its analyses be based on considerations relevant to the possibility of plans’ establishing or receiving meaning or value. It is not a priori certain what, for PHEP plans, those considerations are. However, there are bases for consideration of what they *may* be. As the language-based semiotics of linguistics was particularly appropriate for the approach to the novel, given its characteristics, the approaches to PHEP plans, given their characteristics, may likewise draw from other disciplines’ theoretical contributions to the production of meaning. If so, the investigation might then have a repertoire of theoretical relationships to “test” in cases within PHEP, to see if those factors do illuminate accounts of role divergence. But, it will first be necessary to survey the field to see what actually is there. Only then can any of its characteristics empirically ground the approach of the method.

2.1 Survey of the historical terrain

A trio of incidents beginning in 2001 — the September 11th terrorist attacks, anthrax mailings, and SARS outbreak — drew worldwide attention to the need to establish and strengthen public health and emergency preparedness infrastructures [Evans and Schwartz, 2009]. Within the United States, contemporary assessments of the nation’s preparedness posture were almost uniformly uncomplimentary. Recognizing that states and their local agencies are principally responsible for emergency response via the police powers reserved to them by the Constitution, [Childress et al., 2002] calls for improvements in PHEP would

face the challenges posed by large variation between the nation's many state and local health departments (LHDs). Those departments were marked by differences with respect to their prior response experience, availability of human and material resources, and quality of their existing plans [Lurie et al., 2004], as well as their organizational and political structures [Mays et al., 2010]. Responding to these perceived vulnerabilities, federal, state, and local governments subsequently committed unprecedented resources to developing more integrated and effective disease detection and response systems [Lister, 2005]. Internationally, the World Health Organization (WHO) renewed its efforts to coordinate disease reporting, to improve surveillance capacity, and to develop standardized procedures for handling disease threats under revisions to the International Health Regulations [Hitchcock et al., 2007].

Among the most significant of the domestic changes were the following: federal emergency preparedness functions were largely subsumed under the newly-created Department of Homeland Security (DHS); state and local public health agencies were required to develop new preparedness plans [Lister, 2005]; State and local PHEP initiatives were supported by roughly \$1.5 billion annually in federal grants from 2002–2013 [CDC, 2010]; the field shifted from a threat-specific to an “all-hazards” approach [Trust for America's Health, 2010]; most health agencies adopted aspects of the “Incident Command System,” (ICS) an emergency management concept with defined organizational roles and functions; localities integrated public health functions into their existing “emergency operations centers,” or, started them anew [CDC, 2010]; interagency, public-private partnership, and other mutual aid agreements were formed, and; new disease surveillance methodologies and systems came into force [Morse, 2007]. Collectively, these initiatives accelerated an ongoing process of standardization, professionalization, and centralization of emergency management [’t Hart et al., 1993].

Within the U.S., the operational changes were founded upon the *National Incident Management System* (NIMS), a complex of technologies representing “a core set of doctrine, principles, terminology, and organizational processes to enable effective, efficient and collaborative incident management at all levels [so as] to provide a consistent nationwide approach for federal, state, tribal and local governments to work together to prepare for, prevent, respond to and recover from domestic incidents, regardless of cause, size or complexity” [U.S. Department of Homeland Security, 2008]. The NIMS framework requires, by law and under penalty of withheld grants, that response agencies adopt a host of “NIMS compliant” practices from how they write plans and conduct preparedness exercises to how their incident command organizations are staffed and what degree of training their responders

should possess. The rigorously defined principles and processes include injunctions to plan for specific events and scenarios and requirements for the evaluation and maintenance of operational plans. As part of NIMS processes, agencies are required to submit After Action Reports (AARs) following any “live” event or significant exercise to assess capabilities, activities, and critical tasks and to guide future plan improvement [U.S. Department of Homeland Security, 2007b, p.iii].

Alongside of these new bureaucratic and political inducements to plan, public health agencies in the early 2000’s faced an increasingly alarming threat of pandemic influenza due to the emergence of highly-pathogenic H5N1 “bird flu” in Southeast Asia. Leading scientific and public officials worried that a virulent and lethal strain against which there was little human immunity might “jump” from birds to the human population [Gostin, 2004]. Explicit comparisons to the catastrophic outcomes of the 1918 influenza pandemic were common. International authorities highlighted H5N1’s deadly potential in calling for increased basic and operational research [CDC, 2006]. Partly on the basis of those concerns, many public health agencies adopted infectious respiratory diseases like influenza as a focus of their PHEP planning and infrastructure development efforts. By 2008, reviews of U.S. state and local health departments’ preparedness plans highlighted widespread improvements [PHEP Partners Working Group, 2008] but, also, found that significant gaps remained [U.S. Government Accountability Office, 2004].¹ Despite this somewhat uneven progress, when the H1N1 “swine flu” pandemic began in the Spring of 2009, pandemic influenza plans were among the most well-developed and well-exercised of any emergency event type that public health agencies might face.

2.2 Theory and methods

It is around the historical context of the 2009 H1N1 outbreak that this investigation is centered. To the extent possible, it aims to capture and describe elements of plans and practices as they were at the time of that event. Practically, like any analysis of plans or planning practices, this one must in some way be temporally bounded given that both change over time. Serendipitously, the H1N1 outbreak provides highly appropriate bounds given the project’s aims. In the period prior to it, plans were at their most philosophically ideal — they had not yet undergone the trials of a real, large-scale, event and would not, therefore,

¹A contemporary review of the federal flu strategy and plans also discovered significant lacunae in federal agencies’ own planning documents, too [U.S. Government Accountability Office, 2007].

reflect whatever practical experience might be learned from one. Without the benefit of prior experience, responders would have a more limited repertoire of skills upon which to draw and would be expected to more directly and transparently “follow” the plans’ guidance than might later be the case. Whatever links between the thinking and structures that had shaped plans and the responses they were expected to engender would then be easier to discern.² Additionally, as the first pandemic declared by the WHO in the current era, the response to H1N1 would prove to be an event of uncommon public health and political import. As a practical consequence, in its aftermath, the professionals most directly responsible would be expected to wrestle with its lessons so as to inform improvements. The details of their prior planning efforts would be salient and more vividly remembered. For a project probing approaches to plans, it would be a period of heightened possibility.

Theoretical approach of the investigation

The specific aim guiding the project is to investigate the mechanisms by which plans and the ways of thinking about plans interact and seem capable of producing different accounts of their role. Thus, the crux of the investigatory approach is that it be designed to “encounter” a variety of accounts, as it is through the comparison of different accounts’ approaches that modalities of production and of reception of meaning and of value can be related. It is then necessary to adopt an approach that situates plans, approaches to plans, and the field in which both reside in some common frame. It would also be desirable if that approach is capable of representing the complexity of the organizations, technologies, professional standards, locations, and people that comprise field. On both of these fronts, the practice-based theoretical approach typical of studies of Science, Technology & Society (STS) provides a framework for “isolating objects from their context, grouping them in the same frame [and] establishing original relations between them” [Cabantous et al., 2010, pp.1534-5]. In the remainder of this section, an overview of literature from related perspectives provides a vocabulary for the elaboration of applications in the PHEP domain. This presentation serves as the common theoretical foundation on which the subsequent chapters’ accounts are built.

²For example, several plans, following WHO guidance, direct disease investigators to “line list” — to collect detailed epidemiologic profiles on — the first 100 cases in their jurisdiction for the purpose of informing assessments of disease severity which, subsequently, might inform the selection of response or containment strategies. The utility of this practice was called into question during and after H1N1. Its presence in plans prior thereto helps establish in what ways plans were then anticipated to inform preparedness or response operations.

Among the animating principles of STS is that sociality is a defining characteristic of human experience. That is, what is characteristically human about the human experience is the degree or extent to which it is social. Not only do individuals constantly form associations with each other to achieve practical ends, they rely on group membership and their position relative to socially-defined units to derive personal and existential meaning. That contemporary life appears to be conducted via the multiple and overlapping social worlds that people typically inhabit suggests, at least, that accounts of human behavior must always in part be “social explanations.” A stronger view holds that the routine appearance coordinated and comprehensible human activity is, given both its apparent power and ubiquity, actually our most remarkable achievement. And, if so, accounting for the development, stability, change, and effects of existing social relationships is a basic aim of social science.

Relatedly, the investigation is informed by ethnomethodological approaches in social science — those “concerned with practical reasoning in everyday situations, and the ways in which practical actions are collectively accomplished and made socially intelligible” [Horlick-Jones and Pradesb, 2009, p.426]. For Clarke, grounding the analytic approach in “situatedness” highlights that social activity tends to be organized with “at least one primary activity, particular sites, a technology (inherited or innovative means of carrying out the social world’s activities), and, once underway, more formal organizations typically evolve to further one aspect of or another of the world’s activities” [Clarke, 2005, p.46]. Situations appear readily distinct from each other by the gradual development of different shared vocabularies, ways of thinking, rules of interaction, and the expected relevance of certain actors to the ongoing concern within the relevant social sphere. Thus, the situation (i.e., the primary activity, conducted at certain sites, with particular technologies) is identified by and constituted alongside the social world (i.e., the different vocabularies, knowledge, and rules) which is identified by and constituted alongside the situation. They are, in a word, co-produced [Jasanoff, 2006]. Ethnomethodological accounts generally conceive of features or limitations of the practical situation as resources available to enable or make sense of engagement in some relevant world.

Drawing specific attention to the relationship of the concept of practice to the development of social order, Schatzki argues that, “important features of human life must be understood as forms of or as rooted in human activity — not in the activity of individuals, but in practices, that is, in the organised activities of multiple people” [Schatzki, 2012, p.1]. The “open-ended, spatially-temporally dispersed, nexus of doings and sayings” [pp.2-4] that define a field of practice are responsible for producing social order in that any phenomenon

responsible for structuring or coordinating effects will be “embedded in practices, hence subject to or constituent of [them]” [Schatzki, 2001, p.5]. That practices are fundamental to meaning generation is an increasingly common position in the cognitive sciences [Smith and Semin, 2004], linguistics [Johnstone, 2007], and organizational theory [Becker, 2004] [Abell et al., 2008]. Lave and Wenger’s concept of *communities of practice* further ties practices to community participation, meaning, and identity. In their account, practice is an inherently social phenomenon that designates,

“Doing in a historical and social context that gives structure and meaning to what we do. [... It] includes both the explicit and the tacit. It includes what is said and what is left unsaid; what is represented and what is assumed. It includes the language, tools, documents, images, symbols, well-defined roles, specified criteria, codified procedures, regulations, and contracts [...] implicit relations, tacit conventions, subtle cues, untold rules of thumb, recognizable intuitions, specific perceptions, well-tuned sensitivities, embodied understandings, underlying assumptions, and shared world views” [Wenger, 1999, p.47].

Further illustrating the role of practice in illuminating various aspects of social theory, in constructivist organizational theory, practice is often explicitly linked with knowledge management [Ringberg and Reihlen, 2008]. For example, Brown and Duguid argue that one popular view of a “problem” of knowledge — that within organizations it is sometimes problematically “sticky” and at other times problematically “leaky” — does not refer to different types of knowledge but, rather, to different types of practice. They conclude that “knowledge leaks in the direction of shared practice [and] it sticks where practice is not shared. People with different practices have different assumptions, different outlooks, different interpretations of the world around them, and different ways of making sense of their encounters” [Brown and Duguid, 2000, p.207]. The practical, processual, and interpretive roots of the sensemaking perspective are notable features of virtually all of its expressions. Weick defines sensemaking as “a diagnostic process directed at constructing plausible interpretations of ambiguous cues that are sufficient to sustain action” [Weick, 2005, p.57]. In this approach he demonstrates a concern for the modalities of the production of meaning. Making the links between these approaches even more explicit, ethnomethodology has been described as “the science of sensemaking” insofar as the latter is concerned with the methods used by society to “construct a meaningful social world” [Gephart, 1993, p.1467]. Woolgar and Latour similarly ground *Laboratory Life* by emphasizing their concern “with the social

construction of scientific knowledge in so far as this draws attention to the *process* by which scientists make sense of their observations” [Latour and Woolgar, 1986, p.32]. In PHEP, a practice perspective will be particularly important to understanding the capacities that practitioners “contribute” to various approaches to plans’ role.

Shifting the focus to plans and other technologies, in most practice-oriented theories, practices and material artifacts are bundled. “To say that practices and [material] arrangements bundle is to say (1) that practices effect, use, give meaning to, and are inseparable from arrangements while (2) arrangements channel, prefigure, facilitate, and are essential to practices” [Schatzki, 2012, p.4]. The technical/material artifact requires, in this sense, a practical application in order to be meaningful while, simultaneously, the artifact fundamentally shapes the practical application. In Clarke’s framework, practices and materials are both constituent elements of the social worlds that share resources, discourse, and commitments to certain goals and activities. Interactionist studies have shown how objects, technologies, and, at larger scales, infrastructures, “can be understood, in a sense, as frozen discourses that form avenues between social worlds and into arenas and larger structures” [Clarke and Star, 2007]. The notion of infrastructure as embedded, reified, materio-practice is an extension of the concept of “boundary object,” the material form around which practices of distinct groups are focused and negotiated [Star and Griesemer, 1989]. Wenger highlights similar dynamics in everyday work environments where materials and practices are “congealed into *thingness*” around which meaning is negotiated [Wenger, 1999]. Additionally, material things may be subject both to objectification (the process of being rendered into an object relevant only in relation to an agential subject) and to reification (the process of fixing experience into certain forms and “projecting” that concretized experience back into reality for others’ use) [Miller, 2005].

As sociotechnical objects, plans are particularly interesting because language and speech practices are arguably the most important of the practices within the social worlds of professional communities [Maynard and Perakyla, 2003]. Goodwin analyzes the ability of “members of a profession to shape events in the domains subject to their professional scrutiny” [Goodwin, 1994] through discursive work. In his view, actors talk reality into existence by (1) *coding*, i.e., transforming observations into “objects of knowledge,” (2) *highlighting*, marking certain phenomena as particularly salient, and (3) *producing material representations*, which can embody and reify relationships and be transmitted across space and time to enroll, or *interesse* [Callon, 1986], others. Representing and highlighting salient features through narrative forms, among a host of other formal features including coherence, is an essential part

of any text [Wyer et al., 2002]. Thus, documents do not simply “risk” shaping practices, they are a type of artifact often developed to intentionally do so [Nemeth et al., 2006]. For this reason documents are very likely to form part of technosocial infrastructures that stabilize professional communities [Lund, 2009]. Their intentional quality simultaneously raises critical questions about potential consequences of their performativity [Law, 2009], authority [Shackley and Wynne, 1996], agency, and power [Latour, 1988].

Arriving at the beginning: Plans

The application of a sociotechnical perspective to plans in PHEP is a means to do two things. First, it highlights practice-based mechanisms whereby plans’ meaning is established. Second, it illuminates potential sites or modalities where the effects of approaches to plans’ role may play out. Reflecting the project’s theoretical approach, the expectation is that plans and practitioners’ accounts of plans contain resources that comprise an essential part of the modalities of meaning production. That, in their capacity as documents, as material objects, as representations of knowledge, as styles of narrative, as repositories of experience, as information technology, etc., plans’ role is established partly from “within,” as a function of their own capacities. Moreover, the part of their role that is established from “without,” i.e., from the interplay between plans’ and people’s capacities for the production and reception of value in various practice settings, is conceived as being related to these very same capacities of plans, *not* simply to plans, per se. The result is an orientation towards plans in which they are, in effect, “bracketed out” — where they are central in the analysis but are denied agency; where whatever meaning they have, and whatever difference they make, is attributed to the interplay between some set of their, and their users’, practice-relevant features.

Overview of the practical and analytic approach

The open question is what of these features or associations are operative in any given case? Again drawing on the project’s aims to guide the investigation, the selection of cases should in some way maximize the potential to observe modalities of production of meaning when plans’ actual and conventionally-recognized roles are misaligned. As described above, the context of H1N1, with its proliferation of plan and planning standards, will serve to reinforce the conventionally-recognized roles of plans, whatever they prove to be. As a general strategy,

the presence of even minor controversies suggest places or situations in which approaches to plans are producing differing conceptions of their role. It would be desirable to narrow-in on such cases and to root the controversy in plans, i.e., (in some modality) in planning practice, and to show what mechanisms are informing different approaches to plans.

In this project, two separate studies identify and follow disagreements about plans in PHEP. The first, the focus of chapter 3, investigates questions about the capacities and effectiveness of U.S. public health departments' PHEP plans to coordinate the functional activities required for enhanced surveillance and response during emergencies. As that chapter will show, while there is nearly universal agreement that coordination is desirable, there are disagreements concerning plans' role in bringing coordination about and concerning their role in facilitating operational goals. The second, the focus of chapter 4, investigates questions about the capacities and effectiveness of the International Health Regulations (IHR) to coordinate activities and information required for global outbreak detection and response.³ Despite near-universal agreement on the desirability of a sort of global "situational awareness" as the precursor to coordinated outbreak response, that chapter will show there are disagreements concerning the IHR's role in facilitating these goals. Both studies investigate these discrepant accounts of plans in their respective settings in an effort to characterize the relationship of theoretical approaches to plans' role in practice.

Befitting the different settings, the two studies focus on distinct modalities of meaning production, test different associations between plan features, and make use of largely independent sources of data.⁴ However, the chapters and studies are united by the project's aims and share the theoretical approach to the object of investigation. What distinguishes plans in PHEP from other types of plans is that they are expected to guide a 'pre-planned and coordinated rapid-response' to a wide range of rare and high consequence events expected to produce demands on public health agencies that are time-critical, and for which routine organizational processes are not adequate, opportunities for learning are limited, and reliance on a diverse set of organizations and professionals is essential [Nelson et al., 2007, p.S10]. Despite the IHR's role as a legally-binding convention, it shares many of these aspects with

³In this project, the plans of domestic public health agencies are collectively referred to as "PHEP plans" for convenience. That nomenclature should not be taken to imply that "PHEP plans" and the IHR are conceptually distinct. They are all "plans in PHEP." In a way, the domestic plans and the IHR are mutually reinforcing and together constitute the broader field of PHEP in that the effectiveness of the IHR system requires effective domestic plans at the same time as the effectiveness of the domestic system requires an effective IHR. They are the twin pillars of plans in PHEP.

⁴These details appear in separate sections at the appropriate place within each of the chapters

the plans that are the focus of chapter 3. And, like them, it is taken to be a plan that establishes preparedness goals, that sets out the various activities required to achieve them, that coordinates the network of actors that will carry them out, and that is used instrumentally to guide operations.

The two studies of plans also share the same approach to data collection, analysis, and research products. Because of its centrality to the overall project, an overview of the intuition behind the text-based interpretative approach appears here. The main idea is that empirically establishing any part of how plans are meaningful in PHEP (remembering that this always refers to their having meaning in relation to prior established practices *and* their relation to the establishment of practices) rests on interpretive and grounded analytic methods. The act of interpretation is an attempt to find within an object some trace of that meaning, some “tangible evidence of the values, beliefs, and feelings that a group holds, believes in, and practices” [Yanow, 1999, p.15]. As indicated above, these traces were presumptively easiest to discern during the time-period upon which this project is focused. Technical artifacts can, of course, admit of multiple meanings depending on the context specific to its use; interpretative analysis thus always risks attributing to some actors beliefs they do not in fact hold. Yet, in attempting to understand how actors engage objects and read texts — with an explicit emphasis on how texts are “taken” by actors — an analyst gains insight into the practices humans find valuable. Once these social aspects are plans are acknowledged, it is desirable that “their inevitable presence be revealed and their worth be publicly discussed” [Yanow, 1999, p.3].

Grounded methods refer to the systematic, empirically-driven, approach to qualitative research and analysis that proceeds by elaborating properties (coding) of data sources, combining and refining codes into broader categories, and inductively developing new theoretical perspectives on a previously under-specified area of concern [Clarke, 2005]. Clarke and Star describe grounded theory as “an abductive approach in which the analyst tacks back and forth between the empirical materials and conceptual means of expressing them” [Clarke and Star, 2007, p.117]. That is particularly appropriate for this project as it concerns the articulation of the theoretical meaning and value of plans in unconventional domains and in terms, perhaps, that practitioners do not. Grounded analyses focus on material traces in a given social arena for the purpose of representing, not necessarily explaining the variation among, available perspectives. As such, they treat the naturally-occurring language of actors within that arena as the principal source of insight. Intuitively, analysts in this tradition are drawn to the texts and discourse “by which members [of a community] create meaningful

statements about the world” [Wenger, 1999, p.83]. Textual approaches, which can include as data the researcher’s ethnographic notes, assemble collections of documents “to uncover the general conventions, interests, and cultural practices that make the text meaningful” to a reader in the relevant field [Gephart, 1993]. This may proceed by identifying so-called “rich features” of texts – lexical items with both *linguistic integrity* (i.e., a definable, typically structural, feature that can be coded, counted, and empirically analyzed) and *contextual value* (i.e., there is a conventional significance to its use) [Bazerman and Prior, 2003, p.66]. Gephart further elaborates that, “The textual approach is based on the assumption that texts have the interpretations of their creators embedded in them. A second assumption is that meaning is actually “inter-textual:” a given text is constructed from, and acquires meaning through, its embeddedness in a multiplicity of discourses and texts. Discourse is a conversational or textual presentation or narration of events. The practices used in a given culture to make sense of events also give meaning to texts. Some of the prior texts, or “pre-texts,” and practices that make a given text meaningful are explicitly evident in it; others are embedded in it but have become anonymous”⁵ [Gephart, 1993, p.1468-9].

The foregoing suggests that the appropriate unit of analysis for this project is the entire universe of discourse relevant to plans and planning in PHEP. That would include plans, their associated guidance documents, critical and academic commentary, planner’s views, plan user’s views, the views of those in any way affected by plan development or use, observational notes, and more. While inspired by actor-network scholarship that approaches that synoptic ideal in an effort to describe the stabilization of a broad array of social worlds, the project’s aims not quite so broad. Although it draws from each of the above sources, its relatively strong emphasis on accounting for plans’ role within one already-established and somewhat extensible social world (as opposed to, and at the expense of, describing the extent of the entire network of mediated actors), the analyses privileges data sources which “give voice to” the plans themselves, plan users, and plan designers. The latter is a particularly important point of emphasis because the individuals responsible for writing plans have expectations about the “interests, skills, motives, and behavior of future users,” and because plans, like all other “technologies contain a script (or scenario): they attribute and delegate specific competencies, actions, and responsibilities to users and technological artifacts” [Oudshoorn and Pinch, 2007, p.549].

⁵Original citations omitted.

2.3 Setting off

Karen Barad notes that “If the discursive practices by which we seek to describe phenomena do not refer to properties of abstract objects or to observation-independent beings but rather actively reconfigure the world in its becoming, then what is being described by our epistemic practices is not nature itself, but *our intra-activity as part of nature*” [Barad, 2007, p.207]. Our approaches, technologies and practices do not, in this view, record nature as it is.⁶ They enact, structure, and perform. More fundamentally, “the natural,” or “facts,” are nothing but this; they are nothing but the technologies and social work necessary to characterize some *thing* in relation to the means available to characterize it. Latour reminds us that this is most easy to see when some new object is created. “At the time of its emergence, you cannot do better than explain what the new object is by repeating the list of constitutive actions: ‘with A it does this, with C it does that.’ It has *no other shape than this list*. The proof is that if you add an item to the list you *redefine the object*, that is, you give it a new shape” [Latour, 1988, p.88]. In 2009, the thing now naturalized as “plans” was either a rapidly evolving or essentially new object in PHEP. In my view, much of what we know about that object relies on stereotypes of plans, their users, and the nature of their work. We have never sufficiently accounted for what plans *are* by soliciting from them and from their users, via whatever means are available, this list of constitutive actions and associations. This project is an attempt at a remedy, however partial it may be.

⁶“Our” is meant here to designate all of humanity in all of its varied activity — but also, perhaps obviously, with the connotation that it most emphatically applies to any group in which the author and reader and likely to be joint members.

Chapter 3

Coordinating Functions in PHEP Planning Theory

3.1 Background

The problematization of the future as uncertain or surprising has given rise to a set of “anticipatory actions” — of which planning is the most fundamental — that relate “*styles* through which the form of the future is disclosed and related to; *practices* that render specific features present; and *logics* through which anticipatory action is legitimized, guided and enacted” [Anderson, 2010, p.777]. Marked differences in plans’ logical relationship to specific problematic features of the future are evident between two common conceptions of plans. The first, let’s call it the “protocol view,” styles the future in terms of a well-characterized goal or destination where what is uncertain are the activities or steps required to reach it. Plans in this view are the mechanism that provides for “a reordering of priorities to match stated purposes, for the design of new kinds of goal-directed actions, for a reorientation [toward] the outputs of professional activities rather than to the inputs into them” [Rittel and Webber, 1973, p.157] and, simultaneously, the mechanism which coordinates these activities “with an emphasis on prospective preparation for task completion” in light of some purpose [Okhuysen and Bechky, 2009, p.473]. In this stereotype, achieving a plan’s purpose is taken to be a matter of “following” a script; they are meant to supply instructions sufficient to allow a user to reach some goal she wishes to reach. From a design standpoint, the important thing is that a plan’s content be instrumentally related to its ostensible objective — the user will take care of the rest.

As described in the introduction, the second common conception, the “fantasy view,” styles the future in terms of uncertain, ill-defined, or competing goals where the steps required to satisfy any one may not be possible to articulate [Clarke, 1999]. Plans in this view are a mechanism to coordinate rhetorical and substantive resources necessary to represent some competency of the planner to an external authority [McConnell and Drennan, 2006]. In this stereotype, a belief that “following” the plan will achieve its ostensible objective, “that everything will work right the first time, that every contingency is known and prepared for” [Clarke and Perrow, 1996, p.1041] is taken to be a fantasy, so complex and uncertain is the nature of the task or of the environment in which implementation would be carried out. To the extent that a plan represents having already “done something,” a plan’s purpose may simply be *to be*, not necessarily to be used instrumentally. From a design standpoint, the important thing is that a plan address the appropriate audience and includes content relevant to whatever is their purpose.

Approaches to PHEP plans evince elements of both views. Instrumentally, the U.S. National Response Plan has been described as the “primary mechanism for coordinating the federal government’s response to a pandemic” [U.S. Government Accountability Office, 2007, p.55]. Public health preparedness is itself described as the result of a process that “develops, maintains, and uses a realistic preparedness plan, integrated with routine practices [that guide] preplanned and coordinated rapid-response capability” [Nelson et al., 2007, p.S10]. It is a field in which “successful” operations are attributed to organizations that understand “how they fit into the overall plan, and are able to execute the plan” [FEMA, 2010, p.i]. At the same time, inducements to develop plans based on guidance and predefined standards for preparedness [Chen et al., 2008] in order to secure funding [Public Law No. 109-417, 2006] suggest that PHEP plans are at least partly concerned with fulfilling requirements of political accountability and not strictly operational goals. Additionally, public health agencies are held responsible for reducing vulnerabilities across an incredible “complex of critical systems” and their plans face very high expectations of performance [Collier and Lakoff, 2015, p.20] despite the expectation that these events will actually feature novel forms of complexity [Roux-Dufort, 2007] likely to confound attempts to plan.

This chapter does not attempt to adjudicate which perspective warrants our allegiance. Rather, it links up with a third conception of plans, the “situated action view,” that acknowledges elements of the two more common perspectives while shifting attention away from them. Although plans may instrumentally relate purposes and actions, as in the protocol view, and may assemble various resources to achieve different purposes, as in the fantasy

view, in either case “to characterize purposeful action as in accord with plans and goals is just to say again that it is purposeful and that *somehow*, in a way not addressed by the characterization itself, we constrain and direct our actions according to the significance that we assign to a particular context. How we do that is the outstanding problem. Plans and goals do not provide the solution for the problem, they simply restate it” [Suchman, 2006, p.67]. In this view plans are not scripts, but they do *contain* them. To the extent that plans either intend to direct action, or succeed in so doing, the approach is to elucidate the processes by which actors engaged in some activity use plans as a resource “to achieve intelligent action” and “find evidence for plans in the course of their activities” [Suchman, 2006, p.70]. From a design standpoint, plans contribute to how action unfolds “not as the generative *mechanism of action*” but as an “artifact of our *reasoning about action*” [Suchman, 2006, p.70].

3.2 Methods

Approach to the investigation

Suchman’s perspective dovetails with the project’s approach: that accounts of plans’ role are established in light of theoretical approaches that require elaboration. This chapter explores the hypothesis that the modalities to which plans’ role are attributed in differing accounts in PHEP will reveal ways in which the field’s theoretical approach to plans affects their meaning and value in actual practice.

In a more direct sense, this chapter investigates what the role of plans in PHEP is conventionally taken to be, what features of plans and what approaches to plans are essential to account for that role, and what are the consequences of the field’s approach. The inquiry proceeds by soliciting accounts¹ of plans from a variety of sources within the field. These various accounts are then synthesized into “the field’s” account via an interpretative, grounded, analytical procedure that imports the minimum theoretical freight required to identify and organize the attributes of plans and their use that are commonly addressed and most essential to the situations and activities that define the field. This is followed by a description of the field’s account; an empirically-grounded “finding” of what the meaning and value of plans in PHEP is, from the field’s perspective. The investigation continues

¹Reflecting the project’s theoretical approach, *an* account is roughly equivalent to any “bracketed-out” description. That is, any statement or report that relates a “higher” level (i.e. what they are for, what they do, what are their actual or ostensible effects) to a “lower” level (i.e., how they work, by what mechanism do they operate, what are their actual or ostensible causes).

abductively, asking “Given the details of this account, what is theoretical approach to plans in the field that seems likely have produced it?”

In the chapter’s final discussion section, an outline of the field’s theory of plans is first proposed and then situated in a broader theoretical framework. The results of this exercise show that the field’s account of plans’ role reflects an approach to plans that is different from, and narrower than, the approach to plans revealed in a practice-based account of plans’ role. Confirming the hypothesis, the nature of the difference in accounts concerns the relationship between the mechanisms by which plans achieve coordination and the purposes for which coordination is sought; a plan modality absolutely central to the field’s approach to plans. Even more consequentially, that modality is related to an under-recognized risk of the field’s current approach to plans, viz. that plans’ current emphasis on “capabilities and capacities,” characteristic of the approach’s aggressive “nesting” of functional activities, is likely to result in goal displacement and decreased response flexibility.

In keeping with the approach just described, this investigation employs interpretive and grounded methods to identify, collect, and relate practical descriptions and accounts of plans’ role to theoretical constructs. It collects data from three distinct sources.² The first and most central is a set of documents comprised of agency PHEP plans along with guidance and legal doctrine related to plan development and use. The second is a set of formal interviews with public health planners and practitioners. The third comprises a broader and less formal set of interactions with PHEP practitioners including observations and personal notes from preparedness exercises, professional conferences, and research advisory meetings. Details regarding each data source appear immediately below.

Documents

Most of the plans reviewed here were solicited from public health departments in the San Francisco Bay Area. The Association of Bay Area Health Officials (ABAHO) maintains a list of health officers of the thirteen member counties and cities. Emails soliciting participation were sent to the health officer and director of each agency in the Spring of 2012 with follow-up emails sent after initial contact at two and six weeks. After being introduced to the project — billed as one that “examines how various features of plans can impact how emergency operations are conducted” — contacts were asked to provide access to “a copy of

²The protocols for this project were approved by the Committee for Protection of Human Subjects at the University of California, Berkeley.

the emergency operations, influenza, or similar plan your jurisdiction was using circa March 2009.”³ Potential participants were informed that no county-level attributions would be made, that plans would be quoted anonymously, and that spirit of the project was to make synthetic characterizations of plans in general, and not of any particular agency. Notably, emergency operations plans, including PHEP and pandemic influenza plans, are often unavailable to the public due to homeland security concerns. Though none in this set were strictly confidential, several were officially designated “for official use only.”

In all, plans from seven Bay Area counties were secured. To these, an opportunistic selection of plans from several states and federal agencies were also reviewed, including the U.S. Department of Health and Human Services and the Centers for Disease Control and Prevention. Other legal or policy documents include federal and state planning guidance, the Pandemic and All Hazards Preparedness Act (PAHPA)[Public Law No. 109-417, 2006], the National Response Framework (NRF)[U.S. Department of Homeland Security, 2008], and materials establishing the National Incident Management System (NIMS). All plans and other documents were received as electronic versions.

Interviews

In 2012, the author conducted in-person, one-on-one, interviews with individuals who were either responsible for writing all or significant parts of a state or local PHEP plan or who, by virtue of their position or role, would be knowledgeable about their agency’s plans, had in some way been involved in the planning process, and would be expected to engage with the plan during an emergency event. All interviews were conducted in the San Francisco Bay Area and all respondents lived and worked locally at that time. Three respondents were then-currently or formerly employed by the the California State Department of Public Health. Four respondents were then-currently or formerly employed (including by contract) by a local health department (LHD). Three respondents had been formally involved with aspects of planning at both the state and local levels. An interview guide was used to ensure that respondents were asked specific questions. However, the style was conversational and

³Plan structure varies by jurisdiction. In some, the overall PHEP plan may contain sections on infectious disease emergency response (IDER) and/or pandemic influenza. In others, the IDER or pandemic influenza plans may be physically stand-alone and conceptually separate. In general, the request was for whatever plans the agency had available in the month prior to the H1N1 outbreak that had guided their response to that event. The request allowed for the submission of multiple documents. All plans are referred to generically as “PHEP” plans regardless of their structure or specificity, throughout this paper.

topic questions broached organically; in typical cases only a limited number of full breaks were required to “pivot back” to a topic question. Most lasted roughly one hour.

Respondents were prompted to bring to mind a recent PHEP plan with which they had been engaged. This device allowed for the explicit interrogation, for any given issue, of the degree to which the respondent attributed her answer to any features particular to that case and context or, in contrast, to more generalizable features plans or planning processes. To the extent possible, follow-up questions that effect were framed according to Becker’s recommended ethnographic interrogative style by asking “how” rather than “why” questions (e.g., “How did what was going on in your unit at that time affect?” “How do you think this might have been handled somewhere else?” “How did you go about making the documents more useful”) upon belief that the the former elicits practical responses while the latter prompts respondents to want to supply normatively good, defensible, reasons freighted with theoretical baggage [Peretz et al., 2011]. Interviews were audio recorded when granted permission, notes were made while in-progress, synthetic summaries were written after-the-fact, and partial transcriptions were generated at various points to aid analysis. For management purposes, written notes were converted to plain text and the qualitative coding software HyperRESEARCH 3.0.2c1 (Researchware, Inc., 2015) was used to organize source data, automatically identify and flag sections of text related to certain keywords (e.g., “capability”), and, when appropriate, to manage and apply an iterative list of flags.

Observations and other interactions

During the course of this investigation the author was a member of two research groups engaged in related projects on public health preparedness and response. One group was overseen by an advisory committee composed, in part, by public health and emergency response officials at the local, state, and national levels. With funding from the group’s overall support grant, committee members attended a day-long meeting with project investigators with the explicit purpose of being available to respond to questions, participate in discussions, and otherwise inform the projects in a small-group format. During this event, using roughly the same guide and approach as in the one-on-one interviews, the author engaged in conversations with, and facilitated discussions between, roughly twenty individuals. Notes during this meeting were taken while in-progress and direct quotations were transcribed as accurately as possible. Synthetic commentary and initial thematic observations were recorded simultaneously with the other note taking. Select members of this committee additionally

offered feedback on project tools and preliminary findings.

A separate research group hosted a multi-day conference comprised mainly of local, state, national, and international public health officials. While the conference's aims did not include explicitly addressing concerns about plans and planning, participants regularly invoked plans in the context of a broader discussion of H1N1 influenza response and at several points sustained lengthy discussions of their practical benefits and drawbacks, i.e., assessments of their role. The reports of four independent note takers, including the author, were available for review after the event from which a synthetic record was made. Additionally, at various points during the roughly year-long H1N1 response, research group collaborators received official invitations to observe operations at several national and international-level health agencies. Those that did provided semi-regular reports of their observations, interactions, and reflections. Apart from the direct access to data sources made available through each of these two research collaboratives, the author's views were enriched by the participatory exchange of many colleagues, as well as by his coincidental co-habitation with an IDER practitioner, all of whom offered additional, sometimes unsolicited, perspectives on PHEP.

Finally, a colleague of the author, under state contract, directed the activities of an advisory group that developed recommendations for a specific aspect and section the State of California's pandemic influenza preparedness plan. Subsequent to the H1N1 influenza outbreak, a survey of all California local health departments was fielded to characterize the implementation of that aspect of the public health response. Two open-ended questions afforded respondents (a mix of preparedness directors, health officers, and area-specific coordinators) the opportunity to reflect on how the response was informed by their plans. The author requested aggregate data to perform secondary analysis. Although other survey results have been published elsewhere [Hunter et al., 2012] no analysis of respondents' views on the utility of planning has previously been made.

Analytic approach

In all, the views of some 80 individuals, at least two-thirds of whom had direct, instrumental, engagement with PHEP plans, informed this analysis.⁴ While it may be the case that federal respondents hold different views from local ones, or that those in operational leadership roles differ from those in planning leadership roles, characterizing those differences would not

⁴Both to preserve anonymity and reflect that a majority were, in fact, women, only feminine pronouns are used throughout.

serve the investigation and no effort was made to stratify the group in any way. Notes from these interactions, taken together along with reviewed documents and prominent academic literature were treated as a single, synthetic, corpus for investigation.

To realize the account of plans, a semi-structured approach that was initially organized around four question themes: 1) Concerning the processes of plan creation and updates; 2) Concerning conceptual and formal models of plan content and structure; 3) Concerning the utility of conceptual and formal features for certain users, and; 4) Concerning assessments of plan and planning process performance, was used to gather information relating plans' mechanisms and effects. In many cases it was possible to "ask" questions of plans and written accounts that were close analogs to the questions put to interview respondents. For example, during interviews, respondents were explicitly asked to describe the principal utility of the plan, to identify who uses it, and to describe why someone should NOT use it. Correspondingly, many plans and guidance documents include explicit statements of the plan's purpose and aims, overall structure, key roles, and assumptions. Other assessments were more difficult. Respondents were asked to describe features of plans included expressly to make it useful, to identify the source of models used to structure certain parts of the plan, and to describe the plan development, user testing, and plan assessments processes. In these cases, plan reviews might include assessments of the degree to which a plan exhibited some structure identified by practitioners or the frequency in which varieties of forms were expressed.

The findings below represent a dominant, but neither uniform nor comprehensive, way of talking about, understanding, and reacting to plans in PHEP. Following ethnomethodological practice, the account attempts to describe features of or reactions to plans which respondents identified as salient, or whose frequency in documents warranted exposition, in their own terms. However, on occasion, practitioners had difficulty even providing accounts of some aspects of plans. At these times, the project's approach is to describe a practice-based account that sometimes identifies links or concepts not explicitly invoked within the field's regular discourse. Whenever such concepts are invoked, it should be emphasized that doing so is in the spirit of a project that aims to put practitioners' words, practices, and reactions on the most firm, sensible, footing possible. Following Bowker and Star, the essential concern is that "what matters in an argument is who, under what conditions, takes it to be true. [...] If social scientists do not understand people's definition of a situation, they do not understand it at all. That definition [...] is what people shape their behavior toward" [Bowker and Star, 2000, p.289]. Thus, whenever encountering contradictory, puzzling, or counterintuitive

behavior, the analysis resists characterizing it as such and assumes it to be a result of the author's ignorance, not a result of practitioners'. Discursive lacunae are puzzles; missing pieces in otherwise coherent picture that suggest places where the field intelligently deploys concepts that are more subtle, and which for them fills in the gaps, than is commonly known.

3.3 Findings

This section provides an account of plans that organizes impressions, illustrative examples, texts, and quotes into four conceptually interrelated sections as follows. Participants and documents (1) overwhelmingly recognized the centrality and importance of plans in PHEP, (2) related plans' importance to the coordinating function they putatively provide, (3) blended formal, structural, and functional characteristics of plans and response organizations into a conceptual hybrid, and (4) endorsed strategies designed to make plans more likely to be used by increasing their operational specificity.

(1) Centrality and importance

Nowhere is the centrality of plans to PHEP more clear than in the policy, legal, and guidance documents that ushered in the post-9/11 planning era. The National Response Framework (NRF) — the nation's highest-level, all-hazards, preparedness and response plan — describes planning as a “national priority,” “foundational,” and a “critical element of effective response” [U.S. Department of Homeland Security, 2008, p.71]. Aiming to ensure that critical element was developed specifically within the nation's public health system, The Pandemic and All-Hazards Preparedness Act (PAHPA) authorized the award of federal grants to state and local health departments contingent upon their developing and submitting an all-hazards PHEP plan, including a pandemic influenza plan, consistent with national preparedness goals and other federal planning benchmarks [Public Law No. 109-417, 2006]. Within later preparedness guidelines, an emphasis on planning is justified on account that it “ensures organizational structures, processes, and procedures effectively support the intended strategic direction” of the response and “is a key to success in protecting people and property in crises” [U.S. Department of Homeland Security, 2007a, p.20-21]. A seminal statement defining, “Public health emergency preparedness (PHEP) [as] the capability of the public health and health care systems, communities, and individuals, to prevent, protect against, quickly respond to, and recover from health emergencies particularly those whose

scale, timing, or unpredictability threatens to overwhelm routine capabilities” immediately continues that, “preparedness involves a coordinated and continuous process of planning and implementation that relies on measuring performance and taking corrective action” [Nelson et al., 2007, p. S9]. Further reflecting the degree to which PHEP is now central to public health’s overall mission, CDC’s Office of Public Health Preparedness and Response, just one of the more than twelve top-level offices or centers within the CDC, accounts for 20% of the agency’s overall budget.

While it is perhaps unsurprising that federal guidance stresses the importance of preparedness and response plans, they are the frequently invoked in similar terms in other fora. Keller et al., observed that an international group of outbreak response officials regularly invoked (and were critical of) their plans in discussions of their organizations’ initial assessments of and responses to the H1N1 outbreak [Keller et al., 2012]. Illustrating the views of several interview respondents, one official remarked that in her department, “The idea of preparedness being a separate entity [is incorrect] it’s all the time, it’s not just after disaster.” The Association of State and Territorial Health officers concurred with that assessment in a 2008 report. There the group noted that “preparedness planning has matured to the point that it informs and guides activities occurring every day for all types of hazards [ASTHO, 2008, p.2].” Another respondent suggested that the emphasis on plan development had even become too strong, remarking, “It’s awful. You feel like you’re just floating in a sea of planning processes.” The expectation that outbreak responses should be governed by established PHEP plans is now widely and deeply shared among partner response organizations like emergency medical service providers, local police, and emergency management officials. One state official lamented that when her health department responded to novel features of the H1N1 outbreak with unscripted responses, partners would, “throw [the plan] back in our faces and say, ‘well this is what you’re supposed to do.’” Expressing the respect for plans from the opposite direction, one official commented that her department successfully resisted “external pressure” to implement aggressive and restrictive community mitigation measures because they were not part of the plan and they “were trying to go by the book.”

Finally, partly because of the foregoing doctrinal emphasis on planning, preparedness assessments have, in large measure, focused on plans. A plan becomes sort of a proxy for overall preparedness; it is present, reviewable, countable, and lacks the unwieldy moving parts of either an exercise or real event. Among a group of 27 independent instruments assessing public health preparedness, all relied heavily on structural measures with the existence of plans, protocols, and agreements overwhelmingly being the most frequently assessed factors

[Asch et al., 2005]. In regular practice, respondents frequently answer questions about preparedness by figuratively invoking, and sometimes literally pointing to, a plan. Commenting on this, one participant lamented that during a consultancy with a foreign national government, her questions about their level of readiness and capabilities were consistently met by vague gestures in the direction of, what was described as, a meagre 13-page plan. And while the implication was that their response was naive, and exemplified preparedness goal displacement, upon elaboration the participant suggested, disquietingly, that the corrective would be a longer plan.

(2) Coordination

What about plans accounts for their centrality in PHEP? Overwhelmingly they are taken or present themselves as tools or the means to effect, bring about, or cause the coordination of the response activities instrumental to the realization of desired ends. Put another way, achieving the goals of PHEP relies upon the effective coordination of functions and activities specified by the plan. It is this function of plans, that they effect a particularly consequential type of coordination, that is most commonly invoked (and therefore seemingly accounts for their centrality) within the field. Federal assistance for state and local plan development was authorized within PAHPA in part for “ensuring coordination between” the response activities of different jurisdictions. Thomas Frieden, then the CDC Director, writes of the NRF that it “articulates key principles, delineates the roles and responsibilities of responders, and identifies key structures, all of which are integral to an effective, coordinated response to any hazard” and was developed, “to guide the coordination of responders at the local, state, and federal levels [Lurie et al., 2013, p.1251].” A plan’s principal purpose, in his view, is to somehow guide coordination.

Accordingly, state and local PHEP plans reflect these foundational guides. One California county’s plan describes its purpose by saying it “prescribes the [County] Operational Area integrated response [SF Bay Area County C, 2006, p. 4] while another’s asserts that the “plan aims to develop a coordinated countywide strategy through shared responsibilities” [SF Bay Area County E, 2010, p. 6]. Focusing on the roles or functions essential to the response is another way to invoke plans’ coordinating agency. Hunter et al., in a review of the functional activities delivered during PHEP responses recommend plan improvements “particularly with respect to setting expectations and developing a mutual understanding about the roles and responsibilities” of public health and partner agencies [Hunter et al., 2013,

p.11]. Another county plan declares that it “primarily focuses on the roles, responsibilities, and activities, of the [...] Public Health Department [and is] based on the four core functional elements of a public health response” [SF Bay Area County B, 2007, pp. 5-6]. From these and many additional examples in the field, plans are taken to coordinate the activities and functions not just between departments and agencies, but within them. Amplifying this view, one respondent suggested that the requirement “to fine tune and nest our program’s [plan] into the departmental one” was a “useful process of alignment” that increased her confidence that the department’s overall response would go smoothly on the grounds that, only through the mutual adjustment of their plans could they discover whether specific program-level activities were being provided and were not redundant.

At every level, a PHEP plan identifies and coordinates constitutive functions or activities that are themselves *planned*, i.e., that are formally articulated within the document and which serve to identify and coordinate subsidiary constitutive functions or activities. In PHEP, the desired coordination of response activities carries the de facto requirement that the activities receive prior articulation as a plan; activities that do not appear as a functional component of some larger plan or which cannot themselves be construed as plan for a subsidiary organizational level are not coordinated. For this reason, expressions of the preference to operationalize plans at increasingly specific levels of programmatic detail are common. A roundtable discussant offered that “obviously a local plan should be a lot more specific than a state plan” with no objections. Another expressed the desire to “hybridize classic plans and field operations guides.” One interview respondent, when asked to reflect on how the plan she developed for one Bay Area county differed from one she could ideally have written if free from the any of the practical, logistical, organizational, or political constraints of the actual process, replied, “I really don’t know what the perfect plan would have looked like aside from being more specific and accurate [laughter].” Criticizing a prior plan’s lack of detail, another described efforts to ensure “we had a good, comprehensive, plan.” Recounting an operational plan review, one discussant lamented, “Most of the plans were just really generic, you couldn’t glean a lot from them [...] I’d be hard pressed to figure how helpful that is. I think it has to be really logistical. At a local level it has to be even more practical. The more practical the better.” Another suggested a need for a tiered approach to what people needed [from the plan]. There needs to be another level of planning that deals with much more detailed information coming in and out of each component.” Multiple individuals remarked upon the semi-common practice of using outside consultants, as opposed to agency staff, to write plans. They believed outsiders would have less access

to programmatic “sub-components that are very prescriptive” and the resulting plan “even lower probability of getting operationalized.” The consultants did not disagree.

In light of the perspectives immediately above, the “fine tuning / nesting” view illustrates that planned activities’ effects on the outcome are mediated, in theory, by their being well- or effectively coordinated. In other words, increasing specificity or operational detail is preferred, but only upon the assumption that it will be well-coordinated. Otherwise those activities may be delivered haphazardly or ineffectively, undermining the efficacy of the overall response. In the absence of the trial of a real event, the essential, and perhaps only, way to identify coordination is to relate the activities to a higher-order plan. Thus, each unit’s activities are to be coordinated by its own plan, multiple units’ by the department’s, the departments’ by the agency’s, and so on. When respondents describe their efforts to make plans more operational or more detailed without explicitly invoking coordination, it is because the coordinating effect of the plan is already assumed in advance. This assumption is further revealed by the frequent use of the word “effective” — variants of it appear 85 times in the NRF alone⁵ — in many foundational texts. References to effective coordination suggests coordination that has been successfully achieved, a judgment that can only be rendered after-the-fact and upon some evaluation of the higher-order ends for which coordination was being pursued. Yet, notably, in plans and their associated guidance, the order of operations presented is exactly the opposite. In them, establishing the lower-order particulars is taken as sufficient to secure the high-order outcomes *prior to* and without reference to their achievement in practice.

(3) The plan/organization structural/functional conceptual hybrid

For additional evidence that plans’ utility resides in their (as yet unexplored) ability to coordinate response activities, consider the following conclusion from PHEP plan review circa 2006: “The control of future pandemic or interpandemic influenza will necessarily rely on each individual state’s plan to vaccinate persons and detect and contain this disease. Still, the current national (HHS) pandemic influenza plan presents only a categorization and listing of steps, rather than explicit direction for the states. This lack of central coordination can result in a patchwork of plans that will not adequately detect and control this or other respiratory disease pandemics” [Holmberg et al., 2006, p.1415]. By failing to provide “explicit

⁵Where at most five instances are the legalese, “operative on,” sense and the rest have the “successful in light of an intention” sense.

direction” and “central coordination” the national influenza plan is revealed not to really be a plan at all, but to be some lesser thing; it is only categorical, merely a repository for the “listing of steps.” Without specificity and coordination it will not do what plans do, “adequately detect and control this or other respiratory disease pandemics.” Q.E.D., it is not a plan.

While it appears in many of the previous examples, this perspective clearly illustrates the degree to which plans are conceived as having agency in PHEP. The control of disease relies not on people or activities but on each state’s plan. The plans, not the other actors, do the desired detecting and controlling. The plans work by coordinating action. Insufficient plans cause poor outcomes. Though some examples which highlight plans’ agency are sure to be simple metonymic substitutions, a root of ethnographic interpretative analysis is that the natural language employed by practitioners, either within speech acts or within written documents, designate meaningful concepts and relationships at the appropriate level of analysis. In this view, respondents’ propensity to use this language is neither epiphenomenal nor presumed to be mistaken. The question is how, in these perspectives, is it that a document gains the power to do things? In the remainder of this section I present evidence that plans’ ability to coordinate is mediated by the alignment of their formal structure with the organizational structure through which response functions are delivered.

To say that activities are coordinated by a plan is simply to say that the plan somehow lists, arranges, organizes, relates, or elaborates the activities in a way equivalent to their being coordinated. And, indeed, in PHEP plans, the activities are not listed at random. They are prepackaged, coordinated on-the-page and in-advance, by a formal plan structure that typically corresponds to the functional roles of the Incident Command System (ICS). Indeed, the most highly-regarded⁶ of the Bay Area plans reviewed here copies the structure exactly. It is organized as “modules” with the titles *Command*, *Plans Section*, *Operations Section*, *Logistics Section*, and *Finance Section*. This plan, which bills itself as a “functional response guide” to the “activities that may be implemented during an Infectious Disease Emergency Response” [SF Bay Area County A, 2007, p.3] exemplifies that in PHEP, the structure of the organization which carries out *and thus is responsible for effectively coordinating* the response activities is of the foremost concern. A state-level interview respondent emphasized

⁶Its having been recognized by the National Association of County & City Health Officials (NACCHO), a membership organization of some 2800 LHDs which promotes public health policy, as a national model. Citing the plan as a “promising practice” after the H1N1 outbreak, NACCHO, with CDC support, provided for its adaptation into a toolkit which was then publicized and made available for use by other LHDs.

the organizational challenges to which plans provide a solution: “There are eight levels within the departmental bureaucracy, and that’s what we’re dealing with everyday. Now, you insert alongside that an emergency response and you’ve got two choices: use the same hierarchical set of relationships only call it an emergency response or have one entirely parallel to that structure and call it an emergency response. And if you’re not clear which one it is people are very confused.” A good plan, in this view, makes it clear: it establishes the alternate structure that defines the relationship hierarchies necessary to carry the response activities which differ from the agency’s routine, everyday, work.

The ICS model is thought to improve response effectiveness principally by virtue of the coordination improvement that attends its single, unified, chain-of-command structure [Ansell and Keller, 2014]. Foundational guidance again takes on the assumptive achievement stance; arguing in favor of mandatory nationwide adoption, federal preparedness officials have stated that ICS represents an organizational process to “enable effective, efficient and collaborative incident management” [U.S. Department of Homeland Security, 2008, p.2]. Thus, like the overall response, or the plan of which the ICS structure is part, it remains an open question precisely how the ICS achieves effective coordination of activities or outcomes in any given case. What is more clear, however, is that whatever are those means, they⁷ are the same ones responsible for the achievement of effective coordination in the response organization prescribed by PHEP plans. Plans “borrow” the effective coordination mechanism of action by essentially mirroring the formal ICS structure, subsuming functionally-related response activities under organizational structures exclusively responsible for those activities’ execution, and then positing themselves, the plans, as the means by which those structures are enacted. In this way, the establishment of structural alignment between plans and the organization is the means to effect functional alignment upon which their coordinating power relies.

That practitioners seem to locate the coordinating power mainly within in the plan, and not within the organization, is not to suggest they are mistaken about the “true” source but, rather, that their view of a plan is essentially of a plan/organization hybrid. For most purposes, it is practically unnecessary to distinguish between them so closely are they aligned. Offering a critical view that nevertheless endorsed the desire for coordination,

⁷Which is to say that the coordination is the result of some organizational or intrapersonal process. There is obviously a great deal to say about such processes, and the more general role of organizations, in the context of emergency response. The point here, however, is just to show that some aspect of dominant view of plans in PHEP relies on assumed and unarticulated properties of organizations, not to show how those properties work or, even, what they are.

one response official remarked in frustration that “It says the same thing in every AAR: we didn’t know who was in charge and we needed to improve communication” and was equivocal about whether efforts to better performance should be focused on improving the plan or on improving organizational processes. Focusing on and reasoning via plans may even be preferred. One international responder observed that when H1N1 appeared to be less severe than H5N1, upon which plans had been based, “at central level, it appeared that people just started making new plans. [They] didn’t rationalize it as ‘no it’s not H5’ they just started doing something different.”⁸ Similarly, a California-based survey respondent would discuss the insufficiency of her agency’s pre-H1N1 plan in the following manner: “We had to develop a new one. The pre-pandemic plan was general guidance on use but did not provide dispensing specifics.” Amidst an ongoing outbreak response, when this agency’s previously-planned activities were judged to be insufficiently detailed relative to those necessitated by the actual event, the reaction was not simply to perform the necessary actions within the then-extant structure. Doing the newly identified things required the development of a new plan, where the requisite functional specifics would be ideally integrated and coordinated with other structures, *first*.

(4) Use and value

A final nexus of insights makes explicit an assumption present in the discussion of several previous examples: deliberate efforts to make plans more useful will focus on consequential features or meaningful aspects of their use. The first observation is that while frequently acknowledging challenges associated with using plans, participants overwhelmingly believe that plans are used and *should be* used by organizations and individuals during emergency responses. Plan writers absolutely intend that plan users be able to access, refer to, draw from, implement, and otherwise instrumentally use plans in the course of the response. One respondent described her approach as writing plans appropriate for “3:00 in the morning for someone who’s never used it.” Another recounted her department’s enthusiasm for the “notion of a plan on a stick,” putting its plans on USB drives that could be easily carried between workstations or to non-networked computers in the field. Several respondents suggested that

⁸In the context of the discussion, it was clear that by “they just started doing something different” this respondent meant to underscore that, from her vantage, the thing they just started to do appeared to be *making new plans*. However, even if she meant to convey that they just started doing some different response activities, her independent characterization of “different response activities” as equivalent to “making new plans” carries the same force of the point.

a benefit of PHEP plans' modular structure was that responders could metaphorically or physically extract the sections most directly relevant to their functional roles. One wanted users to be able to "pull out the tools created through the planning process."

Similarly, planners frequently tied their judgments about the value, adequacy, or merits of a plan to the likelihood of its use. Asked to give her overall impressions of a recent plan development process, one respondent concluded, "The result was positive, I felt that this was something that would be useable." Another recounted efforts "trying to incorporate concreteness where we could" by wondering, "did the people who are in those positions find it useful?" One consultant stated that "by operationalizing it the way we did, we were trying to maximize its use by internal staff." Otherwise, "the plan could end up a document of a shelf, at best." In a review of preparedness exercises, researchers reported frustrations with plans that "were superficial and lacked sufficient detail necessary for rapid implementation" and "were too vague and lacked concrete actionable steps for realistic application during a real emergency [Dausey et al., 2007]." In each of these examples, plans' operational-orientation is assumed — they are supposed to be used to guide functional response activities — and what is at issue, from the design perspective, is making them better for that purpose.

Given the foregoing emphasis on plans' instrumental use, on their tool-like utility *during* operations, one might expect that the preferred strategies for making plans more useful guides would focus either on making them somehow easier to use or, else, somehow more likely to produce intended outcomes when used. Efforts to more comprehensively detail the operational specifics of an ever-greater number of functional activities look like examples of the latter, at least superficially. But, amplifying earlier findings, in actual practice plan designers appear to undertake those efforts in a way that reinforces plans' coordinating structure. During one discussion a group of health officers considered whether the increasing the use of "job action sheets," which list actions and tasks for specific roles, did not already represent the very functional, specific, sort of guidance they were looking for. "But they're pointless," one suggested. "All those people have to come together to 'play a role.' That's the piece that missing [from them]." That is, precisely defining the ICS structure out to the smallest-possible organizational unit — a single individual — and assigning that unit discrete protocols is not conceived as being useful without that unit's functions being related to others' at a structural level above that one.

In another example, responding to a question about what could be changed about or added to plans to make them more useful, a planner launched into a highly technical discussion of a newly-developed disease surveillance system. This was intermixed with the lament,

characterized as common knowledge, that “plans seem slightly out of date with what is actually happening because they just don’t get updated enough.” By lacking detail about the new surveillance system the existing plan was rendered less useful, old, bad. It would now be difficult, in her words, to “teach to the plan” and orient people new to the job.⁹ And while it would be theoretically possible to separately train an individual, to give her a job action sheet, to show her where to sit during an emergency, and to make a supervisor responsible for her performance using this system, that was not the preferred approach. Rather, it was to operationally detail the functional activities related to the surveillance system *within the plan*, requiring the responder to go *to the plan*, allowing for her becoming familiar with her role within the coordinating structure achieved *by the plan*. Its being the only place the coordinating structure is ever explicitly laid out, the physical plan routinely takes ontological priority.

A second common strategy was the deliberate addition to or rearrangement of plans’ formal structure to better comport with guidance standards or other putatively more useful plans. One respondent, reflecting on the ways a county plan she worked to update had improved upon the original, said “I mean, we followed the latest state and federal guidelines so that stuff I’m confident in, in terms of how we decided to operationalize it” before trailing off. Another described taking an electronic copy of a state plan, deleting “the content,” and copy & pasting details from the the plan which was being updated into the remaining structure. The source state’s plan, by her report, was well known to be good. Updating plans to reflect improvements recommended as part of the after action reporting process was pretty easy, one respondent said, partly “because it was sort of delegated and determined by up above, that this is the format, this is the structure, this is what we want to know.” Deficiencies would be resolved by ensuring the inclusion of the appropriate capability, activity, critical task, or performance measure, at its appropriate place.¹⁰

Both strategies are attempts to make it more likely that plans will result in the effective coordination of activities that they promise. Despite suggestions that the modularity and increasing operational specificity of plans is meant to aid their instrumental use, particularly

⁹Another illustration of their centrality to the field of practice, this orientation function of plans underscores the inherently social aspect of what it means to be, or join, a practice “community” [Duguid, 2005]. As the author’s own entree into this world can attest, until one is well-versed in a plan and in planning terminology, technologies, and concepts — which is often delivered in a crash course upon arrival — not only will PHEP appear mysterious to you, you will appear mysterious to PHEP.

¹⁰These terms being the successively-narrowing structural/functional organization of the Target Capabilities List (TCL).

in the most central public-health relevant domains, these features become coherent only in context of the coordinating effects of the plan/org hybrid. Their utility appears to lie in orienting responders to the plan, perhaps increasing its expected utility, and presumably making it more likely to be used in the first place. Once responders have a plan in hand, the stronger the structural / functional alignment of plan and response organization, the more seamlessly will desired outcomes flow. Indeed, expectations around plan use and response are so strong that situations in which agencies cannot follow planned responses may not be conceived of as a failure of the plan, but as a failure of nature. One survey respondent remarked that operations would have worked better had we been able to follow the plan without deviation. But, alas, nature would not allow for it.

3.4 Discussion

In the main, the above description of the field's account of plans and planning practices appears to confirm a largely conventional approach. The most central emphasis is placed on plans' coordinating role. However the investigation also empirically grounds subtle but important details about the operation of plans in PHEP. In this account, plans are the means by which the delivery of functional activities of public health emergency response are coordinated. Equivalently, their most proximate purpose is to effect those activities coordinated delivery. That purpose is also conceived in relation to more distant goals that serve to reinforce the sincerity with which the field approaches plans' instrumental function to achieve their ends. While the use of plans is generally taken to be instrumental and largely unproblematic, the field clearly labors to make plans more useful within the bounds of its approach. Poor plans entail poor outcomes, and poor outcomes entail poor plans. In PHEP, plans are not perceived as fantasy documents; they may not achieve their aims, but it would not be for lack of trying.

The most significant result of the investigation, however, concerns the modalities responsible for *how* plans achieve the coordination that is their *raison d'être*. Here it will be helpful to refer to an illustration related to the specific criticism, above, that the HHS pandemic plan "lacked coordination" and failed to provide "explicit direction." In the following figure, the problematic plan in question is on the left. It shows, in its entirety, the section devoted to surveillance during a pandemic. In a bulleted list characterized by vague and presumptive language, it lays out activities that states and the federal government variously

would be expected to carry out. On the right of the figure is a representation of a Bay Area county's plan, showing less than 50% of the section on surveillance. The question, for now, is, "What features of the LHD's plan does the HHS plan lack that accounts for its failure to coordinate?"

Part 2 Pandemic Influenza Surveillance **S1-9**

A. Enhanced surveillance

During an influenza pandemic, CDC will use data from the U.S. collaborating laboratories of the WHO Global Influenza Surveillance Network and the NERISS to detect the introduction and early cases of a pandemic influenza virus in the United States, track the virus' introduction into local areas, and monitor changes in the pandemic virus, including development of antiviral resistance. States should conduct the following activities:

- Distribute to healthcare providers the current CDC recommendations for enhanced surveillance for the detection of the first cases of the pandemic virus in their jurisdictions.
- Facilitate the collection and testing of appropriate specimens as recommended for early detection of pandemic virus at the local level.
- Increase testing and the frequency of reporting of virologic data. The most intense testing will be necessary during the early stages of a pandemic, when detecting the introduction of the virus into a state or community is the primary goal.
- Once the virus has been identified throughout the state, the level of testing can be decreased to a level more like that of a non-pandemic influenza season. State health officials can determine the level of testing for their jurisdictions.
- As part of the effort to monitor antigenic and genetic changes and changes in antiviral resistance patterns in the pandemic virus, state public health laboratories should forward a subset of virus isolates to CDC. CDC will advise states on the number of and clinical criteria for these isolates. Supplement 2 contains additional information on monitoring for antiviral resistance.

During an influenza pandemic, CDC will use data from SPI, hospitalization surveillance, state and territorial epidemiologists' assessments, the 122 Cities Mortality Reporting System, MNSS, and other data systems to:

- Monitor the pandemic's impact on health
- Track trends in influenza disease activity and identify populations that are severely affected
- Serve as an early warning system to detect increases in IU in the community

State health departments should:

- Communicate to all partners the heightened need for timely and complete surveillance data.
- Ensure that all sentinel provider surveillance sites are reporting weekly, regardless of the time of year.
- Ensure that EIP and MSN hospitalization surveillance is active.
- Report state influenza activity level in a timely manner.
- Facilitate timely reporting of 122 Cities Mortality Reports and pediatric deaths.
- Implement state and local collection of influenza-associated mortality data and reporting of statewide mortality data to CDC, following CDC guidelines for uniform data collection and reporting.

B. Scale-back surveillance

Enhanced surveillance will be conducted during the introduction, initial spread, and first waves of a pandemic. Over time, as more persons are exposed, the pandemic strain is likely to become a routinely circulating influenza A subtype. When that happens, the activities of the national influenza surveillance system will revert to the frequency and intensity typically seen during inter-pandemic influenza seasons. The return to inter-pandemic surveillance will occur as soon as feasible, and the change will be communicated to all surveillance partners.

HHS plan for pandemic surveillance in states, 2005

9. EPIDEMIOLOGY AND SURVEILLANCE BRANCH

A. ORGANIZATION CHART

B. DESCRIPTION

The purpose of the epidemiology and surveillance branch is to gather information about the influenza pandemic, identify and monitor its progress, and coordinate response activities and strategy.

- Coordinate surveillance, response, and control activities for an influenza disease emergency.
- Coordinate epidemiological investigations.
- Coordinate laboratory and surveillance activities.
- Monitor trends in the incidence and prevalence of disease to identify new or unrecognized exposures.
- Describe the epidemiological and clinical features of an event.
- Describe the response strategy.

C. METHODS

Primary methods for epidemiology and surveillance include:

- Surveillance, surveillance is a continuous activity, transportation, and dissemination of progressively collected data, generally using methods designed by their priority, urgency, and equity with

C. IMPLEMENTATION

Activities for epidemiology and surveillance branch in an influenza pandemic:

- Coordinate surveillance, response, and control activities for an influenza disease emergency.
- Coordinate epidemiological investigations.
- Coordinate laboratory and surveillance activities.
- Monitor trends in the incidence and prevalence of disease to identify new or unrecognized exposures.
- Describe the epidemiological and clinical features of an event.
- Describe the response strategy.

D. STAFF POSITIONING

The following positions are staffed for influenza activity:

Position	Staffing	Reporting Line	Emergency	Other
Branch Chief	1	Director	1	1
Section Chief	1	Branch Chief	1	1
Staff Position	1	Section Chief	1	1

B. SURVEILLANCE REPORT

1. Purpose of the report: To provide a summary of the surveillance data for the influenza pandemic, including the number of cases, the geographic distribution, and the clinical features of the disease.

2. Methods: The surveillance data were collected from a variety of sources, including hospitalization surveillance, mortality surveillance, and laboratory surveillance.

3. Results: The surveillance data show a significant increase in the number of cases of influenza disease, with a peak in the number of cases occurring in the first wave of the pandemic.

4. Conclusions: The surveillance data indicate that the influenza pandemic is currently in progress, and that the number of cases is expected to continue to increase in the coming months.

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< 50% of one LHD's plan for pandemic surveillance, 2007

In addition to detailing a greater number activities and detailing those activities with a greater degree of specificity (both of which contribute to the sense of its being more comprehensive) the most notable feature of the LHD plan is that its formal and conceptual organization aligns with the formal and conceptual organization of the incident command structure. The section begins with an organizational chart. It describes the purposes, objectives, and functions of surveillance. It designates job titles, roles, tasks, and skills. It highlights relevant annexes, tools, and resources related to the functional activities to be carried out. It establishes that among the functions of superordinate organizational units is the coordination of the activities of subordinate units. All of this happens physically and literally on the page. By contrast, even though the authors of the HHS plan (almost assuredly) conceived of surveillance as both a function of some larger enterprise and as comprised of related activities, and even though practitioners reading that plan today (almost assuredly) conceive of surveillance as both a function of some larger enterprise and as comprised of related activities, it is, nevertheless, not possible to *see* those relationships in the HHS plan. Even if its number of bullets were multiplied by ten, it would still lack that which allows for the “recognition” of coordination *in the plan* that is a logical and necessary precursor to the ability to “carry out” coordination *according to* the plan. Lacking whatever features afford the requisite recognition, it would variously be described as vague, not implementable, impractical, or simply bad. Put positively, the feature of PHEP plans that allow for coordination, and all the benefits that might flow therefrom, is formally structuring activities in a nested hierarchy of functional relations that is aligned with the structure and functional relations of the ICS concept.

The striking thing about this feature of PHEP plans is that practitioners’ accounts of plans’ role virtually ignored it. Despite the *effects* of coordination being central in those accounts, the *mechanisms* whereby that coordination was achieved was, more or less, assumed simply to be a matter of using or following the plan. This, again, is not a criticism; it is an opening. Following Clarke and Suchman, it is assumed that the mechanisms whereby plans achieve their effects, even their functional ones, are influenced by theories of plans, behavior, and action that are embedded into them. This investigation hypothesized that 1) discrepant accounts of plans’ role would 2) reveal ways in which theoretical approaches to plans had 3) practical consequences. So far we have observed that the modalities of coordination in the field’s account differ from the modalities of coordination in the descriptive account of the field’s *actual practice*. The first condition has been satisfied. We have also observed that planning practices potentially influenced by theoretical approaches have resulted in signifi-

cant formal similarities in PHEP plans' structure. Recognizing that the different accounts and planning practices both center on concepts related to "functions" and "coordination," the following section first elaborates a theory of plans that comports with expectations in that conceptual domain and then further develops the discussion of the practical consequences of the field's approach.

PHEP's theory of plans

Below, in its most abstract form, is a graphic summary of the the field's theory of plans. Beginning with PHEP's *global purpose* in the box at the upper left "Prevent morbidity & mortality," the object below is conceived to be the largest, most amenable, input, factor, or characteristic that secures, provides for, or results in, the achievement of the goal above. Thus, reading "down," one can say that to prevent morbidity and mortality during a public health emergency requires an effective response. Equivalently, reading "up," the purpose of an effective response is to prevent morbidity and mortality. Securing that factor becomes the goal of the next column, and so on. The effect of any factor on any leftward goal is mediated by all intervening boxes in its row. Reflecting the discussion above, the concept in italics *Effective hybrid alignment* is not, properly speaking, part of field's native account of its own plans and practices. While the field's planning practices suggests that this modality is quite important to realizing plans' role, their accounts essentially "skip over" it, instead recognizing coordination as a result of "using" the plan (i.e., realizing the coordinating benefits of the organizational structure that the plan entails based on the presence of appropriately-aligned functions within the ICS-like organizational structure). In other words, the plans' main script does not contain the instructions about how to carry out public health emergency response, it contains the instructions for setting up the organization that does. It is this capacity of plans' formal structure to be aligned with the formal structure of an organization in a way sufficient for the capacity of humans to realize the benefit of that alignment, even if they don't recognize the alignment, that defines this particular modality. The field's conventional approach to plans' roles does not root coordination in this capacity; thus, in their accounts it is largely missed.

Logic of plans in Public Health Emergency Preparedness and Response

Goal or Purpose...	Prevent morbidity & mortality	Effective response	Effective delivery of activities	Effective plan	Effective coordination	<i>Effective hybrid alignment</i>	Effective org func / struct alignment	Effective use
Secured via / function of...	Effective response	Effective delivery of activities	Effective plan	Effective coordination	<i>Effective hybrid alignment</i>	Effective org func / struct alignment	Effective use	Exp. utility? Coherence? Leadership?

Accounting for PHEP's approach to plans

Having proposed PHEP's theory of plans, the final task is now to account for its role in some way. As in the overall project's approach, this means attending to its production and attending to its effects. Due to the somewhat tentative nature of the theory on which they are based, neither analysis aims to be comprehensive. Nevertheless, they are suggestive accounts in the direction of understanding the role of theoretical approaches.

While reviews examining coordination and plans during responses to public health emergencies are quite common [Hine, 2010], [U.K. Health Protection Agency, 2010], [Scoones and Forster, 2008], [Baalen and van Fanema, 2009], and sometimes critical, assessments of plans' specific contribution to that effort are more rare [Perry and Lindell, 2003]. Nevertheless, some features of PHEP are likely to amplify the standard view that plans, coordination, and purposive organization are closely linked. Because PHEP is explicitly organized around the figure of uncertain [Lipsitch et al., 2009] and future threats, plans' forward-looking utility will strengthen the degree to which they are viewed as an essential element of preparedness [McConnell and Drennan, 2006]. Moreover, because public health systems are quite decentralized [Mays et al., 2010], operate under extreme time pressure, and under "extraordinary conditions of performance which exceptional tools alone can facilitate" [Roux-Dufort, 2007, p.109] the use of plans to ensure functional coordination, not just within but between organizations, during emergencies will always be a primary concern [Chen et al., 2008]. In that way, the dominant approach to plans reflects a broader functionalist and objectivist orientation. As part of a rationalistic decision making paradigm, functionalism is the tendency to reason about situations or objects by focussing on their primary function or objective and to discount factors unrelated to either [Hsee et al., 2003]. Functionalist explanations are intuitively appealing and often go unchallenged even among social scientists [Pierson, 2000]. They attribute the effectiveness of an object of concern to well-functioning order of its particulars [Polanyi, 2009]. The objectivist perspective roots the problems to which organizational responses are required in an external reality. Landry explains that "to solve a problem is akin to a search for the appropriate means for moving from the unsatisfactory reality to the desired one; it is a means-end exercise. The uncertainty as to the appropriate action and how to undertake it is interpreted above all as an uncertainty of means toward ends. The uncertainty as to the nature of the ends (the standards of normality and desirability) is often assumed to be given [...] This tendency to treat ends as exogenous variables explains why, in the empiricist tradition, formulating a problem is viewed as analyzing reality, not

as searching for goals. Viewing problems from the objectivist perspective logically leads to preferred ways of organizing the inquiring process resulting from the discovery of a problem, and to preferred ways of acting [p.321][Landry, 1995].”

Consequences of PHEP’s approach

Regardless of whether objectivist, functionalist, and instrumentalist [March and Olsen, 1984] perspectives are currently considered to be descriptively accurate characterizations of cognition, they undeniably have performative substance and influence practices [Law and Singleton, 2000] [Cabantous et al., 2010]. Learning from rare events like major outbreaks is difficult and relies heavily on prior beliefs [Starbuck, 2009]. Tetlock suggests that basic cognitive styles are “profoundly consequential” and that even “assessments of what counts as an error or bias are shaped by the metaphor-laden standards of rationality that we use to evaluate how people think” [Tetlock, 2000, p.294]. In PHEP, the field essentially views *all* of its activities as means related to its global purpose, the primary end rooted in an external physical and social reality. Each activity is simultaneously a function of some higher objective, and an objective of some lower function. Those functions’ purposes are limited to the operational domain established by the global goal such that activities’ effects outside of that domain are either ignored or, else, to be “contended with.” While the description of plan hybridization in the *Findings* section, above, focused on the shift of the organization’s coordinating effects into the plan, the theorized hybridization of course goes both ways. The field’s purposes are shifted into the plan and then shifted out to the response organization. In the functionalist approach, the response organization becomes the means to achieve the global goal. It is taken to be organized almost exclusively for the purposes, ends, or goals as set forth in the plan — goals which are operationally defined and more limited than any of the organizational, political, or personal agendas that are bound to regularly intrude. It is precisely the emphasis on the functional instrumentality of the plan in the elision of plan/organization that ensures these agendas are perceived as intrusions in the first place; as hostile, unwanted, and exterior factors that can hinder but can never be a resource.

A second consequence of the hybridization of the functionalist approach is that mechanisms to achieve coordinated responses are taken to be rooted in plans. At the first level, the plan is a tool whose function is to coordinate activities for the purpose of achieving effective responses. At the next level, the formal structure of the plan is a tool whose function is to conceptually align activities with ICS for the purpose of coordinating activities. As

a result, the “coordinating” features of ICS that are principally represented within a plan are only the nested functional activities of its model organizational structure. Whatever other mechanisms, processes, structures, or resources that provide for the coordination of the response organization during actual emergencies are not “imported.” This means that efforts to improve response coordination or effectiveness that focus on features of the plan (namely, better, more faithful, or more complete functional/organizational alignment) may not be effective at improving coordination. To the degree plan-focused efforts draw attention away from efforts to improve the coordination mechanism or effectiveness of the response organization directly, they even potentially risk undermining the “actual” mechanisms.

A third and related consequence is illustrated by another divergence of accounts. The view that the type of functional coordination provided by plans is essential to achieving PHEP’s global aims persists despite evidence that plans’ capacity to “deliver” well-coordinated outcomes is still uncertain. Analysts have noted that the belief that operations often deviate from plans or planning assumptions is widespread [Uhr et al., 2008], that operational planning “sometimes leads to response inflexibility in the face of unexpected events” [Chen et al., 2008, pp.70], and that the after-action report and plan-improvement processes do not reveal the real causes of plan failure [Birkland, 2009]. These accounts present an interpretive puzzle for conventional approaches. However, from the practice-based perspective, that well-coordinated functions achieved by planning might prove inflexible during an event appears directly related to the inherent difficulty of “unlinking,” or coming between, the tightly-coupled, nested, “telescoping,” set of plans’ functions and purposes characteristic of the dominant approach.

Not only does the tight linking of activities promote inflexibility, it risks displacing the purposes or goals for which coordination is being sought. In the logic of PHEP, an organization with greater capacity or the ability to execute more capabilities would generally be considered “better prepared” than one with less capacity or which delivers fewer. This metaphor of “capabilities and capacities” gained prominence in the United States in part due to its articulation in foundational strategic preparedness doctrine. Homeland Security Presidential Directive 21, establishing the public health preparedness strategy, flatly declares, “It is the policy of the United States to plan and enable provision for the public health and medical needs of the American people in the case of a catastrophic health event through continual and timely flow of information during such an event and rapid public health and medical response that marshals all available national capabilities and capacities in a rapid and coordinated manner” [Bush, 2007]. In the intervening decade, numerous

planning guides, tools, and assessments would be built explicitly on this approach [U.S. Department of Homeland Security, 2007a]. The Department of Homeland Security identified 35 “Target Capabilities,” the Federal Emergency Management Agency recognizes 32 “Core Capabilities,” and the CDC prioritizes 15 “Public Health Preparedness Capabilities,” in addition its list of “10 Essential Public Health Services.” Within the academic community, there were calls to theorize preparedness in terms of *vulnerability*... which was defined as a lack of capacity [McEntire, 2004]. At the time of the H1N1 outbreak in 2009, *capacity building* was overwhelmingly the dominant operationalization of preparedness improvement in the developed world [Lakoff, 2008].

The challenge of comprehensive plans is that, by nesting so many functional relationships, they risk decoupling the *purpose* for coordinating activities from the *effect* the coordination actually achieves. Schulman argues that this potential for “conceptual drift” is uniquely in cases organized around vague concepts like “capacity” [Schulman, 1988]. To illustrate the idea, one Bay Area County’s all-hazards emergency operations plans runs roughly 390 pages in length exclusive of several of its annexes. The public health annex is treated as a stand-alone, but supportive, plan that refers frequently to the general emergency guidance document. The public health plan is, also, several hundred pages. One *section* of the public health annex, relating to the function of mass dispensing and the Strategic National Stockpile (SNS), itself comprises more than 400 pages [SF Bay Area County F, 2007]. The care and technical detail evident in the preparation of these documents is awesome. The precise number of inches with which pallets of medical materiel must be stacked in warehouses — 72 — is not only specified but it is given a motivating rationale, entreating the user to take seriously how departures may be costly. Mass pharmaceutical or vaccine dispensing sites, which here are primarily local schools, are mapped out relative to their surrounding communities. Within each site, the plan contains scale drawings with floor plans of the main buildings, medical supplies, and anticipated flows of traffic. There are evaluation checklists, job action sheets for dozens of required positions, lists of duties and responsibilities, and specific, scenario-based, medical treatment objectives. It is difficult to conceive of a plan more comprehensive or more implementable than this.

Yet, this plan also illustrates the way in which a focus on capabilities is in fundamental tension with the global goal of PHEP. The logic of capabilities suggests implementability. The work required to ensure that a plan is able, within reason, to function as intended “when the rubber hits the road” can be construed as the benefit of operations-based planning. A planner considers, and is ideally forced to confirm, her agency’s ability to deliver activities

at an increasingly comprehensive level of detail. She asks, “Can we actually pull this off? Will there be generators on site? Is the room big enough? Can one form be used for both individuals and families or do we need two? Do we have a Memorandum of Understanding with the Police Department?” along with myriad other questions. The more checked off — the more planned for — the higher the capacity.

There should be little doubt that the plan has increased the County’s capacity to control the SNS and deliver mass dispensing, one of the designated PHEP capabilities. However, as has been repeatedly shown, PHEP plans present themselves as increasing the capacity to secure a higher purpose. The concept “capacity” was supposed to refer to “capacity to achieve PHEP’s global goal.” Its vagueness allows for the opportunistic redesignation of the purpose to which increasing capacity is being sought. It even allows for conceiving of preparedness as simply so many capabilities to be maximized which leads to the erroneous conclusion that if capabilities are maximized then one is well prepared. Worse still, it allows for conceiving of preparedness as the capacity of a plan that maximize capabilities, displacing not just the goals but the work of achieving preparedness into the object.

Finally, there is a chance the aggressive functionalism of PHEP will not simply not help but can actively hinder. The prior specification within a plan of the operational details related to any particular functional activity or sub-capacity is not equivalent to achieving the goals of the response during an event. Everything that must be in place to make a plan like the one described above operational — the roles, contracts, understandings, technologies, objects, and more — become constraints and sources of problems to the degree any planning assumptions are violated. For example, in a detailed list of assumptions laid out in its beginning, the plan notes that the California Department of Public health will assume the responsibility for repackaging items received as part of the SNS, if necessary, to ensure that medications are delivered to dispensing site in “unit-of-use” format. But what if the state is unable to, or otherwise does not, perform this function? The plan is silent. Not only must responders then use other resources to inform whatever course of action they choose, but the plan itself becomes a detriment. Almost certainly, the county will have to call on its own staff, pharmacies, or other partners to do something they will not have prepared to do. More accurately, they will have prepared not to do it; their time, attention, and resources having been allocated to other activities with insufficient slack available to accommodate the new circumstances without taking on serious organization stress, compromising performance, or angering partners. Under current practice, the mere presence of an expert, highly detailed, operational plan can cause a cascading disruption.

Conclusion

This study hypothesized that the modalities to which plans' role are attributed in differing accounts in PHEP would reveal ways in which the field's theoretical approach to plans affects their meaning and value in actual practice. That hypothesis finds ample support here. The approach was to synthesize, via grounded and interpretive methods, a corpus of accounts into "the field's" account of plans' role. In this account, plans' role and centrality is attributed to the functional coordination they putatively provide. Differences in the accounting of modalities of coordination were revealed through different means. Respondents spoke about various plan features as being "good" but could not relate what functions they served to any role that might warrant that status. Their practices of copying formal structures from other "good" plan and of presumptively aligning functional activities into ICS-like structures of plans suggested a theory of plans in which functional coordination mechanisms were both highlighted, embedded into plans, and closely tied to the achievement of purposes for which coordination was sought. The establishment of a blended formal, structural, and functional characteristics of plans and response organizations can be conceived as a conceptual hybrid. The theory of plans' functional coordination also appears to relate contrasting accounts of the effect of the tightly-linked functional activities in plans: that, on the one hand, they afforded effective response but, on the other, somehow served to hinder response effectiveness. Thus the approach to plans affects not only how plans are structured and written but, more fundamentally, the capacities of plans to relate to the field's aims.

Plans are now a central part of the fields of public health and emergency management. Situating the "work" the conventional approach does to structure the relationship between coordination and purpose — especially apparent in the organizing metaphor of "capabilities and capacities" — into a broader theoretical framework suggests possible consequences of the dominant approach. Due to tight conceptual linkages between the purpose PHEP and the means available to achieve that purpose, the field's view of plans risks substituting a high-level strategic goal with more narrow operational ones. What society wants, so goes the reasoning, is not necessarily narrowly-construed operational capacity but, rather, the capability to meet any unknown challenge effectively. However, mirroring a central challenge of this project, it is not possible to enact, whatever this might mean, "increased capacity" directly, abstractly, or absent some theory. It must be done with respect to the characteristics of the situation of concern and for some purpose. This is the central aporia, and the fundamental paradox, of pandemic plans. To be useful for the purpose of meeting

some goal, they must be implementable. To be implementable, they must surrender a large part of the goal which is their purpose.

Chapter 4

Information Practices in the IHR

4.1 Background

This chapter turns from PHEP plans generally to one specific planning document, the International Health Regulations (IHR, 2005). The IHR¹ is a legally-binding convention, authored by the World Health Organization (WHO) and covering all of its greater than 190 Member States, creating a framework “to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks” [WHO, 2008a, p.1]. To effect this end the IHR establishes, among other things, a comprehensive system of information collection, notification, and verification procedures. The IHR requires member states to “establish, operate and maintain a national public health emergency response plan [a PHEP plan]” [WHO, 2008a, p.41] and to ensure that the state’s capacities to perform the tasks required by the IHR are present and functioning. Despite, and independent of, the IHR’s status as a controlling legal document, it is a plan in the most conventional sense. It establishes preparedness goals, coordinates the various activities required to achieve them, and, through several modalities, is used instrumentally to guide operations.

If plans were judged by the complexity of the sociotechnical systems to which they brought order, then the IHR has little competition at the top of the heap. To achieve its purpose requires the coordination of a network of hundreds of globally-distributed, heterogenous, and individually-complex public health surveillance and emergency response systems. By

¹Despite being *regulations* the term “IHR” is conventionally used as a collective singular when appropriate to the context.

referring to the network organized by the IHR as the “IHR system” it is not meant that IHR network is any more, nor any less, of a system or network than the one that is organized by PHEP plans and detects and responds to outbreaks in the San Francisco Bay Area. It does suggest, however, that relationship between actors in the international IHR system is, in some relatively strong way, *defined* by their mutual contact with the IHR. That is, absent the mediation of this plan for coordinated global disease detection and response, no recognizable form of this activity would exist. And that means that the IHR offers an exceptional vantage point from which differences in a plan’s actual and conventionally-recognized roles might be observed.

A ready-made controversy

Indeed, one need not wade far into the field to suspect that differing conceptions of the IHR’s role may be in operation. In accounts to which this chapter will devote considerable space describing, many critics of the IHR, WHO, and the IHR system, charge that it is supposed to do something that it does not. It is *supposed* to promote the free-flow of information about emergent events that is *supposed* to ensure that the entire network understands the nature of the risk and can calibrate their response measures appropriately. But in too many cases, by the critics’ lights, that is not happening. While, for the most part, *information* appears to be flowing as it should, its *import*, somehow, seems to lag behind, get lost, or never show up. For example, the “significant and unjustifiable delays” in the response to the West African Ebola virus epidemic in 2013, has been attributed to the fact that the many reports sent by “experienced staff” about the “seriousness of the crisis” either “did not reach senior leaders or senior leaders did not recognize their significance” [Kupferschmidt, 2016]. In 2015, after a scathing report on WHO’s failure to declare an emergency until nearly 2,000 cases of Ebola had been reported, four months after having been notified of the outbreak, WHO responded that the organization favored stronger international health regulations [Fink, 2015].

Calls to remedy this “defect” of information either by improving the capacity of information to “flow” [Gostin, 2016] or by simply providing more of it to the system [Briand et al., 2011] do not account for the mechanism through which those actions will result in the desired outcomes. In these accounts, assumptions about information’s role, particularly with respect to its capacity to convey the significance of its meaning, appear to be belied by the plain facts of day. This “gap” in the accounts, paired with a recognized “controversy surrounding the effectiveness of IHR, indicates the presence of theory of information with

strongly embedded modalities. The capacity of information to reliably fulfil some desired function is an open matter of controversy while, at the same time, the modality of information's capacity to reliably fulfil the same function is taken to be self-explanatory. It is ready-made case.

It should also be noted that it is an enduring case. For context, in 1995, one call for a "Global Health Disaster Network" publishing in the *British Journal of Medicine* lamented that "the lack of accurate and timely information is compounded by our inability to establish immediate, real time communications among international health agencies, non-government disaster and relief organisations, affected governments and local authorities, and the people themselves, which leads to needless morbidity, mortality, and waste in both manmade and natural disasters" [Ferguson et al., 1995, p.1412]. The authors envisioned a future in which "information highways" would "allow more rapid assessment and transfer of information" [Ferguson et al., 1995, p.1412]. More than two decades on, information technologies,² for the most part, are no longer the limiting factor. But, still, the anxieties about what information provides persist. A call to "improve the evidence base for decision making" after H1N1 avers "No less important [than the availability of timely information] is providing decision makers and those responsible for implementation with a common source of information that fosters an equal understanding of the problem among all involved" [Lipsitch et al., 2011]. Perhaps, someday, we'll get there.

4.2 Methods

Approach to the investigation

Continuing the development of the methodological approach outlined in project's introduction and as applied in the previous chapter, the general strategy is to analyze accounts of the plan's role to determine to what modalities its role is attributed. However, guided by the project's aims to characterize on what, if any, modalities differing accounts converge, and in light of the "ready-made" potential for controversy around the role of approaches to information, this investigation's analysis is focused on accounts of the plan's (i.e., IHR) role with respect to information.

Also continuing the project's focus on peri-H1N1 period, this investigation was principally informed by accounts of the IHR's performance related to that event. In keeping with

²At least as that is traditionally conceived

the approach described in Chapter 2, this investigation employs text-based, interpretive and grounded methods to identify, collect, and relate practical descriptions and accounts of IHRs role to theoretical constructs. Two sources of data comprise the basis of the “conventional” account. The first and most central is the text of IHR [WHO, 2008a] along with technical guidance related to its development and use (see, for example: [WHO, 2008b] [WHO, 2009] and [WHO, 2013]). The second source is literature addressing the IHR, information in the context of public health surveillance, and global disease detection. This set was drawn from academic, professional, and critical sources over many years of the investigation in both targeted and casual searches. One noteworthy class of reports in this literature are assessments of the response to the H1N1 pandemic. These are especially valuable for revealing ways in which elements of the IHR system that are not directly related to information nevertheless may bear on information’s role.

The author’s participation in two research groups studying PHEP, one of which was specifically addressed to the challenges of sensemaking in a global response network, greatly enriched his views (see: “Chapter 3: Methods”). Although none are quoted directly in this report, the perspectives of participants on the meaning and value of information in the IHR system were, in a direct way, the impetus for addressing the “hitch” in the flow of meaning in the IHR that is at the center of this investigation. However, in the years since the H1N1 experience, the WHO and the international response community have faced a number of other challenges including MERS-CoV³ outbreaks 2012 and 2015 and, most notably, the West African Ebola virus epidemic of 2013-16. While working on this project, the author was indirectly connected to these events through his spouse who, in her capacity as an officer in the CDC’s Epidemic Intelligence Service, traveled to both locations during emergency response and assessment operations. Although the investigation’s aims and approach, characterized by a very high degree of abstraction, appear distant from the action, they are very much motivated by it.

Analytic approach

The question that guides this analysis is: What explains why the approach to information in the IHR does not seem to be able to account for why it is not functioning as it should? This entails that the investigation should encounter or otherwise produce an account of the IHR’s role, an account of information’s role in the IHR, an account of the theory of

³Middle East Respiratory Syndrome Coronavirus

information evident in the account of information's role, and an account of the modalities by which the theory of information in the IHR relates to the others that explains the "gap." The analysis again draws from practice theory to elaborate features of accounts on which to focus the analytic effort. In the course of the investigation, two features of the IHR emerged as particularly salient in the practice-based analysis. The first are the practices that produce information capable of both providing coordination to the IHR system and capable of being "transmitted" across space and time. The second are modalities by which texts produce meaning and, potentially, influence information practices. Perhaps unsurprisingly, the conventional approach to information in the IHR provides only a limited account for the practices surrounding its production, verification, and transmission. Nor does it conceive of a role for the IHR, i.e., the text of the plan, in approaches to information's role in IHR system. Here, it is piece of a vexing puzzle.

The chapter is structured to align with the logic by which the study has proceeded. The first section offers a brief conventional overview of the background events, elements of the IHR, and features of the IHR system, that account for the IHR's role. This is used to ground by what modalities the plan's role is established independent of any specific consideration of information. The second section then considers accounts of the role of information in PHEP within the text of the IHR and the corpus of relevant literature. The result of the analysis suggest that the modalities to which information's role are attributed are the same as those to which the IHR were attributed in part one (i.e., capacities to coordinate complexity [through flexible accommodation] and to coordinate complexity [through enforcing standards]). The third section articulates the approach to information that presumptively accounts for the role of information in the earlier accounts of the IHR. The final section develops a practice-based account of information's role in the IHR and assesses the modalities that account for its divergence with the earlier accounts.

4.3 Establishing the IHR's role

Events prior to 2005

Ratified in 2005 and in effect only since 2007, the current IHR are a major revision to a previous version adopted, and amended only sporadically in the intervening decades, in 1969. One of the factors galvanizing the revision of the IHR was the outbreak of SARS [Gostin, 2009]. Cases of the disease first appeared in Guangdong province, China, in November 2002.

Chinese officials quickly judged the then-new syndrome to be serious and almost immediately began mitigation and control measures. In nearby Hong Kong, where cases were multiplying rapidly, isolation and quarantine orders were placed on high density housing blocks well before the identification of the etiologic agent. However, China did not officially alert WHO until the Spring 2003, months after suspicions of an atypical disease had already reached the international community [Heymann and Rodier, 2004]. In that interim period persons infected with SARS coronavirus travelled abroad and caused community transmission in at least seven other countries. More than 1,000 people became infected before international resources and expertise were able to be mobilized to prevent further spread.

This episode culminated in an official apology from the Chinese CDC and underscored the international community's fears about a lack of transparency [Congressional Research Service, 2004]. SARS is deadly disease; 11% of known cases ultimately succumbed to its effects. However, unlike influenza, certain factors of the virus itself make it particularly amenable to interventions to slow its spread. Had experts known about the cases, isolated its cause, and implemented aggressive isolation and quarantine earlier, far fewer people would have died. It is easy to see, then, the appeal of a treaty designed to promote the rapid reporting and free flow of information about precisely this sort of novel infection. The SARS incident also served to remind public health authorities of the international character of their task. Not only the speed with which the virus circled the globe, but the chain of circumstances by which WHO was first notified, were instructive. The report came to Geneva via the Western Pacific Regional Office in the Philippines, from an Italian doctor who, while working under the auspices of WHO in Vietnam, recognized the novel symptoms of an American, then at a French hospital, that had fallen ill while in China for business.⁴

To be effective in such an environment, a system designed to detect and respond to disease threats would have to be practically universal in scope. It would need to apply to every state actor, compel states to actively surveil their own territories, and provide incentive for local sites of clinical encounters to report to their national agencies, all without regard to administrative, regional, ethnic or national distinctions. It would need to capture all potentially relevant epidemiologic information at its most basic descriptive level [Bowker and Star, 2000]. Every point of contact would become an all seeing eye, responsible for recognizing and reporting up to the appropriate authority any potentially serious disease, no matter how it came to learn of it.

⁴Dr. Carlo Urbani, who died on March 29, 2003 from SARS. The virus, SARS-Urbani coronavirus, now officially bears his name.

Elements of the current system

Though revisions began long before the outbreak, the emergent SARS experience was forefront in the minds of WHO and international officials as they finalized drafting the new IHR [Davies et al., 2015, p.7] and many elements of the current system reflect anxieties of that experience. Its greatest innovation compared to its 1969 predecessor concerns the set of conditions that require reporting. Previous revisions required reporting of only a limited number of conditions (yellow fever, plague, cholera). Now, notification is required based upon the novelty and level of threat to the public's health posed by any infection, allowing for the inclusion of rare, emerging, and as-yet-unknown agents. Apart from the increased political flexibility such a change entails (the World Health Assembly need not meet, negotiate new language, and formally revise the document to add new diseases), the new "event-based" scheme reflects the broader change in thinking that emphasizes public health capacities and global health security. The entire system turns critically on the capacity of states to recognize, verify, and report problems of potential global health concern in an accurate, timely, and regular manner.

At just 58 pages, including front matter and multiple annexes, the IHR is impressive both for its density and breadth. While the official purpose of the regulations (see above) expresses PHEP's common aspirations, a foreword also places the plan in the context of WHO's "central and historic responsibility" for the "management of the global regime for the control of the international spread of disease" [WHO, 2008a, p.1]. The IHR establishes that regime in through seven major provisions. First, it requires member states to develop national public health surveillance systems and promulgates standards and desirable characteristics of said systems. Second, it requires each member state to designate an "IHR focal point." This office is obliged to coordinate the surveillance and other information gathering activities within the member state, to prepare and transmit necessary reports to WHO, to be available to WHO for emergency consultation, and to serve as the liaison between WHO and the member state. Third, it obliges member states to transmit to WHO information about potentially hazardous disease threats known to the member state, while providing guidance, via a decision algorithm, about how to come to this determination. Fourth, it compels WHO to develop criteria for determining *public health emergencies of international concern*. Fifth, it provides guidance to WHO concerning the disposition of information; it sets out when information must be verified with member states, under what circumstances it may be shared with other states or UN agencies, and what sorts of response and assistance WHO must offer.

Sixth, it provides for protecting human rights by imposing limits on the sorts of medical activities, restrictions, and fees member states may impose on travelers for the purposes of responding to an infectious disease emergency. Finally, seventh, it establishes a framework for the investigation and response to health threats arising from international trade, particularly at ports and within the shipping industry, designed to minimize disruptions to trade and commercial activity.

In support of its aims, the IHR incentivizes WHO and highly-developed states to invest in global public health surveillance capacity by directing grants and technical assistance to developing countries. The text of the regulations is supported by a number of supplementary technical guidance documents intended to aid states in fulfilling their IHR obligations, which relate either directly to operationalizing the IHR (see, for example, [WHO, 2008b]), or to developing their underlying public health surveillance infrastructure (for example, [WHO, 2013]). And, indeed, the IHR revisions were undertaken concurrently with a period in which “changes in public health information infrastructure, especially the widespread use of computers and Internet-based systems, resulted in ongoing improvements in the conduct of surveillance [and] advances in laboratory and epidemiologic methods, including molecular diagnostic tests for organism identification, have expanded the surveillance toolset and knowledge base” [M’ikanatha et al., 2007b, p.xx]. Yet, as the following figures illustrate, capturing those improvements in a national public health surveillance system is an immense administrative, technological, and financial burden.

FIGURE 1. Overview of national public health system for a model Southeast Asian country with a population of 60 million.

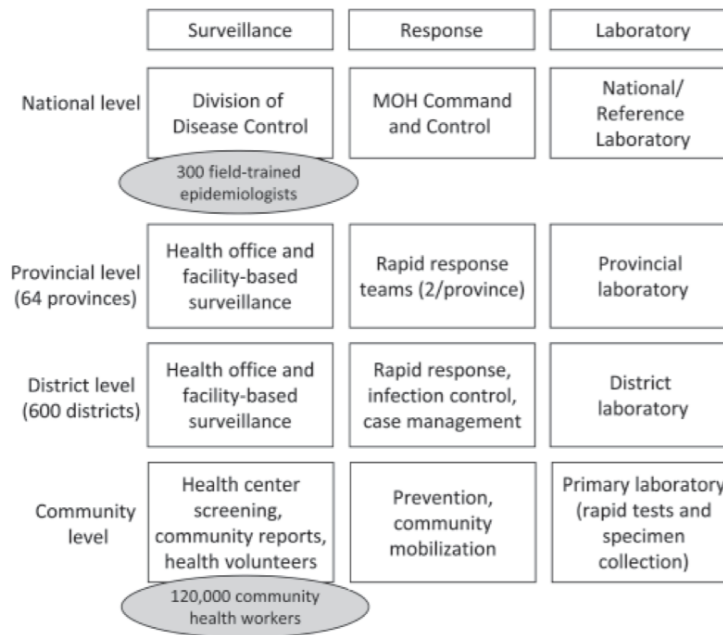
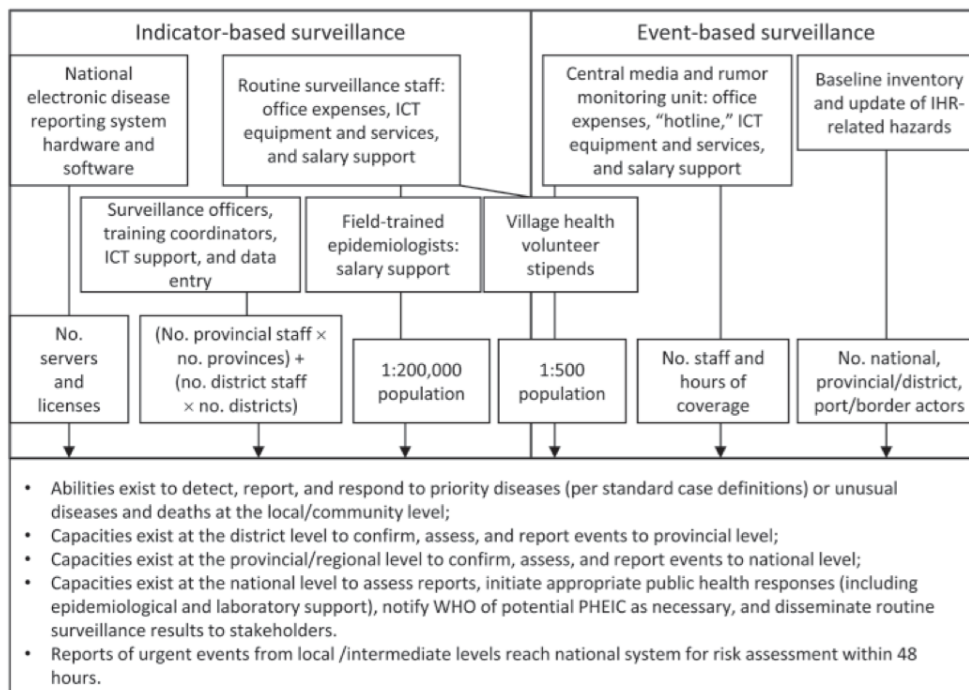


FIGURE 2. Inputs for Core Capacity 3 (Surveillance) of the IHR.



Public domain figures reproduced from Katz et al. (2012). Costing Framework for International Health Regulations (2005). *Emerging Infectious Diseases*, 18(7):1121-7.

From a technical perspective, states may require assistance 1) identifying functional capacities and disease-specific priorities, 2) establishing functional and accountability systems across multiple levels, 3) developing human resources and training programs, 4) planning for supplies, materiel, and personnel, and 5) managing and evaluating program performance [Ministry of Health, 2015]. From a social and political perspective, many states lack the basic infrastructure, human capital, political stability, and financial resources necessary to reliably sustain integrated surveillance and response systems.

The IHR attempt to “tame” the internal complexity of each state’s intra-national surveillance network through the designation of a single IHR focal point at the national level through which information should flow. An additional adjunct to the IHR, the the WHO *Event Information Site* (EIS), an electronic, online, secure, repository developed to facilitate the exchange of IHR-relevant information quickly and confidentially, including verified acute public health risks, risk assessments, and WHO guidance, is only available only to national focal points. In practice, however, the ongoing support and contact between large national health ministries, regional coordinating bodies, reference laboratories, emergency response professionals, academic disease specialists, sub-national public health departments, technology providers, private clinical health systems, news agencies, and the frameworks, conventions, and institutions which bring these various elements into contact, compounds the complications. One result of these many entanglements is that of the roughly 350 official IHR reports received by WHO in the year prior to H1N1, less than 20% were initiated by the national focal point [WHO, 2011]. The rest came from 3rd parties, with the largest number coming from news- and personal-report aggregators like GPHIN and ProMED⁵[WHO, 2017]. Although state recalcitrance assuredly accounts for some part of the lower-than-expected frequency of official reports, the requirements of IHR reporting appear aspirational in light of uneven, fragmented, surveillance and assessment capacity within some states. However, even in the case of 3rd-party reporting, a putative benefit of the current IHR — improved coordination and information flow — could be said to be working to the degree it has strengthened the “mechanisms for outbreak alert and response [to act as] as a global safety net that protects other countries when one nation’s surveillance and response systems fail” [Heymann

⁵GPHIN, the *Global Public Health Information Network*, is a service started by the Government of Canada that searches for, aggregates, and lists reports of cases or outbreaks of disease in news reports and other online fora. It is a secure service available by subscription to public health agencies and related private or public organizations. ProMED, the *Program for Monitoring Emerging Diseases* is a similar internet-based source aggregator sponsored by the International Society of Infectious Diseases. It is available to individuals via listserv and is notable for regularly including field reports and local observations from its subscriber base.

and Rodier, 2004, p.173].

The IHR is expected to coordinate many disparate things. One of its feats is that it provides standards, for example for the types of events that must be reported, that flexibly accommodate the complexities of the surveillance systems that produce while simultaneously accommodating different standards, for example, of types of reports. It is as if the IHR, “guided by the goal of their universal application for the protection of all people of the world from the international spread of disease” [WHO, 2008a, p.10] has adopted a “by any means necessary” approach. Whatever it takes to get reports into the system, it wants to provide.

4.4 Establishing information’s role...

The next step of this investigation is to assemble accounts of the role of information in the IHR. Significantly, many such accounts effectively re-establish the IHR’s purpose as related to information. Of course, this entails attending to the modalities relating the establishment of information’s role to the establishment of the IHR. Accounts are drawn from two sources and are organized in separate sections. The first is the text of the IHR itself. The second is a collection of popular, academic, and practitioner literature of both conventional and critical varieties.

...via the text of the IHR

The centrality of information to the IHR and the IHR system is apparent in the text of the IHR itself. There, it is enough of the right sort of information that allows states to detect disease threats, information that must be marshaled to determine whether or not a threat is sufficiently severe to warrant notification, and information that must be transmitted, verified, shared, and put to use for coordinating the global outbreak response. So it is no surprise, even with so few pages, that the IHR explicitly contain more than 80 instances of the term *information*, and invoke one of its variants on dozens more occasions. In a preliminary section that defines key terms, information does not receive its own entry. However, one learns that “‘scientific evidence’ means information furnishing a level of proof based on the established and accepted methods of science” that, “‘verification’ means the provision of information by a State Party to WHO confirming the status of an event within the territory [...] of that State Party” and that verification relies upon, “‘surveillance’ [which] means the systematic ongoing collection, collation and analysis of data for public health purposes and

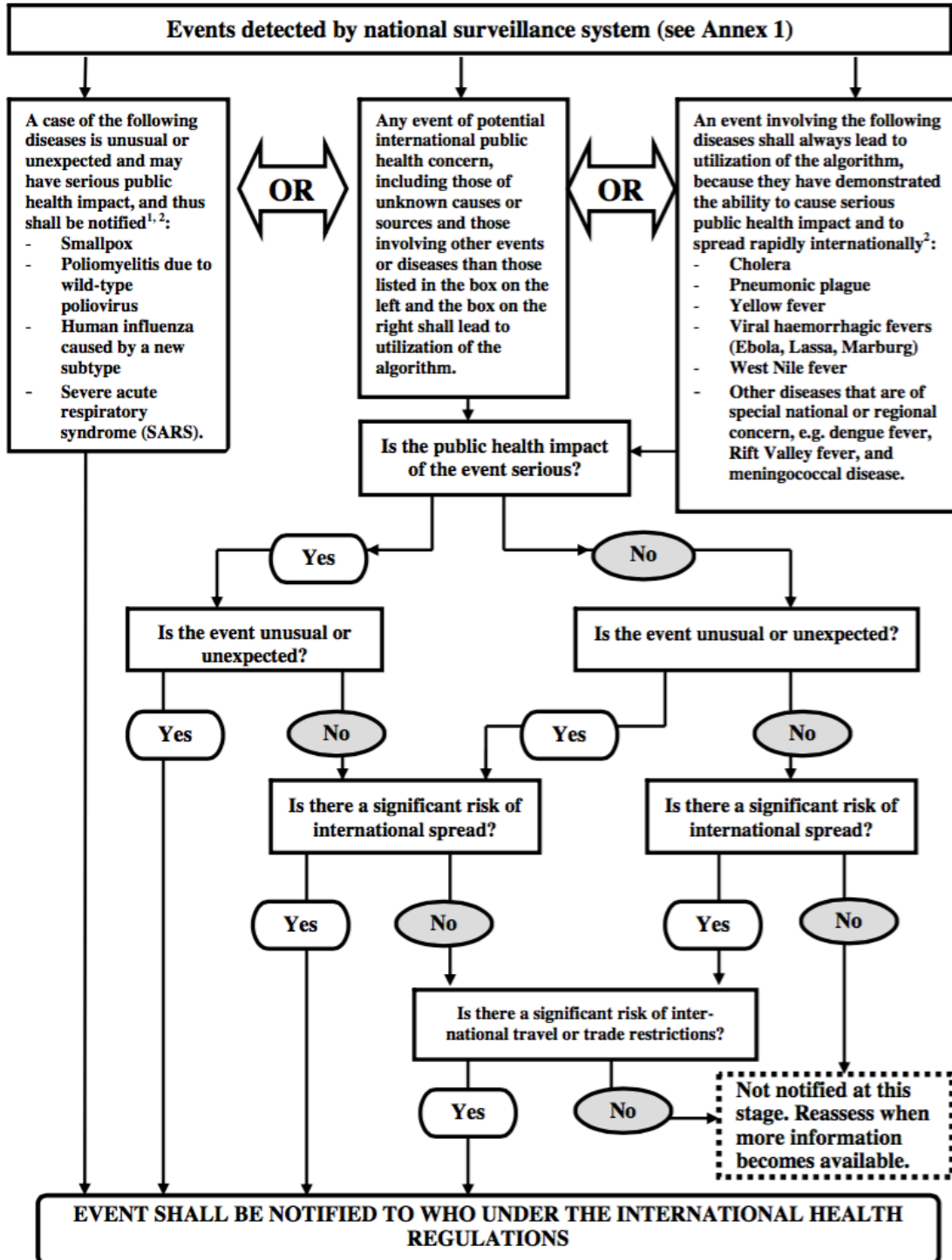
the timely dissemination of public health information for the assessment and public health response” [WHO, 2008a, p.9-10].

The case that information’s role is important to the IHR — invoked here as central to evidence, verification, and surveillance — scarcely needs more evidence. However, three additional examples illustrate the degree to which the IHR system is conceived of as an information generation, transmission, and processing system. Concerning the IHR Focal Points, the coordinating office for each member country, the plan states their functions as, “disseminating information to, and consolidating input from, relevant sectors of the administration [...] including those responsible for the surveillance and reporting, points of entry, public health services, clinics and hospitals and other government departments” [WHO, 2008a, p.1]. In order to assess the potential of any event to threaten international health and trade, WHO is directed to, “collect information regarding events through its surveillance activities” [WHO, 2008a, p.11]. And, finally, “following a notification, a State Party shall continue to communicate to WHO timely, accurate, and sufficiently detailed public health information available to it on the notified event [...] and report, when necessary, the difficulties faced and support needed in responding to the potential public health emergency of international concern” [WHO, 2008a, p.12]. In each of these instances, information is essential to or dispositive of the relevant activity. In several, doing something with information *is* the activity.

...via Annex 2

One part of the IHR is so essential to practices that render information meaningful that it merits special attention. While WHO and the largest, most technically competent, health agencies and reference laboratories form the backbone of the international response network, the IHR practically devolves critical assessment and decision making tasks to national and local levels. This is due to the requirement that cases be reported when their severity or novelty is “above expected levels for the particular time and place” [WHO, 2008a, p.40]. The IHR includes an algorithm, referred to within the field by its location in the plan — “Annex 2” — to assist in identifying reportable events.

DECISION INSTRUMENT FOR THE ASSESSMENT AND NOTIFICATION OF EVENTS THAT MAY CONSTITUTE A PUBLIC HEALTH EMERGENCY OF INTERNATIONAL CONCERN



¹ As per WHO case definitions.

² The disease list shall be used only for the purposes of these Regulations.

As explained in a 60-page technical appendix on the use of this decision instrument, states must report on any event that fulfills any two of the following four criteria:

1. Is the public health impact of the event serious? (yes/no)
2. Is the event unusual or unexpected? (yes/no)
3. Is there any significant risk of international spread? (yes/no)
4. Is there any significant risk of international travel or trade restrictions? (yes/no)

[WHO, 2008b]

Wildtype Polio, SARS, novel human Influenza subtypes, and Smallpox are all presumptively unexpected and serious; these diseases are explicitly called out for required reporting. In contrast, routine diseases with little, or well-managed, public health impact are never reported and effectively have no bearing on IHR system. However, everything else potentially reportable based on the the context of the encounter. For these diseases their severity and/or novelty varies due to local factors. Some known examples include cholera, pneumonic plague, and viral hemorrhagic fevers like Ebola. An outbreak of dengue fever in Petoskey, Michigan would be highly unusual. One near Rio de Janerio, Brazil, where it is endemic, would not. Only the former would necessarily be reported in the current system. Apart from introducing potentially-problematic elements of judgment or discretion into the decision to report,⁶ the most consequential result of this requirement is that every report that *is* made enters the system with some potentially-verifiable marking of significance pre-attached. The implications of this condition are drawn out in a later section.

...via elements of the system

Of critical perspectives on the IHR, one of the most common highlights that its proper functioning relies on global health surveillance capacity widely believed to be insufficient for the task [Hitchcock et al., 2007]. M'ikanatha and colleagues lament that, “despite IHR (2005) mandates, not all countries are able to devote adequate resources to surveillance” [M'ikanatha et al., 2007a, p.11]. States that lack surveillance capacity risk not observe significant events,

⁶An objective understanding of the words “serious,” “unusual,” or “significant” is virtually impossible and, thus, motivated agents might be expected, within some bound of reasonableness, to interpret these terms in narrow or politically self-serving ways. The associated documentation attempts to “train” users on appropriate interpretations by exploring the factors supporting the answer of each of the four assessment questions in a series 16 case studies.

a challenge to the IHR's effectiveness that extends beyond the surveillance technologies to "deficiencies in (1) health infrastructure; (2) scientific methods and concepts of operations of infectious disease surveillance programs; (3) human, technical, and financial resources; and (4) international policies" [Hitchcock et al., 2007, p.221]. Reflecting similar concerns about the role of information pattern recognition to the system, critics charge that even within highly developed countries, public health surveillance systems are lacking. They are characterized with being too passive, too fragmented by disease specificity, funding sources, and levels of organization, and too constrained by political contingencies [Morse, 2007].

Relatedly, even if states could recognize significant events with perfect accuracy, system effectiveness is threatened due to the fact that WHO, as the coordinating body, "is dependent on its member states for reporting" [Morse, 2007, p.1071]. While it may be true that "WHO, with its extensive communications network, can rapidly assess information," [M'ikanatha et al., 2007a, p.4], documented episodes of untoward conduct by individual state actors demonstrate that the "greater scope for action in theory based on [the IHR's] new vision of transparent consensus-oriented globalism, has limits in practice" [Scoones and Forster, 2008, p.64-5]. For example, David Heymann, while WHO director for communicable diseases, concluded that the SARS experience "made one lesson clear early in its course: inadequate surveillance and response capacity in a single country can endanger national populations and the public health security of the entire world" [Heymann and Rodier, 2004, p.173]. More recently, Indonesia's decision to withhold information about sporadic outbreaks of H5N1 influenza, reportedly amid concerns over WHO's sharing of virologic samples with 3rd parties and the associated costs of vaccine development [Fidler, 2008], highlights information flow's dependence on good faith.

Valuable insights about information's role in the system were generated during and in the aftermath of H1N1. Following the outbreak, a special committee of WHO was convened "in order to inform the review of the functioning of the Regulations; to help assess and, where appropriate, to modify the ongoing response and to strengthen preparedness for future pandemics" [WHO, 2011, p.8]. With respect to assessing pandemic severity, WHO recognized the problematic "absence of a consistent, measurable and understandable depiction of severity of the pandemic. Even if the definition of a pandemic depends exclusively on spread, its degree of severity affects policy choices, personal decisions and the public interest" [WHO, 2011, p.20]. The report concludes that, "what is needed is a proper assessment of severity at national and subnational levels. These data would inform WHO's analysis of the global situation as it evolves, allowing WHO to provide timely information to Member States" [ibid].

This statement is immediately followed by the admission that “the Committee does, however, recognize that characterization of severity is complex and difficult to operationalize” [ibid].

Additional challenges related to the production and assessment of information were highlighted in the report. Specifically, it noted concerns about: 1) the frequency of data requests — “Weekly requests for specific data were overwhelming to some countries, particularly those with limited epidemiological and laboratory capacity;” 2) the impact of information sharing efforts — “Country officials were not always convinced the data they submitted were being analysed and used [and] some felt that continued counting of cases yielded less useful information than would have been provided by rates of hospitalization, complications and death in countries affected early on in the pandemic;” 3) the lack of coordinated guidance — “Lack of a cohesive, overarching set of procedures and priorities for publishing consistent and timely technical guidance resulted in a multiplicity of technical units within the Organization individually generating an unmanageable number of documents,” and; 4) the transparency of information assessment procedures — the “decision to keep confidential the identities of Emergency Committee⁷ members,” a standard practice for other WHO committees, “fed suspicions that the Organization had something to hide” [WHO, 2011, p.20].

The report recommends improvements to the Event Information Site (EIS) “to make it an authoritative resource for disseminating reliable, up-to-date and readily accessible international epidemic information. States Parties should be able to rely on the EIS as a primary source for information on epidemiological status, risk assessment, response measures and their rationales” [WHO, 2011, p.20]. The recommendations call for including “more events and expanding information on each event” while also recognizing that, “for the EIS to become an even more valuable tool, States Parties should be more willing to let WHO share information,” pushing aside the political tensions involving “the affected State Parties’ interest in avoiding potential social and economic consequences” that are inherent to sharing such information [ibid]. A separate examination of the response to H1N1 undertaken at the request of the European Commission concurred with virtually all of these findings. It reported that Euro-area member states “believed that information sharing was the most important activity provided by WHO” but also that “further information from WHO would have been helpful” [U.K. Health Protection Agency, 2010, p.42]. Evincing the concern that WHO was

⁷The committee responsible for advising the Director General on issuing declarations recognizing an event as PHEIC and on setting the official pandemic “phase.” Under the IHR, both types of declaration trigger changes in WHO guidance and process and, therefore, have immediate policy impact.

“sitting on” potentially salient information, the report identifies specific requests for “further information about areas outside the EU” and increase in “publishing data received through IHR” [ibid].

Finally, providing yet more support to these findings, Keller and colleagues report that among a conference of select international response officials, negative characterizations of information sharing in the IHR system far outweighed positive ones, with the primary complaints being that 1) information within the IHR system was insufficiently comprehensive to maintain appropriate situational awareness and 2) information dissemination was delayed [Keller et al., 2012]. The authors’ argue these complaints are likely to be linked: the type of abstracted, validated, information transmitted within the IHR system both requires time to produce and lacks the contextual sense-making value of the less formal information sources upon which their respondents ultimately reported relying. In a damning conclusion, they write, “More than simply overlooking the circulation of informal information, our findings suggest the IHR might actively impede it. The IHRs emphasis on validated information may make public health experts reluctant to share hunches and impressions outside of a trusted network of colleagues. Here, the formalization of the reporting process may have displaced a less formal pattern of information-sharing across the international public health infrastructure in which participants did not have to go “on record in order to consult with other health officials. WHO, a source of contextualized information in prior outbreaks, may have ceded an important role in the move to formalization” [Keller et al., 2012, p.22]. Their participants also highlighted several ways in which the IHR structure affected the speed of information flows. On the production side, requirements to report to WHO and also to other organizations (e.g., to other government ministries or to regional coordinating bodies) multiplied the time required to verify and ensure the quality of reported information. On the consumption side, information published by or via different sources often contained “serious inconsistencies” that required time and effort to reconcile or resolve. That effort was made more difficult to the degree that countries perceived that their fulfilling the minimum requirements of formal IHR reporting effectively satisfied their obligation to inform international partners of the import of the reported events [Keller et al., 2012].

...via a summary account

Keller et al.’s analysis usefully homes in on a quality or capacity of information that is a source of difficulty in accounts of the IHR. They draw a distinction between formal (what they

also call validated) and informal (what they also call contextual) information and suggest the two are differentially supportive of the organizational sensemaking required for successful performance in the distributed, uncertain, and high-tempo environment of outbreak response. While I (continue, as co-author, to) agree with the paper’s conclusions about the limitations of the IHR system and the need to support organizational sensemaking, this analysis aims to extend their insights by developing a framework that could account for the modalities by which these, or any, different “versions” of information are created and have effects.

In the above accounts, information is taken to be central to the function and purpose of the network defined by the IHR. Information’s role in the IHR, its instrumental use for the purpose of reducing PHEP’s greatest source of uncertainty — that the severity of a potential problem is initially unknown — is never far from mind. Because the scale of an outbreak can increase more rapidly the society’s capacity to contain or mitigate its effects, decisions about whether to initiate response activities, and to what degree, are often made in advance of definitive information about disease severity, transmissibility, and natural history [Lipsitch et al., 2009]. For this reason, the international surveillance system emphasizes initial reporting and early assessment [Morse, 2007]. These descriptions evince worries that the *system* will fail. They worry that some parts of the network may not be technically capable of capturing or producing important information; that different nodes will produce and report information in an incommensurable way; that information may not be “pushed” from one node to another; that certain nodes have insufficient power to “pull” information from others; that information can become “stuck” in one place; that conflicting versions of “the same” information may be circulating; and that information may be insufficient to guide response activities. Notably, when actors recognize that the network does not provide information that they need, want, or otherwise find useful, they must “go outside” of it. They might engage the resources of some different network — for example, an informal one comprised of personal contacts or a “shadow” network of purported insiders that make information public. Or, perhaps they stick with official sources but engage novel “routes,” finding paths to nodes to whom they are not directly linked. The point, however, is that for practical purposes the network and information are jointly established. By definition, non-IHR information is not available on the IHR network, the IHR network does not provide non-IHR information, IHR information is not available on non-IHR networks, and non-IHR networks do not provide IHR information. In this way, the account of the role of information in the IHR system mirrors the account of the role of the IHR itself. It shares the IHR’s (i.e., the IHR *qua* text) function is to effect the coordination of a disparate set of activities for

the purpose of achieving the PHEP goal. Information substitutes for the disparate set of activities and becomes the object endowed with the capacity to produce the knowledge required to achieve the IHR's aims.

4.5 The information practice account

The theory of information on evidence in accounts of the IHR appears largely devoid of practice. Much like the conventional accounts of plans, the conventional account of information assumes a theory of how information “works” whose effects are not accounted for in practice. In contrast, a practice-based theory of information assumes that information's role (i.e. its meaning and value) is *produced* by specific modalities and practices. For it to be possible to identify what, if any, effects the conventional theoretical approach has on actual practice, it is first necessary to elaborate elements of practice theory likely to account for these modalities.

Elements of practice theory relevant to the IHR

In practice approaches, information and knowledge practices are performative [Law, 2009] in the sense of an “ongoing, continuous, sequence of actions” carries and with the implication that “the object of a performative definition vanishes when it is no longer performed” [Latour, 2007, p.37]. It also has the sense of a “scripted performance” and thus also carries the implication that a different script would result in a different performance/object/reality. Physical objects, material artifacts, and technologies are bundled with practices and, consequently, are components of the performance [Schatzki, 2012]. Using the term “technologies” to designate such a bundling, Oudshoorn and Pinch emphasize that “technologies contain a script (or scenario): they attribute and delegate specific competencies, actions, and responsibilities to users and technological artifacts” [Oudshoorn and Pinch, 2007, p.549]. It is precisely the materiality of technologies that makes the delegation of agency to them so useful, so powerful, and so common; material objects are characterized by their physical and temporal durability and, once created, can continue to function with (almost) their full agential potential across great distances or time period [Latour, 1992]. For this reason, in any sufficiently large network, like the IHR system, one can expect the practices around any given activity to be stabilized by and embedded into technical objects or infrastructures able to span whatever distances are required.

For two related reasons, texts are technologies particularly well suited to the practice-embedding coordination just described. First, they are amenable to being intentionally deployed specifically to do so. They are “an instrument designed for a purpose,” an intentional artifact “designed to summarize precisely those aspects of a complex world that are of immediate interest” [Scott, 1999, p.87], and can be, or include, what elsewhere are called a *cognitive artifacts*, the “highly encoded, compact representations of what matters in this work domain” [Nemeth et al., 2006, p.1013]. Among the most salient aspects of a work domain, to which a text may draw the reader’s interest, is the purpose or aim of the work itself. Texts reflect “choices about the representation of actions, actors, and events” [Johnstone, 2007, p.54], which are structured into narratives, which are seen as an important tool for coordination — particularly for the mutual alignment of purpose and intentions [Bartel and Garud, 2005]. Second, texts have the capacity to shape the practices of their readers. Empirical evidence suggests that individuals form narrative-based representations of activities relevant to their domain of practice [Wyer et al., 2002] and selectively attend to, and *bias their reasoning toward*, features coherent with established narratives [Tsai et al., 2008]. The mechanism by which texts structure attention and “transmit” their import, “arises in part out of the repetitive and patterned use of rich features: if a feature is repeated within and across texts, it is likely to be typified and conventionalized as to appearance and significance” [Barton, 2003, p.66]. That is not to say that plans, as texts, deterministically shape the behaviors of the users. People always engage situations of concern somewhat flexibly and may draw on the resources of a plan only to the degree that they “find evidence for plans in the course of their activities” [Suchman, 2006, p.70]. Nevertheless, actors in a domain of practice are, at least, likely to define their situation in the terms patterned by the text and may shape their behavior accordingly [Boczkowski and Lievrouw, 2007, p.959].

Information practices in the IHR

Armed with the focus provided by these elements of practice theory, the task is now to develop an account of the information practices of the IHR. What does information mean when WHO is directed to “collect *information* regarding events through its surveillance activities” [WHO, 2008a, p.11]? Is it the same as “the timely, accurate, and sufficiently detailed public health *information*” [WHO, 2008a, p.12] state parties are required to report to WHO? While in each case the answer requires an analysis of the purposes, relationships, and the rest of the context established within the text, some generalizations are possible.

Bowker and Star remind us that “it is through what is excluded as trivial that we can frequently understand systems of thought pointing directly at what is important” [Bowker and Star, 2000, p.104]. The exclusion of non-serious diseases from the IHR system and the highlighting of specific, deadly, viruses, underscore that information, at least for reporting, is to be used to inform some assessment of severity. The text offers the following as examples of reportable information: “case definitions, laboratory results, source and type of risk, number of cases and deaths, conditions affecting the spread of the disease and the health measures employed, reports [of] the difficulties faced and support needed in responding to the potential public health emergency of international concern” [WHO, 2008a, p.12]. Each highly synthetic and knowledge-intensive.

The practices capable of producing this type of information are well characterized, theoretically, and are practically rich in the domain of public health surveillance. They are variously identified as “calculability,” [Cabantous et al., 2010] “disembedding,” [Giddens, 1991] and “translation,” [Latour, 1988] practices with practical differences minor enough to allow for a composite view. Giddens argues that social systems able to span time or space rely on disembedding mechanisms that “lift out” social arrangements from one context, through the creation of “symbolic tokens,” a “medium of interchange,” that can be “passed around” to different contexts [Giddens, 1991, p.22]. Latour continues, “As soon as we concentrate on what circulates from site to site, the first type of entities to snap into focus are *forms* [...] a form is simply something which allows something else to be transported from one site to another [Latour, 2007, pp.222-3]. As the physicality of Giddens’ tokens increase their portability, the physicality of certain forms of information increase their mobility. “When you hold a piece of information you have the *form* of something without the thing itself (for instance the map of Sakhalin without Sakhalin, the periodic table without the chemical reactions, a model of Rotterdam harbour without the harbour itself)” [Latour, 1988, p.243]. Latour’s emphasis on form highlights that information represents something, it “stands-in” for something that is not physically there. In public health surveillance systems, techniques of inscription are well known. Note how the following chart, with its original emphases, illustrates the diversity of forms by which information is inscribed, abstracted, and made ready for translation to another domain.

Table 3 Types of analysis, objectives, tools and methods

Type of analysis	Objective	Tools	Method
Time	Detect abrupt or long-term changes in disease or unusual event occurrence, how many occurred, and the period of time from exposure to onset of symptoms.	Record summary totals in a table or on a line graph or histogram .	Compare the number of case reports received for the current period with the number received in a previous period (weeks, months, seasons or years)
Place	Determine where cases are occurring (for example, to identify high risk area or locations of populations at risk for the disease)	Plot cases on a spot map of the district or area affected during an outbreak.	Plot cases on a map and look for clusters or relationships between the location of the cases and the health event being investigated.
Person	Describe reasons for changes in disease occurrence, how it occurred, who is at greatest risk for the disease, and potential risk factors	Extract specific data about the population affected and summarize in a table .	Depending on the disease, characterize cases according to the data reported for case-based surveillance such as age, sex, place of work, immunization status, school attendance, and other known risk factors for the diseases.

"National Technical Guidelines for Integrated Disease Surveillance and Response for Liberia, 2015. Section 3: "Analyze data" >> Annex 3A: "Types of analysis, objectives, tools and methods" >> p. 90

This multiplicity of objectives, tools, and methods all undergo translations to be made calculable, “broadly defined as a three step process of ‘isolating objects from their context, grouping them in the same frame, establishing original relations between them, classifying them and summing them up’” [Cabantous et al., 2010, p.1534]. This allows information to be abstracted, moved, and compared. The movement is toward “centers of calculation” where inscriptions can be accumulated and combined” [Latour, 1988]. In the IHR network this includes WHO, as the hub through which all official information flows, but also national focal points, health agencies, and myriad other offices where levels of abstractions and inscriptions keep piling up and must be brought together in physical proximity for integration by “vertical associations made by the cascade of rewriting” [Latour, 1988, p.244]. While it is possible, given the mediating effects of technologies, to dispute each of the many translations and re-representations information undergoes on the way to the centers, the centers “are busy building elements with such properties that when you hold the final elements you also, in some way, hold the others” [Latour, 1988, p.235]. Though difficult to access the archives, the paper forms, the structured questionnaires, the molecular detection assays, it is possible to move from the information at the center *back down* through the series of inscriptions, reestablishing the links between each place by accounting for the *work* added to put it information in some particular form.

The possibility of interrogating a chain of information in this way is, in fact, at the heart of the information practices of the IHR. National focal points need to do it to verify the accuracy and import of the information they receive from local sites. WHO needs, essentially, to re-do it to verify the accuracy and import of the information they receive from focal points or outside sources. The requirement for verifiable information is embedded into the information production from the very start; in this way, the production and verification of information in the IHR is effectively “opposite movement” within the same set of practices. And this is true despite the fact the IHR is actually silent on the subject of WHO’s verification practices. The definition presented earlier “**verification** means the provision of *information* by a State Party to WHO confirming the status of an event within the territory” [WHO, 2008a, p.10] provides no detail whatsoever of what WHO does to confirm, and thus verify, the status of an event. The most notable feature of this scenario is that the information itself is endowed with the agency to render the confirmation.

4.6 Discussion

The account of information practices in the IHR in the section above affords the following propositions: 1) The production of “information” (in the abstract, medium-of-exchange, sense) essential to the system is the result of a series of highly technical “translation” practices; 2) To the extent that the practices of translation are shared and appropriate to the domain of surveillance, the system produces information effective for the purposes for which it is produced, and; 3) the capacity of information to be “interrogable,” for it to be possible for its chain of translations to be interrogated, allows for the identification of the practices, purposes, and meaning it has in some context.

The “interrogable” capacity of information is one key to puzzle of why the “meaning” of information gets “stuck” in the IHR system. The answer is this: there are (at least) two types of information essential to the IHR system — information for verification and information for dissemination — and only one carries the interrogable chain of translations that conveys the meaning that information in the IHR system is *supposed* to convey.

The assumption of conventional accounts is that “the same” information is “transmitted” across the IHR network. That assumption appears to be incorrect. While information is, of course, in some sense transmitted in the course of its production, conceiving of its movement as *translations* is more appropriate. It is not “the same” information that is being moved between levels and sites but, rather, different forms or inscriptions. The information produced by surveillance systems, the reports of events upon which which the system is based, is an object constituted by these practices for the purpose of verification. However the IHR system is also supposed to disseminate information. The information disseminated by WHO across the network, that which is meant to inform member states, the public, and other interested parties about the status of events, is a different object *even if it is an identical form to what the WHO received*. That is, even if WHO simply republishes, verbatim, a table it has received from a state, the table is not the same information because it is no longer being used for the same purpose. Upon arrival in Geneva, it is a representation whose purpose is to inform an assessment of severity. Upon leaving, it is a representation whose purpose is to represent an assessment of severity. It is thereafter supposed to be transmitted immutably and requires the addition of a different sort of work, a different sort of information practice, to shore up its ability to travel without change. It will become necessary to establish its credibility, its authority, its independence, its trustworthiness. These result of an entirely

different set of information practices⁸ whose “reversal” leads to Geneva and then, not to the paths back to site of the original encounter, but to the paths that establish its network of its authority.

Why might conventional accounts not recognize the importance of distinguishing between these different varieties of information? The assumption that practices of production/verification are the same as those of transmission/dissemination, where the practices of production/verification hold ontological primacy is reinforced via the text of the IHR itself. The directives and key concepts within the text of the IHR are interpreted in the context provided by some field of practice. It is assumed that a knowledgeable reader will be able interpret the document’s “correctly,” i.e., as if in the context of an already-established field of practice that reader and document shared. However, even if this was genuinely true in a particular case, we would say it is the *result* the reader’s ability to recognize the artifacts, contours, and elements of the real world she inhabits as sufficiently similar to the artifacts, contours, and elements of the world produced by and within the language of the text.⁹ To draw out the obvious example, if the reader recognizes an instance of the word “information” in the text as the same “information” that she works with, what, specifically, is she recognizing? She is recognizing the *performance* of information by the purposes, intentions, affordances, limitations, and other mutually-established relationships of the imagined situations within the text.

The conflation of the two varieties of information within the IHR is made difficult to see because the descriptive detail of the activities and technologies involved in various situations of use — which might allow readers to recognize different practices — is generally lacking. What descriptions *do* appear relate almost exclusively to production practice. If, as Norman observed, descriptions need only be as precise as is necessary to discriminate among elements relevant to the context [Norman, 2002, p.58] then the constructed context *within* the IHR must be taken as a suggestion to the reader either that all information is of one type or that it is unnecessary to distinguish between types or uses of information in any context *outside* the text.

⁸It may not even be appropriate to speak of these as information practices. The term might perhaps be reserved only for the translation practices that self-consciously produce forms of information.

⁹N.B., the already-established field of practice that document and reader most clearly share is not the domain of the activity in question but, rather, the domain of language. Collins puts it that practical understanding is contained in language; “that language is not only central to practical understanding in any one domain, but also what bridges disparate worlds of practical activity” [Collins, 2011, p.274].

Conclusion

This investigation is a motivated response to what might reasonably be called a trope in the genre of IHR commentary. It is a common figure: information sharing is the core of the system; holds great promise; mostly works; sometimes exhibits more friction or less consensus than expected; let's make sure that sort of information can flow more freely. Evident here is the notion of "liberation" — that through its greater capacities some new system might afford information the freedom to which it always aspires — that Duguid has recognized as characteristic of the enthusiasm for new technologies [Duguid, 1996]. Evident also is "the implication that technologies are just conduits for information produced elsewhere [which] both denies the material role technologies play in producing information and [...] assumes that information has an inherent shape and integrity independent of the system in which it is produced and consumed. Information is taken to be self-sufficient, self-explanatory, and self-legitimizing" [Duguid, 1996, p.82]. Neither implication is warranted by a practice-based approach.

The approach, with some degree of success, met the aims of the study. The differential capacity of information to provide meaning relevant to the context of use in the IHR was attributed to the different information or translation practices proper to different functions of the IHR system. The "production" version of information is intended to represent the event for the purpose of the making assessments of severity (or related factors). It invites verification of the modalities by which the event is represented. The "dissemination" version of information is intended to represent an assessment of the event for the purpose of informing action. It invites verification of the modalities by which the assessment is represented. Those modalities are potentially quite different from, and at least not the same as, the production modalities.

As was true in the case of chapter 3, the modalities by which approaches to plans and plans interact relate to the objects constructed within the plan. There, a theoretical approach to functional coordination highlights functions whose coordination is realized within the plan. Here, a theoretical approach to information highlights qualities of information realized within the plan. The role of the text is to literally produce a version of information endowed with the frictionless capacities to transmit exactly what is needed. That has consequences, regardless of whether the text was reflexively shaped by the theoretical approaches of its authors, which it no doubt was, and regardless of whether its users already hold the stereotype of information the text produces, which they likely do. The IHR produces an information that

is recognizable as the frictionless sort and does essentially nothing to convince a reader that information relevant to her interests is otherwise.

Although this account has limited its focus principally to one technosocial object of the massive IHR system — the text — it has explored relationships to phenomena “below” it (including the resources of language and the technopractices of texts) and phenomena “above” it (including a field of technical practice and information systems). Perhaps the study’s most remarkable finding is that even at this small scale, technologies are mediators. An agent that enlists the IHR also enlists its *program of action*, its goals, limits, and affordances, with the effect that the agent’s original intentions are shifted, or translated, however subtly, toward those compatible with this technology [Latour, 1999, p.176-83]. No human agent intends to create a rift in the intelligibility of information at the heart of the IHR system. But, with the IHR, they do.

Chapter 5

Conclusions

This project took an unconventional approach to plans in the field of public health preparedness and emergency response. It started with an observation that the role of plans in this field seemed self-explanatory and uninteresting to its practitioners. A certain conventional familiarity might be expected for any useful object, of course. However, the evident ease with which questions about how plans work and what they accomplish were addressed was belied by the considerable time and effort spent attending to them. Based on belief that the field's current approach to plans implicitly calls out for a broader conceptual basis, my foremost interest was in demonstrating empirically what that basis may be. By "opening up" plans and PHEP to different avenues of analysis that were likely to help "explain" what seemed self-explanatory, I thought it might be possible to partially account for the existing relationships between plans and people — to understand why they had become so uninteresting — and, in the course of so doing, to also investigate any promising, but neglected, relationships that appeared to bear on how plans' value was established. Why? Because the field of public health preparedness, its practitioners, and their role in our society matter. Because understanding the contributions of theory to practice matters. A deep dive into the "esoteric" seemed a worthy exploration.

What started as the unsettling question "What is the role of plans in PHEP?" became refined as it encountered theoretical obstacles to its investigation until it reached, "What are the modalities of production and of reception of meaning and of value of plans and of approaches to plans that establish varieties of meaning and value?" When viewed through a sociotechnical lens, grounded in an ethnomethodological approach, what emerged is something that is neither self-explanatory nor uninteresting.

5.1 Contributions

Since its inception, I have viewed this project as one committed to the art of straddling lines. It is situated between the world of public health practice and the world of academic theory. Almost certainly, it is bound to dissatisfy both. Its approach commits neither to the method of “applying” theories for the empirical description of cases nor to the method of “applying” empirical descriptions of cases to the elaboration of theories. Rather, with unknown success, it attempts a theoretically “sensitized” empirical description of theories in cases. It investigates the lines between objects and people, the lines between cause and effect, and, perhaps most of all, the lines between practice and theory. Whether the approach to their mutual articulation highlights or obscures these lines, for good or for ill, is not ultimately up to me.

Nevertheless, because it focuses on the domain of public health, and particularly public health emergency preparedness and response, the project will naturally be expected to make some contribution to the understanding of how it operates. With the emphasis that I believe its findings are descriptive not prescriptive — diagnosis not cure — I must concede that it may. Other fields of practice that have responsibility for operating and coordinating highly complex sociotechnical systems in uncertain and high-consequence environments include humanitarian aid and aerospace engineering organizations. Plans and planning documents in these fields may profitably benefit from a similarly situated approach. The project contributes most directly to “planning theory” in the way in which that was styled like “literary theory.” In that vein, I will reflect on the findings in comparison to the major statements on plans reviewed in the introduction.

5.2 Findings

As an application of a method to explain discursive lacunae in differing accounts of how plans function in PHEP, the project was successful. In two investigations, explanatory descriptions of problematic features of plans in PHEP account for both the existence and effects of those features *and* accounts for their oversight in conventional accounts. In chapter 3, the lacunae of the conventional account of plans’ role was discovered in the processes of that accounts’ description. Respondents’ accounts of many deliberate aspects of plans’ structural, stylistic, or conceptual design relied on presumptive, affective, evaluations about their value. They believed these features to be good but could not articulate the meaning of the role they

served. Using a practice-based lens, I argue that their function was to align plans with the organization structure. Additionally, the effect of plans' capacity to organize activities by relating their purposes and functions in a tightly nested fashion was, in different accounts, variously conceived to be a mechanism essential to the achievement of operational objectives and a mechanism that hindered the achievement of those objectives. The source accounts' oversights of both discrepancies was attributable to the influence of structural/functional theory of plan coordination.

In chapter 4, the lacunae of the conventional account of a plan's role motivated the investigation of the source of the discrepancy. Commentator's accounts of the information in the IHR relied on presumptive, affective, judgments about its capacities. They believed these capacities to be good but could not account for the failure of these capacities to function as expected. An account of information's role in IHR suggested that it mirrored the IHR's role in the network: information both substituted for the sociotechnical objects coordinated by the plan and was taken as establishing its meaning and value directly. A practice-based account restored the work effaced by the theory of information of conventional accounts and was used to inform an account of varieties of information practices related to different purposes in the IHR system: verification and dissemination. The effect of the shift in purposes, and the differences in modalities required to translate information to each, is to create a potential juncture in the "meaning flow" of IHR system. The plan's capacity to realize within its text a practice-less information reinforced the conventional approach.

In both cases, the conventional approaches to plans appeared to undervalue the degree to which concepts absolutely essential to their field of practice are established in the context of plans. While the manifest "content" of surveillance information and the information translations that render it predate and exist apart from the IHR, there is no IHR information without that document. While the organization that responds to public health emergencies is comprised of the people, technologies, and associations that perform the activities of response in an actual event, the only place the "response organizations" exists, day-to-day, is in a plan. The performance of response activities *is* coordinated in exactly the degree of its accord with a plan.

The approaches to plans in both cases suggest that practitioner's engagement with plans reflexively reinforces a focus upon the object on which its utility is based. In both cases the plans' utility is related to some modality of coordination. In chapter 3 the coordination is of the functional activities that presumptively effect its activity-centric concept of preparedness rooted in response. In chapter 4 the coordination is of the variety of information that pre-

sumptively effects its information-centric concept of preparedness rooted in awareness. And while the coordination capacity of plans is assumed in both cases, the dominant approaches' respective foci extend even to accounts of the modalities responsible for plans' capacity to coordinate. The response plans coordinate through realizing structural/functional alignment of activities within structures of its text. The IHR coordinates through realizing the standardized but flexible accommodative form of information. This was an interesting finding in that it illustrates the surprising depths at which theory-laden approaches to plans can operate to shape to shape their role.

Related to the planning literature

Elaborating these findings in light of the contributions of Clarke and Suchman to our understanding of plans, and the utility of different approaches to them, will reveal several areas of agreements, some of disagreement, and some which appear incommensurable. From the start, two important differences with Clarke should be noted. First, reflecting earlier interests in cases in which “*organizations* played central roles as agents of harm and rescue” [Clarke, 1991, p.2] and later interests in worst-case thinking [Marshall and Picou, 2008] the stories (what I might call accounts) in *Mission Improbable* principally address man-made threats for which there is little expertise partly because the technologies that have created the risks are themselves new. While a pandemic has no less catastrophic potential than a nuclear meltdown, and while the technologies of modern medicine and emergency response are also somewhat new, mankind's experience with the dynamics of infectious disease outbreaks is on relatively firmer footing. Which is not to dismiss the key uncertainties that remain. But, reflecting a limitation of his approach, it is not a priori certain whether PHEP represents an environment ripe for fantasy documents in the first place. Second, plans in PHEP in 2009 can be distinguished from the earlier plans on which Clarke bases his thesis in 1999 in that the former are all products of the intervening decade's “planning renaissance” promoted plan designs to more easily integrate with those of supra- and subordinate jurisdictions, different sectors, different hazards, sought to clarify roles and promote more coordination, and increased the use of tabletop, functional, and full-scale exercises. Thus, in theory, these plans stand a better chance of acting to stabilize society and to coordinate other organizations to provide the inputs necessary for the realization of any one plan's functional effectiveness. While such plans might, in his analysis, still have high symbolic utility, now with a lower expected ratio of symbolic to functional utility it is not obviously appropriate that they

are “whimsical speculations” or “flights of fancy in which scenarios are imagined with little regard to usual constraints” [p.41]. Plans in PHEP are used too often for that to be the case.

These studies comport with and extend Clarke’s findings in two meaningful ways. First, texts create worlds. In his analysis, it is within the text of the plan that the “apparent affinities” between disparate problems become linked and turned into “facts,” and through the modalities of coherence with theoretical expectations that its symbolic achievements are obtained. In mine, it is within the texts that the mechanisms of functional and informational coordination are realized and through the modalities of coherence with theoretical expectations that their functional achievements are obtained. Second, those worlds mislead. For Clarke, the problematic theory in play is that expertise can yield the knowledge necessary to make likely-to-succeed plans. If it cannot, we should, in his view, be more open to admitting that some things cannot realistically be planned-for. Since we often do not really know what we are talking about, the problem is that there is a plan that purports that we do at all. For me, the problematic theory in play is that planning model describes how plans can be followed in some likely-to-succeed way. Just as Clarke shows that theory of expertise can be wrong and that the expertise doesn’t actually produce what it says it will (“actual” risk) as it say it will (through “actual” analytic methods) but, rather, by modalities the theory of expertise previously ignored (rhetorical affinities), I show that the theory of plans can be wrong and that plans do not actually produce what they say they will (preparedness) as they say they will (by functional coordination) but, rather, by modalities the theory ignores (formal alignment and information substitution/standardization).

Suchman anticipated that the theory of plans would mislead. In accounts of action based on the planning model,

“actions are described, at whatever level of detail, by their preconditions and the consequences: ‘In problem-solving systems, actions are described by prerequisites (i.e., what must be true to enable action, effects (what must be true after the action has occurred), and decomposition (how the action is performed, which is typically a sequence of subactions). (Allen 1984:126)’ Goals define the actor’s relationship to the situation of action, because the situation is just those conditions that obstruct or advance the actor’s progress toward his or her goal. Advance planning is inversely related to prior knowledge of the environment of action and of the conditions that the environment is likely to present. Unan-

anticipated conditions will require replanning. In every case, however, whether constructed entirely in advance or completed and modified during the action's course, the plan is prerequisite to the action" [Suchman, 2006, p.53]

The project's findings, particularly from chapter 3, clearly confirm the presence of the hypothesized planning model of action within PHEP. What these analyses add is to show that the planning model has reflexively affected the design of plans-as-object. Recall that the "rules and features" of plans are used as resources to explicate purposes and deliberate about action which is "then made accountable to [those rules and features]" [p.74]. PHEP has designed features into their plans (e.g., hybrid alignment) that provide specific, additional, resources with which to minimize the "friction" of accounting for action in terms of the plan's features.

Developing that idea that approaches to plans in PHEP have resulted in planning practices that reinforce how deeply the plans embed the functional logic of the planning model highlights a final difference between PHEP plans and fantasy documents. In Clarke's account symbolic "plans develop according to the needs of the organization rather than in response to realistic assessments of organizational capabilities or limitations" [Garrison, 2008, p.627]. By contrast, in PHEP, planning clearly attempts to make realistic assessments of their organizational and operational capacities. However, when committed to a physical plan, those assessments' practical effectiveness (or functional utility, in Clarke's terms) are undermined, not due to considerations of an outside audience, but due to considerations of the field's own aggressive theory of plans. That is, even functional plans develop according to "symbolic" representations of theory that may reduce their effectiveness by making capability assessments less realistic for the organization's own use. In this way, this project extends both Clarke and Suchman by describing mechanisms whereby "functional" plans demonstrate the "over-coherence" characteristic of symbolic plans.

5.3 Limitations and extensions

One limitation of the project's approach is that it is difficult to characterize the generalizability of its findings. Operating a level of abstraction that is *supposed* to represent a broad field, its accounts nevertheless are products of engagements with particular sites, times, people, and concerns. For any finding it is uncertain what constraints should be placed on to whom it applies, to what plans it applies, to what *parts* of plans it applies, and many more.

The account of varieties of information in the IHR system, and their differential capacity to carry the meaning of significance to that context poses a unique challenge in that its explanation is potentially confounded by the organizational culture particular to WHO who operates as an *obligatory point of passage* [Callon, 1986] for information in the IHR. While I do not think it is just that WHO is bad at their job as, for example, the chapter's analysis explains why information disseminated as already-verified statements of severity failed to achieve significance in the early stages of Ebola, accounting for the contribution of their internal processes and expert systems to this dynamic would no doubt enrich the analysis.

A second limitation is that, like any sociotechnical object, plans have many roles and are taken to be many things. To permit analysis, the project's approach was to limit its attention the roles most central to conventional accounts. This choice was, in part, guided by a theoretical commitment to attend to the objects that practitioners believe matter. It also, in part, satisfied a condition that results of the analysis have the capacity of possibly being relevant to any matters of consequence in this critically important field. And, for the purposes of the project's aims, comparing accounts of *any* role will do. Nevertheless, if the project is taken to be a comprehensive analysis of the role of plans in PHEP, it is a limited one. It does not consider plans' role in accountability relations, in relations of political or physical control, or in relations to other social worlds.

A third limitation is that this account attends in far greater measure to plans' capacities than it does to people's. While justified by the approach, it nevertheless omits an important part of the picture. Particularly in PHEP, people are not just trained by the everyday engagement with a plan but are explicitly trained for its use. Accounting for what effect having been trained in ICS, or in medicine, or of having served in the military (which, a disproportionate percentage of the most senior officials involved in plan develop have) has on the approaches to plans, on the capacities to "take" plans in certain ways, and the capacity to recognize the plan in the course of their activities would reveal additional complexity to the picture of how plans' role was established.

These limitations suggests several areas for future investigations or extension. Repeated use of the project's approach on different varieties of plans, potentially including those of other fields, would strengthen the confidence with which this study's findings could be generalized. To the degree that plans in PHEP share any characteristics with protocols or with fantasy documents, it would be informative identify salient exemplars of each, account for their roles and identify by what modalities they were achieved. Relatedly, the possibility of political pressure in PHEP, as particularly derived from the need to secure grant fund-

ing, might be semi-directly observable in plan development of improvement processes to the degree that either are responsive to standards imposed by new funding requirements. Attending specifically to the development of plans or their improvement processes seems to be a particularly fruitful area for investigation. I conceive of a three-step approach. First, understanding what is common to the process and what typical impingements plan writers perceive. Second, developing and testing “interventions” designed to sensitize planners to the effects and potential detriments of their approaches to plans. And, third, assessing whether resulting plans substantively differ either on formal, conceptual, or in the interests of practitioners, effectiveness grounds.

5.4 Final thoughts

There is reason for concern that planning practices in PHEP are insufficiently attentive to the focusing effects of their approaches. The effects are evident not just in the conceptions of what plans are for and do, but conceptions of *how* they do. And it is that aspect that has the most direct application *on* the plans themselves. The capacities of texts to create worlds, of forms to imply functions, of technologies to define practices — these do not currently feature in the fields’ approach to plans. How might they come to do so? I am afraid only with a considerable amount of effort. In many important professional domains, direct contact with the social sciences is rare. Gaining access to people and organizations strictly for the purposes of observing them, in this and related antecedent projects, was *hard*. And when successful, practitioners tended to be skeptical that the effort would yield much of interest, even to the investigator. Nevertheless, accessing these processes for the purposes of participating in them, despite the skepticism, despite the challenges, is necessary. Society asks that plans in complex critical domains work well. If ever there was a basis for defining an ongoing role for social scientists, it is in bringing their resources to bear here.

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