

Stuck in 'the field': why applied epidemiology needs to go home

Freya L Jephcott 

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Between December 2010 and January 2011, 16 children presented to a mission hospital, in what at the time was, the Brong Ahafo Region (BAR) of Ghana, with unusual forms of seizure and paralysis. Initial testing suggested that the cause was B virus, a zoonotic monkey-borne virus not previously seen in Africa. These unexpected and concerning results spurred national public health authorities to deploy a field epidemiology team from the capital. Although short-lived, the findings from their investigation implicated a local monkey population occupying a forest belt which stretched along all of the affected communities. Newly collected samples were sent to a foreign reference laboratory for confirmatory testing, but no results were reported back. In the interim, several transnational research coalitions were formed to investigate the outbreak further. One did manage to obtain some confirmatory testing and the results suggested that B virus was not the cause of the outbreak. This prompted the remaining research coalitions to consider other potential causative agents and animal hosts. Over time it became clear, however, that the reports of a monkey-filled forest were also incorrect and that the clinical picture had not supported an infectious aetiology as definitely as first thought.¹

Despite the mounting evidence suggesting it was not a zoonotic outbreak, more likely explanations for the outbreak, specifically that it had a toxic aetiology, went unexplored. After 2 years, all of the investigations into the outbreak had petered out. No meaningful public health interventions had taken place nor a compelling explanation for the event developed. However, if you read the draft and published manuscripts describing the outbreak authored by the investigators during that time, you would be left with the opposite impression.

A more exact account of the investigations into the BAR outbreaks is presented in a recent article exploring the processes of hypothesis building that took place.² As

both an author on the paper and a piece of its subject matter, as I was one of the epidemiological responders to the outbreak, I have worried that a key insight from the saga might have been lost in the academic minutia of its publication. The paper had a number of obvious take-home messages for current and aspiring field epidemiologists, including:

1. Do not treat laboratory findings as definitive or infallible.
2. Obtain expertise in managing toxicological events.
3. Do not displace local public health professionals as the leaders of outbreak investigations.
4. Avoid short (<3 month) 'field visits'.
5. Accurately document investigative activities and their impacts.

All of these points have been made many times before.³ Underpinning them though, and echoing throughout the BAR investigations, is a more fundamental, typically unspoken flaw in contemporary field epidemiology, namely, that it imagines itself the work of elite outsiders.

The 'field' in the job title speaks to a profession that sees its work as taking place elsewhere, specifically somewhere rural or remote. The imagery and stories it cultivates are of brilliant so-called 'disease detectives' who step into disaster-afflicted communities and rapidly restore them to health and tranquillity by uncovering some pathogenic or toxicological culprit.⁴ However, despite its endurance and pervasiveness, this story is neither an accurate rendering of the work of field epidemiology nor a plausible model for disease control.

Outsiders are a terrible choice for doing this work. They show up too late—an average of 2.7 months in recent WHO review of transnational outbreak investigations³—and leave too soon. The 2-week international deployment model favoured by the US Centers for Disease Control and Prevention's (CDC) Epidemic Intelligence Service, the WHO and



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Centre for the Study of Existential Risk, University of Cambridge, Cambridge, UK

Correspondence to
Dr Freya L Jephcott;
flj22@cam.ac.uk

most other field epidemiology organisations is incompatible with conducting proper descriptive epidemiology, let alone overseeing an effective intervention. Further, as the BAR outbreak paper shows, such incursions by outsiders can directly, and negatively, impact on the processes of evidence gathering and hypothesis building undertaken during investigations.

What we currently call field epidemiology would make far more sense reimagined as a situated practice. That is, as work performed by local public health professionals with longstanding ties to the affected communities and a stake in their long-term health. No public health emergency is a discrete event; all are grounded in ongoing, intersecting social, political and environmental trajectories, and ensuring protection against common and novel threats alike is a single never-ending project. This then begs the questions: where did this apparently infective model of field epidemiology come from and what has sustained it?

One, admittedly speculative, answer to the origins of the expert outsider trope and the superficial investigative practices it engenders is that it is a modern amalgamation of 19th-century epidemiological field studies, whose investigations were directed at uncovering fundamental insights about infectious disease dynamics rather than realising immediate interventions, the imagery of colonial tropical medicine and the legacy of domestic fundraising efforts on the part of the CDC in the 1950s, which borrowed heavily from Arthur Conan Doyle's Sherlock Holmes stories.^{5 6} What is sustaining this ineffective model is a little more certain.

The endurance of this incongruous model of disease control appears to be due, in part, to the work being misconstrued as something only a brilliant few are capable of. This in turn necessitates the importation of such talent and expertise. However, the development of an instructive epidemiological explanation for outbreaks and other public health emergencies is relatively straightforward, intuitive work. Further, fully qualified field epidemiologists frequently require supplementary specialist support when it comes to the various technical components of investigations (clinical assessments, laboratory testing, environmental assessments, etc). Outbreak investigations have never actually been the work of an individual or small group.⁷ As the BAR outbreak paper, and numerous ethnographic accounts of outbreaks before it, show, evidence gathering and interpretation is the work of large diffuse networks of 'sensemakers', with those with the strongest ties in the community often contributing the most.^{2 8-10}

This characteristic of investigations has been routinely obfuscated by both it being the elite outsiders who typically get to write the authoritative accounts of these investigations and by epidemiological publishing practices that see the role of local generic public health infrastructure, and the professionals who comprise it, often downplayed or omitted entirely. This is not to imply that field epidemiologists are consciously or consistently performing

substandard work, co-opting the products of others' labours, and then meticulously erasing the evidence of both. These are just the inherited norms of the profession. Field epidemiologists appear to be, on the whole, an unusually reflective and well-intentioned group. The European Programme for Intervention Epidemiology Training (EPIET) alumni gatherings often erupt into impassioned Socratic debates over how political or apolitical the profession ought to be or if the measure of good epidemiological work is found in its technical sophistication or the interventions it breeds. In part, this is likely due to the type of people drawn to a career in public health but also because of the amount of active field building that is currently going on as the profession is formalised and its features defined.¹¹

That said, a reluctance, conscious or subconscious, to give up the perks of such arrangements by those in senior positions and the heir apparents, may also be sustaining these flawed perceptions and practices.¹² It is not unheard of for senior field epidemiologists to briefly appear in the midst of an ongoing crisis, ostensibly there to transport samples to a far-off reference laboratory, gather up the already collated data and then present the investigative work as their own in high-level meetings and conferences. Similarly, reference laboratories gazumping local responders when it comes to publishing accounts of outbreaks in peer-reviewed journals has been a recurring point of tension following responses.¹³ Both scenarios involve high-level public health actors leveraging unequal access to specialist resources on the ground. Their actions are further enabled by peer-reviewed journals' frequent demands for highly sophisticated laboratory testing prior to publishing an account of an outbreak investigation, a threshold few public health professionals working at community interface could reach.

Early on in the BAR outbreak response, a district disease control officer had raised concerns about introducing elite foreign and national outsiders into the investigation, warning: 'They will come in, sit down and they will take this one, and this, and then they will come out with a nice story of a nice thing'. In an email to his fellow local outbreak responders, he explained that the outsiders will 'want to publish because it is an emerging disease, however, there is the need for deeper investigation' and that instead, they themselves should 'work as hard as possible to answer all the possible questions, irrespective of the years or months that it will take'. Regardless of the image of transnational outbreak responders might have cultivated among themselves and the upper echelons of the larger epistemic community, to have such a reputation on the ground with those who witness work directly, is a damning indictment of these practices and their effectiveness.

Some of the work redressing these epistemic injustices and practical shortcomings is already being undertaken. For instance, EPIET has quietly switched 'field' to 'intervention' across their website; though they have maintained the website's 'postcards from the field' section,

which highlights the short visits of their mostly white European fellows to African outbreak responses. Similarly, the cover of Mark Pendergrast's book *Inside the Outbreaks: The Elite Medical Detectives of the Epidemic Intelligence Service*, which previously featured a white epidemiologist holding a test tube aloft in the style of cartoon superhero while his colleague urgently tends to unconscious black bodies lying beside him, is now just backlit petri dish.¹⁴ And, more substantively, training in field epidemiology, including outbreak investigation and response, is being increasingly offered to professionals working in health system's bottom tiers, those most proximal to communities. These discussions and reforms, however, have been piecemeal and there is an apparent reluctance to call out and surrender the heroic imagery of the intrepid shoe-leather epidemiologist altogether. More needs to be done to address this central self-mythology and collectively imagine something better.

For my part, effective reform starts with our publishing practices. This includes both the types of stories we are producing and the systems we have in place to bring accountability and rigour to them. This will require not only abandoning the heroic cliches of expert outsiders but also making structural changes that enable and privilege local accounts. This in turn will require greater allowances for messy, inconclusive accounts of outbreaks that accurately reflect the situation on the ground and do not always stretch to sophisticated laboratory testing. There is a further urgent need to bring direct checks on the assertions and intimations of effectiveness that often appear in accounts of such epidemiological work. For example, journals should require updates on the impact of these kinds of investigative activities on the affected communities at 3 months and 1 year, so that we might better assess and address the mid- and long-term effectiveness of our practices. To fail or tarry on any of these fronts will see the image of this crucial and rapidly maturing profession irrevocably harmed, as our exploits increasingly read less like episodes of Sherlock Holmes and more like the skirmishes of Don Quixote.

X Freya L Jephcott @freyjephcott

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ORCID ID

Freya L Jephcott <http://orcid.org/0000-0003-3256-0099>

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