Smallpox and Public Health: a Reality Check

THE UNITED STATES IS CONSIDERING THE vaccination of hundreds of thousands of medical and emergency personnel against smallpox as a preventative measure. The CDC has released guidelines for vaccinating the entire U.S. population in the case of a smallpox attack (*1*). Before we begin such a campaign, which in either case would involve a massive public health effort, it is imperative that we step back from the sensationalist press and marketing hype emerging from the burgeoning biodefense industry and ask if such a vaccination scheme is a good idea.

In her recent letter "Smallpox transmission risks: how bad?" (5 July, p. 50), L. H. Kahn suggests that "planning for a worst-case scenario such as the one envisioned in 'Dark Winter' [a scenario developed by U.S. bioterrorism experts to model a possible smallpox biological attack] makes the most sense." However, "Dark Winter" is not a technically sound depiction of the course of its particular epidemic in either time progression or casualty numbers. Many smallpox scenarios are now being promulgated as "ground truth" to lawmakers and the public and are being used to justify the potential vaccination of possibly hundreds of thousands of people, without the necessary peer-reviewed science to back them up.

Ellis McKenzie and the staff of the NIH Fogarty Center and the Rutgers University DIMACS program have recently held workshops with leading modelers to address the difficulties involved in modeling smallpox outbreaks. For the past several years, the Department of Defense has been carefully analyzing historical epidemics and hypothetical contagious disease threats against its forces while striving to improve its modeling capabilities at all scales of analysis, both temporal and geographic (*2*–*4*). More of such peer-reviewed scholarship is desperately needed.

Variola virus is known to exist in only two guarded repositories. It is widely assumed that it exists elsewhere and that these other stocks pose a terror threat, driving the need for emergency vaccination programs. We know from history that such programs will injure or kill a small number of people (*5*), at least a few in a million; such a risk was considered to be acceptable in the days of natural and very real smallpox epidemics.

If there are no unofficial stocks of variola virus, and assuming that no one could or would create the variola virus in a lab, the potential vaccine casualties would be in vain. It is thus incumbent upon any government, agency, or individual with specific and credible knowledge of the whereabouts of unofficial stocks to report this information openly. Only then can the full weight of international opinion and resolve be brought to bear to rid the world of the threat from this terrible disease. Lacking such revelations, we will continue to unjustifiably invest scarce public health resources in preparations against a phantom threat, to the delight of our adversaries and to the detriment of public health. We should carefully weigh bioterror risks against the likely consequences with careful peer-reviewed scholarship.

Women line up to be vaccinated during the 1947 New York City smallpox epidemic. Another large-scale vaccination could happen in the near future if the United States decides to vaccinate medical and emergency personnel.

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Ancient Animals or Something Else Entirely?

IN THEIR REPORT "DISCOIDAL IMPRESSIONS AND trace-like fossils more than 1200 million years old" (10 May, p. 1112), B. Rasmussen and colleagues present evidence for what might be the oldest known animals, from the Stirling Range Formation of southwestern Australia. Thanks to the kindness of Rasmussen and Fletcher, I recently had the opportunity to study this material. I suggest that some of their conclusions may be premature. The supposed trails are clearly all of a kind, but they show three peculiar features. First, although not remarked upon by Rasmussen *et al.*, some ridge margins show a striking imbrication with the adjacent sediment, reminiscent of the overfolding of a flexible surface. Second, on one surface, despite the presence of discrete "trails," an adjacent area is strongly corrugated (see left-hand side of Rasmussen *et al.*'s Fig. 2E). The texture and scale of this region are closely similar to the supposed trails, indicating a possible common origin. Finally, albeit a weaker argument and one already addressed by Rasmussen *et al.*, there is the striking parallelism of the two most prominent "trails" (Fig. 2, C and D), the ridges of which show the same sense of imbrication.

These observations suggest that alternative explanations may be preferable. The most probable is that these structures result from flexible microbial mats that coated sediment surfaces and were subsequently