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EDITORIAL

Treating Antibiotic Resistance as Medical Error

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The way in which the medical establishment categorizes an iatrogenic harm plays a crucial role in determining how much public attention the problem receives—and subsequently how much effort is invested in reducing its prevalence. Death due to a foreseeable complication from an intervention does not evoke the same kind of visceral reaction as death due to medical error, despite the fact that both may be types of iatrogenic harms. After all, complications are risks that patients presumably understand thanks to informed consent. By contrast, medical error is always unexpected and particularly unacceptable from the patient's viewpoint. Therefore, it is no surprise that when the Institute of Medicine (IOM) released its landmark report *To Err Is Human*, which indicated that preventable medical errors annually kill between 44,000 and 98,000 people in the United States,[1] massive public outcry catapulted the issue of patient safety to the top of the medical establishment's priority list. One decade later, it was evident that the report's findings had catalyzed major advances in promoting patient safety.[2]

The task of labeling a given iatrogenic harm as either a medical error or complication is not always straightforward. The IOM defines medical error as "the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim."[1] By contrast with this concise definition, the medical literature has struggled to produce a widely agreed-upon definition of a complication, owing to the slippery problem of pinpointing causality. For instance, it has been argued that negative outcomes from surgery can only be considered complications when they are the "*direct* result of an operation"[3] (emphasis added). Others have challenged the notion of directness by insisting that more distal causes of negative outcomes can and should be considered complications as well.[4] Despite the challenge of defining what the term complication means, the medical establishment has applied this label to antibiotic resistance. We are not convinced that this is always the appropriate categorization.

Incorrectly written or totally unnecessary prescriptions are responsible for the fact that as much as 50% of antibiotic use is inappropriate.[5] The inappropriate use of antibiotics represents an example of the use of the wrong plan to achieve an intended aim. It follows that as much as 50% of antibiotic use is medical error, according to the IOM definition. By extension, the emergence of resistance that results from this inappropriate use of antibiotics is due to medical error. Of course, microbes may harbor determinants of resistance even in the absence of antibiotic selective pressure. Additionally, there is tremendous use and misuse of antibiotics that occur in the agricultural sector. Therefore, not all resistance to antibiotics can reasonably be attributed to medical error. This creates a challenge in determining what fraction of antibiotic resistance results from medical error versus appropriate use. Nevertheless, it is a major oversight not to label at least a significant part of antibiotic resistance as medical error.

We argue that referring to antibiotic resistance exclusively as a complication instead of a medical error is a categorical mistake that undercuts what would otherwise be significant public pressure to improve antibiotic prescription practices. Despite our knowledge that improved antibiotic used can be accomplished through antibiotic stewardship programs,[6] our health care system has been slow to implement and adhere to such programs. Moreover, the public remains largely unaware of the threat posed by antibiotic resistance.[7] Based on the profound effect of the IOM's *To Err Is Human*, it seems reasonable to predict that attributing a significant proportion of antibiotic resistance to medical error would be an effective way to generate a stronger societal response to the problem. In turn, and as has been demonstrated by the reaction to *To Err Is Human*, public awareness very likely could result in actions to generate the political will necessary to make significant advances in the appropriate use of antibiotics and the promotion of potentially life-saving antibiotic stewardship programs.

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