

# Precision Health in Disaster Medicine and Global Public Health

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**Abstract**

Current debates about precision medicine take different perspectives on its relevance and value in global health. The term has not yet been applied to disaster medicine or humanitarian health, but it may hold significant value. An interpretation of the term for global public health and disaster medicine is presented here for application to vulnerable populations. Embracing the term may drive more efficient use and targeting of limited resources while encouraging innovation and adopting the new approaches advocated in current humanitarian discourse.

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Debates about precision medicine and its role in public health and global health have taken various perspectives in the literature that interpret its meaning in different ways to make a case for and against it. A seminal publication by the US National Research Council (Washington, DC USA) that significantly launched the term described precision medicine and health as “the tailoring of medical treatment to the individual characteristics of each patient [or group].”<sup>1</sup> Semantically, those supporting precision use the words “precision health” rather than “precision medicine.”<sup>2,3</sup> The term “precision medicine” tends to relegate it to tailored, presumably high-cost, and genetically informed treatments while “precision health” allows a broader interpretation that can encompass a look at addressing the root causes and broader determinants of health in a more data-informed and precise manner. These perspectives are not necessarily at odds given these semantic alterations, but can in fact be complimentary. The idea that medical treatments can be tailored does not discount the idea that a more precise and data-informed approach can be taken to global public health. In disaster medicine or humanitarian health, this debate has yet to enter the discussion, but it inevitably will. Rather than view it as something unrelated to the task of humanitarian health or the health of vulnerable populations, embracing the broader understanding holds immense value and allows for much needed innovation while leaning into the new approaches advocated in humanitarian practice that are more evidence-based, less top down, and more locally contextualized.<sup>4,5</sup>

Increasing precision in humanitarian health can take a number of forms with a more evidence-based approach. Given the growing complexity of humanitarian crises, especially in rapidly growing urban settings where chronic poverty and health needs can be significant prior to any displacement or crisis, precision can be key to determining how to target limited time and resources.<sup>6</sup> A systematic review of targeting in urban humanitarian crises found a dearth of evidence to guide practice.<sup>7</sup> This can lead to waste and harms the most vulnerable for whom aid is critical if resources are not as well targeted as possible.<sup>8</sup> More precise targeting through better evidence-based and validated measures is an area that needs more study to improve response. It can mirror similar practices in developing better vulnerability measures prior to a disaster for risk reduction and preparedness.

Similarly, locally contextualized measures of vulnerability and insecurity have shown promise as more precise measures than universal ones.<sup>9,10</sup> Rather than a blueprint or universal scale to measure something such as food security, measures that incorporate local coping strategies and a deeper understanding of how vulnerability plays out can be more precise. These measures adopt a locally informed perspective, and sometimes locally driven one as well, and represent a way to operationalize the Grand Bargain to “localize aid” during the World Humanitarian Summit (WHS; United Nations Office for the Coordination of Humanitarian Affairs; Geneva, Switzerland and New York, USA).<sup>11</sup> They can be

developed before a crisis and help inform practice in the pre-disaster phase, as well as the acute phase, of a crisis with greater synergy between development and humanitarian practice, another highlighted theme during the WHS and other reform efforts.

Having more precise measures does not ignore the fact that there is often widespread need and pre-existing vulnerability. One could argue that “wasted” aid on less vulnerable or less in-need persons in many such contexts is a fallacy as most may be deserving or in-need of some assistance. While this may hold true, humanitarian funding continues to lag behind actual need.<sup>12</sup> More precise targeting of funding must be pursued to improve critical outcome measures in morbidity and mortality from humanitarian crises. The task of humanitarian practitioners is not to end need in isolation. Ending need and building resilience are critically important goals, but ones that the global community must take on through development and poverty-reduction efforts in conjunction with humanitarians. Humanitarian practice must continue to hone humanitarian skills and tools which require more precise and evidence-based approaches to acute crises. Fortunately, humanitarian and development practice have the ability to work on shared instruments to more precisely identify vulnerability and understand more deeply how people cycle in between chronic and acute crisis to build resilience.

Just as precision can help advance improvements in resource allocation, it can also guide innovation and adoption of new technology. Technology that allows more precise mapping, for instance by drones or LiDAR, can provide much greater resolution and detail about debris, viable roads, facilities, and damage

estimates. Similarly, innovative uses of cellular or remote sensing data may provide more precise epidemiology on currently imprecise, yet basic measures of population and displacement estimates. Advances in data analytics and modeling of disease dynamics to better plan for crises, as well as predictive analytics for more precise early warning, would be welcome examples of precision in disaster medicine and humanitarian health. Finally, the same technology and data applications could make vulnerability assessments and targeting more precise and accurate as well.

As foreign and as momentary as the precision medicine or precision health initiatives may seem to global public health and humanitarian health specifically, engaging these perspectives as they can apply to vulnerable populations holds significant value. Without creating new semantics, such as precision disaster medicine, researchers can and should adapt the principles of harnessing more evidence-based and data-driven assessments and evaluations, leveraging growing data availability, new technology, and innovating where necessary. Already, funding vehicles, such as the Research for Health in Humanitarian Crises (R2HC), are helping advance the evidence base and should be expanded to further improve precision in disaster medicine and humanitarian health. Practitioners are also forging ahead with more data-informed programs to eliminate waste and improve effectiveness. The evolving practice in humanitarian health and disaster medicine above can all fall under the domain of precision health and allow the field to capture the value of these new initiatives.

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