

Reply to “Valuing Knowledge: a Reply to the Epistemological Perspective on the Value of Gain-of-Function Experiments”

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We thank Dr. Evans for his letter (1). In reading his letter, it was difficult for us to sort out exactly what his criticism is of our editorial. However, we were able to discern three critical themes: (i) that we are guilty of “double counting” in the sense of counting both the benefits to human health from the knowledge gained via gain-of-function experiments on pathogens with pandemic potential (GOF/PPP experiments) and the value of the knowledge itself that is instrumental to the achievement of those benefits, (ii) that we did not propose standards for comparing epistemic value with other values, and (iii) that the absence of a measure for epistemic value that can be used to weigh other values means that the epistemic value should not be a major consideration. We will consider each criticism individually.

The criticism that we are guilty of double counting is a red herring. Scientific discoveries often contribute in both the pure science and utilitarian domains. Consider the discovery of radio waves by Heinrich Hertz in the 1880s, a finding that was initially a confirmation of a theoretical prediction in physics but was subsequently applied for the utilitarian purpose of communications that continue to be used today in the form of radio. Additionally, the same discovery was used later in the 20th century to map radio galaxies and help understand the structure of the universe in a quest for pure knowledge. Hence, double and triple counting is appropriate when considering the epistemic value of a scientific discovery, the point being that there is often value in the knowledge gained independent of and in addition to the benefits of any one application of that knowledge. However, in fact, our argument did not turn upon such claimed double counting.

The criticism that we failed to propose standards for comparing epistemic value with other values misses the mark, for there are no standards for comparing these relative values, and our editorial already contains a disclaimer to that effect (2). We interpret Dr. Evans’ words as suggesting that in the absence of those standards, there is no point in considering the epistemic value of discoveries. If this is indeed the message, then we disagree. Why? Because there are also no objective standards for measuring human suffering or well-being nor for comparing the relative values of different forms of suffering and well-being, and so, by parity reasoning, they too should be ignored, which is absurd. In fact, our society routinely

tries to assign value to pain and suffering in the courts and does that in the absence of universally accepted standards for comparing levels of human suffering. Hence, the inference from Dr. Evans’ words that we should just ignore epistemic gains because we do not know the relative value of epistemic gains does not make sense when considered in light of current societal practices.

Finally, Dr. Evans argues for risk-benefit calculations in biology. We support those exercises as a means to identify parameters that contribute to risks and benefits (3). However, we anticipate that, in such calculations, proponents of GOF experiments would attempt to maximize benefit but that opponents of GOF research would attempt to maximize risk, there being no objective standards for either. We note that such calculations are currently being proposed primarily by opponents of GOF experiments, presumably because they feel that they can make a stronger case for risk than benefit, but we doubt that these will be convincing or definitive. Hence, we do not believe that risk-benefit calculations would ever yield a number that would be accepted by all parties, and consequently, such calculations are of only limited benefit.

REFERENCES

1. Evans NG. 2014. Valuing knowledge: a reply to the epistemological perspective on the value of gain-of-function experiments. *mBio* 5(5):e01993-14. <http://dx.doi.org/10.1128/mBio.01993-14>.
2. Casadevall A, Howard D, Imperiale MJ. 2014. An epistemological perspective on the value of gain-of-function experiments involving pathogens with pandemic potential. *mBio* 5(5):e01875-14. <http://dx.doi.org/10.1128/mBio.01875-14>.
3. Casadevall A, Imperiale MJ. 2014. Risks and benefits of gain-of-function experiments with pathogens of pandemic potential, such as influenza virus: a call for a science-based discussion. *mBio* 5(5):e01730-14. <http://dx.doi.org/10.1128/mBio.01730-14>.

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