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# Studies in History and Philosophy of Biological and Biomedical Sciences

journal homepage: [www.elsevier.com/locate/shpsc](http://www.elsevier.com/locate/shpsc)

## Effectiveness of medical interventions

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### ARTICLE INFO

#### Article history:

Available online 22 July 2015

#### Keywords:

Effectiveness  
Health  
Disease  
Hybridism

### ABSTRACT

To be effective, a medical intervention must improve one's health by targeting a disease. The concept of disease, though, is controversial. Among the leading accounts of disease—naturalism, normativism, hybridism, and eliminativism—I defend a version of hybridism. A hybrid account of disease holds that for a state to be a disease that state must both (i) have a constitutive causal basis and (ii) cause harm. The dual requirement of hybridism entails that a medical intervention, to be deemed effective, must target either the constitutive causal basis of a disease or the harms caused by the disease (or ideally both). This provides a theoretical underpinning to the two principle aims of medical treatment: care and cure.

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When citing this paper, please use the full journal title *Studies in History and Philosophy of Biological and Biomedical Sciences*

### 1. Effectiveness, health and disease

Medicine aims to mitigate death and disease. There is much to recommend the platitude that an effective medical intervention is one that improves the health of patients by curing disease or at least treating the symptoms of disease. Effectiveness of medical interventions is a capacity to satisfy these ends. Though fine as a starting point, an analysis of effectiveness of medical interventions based on this platitude leaves many conceptual and practical problems unilluminated.

Some interventions are effective for minimizing pain, or mitigating male pattern baldness, or modulating female reproductive cycles. Other interventions were alleged to treat homosexuality or drapetomania (a slave's urge to escape his master). At least some of these interventions are not properly 'medical', since they are not targeting genuine diseases with the aim of improving a person's health. It is just a sociological accident, such reasoning would go, that physicians have sometimes administered such interventions. This thought, though, depends on a particular view of the appropriate aim of medicine. Re-stating the platitude that effective medical interventions improve health by targeting causes and

symptoms of diseases does little to help distinguish effective medical interventions (say, insulin) from medical interventions which are not effective (say, bloodletting), or from interventions which are not medical (say, giving lunches to poor schoolchildren), or from interventions which do not target genuine diseases (say, cognitive behavioral therapy for homosexuality). That is because our platitude depends on the notoriously controversial notions of health and disease.

In what follows I canvass some of the leading conceptual accounts of disease, and defend a hybrid account of disease, which holds that there is both a constitutive causal basis of disease and a normative basis of disease. This entails conceptual requirements for effectiveness. To be effective, I argue, a medical intervention must successfully target one or ideally both of these bases of disease.

There are goals in medicine other than the treatment of disease, and interventions employed to achieve those goals—say, screening modalities, vaccinations, and methods of birth control—do not fall under the purview of my analysis, because my focus is on therapeutic interventions that are intended for treating diseases with the end of improving health (though, as we will see, to be compelling such a statement ultimately must rely on an independently justified notion of disease).

A widely held view is that health is a naturalistic notion, construed as normal biological functioning, and disease is simply departure from such normal functioning. Alternatively, many hold

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a normative conception of health and disease, which claims that health is a state that we value and a disease is simply a state that we disvalue. A third approach is a hybrid view, which holds that a disease has both a biological component and a normative evaluation of that biological component. A fourth major approach is eliminative, which claims that notions of health and disease should be replaced by physiological or psychological state descriptions and evaluations of such descriptions. I will call these, respectively, naturalism, normativism, hybridism, and eliminativism. A rich literature has formulated numerous considerations for and against these accounts of health and disease. Though I do not have the space to adequately address all such considerations in what follows, I attempt to highlight the central issues dividing these approaches, show that these different conceptions of disease have different implications for determining what counts as an effective medical intervention, and ultimately defend hybridism and a corresponding theory of effectiveness.

To illustrate the importance of a concept of disease for understanding the concept of effectiveness, consider antidepressants, a class of medical interventions widely employed to treat depression. If, as some argue, most cases of depression are normal responses to the many difficulties of life and do not involve a departure from normal biological functioning (quotidian cases), then quotidian cases of depression are not cases of disease according to the normal biological functioning account of disease.<sup>1</sup> It follows that in a quotidian case of depression, antidepressants cannot be considered effective, since they are not intervening on an abnormal biological function to render it normal. This point is conceptual, not empirical: the notion of effectiveness of medical interventions is not merely effectiveness simpliciter—effectiveness of medical interventions does not refer merely to a capacity for generating some effect or other; rather, the notion refers to a capacity to improve health by modulating the causes or symptoms of disease. There happens to be many empirical studies which show that antidepressants are ineffective for most cases of depression, where “ineffective” means “does not modify subjects’ reports of well-being on standardized depression scales, compared with subjects receiving a placebo”.<sup>2</sup> The conceptual conclusion of this line of reasoning is that regardless of such empirical evidence, given a certain theory of health, antidepressants cannot be effective in quotidian cases of depression, because the right way of construing “effective” is something like “intervenes on causes or symptoms of disease to improve health” and because quotidian cases of depression are not cases of disease.<sup>3</sup> One’s commitment to a particular concept of disease is crucial for assessing the effectiveness of medical interventions. In the companion article to this one (‘Measuring Effectiveness’, published in this issue) I address epistemological concerns regarding

how effectiveness ought to be measured. Here I am concerned with the conceptual matter regarding what effectiveness is.

I defend hybridism. Alleged alternatives to hybridism have recently been proposed, and so one aspect of my defense of hybridism is to argue that these alleged alternatives are not compelling. Hybridism about disease entails that for a medical intervention to be deemed effective it must successfully target either the causal basis of the disease in question or the harms caused by the disease. Thus the view presented here provides standards of effectiveness with which to assess particular medical interventions. Moreover, the view presented here provides a theoretical underpinning to the two principle aims of medical treatment: disease cure and symptom care.

## 2. Naturalism

The most prominent defender of naturalism has been Boorse. Here is his formulation from Boorse (1977):

- (1) The *reference class* is a natural class of organisms of uniform functional design; specifically, an age group of a sex of a species.
- (2) A *normal function* of a part or process within members of the reference class is a statistically typical contribution by it to their individual survival and reproduction.
- (3) *Health* in a member of the reference class is *normal functional ability*: the readiness of each internal part to perform all its normal functions on typical occasions with at least typical efficiency.
- (4) A *disease* is a type of internal state which impairs health, i.e. reduces one or more functional abilities below typical efficiency.

This is a naturalist account of health and disease because disease is construed solely in terms of a departure from typical biological functioning. This account has a clear implication for the notion of effectiveness of medical interventions: to be effective, according to this naturalist account, a medical intervention must modify an internal state which is no longer functioning normally and return the functioning of the relevant part or process to typical efficiency.

Boorse’s theory of disease requires a diminished ability of parts or processes to contribute to survival or reproduction for a state to count as a disease (made explicit in condition 2 above). Disease, then, involves a failure of a system to achieve its *adaptive* function. In contrast, Schaffner (1993) and Murphy (2008) argue that a naturalist theory of health and disease is better based on a causal or mechanistic account of function. An entity or activity is properly functioning, on a mechanistic account, if and only if it makes its typical contribution to the operation of the mechanistic system which contains that entity or activity. Boorse (1977) himself employs mechanistic language when he calls a disease a “failure of parts of the body to perform biological functions which it is statistically normal for them to perform,” but the ultimate biological function for Boorse’s theory is the propensity of a part to contribute, however slightly, to survival and reproduction. One can relax this requirement on the notion of biological function: the internal states which constitute diseases can be thought of in terms of parts of the body which perform certain operations; when these operations are not typically efficient for the end of that particular mechanism, the internal state is a disease (see Hausman, 2012 for an articulation of what he calls the ‘functional efficiency theory’ of health). To use the definition of Bechtel and Abrahamsen (2005), a mechanism is a “structure performing a function in virtue of its component parts, component operations, and their organization”. Thus ‘health’ is the capacity of one’s physiological mechanisms to operate at typical

<sup>1</sup> For this interpretation of depression, see Horwitz & Wakefield (2007). I discuss this view in more detail below.

<sup>2</sup> The usual scale employed in such research is the Hamilton Rating Scale for Depression. One of the most careful reviews of the effectiveness of antidepressant medication (ADM) concludes that “True drug effects (an advantage of ADM over placebo) were nonexistent to negligible among depressed patients with mild, moderate, and even severe baseline symptoms” (Fournier et al., 2010). Such findings are now ubiquitous; as examples, see Kirsch, Moore, Scoboria, & Nicholls (2002), Nemeroff et al. (2003), Ioannidis (2008), and Kirsch et al. (2008).

<sup>3</sup> It would not necessarily follow that antidepressants should not be used in quotidian cases of depression—perhaps warrant for the use of antidepressants in quotidian cases would be considered similar to drinking coffee or wine (pleasant perks in a day of a hard but otherwise normal life)—but the use of antidepressants in quotidian cases (according to this line of reasoning) would not be based on their *effectiveness*. Of course, this line of reasoning would require antidepressants to have at least some capacity to improve subjective reports of well-being, which, as the empirical work cited in the footnote above suggests, is doubtful.

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