

How Many Principles for Public Health Ethics?

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Abstract: General moral (ethical) principles play a prominent role in certain methods of moral reasoning and ethical decision-making in bioethics and public health. Examples include the principles of respect for autonomy, beneficence, non-maleficence, and justice. Some accounts of ethics in public health have pointed to additional principles related to social and environmental concerns, such as the precautionary principle and principles of solidarity or social cohesion. This article provides an overview of principle-based methods of moral reasoning as they apply to public health ethics including a summary of advantages and disadvantages of methods of moral reasoning that rely upon general principles of moral reasoning. Drawing upon the literature on public health ethics, examples are provided of additional principles, obligations, and rules that may be useful for analyzing complex ethical issues in public health. A framework is outlined that takes into consideration the interplay of ethical principles and rules at individual, community, national, and global levels. Concepts such as the precautionary principle and solidarity are shown to be useful to public health ethics to the extent that they can be shown to provide worthwhile guidance and information above and beyond principles of beneficence, nonmaleficence, and justice, and the clusters of rules and maxims that are linked to these moral principles. Future directions likely to be productive include further work on areas of public health ethics such as public trust, community empowerment, the rights of individuals who are targeted (or not targeted) by public health interventions, individual and community resilience and wellbeing, and further clarification of principles, obligations, and rules in public health disciplines such as environmental science, prevention and control of chronic and infectious diseases, genomics, and global health.

INTRODUCTION

The words “principle” and “principles” have several different meanings in moral philosophy, science, and common usage. Principles are sometimes taken to be basic truths, laws, or assumptions, as in “the principles of democratic societies”. In everyday English, a principle is a rule of personal conduct or standard of good behavior (as in, “she is a woman of principle who will not violate her principles”). In moral philosophy, principles have more to do with the ethics, value system, or moral code that is accepted by society. In many accounts, principles are seen as basic qualities that determine intrinsic nature or characteristic behavior.

General moral (ethical) principles play a prominent role in certain methods of moral reasoning and ethical decision-making in bioethics and public health. Examples include the principles of respect for autonomy, beneficence, nonmaleficence, and justice [1-3]. Although this article may strike some readers as being relatively theoretical, there have been numerous publications on ethical issues in public health practice which included more applied and less abstract discussions of important public health ethics topics [see, for example, 4-7]. It is essential that public health professionals contribute to the identification and clarification of the ethical and moral philosophic underpinnings of their discipline, analogous to theoretical work done by leading epidemiologists to clarify causal inference in observational research [8-10].

Principles such as justice are sometimes referred to as mid-level moral principles to distinguish them from philosophical theories. Principles serve at a middle level between fundamental theory and particular rules; the latter are more restricted in scope than principles and apply to specific contexts [11]. The above list of principles is not necessarily exclusive (for example, principles of fidelity and veracity have been added to some accounts of bioethics [12]). In addition, some accounts of ethics in public health have pointed to additional principles related to social and environmental concerns, such as the precautionary principle and principles of solidarity or social cohesion [13, 14]. The complexity that exists because different accounts point to different principles is increased by the tendency for philosophers to use the term “principle” to refer to widely varied concepts.

This article provides an overview of principle-based methods of moral reasoning as they apply to public health ethics including a summary of advantages and disadvantages of methods of moral reasoning that rely upon general principles of moral reasoning. Drawing upon the literature on public health ethics [5-7, 14-18], examples are then provided of additional principles, obligations, and rules that may be useful for analyzing complex ethical issues in public health. A framework is outlined that takes into consideration the interplay of ethical principles and rules at individual, community, national, and global levels. For the sake of brevity, however, this article does not provide a full discussion of concepts of moral relativism [11, 19] or social constructionism [20, 21]. This latter refers to sociological and psychological theories of knowledge that consider how social phenomena are tied to particular social contexts.

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GENERAL MORAL PRINCIPLES

Philosophers and bioethicists have frequently conceptualized the moral life in terms of one or more principles, although conceptualizations of moral principles have varied remarkably. In the eighteenth century, the Scottish empiricist philosopher David Hume (1711-1776) pointed to approaches to moral philosophy that sought to further our understanding of human nature by finding “those principles, which regulate our understanding, excite our sentiments, and make us approve or blame any particular object, action, or behavior.” Hume noted that such philosophic approaches seek to discover truths (“ultimate principles”) that will “fix, beyond controversy, the foundations of morals, reasoning, and criticism” [22]. Rather than focusing on ultimate principles, which he argued go beyond anything that can be experienced, Hume called for the establishment of an empirical approach to understanding human nature that would concentrate on describing principles that govern human nature [23]. The principles proposed by Hume (for example, principles that attempted to account for the origins and associations of ideas) are more directly tied to human experience and perceptions than those proposed by rationalists and some other philosophers. The dispute between empiricism and rationalism takes place within epistemology, the branch of philosophy devoted to studying the nature, sources, and limits of knowledge [24].

A topic central to moral reasoning is the question of what moral truths there are, if any [25]. Important questions arise from striving to provide a metaphysical grounding for moral truths and to identify what makes them true [25]. This includes questions about moral relativism and moral skepticism. Numerous philosophers have inquired, are there any true general principles of morality and, if so, what are they?

Some moral philosophers have argued that there are no defensible moral principles, and that moral reasoning does not consist of the application of moral principles to cases [26]. From this perspective, moral reasons or well-grounded moral facts can exist independently from any general principle [25]. Others have noted that, although there may be some moral principles, moral judgment requires far more than a grasp on a range of principles and the ability to apply them. In contrast to such positions, other philosophers argue that moral judgment and thought does depend on the provision of suitable moral principles [26]. This contrary view holds that moral reasons are necessarily general, perhaps because a moral claim is weak if it is based solely on particularities [25]. Even if it can be established that one or more general principles are essential to moral reasoning, this leaves open the questions of whether exception-less principles are also essential to moral reasoning, and how to resolve conflicts between principles if more than one principle is accepted [25]. Moral disagreements often stem from divergent beliefs about what is morally salient and what should be counted as a moral principle [25]. John Stuart Mill (1806-1873), Immanuel Kant (1724-1804), and other philosophers from diverse schools argued that unless two options are deliberately commensurable it is impossible to choose rationally between them. Thus, philosophers have often sought a single, ultimate principle that could be used to resolve conflict between different moral or practical considerations.

Dancy [26] noted that there are at least two different conceptions of what moral principles are. One conception, the “absolute” conception, holds that a moral principle is a universal claim to the effect that all actions of a certain type are wrong (or right). An example of an absolute moral principle is the principle of utility in utilitarian theories, summarized below. As Dancy put it, “Absolute principles, which specify a feature or combination of features that always succeed in making an action wrong (or right) wherever they occur, purport to specify an invariant overall reason...” With the possible exception of theories, such as utilitarianism, in which only one principle is defended, the notion of absolute mid-level principles that must not conflict seems inconsistent with the moral life. An alternative conception views moral principles as “contributory” rather than as absolute. This contributory conception of moral principles holds that more than one principle can apply to a particular case [26]. A classic example of a moral philosophic theory based upon contributory principles is W. D. Ross’s theory of prima facie duties [27]. Ross described each prima facie duty as a “part-resultant” attribute, obtained by looking at one morally relevant aspect of an act, and being one’s actual duty as a “toti-resultant” attribute, obtained by looking at all of the relevant aspects [25]. Obligations cited by Ross include fidelity (which includes promise keeping and veracity), reparation, gratitude, self-improvement, justice, beneficence, and non-maleficence (as defined below). He did not identify any general rules for estimating the comparative stringency of prima facie obligations, but rather pointed to the need for practical judgment. Ross [27] viewed the prima facie obligation of nonmaleficence as having priority over other duties such as beneficence.

The plurality of methods that exist in philosophic ethics for moral reasoning includes Kantian (deontological) approaches, act and rule utilitarianism, principle-based approaches such as the principle-based common morality theory developed by Tom Beauchamp and James Childress for moral reasoning in bioethics, and many other approaches. These deductivist and non-deductivist approaches are described below, with an eye towards identifying and clarifying general moral principles in public health.

Deductivist Theories of Moral Reasoning

Moral reasoning involves deliberating about ethical questions and reaching a decision with the help of judgment and rational analysis. In such deliberations, particular decisions and actions may be justified by ethical theory (an integrated body of rules and principles). *Deductivism*, a common approach to justification of moral judgments and ethical decisions, involves justifying a particular judgment or belief by bringing it under one or more principles. In some cases, principles or rules are defended by a full ethical theory [11]. Two deductivist theories have commonly been cited: deontological and utilitarian [28], although these are by no means the only philosophical theories of moral reasoning that have been proposed.

Deontological theories (sometimes referred to as Kantian theories) hold that people should not be treated as means to an end and that some actions are right or wrong regardless of the consequences [11]. Kant, who viewed morality as

grounded in pure reason rather than in intuition, conscience, or tradition, argued that the moral worth of an individual's action depends on the moral acceptability of the rule on which the person acts [29]. Throughout Kant's writings, "he insists that we cannot derive ethical conclusions from metaphysical or theological knowledge of the Good (which we lack) or from a claim that human happiness is the sole good (which we cannot establish)" [30]. His categorical imperative (which he also referred to as the "supreme principle of morality") tested the consistency of maxims or rules by asserting: "I ought never to act except in such a way that I can also will that my maxim become a universal law". On this account, "One must act to treat every person as an end and never as a means only". For Kant, "practical reasoning must reject any principles that cannot be principles for all concerned, which Kant characterizes as non-universalizable principles" [30]. Contemporary Kantian and deontological ethics have many distinct forms [30, 31].

By way of contrast, utilitarian theories strive to maximize beneficial consequences [28, 32]. The principle of utility requires aggregate or collective benefits to be maximized. From an act or rule utilitarian perspective, the principle of utility is the ultimate ethical principle from which all other principles are derived [28]. The utilitarian philosophy developed by Jeremy Bentham (1748-1832) argued that the rightness of an act or policy was determined by the extent to which it would result in the greatest happiness of the greatest number (happiness in the sense of pleasure or absence of pain). This greatest happiness principle has become known as the principle of utility. Bentham's ideas influenced his student John Stuart Mill, who, in his well-known book *On Liberty*, noted that people are more likely to adopt correct beliefs if they are engaged in an open exchange of ideas and encouraged to reexamine and reaffirm their beliefs [33]. Utilitarian philosophies like Mill's are rooted in the notion that an action or policy is right if it leads to the greatest possible balance of good consequences. The goal of finding the greatest good by balancing the interests of all affected persons depends upon judgments about likely outcomes [11]. Some utilitarian theories limit the relevant benefits and harms to those experienced by human beings and others include animal species or any entity that can experience benefits and harms [12].

Philosophic moral theories do not arise in a vacuum but rather against a broad background of moral convictions and considered judgments (moral convictions in which we have the highest confidence)[25]. Accounting for a wide range of moral facts provides support for moral theories, which are subject to revisions and improvements [34]. Moral philosophers have expressed skepticism that there will ever be a single philosophic moral theory (for example, a perfected deductivist theory), that will provide answers to what should be done in all concrete cases [25].

Non-Deductivist Principle-Based Approaches

One principle-based approach to moral reasoning has already been mentioned—W. D. Ross's theory of *prima facie* duties [27]. Ross's approach, which emphasizes *prima facie* obligations rather than absolute moral principles or rules, has influenced more recent principle-based approaches that are based upon the common morality. Common morality ap-

proaches to moral reasoning rely upon ordinary shared moral beliefs rather than deduction or pure reason, and may include two or more *prima facie* principles. For example, a common morality theory proposed by William Frankena incorporated principles of beneficence and justice [35], which are discussed below. The principles of the common morality are viewed as universal standards (analogous to universal human rights) rather than simply local customs, beliefs, and attitudes [11].

The principle-based common morality theory proposed by Beauchamp and Childress [11] was developed to address ethical issues in biomedicine and has not been presented as a comprehensive moral theory. It seeks to reduce morality to its basic elements and to provide a useful framework for ethical analysis in the health professions. The source of the principles is the common morality (socially approved norms of human conduct) and professional norms and traditions in medicine. In Beauchamp and Childress' account, which has frequently been used to analyze ethical issues in public health, principles are abstract and provide only general guides to action. Beneficence, nonmaleficence, respect for autonomy, and justice are included. Only a loose distinction is drawn between rules and principles. What is termed a "coherentist approach" is used for justification of moral judgments and ethical decisions [11]. Simply put, this refers to the coherence of moral arguments and ethical decisions with other rules, principles, and theories.

The ethical principle of *beneficence* requires that potential benefits to individuals and to society be maximized and that potential harms be minimized [11, 28]. Hume referred to benevolence as the "ultimate foundation of morals." In everyday language, beneficence is associated with acts of mercy, charity, and love benefiting other persons [11]. Some beneficent actions are morally required and others morally discretionary [36]. The principle of beneficence entails a moral obligation to help other persons (for example, obligations of health professionals to assist patients) or to provide benefits to others [11]. Beneficence involves both the protection of individual welfare and the promotion of the common welfare.

The principle of *nonmaleficence* requires that harmful acts be avoided. This principle (together with basic rules embedded in the common morality) recognizes that intentionally or negligently causing harm is a fundamental moral wrong [11]. However, the principle of nonmaleficence does not preclude balancing potential harms against potential benefits. For example, the risks and potential harms of medical and public health interventions often must be weighed against possible benefits for patients, research participants, and the public [28].

The principle of *respect for autonomy* focuses on the right of self-determination. This conception of autonomy is not the same as Kant's notion of free will. Autonomy entails freedom from external constraint and the presence of mental capacities needed for understanding and voluntary decision-making [11]. Respect for the autonomy of persons is a principle rooted in the Western tradition, which grants importance to individual freedom in political life, and to personal development [28].

Principles of *justice* are also important [28, 37, 38]. Utilitarian theories of justice emphasize a mixture of criteria so that public utility is maximized. From this perspective, a just distribution of benefits from public programs is determined by the utility to all affected. An egalitarian theory of justice holds that each person should share equally in the distribution of the potential benefits of public services. Other theories of justice hold that society has an obligation to correct inequalities in the distribution of resources, and that those who are least well off should benefit most from available resources. The theory of justice proposed by John Rawls [39] is a leading example of “justice as fairness”. Rawls argued that the goal of a theory of justice is to establish the terms of fair cooperation that should govern free and equal moral agents. In this conception, “the appropriate perspective from which to choose among competing conceptions or principles of justice is a hypothetical social contract or choice situation in which contractors are constrained in their knowledge, motivations, and tasks in specific ways.” Under constraints of this nature, “rational contractors would choose principles guaranteeing equal basic liberties and equality of opportunity, and a principle that permitted inequalities only if they made the people who are worst off as well off as possible” [40]. Such theories of justice provide considerable support for maximizing benefits to underserved people [37].

The four principles of beneficence, nonmaleficence, justice, and respect for autonomy do not provide an exhaustive account of how the principles can be used as a framework for moral reasoning in biomedicine or public health [11]. The principles also do not provide a full philosophical justification for decision making. In situations where there is conflict between principles, it may be necessary to choose between them, to assign greater weight to a particular principle, or to further specify principles and rules. Veatch [12] noted that further specification is only one of several approaches that can be considered for resolving conflicts among principles. Other approaches for resolving conflicts include the use of single principle theories (for example, utilitarianism), balancing theories, conflicting appeals theories, and lexical ordering of principles [12]. Historically, the balancing of principles has been tied to intuition (or, more precisely, what some philosophers refer to as “intuitionism”). The use of balancing theories and intuition to resolve conflicts between principles has the potential drawback of being an elaborate way to provide support for preconceived opinions or prejudices [12]. In the “four-principles” approach to moral reasoning in biomedicine [11], no lexical ordering or ranking of the principles has been proposed.

Ethical decision making in public health and biomedicine (for example, decisions about how best to protect participants in human subjects research) require more than merely invoking ethical principles and rules [11]. Through a process of further specification of principles and rules (or another valid approach to resolving conflicts among principles), problems of feasibility, effectiveness, efficiency, uncertainty about benefits and risk, cultural pluralism, political procedures, and so forth must also be taken into account [11]. Beauchamp [28] noted that practical problems in biomedical ethics and public policy often require that these principles be made more applicable through a process of specification and reform. Ongoing progressive specification is needed as new issues and concerns arise [41]. The principle-based common

morality theory developed by Beauchamp and Childress [11] does not rely on deduction but rather recognizes that other approaches for justification have value. In various editions of their book, they recognize that moral justification often proceeds inductively (from the particulars of individual cases to more general rules and mid-level principles). Thus, the form of justification they recommend is a coherence approach that is similar to the *reflective equilibrium* described by John Rawls and other philosophers [39, 40, 42]. The connection of the principle-based common morality developed by Beauchamp and Childress to reflective equilibrium appropriately recognizes the dialectical nature of moral reasoning. Seen from this perspective, justification is neither purely *deductivist* nor purely *inductivist*. In Rawls [39] account, an important starting point is our “considered judgments” or moral convictions in which we have the highest confidence. Considered judgments (sometimes referred to as “self-evident norms and plausible intuitions”) are those in which our moral capacities are most likely to be displayed without distortion or bias [11]. A goal of reflective equilibrium, then, is to match and adjust considered judgments and other moral judgments so that they are coherent with the premises of ethical theory. Sound judgment is needed for any method of moral reasoning or ethical decision-making.

Advantages and Limitations of Principle-based Approaches to Moral Reasoning

Principle-based approaches to moral reasoning, including the method proposed by Beauchamp and Childress for bioethical decisionmaking, have several advantages [43]. These advantages include their endurance, resilience, and output capacity or yield. A useful philosophical theory or method for moral reasoning should endure through competitive encounters with alternative approaches to moral reasoning, have explanatory power, be adaptive to novel situations, and offer practical solutions to new moral problems [11]. As Beauchamp and Childress put it, “A proposed moral theory is unacceptable if its requirements are so demanding that they probably cannot be satisfied or could be satisfied by only a few extraordinary persons or communities” [11]. Principle-based approaches also have the advantage of universalizability, at least within specific fields such as bioethics and public policy. Universalizability is not a moral norm analogous to a substantive principle of justice but rather a formal condition [11]. A further advantage of principle-based approaches to moral reasoning is that they can be joined with a coherence model of justification [11]. Notwithstanding these advantages, principle-based methods of moral reasoning also have certain limitations.

Critiques of these methods for moral reasoning generally occur at the level of meta-ethics, which involves analysis of the methods and concepts of ethics including general moral principles. Critics of principle-based approaches to moral reasoning have argued that such approaches cannot provide genuine action guides and that they do not provide an adequate philosophical theory [44-47]. Mid-level moral principles function quite differently than fundamental principles do in classical utilitarian (the principle of utility) or Kantian (the categorical imperative) theories [43]. As DeGrazia put it, principlism “acknowledges the lack of a supreme moral principle or set of explicitly-related principles from which all correct moral judgments can be *derived*” [44]. Clouser and

Gert [46] argued that, in contrast to principle-based approaches in biomedical ethics, principles in deductivist theories such as utilitarianism or Kantian theory summarize or serve as short-hand for a whole theory rather than representing a listing of ethical issues [46]. From this perspective, the four principles of beneficence, autonomy, justice, and non-maleficence are not systematically related to each other by an underlying unified philosophical theory and there is no priority ranking of the principles [46]. This raises the question of where the principles come from in the first place (a question answered by Beauchamp and Childress by pointing to the common morality and to professional norms and traditions in medicine).

The approach that has been referred to as “principlism”, where the emphasis is on general moral principles, has also been criticized for an avoidance of deep engagement with basic theoretical issues in moral theory. In the view of some critics, principle-based approaches are insufficiently attentive to the dialectical relations between philosophical theory and moral practice [45], although others have defended principlism from this criticism [11, 43].

Critics have also charged that the four principles approach to moral reasoning in bioethics, as a version of moral pluralism, suffers from theoretical agnosticism. As Clouser [47] put it, “the principles of principlism are unconnected with each other, and although each embodies the key concern from one or another theory of morality, there is no account of how they should relate to each other.” Other authors, however, do not agree with this criticism [11, 43]. Beauchamp and Childress [11] noted that there may be a convergence across theories in terms of different theories leading to similar action-guides. Consistent with this viewpoint, DeGrazia [44] argued that the authors of *Principles of Biomedical Ethics* plausibly maintain that two distinct theories (rule-utilitarianism and rule-deontology) are equally adequate. He added, “This pluralistic claim suggests that neither theory itself plays an essential role.... We should simply drop these theories from the picture. *The entire network of principles and their specifications becomes the theory*” [44]. Other authors have expressed different perspectives. For example, Brody argued that “We need to understand the theoretical roots of various proposed mid-level principles of bioethics. We need to understand how the theoretical roots do or do not help us to find the scope, implications and relative significance of the mid-level principles” [48].

A further issue is that some authors have argued that mid-level moral principles may be variously construed, such as when more than one theory of justice is accepted [11]. As DeGrazia put it, “the precise content of the principles is not as crucial as it would be in a deductivist theory. This is because the principles are only starting points; their precise content is determined by specification” [44].

Despite these defenses of the four principles approach and various proposals for further specification, these issues have led some authors to raise important questions about principle-based approaches to biomedical ethics. Green [49] asked, “is it possible in serious discussion of moral issues to bypass entirely any direct consideration of the nature and process of moral justification, the task to which meta-ethics

in its most basic effort is devoted?” He further argued “that moral analysis cannot be confined to a process of identifying and applying moral principles, however sophisticated this process might be, when the essential work of deriving the basis, meaning, and scope of these principles is left undone” [49]. To the extent that existing principles and rules are imperfect, coherence between principles and rules will tend to lead to imperfect ethical decisions (analogous to a “bias towards the null” in analytic observational research).

Clouser and Gert [46] have noted that mid-level moral principles such as nonmaleficence collapse four or five moral rules (do not kill, do not cause pain, do not disable, do not deprive of freedom, and do not deprive of pleasure) into a single principle. The principle of autonomy articulated in early editions of *Principles of Biomedical Ethics* (which is quite different from Kant’s notion of autonomy) does not distinguish between respecting autonomy and promoting autonomy. Other principles (for example, the principle of justice) do not provide a specific action guide but rather serve more as a checklist of moral concerns [46]. As Clouser [47] put it, moral conclusions or solutions often seem to be “under-determined” by the “agent’s cited principle”. In his view, “There must be other factors (intuitions, rules, theories, or whatever) that are surreptitiously and otherwise influencing the agent’s decision-making” [47].

Others have argued that inductive approaches to moral reasoning such as casuistry and analogical reasoning involving particular cases have advantages over principle-based methods [50-53]. From the perspective of casuists such as Albert Jonsen and Stephen Toulmin, neither principle-based methods (which often use a reflective equilibrium or coherence approach for justification) nor philosophic theories based upon deductivism adequately express the nature of moral reasoning [50]. Casuists insist that the relation between principles and moral judgment cannot be properly understood without an appreciation of the place of circumstances as integral parts of moral argument [51]. Case materials, casuistry, and analogical reasoning have considerable value for understanding ethics in such diverse fields as medicine, public health, genetics, and the humanities [5, 51-54]. Notwithstanding such potential benefits of case analysis, analogical reasoning does have some disadvantages. For example, casuistry may rely too heavily on intuition in cases of moral conflict [44]. In addition, by focusing on specific cases, casuistry may overlook global ethical issues [44]. Thus, case-based methods of analogical reasoning such as casuistry, as potential alternatives to principle-based methods of moral reasoning, also have certain drawbacks. In addition, principles such as beneficence and respect for autonomy are never far from the maxims (normative statements that reflect a consensus of opinion) and enthymemes that are often invoked in casuistry [51]. Casuistry can be seen as complimentary to principle-based approaches in that the circumstances of cases may suggest the relevance of principles. Also, the circumstances may reveal the suitability of a particular specification of a principle [51].

It is important to note that some earlier criticisms of principle-based methods for moral reasoning have been addressed in revised accounts of these methods. In highlighting inadequacies in principle-based methods for moral reasoning, for example, David DeGrazia [44] asked how one is to

know which mid-level principle of biomedical ethics to favor when two or more of autonomy, beneficence, nonmaleficence, and justice conflict? This concern has subsequently been addressed by Beauchamp and Childress in more recent editions of *Principles of Biomedical Ethics* (for example, in their elaborations of how principles are further specified and moral judgments justified through a coherence approach). Meta-ethics are dealt with to a greater extent in recent editions of their book. These and other authors have provided accounts of how mid-level moral principles can be further specified in specific contexts [11, 41, 44]. Although different sets of mid-level ethical principles have been proposed by various authors, and definitions of *prima facie* principles vary, this is not problematic if principles are only viewed as starting points for application to specific contexts through further specification [44]. A dialectical relationship exists between fundamental philosophical theories and mid-level principles and rules. On this account, philosophical theory and the application of particular principles and rules in specific contexts serve to enrich and modify one another. As Lustig [43] put it, “theoretical commitments that lead to counter-intuitive or implausible conclusions in particular cases may, over time, cast doubt upon the adequacy of one’s working theory” and lead to revisions or reassessments of a philosophical theory or method for moral reasoning.

ADDITIONAL PRINCIPLES IN PUBLIC HEALTH ETHICS

As noted by Childress *et al.* [16], “The terrain of public health ethics includes a loose set of general moral considerations—clusters of moral concepts and norms that are variously called values, principles, or rules—that are arguably relevant to public health.” Accounts of public health ethics have extended beyond the four commonly cited principles of beneficence, nonmaleficence, respect for the autonomy of persons, and justice to include important rules and values such as ensuring public participation and the participation of affected parties (procedural justice), protecting privacy and confidentiality, keeping promises and commitments, disclosing information and speaking honestly and truthfully (transparency), and building and maintaining public trust [16, 17]. Other rules or conditions cited in the literature on public health ethics include the need for effectiveness, efficiency, proportionality, necessity, least infringement, and public justification [16]. The effectiveness and efficiency of public health programs are closely related to principles of utility and beneficence. The condition or value of transparency, which asserts that government agencies and institutions should be open and transparent in their interactions with the public, is closely tied to moral concepts of veracity and truth telling.

Other examples of principles cited in the public health literature are provided below including the precautionary principle and principles of solidarity or social cohesion. The overall goal of this section is not to detail the complex ethical issues that arise in public health but rather to provide a framework for identifying and clarifying additional principles related to public health ethics. Namely, a framework that takes into consideration the interplay of ethical principles and rules at individual, community, national, and global levels.

The Precautionary Principle

In recent decades, there has been sustained interest among environmental ethicists, scientists, and policymakers in the sustainability of the global environment and human systems [55-59]. Sustainability relates to the continuity of the non-human environment and to the continuity of social, institutional, and economic aspects of human societies. Biological entities and the non-biological world (for example, the atmosphere, land, and ocean) involve complex systems and are fundamentally interdependent. Achieving a sustainable environment is therefore essential to human beings, including future generations. The Brundtland Commission, headed by former Norwegian Prime Minister Gro Harlem Brundtland, defined sustainable development as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Intergenerational equity underlies concerns over the need to look out for the interests of future generations. This includes taking steps to help ensure that the world inherited by future generations is not diminished by loss of animals, plants, ecosystems, or land that is suitable for homes or growing crops [60].

Concern over the continuity of the global environment and human systems encompasses concern over the sustainability of life and whole ecosystems; economic resources; agricultural and food resources; energy resources; and other natural resources including timber, arable land, and metals or metallic ore. To this list can be added concern over the maintenance or improvement of population health and quality of life. >From an analytic standpoint, all of these issues can be examined at the global level and also at smaller levels of analysis (for example, within geographic regions, countries, states or provinces, cities, or neighborhoods). For example, the sustainability of life and whole ecosystems is a global issue that can also be analyzed from the standpoint of specific geographic regions, countries, and smaller governmental jurisdictions.

From this overview, it is clear that sustainability has multiple dimensions that may be of analytic interest (for example, focusing on the present and on the future, having a global or more localized frame of reference), and that the concept can be applied to multiple areas of concern that may be interrelated or even conflicting (for example, concerns over the sustainability of ecosystems sometimes conflict with concerns about economic development). Other dimensions that may be pertinent include the complexity of the human or non-human systems of analytic interest, and the degree or extent of sustainability that is desired. Ethical issues that have bearing on the continued functioning of societies (for example, certain issues that arise in preparedness for natural or man-made disasters) have often been given considerable weight.

The literature on sustainability has led to several questions. For example, what other ethical principles, obligations, and rules that relate to it? Some duties are desirable but not obligatory, and others are both morally desirable and obligatory [61]. Rules associated with morally desirable duties, which can be related both to sustainability and to the principle of beneficence, include maximizing possible benefits and

balancing benefits against risks. An example of a rule that is both morally desirable and obligatory, which can be related to sustainability and justice, is the requirement that we treat others (including members of future generations) fairly. Rules that can be related to sustainability and nonmaleficence include minimizing possible harms and not causing suffering or loss of life. A conceptual understanding of sustainability is useful to public health ethics, especially if it can be shown to provide worthwhile guidance and information above and beyond principles of beneficence, nonmaleficence, and justice, as well as the clusters of existing rules and maxims that are linked to these principles.

The *precautionary principle* asserts that “when an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically”. The force of this principle, which relates to the frequent need to take preventive action in the face of scientific uncertainty, is to shift the burden of proof to the proponents of activities that may threaten health or harm the environment [13, 15, 18]. Nevertheless, this principle is not universally accepted by regulatory agencies and policy makers. Critics have argued that it focuses on hypothetical risks rather than actual hazards and that other analytic methods (for example, cost-benefit analysis) may provide a more suitable basis for regulation. The phrase “precautionary principle” (frequently cited in the literature on environmental advocacy and public policy) is a translation of the German word *Vorsorgeprinzip*, which can also be translated as “foresight principle”. The *Vorsorgeprinzip* is often viewed positively among German environmental policymakers as a stimulus for innovative social planning and sustainability [15]. Arguments have been made that *Vorsorgeprinzip* is not a mid-level moral principle, but rather a cluster of virtues (for example, prudence and wisdom), maxims, and moral rules that can be specified using principles of nonmaleficence, beneficence, and autonomy as starting places (for example, the rule that a wide range of alternatives to potentially harmful activities should be explored before taking action, and that public participation in decision making is desirable)[61]. Whether the *Vorsorgeprinzip* is viewed as a “principle” or as a cluster of virtues, maxims, rules, and mid-level moral principles obtained from the common morality, some advocates for public health and the environment may prefer to use the term principle because it gives the concept more thrust or weight.

Connectedness, Solidarity, and Communal Responsibility

The principle of *solidarity* or *social cohesion* provides another useful example of the value of analysis at multiple levels (individual, community, national, and global). This principle relates to how united, connected, and cooperative a society is. A socially cohesive society is one that tolerates and embraces cultural diversity, a society where the vast majority of citizens respect the law and human rights, and where there is a shared commitment to social order and communal responsibility [14, 62]. Many philosophical theories and traditions have attempted to describe the ways in which people are interdependent within communities. *Communitarianism* approaches, for example, draw upon the work of Aristotle and more recent political philosophers (for example, the writings of Georg Wilhelm Friedrich Hegel) to

highlight the importance of tradition and social context for moral reasoning and the value of community. Community can be understood both as a description of human social situations (for example, the notion of togetherness and solidarity) and as a normative standard for evaluating human situations (for example, a strong sense of mutual obligation and reciprocity)[14]. Contemporary communitarianism developed in the 1980’s in response to concerns about a perceived overemphasis on individual rights. From a communitarian perspective, individuals are inseparable from community life and, while individuals make their own moral choices, their moral commitments and values are shaped by community norms and experiences. As Jennings [14] put it, there is “a fascinating dynamic in which participants are both shaped as selves by their life in community with others and at the same time have the power to reshape their community through their own agency.” Communitarians such as Alasdair MacIntyre and Charles Taylor have argued that moral and political judgments such as standards of justice depend on the life contexts and traditions of particular societies and the interpretive framework within which community members view their world [63]. From a communitarian viewpoint, standards of justice and other moral and political judgments may vary from context to context and not be universally true. Communitarian writers such as Michael Sandel and Charles Taylor have argued that liberal theories of justice such as the one proposed by John Rawls may rest on an overly individualistic conception of the self that does not adequately recognize communal attachments such as family ties, social and communal responsibilities, or religious traditions [63]. Rawls defined community narrowly as “an association of society whose unity rests on a comprehensive conception of the good” [64]. To a greater or lesser extent, communitarian values and principles may conflict with individual autonomy and self-determination [14]. A tension may exist between the liberal tradition that emphasizes individualism and principles of solidarity and social cohesion.

Scientific studies documenting the important role of social support, social networks, and social cohesion in enhancing overall health, wellbeing, and quality of life provide empirical evidence of the value of social cohesion. For example, studies have shown an association between social connectedness and quality of life and physical functioning among children and adults with a variety of serious illnesses, injuries, and psychological traumas [65-67]. There are important connections between social connectedness and social support and the health, wellbeing, and resiliency of individuals and whole communities [68, 69]. Some communities or networks of persons may be more resilient and capable of responding positively to adverse events than others, due to differences in community resources, infrastructure, or social and cultural factors [61].

As in the first example, we can reasonably conclude that a principle of solidarity or social cohesion is useful if it provides moral guidance above and beyond existing principles derived from the common morality such as beneficence, nonmaleficence, justice, and respect for the autonomy of persons, including the clusters of rules that are linked to these moral principles. Interactions between principles are likely to be important. For example, the principle of solidarity, when combined with the principle of beneficence and rules linked to it, provides considerable support for building

cities with green space, sidewalks, park facilities, and other infrastructure that facilitates exercise and recreation. A growing literature highlights the important role of urban design and architecture in promoting a sense of community, socialization, and improved health and quality of life [70, 71]. Because principles and rules may interact with each other and magnify (or diminish) each other's importance, a simple checklist of principles and rules, in such diverse fields as urban design, city planning, public health, and environmental science, may understate the importance of individual principles and rules for moral reasoning.

SUMMARY AND CONCLUSIONS

This article has considered general moral principles that play a prominent role in certain methods of moral reasoning in public health and biomedicine, as well as the advantages and disadvantages of methods of moral reasoning that rely upon such principles. The taxonomy of principles identified in this account includes principles that figure prominently in some deductivist philosophical theories and mid-level principles based upon the common morality. None of the principles in this taxonomy have been confirmed as "first principles" or "ultimate principles" that incontrovertibly fix the foundations of moral reasoning, to paraphrase Hume.

Additional principles cited in the literature on public health ethics were also considered. Ethical principles and values underlie the need to take appropriate action even in the face of some scientific uncertainty [13, 56]. Concepts such as the precautionary principle and solidarity are likely to be useful to public health ethics to the extent that they can be shown to provide worthwhile guidance and information above and beyond principles of beneficence, nonmaleficence, and justice, and the clusters of rules and maxims that are linked to these moral principles.

Future directions that are likely to be productive include further work on several areas of public health ethics, including public trust, community empowerment, the rights of individuals who are targeted (or not targeted) by public health interventions (who may include citizens in multicultural democratic societies or in other parts of the world), and individual and community resilience and wellbeing. Other future directions are likely to include further clarification of principles, obligations, and rules in public health disciplines such as environmental science, prevention and control of chronic and infectious diseases, genomics, and global health [72].

To formulate public policies and decide about particular cases, there will be an ongoing need to further specify and balance the principles using sound judgment [1]. Further specification is viewed as the ongoing process of filling in and development of principles and rules, reducing or eliminating their indeterminateness and abstractness, and providing specific action guides. Sound judgment will be needed to accompany any system of ethical principles and rules. As noted by Aristotle, "It is a task less for the clever arguer than for the *anthropos megalopsychos*, the "large-spirited human being" [73].

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