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RESEARCH ARTICLE

Equality of opportunity in health care: access and equal access revisited

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Abstract

We offer a framework for identifying disparities in the distribution of healthcare opportunities. In line with the Rawlsian tradition of *fair equality of opportunity*, we argue that these have to be primarily defined in terms of access to a (bundle of) health services of appropriate quality. Our approach allows to disentangle the opportunities individuals enjoy—assessed by jointly considering chances of access and disparities in access conditions—from the mere utilization of health services while preserving normative consistency with the principle of *equal (access to) health care for those in equal need of health care*. A simple exercise based on real data shows that the definition we provide can be easily applied to gather policy-relevant insights.

Keywords Health care · Equality of opportunity · Access costs

JEL Classification I14 · I18

1 Introduction

Motivated by the search for financial sustainability, many governments have recently contemplated radical reforms of the national health systems that exacerbate the public health effect of economic crises (Karanikolos et al. 2013). Unsurprisingly, a recent study using data on self-reported perception of access to health care across and within 29 European countries identifies many individual characteristics (e.g. poor health, unemployment) systematically associated with perceived access barriers and limited access to health treatments (Cylus and Papanicolas 2015). This is true even if universal health coverage is formally enshrined, and the problem is

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rather one of the conjugating accesses to care with the objective difficulties governments meet in financing health systems.

This paper wishes to contribute to the ongoing debate on access disparities, by offering a novel more inclusive framework to evaluate healthcare systems and policies. Greater inclusiveness derives from simultaneously taking account of: (1) disparities among individuals who have access to health care and individuals who have not; (2) disparities in access conditions among individuals having access. Our proposal is grounded in the idea that reducing aggregate inequality of opportunity in health care first requires granting universal access and then equalizing conditions for access, or, equivalently, "to close gaps in access and incrementally to approach equality of access" (Daniels 2013). Accounting for both the disparities mentioned above is in this respect fundamental to design health policies that grant universal access to health care on equal basis.

The literature on health (care) inequality provides a wide choice set from which a normative criterion, the *equalizandum*, can be drawn. At a very general level, such a set can be partitioned along the line marking a key distinction between an approach inspired by the so-called *outcome* egalitarianism and an approach supporting the view that egalitarianism should instead be concerned with *opportunities*. As health depends on many factors varying from genetic propensities to individual lifestyles and attitudes to treatments, any attempt to equalize outcomes (e.g. Quality-Adjusted Life Years) would inevitably imply a too intrusive intervention in people's life. For these reasons, equality of opportunity is generally considered a more defensible perspective.

The most common way to understand egalitarianism of opportunities in health care is based on a notion of horizontal equity, for, it is said, the end goal consists of *equal health care (or, equal access to health care) for those in equal need of health care* (Wagstaff and van Doorslaer 2000; Oliver and Mossialos 2004). Within the latter perspective, it is usually the case that *utilization* of health treatments is taken as the basic information for assessing disparities in opportunities. However, as utilization depends on both access conditions and individual preferences, it follows that, even if access conditions were equalized across the entire population, health care for those in equal need would probably not.

More recently, egalitarianism of opportunity in health care has been reformulated according to Roemer's (1993, 1998) ideal of *levelling the playing field* (Fleurbaey and Schokkaert 2011; Arneson 2015). Within this approach, disparities of opportunities are inferred, ex-post, from the assessment of health (care) inequalities, once health needs and/or preferences (over both lifestyles and health treatments) are revealed so that a distinction can be made between legitimate and illegitimate health (care) inequalities, depending on their origins, i.e. circumstances (factors beyond individual control) or responsible choices. This distinction, whose ratio has been defended at length in the work of eminent political philosophers (Dworkin 1981a, b; Arneson 1989; Cohen 1989), maintains that justice or equity requires that all factors that influence individuals' final achievements, for which they cannot be considered responsible, be compensated by society. As far as health (care) is concerned, Fleurbaey and Schokkaert (2009) emphasize that differences are said to be *unproblematic* whenever they originate from lifestyle decisions, “because we want to hold people responsible for these”. It is pretty clear that, within this perspective, the horizontal equity principle of *equal health care for those in equal need* is disregarded, sacrificed on the altar of individual responsibility.

Differently from the views presented so far, in this paper we define equality of opportunity in health care from an ex-ante perspective, i.e. when neither health needs have emerged nor responsible choices have been taken yet; as we will suggest later on in this paper, our proposal is deeply grounded in the Rawlsian principle of *fair equality of opportunity*, by which the *equalizandum* has to be agreed behind a *veil of ignorance*.

As compared to the wide literature on horizontal equity in health (care), our approach amends *the equal health care for those in equal need* principle by considering the key disparity between individuals who have access to care and individuals who have not. In doing this, it is inspired by the older tradition on “equal access” (Le Grand 1982, 1987; Olsen and Rodgers 1991), according to which opportunities for health care are shaped by the distribution of access costs, reflecting the monetization of formal and informal barriers individuals have to overcome, would a health need really emerge.

More specifically, in the ex-ante perspective we propose, what is salient is how the size of access barriers, i.e. *the monetary cost of a bundle of health services of appropriate quality*, is distributed across *cells*, where each cell is defined by a set of characteristics (age, geographic location, presence of a disability, etc.) which are relevant in determining barriers. Consistent with the general views expressed above, we claim that equality of opportunity in health care is improved if either of the following is satisfied: (1) access is granted to an additional cell; (2) provided that access is granted to any cell (what we term *universal access*), inequality in the cost of health treatment(s) is reduced.

Our conceptual proposal also differs from the ideal of levelling the playing field, in that individuals are held responsible for their preferences on health treatments (e.g. treatment acceptance, commitment to therapies), but not for their preferences on lifestyles (e.g. smoking). This does not exclude that individuals might be incentivized to take better lifestyle decisions; it rather suggests that other tools (e.g. taxes on cigarettes)—other than denying access to medical treatments (or collectively financed treatments)—should be handled, in order to avoid normative objections.

In a policy perspective, our approach suggests that resources within the health sector should be first allocated to grant access to cells with the smallest resource gap from the minimum amount necessary to gain access. As a counter-intuitive consequence, since access is said to be prioritarian with respect to equality of access, to enhance the distribution of health care opportunities might be necessary to ameliorate first the condition of whom may not be considered at a greater disadvantage.

The paper is organized as follows. Section 2 discusses the philosophical underpinnings of our notion of equality of opportunity in health care, and the main literature on equality of opportunity in health care. In Sect. 3, our definition is formally provided and tested on by means of a simple exercise based on Italian data. Section 4 concludes.

2 Equality of opportunity in health care

2.1 Philosophical underpinnings

The idea that health care is necessary to protect individuals' fair shares of opportunity is key to prominent egalitarian perspectives; it can be seen as innervating Rawls' (1971, 2001) appeal to a principle of *fair equality of opportunity* (Daniels 1981, 1985, 2008), as well as Sen's (1980, 1992) work on *capabilities* (Pereira 1991).

The normative dispute between Rawls and Sen's approaches to opportunity egalitarianism echoes the more general distinction between *liberal egalitarian* theories of justice and *liberalist* theories. The former are concerned with inequality of outcomes originating from both different access to resources and different responsible choices, and outcome disparities are said to be legitimate or not depending on their origins. The latter, "are mostly concerned with eradicating formal and informal barriers...not supporting a substantial positive commitment to securing equal opportunities" (Cappelen and Norheim 2005).

In His theory, Rawls identifies legitimate *socio-economic inequalities* by appealing to the principle of *fair equality of opportunity*, by which, it is said, those who are at the same level of talent and have the same willingness to use them, should have the same prospects of success regardless of their initial place in the social system. In this sense, as emphasized by Sugden (1993), "individuals have equal opportunities ...if they have equal command over resources", independently from outcomes; inequality of opportunity should not be concerned at all with the distribution of final goods; it should instead be concerned with the distribution of resources, i.e. with the distribution of primary goods "that are generally necessary to enable citizens adequately to develop and fully exercise ...their determinate conceptions of the good" (Rawls 2001, p. 57).

Given His perspective, Rawls' theory of justice is silent on the distribution of health statuses, but it is not so on the distribution of health care. Rather, access to care is considered fundamental in order to construct a *well-ordered society*, because the "provision for medical care, as with primary goods generally, is to meet the needs and requirements of citizens as free and equal" (Rawls 2001, p. 174). This, as emphasized by Daniels (1985) while reinterpreting Rawls' theory of justice, clearly implies a social obligation to grant access to health care to everyone.

Most importantly, as far as individuals are supposed to agree on the principle of *fair equality of opportunity* behind the *veil of ignorance*, access to health treatments has to be assessed from an ex-ante perspective, that is, independently from preferences over lifestyles and attitudes towards treatments, as well as from inequalities in health outcomes. Quoting Rawls' words, by the logic of *background procedural justice*, "when everyone follows the publicly recognized rules of cooperation, the particular distribution that results is acceptable as just whatever that distribution turns out to be (Rawls 2001, p. 54)".

While in Rawls' moral system health plays an *ancillary role* with respect to the relevant outcome as defined in terms of socio-economic inequalities, according to Sen (2002), health is something that has special moral importance in itself. Indeed, in His perspective, the distinction between health achievements and the capability to achieve good health (which may or may not be exercised) is crucial. As outlined by Pereira (1991, p. 40), who also provides an elegant formalization of Sen's capability approach as applied to health, "in terms of equity our interest is less in whether a person is functioning in a certain way and more on whether that individual has the capability to do so. Hence the guiding equity principle being equality of basic capabilities...". In this sense, justice in health requires that all individuals share, ex-ante, the same set of possible health statuses (capability set), whose levels inevitably depend on individual choices as well as on available resources. Moreover, as "the factors that can contribute to health achievements and failures go well beyond health care, and include many influences of very different kinds, varying from genetical propensities, individual incomes, food habits and life styles, on the one hand, to the epidemiological environment and work condition, on the other...We have to go well beyond the delivery and distribution of health care to get an adequate understanding of health achievement and capability. Health equity cannot be understood in terms of the distribution of health care" (Sen 2002).

Hence, according to the capability approach, disparities in the health status are legitimate to the extent that they originate from different responsible choices, even if, the identification of responsible choices in health is far from being straightforward, because "we tend to give priority to good health when we have the real opportunity to choose" (Sen 2002).

Evidently, Rawls and Sen's approaches strongly differ from each other, in that Sen's ideal of equity in health is defined with respect to health *prospects* which may (or may not) be realized ex-post, whereas health prospects are totally irrelevant in Rawls' theory, whose ideal of a well-ordered society is concerned with the sole distribution of resources necessary to pursue one's own goals as a moral and free person.

In this paper, we borrow from Sen the idea that equal opportunities for health is valuable per se. However, in our view, the equalizandum is not given by the *health prospect* an individual is able to enjoy (whose equalization would be a very demanding objective), but by the concrete impediments (barriers) individuals face in obtaining access to health care. In this sense, our notion—discussed later on in the paper—is closer to Rawls' ideal of *equal command over resources*, in that health care is aimed at promoting health, which, in turn, is needed for realizing one's life's "projects" (Williams 1974), or being able to operate within the "normal opportunity range" (Daniels 1985).

2.2 Health care literature

Inspired by the views briefly discussed in the previous section, several *operational* definitions of equality of opportunity in health care have been considered in the last two decades. In this section, we first recall the main literature on the application of the horizontal equity principle in health care; we then discuss the more recent attempts to extend the ideal of *levelling the playing field*—overwhelming in the field of income inequality—to opportunity egalitarianism in health care.

2.2.1 Horizontal equity in health care

The most common way to understand egalitarianism of opportunities in health care is based on a notion of horizontal equity, for, it is said, the end goal consists of either (1) equal *utilization* of health care for those in equal need of health care, or, alternatively, (2) equal *access* to health care for those in equal need of health care (Wagstaff and van Doorslaer 2000; van Doorslaer and Masseria 2004). By (1), individuals revealing the same need of health care should make the same use of health care, i.e. should gain access to the same amount of health care. By (2), those who have an equal need for health care should face the same access conditions.

A serious shortcoming of the principle of equal utilization for equal need is that potentially acceptable reasons for unequal use by those in equal need—due for example to different preferences—have to be overridden (Oliver and Mossialos 2004). For this reason, equal utilization of health care for those in equal need is generally recognized as a principle implying a too intrusive intervention in people's life.

Arguably, "[t]he definition of equity most appropriate for policy-makers is that of equal access for equal need" (e.g. the Research Note for the European Commission by Allin et al. 2007), what implies that access conditions—in line with liberalist theories—be equalized across individuals manifesting a health need.

In the empirical literature inspired by the (horizontal equity) principle of *equal access for equal need*, analyses are usually concerned with the distribution(s) of access conditions among those individuals who, having manifested a health need, have effectively received a treatment. However, as observed in Allin et al. (2007), this implies that the term "access" is used as a synonymous for "utilization": an individual's use of health services would be the proof that he/she can actually have access to these services.

In our view, as far as out-of-pocket payments are becoming more and more relevant in national health systems—so that access to health care might be sensibly jeopardized—taking utilization as a proxy for access may generate very misleading results, since individuals having no access to health treatments would be totally disregarded. Put differently, any definition of equality of opportunity in health care based on the sole equalization of health care utilization would not be satisfactory enough, as it would lock out of the door all those that, due to the lack of adequate resources or for other reasons, are left without any concrete chance of access to care.

2.2.2 Levelling the playing field in health care

As far as access is required to be equalized among individuals with equal health needs, the horizontal equity principle implicitly assumes that health needs have already emerged (ex-post). So, if health needs have already emerged, one may reasonably claim that the same health need can be differently assessed according to its source. Specifically, a separating line might be drawn between health needs originating from factors beyond individual control, or circumstances (parental background, genetic influences and so on), and needs originating from individual responsible choices (e.g. lifestyle, treatment preferences).

As outlined above, by evoking Roemer's (1993, 1998) ideal of *levelling the playing field*, it has been argued that some health or health care inequalities are indeed legitimate or unproblematic (e.g. Fleurbaey and Schokkaert 2009; Li Donni et al. 2014). More precisely, by virtue of the principle of *reward*, inequalities in health or health care between individuals facing the same set of circumstances (*type*) are legitimate as they originate from different responsible choices, and do not require compensation. In the same spirit, by virtue of the principle of *compensation*, inequalities in health or health care that can be attributed to differences in circumstances are illegitimate, and should be compensated.

According to the principle of reward, even if health needs are equal, the horizontal equity ideal does not apply.

The perspective at hand—independent from the priority assigned either to the principle of reward or to the principle of compensation—entails different consequences depending on what is identified as the major outcome: health or health care. In particular, the application of Roemer's approach to health care would imply cogent normative objections.

First, even if some inequalities in the health status might be unproblematic (e.g. due to bad lifestyles), health care is a *social primary good*, whose accessibility is a prerequisite for the exercise of basic rights and liberties; it turns out that, by rewarding lifestyle decisions in the context of health care, one would inevitably jeopardize the liberal principle of equal political and civil rights, because a bad health status would limit individual possibilities to exercise these rights.

Second, by legitimating unequal access to health care among equally needy individuals with different lifestyles, one would agree to the principle that individuals should be refused health treatments when in need if they could have avoided to be in need by making different choices (which is not uncontroversial even in the income literature, e.g. Lefranc et al. 2009; Abatemarco 2015). However, the principle of responsibility states that individuals should be held responsible for their choices, not for the consequences of their choices; it is only in the special case where outcomes depend solely (or sensibly) on personal choices—what does not seem to be the case with health—that individuals can be held responsible. As actual consequences of a choice partly depend on factors beyond the individual's control, those who make the same choices may not have the same need for treatment. Forcing only the subset of people in need to pay for the treatment, when the need is considered self-inflicted, is at the hearth of a what might be called a fairness objection (Cappelen and Norheim 2005)

In addition to these, a humanitarian argument is also worth mentioning. According to it, society as a whole has a moral obligation to help people in need, regardless of the reasons why they are in such a situation and provided that helping is possible and do not impose unacceptable sacrifices on those providing it.

Different from the most recent literature, in what follows we propose an ex-ante re-visiting of the principle of equal access for those in equal need, where egalitarianism of opportunity in health care is defined when both individual preferences and health needs have not emerged yet. Our proposal is grounded in a perspective resembling the Rawlsian original position (veil of ignorance), from which it borrows the assumption that needs and preferences have not emerged yet and a social contract is signed between "souls", not individuals (Rawls 2001). In our view, this is a better starting-gate for the definition (and measurement) of equality of opportunity in health care.

2.3 Access and equal access

As previously emphasized, any attempt to adapt the notion of equality of opportunity in such a way as to make it suitable to cope with health related issues is reasonably based on the notion of access. Access stands for chance of access; hence equal access means equal chances to take advantage of something, that is, equal opportunities.

The question of what should be meant by access, and, consequently, by equal access, is not a trivial one. Most of the literature during the 1970s and the 1980s—focusing on *potential* access, independently from health needs—sees access as depending on supply as well as demand factors (e.g. Mooney 1983). Supply factors affecting access to health care relate to the spatial distribution of providers, the production technology as well as other factors influencing the cost and the appropriateness of health services. Demand factors are generally related to the individual capacity of obtaining and processing the necessary information; health needs; skills and attitudes; the diffusion of self-care practices (Aday and Andersen 1975; Andersen 1995).

The strand of literature focusing on the role played by demand factors—hence stressing the role played by elements such as beliefs, health needs, preferences and information constraints—does not allow to properly disentangle *potential* from *effective* use of health services. This is particularly relevant, for, in assessing opportunities, what really matters is *potential* use.

To clarify this point, let us suppose that, due to cultural beliefs, some individuals are not willing to get a health treatment that would be appropriate for a given disease. For these individuals, the opportunity to take advantage of health services may well be the same as for any other, i.e. cultural beliefs as well as psychological factors do not affect their *objective* possibilities of access. More generally, this is the case for all "cultural and social factors determining the possibility for people to accept the aspects of the service (e.g. the sex or social group of providers, the beliefs associated with systems of medicine) and the judged appropriateness for the persons to seek care" (Levesque et al. 2013). In a similar fashion, different health needs may determine different effective uses of health services, but this is not at all concerned with potential access to health services.

On the contrary, let us suppose that, due to the lack of acceptable supply standards in their residence area, individuals belonging to a given group are either forced to consume bad-quality health services or prevented from receiving what is considered an appropriate treatment. In these cases, chances are unequally distributed and this fact is independent from demand factors.

Within the strand of the literature focusing on the notion of potential access, several *workable* definitions of equity in health care have been provided. Here, we discuss the most prominent ones.

Le Grand (1982) first defines equal potential access as a situation in which all the individuals face the same price (in terms of both money and time) for health care, and then—in an attempt to ameliorate his previous definition—suggests that equal potential access means equality of feasible choice sets (Le Grand 1987), something requiring an identical budget space, however.

Olsen and Rodgers (1991) suggest instead that potential access to health care can be considered as fully equalized if and only if everyone is able to consume the same maximum attainable amount of health services, with this implying that the price (cost) of access should be opportunely differentiated among individuals with different budget constraints.

All these definitions have proved inadequate to closer scrutiny. For what concerns the possibility to define equal potential access with respect to the sole price (cost) of access, it has been observed that this would not take individuals' resources into account so that "two individuals facing the same price of health care would enjoy the same access even if they had no income, which seems absurd" (Culyer and Wagstaff 1993). Differently, the definition of equal potential access in terms of feasible choice set has been considered as a *too-broad* proposal, which would not recognize the special concern to be reserved to access to health care (Olsen and Rodgers 1991).

On the other hand, the definition of equal potential access in terms of maximum attainable amount of health services would clearly hide the primary disparity among those having an effective chance of access to health care and those who have not (Daniels 2013), as well as the diverse quality of health treatments provided by different suppliers.

The lack of an adequate consensus on what should be meant by equality of (potential) access—coupled with the difficulties arisen in the attempt to carry on empirical analyses (Allin et al. 2007)—has seriously contributed to abandon this approach in favour of the more tractable ideal of *equal utilization of health care for those in equal need*. In what follows, we propose to partially restore it, by recovering some of its features that are sufficiently general to attract consensus and not excessively information-demanding for empirical investigations.

3 Equality of opportunity in health care as *equal universal access*

The existing literature on equality of access has mainly focused on the price of access, or the maximum attainable amount of health services. In doing this, it has completely disregarded, for example, those individuals not having access because of lack of adequate resources. As noticed above, the same drawback can still be found in empirical analyses inspired by the ideal of *equal access for equal need*, whose focus has been mostly concerned with the equalization of access conditions among those who have benefited from health services.

Here, we opt for a more general approach which accounts for both, (1) the actual chance of access to appropriate medical care provision (should a health care need really emerge), and (2) the cost (price) of access to be faced by each individual. Most importantly, this is done by considering access within an ex-ante framework, i.e. when individual preferences (choices) and health needs are not yet revealed.

3.1 Notations

Let $\Theta = \times\Theta_{k=1}^{m}$ be the space of individual characteristics (e.g. age, place of residence, presence of disabilities, accommodation needs, etc.) that, given the features of the supply side (e.g. geographical distribution of providers, presence of access fees, level of out-of-pocket payments, etc.) and other more general aspects of the economy (e.g. transportation system) affect the direct cost of access to health care, that is, the cost borne by a *cell* to get access to a bundle of health treatments of appropriate quality, which may be intended as either a composite good, or as a single health treatment. A vector $\theta_i \in \Theta$ is a point in the Θ-space fully characterizing the *i*th *cell*. Let $\theta = \{\theta_i\}_{i=1}^{n}$ be the set of such cells.

We write $C(\theta) := \{c(\theta_1), \dots, c(\theta_n)\}$ to denote the cost distribution, i.e. the cost that the *i*th cell has to bear in order to obtain the health treatment of appropriate quality. Notably, individuals falling in the same cell (having the same *policy-relevant* characteristics: there might indeed be other characteristics affecting the cost of access but not considered relevant by the policy-maker) are inevitably associated with the same cost of access.

Let Y, with supports $[\underline{y}, \bar{y}]$, be the distribution of accessible financial resources (e.g. income, wealth, loans, public and private transfers) that can be employed to obtain, when in need, a treatment of appropriate quality. In an ex-ante perspective, it is not known the endowment of resources enjoyed by each cell, so it is as if each cell confronted with the whole distribution of resources; access is therefore (ex-ante) granted only to those cells bearing a cost of access not greater than the *minor pocket* $\underline{y}$. Universal access is then realized when all costs are not greater than the minor pocket, i.e. $c(\theta_i) \leq \underline{y}\ \forall\ i = 1, \dots, n$.

Given the formal notations above, let $\Gamma(\cdot)$ be the criterion used to measure individuals' dis-opportunities; that is, $\Gamma(\cdot)$ maps the cost associated with a given cell (i.e. *cell-specific* monetary cost) into a point on the dis-opportunity curve $\Omega_i = \Gamma(c(\theta_i))$. As $\Gamma(\cdot)$ is independent of the characteristics of each cell, it must be the case that the sole cost distribution matters.

More specifically, we write $\Gamma(c(\theta_i)) = c(\theta_i)$ to quantify dis-opportunities for each cell having access to the health treatment, with $\Gamma(c(\theta_i)) = +\infty$ for all cells such that $c(\theta_i) > \underline{y}$. Hence, if a treatment is not affordable, dis-opportunities are at the maximum, whatever the gap to the minor pocket. This aspect clearly emphasizes the peculiarities of health care as compared to the literature on income inequality and poverty; e.g. increasing the income of a poor income unit inevitably reduces poverty, whereas stretching in any direction the cost of access associated with a given cell would not stretch opportunities until access is granted to the cell.

3.2 Equal universal access

Let $C^A(\theta) := \{c^A(\theta_1), \dots, c^A(\theta_n)\}$ and $C^B(\theta) := \{c^B(\theta_1), \dots, c^B(\theta_n)\}$ be two alternative distributions of the cost of access associated with the vector of cells $\theta = \{\theta_i\}_{i=1}^n$, and let $\underline{y}$ denote the lower support of the distribution of accessible financial resources, $\bar{Y}$. We define equality of opportunity in health care as follows.

Definition (*Equality of opportunity in health care*) The cost distribution B is strictly preferred to A in terms of equality of opportunity, if, for a given bundle of health services of appropriate quality, either (i) there exists θ_j such that $c^A(\theta_i) = c^B(\theta_i)\ \forall\ i \neq j$ and $c^B(\theta_j) \leq \underline{y} < c^A(\theta_j)$, or (ii) provided that $(c^A(\theta_i), c^B(\theta_i)) \leq \underline{y}\ \forall\ i$, $C^B(\theta)$ Lorenz-dominates $C^A(\theta)$.

Three major attributes characterize our definition of equality of opportunity in terms of equal universal access.

First, since our definition is contextualized within an ex-ante framework—i.e. when both health needs and individuals' preferences (so responsible choices) are not revealed yet—we refer to the distribution of the cost of access across *cells*, and not, as it is commonly understood, across individuals, where each cell is defined by a set of *characteristics* determining objective impediments to care (e.g. distance from the nearest place where a treatment is delivered, presence of disabilities, etc.). Ex-ante, individuals have the same chance to fall into each one of the cells in the population.

Second, we focus on health treatments of appropriate quality. Specifically, for a health treatment to be regarded as appropriate, according to Levesque et al. (2013) it is usual to require (1) medical consensus on treatment benefits, and (2) social consensus about the relevance of the health need it aims to meet.

The definition of appropriateness is crucial since the quality of treatments allows to account for access barriers connected to relevant characteristics of productive facilities. For instance, the limited availability of medical staff and other health resources in a geographical area may yield very long waiting-lists, so jeopardizing individual access opportunities in that cell and, in turn, increases the cost of access due to patient mobility.

Third, according to our definition, equality of access can be only achieved by first granting universal access, and then by equalizing the monetary costs individuals face. As such, if access is granted to an additional cell, then equality is improved. On the contrary, any cost equalization is ineffective if universal access is not yet granted. Notably, the priority to access we opted for is not defined in a purely lexicographic fashion, as equality of access cannot be evoked to rank alternative schemes which do not differ from each other in terms of access (unless universal access is granted first).

The priority to access is immediately relevant for the design of health policies; indeed, if equality of opportunity in health care is defined in terms of equal universal access, then targeting health programs—i.e. characterizing the potential needers and beneficiaries of public spending in the health sector—are necessarily required to promote equality of opportunity in health care. Specifically, auditing and monitoring of access conditions, which go well beyond the realization of health care standards, become crucial to obtain maximum benefits in terms of equality of opportunity in health care while keeping public budgets in order, or, equivalently, to realize equity targets at the minimum cost.

As we mentioned above, the priority to access within an ex-ante framework represents the major departure from the standard healthcare literature based on the horizontal equity principle. Indeed, if access is universally granted, then our definition is normatively consistent with the ideal of “equal utilization of health care for those in equal need”: as far as access is universally granted at the same cost of access before health needs are revealed, it must be the case that utilization will be provided at the same costs ex-post, would the health need effectively emerge. However, if access is not universally granted, then our definition would imply different orderings in terms of equality of opportunity, in that inequality among the sole subset of individuals (or cells) having access to the treatment is not relevant according to our definition, unless universal access is granted first.

As compared to the ideal of levelling the playing field, at a first sight one may think that cells are defined up to circumstances (factors beyond individual control) influencing the cost of access. However, even if this is a possibility, this would not imply the acceptance of the principle of reward in our framework, since individuals belonging to the same cell share the same cost of access, at least with respect to policy-relevant characteristics identified by the decision maker.

Our approach differs with respect to the ideal of levelling the playing field also in this respect, in that the principle of responsibility is implicitly limited to the application of different treatment decisions of individuals, but individuals are not held responsible for different lifestyle choices. Notably, this does not exclude that alternative solutions, other than legitimating disparities in access to health care, might be considered to incentivize better individual lifestyles (e.g. taxing tobacco goes in this direction).

Notice that the definition we propose is *healthcare-specific* in that it cannot be equivalently applied to health; indeed, our cost-based approach is meaningless if applied to inequalities in health statuses.

3.3 A simple example

In this section, we run a simple test using real data. The only aim is to show that, by implementing standard tools for nonparametric estimation, our definition can be easily applied to measure disparities in healthcare opportunities both across areas and over time. For our purposes, we assume that the only relevant characteristic, distinguishing any cell from the others, is geographic location. In particular, each cell is characterized by being situated in one of the Italian provinces.

As for the health treatment of appropriate quality, we use data on Heart Valve Replacement (Italian Ministry of Health 2016). We consider the cost borne by any cell to get access to a surgical treatment entailing a 30-day mortality rate no greater than 1.5%. Only 19 Italian hospitals respect this quality standard.

Under the Italian National Health System, Heart Valve Replacement is granted to anyone in need; there are no patient's fees. We only consider then: the cost borne to get to the nearest hospital providing a treatment of the specified quality level; the accommodation costs.[1]

On the other side, to compute the minor pocket, it is necessary to know the ex-ante distribution of accessible resources: whoever in need may indeed receive additional resources from other members of the social networks he belongs to (his family, his friends, and so on). Not always this information is available, although suitable estimates can be carried out.

As the present exercise is only run for illustrative purposes, to compute the minimum of accessible resources we employ the generalized mean (or, Hölder mean)[2] from the distribution of annual provincial[3] disposable incomes at the net value of subsistence. Data come from the Survey on Household Income and Wealth (SHIW) carried on by the Bank of Italy. Incomes are obtained from the 2015 wave (which refers to the 2014 chronological year) at the net value of subsistence (the absolute poverty line set by the Italian National Institute for Statistics: Istat 2014).

Formally, let y_{ij} be the annual disposable income at the net value of subsistence of the ith individual in province j, with $i = 1 \ldots n(j)$. The minor pocket is computed as $\underline{y} = \min\{y_j\}$, where $y_j = \left(\sum_{i=1}^{n(j)} y_{ij}^{\rho}\right)^{\frac{1}{\rho}}, j = 1, \ldots, 103.$

The advantage of using the generalized mean is that by varying the parameter ρ, it is possible to inflate the minor pocket as resulting from income and wealth surveys, in such a way as to take into account the additional resources individuals can have access to (in case of need).[4]

For our purposes, we consider two different values of the parameter, $\rho = 1$ (arithmetic mean) and $\rho = 0$ (geometric mean) that give rise to two different scenarios: with and without universal access. Specifically, for $\rho = 1$ the minor pocket is 4467.01€, whereas for $\rho = 0$ the minor pocket is 277.16€.

Given the distribution of the cost of access among cells, $C(\theta)$, and the minor pocket, $\underline{y}$, access is granted to a given cell when the cost of access is not greater than the minor pocket. Hence, let $q = \sharp i : c(\theta_i) \leq \underline{y}$ be the number of cells having access

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[1] Travel costs are computed using the Michelin Guide, once all the distances separating any given province from the nearest hospital *suitable for care* are determined. Accommodation costs—incurred by whoever provides assistance to the patient during the three weeks, on average, he/she is hospitalized—are calculated using information on the accommodation prices required by the B&Bs advertized on the Hospitals' websites, in the area dedicated to inform patients about accommodation opportunities.

[2] The generalized mean—with ad hoc parameter restrictions—is widely used in economics, especially in the field of risk and inequality measurement (Markowitz 1952; Atkinson 1970).

[3] As income information for each province is not made available by the Bank of Italy for privacy reasons, we have imputed to each province belonging to the same region, the same endowment.

[4] Notably, the financial endowment of each province, y_j would be: (1) the maximum value in the income distribution at the provincial level, for $\rho \to +\infty$; (2) the arithmetic mean for $\rho \to 1$; (3) the geometric mean for $\rho \to 0$; (4) the harmonic mean for $\rho \to -1$; the minimum value in the jth distribution of resources for $\rho \to -\infty$.

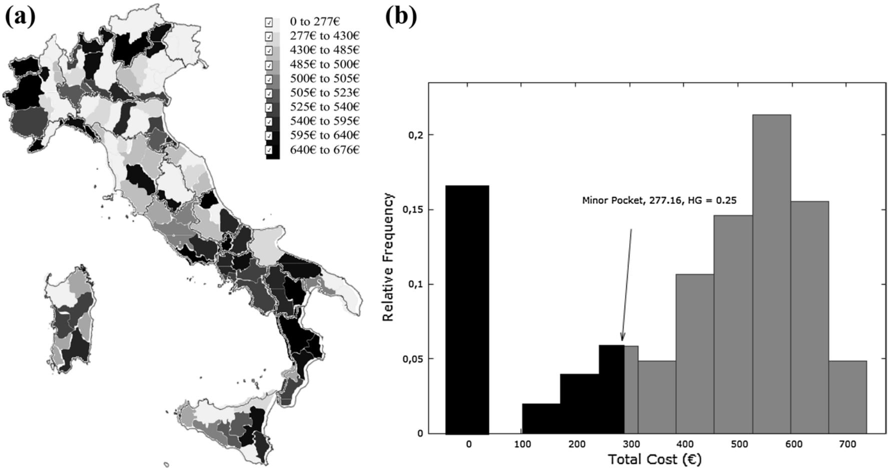

Fig. 1 **a** Cost of access to Heart Valve Replacement for each of the 103 Italian provinces; **b** proportion of provinces having access ($\rho = 0$)

to the health treatment, the frequency of access can be measured *sic et simpliciter* by the Headcount Ratio, $H = \left(\frac{q}{n}\right)$.

If access is less than 1, $H < 1$, then alternative cost distributions are ranked according to the Headcount Ratio only. Instead, if access is granted to all cells, i.e. $H = 1$, cost distributions are ranked according to Lorenz dominance conditions also, provided that, because of the priority of access on equality of access, cost distributions granting universal access are generally preferred to those which do not. If universal access is granted for any of the cost distributions to be compared, then within a complete ordering approach one may simply consider the Gini index (or any other metric satisfying ordering-consistency with respect to Lorenz dominance). So, we define

$$HG = \left(\frac{q}{n}\right) \max \left\{1;[1 + (1 - G(C(\theta))]^{1+q-n}\right\} \tag{1}$$

Specifically, the formulation in Eq. (1) accounts for each of the two conditions below:

(1) if $q < n$, as the term in square brackets cannot be lower than one and the corresponding exponent $(1 + q - n)$ is no greater than zero, then $\max\{.\} = 1$ and, as a result, $HG = HG_1 = \frac{q}{n}$ with $HG \in [0, 1[$;
(2) if $q = n$, $HG = HG_2 = 2 - G$ with $HG \in [1, 2]$.

As shown in Fig. 1, for $\rho = 1$ universal access is granted and $HG = 1.71$, whereas for $\rho = 0$ universal access is not granted, and $HG = 0.25$.

Notably, in the two scenarios above, egalitarian health policies would strongly differ to each other; in the case of $HG = 1.71 > 1$, the policy-maker can ameliorate equality of opportunity in health care by reducing the cost of access for those cells whose access to the health treatment is more expensive than for the others. Differently, in case of $HG = 0.25 < 1$, equality of opportunity in health care can be ameliorated by granting access to cells having no access, targeting first those cells requiring less spending to gain access (i.e. better-off cells among those having no access). Hence, whatever of the two scenarios, auditing and monitoring of access conditions are inevitably required to properly and effectively design public policies.

4 Concluding remarks

A dramatic increase in the cost of provision of health services coupled with the need to cut public deficits is currently downplaying the expectation of adequate healthcare opportunities in Western countries. This is happening with perhaps greater strength in Europe, where an aspiration to an adequate level of justice in access to care is still present. We believe that in such *hard times* this aspiration requires to re-define the general principles informing the national health policies in such a way as to enhance the effectiveness of public health programs in promoting equality of opportunity in health care.

In this paper, recalling the Rawlsian tradition of *fair equality of opportunity* and the centrality of *equality of access* (Le Grand 1982, 1987; Olsen and Rodgers 1991), we propose a reformulation of the ideal of equality of opportunity in health care. According to our view, equality of opportunity in health care must necessarily account for both disparities jeopardizing any ideal of justice in healthcare, that is, the disparity between individuals having access to health treatments and those who have not; the inequality in access conditions between individuals having access.

To simultaneously consider the two disparities above, we suggest that the major emphasis should be posed on the cost of access that an individual would have to bear (in case of a health need) given his/her characteristics. In this perspective, what is salient is the potential cost of access an individual may incur in, which is not to be confused with the effective cost of utilization borne by real patients.

In a policy perspective, given the distribution of the cost of access among cells, according to our definition, equality of opportunity in health care can be improved by allocating resources to the health sector in such a way as to grant, first, access to the cells with the smallest gap from the minor pocket, i.e. to cells with the lowest costs among those having no access. Even if this may increase statistical inequality among those cells, such an increase in inequality is irrelevant since the size of the gap to the minor pocket is not something that impinges on opportunities when access is not granted. In this sense, a policy that makes all the costs closer to the minor pocket without pushing any cost below it would be ineffective and, worryingly, a waste of resources.

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