


RESEARCH ARTICLE

Setting Limits for the Principle of Equal Entitlement to Continued Life

Juan D. Moreno-Ternero¹ and Lars Peter Østerdal² 

¹Department of Economics, Universidad Pablo de Olavide and ²Department of Economics, Copenhagen Business School
Corresponding author: Lars Peter Østerdal; Email: lpo.eco@cbs.dk

Abstract

The normative principle that every individual is equally entitled to continued life is a subject of debate in ethics, health economics and policy. We reconsider this principle in the context of setting priorities for healthcare interventions. When applied without restriction, the principle overlooks quality of life concerns entirely. However, we contend that it remains ethically relevant in certain situations, particularly when patients suffer from conditions unrelated to the therapeutic areas and treatments under consideration. Thus, we defend the principle while also emphasizing the need for its application within tight limits.

Keywords: equal entitlement to continued life; morbidity; mortality; population health; QALYs

Introduction

One of the central postulates of most egalitarian doctrines is the idea that every life has equal value. The idea lies at the heart of a wide array of philosophical, political, and economic discussions. It constitutes a core guiding principle of the Bill & Melinda Gates Foundation, the second-largest private foundation in the world, and it has received strong endorsements from numerous public figures.¹

A salient interpretation of this postulate, which has been scrutinized in academic research, is the principle of equal entitlement to continued life. It says that all individuals have a fundamental right to the same extent of continued life. John Harris has been one of the most vocal advocates of this principle within the academic community.^{2,3,4,5,6} Harris defends that even if some lives are not lived at perfect health, lives are in fact equally valuable, as long as they are valued by those living those lives. Such a conclusion has also found support within the health economics community, where it has been argued that discriminating on the basis of health states would involve interpersonal welfare comparisons, which are generally considered incommensurate.^{7,8} However, this stance is contested,^{9,10,11,12} and subject to ongoing debate.^{13,14,15,16} In particular, it goes against the use of *Quality-Adjusted Life Years* (in short, QALYs), *Disability-Adjusted Life Years* (in short, DALYs), or *Health-Adjusted Life Years*, (in short, HALYs), the most frequently employed measures for the economic evaluation of health care programs.¹⁷

The principle of equal entitlement to continued life is a non-welfarist fairness principle. As such, its application may reduce welfare, as argued by Louis Kaplow and Steven Shavell.^{18,19} Specifically, Andreas Hasman and Lars Peter Østerdal showed that applying this principle, universally or with age-dependent restrictions, conflicts with the Pareto principle under mild assumptions about preferences on health distributions.^{20,21}

This means that a policymaker consistently applying the principle of equal entitlement to continued life may choose a distribution that is worse for everyone compared to another feasible alternative. In other words, achieving fairness—in the sense of equal entitlement to continued life—may come at the cost of reduced well-being for everyone. The more narrowly the fairness principle is applied, the smaller the

potential well-being loss. Therefore, if the policymaker seeks to minimize efficiency losses in policy implementation, it is crucial to limit the principle's use to situations where it is ethically unquestionable.²²

More recently, Juan D. Moreno-Ternero and Østerdal,^{23,24} as well as Marc Fleurbaey and Grégory Ponthiere,²⁵ have also examined the logical implications of the principle of equal entitlement to continued life in terms of valuation of life years and health status in a population.²⁶ Essentially, their analyses showed that applying this principle without restrictions leads to overly strong implications, such as an exclusive emphasis on mortality-reducing interventions and the disregard for quality-of-life improvements. In other words, there exists a dilemma between fully implementing the principle of equal entitlement to continued life and being concerned with quality-of-life improvements.

We take here that dilemma as a starting point and explore various options to set boundaries for the principle of equal entitlement to continued life. While the unrestricted application of this principle leads to overly strong logical consequences, making it unsuitable for universal use, there exist possible ways out of this dilemma. These include either modifying the principle or limiting its scope. We shall conclude from our analysis that the principle remains ethically compelling under specific, yet relevant circumstances. Importantly, we will conduct our analysis at the most basic and fundamental level, without relying on the controversial notion of individual health preferences.²⁷

The remainder of the paper is organized as follows. First, we present the dilemma arising from the full implementation of the principle of equal entitlement to continued life. Next, we outline several possible options to escape from it, drawing on contributions from the existing literature. We will conclude that each of these options comes with caveats. This will lead us to suggest a new option, which we believe provides a more practical and ethically justifiable way to resolve the dilemma while maintaining the essential integrity of the principle of equal entitlement to continued life.

The dilemma in a nutshell

Imagine a policymaker responsible for prioritizing health care for a given population. Each policy is evaluated based on the distribution of health it generates for that population. The health of each individual in the population is described by two factors: quality of life (for instance, one of the 243 health states of the EQ-5D instrument from the EuroQol system) and quantity of life (age of death).²⁸

Suppose that the policymaker evaluates population health distributions rationally, that is, the policymaker has a preference relation that is complete and transitive across possible distributions.²⁹ Assume further that the higher the quantity of life, the better.³⁰ Conversely, we also assume that if an individual has zero lifetime, the quality of life is no longer relevant. The latter condition on the policymaker's preferences, also known as the *social zero condition*³¹, is the counterpart to the (individual preference) zero condition introduced in the context of decision under uncertainty.³²⁻³³

We then define the principle of *equal entitlement to continued life*³⁴ in terms of the policymaker's preferences: adding a fixed number of life years to individual i is equally preferred to adding them to individual j , regardless of their respective health states and ages.

With these definitions, the dilemma can be succinctly stated: When a policymaker has rational preferences that adhere to the two basic assumptions outlined above, the principle of equal entitlement to continued life *logically implies* that health distributions are assessed based on the total aggregate lifetime across individuals. In other words, if one program results in a distribution with a greater total lifetime than another, the former is preferred, regardless of the quality of life they both offer.

The intuition is as follows:³⁵ Assume that the policymaker's preferences are rational and align with the two basic assumptions mentioned earlier. Given a health distribution and two individuals, i and j , applying the principle of equal entitlement to continued life makes this distribution equally preferable to one where individual i has the combined lifespan of i and j , while j has a lifespan of zero. Repeatedly applying this principle implies that any health distribution is equally preferable to one where a single individual has the entire total lifespan, while all others have zero lifespan. Now, by repeatedly applying the condition that if an individual has zero lifetime, the quality of life is irrelevant, the distribution becomes equally preferred to one where those with zero lifespan are in full health. By further applying this

condition and equal entitlement to continued life, the distribution remains equally preferred to one where the individual with the aggregate lifespan also enjoys full health. As a result, the policymaker's preferences are determined solely by the aggregate lifespan of the distribution.

The result above demonstrates the strong logical implications of the principle of equal entitlement to continued life. When combined with two basic assumptions—one emphasizing the appeal of more quantity of life, and the other asserting that quality of life holds no significance in the absence of any lifetime to experience it—it leads to evaluating health distributions solely by the aggregate lifetime they provide, disregarding any concern whatsoever for the quality of life associated with health distributions. In other words, this principle prioritizes life-saving interventions over those aimed at enhancing quality of life, a view supported by some scholars.³⁶

But not only that. The result also says that quality-of-life enhancing programs are essentially dismissed. For example, consider two programs: A and B. Program A provides each individual in the population with one year of life in full health. Program B also provides each individual with one year of life, plus an additional day for one individual; however, all of this time is spent in a poor health state (though still preferable to death). According to the principle of equal entitlement to continued life (in combination with the other two basic assumptions), Program B would be preferred over Program A. This means that even a tiny increase in time for a single individual can outweigh the benefit of everyone in the population enjoying full health for a longer period.

The above outcome seems too extreme, despite the intuitive appeal of the principle of equal entitlement to continued life as a fundamental right and a means to ensure equal access to medical care on a non-discriminatory basis. This creates a dilemma.

Escaping the dilemma with existing tools

We now explore the viability of several alternative options to escape from the dilemma, building onto contributions in the related literature.

Equal entitlement to continued life at a similar age

A first option would be to restrict the principle only to individuals of similar age.³⁷ Some policy interventions, such as vaccine shots within immunization schedules, certainly target cohorts of equally old individuals. In our discussion, this would amount to stating that one additional life year to one person is equally preferred to one additional life year to another person, regardless of their health status, but *provided that the two persons otherwise obtain a similar number of life years*. Clearly, this is a narrower interpretation of the principle, as it applies only to comparisons of people who, from the outset, obtain the same number of life years. However, it turns out the resulting principle would also essentially lead towards evaluating health distributions disregarding quality of life concerns. More precisely, when choosing between available policies for a cohort of equally-aged individuals, if one endorses equal entitlement to continued life at a similar age, along with mild additional assumptions on the policymaker's preferences, then quality-of-life concerns must also be set aside.³⁸ Thus, this conclusion would parallel that of the unrestricted application of the principle, where quality-of-life considerations are set aside.

Priority to the sick and disabled in evaluating life extensions

A second option is to weaken the principle in a way that softens the equal entitlement restriction but maintains a principle of no discrimination against the sick and disabled. This is also suggested by the prioritarian approach, as originally introduced by Derek Parfit,³⁹ and endorsed by many others in different settings.^{40,41} More precisely, the idea is that extending one individual's life by, say, one year in any health state is *at least as preferable as* extending the life of another individual by one year, provided the latter is in full health and has an equal or longer prior lifetime. Although this is departing from the equal entitlement to continued life principle, it captures the broader idea that nobody should get less priority for

lifetime extensions just because they do not enjoy full health. However, as shown by Moreno-Ternero and Østerdal,⁴² under basic and mild assumptions on the policymaker's preferences (encompassing the two mentioned above), this principle also implies that health states must be disregarded entirely when evaluating health distributions. In other words, it implies that only the distribution of life years matters, not the quality of life associated with it. Now, more nuances are allowed in the evaluation of the health distribution than under equal entitlement to continued life, as it allows for inequality aversion in the distribution of life years. That is, not only the aggregate amount of life years matters for the evaluation, but also how it is distributed among the members of the population. This approach enhances the evaluation method aligned with the principle of equal entitlement to continued life. However, it still risks overlooking different health states when assessing health distributions, which remains unsatisfactory. Therefore, adjusting the principle to prioritize the sick and disabled in assessing continued life does not effectively resolve the dilemma either.

Equal entitlement to continued life at a similar health state

Another option would be to restrict the principle to individuals having the same quality of life. This can be considered as a sort of parallel to the first option explored above. Nevertheless, it turns out that the implications are drastically different. More precisely, the resulting principle of equal entitlement to continued life at a similar health state, in combination with the basic assumptions on the policymaker's preferences mentioned above, would lead towards popular forms of evaluation for health distributions such as aggregate QALYs or aggregate *Healthy Years Equivalents* (in short, HYE).⁴³

This outcome may seem appealing, but it rests on a premise that effectively undermines the spirit of the principle of equal entitlement to continued life, transforming it into a criterion of horizontal equity. While this shift may carry normative justifications, it is ultimately disconnected from the original idea of equal entitlement to continued life.

An alternative approach would be to restrict comparisons to populations with *somewhat similar* health states. The idea is that if health states are not significantly different, there would be less basis for discrimination among individuals. However, this adjustment would dilute the core of the principle of equal entitlement to continued life, as this principle originally addressed potentially large disparities in quality of life. Furthermore, for populations with similar health states, standard methods for evaluating health distributions (like aggregate QALYs or HYE) would naturally result in minimal discrimination—precisely the issue that motivated Harris and others to advocate for the principle initially.

Finally, a hybrid option could be considered, combining this approach with the previous one (giving priority to the sick and disabled in evaluating life extensions) by applying the priority principle solely to individuals in full health. In other words, extending the life of one fully healthy individual by, say, one year is at least as preferable as extending the life of another fully healthy individual by the same amount, assuming the latter has had an equal or longer prior lifetime. This principle, together with the basic assumptions about the policymaker's preferences mentioned earlier, would support an equity-focused aggregation of QALYs in evaluating health distributions,^{44,45,46,47,48,49} or HYE.⁵⁰ In our health setting, this would mean aggregating QALYs or HYE after submitting them to a strictly concave function.

Proportional equal entitlement to continued life

An alternative approach could soften the absolutism of equal entitlement to continued life by adopting a proportional, relative version. Specifically, a change in life years for individual i is regarded by the policymaker as equally desirable as a proportional change in life years for individual j , irrespective of their health states. For example, doubling the quantity of life for individual i is considered as desirable as doubling the quantity of life for individual j .

It has been shown elsewhere⁵¹ that combining this alternative principle with other basic ones (similar to those mentioned above) drives towards an equity-sensitive evaluation of health distributions including concerns for quality of life (and not just quantity of life).⁵² Such a function would favor one treatment

over another if the *product of the QALYs* each individual would gain from the former treatment exceeds that from the latter. Here, the QALYs for each individual are calculated by multiplying a 0–1 normalized health state index by the number of life years. Notably, using multiplication instead of aggregation of QALYs leads to significantly different evaluations, promoting more egalitarian distributions.

To illustrate this option to modify the principle of equal entitlement to continued life, we revisit the example mentioned above, involving a choice between Program A (which provides one year at full health for each individual in the population) and Program B (which provides one year for each individual, plus an additional day for one individual, but all in the lowest possible health state still considered better than death). The multiplication of QALYs (derived from the proportional version of equal entitlement to continued life) would rank Program A above Program B. In contrast, the aggregation of lifetimes (derived from the canonical version of equal entitlement to continued life), would rank Program B higher, as previously noted.

To further illustrate, consider the following programs involving two individuals. Program C yields five years for each individual, each of them enjoyed at full health. Program D instead yields one year and one day for one individual and nine years for the other, each of them enjoying full health. Evaluating the health distributions according to the multiplication of QALYs (derived from the proportional version of equal entitlement to continued life) would rank Program C above Program D, whereas the aggregation of lifetimes (derived from the canonical version of equal entitlement to continued life) would do the opposite. The aggregation of QALYs would also rank Program D above Program C, as the latter.

In the above examples, the proportional version of the principle of equal entitlement to continued life gives appealing evaluations. However, the normative appeal of this principle relies on the premise that the initial distribution of quantity of life is not extremely dispersed in the population. If the population consists of, say, two individuals with 25 days and 25 years of lifetime, respectively, it seems reasonable to differentiate between doubling the shorter and the longer lifespan. Therefore, the proportional modification of the principle of equal entitlement to continued life may not always be satisfactory. For instance, in large populations, multiplying individual QALYs can lead to cases where extending the lifetime of a single individual with a very short remaining lifespan is deemed more beneficial than extending the lifetimes of many others. In other words, the health outcome of a single individual could have an outsized effect on the total population health evaluation, making the multiplication of individual QALYs arguably unsuitable for evaluating health distributions across large groups.

Escaping the dilemma with new tools

The previous section listed several alternatives to escape the dilemma, based on existing tools from the related literature. But we have also listed the caveats that apply to each of them. That motivates the following alternative, which we shall explain and substantiate.

Equal entitlement to continued life when health states differ only for reasons unrelated to the therapeutic areas and treatments under consideration

Another option to escape the dilemma would be to narrow the scope of the principle, requiring a closer examination of the specific circumstances and health states involved.

To illustrate this, imagine a situation in which we have to select a recipient for a kidney transplant.⁵³ Now imagine that one of the potential recipients is blind due to reasons unrelated to kidney failure, while otherwise being identical to the other. In this case, it would be ethically wrong to discriminate against this recipient on the basis of blindness; thus, applying the principle of equal entitlement to continued life becomes essential.

The absence of discrimination noted in the previous example may conflict with the principle of unrestricted QALY maximization. To illustrate, let us consider Eleonor and Frank, two patients of the same age with kidney failure, which can only be effectively treated through a kidney transplant. Suppose Eleonor is blind (a condition unrelated to her kidney failure) while Frank is not, and they are otherwise

similar in health status. Imagine that Program E recommends Eleonor for a kidney transplant, while Program F recommends Frank, with this being the only distinction between the two programs. If we base our decision solely on the total QALYs each individual would receive, Program F would be ranked above Program E. However, we believe this is not ethically justified; Programs E and F should be ranked equally, in line with the principle of equal entitlement to life.

Now, if Eleonor's blindness were directly related to her kidney failure, we would recommend to prioritize Frank, thus departing from the principle of equal entitlement to continued life. The reason is that the transplant could potentially prevent Frank from experiencing blindness due to untreated kidney failure, whereas it would be too late to do the same for Eleonor, who has already suffered this irreversible consequence. Prioritizing Eleonor over Frank would, in effect, cause Frank additional avoidable morbidity. This consideration might provide a compelling reason to depart from the principle of equal entitlement to continued life in this case.

The example above suggests that there are meaningful situations where the principle of equal entitlement to continued life is ethically appropriate and applicable. These occur when patients have conditions unrelated to the underlying cause requiring the treatment in question, while being otherwise identical—particularly regarding their medical need for the intervention.⁵⁴

One might wonder why we emphasize the importance of whether a patient's condition is unrelated to the underlying cause requiring intervention. Health is multidimensional, encompassing a range of aspects like mobility, physical functioning, pain, and mental well-being. These dimensions can interact, influencing each other and overall well-being in complex ways. Nevertheless, each dimension is inherently distinct, representing unique facets of individual health and functioning. In other words, as we see it, individual health itself consists of separate (health) spheres. Michael Walzer argues that the distribution of various social goods within a society is a matter of justice, with different types of goods and appropriate distribution criteria forming distinct *spheres of justice*.^{55,56} Walzer considered broad life categories such as Security and Welfare, Money and Commodities, Education, Office (position of employment), Recognition, Political Power, and Love and Kinship. However, the diverse dimensions of health also represent distinct "spheres," each with unique characteristics that require specific consideration. Thus, echoing this concept of (separate spheres of justice) argument, a patient's entitlement within one health sphere should not be increased or reduced based on her condition within another distinct health sphere.

Now, interactions between the dimensions of health require careful consideration. The core of the separate spheres argument is that the individual status in one sphere should not influence the individual entitlement to treatment in another (separate) sphere. However, conditions or events pertaining to one sphere may influence the status of the individual in other spheres. For example, low education is associated with poor health. In addition, within a broad health context, low mobility can exacerbate mental health issues. If the interaction effect is direct and causal, ignoring it would be hard to justify. That is, if treating a mobility issue for one patient prevents pain directly related to the issue for one patient but not for another, it could be a valid reason for prioritizing the former. But if the pain is unrelated and not clearly affected if treating the mobility issue, taking it into account would be discriminating as there is no clear linkage between the issues.

A similar reasoning can be applied to interventions that extend life. If they treat a health condition that has already had a direct causal effect on other dimensions of health, arguably, these other effects and dimensions are no any longer irrelevant to the treatment and the underlying condition.

Precisely defining the boundaries for applying the principle within a multidimensional health context can be challenging. This typically involves identifying which health dimensions are genuinely "separate" and assessing whether certain conditions and effects are directly connected. However, in practice, the limited application of the principle of equal entitlement to continued life is often shaped by the limited information available to both policymakers and clinicians. Specialized treatments usually focus on specific health aspects, and comprehensive information across all health dimensions may be lacking. According to the principle of equal entitlement to continued life, such additional information may not be relevant to prioritization decisions in any case. Therefore, the limited application of this principle does not impose excessive information demands but instead serves as a normative guide, promoting a more transparent, accountable system that reduces complexity and redundancy.

Final remarks

In spite of its intuitive appeal, the principle of equal entitlement to continued life has strong and arguably undesirable implications if *universally applied*. We have explored several options to modify or limit its scope in meaningful ways. A proportional (rather than an absolute) version of the principle has less drastic consequences. It carries quality of life and equity concerns, but it is not satisfactory either for universal application. However, we have discussed – and defended – an application of the (original) principle for cases in which patients differ only in conditions unrelated to what is causing the medical need for an intervention. As previously mentioned, applying the principle of equal entitlement to continued life incurs a cost in terms of potential efficiency loss, even when employed within a limited scope. To inform better decision-making in healthcare policy, it is essential to conduct a holistic assessment of the health of the individuals involved, paired with a thorough analysis of the ethical imperative to apply the relevant principle under the given circumstances.

We conclude by discussing two potentially important factors that may affect the (limited) application of the principle of equal entitlement to continued life, which were not considered above.

First is uncertainty.⁵⁷ Consider two individuals with similar conditions who will each die if not treated. If treated, one individual will survive with a 50% probability while the other will survive with a 90% probability. Otherwise, they are identical. Would the two individuals be equally entitled to treatment? We do not believe so. Since the treatment has a higher chance of benefitting the first individual, we should take into account this property of the treatment in connection to the condition in question. Now, what if the treatment is equally effective for the two individuals (say 90% effective for both, everything else equal) but one individual has a higher risk of dying for reasons independent of the condition and treatment in question? In this case, the higher risk of dying is a separate issue within a separate (health) sphere, and thus, as a starting point, the individuals have an equal right to treatment.⁵⁸ Thus, introducing uncertainty does not change the picture. Its role depends on whether it constitutes a separate health issue.

Second, timing of effects. If the effect is immediate for one person (for instance, the person would die immediately if not treated), while the effect on another is not (for instance, the person would obtain an extension of life further into the future), it would be reasonable to prioritize saving the life at immediate risk. While both life-extension treatments are of significant importance, everything else equal, there is more risk involved with effects further in the future. Adverse health events, or new treatment opportunities, may occur before the benefit of the treatment is realized. Moreover, a policymaker and individuals alike may apply discounting to reflect time preferences for immediate gratification over delayed benefits. Thus, it would be unjustified to apply the principle of equal entitlement to continued life across time periods.

Acknowledgements. The authors thank Aitor Calo-Blanco and Kristian Schultz Hansen for their detailed and valuable input. Financial support from the Spanish Agencia Estatal de Investigación (AEI) through grant PID2023-146364NB-I00, the Independent Research Fund Denmark (grant ID: 10.46540/4260-00050B), and from the National Research Centre for the Working Environment (NFA), Denmark, is gratefully acknowledged.

Notes

1. Hood LE, Lazowska ED. Every life has equal value. *Cell* 2013;**154**:1178–1179.
2. Harris J. *The Value of Life*. Routledge; 1985.
3. Harris J. QALYfying the value of life. *Journal of Medical Ethics* 1987;**13**:117–123.
4. Harris J. What is the good of health care? *Bioethics* 1996;**10**:269–291.
5. Harris J. The rationing debate: Maximising the health of the whole community. The case against: What the principal objective of the NHS should really be. *British Medical Journal* 1997;**314**:669–72.
6. Harris J. It's not NICE to discriminate. *Journal of Medical Ethics* 2005;**31**:373–375.
7. Arnesen T, Nord E. The value of DALY life: Problems with ethics and validity of disability adjusted life years. *British Medical Journal* 1999;**319**:1423–5.
8. Nord E. The desirability of a condition versus the well being and worth of a person. *Health Economics* 2001;**10**(7):579–581.

9. Williams A. Cost-effectiveness analysis: Is it ethical? *Journal of Medical Ethics* 1992;**18**:7–11.
10. Singer P, McKie J, Kuhse H, Richardson J. Double jeopardy and the use of QALYs in health care allocation. *Journal of Medical Ethics* 1995;**21**:144–50.
11. McKie J, Kuhse H, Richardson J, Singer P. Double jeopardy, the equal value of lives and the veil of ignorance: A rejoinder to Harris. *Journal of Medical Ethics* 1996;**22**:204–208.
12. Edlin R, McCabe C, Round J, Wright J, Claxton K, Sculpher M, Cookson R. Understanding Harris' understanding of CEA: Is cost effective resource allocation undone? *Journal of Health Services Research and Policy* 2013;**18**:34–39.
13. Grimley Evans J. The rationing debate: Rationing health care by age. The case against. *British Medical Journal* 1997;**314**:822–825.
14. Williams A. The rationing debate: Rationing health care by age. The case for. *British Medical Journal* 1997;**314**:820–822.
15. Basu A, Carlson J, Veenstra D. Health years in total: A new health objective function for cost-effectiveness analysis. *Value in Health* 2020;**23**:96–103.
16. Lakdawalla DN, Doctor JN. A principled approach to non-discrimination in cost-effectiveness. *The European Journal of Health Economics* 2024;**25**:1393–1416.
17. Moreno-Ternero JD, Platz TT, Østerdal LP. QALYs, DALYs, and HALYs: A unifying framework for the evaluation of population health. *Journal of Health Economics* 2023;**87**:102714.
18. Kaplow L, Shavell S. Any non-welfarist method of policy assessment violates the Pareto principle. *Journal of Political Economy* 2001;**109**:281–286.
19. Kaplow L, Shavell S. Fairness versus welfare: Notes on the Pareto principle, preferences, and distributive justice. *The Journal of Legal Studies* 2003;**32**:331–362.
20. Hasman A, Østerdal LP. Equal value of life and the Pareto principle. *Economics and Philosophy* 2004;**20**:19–33.
21. This is somewhat reminiscent of the incompatibility between Pareto optimality and multidimensional versions of the transfer principle, as discussed in the social choice literature, see, e.g., Fleurbaey M, Trannoy A. The impossibility of a Paretian egalitarian. *Social Choice and Welfare* 2003;**21**:243–263.
22. This is also the typical way out in the social choice literature mentioned above, where weaker versions of the (multidimensional) transfer principle are considered to reconcile with Pareto optimality, see, e.g., Fleurbaey M, Maniquet F. *A Theory of Fairness and Social Welfare*. Econometric Society Monograph, Cambridge University Press; 2011, and Calo-Blanco A. Fair compensation with different social concerns for forgiveness. *Review of Economic Design* 2016;**20**:39–56.
23. Moreno-Ternero JD, Østerdal LP. The implications of equal value of life and prioritarianism for the evaluation of population health. *Discussion Paper No. 2015:1, COHERE—Centre of Health Economics Research, University of Southern Denmark*.
24. Moreno-Ternero JD, Østerdal LP. Entitlements to continued life and the evaluation of population health. *Review of Economic Design* 2023;**27**:561–579.
25. Fleurbaey M, Ponthiere G. The value of a life-year and the intuition of universality. *Journal of Ethics and Social Philosophy* 2022;**22**:355–381.
26. The principle is called *the principle of universality* in note 25, Fleurbaey, Ponthiere 2022.
27. For example, the validity of measures of (individual) decision utility for the evaluation of the weights assigned to different health states has been questioned, see, e.g., Dolan P, Kahneman D. Interpretations of utility and their implications for the valuation of health. *The Economic Journal* 2008;**118**:215–234.
28. The running interpretation is that individuals only experience chronic health states, but it could also be interpreted as the health state reflecting the typical quality level at which the associated lifespan is experienced.
29. The former means that for each pair of health distributions, either the first is at least as preferred as the second, the second is at least as preferred as the first, or both. The latter means that if a first health distribution is at least as preferred as a second distribution, and the second distribution is at least as preferred as a third one, then the first health distribution is at least as preferred as the third distribution.

30. Strictly speaking, we only need this assumption for the case of full health. However, we assume it for all health states, as we are not addressing dilemmas about extending lives whose value is not clearly and unambiguously positive. In other words, we assume all health states are worth living.
31. Hougaard JL, Moreno-Tertero JD, Østerdal LP. A new axiomatic approach to the evaluation of population health. *Journal of Health Economics* 2013;**32**:515–23.
32. Bleichrodt H, Wakker P, Johannesson M. Characterizing QALYs by risk neutrality. *Journal of Risk and Uncertainty* 1997;**15**:107–114.
33. Miyamoto JM, Wakker PP, Bleichrodt H, Peters HJ. The zero-condition: A simplifying assumption in QALY measurement and multiattribute utility. *Management Science* 1998;**44**:839–849.
34. See [note 23](#), Moreno-Tertero, Østerdal 2015 and [note 24](#), Moreno-Tertero, Østerdal 2023.
35. A formal statement and proof of this result can be found in [note 23](#), Moreno-Tertero, Østerdal 2015 and [note 24](#), Moreno-Tertero, Østerdal 2023. The result is closely related to a finding in [note 20](#), Hasman, Østerdal 2015. Therein, a richer framework is considered in which life profiles are modeled as paths specifying individual health states from birth to death, and the policymaker's preferences are then evaluated over distributions of such life profiles in the society. It is also closely related to a finding recently stated in [note 25](#), Fleurbaey and Ponthiere 2022.
36. See, e.g., Harris J. Justice and equal opportunities in health care. *Bioethics* 1999;**13**:392–404.
37. This is referred to as *age-dependent equal value of life* in [note 24](#), Hasman, Østerdal 2004.
38. This is formally shown in [note 20](#) Hasman, Østerdal 2004 and [note 24](#), Moreno-Tertero, Østerdal 2023 for their corresponding models.
39. Parfit D. *Equality and Priority*. *Ratio: New Series* **10**, 202–221. Oxford: Blackwell Publishers Ltd.; 1997.
40. Moreno-Tertero J, Roemer J. The veil of ignorance violates priority. *Economics and Philosophy* 2008;**24**:233–257.
41. Brock DW. Cost-effectiveness and disability discrimination. *Economics and Philosophy* 2009;**25**:27–47.
42. See [note 24](#), Moreno-Tertero, Østerdal 2023.
43. See [note 31](#), Hougaard et al. 2013.
44. Wagstaff A. QALYs and the equity-efficiency trade-off. *Journal of Health Economics* 1991;**10**:21–41.
45. See [note 9](#), Williams 1992.
46. Østerdal LP. Axioms for health care resource allocation. *Journal of Health Economics* 2005;**24**:679–702.
47. See [note 31](#), Hougaard et al. 2013.
48. Bognar G, Hirose I. *The Ethics of Health Care Rationing: An Introduction*. New York: Routledge; 2014.
49. John TM, Millum J, Wasserman D. How to allocate scarce health resources without discriminating against people with disabilities. *Economics and Philosophy* 2017;**33**:161–186.
50. See [note 24](#), Moreno-Tertero, Østerdal 2023.
51. Moreno-Tertero JD, Østerdal LP. A normative foundation for equity-sensitive health evaluation: The role of relative comparisons of health gains. *Journal of Public Economic Theory* 2017;**19**: 1009–1025.
52. This result requires a slightly different model in which zero lifetimes are not allowed. Consequently, the condition that if an individual has zero lifetime the quality of life is no longer relevant is replaced by a basic assumption stating that quality of life improvements become almost insignificant when lifetimes are negligible.
53. For recent accounts and discussions of ethical solutions to the problem of organ shortage, see, e.g., Platz TT, Siersbæk N, Østerdal LP. Ethically acceptable compensation for living donations of organs, tissues, and cells: An unexploited potential? *Applied Health Economics and Health Policy* 2019;**17**:1–14, and Sterri AB, Regmi S, Harris J. Ethical solutions to the problem of organ shortage. *Cambridge Quarterly of Healthcare Ethics* 2022;**31**:297–309.
54. For an analysis of the interplay between health needs and resource allocation in health care, see, e.g., Hasman A, Hope T, Østerdal LP. Health care need: Three interpretations. *Journal of Applied*

Philosophy 2006;23:145–156, and Hope T, Østerdal LP, Hasman A. An inquiry into the principles of needs-based allocation of health care. *Bioethics* 2010;24:470–480.

55. Walzer M. *Spheres of Justice: A Defense of Pluralism and Equality*. New York: Basic Books;1983.
56. For comments and criticisms of Walzer's ideas, along with his response, see Miller D, Walzer M, eds. *Pluralism, Justice, and Equality*. Oxford: Oxford University Press; 1995. See also Brock DW. Separate spheres and indirect benefits. *Cost Effectiveness and Resource Allocation* 2003;1:1–12.
57. Adler M. *Risk, Death, and Well-Being: The Ethical Foundations of Fatality Risk Regulation*. Oxford University Press; 2024 offers a detailed analysis of welfarist approaches to regulating fatality risks, which complements the ethical discussion on the principle of equal entitlement to continued life that we explore here.
58. This does not imply that we cannot adopt a holistic perspective on an individual's health and circumstances, as previously discussed.