



This is a repository copy of *QALYs and ageism : philosophical theories and age weighting*.

White Rose Research Online URL for this paper:

<https://eprints.whiterose.ac.uk/167488/>

Version: Accepted Version

Article:

Tsuchiya, A. orcid.org/0000-0003-4245-5399 (2000) *QALYs and ageism : philosophical theories and age weighting*. *Health Economics*, 9 (1). pp. 57-68. ISSN 1057-9230

[https://doi.org/10.1002/\(SICI\)1099-1050\(200001\)9:1<57::AID-HEC484>3.0.CO;2-N](https://doi.org/10.1002/(SICI)1099-1050(200001)9:1<57::AID-HEC484>3.0.CO;2-N)

This is the peer reviewed version of the following article: Tsuchiya, A. (2000), *QALYs and ageism: philosophical theories and age weighting*. *Health Econ.*, 9: 57-68. , which has been published in final form at [https://doi.org/10.1002/\(SICI\)1099-1050\(200001\)9:1%3C57::AID-HEC484%3E3.0.CO;2-N](https://doi.org/10.1002/(SICI)1099-1050(200001)9:1%3C57::AID-HEC484%3E3.0.CO;2-N). This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Use of Self-Archived Versions.

Reuse

Items deposited in White Rose Research Online are protected by copyright, with all rights reserved unless indicated otherwise. They may be downloaded and/or printed for private study, or other acts as permitted by national copyright laws. The publisher or other rights holders may allow further reproduction and re-use of the full text version. This is indicated by the licence information on the White Rose Research Online record for the item.

Takedown

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.



eprints@whiterose.ac.uk
<https://eprints.whiterose.ac.uk/>

**QALYs and ageism:
Philosophical theories and age weighting**

Aki Tsuchiya

Centre for Health Economics, University of York, Heslington, York, YO1 5DD

ACKNOWLEDGEMENTS

An earlier version of this paper has been presented to the Health Economists' Study Group meeting, January 1998, Sheffield. The author has received financial support from the Grant-in-Aid for Scientific Research issued by the Ministry of Education, Science, Sports and Culture, Japan. David Cohen, Richard Cookson, Raanan Gillon, Julian leGrand, Shuzo Nishimura, Peter Singer, Peter Ubel, Alan Williams, and two anonymous referees to *Health Economics* have offered comments. The discussion at the OHE lunchtime seminar in February 1999 was helpful. The author is a Visiting Research Fellow to the Centre for Health Economics, University of York, funded by the Japan Society for the Promotion of Science. The usual disclaimer applies.

SUMMARY

QALY maximisation is sometimes criticised for being “ageist”, because, other things being equal, the aged, with a shorter life expectancy, will be given lower priority. On the other hand, there are philosophical arguments that, for different reasons, advocate rationing health care to the aged, even when the size of the expected benefits in QALY terms are the same across older and younger patients. The paper examines six proposals, both from the philosophical and the health economics literature, that will lead to such conclusions. These are: the so-called fair innings arguments, and the fair innings weights, the DALY age weighting, the biographical life span, and the prudential lifetime account. Two questions are addressed regarding each of these. One is, what is the reason for choosing the younger patient when the benefits are equal; and the other is, whether the younger patient will continue to be chosen even when the benefits to the older patient is larger. The paper studies the relationship between these proposals and explores their possible implications for QALY maximisation.

key words: age weights, ageism, fair innings, QALYs

no. of tables: 2; no. of figures: 3

length of main text: 5200 words

length of summary: 170 words

1. INTRODUCTION

Some have argued that treating QALYs as being equal no matter who gets them reflects an egalitarian judgement, and that the QALY concept is therefore equitable. Others, most notably Harris, have criticised QALYs for discriminating against the aged (and those with pre-existing permanent disabilities).[1] This is because, other things being equal, a “full” recovery from a given acute life threatening condition for these groups will always be smaller than a full recovery from the same condition for the young (see Figure 1). This has been referred to as “utilitarian ageism”.[2]

On the other hand, the idea that, under certain circumstances, the old should give way to the young in the name of fairness, because, by definition, the former has lived more than the latter, seems to have intuitive appeal to many. It was Harris himself that gave this idea a form and the name “the fair innings argument”.[3]

It seems as if the argument will provide a justification for the utilitarian ageist aspect of QALY maximisation. Nevertheless, regarding the extent to which this may be the case, McKie and others have concluded that the fair innings argument is not compatible with QALY maximisation.[4] The reason for this is that, if his expected QALY gains are larger, QALY maximisation requires that the *older* patient is saved, rather than the *younger* patient. The fair innings argument will never favour such a decision.

Then, is this the end of the relationship between the fair innings argument and QALY maximisation? In an article in *Health Economics*, Williams has proposed weighting QALY gains

differently based on the fair innings argument.[5] “Fair innings weights” are to reflect people’s aversion to inequality in lifetime QALYs and the willingness to sacrifice some overall efficiency for a more equitable distribution of health. Since people’s expected lifetime QALYs increases with survival, the weights will decrease with age to reflect this fact.[6]

The objective of McKie et al. was to see whether the proponents of QALY maximisation could appeal to the fair innings argument in order to justify its utilitarian ageism, and this was found impossible. The approach of Williams, on the other hand, is founded from a different perspective. He is not arguing to justify utilitarian ageism with recourse to the fair innings argument, but is arguing to combine the two together with a view to balancing efficiency and equity concerns. The result of this is that, under certain conditions, a younger patient will be saved even when her expected net benefits are no larger than the elder’s are.

There are several ways in which we may want to save a younger patient rather than an older patient. Such preferences have been elicited from the general public.[7] The purpose of this paper is to examine six different formal concepts, including the original fair innings argument and the fair innings weights, under which the same will happen, and to explore the different reasons for which this should be so.

Throughout the next section, let us suppose that there are two individuals[8] competing for a life-saving treatment, without which they will shortly die. One of them, *he*, is “old” while the other, *she*, is “young”,[9] which are defined by the number of years they have already lived. Their ages will not necessarily reflect their particular life expectancy in the sense that, while the cure obtained

from this life-saving treatment will result in a complete recovery of health-related quality of life, this will not provide a complete recovery of life expectancy relevant to their age group. Whenever a “cut-off age” is involved, she is younger than and he is older than this threshold age. All other things, including the costs for treating each of the patients, are assumed to be equal, and there are no uncertainties to be involved. Further, the nature of the thought experiment allows for no scope for redistributing the resource in question. Finally, the treatment is to provide full health, and therefore maximising QALYs gained is equal to maximising life years gained.

2. BEYOND UTILITARIAN AGEISM

There are several reasons why we may want to save her (i.e. the younger patient) rather than him (i.e. the older patient), despite her benefit from treatment is no better than his, and this section will present six such proposals. They are: the original, the relative, and the extended forms of the fair innings argument, the DALY age weighting, the biographical life span, and the prudential lifetime account. They are summarised in Table 1. Regarding each of these, there are two questions asked:

what is the *reason* for choosing her when the benefits in life year terms are equal, and whether she will *continue* to be chosen even when his benefits are larger than hers.

The first situation is illustrated in Figure 2, and the second in Figure 3.

Below, the first three proposals are those with some threshold age, beyond which older patients are not chosen for life-saving treatment. The second three are those where the change in eligibility

comes more continuously.

2.1 The Original Fair Innings Argument

As was mentioned above, it was Harris that first gave the fair innings argument a formal assessment. The main point in the argument under his formulation is that we may set some amount of life years as a “fair innings” and say that, supposing we had to choose between saving the life of somebody above this age and somebody else younger, other things being equal, we should save the life of the younger person, who otherwise will not be able to enjoy the fair innings. We will refer to this formulation as the Original Fair Innings Argument (denoted OFIA hereafter).[10]

Harris himself argues for valuing lives (not life-years) equally, which amounts to assigning an equal weight to what remains of one's life no matter what its expected quantity or quality, as long as the person wishes to go on living. If the two competing patients both want to live, a coin should be tossed. OFIA “would only operate as a counsel of despair” where one person has already had a fair innings while the other has not, and it was impossible to save both: a case he hopes, rather optimistically, is “rare”.[11] If both are aged above, or both below, the fair innings, OFIA is irrelevant to the situation. Since she is below and he is above the fair innings, OFIA is applicable to our example case. The result will be that she should be saved in Figure 2, for an equity reason. She will continue to be saved, in Figure 3, even when her benefits are smaller than his are, because according to Harris, the number of life years gained is irrelevant.

2.2 The Biographical Life Span

The concept of Biographical Life Span (hereafter BLS) presented by Callahan[12] is similar to OFIA in that they both set a fixed age as a cut off point. Nevertheless, note that the reasons for these two arguments are rather different. Callahan stresses the nature of health care and of life that, though medical technology may continue to progress, enabling us to control certain diseases and delay death, always pushing the frontier ahead by marginal proportions, there is no hope for abolishing diseases and death altogether: there will always be diseases and death, and there will always be a frontier. Considering the costs this entails, and the fact that to live longer and more healthily is not the only way to live a better life, Callahan argues for the necessity of setting reasonable limits to health care, one strong candidate criterion being age. BLS is assumed to be set around the late 70s to the early 80s, but this should be open to public discussion. The central aim of medicine should be to avoid premature death for those under BLS, and to avoid pain and suffering for those over BLS.

This implies that all life saving treatment should go to those who have not reached BLS (i.e. she), while those over BLS (i.e. he) will not be offered any as a matter of general rule, irrespective of the expected gains. Recall that according to Harris, people ought not be denied life saving treatment if they wish to go on living, no matter what age, and OFIA-based rationing is for cases where one patient is over and the other is below the fair innings, cases which he hopes are only exceptional. Further note that the primary concern of BLS is sustainability and affordability of health care as a society, and the value of living a good satisfactory life as an individual. Fairness across different

individuals regarding age of death is of secondary interest, if any. Thus, while Harris and Callahan share the same conclusions regarding our two example cases, this is for starkly different reasons and purposes.

2.3 The Prudential Lifetime Account

Daniels proposes to re-frame the inter-personal and inter-generational issue of different concurrent age groups competing for limited resources into an intra-personal and inter-temporal resource allocation issue, by adopting a “lifespan approach”.[13] To live is to age, passing through alternate ages one by one: a 30-year-old today will (unless he/she dies prematurely) in 40 years’ time be age 70. This transformation implies that the relevant criterion changes from inter-personal justice to intra-personal prudence: for example, supposing a 70-year-old is treated differently from a 50-year-old, if the former has been treated 20 years ago as the 50-year-old today, and if the latter is to be treated 20 years hence as the 70-year-old today, then this does not necessarily generate some age-biased inequality. Thus, the issue of allocating scarce resources between different age groups is transformed into one between different stages in our own lifespan, no longer one between *them* and *us*. The obvious condition for this approach is that whatever allocation pattern chosen stays stable over our lifespan.

This approach is used in the form of a “prudential reasoning”, a scheme akin to the veil of ignorance, but not as restricted as the latter. Here, fully informed deliberators are to allocate a fixed fair share of resources to each life stage so as to maximise lifetime well-being. Against this

background, Daniels proposes the Prudential Lifetime Account (hereafter PLA). The purpose of health care is to secure a fair equality of opportunity to everybody, and this implies that resources ought to be allocated so that each can achieve a “normal lifespan”. Daniels argues that, faced with a particular resource constraint, rather than to allocate resources to extend life beyond the normal lifespan for those who have reached it while a substantial number of people die prematurely, prudential deliberators will choose to give priority to let as many people as possible to reach the normal lifespan, and to impose age-based rationing of life-saving treatment beyond it. The reason why prudence dictates such a choice is because deliberators will want the best chance to live out their life plans, and life plans, whatever they are, are most likely to be achieved in the normal lifespan rather than in half the time, or double this.

Strictly speaking, PLA is restricted (or, “framed”) and is not to cross the boundaries between persons to deal with distributive justice. Nevertheless, if we assume that PLA has been in practice for generations, and that we can appeal to it in order to choose between our two example patients, then the conclusion will be the same as OFIA and BLS: save her, and not him, in both Figures 2 and 3. The primary reason for this decision is prudence.

2.4 The DALY age weights

The three theories presented above employ a cut-off point, where people will be treated very differently depending solely on which side of the threshold their age is. Under the three following theories, priority is also affected by the size of the benefit.

The DALY (Disability Adjusted Life Year), designed by Murray and used by the World Bank, is a unit, akin to QALYs, with which to calculate the Global Burden of Disease.[14] The age weights of DALYs are to reflect how people in general are supported by others during infancy and at an advanced age, but support others during adulthood. This relationship, called “welfare interdependency”, is assumed to apply universally when the size of disease burden is calculated. The weights are to reflect the general tendency in welfare interdependency between different ages.[15] The age weights are expressed by a hump shaped curve, which starts at zero for new-borns, increases rapidly to a peak at age 25, and then gradually declines, but never reaching zero. Thus, for example, being bedridden for one year counts as a larger loss if it happens to a 30-year-old, and counts as a smaller loss if it happens to an 80-year-old.[16]

The effect of the weights is such that (unless both patients are children) the social value of life from a given number of years to her is always larger than the value of life from the same number of years to him.[17] Therefore, when the benefits in life year terms are the same as in Figure 2, maximising DALYs gained will require to save her rather than him, based on an efficiency argument. Under Figure 3, where her benefits in life year terms are smaller than his, there will come a point when her larger weights will no longer outweigh his larger benefits. Beyond this point, it will become more efficient to save him, and not her.

2.5 The Relative Fair Innings Argument

Harris’ formulation of OFIA does not in fact emphasise there being a fixed cut off age, and in

examining its shortcomings, he explores the possibility of what we here will refer to as the Relative Fair Innings Argument (hereafter RFIA). Instead of setting a fixed number of life-years as a fair innings, this prescribes that in any situation where a choice has to be made between saving the lives of two different people, the younger must be saved no matter the difference in the two people's age, other things being equal.[18] This distinction between OFIA and RFIA is important, because, as we will shortly see, they may lead to different conclusions in certain cases.

Harris is not in favour of this Relative version. His reason for it is that, while it may be just to choose to save the life of a person who otherwise will not live some fair innings in place of another who has already done so, it seems "invidious" to give priority to somebody merely because she is younger than him by marginal degrees.[19] Instead, RFIA was taken up by Lockwood.[20] Lockwood argues for the relevance of age in life saving situations without reference to a certain fixed number of life years.[21] It is "inequitable" that she should die early with less life years while he, who already has lived more, should live longer yet, and hence the relevance of age in allocating life saving treatment. Lockwood sums up by pointing out that the problem with QALY maximisation is that "[i]t fails to be ageist when it should be, rather than being ageist when it should not",[22] implying that simple utilitarian ageism is not enough. Regarding our example, for equity reasons, RFIA will save her in Figure 2. It is straightforward that it will continue to do so, as long as her age of death is below his present age.

What RFIA will prescribe for the case of Figure 3, where her expected age of death with treatment is larger than his present age, is unclear.[23] Under OFIA, she will be chosen. This is because, on

one hand, if he is saved, the result will be such that only one of the two will achieve the fair innings, the one who had already reached this without the treatment; if, on the other hand, she is saved, then both patients will have achieved the fair innings. Under OFIA, the fact that she will eventually die at an age beyond where he will die now should be of a secondary importance compared to one extra person reaching the fair innings. Nevertheless, unlike OFIA, RFIA cannot simply prescribe to save her. This is because without a specific cut-off age, RIFA cannot claim that treating her will yield the benefit of one more extra person achieving the fair innings. To the contrary, if her gains are large enough, treating her will result in enlarging the difference in age of death between the two patients, which RFIA should give some weight to.[24] Therefore, while OFIA will always choose her, RIFA is less certain.

2.6 The Extended Fair Innings Argument

Williams re-formulates the fair innings argument using microeconomic concepts. Assume there are n people in the community and that the present situation is represented by a point in an n -dimension space, as a vector of each individual's expected lifetime QALYs. Further, define "overall health" as the simple sum, or the average, of these lifetime QALYs. Supposing the people are indifferent between the present situation and another situation, where overall health of the community is smaller but variation across individual health within the community is also smaller, then these two points should lie on the same iso-welfare contour convex to the origin. This implies that people are willing to forego overall health for more equality in lifetime QALYs. Assuming a

social welfare function with constant elasticity of substitution, Williams defines the fair innings in terms of QALYs as the point on this contour where lifetime expected QALYs is the same for all individuals.

The fair innings weight applied to health gains of each individual is defined as a function of his/her present expected lifetime QALYs, the fair innings, and the curvature of the social welfare function so that, if his/her expected lifetime QALYs at present age falls short of (exceeds) the fair innings, the weights are larger (smaller) than 1.[25] Since expected lifetime QALYs increase gradually with survival, the lifetime longitudinal profile obtained (i.e. the age weight profile) will be downward sloping. Let us refer to this as the Extended-FIA.

In order to apply EFIA to our example, we need to know what the patients' prospects of achieving the fair innings are. His case is straightforward: since he is assumed to have already had the fair innings, his overall prospects are better than simply achieving this, and therefore his weight is less than 1. On the other hand, note that, while she has not actually reached the fair innings, this alone will not automatically give her a weight larger than 1, because her life expectancy may be large enough to reach it. It is the fact that, without the treatment, she will die shortly and not reach the fair innings that gives her a weight larger than 1. Since, in Figure 2, benefits in life year terms are equal for both, she, with a larger weight, will be given the life-saving treatment, based on fairness[26].

Under Figure 3, where her benefits are smaller than his, it will be a matter of whether her larger weights will outweigh his larger benefits. There will be a point beyond which equity will be

traded-off for efficiency, and then, he will be saved, not her.

3. DISCUSSION

There are three important perspectives from which to discuss these six proposals. One is with reference to their underlying reasons, another is in regard of the cut-off point, and the third is by examining their compatibility with a QALY maximising framework. Each of these is discussed below. Table 2 is a summary of who shall be saved under life-saving and health improving contexts respectively, and for what reason.

3.1 Underlying reasons

Regarding the underlying reasons for their conclusions, the six proposals can be divided into two groups. One is of those for which the fairness is a major concern: OFIA, RFIA and EFIA belong to this group. Amongst these, while OFIA and RFIA are solely concerned with fairness, EFIA is concerned with both efficiency and fairness, and explicitly trades off between these two major objectives.

The other group consists of those that are not concerned with fairness: the DALY age weights, BLS, and PLA belong here. We have already seen that the purpose of the DALY weights is to reflect the general pattern of welfare interdependency. The background assumption is that healthy people of different age contribute to social value at different rates, and these are captured by the age

weight function. So this is entirely an efficiency-based system of age weighting. BLS and PLA are also concerned with efficiency, but, as we shall presently see, not of the same kind as the DALY age weights.

The major concern of BLS is what is good for both individuals and a society. To aim for eternal life in perfect health is not considered a good worth pursuing, because it is unattainable, and even if it was, it does not mean a happy, good life. To the contrary, we need to set some limits to modern medicine, and patient age is one clear criterion for this. Fairness does have a secondary role to play, which demands to invest in the health of disadvantaged groups in order to bring their level of health up to what others have already achieved. Nevertheless, age based rationing is not being introduced so that the resources could be redirected to promote this.

As has been noted above, the theoretical structure of PLA is such that the inter-personal problem is reformulated as an intra-personal inter-temporal matter. The concern for equity will be an issue during the implementation of PLA, because this will inevitably involve treating people differently depending on the cohort they belong to. Nevertheless, once PLA has been in practice for long enough, age based rationing of life-saving is carried out without reference to fairness or justice across people of different age.

Are BLS and PLA based on efficiency concerns? In a broader sense of the term, they are. They are not aimed to maximise the output from individual health care interventions, but they are forwarding methods to best promote a given objective, namely, to maximise peoples' chances of achieving a threshold age.

3.2 Choosing a cut-off point

While the DALY age weights and RFIA have no particular cut-off points, the remaining proposals assume a certain threshold. The thresholds of OFIA, BLS and PLA are literal “cut-off” points, and people are treated with a difference of life and death depending on which side of the threshold they find themselves.

As was mentioned above, these cut-off points are related to some idea of a sufficient amount of time or opportunity to live out a full life or a normal lifespan or a decent lifeplan. The implied idea is that there are widely applicable cycles or stages in life, and that there comes a time when life can be expected to reach some plateau. There are two things to note.

Firstly, in a society where half the people died before reaching, say 50, the relevant threshold age will likely be set around 50 or even less. The reason why OFIA, BLS, and PLA assumes the threshold age to be around 75 to 80 appears to be because late seventies, rather than 60 or 95, is around when the median death of a cohort occurs in industrialised countries today. It is only reasonable for people in general to expect themselves to live to what is average in their community, and to form their life goals accordingly. Further, once such a cut-off age were in actual practice, people would account for this to form their life plans. Then, the level of these plateaux and thresholds will indirectly and implicitly depend on the local prevailing patterns of mortality. Secondly, these three proposals assume to apply the same cut-off age to everybody. Amongst people at the cut-off age, there will be those who actually have reached this satisfactory stage in life,

and those who have not. The implication will be that, if people have been given an equal sufficient chance, whether in fact they achieve to reach this plateau is of secondary concern in this context. These two points taken together undermine the appeal to lifeplans and stages of life, because it seems more straightforward to relate these threshold ages to mortality patterns, without the intermediary references.[27]

On the other hand, there are two things to note regarding the threshold in EFIA. Firstly, under EFIA, people are not treated with stark difference depending on whether they have or have not crossed the threshold, because the fair innings weights are a function that is continuous at the threshold. The fair innings in EFIA is not a “cut-off”, but simply a standard level of lifetime QALYs to refer to when the weight applied to each individual is calculated.

Secondly, the notion of a fair innings under EFIA does not refer to the amount of time being sufficient for internal, personal aspirations. The fair innings, here, is explicitly determined by the prevailing distribution of age of death (or of lifetime QALYs) and by the extent to which people find this inequitable. Therefore, the threshold of EFIA directly and explicitly depends on actual life expectancy. What each individual actually manages to achieve in his/her life, and whether in fact the given level of QALYs is enough for most to reach any significant stage in life is of no relevance under EFIA, and therefore these are not mentioned.

3.3 Going beyond the life-saving context

So far, we have studied cases where two patients are competing for life-saving treatment. Let us now consider the following two elements for each of the six proposals. The first is the treatment of non-fatal conditions, and the second is whether they are compatible with QALY maximisation.

Regarding non-fatal conditions, two patients are to be competing for health improvements that do not affect life expectancy. Two examples will be used as test cases, parallel to the life-saving context. One is where the benefits to the two patients are to consist of the same improvement in QALY terms: for example, the two patients will, if treated, enjoy the same improvement in HRQOL for the same length of time. The other is where his benefits are larger than hers are: for example, the duration of the improvement is longer for him than for her.

If a proposal is not irrelevant to non-fatal conditions, then it may be possible to combine it with QALYs, which essence is to treat fatal and non-fatal outcomes as commensurable. QALY maximisation addresses a particular efficiency problem (viz. maximise health gains measured in terms of QALYs subject to an exogenous resource constraint), which is not necessarily the sole concern for social policy regarding health care resource allocation. Each of these six proposals represent different values that may or may not be accounted for along side QALY maximisation, and the issue here is to examine how feasible this may be, if at all.

Let us begin with OFIA and RFIA. Since these are targeted to life-saving situations, they are irrelevant to priority setting concerning non-fatal conditions. Further, OFIA, and probably RRIA, are incompatible with QALY maximisation. One reason for this conclusion is that they have no

regard for differences in life years gained, nor quality of life.[28] Another important consideration is the way in which these are formed for restricted cases where there are two particular patients and where saving one will carry as the explicit opportunity cost the life of the other. Broadening the context of OFIA to a more collective level will involve statements such as nobody over the threshold age should be given life-saving treatment. This will correspond to BLS, discussed below.[29] Also note that this broadening cannot be done with RIFA, since this does not pose a cut off age.

BLS and PLA are indifferent between a younger patient and an older patient in a non-fatal context, because people eligible for health care in non-fatal conditions on an equal footing, irrespective of their age. If BLS and PLA are to be combined with QALY maximisation, this may be done in such a way so that life years that are gained by treatment beyond the threshold age are given a zero weight. Regarding treatment that improves both health *and* life expectancy above the threshold age, improvement in HRQOL up to the originally expected age of death can be incorporated in the QALY calculus, but further QALYs that are generated by extending life beyond this will not be incorporated. Note that it is not the patient's present age that affects this zero-weighting, but it is whether the base line expected age of death (estimated at the point of appraisal) lies beyond the threshold age or not that matters: for example, if a 50-year old who is expected to live to 80 (beyond the threshold age) received a treatment that would improve her HRQOL and extend her life expectancy by 3 years, then QALYs that belong to these additional 3 years would be given a weight of zero. If a 80-year old who is expected to live to 83 received a treatment that would improve his HRQOL and extend his life expectancy by a further 2 years, then only the HRQOL improvement between ages 80 and 83

would be calculated. This shows that it is possible to combine BLS or PLA with QALY maximisation.

Regarding EFIA and non-fatal conditions, it is useful to distinguish three different cases depending on the relationship of the fair innings weights of the two patients: where the two have the same weights, where her weights are larger, and where his weights are larger.[30] Firstly, EFIA with equal fair innings weights is the same as simple QALY maximisation. Both EFIA and simple QALY maximisation will be indifferent between the two patients when benefits are the same, and choose to treat him when his benefits are larger. Secondly, EFIA, when her weights are larger, will choose to treat her when benefits are equal, but when his benefits are larger, the choice will depend on whether his larger benefits will outweigh her larger weights. The same will apply to DALY age weights. Thirdly, under EFIA when his weights are larger, he will be chosen over her, in both cases. As this shows, it is obvious that the DALY age weights and EFIA can be combined with QALY maximisation: what they propose are in essence, *weights* for QALYs.

3.4 Conclusion

The proposals studied here are all dissatisfied with utilitarian ageism of simple QALY maximisation: they argue to go further and to favour saving her (i.e. the younger patient) when her expected benefits are no better than his (i.e. the older patient's). Some of them continue to save her even when his benefits are larger than hers, while others at some point switch from saving her to saving him. Roughly three underlying objectives to these proposals were identified. One was

fairness: it is unfair that some people should die young while others live longer. The second was efficiency: people contribute to collective welfare at different rates, and this rate depends, on average, on people's age. The third was another kind of efficiency: to maximise people's chances of reaching a given threshold age.

QALY maximisation is not designed to and therefore not capable of offering the unique and best answer to health care resource allocation problems. What it does is to offer recommendations that will maximise aggregated QALY gains under a given resource constraint. People, or the relevant decision maker, may also have other concerns to take into account, such as the fairness in terms of age of death, or collective welfare other than aggregated health per se, or affordability of the health care system; in which case cost-effectiveness in terms of simple QALYs will not be the sole decision criterion. Four of the six proposals studied can be combined with the QALY maximisation approach to reflect these additional concerns accordingly.

Tables

Table 1: Forms of ageism

name	notation	reference	characteristic
simple utilitarian ageism			maximisation of aggregated expected QALYs all QALYs are equal regardless of whose they are
original fair innings argument	OFIA	Harris(1985, 1988, 1994)	no life-saving beyond threshold age for use under restrictive circumstances
biographical life span	BLS	Callahan(1987, 1990)	also called “natural life span” (Callahan, 1987) no life-saving beyond threshold age pain/suffering always to be taken care of
prudential lifetime account	PLA	Daniels(1988)	intra-personal inter-temporal prudential framework no life-saving beyond threshold age fair equality of opportunity for “normal” lifespan
DALY age weighting	DALYs	Murray(1994, 1996)	no specific cut-off age hump shaped age weights applied to life years equivalent to <i>age weighted</i> QALYs
relative fair innings argument	RFIA	Harris(1985) Lockwood(1988)	no specific cut-off age save the life of younger patient unclear when younger has very large benefits
extended fair innings argument	EFIA	Williams(1997)	fair innings based on efficiency/equity trade-off weights based on prospects of achieving fair innings <i>fair innings weights</i> for application to QALYs

Table 2: Whom to choose when she is younger and he is older †

	life saving		health improvement		primary concern
	same benefit	his benefit larger	same benefit	his benefit larger	
QALY max and EFIA: equal weights	indifferent	save him	indifferent	treat him	efficiency
OFIA	save her		irrelevant		fairness
BLS and PLA	save her		indifferent		good, prudence
DALY max	save her	depends	treat her	depends	efficiency
RFIA	save her	save her? ‡	irrelevant		fairness
EFIA: her weights larger	save her	depends	treat her	depends	fairness
EFIA: his weights larger ¶		–	treat him		fairness

† *She* is younger than, and *he* is older than the threshold age, wherever relevant.

‡ Under RIFA, the conclusion is unclear when her benefits are large enough to let her die beyond his present age, while OFIA will always choose her.

¶ Under life-saving, the example with “same benefits” and the example with “his benefits larger” are incompatible with his fair innings weight being larger. Further, for both life-saving and health improving treatment, it is where his weights are larger than hers and *her* benefits larger than his (a case we are not studying), that the results will “depend” on whether his larger weight will compensate for his smaller benefit.

Figures

Figure 1: QALY maximisation is utilitarian ageism

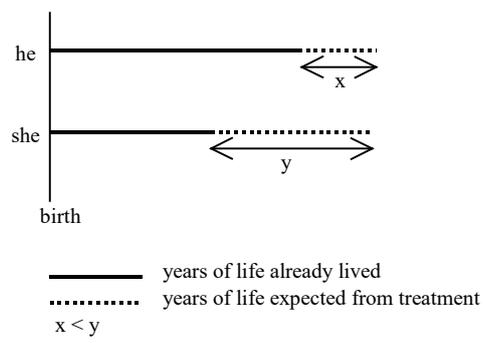


Figure 2: We may still want to save her (the younger patient), when her expected benefits are no better than his (the older patient)

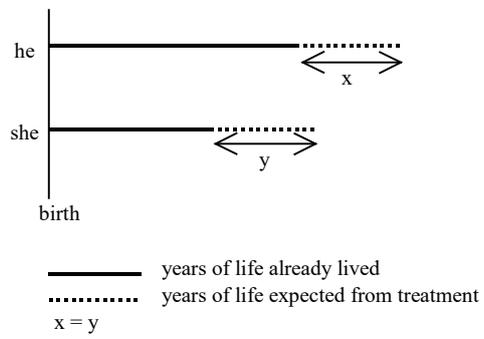
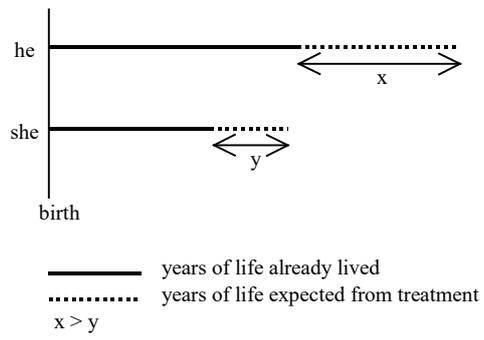


Figure 3: Will she continue to be chosen, even when her expected benefits are smaller than his?



Notes

1 See, for example, Harris, J. QALYfying the value of life, *Journal of Medical Ethics*, 13:117-123, 1987; Harris, J. More and better justice, in Bell, J. M., Mendus, S. eds., *Philosophy and Medical Welfare*, Royal Institute of Philosophy Lecture Series 23, Cambridge University Press 1988; Evans, J. G. Rationing health care by age: The case against, *British Medical Journal*, 314:822-825, 1997.

Note that the criticism should be addressed to QALY maximisation than to the health outcome measure QALY. Some authors do not distinguish between these two, which is confusing, especially when cost is not explicitly mentioned.

2 Nord, E., Richardson, J., Street, A., Kuhse, H., Singer, P. The significance of age and duration of effect in social evaluation of health care, *Health Care Analysis*, 4:103-111, 1996. Throughout this paper, the term “ageism” is used to mean disadvantageous treatment of the old, without any implication regarding its moral or political acceptability.

3 Harris, J. *The Value of Life: An Introduction to Medical Ethics*, Routledge, 1985, p.87f.

4 McKie, J., Richardson, J., Singer, P., Kuhse, H., *The Allocation of Health Care Resources: An Ethical Evaluation of the ‘QALY’ Approach*, Ashgate Publishing, 1998

5 Williams, A. Intergenerational equity: An exploration of the ‘fair innings’ argument, *Health Economics*, 6:117-132, 1997.

6 Nevertheless, since different population subgroups have different overall life expectancies, note

that a person from an advantaged subgroup is given less weight than a person *of the same age* from a disadvantaged subgroup.

7 There are several studies that explored this possibility on the empirical front. See for example, Busschbach, J. J. V., Hessing, D. J., de Charro, F. T. The utility of health at different stages in life: A quantitative approach, *Social Science & Medicine*, 37(2):153-158, 1993; Cropper, M. L., Aydede, S. K., Portney, P. R. Preferences for life saving programs: How the public discounts time and age, *Journal of Risk and Uncertainty*, 8:243-265, 1994; Johannesson, M., Johannesson, P-O. Is the valuation of a QALY gained independent of age? - Some empirical evidence, *Journal of Health Economics*, 16: 585-599, 1997; Nord, E., Richardson, J., Street, A., Kuhse, H., Singer, P. The significance of age and duration of effect in social evaluation of health care, *Health Care Analysis*, 4:103-111, 1996; Tsuchiya, A., The value of health at different ages, *Journal of Health Care and Society*, 6(3):123-136, 1996 (in Japanese). These studies quantify the extent of age-related preferences. Also see Tsuchiya, A. Age-related preferences and age weighting health benefits, *Social Science and Medicine*, 48(2):267-276, 1999 for a review of the empirical findings.

8 The assumption of two *individuals* is equivalent to the assumption of homogeneous groups, and the assumption of *two* individuals is partly for simplicity and partly due to the way the issue has been treated in the existing literature. There is no doubt these, and the remaining assumptions, are extreme abstractions compared to the real world.

9 Needless to say, the particular distribution of the genders between the two patients is entirely

immaterial to the substance of the argument.

10 Literally, the version of OFIA advocated by Harris does not refer to an explicit age as a fixed cut off point, but a more vague idea of whether people have “already lived full lives” or not, as judged by “reasonable people” (*ibid.*, p.94). Nevertheless, what is relevant here is that OFIA requires one to have reached some specific point in life to be considered to have had a fair innings. Throughout this present paper, OFIA is to have a specific threshold defined in terms of age, and those above (below) this are assumed to have (are not to have) achieved a full life. Also see note 27 below.

11 *ibid.*, p.94, p.101.

12 Callahan, D. *What Kind of Life: The Limits of Medical Progress*, Georgetown University Press, 1990. See also Callahan, D. *Setting Limits: Medical Goals in an Aging Society*, Simon and Schuster, 1987, where he refers to the same concept as the Natural Life Span.

13 Daniels, N. *Am I My Parents' Keeper? An Essay on Justice between the Young and the Old*, Oxford University Press, 1988. Also see Daniels, N, *Just Health Care*, Cambridge University Press, 1985

14 For details of DALYs, see Murray, C.J.L. Quantifying the burden of disease: the technical bases for disability-adjusted life years, in Murray, C.J.L., Lopez, A. D. eds., *Global Comparative Assessments in the Health Sector*, World Health Organization, 1994; Murray, C. J. L. Rethinking DALYs, in Murray, C. J. L., Lopez, A. D. eds., *The Global Burden of Disease*, Harvard University Press, 1996; World Bank, *World Development Report 1993: Investing in Health*, Oxford University

Press, 1993

15 Apart from age, welfare interdependency may well be affected by, for example, occupation and income, but weights adjusting for these are not employed in DALYs. This is because people experience different ages on an equal footing as they go on living, and differential treatment by age is not the same as differential treatment by these elements.

16 Note that the difference arises from the difference in the relative value of a healthy year at different ages. The ratio of loss due to a given disability to full health is assumed to be the same across all ages.

17 The social value of life for her may be smaller than that for him if, for example, she is age 5 and he is age 10, because the function is hump shaped with a peak at around age 10, and the value for age 0 about the same as the value for age 20. For details, see references on DALYs.

18 *op.cit.*, p.92.

19 Harris maintains that a fair innings is only satisfied when it is achieved, and cannot be satisfied in portions. For example, supposing 70 years was the fair innings, then somebody dying at 40 years cannot be said to have had a “fairer” innings than another dying at 30 years (*ibid.*, p.92). Nevertheless, note that this argument is valid only when one presupposes that there is such a thing as a *fixed* fair innings. Further, OFIA may be subject to the same criticism, namely, that it is also invidious not to save his life simply because he is older than the threshold by some marginal degree (a point made by one of the anonymous referees).

20 Lockwood, M. Quality of life and resource allocation, in Bell, J. M., Mendus, S., eds., *Philosophy and Medical Welfare*, Royal Institute of Philosophy Lecture Series 23, Cambridge University Press, 1988.

21 As such, this perhaps should no longer be referred to as being a variant of the fair innings argument. Nevertheless, both Harris (1988, p.93) and Lockwood (*op. cit.*, p.50) refer to this (i.e. the format *without* a specific cut off age) as the fair innings argument.

22 *ibid.*, p.54. Also see Kappel, K., Sandøe, P, QALYs, age and fairness, *Bioethics*, 6(4):298-316, 1992, and Kappel, K., Sandøe, P, Saving the young before the old — A reply to John Harris, *Bioethics*, 8(1):84-92, 1994 for an argument very close to RFIA.

23 Lockwood himself does not discuss this case.

24 See Harris, J. Does justice require that we be ageist? *Bioethics*, 8(1):297-316, 1994, where Harris seems to think that if we follow RFIA then we should save her conditional to her being killed when she reaches his present age: a condition which is absurd and hence, concludes Harris, RIFA must be unsupportable. If we do not allow this, then RFIA may have to choose to save neither patient (a possibility pointed out by one of the anonymous referees).

25 If people are unconcerned with distribution of health and there is no trade-off, then the contour will be a straight line and the present level of average lifetime QALYs will be the fair innings. In this case, since the contour is a straight line, all weights will be equal to 1.

26 Since those with permanent or long term disabilities will have a smaller prospect of achieving the

fair innings than those without disabilities, the former will be given a larger fair innings weight, other things being equal. While this does not overturn the so-called double jeopardy argument, it does indicate the extent to which the argument will be accounted for in QALY maximisation.

27 This conclusion does not apply to the literal version of OFIA as advocated by Harris. This is because it sets the fair innings as whether one has had a “full life” or not, and age itself cannot determine whether one has achieved the fair innings in this sense. Note that it is not the chance or opportunity that one has had, but the actual achievement of a full life that is the issue here. Also see note 10 above.

28 In fact, one implication of Harris’ position is that there should be no recourses allocated to the treatment of non-fatal conditions while there are people dying from treatable conditions despite their wishes to go on living, and this applies regardless of the magnitude of HRQOL improvements forgone, or in other words, costs.

29 It will nevertheless be difficult to apply the literal version of OFIA advocated by Harris to the policy level, since whether one has reached the fair innings is to be determined individually, not categorically by one’s age. Individual vs. categorical treatment is an important issue regarding ageism, but is not addressed in this paper. There are arguments throughout Callahan, 1994 in favour of categorical treatment. For an argument against categorical treatment in the context of ageism, see for example Evans, 1997.

30 Under the life-saving scenario, the first and third cases do not apply. This is because the

assumptions are such that her fair innings weight is larger than 1 and his weight is smaller than 1.

They become possible under the health improvement context, because , depending on their lifetime expected QALYs, it is possible for her fair innings weight to be larger than his, despite her present age being less than his.