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Biases distorting priority setting

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ABSTRACT

Modern health care faces an ever widening gap between technological possibilities and available resources. To handle this challenge we have constructed elaborate systems for health policy making and priority setting. Despite such systems many health care systems provide a wide range of documented low-value care while being unable to afford emerging high-value care. Accordingly, this article sets out asking why priority setting in health care has so poor outcomes while relevant systems are well developed and readily available. It starts to identify some rational and structural explanations for the discrepancy between theoretical efforts and practical outcomes in priority setting. However, even if these issues are addressed, practical priority setting may still not obtain its goals. This is because a wide range of irrational effects is hampering priority setting: biases. By using examples from the literature the article identifies and analyses a wide range of biases indicating how they can distort priority setting processes. Overuse, underuse, and overinvestment, as well as hampered disinvestment and undermined priority setting principles are but some of the identified implications. Moreover, while some biases are operating mainly on one level, many are active on the micro, meso and on the macro level. Identifying and analyzing biases affecting priority setting is the first, but crucial, step towards improving health policy making and priority setting in health care.

1. Introduction

The rapidly widening gap between technological possibilities and available resources has boosted the relevance of priority setting in health care. Principles for priority setting are postulated [1,2], procedures have been elaborated [3], and many countries have priority setting regulations in place. Moreover, tools for assessment, reassessment, and disinvestment are widely available [4–6].

In particular, there is increased attention on eliminating low-value health services in order to assure access to high-value care [7–12]. A series of drivers of poor medical care have been identified [13–17] and specific solutions are suggested [18–25]. For example, low-value care lists have been elaborated, promoting and facilitating disinvestment and reinvestment [14,15,26–31]. Recommendations from NICE (Do-not-do list), Choosing Wisely, and in Australia [15] together identify 1350 specific low-value technologies [32]. Correspondingly, high-value technologies and services are not implemented [137]. However, despite vast challenges and extensive efforts, the outcomes of practical priority setting are scarcely documented [33–35]. Why is this so? This is the key question of this study. That is, why are the outcomes of priority setting so poorly documented, e.g., in reducing low-value care, when the principles, regulations, and tools for priority setting are fairly well developed?

This question is addressed by first briefly reviewing some rational explanations for the discrepancy between theoretical efforts and practical outcomes in priority setting. Then I turn to non-rational explanatins, investigating a series of biases in the assessment and implementation of health technologies and services that tend to hamper practical priority setting. I argue that ignoring these effects is a mistake in priority setting, and that revealing them is the first, but crucial, step towards making priority setting more aligned with its own aspirations.

2. Why priority setting lacks traction

There may of course be a wide range of reasons why priority setting does not have the same traction in practice as in theory. The most obvious reason is that the outcomes of priority setting may be difficult to measure or that its evidence may be poor. However, this explanation does not hold, as low-value care is well documented [14,15,26–31,36].

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Moreover, the principles of priority setting may be difficult to specify and apply [37,38]. There may be strong interests or forces countering priority setting [39], and the structure and context of the health care system may hamper its practical processes. The rules and regulations for priority setting may not be known, difficult to interpret, disputed, rejected, ignored, or disrupted. Lack of incentives or interaction between the health care levels (micro-, meso-, and macro-) and the complexity of the health services may also explain the lack of success [35,40]. So may the fact that even small adjustments in practical health care may demand large-scale changes, due to the pervasiveness, depth, and size of the services [41].

It may of course also be argued that the situation would have been much worse without priority setting and that the theory-to-practice gap may be a problem of abundance, i.e., that the health care in highly "developed countries" have implemented all high-value care and their adoption of low-value is a result of excess. However, the latter two explanations lack empirical support. Given the financial hardship of all health care systems, a great number of high-value care is not offered, and a vast volume of low value care still provided. Hence, the "excess explanation" does not seem to hold.

More specifically, Scotland and Bryan give six structural explanations for why priority setting does not exclude low-value technologies: 1) because cost or cost-effectiveness evidence is not considered in reimbursement decision making; 2) technologies have been adopted prior to implementation of such value-based approaches; 3) indication creep; 4) unjustified extrapolation of cost-effectiveness estimates; 5) difficulties in changing practitioner behavior to discontinue use of the older or obsolete technologies; 6) cost-effectiveness of a technology may change over time [25].

What is common to many of these explanations for lack of successful priority setting in practice is that they can be characterized as rational and structural. So are their solutions. They demand structural or behavioral changes that are sometimes hard to obtain. However, the reason why this article will not pursue them any further is because even if we would be able to address these and other structural issues, we may still not be able to obtain "successful priority setting" [35]. The reason for this is a series of biases that appear to distort priority setting in health care, and that need to be addressed in order to provide effective priority setting in practice.

3. Biases distorting priority setting

There are many types of biases, and common to several of them is that they may lead to what is broadly called irrationality: perceptual distortion, inaccurate judgment, illogical interpretation [42,43]. It is beyond the scope of this article to review all documented biases with respect to how they may influence priority setting. I will only present a limited (but still quite large and diverse) sample of biases and indicate how they influence priority setting by giving some examples from ordinary health care. Fig. 1 gives an outline of the relationship between biases and priority setting while Table 1 gives an overview of the biases and potential implications for priority setting. What follows is an overview of potentially important biases to address in priority setting. The format does not allow an in-depth analysis of all the biases, their implications, or of potential solutions on how to handle them. Nonetheless, the overview may be an initial and inspiring step to address an important issue in health policy making. Moreover, some implications and indications of how some of the biases may be addressed will also be presented in the discussion.

The **Identifiability and Singularity effect** occurs when a single patient in front of the health care professional or on the front-page of the newspaper emotionally "takes priority" over the many thousands that also may be in need [44]. One example is when individual patients or patient groups get access to very expensive treatments without evidence after media appearance. Empirical studies show a "bedside effect" in rationing, where respondents rationed to a greater extent at a policy level than at a bedside level [45]. When the individual and proximate patient trumps all non-present and more remote patients general priority setting principles, such as justice and equity, are undermined [46]. This bias connects to "compassion collapse," "empathy decline," and other related effects well described in the psychology, behavioral economics, and risk handling literature [47]. While the duty to the identified and present person is understandable from an emotional and proximity ethics point of view [48], the Singularity effect may trump priority setting principles, such as severity, effectiveness, and efficiency, and bypass established procedures and hence distort priority setting.

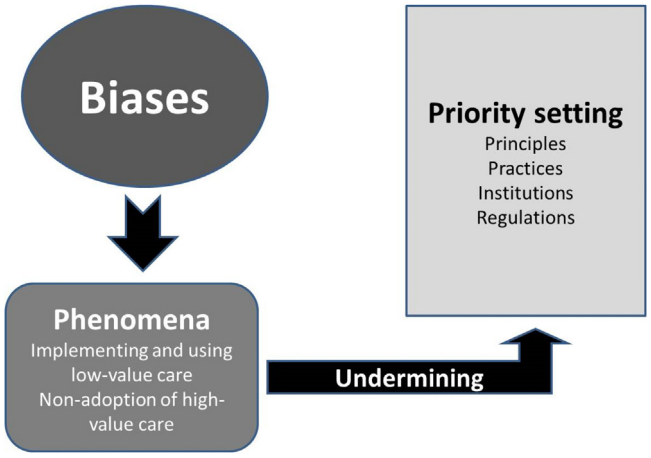

Fig. 1. Outline of the relationship between biases and phenomena (irrational decisions) that occur in health care and how they undermine priority setting. Three tasks appear important for avoiding this effect, i.e., revealing, addressing, and handling biases.

Another bias potentially distorting priority setting is **Rejection Dislike**, which stems from the fact that no one likes being rejected or to reject others. Saying no to individual patients or patient groups or disinvesting in specific (low-value) health services may mean that some services will stop being provided. Not offering MRI or arthroscopy of the knee are but two examples [49]. Hence, some patients cannot get what they previously have been offered, and despite the fact that it is of low value, it feels bad to take it away and thereby rejecting people. Moreover, rejection dislike is related to not being generous, but to be stingy. Therefore, priority setting can be connected to the feeling of taking something away, denying a welfare good, rationing, and being stingy.

3.1. Failure embarrassment effect

This is a bias resulting from the fact that no one likes to admit to have been wrong or behaved foolishly. The history of medicine is full of examples where futile or even harmful treatments have provided for a long time, even when inefficiency were known [50,51]. Percutaneous coronary intervention performed for stable coronary artery disease and hormone therapy prescribed for postmenopausal women [52] are but two examples. Priority setting, and in particular disinvestment, implies that we may have provided patients with low quality care, which is not compatible with the professional integrity and self-conception of many health professionals. This may be one of many reasons why clinicians, health managers, as well as health decision makers are hesitant with priority setting and obtain modest outcomes.

Table 1
Overview of various biases and potential implications for priority setting and at which level they may be most prominent.

Bias	Potential Implications	Level
Identifiability and Singularity effect	Undermining principles	Micro
Rejection Dislike	Hamper disinvestment	Micro, meso
Failure Embarrassment effect	Overuse	Micro (primarily)
Prominence Effect (Opportunity Cost Neglect)	Non-warranted use	All
Status Quo Bias	Overuse, Underuse	All
Endowment Effect	Overuse, Underuse	Micro (primarily)
Loss Aversion	Hamper disinvestment	All
Aversion to Risk / Ambiguity	Overuse	Micro, meso
Availability Heuristics	Overuse	Micro, meso
Sacred Values and Taboo trade-offs	Undermining principles	All
Progress bias	Overuse	All
Adoption Addiction	Overuse	Micro, macro
Complexity bias	Undermining principles, overuse	Micro, meso, macro
Extension bias	Overuse	All
Asymmetry of risks and benefits	Overuse	Micro (primarily)
Positive cognitive feedback loops	Undermining principles, overuse	Micro, meso, macro
Prestige bias	Undermining principles, overuse	Micro (primarily)
Imperative of Action	Undermining principles, overuse	Micro (primarily)
Technology Placebo Effect	Undermining principles, overuse	Micro (primarily)
Imperative of Knowledge	Overuse	Micro
Competency Effect	Overuse	Micro
Multiple Replacements	Overuse	Micro
White Elephants	Overinvestment	Micro
Boys and Toys Effect	Unwarranted use	Micro

Hence, as far as priority setting is associated with rejecting, taking away, or having behaved foolishly, we tend to be inclined to avoid such situations (both individually and collectively). This can help us to explain our moderate outcomes in priority setting, but also point to important tasks of priority setting.

3.2. The prominence effect

This is the effect from the tendency that one dominant factor determines the decision-makers' preferences. Situations in clinical practice as in health policy making are complex, and taking all aspects into account is demanding. Hence, reducing complexity by highlighting one (or a few) aspects eases the process. However, this hampers rational priority setting. One way that this can play out in priority setting is what has been called the *opportunity cost neglect* [53]. We assess the beneficence for the present patient, but not what we could have done for those who are not present. Another example is cancer screening programs that have focused on benefits in terms of increased survival and disease-specific reduced mortality while ignoring overdiagnosis [54].

3.3. The status quo Bias

This is a cognitive bias which describes the irrational preference for an option only because it preserves the current state of affairs [55]. Many people may have an *aversion to change* (conservativism) making people avoid alteration [56]. As far as priority setting implies changes, the status quo bias may hamper priority setting. It may make it difficult to abandon futile or low-value services [52] but also to adopt new and efficient ones [57]. The *Status Quo Bias* is associated with the *Endowment Effect*.

3.4. The endowment effect

According to this effect which we tend to overvalue what we already have got compared to alternatives. In economic terms: "the fact that people often demand much more to give up an object than they would be willing to pay to acquire it" [58]. Hence, the technology or health service that we have assessed and implemented, been trained to use, become familiar with, and which partly constitutes our professional identity tends to be valued higher than other technologies; even if evidence can show that the alternative technology is better. Arthroscopic surgery for degenerative knee may be but one example [59]. The Endowment Effect in turn is related to an asymmetry of value expressed as *Loss Aversion*.

3.5. Loss aversion

According to this effect we feel uncomfortable with loosing what we have, or in economic terms "the disutility of giving up an object is greater that the utility associated with acquiring it" [58]. A related bias is *the sunk cost effect*, according to which we have a tendency to continue a behavior because we have invested resources in it, such as time, money, or competency [60]. This is exactly what we may fear is happening in priority setting, especially in disinvestment and rationing. To stop giving adrenaline in situations of out-of-hospital cardiac arrest is difficult even if there is little evidence for the long-standing practice [61].

Other related effects are **anticipated decision regret** [62] and **better safe than sorry**. For example, the fear of doing too little may be greater than the fear of doing too much (Fear Asymmetry), which may be related to defensive medicine and what has been called the "popularity paradox" [54,63]. Excessive laboratory tests and unwarranted [64,65] imaging are but two examples of this [66,67], and where priority setting principles may be bypassed or overruled.

Aversion to Risk and **Aversion to Ambiguity** [56] are aversions to dangers or uncertainties that may make us resist priority setting, e.g., in terms of curbing the use of diagnostics. We cling to making extra blood tests or excess imaging even though they will not increase our knowledge or change the clinical pathway because we are afraid of missing something [65].

Other cognitive biases that are relevant for priority setting is the **Anchoring Effect**, where the decision-maker is relying too much on initial information, and not on more hard-to-get high quality evidence [56].

Correspondingly, **Availability Heuristics**, can make diagnostics or treatment option considered to be important because they are available. This phenomenon is easily observed in radiology, where there is a strong correlation between available modalities and the number of examinations [68,69]. The proverb "scan because you can" [70,71] is telling. Despite extensive awareness of "Roemer's

law" ("A built bed is a filled bed") [72] few effective measures are in place to counter it.

Yet two other biases are what have been called **sacred values and taboo trade-offs**. According to the first there are some values, such as saving a person's life, which people are knowingly reluctant to trade-off no matter what the harms and benefits of doing so may be [73,74]. Correspondingly, to trade off health against (material) consumption is considered to be taboo [53]. Clearly, a strong urge to save lives, no matter what, infringes priority setting principles. These biases relate to the identifiability and singularity effects.

According to the **Progress Bias** we experience a strong propensity to promote what is considered to be progress [75]. Although one might think that a strong belief in progress would promote change, leaving old technologies obsolete when embracing new ones, there is an accumulative effect in practice. We tend to think that science in general and medicine in particular progresses by adding new technologies and services, not by reducing or removing old ones. Expansion and addition is part and parcel of progress.

3.6. Adoption addiction

Related to Progress Bias one can observe very strong beliefs in positive outcome of advanced technologies [57,76] and an urge to adopt new technologies [25]. This biases assessments and decision-making towards implementing and applying technologies and is related to phenomena such as "denial of the need for disinvestment" [77] and to use technology for other purposes than intended without documentation of outcomes. Diagnostic imaging is again a good example, where technology that is developed to *detect somatic disease*, such as MRI, is used to treat *mental* conditions, such as health anxiety, or to confirm *health* rather than detecting disease [78–80].

3.7. Complexity Bias

This is a tendency to think that advanced systems and technologies are better than simple ones. A great number of technologies identified as low-value care are advanced or hi-tech, while high-value care are low-tech. Complexity bias provides one explanation for the extensive use of hi-tech low-value care [32]. It seems to counter our intuition that advanced technologies could be ineffective, inefficient, or even harmful. However, such tendencies (of thought) can undermine rational priority setting by unwarranted implementation and use of health services.

The **Extension Bias** is a tendency to think that more is better than little [81], for example in terms of more monitoring or more tests. While there are many examples of where more diagnostics and more treatment certainly are good for individuals' and population health, lessons on overdiagnosis and overtreatment has taught us that this is no general rule. Extension bias certainly challenges resource allocation. Moreover, *extension bias* may be supported by *loss aversion* (see above) as measures to counteract the extension bias, e.g., by restricting access to technology, may be seen as values being taken away. One explanation for the fact that we tend to think that *more is good* can be found in metaphorical theory [82], according to which we tend to have an ingrained tendency to value extension.

There is also an **Asymmetry of risks and benefits** as we tend to understand risks and benefits in very unbalanced and biased ways [83,84]. Accordingly, technologies and services may not be assessed in an unengaged way [85]. The risks of low-value technologies appear to be underestimated while the benefits may be overestimated. Screening services may be but one example of this [86–88]. Certainly, biases in the assessment of risks and benefits can distort priority setting and even make it appear counterintuitive or unnecessary.

3.8. Positive cognitive feedback loops

The assessment and handling of medical technologies tend to generate imperatives. For example, increasing the accuracy of diagnostic tests may lead to the detection of milder cases, which when treated in turn increases the success rate [80,89,90] and thereby promotes innovations to increase the diagnostic accuracy. Any measures that counter this experience of success appear counterintuitive, "irrational," and regressive and thereby can hamper priority setting. Finding and successfully treating more disease obviously appears to be a good thing. If this results in spectrum shift, indication creep, overdiagnosis, and overtreatment then it undermines priority setting.

3.9. Prestige bias

Yet another effect that can influence priority setting is the fact that specific diseases and technologies differ in status and prestige. In particular, diseases (and the corresponding specialties) that are organ-specific, action oriented, acute, and involve the application of advanced technology have higher prestige than others [91,92]. Extensive monitoring of vital organs, even when there is little evidence for the outcome [93,94], is but one example of this. This may certainly result in implicit and tacit priority setting, making us reluctant to disinvest in anything that is associated with progress, action, and control, and conversely, to invest in low-tech approaches to diffuse chronic conditions.

3.10. Imperative of action

Another such tendency, is expressed by the traditional medical phrase *ut uliquid fiat* (something must happen), i.e., that action is better than inaction. Modern health care, and technology in particular, is associated with actionability, and reducing readiness to action can be conceived of as plummeting professional stamina. The extensive and futile use of technology at the end of life, is but one example of this [95]. This Imperative of Action can be connected to *Roemer's Law* (see above) as well as the tendency to use technology as a placebo.

3.11. Technology placebo effect

It is well documented that technology has or enhances the placebo effect [96–98]. As already mentioned, we use diagnostic technology therapeutically, and sometimes we use somatic diagnostic technology (imaging) to treat mental conditions in physicians (litigation anxiety). When the Technology Placebo Effect is high its overall effect may be considered to be significant even if documented (placebo-controlled) effect may be small [99]. This may explain the extensive use of a wide range of low-value technologies, including several kinds of surgery [98], and it can hamper or undermine rational priority setting.

3.12. Imperative of knowledge

A related effect is fostered by professionals experiencing a series of new technologies entering their professional scene all the time. New methods and technologies are usually experienced as a continuous progress. This can be because technology is associated with innovation, advance, action, control, and optimism [100–103]. Accordingly, any arrangements countering this forward-flow of advancement appear counterintuitive and regressive. Hence, to the extent that priority setting appears stifling it is conceived of as

something negative (and to be avoided). In the field of diagnostics this is expressed as an *Imperative of Knowledge*, e.g., in terms of that "to know is better than not to know" [104] While knowledge certainly is a good thing in health care, false positives, incidental findings [105], and overdiagnosis [90] undermine the universality of this benefit. Nonetheless, we want to know, and tend to think that early detection is better than late [106]. Therefore, to reduce such technologies appears counterintuitive and opposes professional norms and values [107]. Thus, it may undermine priority setting.

3.13. The competency effect

This effect is connected to the need of training and education. In order to maintain competency in the use of specific technologies (and the status of certain specialties) professionals need to practice. Accordingly, procedures are sometimes carried out that are less warranted and of low value to the patients [31]. This *Competency Effect* can counter rational priority setting.

Several effects countering priority setting can be observed in the use and management of medical technologies in everyday clinical practice. **Double (or multiple) replacement** is but one example: an ultrasound machine is "replaced" because it is "outdated," "provides low quality images," or "is dangerous." However, the old machine is kept as a backup. After a while, the old machine re-enters the daily practice, e.g., due to high demand. After some time, it is argued again that it is "outdated," "provides low quality images," and "is dangerous" and needs replacement again.

"**White Elephants**" are technologies that are implemented in order to attract a special group of professionals, to keep individual professionals happy, or to entice patients, but where the technology may not be of any or little value to patients' outcome. Various types of imaging devices or equipment for specific surgical procedures are but two examples. Unfortunately, there are many examples of technologies that have been acquired and maintained for many years without ever being used. This generates opportunity costs and challenges priority setting.

What has been called the **"Boys and Toys Effect"** is where technologies, such as surgery robots, have been implemented not because of their effectiveness or efficiency, but because of their attractiveness to professionals and patients [108]. This effect can be related to the fact that the requirements for documented effectiveness and efficiency has been different for devices than for drugs [109]. Certainly, the fun-factor is important in every employees daily life. However, when what is fun for the professional does not increase the health of patients, and, on the contrary, generates opportunity costs, it becomes a problem for rational priority setting in practice.

4. Discussion

Hence, there are a wide range of biases that can counter, obstruct, or distort priority setting processes. They may result in overuse, underuse, and overinvestment, and may hamper disinvestment and undermine priority setting principles. Moreover, biases are operational both on micro, meso and macro level, but this varies with the different biases. Being aware of such biases and their potential effect on practical priority setting is the first step towards addressing and handling them. As such this overview can be useful. However, it is by no means exhaustive.

4.1. Many more biases

In general there are more than 150 biases identified in a number of fields [110]. Even though, not all of these may be relevant for priority setting, many more than those included here may be relevant. Certainly, social pressures (**Bandwagoning**) frequently studied in Human Relations can be relevant [111]. The same goes for **Context Errors** that are well known from clinical decision making, e.g., when the physician is not able to see the context of the patient's condition and makes erroneous diagnostic or therapeutic judgements [110]. **Present bias**, discounting future events [112], and **mental accounting** are yet two other.

4.2. There is much more to say about each bias

However, the point here has not been to generate an exhaustive list of biases, but to give some examples to illustrate how different biases and imperatives can affect priority setting in different ways. Moreover, the description of the biases and their effects is quite brief. Every bias and its influence on priority setting have to be investigated in further detail. However, this is beyond the scope of this article that mainly aims at drawing the attention to and providing an overview over the biases that can distort priority setting. Relatedly, another important issue beyond the scope of this study is whether all biases are bad. No doubt, several biases function as heuristics helping us to make decisions fast [42]. However, the biases included in this study are selected because of their distortive potential, and hence may appear as morally and rationally bad (as in Table 1). Moreover, many of the examples are from excessive use of technology. As already underscored, biases may also hamper the implementation of high-value technology. The status quo bias is one example of such a bias and telemedicine is one example of such a technology [57]. Hence, biases can also undermine priority setting by non-adoption. The reason why most examples are from excessive use of technology may be that they stem from health care in affluent countries (where there is a rich literature). Situations are very different in other health care settings. This bias in example may be one that this author shares with many people in the so-called "developed world."

4.3. Classification of biases

Correspondingly, the point with this study has not been to go into the diverse and detailed debates on the classification and relationship between various types of biases, but rather to point to some effects that appear to be relevant for explaining and handling the apparently irrational priority setting. Future work may want to categorize biases in priority setting in the same way as Gretchen Chapman divides decision biases in medical decision making into three different types; strategy based, association based, and psychophysical based biases [113]. While strategy based biases are applied because they make decisions faster or easier, association based biases bring together information (by association) that is not relevant for the decision, and psychophysical based biases result from non-linear mapping of physical stimuli to psychological representation [114]. It is also possible to analyze distorting factors to priority setting in terms of other frameworks, such as imperatives [115], inertia [116–119], as technological drivers/imperatives [78,120–122] and in terms of human deficiencies [123]. One may also apply dual-system theories in cognitive and social psychology [42,124–126] to analyze the ways of thinking that may distort priority setting. For example, one may think that biases belong to the fast, affective, intuitive, and non-analytical System-1 mode of thinking and that they distort the slow, deliberative, and analytic System-2 mode of thinking in priority setting. However, biases do not always result from System 1 modes of thinking and System 2 thinking does not always provide the rational answer [126]. No doubt, these issues are important and interesting, but beyond the scope of this article.

4.4. Context matters: priority setting and theoretical framework

Moreover, this study has analyzed the effects relevant for priority setting in general. Other, related, and more specific fields could have been studied as well, such as implementing high-value care, reassessment, disinvestment, decommissioning, and withdrawal. While the effects of biases on these more specific issues certainly is of great interest, such analysis merit their own and more specific studies. Correspondingly, the space has not allowed an extensive analysis of the effects revealed here and "implicit rationing" and "hidden rationing."

Another important issue that is not covered here is placing the effects within specific theoretical frameworks. For example, many of the effects can be elaborated from conceptual-metaphorical theory [82], according to which concepts are established by metaphors. For example, the concept of argument is constituted by the metaphor of war, as is evident from statements like "winning an argument." If this is how biases are established, i.e., through metaphors, this may have implications on how we may address them. Theoretical framing is certainly interesting and important, but has to be addressed more explicitly in more dedicated studies.

4.5. How do the various biases hamper or undermine priority setting?

This study only provides some examples of how the various biases interrelate and hamper or undermine priority setting. More in-depth analyses are necessary, but beyond the scope of this study. This study is a modest first step to prepare for and motivate more elaborate studies.

It may well be argued that priority setting is not a rational or principle based matter, but involves a wide range of other non-rational aspects. I fully agree with this. Here I have only taken the rational and principle-based accounts of priority setting into account that are claimed by the field itself and used to justify its activity. A wide range of biases or heuristics may be warranted in priority setting, but they would have to be explicitly justified.

4.6. What can we do to avoid or hamper biases and promote rational priority setting?

Certainly, the issue of how to handle the biases in order to promote rational priority setting is giant next step and well beyond the scope of this work. However, something can be said about this in order to stimulate this important work. First, there already exist a series of advice on debiasing in general [111,114] and for health decisions in the clinical setting in particular [127–129]. Several of these may be relevant for the health policy context, such as "stopping rules," check-lists," and "cognitive forcing strategies." Moreover, specific suggestions to reduce cognitive biases within special fields are available, such as decision support to reduce diagnostic errors [130–132] and interventions to improve clinical reasoning and decision-making skills [133]. Other suggested strategies are "cognitive huddles, narratives of patient harm, value considerations in clinical assessments, defining acceptable levels of risk of adverse outcomes, substitution, reflective practice and role modelling, normalisation of deviance, nudge techniques and shared decision making" [134]. Additionally, there exist tests that are elaborated to detect specific biases. For example, a test has been developed to identify and counteract the progress bias [75]. In general, identifying biases is a first step to address them. Hence, openness and transparency are important. However, biases are not like trolls: they do not explode when they are exposed to sunshine. The reason for this is that biases are trolls inside us. But revealing the biases amongst and within us forces them to hide like the trolls for the sun, hopefully doing less harm. Hence, despite the study's limits with respect to providing specific solutions, it nourishes an underlying belief that revealing, acknowledging, analyzing, and addressing the effects of biases is a good thing and a prerequisite to improving priority setting. Hence, the study implies that priority setting is more than deliberative application of principles and guidelines – and it explains why the priority setting outcomes have been slow and hard to obtain. We need to address distorting factors in order to obtain well-reasoned priority setting measures to provide the best care to patients. Against this, one can of course argue that it is not possible to eliminate biases [135,136], or that biases and heuristics are efficient ways to handle uncertainty [138]. Another objection would be to claim that "biases and heuristics pose a serious threat to autonomous decision making and human agency" [136] and that rational and deliberate priority setting is an utopian game that should be abandoned. Correspondingly, one could argue that the strong belief in our ability to eliminate or reduce the effect of the various biases in priority setting is itself an unwarranted preconception and a bias. However, for the time being I think we have too poor empirical evidence to abandon deliberative priority setting, and that we meanwhile improve the deliberative process as much as we can.

5. Conclusion

Given the rapidly widening possibility-provision gap and the extensive use of low-value care in the health services this article set out asking why the outcomes of priority setting are so poorly documented in health care while principles, regulations, and tools for priority setting are comparably well developed and readily available. The initial assessment identified several rational and structural explanations for the discrepancy between theoretical efforts and practical outcomes in priority setting. However, even if these and other barriers are addressed, practical priority setting may still not obtain its explicit goals. The reason is that a wide range of biases can hamper or distort priority setting. Biases can result in overuse, underuse, and overinvestment; it may hamper disinvestment and undermine priority setting principles. Biases are operational both on micro, meso and macro level, depending on each bias. They can explain the extensive use of low-value care and direct our efforts to free resources for high-value care. Addressing these biases is crucial for improving priority setting – both in practice and for theory – and especially to provide good health care. A first step towards doing so is to reveal and acknowledge the biases involved.

Declaration of Competing Interest

I am the sole author of this manuscript. The manuscript is sent exclusively to you, has not been previously published elsewhere, and is not currently under review elsewhere.

I certify that there is no conflict of interest in relation to this manuscript, and there are no financial arrangements or arrangements with respect to the content of this manuscript with any companies or organizations.

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