Personalised Medicine and Scarce Resources: A Discussion of Ethical Chances and Challenges from the Perspective of the Capability Approach

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Abstract

In the aftermath of the economic crisis that started in 2008, resources have become scarcer than ever in some countries, also in health care. Priority setting and rationalisation of existing resources also affect pharmaceutical innovations, including those that would contribute to what is called personalised medicine. In this paper, we will highlight the ethical issues surrounding rationalisation and its impact on personalised medicine through the lens of the capability approach. Thereby, challenges to and opportunities for personalised medicine will be examined, assessing how they affect patients' 'real options' to access innovative therapies. In our focus on the 'first challenge: citizens and patients' of the so-called Strategic Research and Innovation Agenda, the strength of the capability approach becomes particularly apparent in identifying what different values are at stake in this context.

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Introduction

In the aftermath of the economic crisis of 2008, resources have become scarcer than ever in some countries, also in health care. Besides the impact of austerity policies in various European countries on general health care service provision (as e.g. in Greece [1]), priority setting and rationalisation of existing resources furthermore affect the development and implementation of pharmaceutical innovations – as, for instance, the promising concept of personalised medicine. Personalised medicine has been hailed as a strategy to achieve the key goal of medicine: to provide the right person with the right care at the right time [2]. However, there is no common definition of personalised medicine yet, and there is a dispute about what should actually be understood by the term 'personalised medicine' [3]. While this already exemplifies an ethically relevant discourse about the promise and reality of personalised medicine and the inclusion of a person's values and ideas in the course of treatment, we refer to the definition by the European Commission's Horizon 2020 Advisory Group [4], which states: 'Personalised Medicine refers to a medical model using characterisation of individuals' phenotypes and genotypes (e.g. molecular profiling, medical imaging, lifestyle data) for tailoring the right therapeutic strategy for the right person at the right time, and/or to determine the predisposition to disease and/or

to deliver timely and targeted prevention'. Accordingly, improvements in patient care are realised by optimising care for the individual by choosing the most promising therapy and to eliminate futile therapies including side effects on the basis of genetic and molecular knowledge about the patient.

Additionally, it is becoming more and more apparent that the wide field of personalised medicine is increasingly divided into two strands, namely stratified medicine on the one hand and personalised medicine on the other. While stratified medicine labels the approach that defines certain subpopulations at the cohort level according to shared biomarkers, personalised medicine aims to focus on the individual patient 'using omics and related technologies (e.g. imaging) and based on computer models and simulations' [5]. Combining omics and technologies such as imaging is expected to achieve the greatest potential for personalised medicine [5, 6].

The innovative concept of personalised medicine is expected to offer several advantages over conventional therapy. Early diagnosis, prevention, and thus safety and quality for the patient are anticipated to be improved [7]. These changes also denote a paradigm shift in medicine [8] from a 'one-size-fits-all', top-down approach towards an 'individualised' bottom-up approach. This approach would also, as some argue, need to include 'big data analytics of personal data in which the effects of a particular treatment protocol and prevention strategies can be assessed based on distinct diagnostic parameters' [5].

It remains questionable in how far such an innovation, which is often deemed to be a costly treatment [9], is affected by the current climate of austerity and scarcity of available resources. Among the questions that arise in this context of scarce resources and pharmaceutical innovation is the following: under what conditions are new investments justifiable? Especially when investments are high and outcomes are still indeterminate to some extent, there is great uncertainty about what to do and whether it is morally right to invest in these kinds of innovation. This ambiguity is even exacerbated when a therapeutic innovation only benefits few people (i.e. only those with fitting genetic biomarkers or profiles).

However, it has been stated that by individualising care, health care systems will be more sustainable, since wasting will be reduced by cutting unnecessary treatment costs via genetic profiling [10]. Beyond its use in cancer therapy – a field in which personalised medicine pioneered [7] – personalised medicine can also be applied to therapies for other diseases. However, a cancer prevalence of 14 million cases worldwide for all types of cancer

as well as related costs of treatment of 5% of total expenditure on health in 2012 already show the magnitude of cancer treatment expenses [11, 12].

In general, the accomplishment of personalised medicine is hindered by several factors: the fragmentation of efforts on an international scale, differing national regulations, a non-universal definition and evidence base for personalised medicine, and a wide spectrum of stakeholders, just to name a few [5].

In this paper, we will highlight the ethical issues surrounding scarce resources and rationalisation and their impact on personalised medicine by taking three different stances: we will shortly assess the development from a utilitarian point of view, followed by a libertarian perspective – two theories that traditionally span the spectrum of normative-ethical theories – and finally and mainly through the lens of the capability approach (CA) by Sen [13], which holds the potential to cover the normative blind spots of the other theoretical perspectives. In doing so, we will examine the ethical implications of the challenges to and opportunities for personalised medicine, thereby identifying what different values additionally are at stake in this regard.

Ethical Chances and Challenges Resulting from Scarce Resources: Utilitarian and Libertarian Perspectives

Various questions expressing ethical concern have emerged in the last years with regard to the fair use and implementation of personalised medicine. McGowan et al. [14] identified four main categories of ethical concern as regards personalised medicine in an extensive interview study with 117 experts from all stakeholder groups in the field of personalised medicine. These categories included the topics of (1) difficulties in reaching informed consent on clinical cancer genomic testing, (2) ensuring privacy and the confidentiality of genomic test results, (3) safeguarding access to genomic testing and therapies, and (4) the costs of rising personalised cancer therapies.

As the latter two issues have not been dealt with to the same extent as the former two, and in view of the as yet unclear consequences of the economic crisis of 2008 on the development and implementation of personalised medicine, we will in the following specifically assess the issues of access (topic 3) and costs (topic 4). Which chances and challenges did the circumstances of strict austerity in some countries bring to personalised medicine?

As Caplan [15] stated, an ethical infrastructure for implementing personalised medicine is much needed. Therefore, the different aforementioned theoretical perspectives will be applied in order to highlight the ethical issues at stake. The utilitarian approach is often seen as being the most relevant to questions concerning public health, so that Powers and Faden [16] even call it the 'standard view', since it focusses on best outcomes and efficiency. The libertarian approach, on the other hand, represents the conventional free-market view, demanding no regulation from governments – or at least as little as possible – but liberal and competitive markets. With both approaches, a normative spectrum is covered and controversial ethical issues can be identified.

The utilitarian point of view presents the maxim of choosing the action which results in maximal utility for the greatest number of people [17]. With regard to personalised medicine, the utilitarian view holds that large investments in new therapies should be avoided when opportunity costs are incurred and/or when there is uncertainty about the beneficiaries of the investments. Opportunity costs refer to the forgone options to invest in more conservative treatments, treatments that benefit more people in the short run or treatments or care arrangements for other conditions than cancer, such as for instance mental health or elderly care [18]. With regard to the last, the question arises whether it is ethically justifiable to invest in personalised medicine or whether existing resources should rather be allocated to other developments in the health care sector. A utilitarian perspective – *prima facie* – could support cheaper one-size-fits-all therapies instead of personalised medicine, assuming that (for the time being) this is more efficient, so that the maximum number of individuals can access – and, if possible, also benefit from – those therapies, even if there remain some people who are not or only suboptimally treated. Therefore, the focus of a utilitarian perspective is more on investing in treatments for common diseases and not for 'rare diseases' or cures that require rare genotypes, as those do not yield a benefit for the maximum number of people within a foreseeable time.

In contrast to the utilitarian perspective, libertarianism highlights individual liberty and demands that there be as few constraints to individuals as possible, no matter what the (population health) outcome of this will be. This would also lead to a more radical free market, which again implies freedom for industry to make the investments they deem promising – mostly in the sense of making profits. For libertarians, purchasing goods is an individual matter; the market regulates the price, and access to

goods is an individual issue, not a social responsibility. In this context, all regulatory interventions by the state have a high burden of proof of being justifiable, so that a free market with competitive characteristics is ensured. Moreover, the libertarian perspective is critical of government subsidies – which stem from tax money – for research done by industry, since market-oriented competition should not be interfered with and new developments should be led by industry.

Unlike the two approaches just briefly introduced, the CA embraces the plausible norm of focusing on equality of opportunity, but in this case even from a more special perspective. The question asked is the following: how do new approaches based on personalised medicine affect patients' 'real options' to benefit from innovative therapies?

The Capability Approach

The CA was termed by Amartya Sen in the 1980s and is seen to be relevant to the moral assessment of social arrangements. It can thus be used as a normative framework for analysing and evaluating individual and population well-being and the respective social developments and policies on the basis of how they affect people's 'capabilities' to achieve a life they have reason to value [13, 19, 20]. Capabilities are understood as all the potential 'real' options that a person can choose from in order to lead a good life and therefore achieve a good quality of life [19]. Therefore, capabilities are also termed 'real opportunities' or '(positive) freedoms'. The traditional economic metrics for measuring human progress (as e.g. growth in GDP per capita) are thus widened with the CA, which captures progress or development as an increase in real opportunities.

Sen argues that it is morally relevant to assess what people can really do with the goods or options they receive (considering their personal circumstances), placing a special focus on potential outcomes (i.e. what an individual can realise with the goods he or she receives). Realising a certain capability is thus termed an 'achievement' or 'functioning' according to Sen [13]. People can thus attain a specific set of 'functionings' chosen from real options (or capabilities) on the basis of their own personal values.

Noteworthy in this approach is that it is essential that people have the choice of whether or not to make use of their capabilities. The example of a fasting and a starving person elucidates the value of choice in this regard; they

might be in a similar physical state with respect to their nutrition and health levels, but one can eat but chooses not to do so, whereas the other has no freedom to make this choice.

In Sen's view, choices must be fully informed, deliberate, and consciously made decisions. The value of real freedom (perceived as a real opportunity) to achieve a good life also becomes particularly important in this approach [21].

Besides the distinction between capabilities (freedoms and options to choose from) and functionings (achieved outcomes), Sen bases the CA on another distinction, namely between 'means' and 'ends'. While means signify the requirements to reach ends and are instrumental in attaining certain ends, ends are valuable in themselves, and as such are central to the CA when assessing pharmaceutical innovation in view of scarce resources. However, in some cases there are no strict lines of demarcation between means and ends, as capabilities can also be ends as well as means to other capabilities. For example, being healthy is an end as well as a means of being able to work [13]. Given human diversity, means such as income to different degrees enable people to either develop valuable capabilities (opportunities) or transform them into functionings (achievements). The ability to transform means into functionings – if valued – is described by the term 'conversion factor' [22]. By placing a special focus on the ends and simultaneously assessing the means, it is possible to examine the extent to which people's situations influence their ability to realise pursued ends [22].

Within the context of scarce resources and the impact on personalised medicine, the CA can be used to test whether resources (or means) to reach good health exist. In a basic sense, this would imply, for instance, access to fresh water, adequate food supplies and medical care, a basic understanding and knowledge of health-related matters, protection mechanisms from infectious diseases or other illnesses, and preservation of human dignity [19, 23]. In terms of personalised medicine, the resources and means would, for instance, be access to personalised therapies through insurance coverage or sufficient income, understanding genomic information, and possessing the decision-making capacity to choose the 'right' therapy.

Factors influencing these capabilities range from economic and financial resources to social structures, institutions and norms, traditions, and political practices [13]. Social and political structures can also be a key influence regarding inequalities between different social groups. In addition, personal dispositions, preferences, and differ-

ences in access to resources, institutional arrangements, as well as genomic disparities can be sources of inequality [24]. Nussbaum [25] adds in her extension of the CA that the question of how many resources one has to have in order for these resources to be considered 'sufficient' from a moral point of view depends on the resources and capabilities that exist in society. Thus, the real-world application of this approach subsumes a social relativist perspective [22]. It is important to note that neither does this conception of justice demand total redistribution (as Rawls' request for an equal distribution of goods or the utilitarian position would do), nor is it indifferent to 'brute luck' (as a libertarian position would be). Rather, it requires a sufficient level of capabilities (according to social relativism).

Notably, capabilities also require the personal responsibility to act reasonably [26, 27]. In terms of health, this personal responsibility denotes a person's capability to influence his or her health status positively. In order to be able to act in a self-responsible manner, one has to be empowered or enabled to do so (e.g. by being offered health education, access to medical care, etc.) [27]. Here, Sen's approach offers a wider perspective than many liberal theories of justice (such as Rawlsian theories) that consider the distribution of and access to goods instead of asking what people can do with these goods, what they are really enabled to do with them, and to what extent these goods can really affect their capabilities. Along these lines, application of the CA allows the identification of certain issues having arisen in the wake of scarce resources that influence the application of personalised medicine. In this respect, the CA can help to clarify which goals should be prioritised in improving functionings with regard to personalised medicine [28].

Figure 1 aims to visualise the CA in the context of personalised medicine and scarce resources. It draws attention to the individual capability set, which is based on the available goods, services, and conversion factors, which can then be transformed into functionings, namely good health. The context which shapes an individual's capability set is determined by policy making – which, however, has to adapt to the overall social context. Since the economic crisis of 2008, the societal context of scarce resources has challenged even formerly well-resourced social systems of Western states, not only by its severe short-term effects but also by lasting long-term consequences that need to be dealt with, also in health care.

Having outlined the main features of the CA, we will now highlight the chances, issues, and challenges regarding personalised medicine from the CA angle.

Fig. 1. The capability approach and personalised medicine. Framework adapted from Robeyns [22] and Arndt and Volkert [36]. PM = Personalised medicine.

Chances and Challenges regarding Personalised Medicine from the CA Perspective

At first glance, it may seem that in times of scarce resources and rationalisation personalised medicine is facing more challenges than chances when assessing it from the CA perspective, because the opportunity to attain those treatments is reduced due to a lack of resources. Applying the CA point of view elucidates that financial means are crucial in obtaining personalised treatment, especially when social arrangements are established in such a way that insurances do not cover the costs of personalised medicine – which is the case in many countries in this as yet relatively unregulated field [5, 29]. An individual's conversion factor (and hence ability to realise health by undertaking the sought treatment) is thus higher when he or she has more means in terms of money to spend on the treatment. The money to spend on the treatment is accordingly more than a means, but can ultimately be regarded as an end to receive personalised treatment. In other words, money is a prerequisite to realising personalised treatment. When taking into account the means-ends distinction, it furthermore becomes apparent that treatment can also be viewed either as a means to an end – the way by which the goal of better health can be realised – or as an end in itself, when receiving the treatment is already regarded as the end despite unclear health outcomes. Especially those would regard it as an end in

itself who wish to pursue personalised medicine even when their genetic biomarkers do not match.

The fact that treatment can be received based on one's financial capability correspondingly leads to the ethical imperative – from the CA perspective – of enabling access to available and auspicious therapies. From the normative point of view, everyone who can benefit from the treatment thus should have the possibility to access and retrieve it, whatever the costs may be. The focus therein should obviously not lie on an individual's financial capability to pay for personalised treatments, but on the social arrangements – the reimbursement schemes – for enabling access.

Related to the costs of treatment is the issue of value-based pricing for personalised or precision pharmaceuticals. As regulations regarding prices and reimbursements have so far been largely uncoordinated [29], pharmaceutical companies mainly determine the prices themselves. In the German context, for instance, the Pharmaceutical Market Restructuring Act (AMNOG) was effected in 2011 with the purpose to control costs. It sets forth that pharmaceutical manufacturers can determine prices solely for 1 year; after that, price negotiations between insurers and manufacturers are possible, which on average yield results of a 10% lowering of prices [30]. However, in many cases the additional benefit from new therapies is not clear, and challenges occur from demonstrating the value of precision therapies [10]. From a moral utilitarian

perspective, one can state that asking for higher prices although an additional benefit is not clear has a high burden of proof of being justifiable. The libertarian perspective, however, sees asking for higher prices as being justifiable and solely requests that information about the additional benefit be elucidated in a transparent manner. From the CA perspective, however, requesting prices which go beyond their value in accordance to the costs of research, development, production, and marketing plus a reasonable profit margin limits individuals' conversion factors to transform capabilities regarding available therapies into the functioning of receiving these treatments due to several factors and initial situations in an unacceptable manner: if reimbursement schemes do not exist – as is the case in several countries – individuals have to pay for the therapies out of their own pocket. In this case, the conversion factor with regard to turning existing therapies into receiving them is limited, since the majority of people cannot pay those high prices themselves; it would again depend on the financial capability of individuals. If treatments are paid by insurances, capabilities are created and individuals can receive the treatment and ultimately attain better health levels. In this case, however, attention has to be paid to the long-term consequences of exorbitant prices for health systems. In times of scarce resources, such high prices are a high burden for social health care systems and might even result in exhaustion of public resources. From the position of the CA, one would argue that everything diminishing the state's capacity to enable opportunities for receiving treatments is morally ambiguous. Hence, pharmaceutical companies asking for prices which are beyond a reasonable profit margin for pharmaceuticals pose a challenge to health care systems in ensuring reimbursement schemes for – and thus opportunities for accessing – personalised medicine. From the moral perspective of the CA, demanding higher prices with no clear indication of an additional benefit is unjustifiable because capabilities are reduced.

The concern of value for money was also identified during a qualitative public deliberation study by Bombard et al. [31]. The study moreover showed that citizens are concerned about whether access to treatment is limited by the application of preliminary genetic tests [31]. They expressed the fear that genetic tests – which check an individual's genetic suitability for a particular personalised therapy – might be used to rationalise care. Their opinion was that all treatments should be made available if patients requested it. From the CA perspective, such genetic tests can indeed be seen as limiting a patient's capability to obtain cure. On the other hand, however, can

a capability be limited if a patient – assuming that the genetic test is negative and provides correct results – does not have the conversion factor, namely the genetic biomarkers, to turn the capability (of obtaining the treatment) into a functioning (being cured)? Drawing a conclusion while taking into account the perspective of the CA, it may be stated that a capability cannot be limited if an individual cannot convert it into a functioning. Thus, it is justifiable not to offer a type of targeted therapy if the genetic profile does not match and the drugs do not evoke any response. When the drug responsiveness – or, more fittingly, non-responsiveness – is also clinically proven in a thorough way, it should be socially accepted that only individuals with a fitting profile receive those drugs. This would also be in line with scarce resources and fair allocation, so that only those will receive these drugs who can really benefit from them. In contrast to the utilitarian approach, which tends towards 'one size fits all', the CA therefore proposes the use of drugs made suitable according to genetic biomarkers and hence the fair allocation of existing medical resources. Fair and reasonable allocation of resources can thus be seen as a chance when unnecessary costs are controlled.

At the research level, this fair allocation of resources moreover needs to be ensured, for instance by appropriate funding of research progress, so that also diseases which have so far not been the focus of research or which are labelled as orphan diseases receive funding, so as to advance drug research and development in these fields as well. Being in line with the CA, advances in orphan diseases should aim to create capabilities – new treatments – for these conditions as well.

Moreover, the CA might offer help in view of the abovementioned challenge of opportunity costs [18]: costs can be saved by providing personalised treatment only to those patients who can obtain a benefit according to their genetic profile. These saved costs can hence be invested wisely in other areas of health care. From the CA point of view, it is primarily important to provide the goods and services from which 'basic' capabilities can be formed. These basic capabilities are defined as the 'freedom to do some basic things that are necessary for survival and to avoid or escape poverty' [32, 33]. In the health care context, specific measures in this regard are safeguarding appropriate nutrition and basic health care provision. Secondly, the saved costs should be invested in the best care possible to cure diseases and facilitate survival. According to Nussbaum's version [25], the CA holds a sufficiency account, meaning that distributive justice should be arranged in such a way that everyone has

enough instead of adjusting and levelling up inequalities. In terms of personalised medicine, novel therapies can certainly be categorised as the best care possible to cure diseases, but they might even become necessary for survival and obtain their legitimacy of being invested in from this.

With regard to investing resources in other sectors, it is wise to focus on realising a set of capabilities. As Sen proposes, those capabilities should be ‘co-realizable’ [32]. In terms of personalised medicine, opportunity costs could occur when decisions are made to either invest in (a) more conservative treatments, (b) treatments that benefit more people in the short run, and (c) treatments or care arrangements for other conditions than cancer, for instance mental health or elderly care. The CA could help in investigating which set of co-realizable capabilities yields the best results for people to realise a life according to their goals and achieve a good quality of life. An in-depth analysis in this regard, however, goes beyond this brief outline of issues at stake.

In addition to the ethical issues occurring during the development and implementation of personalised medicine – which were predominantly identified when applying the CA – other challenges to innovations in personalised medicine regarding diagnosis, therapy, prevention, and information communication technology were identified during stakeholder dialogue platforms and meetings and stated in the Strategic Research and Innovation Agenda (SRIA) [5]. In our focus on the ‘first challenge: citizens and patients’, more issues at the individual level become evident.

A challenge of key relevance is to develop awareness and empowerment among citizens and patients. According to the SRIA, this should be achieved by increasing public engagement through enabling citizens to get actively involved in research and the development of personalised treatments. This proposal is in line with the CA, since it emphasises one of its core features: empowerment as a main element of choosing the life one values. According to the CA, empowerment can therefore be regarded as a chance to improve the implementation of personalised medicine.

Besides empowering citizens and patients, the SRIA furthermore recommends the empowerment of health care professionals, which is a key element with regard to personalised medicine. Given the fact that new treatments enter the market and treatment outcomes become more complex due to genetic variance and complexity [34], capabilities must also be offered to health care professionals to improve their understanding of these thera-

pies. Moreover, this can improve patients’ capability of accessing personalised therapies, since health care professionals can offer better advice and guidance.

Another challenge to be met is the development of more responsibility with regard to health data, not only with patients but also with researchers, industry, and policy makers. Here, the role of the personal responsibility to act reasonably, which is inherent in the CA, is emphasised.

Having outlined the chances and challenges regarding personalised medicine from a CA point of view, we will highlight the added value of the CA in assessing the development of such innovative therapies in the next section.

The Added Value of the CA in View of Personalised Medicine

The CA as a concept focussing on equal opportunities can be regarded as a useful method of exploring normative dimensions of patients’ access to personalised medicine in times of scarce resources, since the inherent emphasis of the CA on the role of patients is an added value to existing approaches in evaluating innovations in medicine. Utilitarianism, as an outcome-based theory, stresses the importance of achieved functionings and assesses whether the maximum number of people are able to receive personalised treatment – irrespective of an equal distribution of actual health benefits or the value of equality of opportunity, however. In the libertarian concept, as the other dominant ideological moral perspective, the role of ‘brute luck’ with regard to personalised medicine becomes prevalent: those who can afford personalised medicine and who can benefit from these treatments are lucky – the others, who cannot afford effective personalised treatments or for whom no personalised treatments are developed (because their condition is too rare), are unlucky. Despite their unluckiness, libertarians would claim that there is no moral demand on social structures to compensate for their situation or invest in their health.

The CA added an important feature to the predominant perspectives of utilitarianism and libertarianism, namely the importance of individual and societal freedoms or opportunities, and especially the significance of the conversion factor of genetic profiles for receiving personalised medicine. It adds to the existing approaches the principle of focussing on equality of opportunity with regard to receiving personalised medicine – a value not addressed by either utilitarianism or libertarianism – and

even extends it to how personalised medicine affects patients' 'real options' to benefit from such treatments: when applied to personalised medicine, the CA specifies that only individuals with corresponding genetic biomarkers are able to achieve a 'real benefit' from personalised treatments. In terms of scarcity of resources, it can thus be regarded as efficient to only offer treatment to those who can benefit and thus attain better health from personalised medicine, and to reduce the expenses of futile treatments for persons who do not possess matching genetic biomarkers. Conversely, questions are raised about autonomy on the one hand and real benefit on the other when a person without matching biomarkers cannot receive treatment even if he or she wishes to receive it. From the perspective of the CA, however, 'rationalising' treatments by only offering them to those who can benefit is morally legitimate. Instead of causing inequality or social injustice, introducing the conversion factor as a key prerequisite to benefitting from personalised medicine shows, from an ethical perspective, what aspects could be taken into account when developing equitable structures.

By applying the CA, also issues at stake for an increased use and implementation of personalised medicine become clear and could advise policymakers on which areas to focus upon – and maybe even about investing in personalised medicine. Accordingly, everything that facilitates the conversion of existing personalised medicine therapies into a capability set – the opportunity to make use of these therapies, if wished for – should be furthered. As previously mentioned, practical examples are improving patients' financial opportunities to receive personalised medicine by reimbursement structures that cover the treatments or regulating prices of pharmaceutical companies by means of benefit assessments as shown in Germany. Moreover, engaging in literacy and empower-

ment is key from a CA point of view, since ensuring knowledge and understanding as a basis for making the right choices promotes the freedom and capability of living a healthy life.

Genetic profiles constitute the only conversion factor that cannot be changed or influenced by social arrangements. Social arrangements in this regard can only help to promote research on personalised medicines and their development, in that a broad spectrum of research foci is covered and treatments for different types of disease may be developed. Here, again, the added value of the CA, as opposed to the ideological perspectives of libertarianism and utilitarianism, is noteworthy.

Conclusions

As outlined above, the chances of personalised medicine become more apparent. One of the advantages of using an approach such as the CA lies in the possibility to delineate chances, since it operationalises relevant theoretically developed variables for use in practice, as has also been proven when it was used in the Human Development Index (as part of such a renowned project as the Human Development Report, which is published annually by the United Nations Development Programme). Another advantage of the CA is that it not only assesses the distribution of goods or population health on an aggregate level but also shifts 'attention from goods to what goods do to human beings' [35].

Disclosure Statement

C.B. and P.S.-B. have no disclosures to declare.

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