



# “Different names for the same thing”? Novelty, expectations, and performative nominalism in personalized and precision medicine

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## Abstract

This paper explores the complementary and contrasting uses of the terms ‘personalized medicine’ and ‘precision medicine’ in denotations of a biomedical approach attentive to individual specificities that harnesses genomics and other data-intensive profiling technologies. Drawing on qualitative interviews conducted with biomedical experts in the context of the Precision Medicine Initiative in the United States and the 100,000 Genomes project in the United Kingdom, we read definitional reflection and debate through the lens of the sociologies of expectations and novelty. We observed two key aspects in the shift from ‘personalized medicine’ to ‘precision medicine’ that has been especially prevalent in the United States. First, the term ‘precision medicine’ enables its proponents to rhetorically depart from the idea that this approach to medicine can be expected to deliver *individually* personalized treatments—an expectation that is seen as unrealistic by many. Second, it enables its proponents to assert that personalization, when understood as caring about the patient as an individual person, is not a new approach to medicine but rather something that many medical professionals have always aimed to do (eliding in the process other experiences of US healthcare as, for instance, alienating and discriminatory). We argue that the shift from ‘personalized’ to ‘precision’ medicine can be regarded as a manifestation of performative nominalism: an attribution of ‘newness’ that contributes to performing and propelling innovation, rather than solely reflecting it. In so doing, rhetorical demarcations between personalized and precision medicine emerge as performatively contributing to the production of different biomedical ontologies.

**Keywords** Precision medicine · Personalized medicine · Naming · Novelty · Expectations



## Introduction

I: Do you think there is any difference between personalized, precision and stratified medicine?

R: Oh yes! Of course! They are different words for the same thing!

Over the last decade or so, institutions and scholarship across a range of countries have displayed increasing interest in the biomedical approach of ‘precision medicine.’ Studies, analyses, events, and media coverage on precision medicine have proliferated internationally. The term emerged years after the term ‘personalized medicine’ was already widespread, but precision medicine has now gained popularity that is comparable to—and perhaps exceeds—its predecessor.

Broadly, both personalized medicine and precision medicine refer to the translation of new and emerging data-intensive biomedical technologies to medical practice and healthcare delivery that take individual variability into account to tailor or target the most appropriate treatments and preventive strategies. Data-intensive techniques enable the integration and co-analysis of information from sources including population genomics, electronic medical records, environmental sensors, and lifestyle applications to construct predictive models of health and disease (Kitchin 2014). While based on population-level data, models aim to direct these into more targeted—or personalized, or precise—medical interventions for individuals or groups (Flores et al. 2013; Lupton 2013). Much biomedical research has come to focus on such approaches, synthesizing hopes and aspirations about a wider transformation in medicine and healthcare (see, e.g., Flores et al. 2013; Hood et al. 2012; Kerr et al. 2021).

Although the terms personalized medicine and precision medicine have for some time been widely—and even interchangeably—used in biomedicine and beyond, contestation remains with respect to their definitions, overlaps, and divergences (Pokorska-Bocci et al. 2014; Tutton 2014). The humorous response with which we opened this paper, made by a biomedical research leader who participated in the interview study discussed herein, highlights the ambiguity that arises from the concurrent use and circulation of different words that may seem to many to denote more or less the same thing—but which, still, are literally and potentially performatively different.

This paper employs the lenses of the sociologies of expectations and novelty to analyze how precision medicine is framed as similar to or different from personalized medicine. It demonstrates how different constructions of these terms (including as synonyms) can participate in the novelty work (Pickersgill 2021) of biomedicine—i.e., the discourses and practices by which ‘the novel’ is recognized or contested. It argues that respondents themselves reflexively characterize the strategic uses of novelty, yet in so doing also necessarily frame their responses around their own perspectives of what biomedicine is and should be. Accordingly, by providing reflexive accounts of novelty work, they also contribute to it and thereby to the promissory work of normative claims’ making about the present and futures of biomedicine.



## **'Personalized medicine' and 'precision medicine': terminological evolution and contestation**

The first official large-scale investments in research grouped under the label of personalized medicine started around 2007 in the European context. European Union (EU) funding programs included an investment of over three billion euros in personalized medicine research through the Horizon 2020 program and the Innovative Medicines Initiative (Nimmegern et al. 2017), which pinpointed personalized medicine and the development of related approaches as a research priority and a core research theme. The European Commission defined personalized medicine as a "medical model using characterization of individuals' phenotypes and genotypes ... for tailoring the right therapeutic strategy for the right person at the right time" (European Commission 2015, C42-3). The term personalized medicine, based around this definition, has since predominated within European policy discourses. Its adoption by the European Commission and organizations associated with it is connected with a wider emphasis in healthcare policy on person-centered approaches to medicine and healthcare, to which personalized medicine is seen to contribute (Erikainen and Chan 2019).

The term precision medicine has been in use since at least 2010. Since its emergence and then diffusion, it has been explicitly related by its proponents to the concept of personalized medicine. In 2011, the US *National Research Council of the National Academies* circulated a plan for advancing research in terms of precision medicine. Its authors had been tasked with "explor[ing] the feasibility and need for 'a New Taxonomy of human disease based on molecular biology' and to develop a potential framework for creating one" (ibidem, 1). The Committee indicated that a "major beneficiary of the proposed Knowledge Network of Disease and New Taxonomy would be what has been termed 'precision medicine'" (ibidem, 7). The Council's proposals found their implementation in 2015 when, during the 2015 State of The Union Address, the then US President Barack Obama announced "a new Initiative on Precision Medicine" (Obama 2015).

The closeness of precision medicine to personalized medicine has been made explicit by the proponents of this term since the beginning. When the Precision Medicine Initiative (PMI) was first launched, Obama described it as medicine "that delivers the right treatment at the right time" (Obama 2015). These words closely echo the European Commission's aforementioned definition (European Commission 2015, C42-3). Indeed, when introducing precision medicine, Obama himself remarked that "in some cases, people call it personalized medicine" (Obama 2015). To corroborate this idea of synonymity, within the glossary of the 2011 Council Report the items 'precision medicine' and 'personalized medicine' refer one to the other, and the definitions provided are nearly identical.

Not only the proponents but also many of the users of the term 'precision medicine' have always openly taken for granted its closeness or even overlap with personalized medicine. Within the biomedical literature, there is significant overlap in how the two terms are defined and used; indeed, they are often applied interchangeably. Illustrative of this is Iriart's (2019) use of the acronym 'PM,' which is explicitly aimed to encompass both 'personalized medicine' and 'precision medicine'



with one term, “[g]iven the similarity between the two terms and the fact that many researchers use them as synonyms” (ibidem, 4).

Still, it cannot be straightforwardly claimed that across biomedicine precision medicine and personalized medicine are always and precisely synonymous, since some scholars and stakeholders choose one term and use it exclusively. This is by, for instance, explicitly differentiating precision medicine from personalized medicine and other related approaches. The report of the US National Research Council’s Committee on A Framework for Developing a New Taxonomy of Disease (2011) provides a key example: “the Committee thinks that the term ‘precision medicine’ is preferable to ‘personalized medicine’ to convey the meaning intended in this report” (ibidem, 125).

Given ambiguities regarding the distinction between ‘precision medicine’ and ‘personalized medicine,’ a range of biomedical and social scientists have problematized the relationship between them, alongside terms such as ‘stratified medicine,’ and ‘P4 (predictive, preventive, personalized, and participatory) medicine’ (e.g., Pokorska-Bocci et al. 2014; De Grandis and Halgunet 2016; Erikainen and Chan 2019; Ong et al. 2021; Cesario et al. 2021). Katsnelson (2013), Khoury (2016), and Juengst et al (2016) have shown that precision medicine is often expected to overcome what some see as the unrealistically high expectations and limits of having the individual person as the fundamental focus. Juengst et al (2016) and Chan and Erikainen (2013) have argued that the term precision medicine was established as the major term in the US after the launch of the PMI, and that it was strategically chosen to build trust in the US context: the notion of ‘precision’ avoids the arguably unrealistic connotations of ‘personalization’ as patient-centered care, as well as the potential reference of ‘stratification’ to population segregation along socio-economic and racial lines. It remains a positive notion in the US cultural imagination, retaining the rhetorical appeal of individualization.

Illuminated by these studies, this paper reflects further on the debate around the (lack of) interchangeability of the two terms by exploring how different key stakeholders—not only proponents but also opponents or sceptics—use and interpret them. Specifically, we explore the performative dimensions of naming (Pickersgill 2019b, Birk et al 2021; Moreira 2023) in relation to social objects such as personalized and precision medicine.

## **Biomedicine, expectations, and novelty**

Sociologists have extensively and deeply engaged with the enacting role of expectations around science, technology, and medicine, showing how future-oriented promissory narratives and visions are central in shaping technoscientific innovation (e.g., Brown et al. 2000; Brown 2003; Brown and Michael 2003; Hedgcock 2004; Tutton 2014; Borup et al. 2006; Rubin 2008; Kraft and Rubin 2016; Kerr et al. 2021). New technoscientific innovations tend to be imbued with expectations about their future, often articulated as the “promise” that these innovations carry (Brown et al. 2000). In the biomedical context, this promise tends to be characterized by a rhetoric of “hope” around better treatments that are expected to arise from the innovations



(Brown et al. 2000). The promise and hope that are attributed are often in turn carried by particular terms or labels that come to denote the innovations' future potential. For example, Hedgecoe (2004) has illustrated how the term 'pharmacogenomics' initially functioned as a terminological device that harnessed the "hype" associated with the notion of 'genomics' in ways that enabled those working within this emerging field to gather support from funders and decision-makers for research projects that were collated under the new 'pharmacogenomics' term.

Notably, these kinds of expectations are performative, in that the future promise they are envisioned to bring often functions to shape research and innovation activities in ways that are geared towards the realization of the future promises that have been constructed (Borup et al. 2006). Expectations direct and gear the development of innovation in the present, working to attract (both material and symbolic) investment in the new and emerging technologies and approaches, mobilizing resources, and recruiting supporters, including research funders, to buy into particular agendas around innovation (Brown & Michael 2010). Given their future-oriented nature, expectations and their performative nature are strongly associated with contexts of novelty and they carry high potential to function as a marketing tool.

Following Miller and Rose (1997), we note that branding and marketing are themselves powerfully productive activities that mobilize particular affects and agendas. The construction of a marketable identity for a research agenda—one which can galvanize and extend expectations—is part of the process of gaining research funding. As Powell et al. (2007) have argued, to secure investment, emerging biomedical research clusters—like pharmacogenomics (Hedgecoe 2004) but also precision as well as personalized medicine—and their proponents often invest effort into distinguishing the "newness" of the new approach from past research paradigms and methods.

Relatedly, Webster (2002, 2005) and Pickersgill (2013, 2019a, 2021) have argued that newness or novelty is negotiable attributes that are constructed socially rather than being fixed or quintessential properties of an object. Ascriptions of novelty can themselves be part of the machinery of expectation making, and expectations made through processes of ascription itself. In effect, novelty can be encoded within the names of biomedical endeavors so that innovation is in part materialized precisely through the act of naming, which substantiates claims to novelty and propels promises and expectations, in ways that can then also enable the adoption and translation of the innovations into clinical practice, facilitating the emergence of new regimes of biomedicine clustered around the name (Nelson et al. 2012). This involves what Pickersgill (2019b, p. 16) terms performative nominalism, "whereby articulations of a neologism in relation to established and recent developments participate in producing the referent of the new term" (see also Birk et al. 2021; Moreira 2023, and relatedly Hedgecoe 2004).

The analysis that follows is grounded on this understanding of novelty as negotiable and constructed to scrutinize the roles that names (i.e., 'precision medicine') play in promoting perceptions of newness in ways that reflect and trigger performative expectations—with implications for the ontologies of the projects to which different terms refer.



## Materials and methods

This paper focuses on two case studies of large-scale, influential initiatives around precision and personalized medicine briefly outlined below: the aforementioned PMI and the 100,000 Genomes project.

The PMI was launched in 2015 by the Obama administration with a \$215 million investment, and it was aimed to “pioneer a new model of patient-powered research” (White House 2015). At the heart of the PMI is the All of Us Research Programme. This is a cohort study aiming to collect wide-ranging environmental, lifestyle, and biological (including genetic) data from one million or more people living in the US.

Prior to the launch of the PMI, the 100,000 Genomes Project (100KGP), delivered by Genomics England, was the largest scale cohort study performing whole genome sequencing, with ambitions comparable to those of the PMI. It was launched with an overall investment of over £300 million in 2012 by the then UK Prime Minister David Cameron. The initial aim—ultimately accomplished in 2018—was to sequence 100,000 whole genomes from UK National Health Service (NHS) patients affected by rare diseases or cancer. The genome from cancer cells is contrasted with the genome from healthy cells of the same person, and the genome of rare disease patients is contrasted with the genome of a close relative. This large-scale analysis is expected to ultimately create a genomic medicine service for the NHS, which would bring “advanced diagnosis and personalized treatments to all those who need them” (Genomics England 2018).

Our analysis is based on qualitative semi-structured interviews conducted by the first author in 2017. This was a critical timeframe, as the PMI was finalizing its study design and framing its public image in preparation of the launch of volunteers’ enrollment (then started in May 2018). Following ethics approval from the University of Milan (reference number: 24/16), 43 interviews were conducted with respondents based either in the UK ( $n = 16$ ) or US ( $n = 27$ ).

Interviewees were chosen through purposive sampling with respect to their role in the initiatives analyzed and/or their role in the contextual debates around these initiatives. Of the 16 UK-based respondents, seven were directly involved in the 100KGP, as consultants, board and committee members, or leading researchers in the project. Of the 27 US-based respondents, 13 were directly involved in the PMI, as experts in the PMI boards, executive staff, and members of advisory panels, as well as coordinators of regional centers and lead researchers. Participants not directly involved in the projects included prominent scholars in the fields of genomics or public health who had publicly voiced notable expectations or concerns around either of the initiatives, within arenas where their voices might expect to be heard (e.g., editorials or commentaries in major biomedical journals). This group of participants is an important element of originality for our research. By including both precision and personalized medicine supporters and proponents, and scholars who embraced a critical perspective, our research gained a comprehensive range of perspectives while also focusing on the limits and inappropriateness of the terms and of the related described approaches.



The interviews primarily aimed to investigate the debate about the contribution of precision medicine to social equity and population health. Interviews included questions about the perceived significance and scope of the initiatives under analysis and the expected outcoming benefits and their distributions. Participants were also queried about the epistemic dimensions of precision and personalized medicine, including if and how they are perceived as different. While the initial aim of the project for which this data was collected was not to examine terminology, the insights into this within the data propelled our interest in exploring this further.

To protect the identity of participants, we refer here to their interviews with the initials of the country where the respondent was based (i.e., UK or US) and a progressive number. The interviews were conducted mostly in person, with six via telephone. The interviews were transcribed and inductively coded by the first author. This paper analyzes all the interview sections in which respondents reasoned about terminology or the differences between personalized or precision medicine, either when prompted by the interviewer or spontaneously. The interviewer used the term 'precision medicine,' given its prevalence at the time. We are aware that our own terminological choice may have influenced the terminological choices of the interviewees, although given professional status differences between them and the interviewer we do not assume that a respondent would have used the term 'precision medicine' if they personally preferred to speak of 'personalised medicine,' for instance. This is supported by the fact that most of the UK-based respondents spontaneously used the term 'personalized medicine' when asked about 'precision medicine.'

## Results

While US-based respondents spoke of 'precision medicine' throughout all the interviews, most UK-based participants spontaneously used 'personalized medicine' even if they were asked about 'precision medicine.' When asked to reflect on the existence of different terms and on their perceptions of the differences between them, many considered there to be no substantive difference between precision and personalized medicine. Most of them explained the different terms as geographical variations or as a deliberate "rebranding" to attract hype and funding. Some, however, considered personalized medicine to be broader than precision medicine, in the sense that the former encompasses person-related aspects of medical practice while the latter does not. Others, conversely, considered precision medicine to be broader than personalized medicine, in the sense that it overcomes or supersedes and adds new dimensions to it.

### Personalized medicine in the UK and precision medicine in the US?

In alignment with the terminology respectively prevalent in US and European projects, UK-based respondents displayed a clear preference for 'personalized medicine,' while US-based respondents used no other term than 'precision medicine.'



In 23 out of 27 US-based interviews, no other term than ‘precision medicine’ was spontaneously used by the participants to denote the biomedical approach being discussed. Only four respondents mentioned ‘personalized medicine’ unprompted. Mostly, these participants referred to personalized medicine when introducing precision medicine from a historical point of view, by describing precision medicine as the evolution of, or—in some cases, as we will expand on below—the *new brand* for, personalized medicine which temporally supersedes it.

By contrast, in the UK, even if respondents were only ever asked about ‘precision medicine,’ most used the term ‘personalized medicine’ (with 11 of the 16 UK-based interviewees applying the term on their own initiative). Only four interviewees spoke about ‘precision medicine’ without introducing any other terms in its place, at least until explicitly asked to comment upon terminology. One respondent advanced an additional term, ‘genomic medicine’:

I like to use the word ‘genomic medicine’, because it is more about the technique. In some senses medicine has always been precision, wanted to be precise and personalized. But in many ways you are trying to have a very individual response to the disease that an individual has, and one component of it is sequencing the genome of that individual. But I would use the word ‘precision medicine’ to mean more than genomic medicine, so it is also other things that you can personalize to the individual. (UK12).

In some cases, UK respondents who used a term other than ‘precision medicine’ made their choice explicit, sometimes providing explicit justifications for that choice on their own initiative. In other cases, they just changed the term they used without providing any comment on the motivation behind this change. Often, as the interviewer continued to use ‘precision medicine,’ the respondents switched seemingly at random from ‘personalized medicine’ to ‘precision medicine’ during the interview. In some cases, the two terms were used together; i.e., ‘personalized or precision medicine.’

Three UK interviewees also mentioned the term ‘stratified medicine’ when commenting on the terminology. Two of them explicitly declared ‘stratified medicine’ to be their preferred term, arguing that it is the most suitable label to represent the approach at issue. One of them added that even if ‘stratified medicine’ would be the most scientifically correct term, it should not be used due to socio-political reasons:

The best term for that is ‘stratification’, or ‘segmentation’. But the Americans don’t like these words. Because to the Americans, ‘stratification’ has a social overturn of separating Blacks and Whites (UK06)

Notably, the term ‘stratified medicine’ or ‘stratification’ was never used or mentioned by any of the US-based interviewees.

The terminology applied by the interviewees maps onto the regional differentiation between the adoption of the personalized and precision medicine terms in Europe and the US, respectively. However, their reflections around possible





alterative terms like 'genomic' or 'stratified medicine' also suggest pragmatic negotiation around the choice of terminology. This pertains both to practical or methodological considerations of what the biomedical techniques grouped under these terms actually enable, and to the wider cultural and geographical context in which the terms are being applied.

### **Personalized medicine = precision medicine?**

Most of the respondents in the two countries claimed that 'precision' and 'personalized medicine' denoted the same thing and were interchangeable. When asked directly to comment on the relation between terms, the interviewees both in US and in UK largely expressed that there was no substantive or conceptual difference or that, if there was such a difference, they were not aware of or are unable to discern it. In the words of US07: "I don't pretend to appreciate or understand the difference!... Maybe there is no difference!"; as US10 put it: "I would use these two terms interchangeably, if the two terms mean something different, I don't know." Nine of the UK-based interviewees also stated that there was no conceptual difference between the two terms, even if they put different emphasis and displayed different degree of interest in the issue: some for example declared that they "don't worry too much about different definition[s] of the word 'precision medicine'," because they are "more interested in the outcome for patients" (UK12). Others explained the existence of two (or more) names denoting the same thing as a local difference between UK and US: "what we call 'personalized medicine' here, they call 'precision medicine' in the US" (UK05).

Sometimes, however, the existence of the two terms was regarded as a "rebranding":

I think the phrases are used interchangeably, it just depends on the politics of the time as to whether one word is considered more or less politically acceptable, or more or less scientifically effective in raising funding, I am not convinced they are particularly different in the way they have been used (UK02).

The fickleness of human nature is that we need something that is new, to present it as new, new things are the only things that get funded (UK04).

A similar perspective was also expressed by US-based respondents, who considered that the term 'precision medicine' was the evolution of the term 'personalized medicine,' introduced as a rebranding to give the impression of novelty:

The real history is that everything to do with genomics and genomic medicine is associated with hype. So one term comes along and then we need to get rid of it because it is getting a little bit tiring! So 'personalized medicine' was the term for a while, 'precision medicine' is the new term. Surely we have stories about what it means...but I think the real reason is that the community was entering into a new era and wanted to sort of create some distance to the old era. (US02)



While many of the participants' comments imply a high degree of presumed synonymy between personalized and precision medicine in practice, their reflections on the mobilization of terminology as a form of rebranding shows how terminological choices function as ascriptions of newness. In the context of a competitive funding landscape, an impression of novelty can be translated into both symbolic and financial investment.

### **Personalized medicine > precision medicine?**

Some respondents claimed that personalized and precision medicine were actually two different things. The interviewees who considered there to be a conceptual difference between the terms (seven in the UK; five in the US) mostly framed 'personalized medicine' as broader than 'precision medicine.' Specifically, it was presented as encompassing a personal dimension beyond medical techniques; a personal dimension that they asserted could get lost in precision medicine:

Personalized was primarily to look into the patients as they are. It also had very strong interpersonal component, that's why it was 'personalized medicine', because it meant the physicians taking care of the specific patients as individuals, really interacting with them to better understand them. I think that is what every physician should be doing. Precision medicine is a slightly different approach. It is supposed to be very individualized, because it is supposed to be depending on your genetic makeup, but we have to think about where is the interpersonal interaction and interpersonal relationship that comes into place it, and I don't know whether they are still there. (US20)

Moreover, some respondents in both countries stressed that the term 'personalized medicine' carries unrealistically high promises, since it gives the misleading idea of individualized treatments for each person:

In a state healthcare system [sic] it is unaffordable and unattainable the concept of an individual personalized medicine. Personalized medicine became precision medicine for very good reasons: because I think it's unrealistic. Maybe the US, but most European nations and certainly the UK with the state healthcare will never get to do that. (UK04)

These reflections are connected to wider considerations around the link that has been constructed between personalized medicine and wider person-centered approaches to healthcare, promoted especially in European policy discourses. While the notion of 'personalization' as treatment individualization is perceived by some as fallacious in practice (see e.g., Nicholls et al. 2014), precision medicine can be framed as narrower in scope; i.e., focused on more "precise" and highly targeted rather than more broadly "personalized" treatments. Consequently, the precision medicine approach can be regarded as more realistic in terms of what these treatments can actually enable in practice.



## Personalized medicine < precision medicine?

Only one interviewee explicitly considered 'precision medicine' to be a broader concept than 'personalized medicine':

personalized medicine is actually more to do with treatments and risk prediction, while precision medicine incorporates a bit more broadly risk prediction, and also treatments as well (UK16).

However, several interviewees (although a minority of respondents overall) both in the UK and the US appeared to implicitly assume that 'precision medicine' has a broader scope than 'personalized medicine.' According to this perspective, the choice of a term other than 'personalized medicine' acknowledges that personalized approaches were already implemented and so already part of precision medicine. This de-reifies personalized medicine as a special category of biomedical research and practice, and suggests that the term precision medicine is strategically useful to incorporate what was once characterized as personalized medicine alongside any particular further signifiers that might be newly associated with precision medicine. This was expressed in various ways:

At the beginning everyone used the term 'personalized medicine'. Until some medical doctors said our medicine is always personalized, the person is in the middle! And then 'precision' and 'stratified' were used. (UK11)  
 The idea there is that medicine has always been personalized. So 'precision' is meant to indicate something more than that (US02)  
 when people use the term 'personalized medicine', a lot of physicians don't like that, because they felt medicine was always practiced at individual level (US05).

In the above, the use of a different term was presented as essential to stress that the approach the government was investing in was something different from what has always been done, or should always be done.

Only one interviewee, who referred to their own experience as a clinician, discussed how physicians should practice medicine both in a *personalized* and in a *precise* way. Consequently, in their account, the term 'precision medicine' is not superior to 'personalized medicine' for the purposes of acknowledging the efforts and the duties physicians have always had:

I am not a fan of either term. We have always been practicing personalized medicine and we have always tried to be as precise as we can. As a cardiologist I have always tried to personalize every decision I make. Every time I have a patient in front of me I want to be as precise as I can, and I want to personalize recommendations as best as I can (US18).

The idea that precision medicine was a "rebranding" to harness the idea of novelty, while simultaneously acknowledging the personalized approach already followed by physicians, was importantly also embraced by two interviewees who



had firsthand information about the choice of the term ‘precision medicine’ for the launch of the major US initiative to underpin this medical framework:

I should say that when the initiative was funded we struggled with the name to call it. Because the names that are currently used, that have been used in the past, have certain negative connotations, ‘personalized medicine’, ‘precision medicine’, and I think there is a lot of hype involved in both of those terms and a lot of promises were made that were not based on a full understanding on the complexity and difficulty of practicing precision medicine [...] One of the reasons why we chose ‘precision medicine’ over ‘personalized medicine’ is that it carries with it the implications that precision medicine is far more than the personal interaction between a patient and a doctor, it involves all the infrastructures and dimensions including basic science, including reimbursement, including all the ethical issues (US12).

In contrast to those who perceived the term ‘personalized medicine’ to carry unrealistically high promises of individualized treatments for each person, those who (implicitly) positioned precision medicine as broader than personalized medicine framed the person-centered care dimension associated with the notion of personalization as an already well-established element or virtue of medical practice. To the extent that personalization already is or should be part of medicine, personalized medicine is temporally positioned in the past and present, in ways that do not lend themselves well to ascriptions of novelty. The framing of ‘precision medicine’ as something “more” than personalization enables both an acknowledgment of personalization as an existing virtue in medicine and the harnessing of precision as a new virtue that moves beyond or expands on what is already done, in ways that are future oriented.

## Discussion

Read against the literature on sociology of expectations and novelty (e.g., Brown et al. 2000; Brown and Michael 2003; Hedgecoe 2004; Borup et al. 2006; Pickersgill 2019a, b), our interviews underscore how the idea of newness is presented by key biomedical and public health actors as central engine to catalyzing support for the advancement of biomedical innovation within their epistemic community. Moreover, the data also indicates how terminology contributes to framing the ontologies of biomedical endeavor by helping to redefine technical as well as normative priorities shaping such innovation.

In relation to the first point, the recurring mention of “rebranding” and talk of funding within our interviews focuses attention on how the strategic positioning of notions and endeavors as “new” or “novel” to galvanize symbolic and financial investments is internalized as important for national initiatives themselves as well as for individual researchers submitting grants to such bodies (see relatedly Calvert 2006; Calvert and Fujimura 2009; Hilgartner 2015; Schyfter and Calvert 2016; Pickersgill 2021). The affirmation of a different term “for the same thing” can be seen as a way of harnessing future-oriented expectations that enable institutions to position



the 'new' approach as innovative. According to our respondents, the terms 'personalized' and 'precision' are at least partially strategically mobilized as marketing tools to gain or justify investment in the context of a competitive landscape of scarce research funding. The choice, and especially introduction, of a label—be it 'precision' or 'personalized medicine'—enables the construction of an identity for the emerging area of research, with such performative nominalism acting to collate the research activities in an intelligible way (Powell 2007). However, to gain purchase, the term that is chosen must also appeal to stakeholders in the national and social context where it is used. Further, we have seen how the name 'precision medicine' is not (only) used to describe an ostensibly new, targeted medical approach; beyond this, it also contributes to performing the approach itself, and the whole framework around it, through the magnetic appeal of novelty. Constructions of novelty thus integrate within the very texture of technoscientific expectations (Hedgecoe 2004; Pickersgill, in press), harnessing scientific and public interest, engagement, and support (Brown and Michael 2010).

What is of key interest within our data is the degree to which the respondents expressed their own considerations of how this process played out in practice, while also at times contributing to it through the drawing of distinctions. This further underscores the importance of novelty work (Pickersgill 2021) within biomedicine, which we suggest can play out even through reflexive considerations of how novelty is leveraged. By arguing that a particular term has been adopted as a "marketing tool," respondents also generally affirm or refute novelty *per se*, in ways that might relate to their own professional and epistemic interests. Ascriptions of "rebranding" by some participants can thus themselves be read as part of the negotiations of novelty associated with the introduction of purportedly new approaches and initiatives.

We also argue that rather than "simply" rebranding, the linguistic shift we document aims to have—and indeed seems to have had—ontological effects (cf. Miller and Rose 1997). Technoscientific expectations galvanize the future in order to make material changes in the present (Brown et al. 2000; Brown 2003; Brown and Michael 2003), and terminological shifts can reorientate expectations in part through shaping understandings of novelty. While our research participants often presented the term 'precision medicine' as analogous to 'personalized medicine,' deeper scrutiny of these accounts reveals how the terms are presented often as departing in diverging, although not necessarily entirely separate, directions. These divergences do normative as well as novelty work, by conveying implicitly or explicitly what good medicine does/should look like, and so help to ontologize medicine and biomedical initiatives in potentially different ways.

Precision medicine is envisioned commonly to simultaneously take one step forward and one step back with respect to personalized medicine (see also Juengst et al. 2016). On the one hand, precision medicine takes a step back by disassociating the emerging targeted medical approach from the promise apparently suggested by 'personalized medicine' of individualized treatments tailored to every person. This is a promise that many see as misleading when it comes to what can be realistically achieved. In so doing, 'precision medicine' mitigates against the fallbacks of unmet expectations and disillusionment (Brown 2003). On the other hand, precision medicine can be framed as diverging from personalized medicine in the context of



‘personalization’ when this is understood more specifically in terms of person-centered care (Cornetta and Brown 2013). This in turn can be interpreted as care that pays attention to the patient as an individual person with specific narratives, preferences, relations, and values (Horwitz et al. 2013; Tutton 2014; Prainsack 2014, 2018). So long as personalized medicine is framed as such, it is supposed to be *broader* than precision medicine, the name of which only “promises” precision and not necessarily personalization as care for the patient as a person.

Conversely, many interviewees appeared to prefer the term ‘precision medicine’ because, rather than promising this kind of personalization as something that needs to be achieved, it can accommodate the idea that medicine has always been personalized. This perspective can be seen to configure personalization itself as a kind of biomedical virtue (Pickersgill 2019b) which purportedly does and should contribute to the constitution of research and practice. Proponents of the term ‘personalized medicine’ tend to see personalization as something that is not yet realized but still needs to be reached. However, many proponents of ‘precision medicine’ appear to account for personalization as already operant within practice—with ‘precision medicine’ aiming to go beyond existing modalities through an even more contemporary virtue of precision. In this sense, precision medicine is accounted for as a “step forward” with respect to personalized medicine and something that supersedes it in temporal terms. We can see, then, that different terms can conjure different ontologies for the projects they describe, and in various ways. Terminological changes thus play a part in the novelty, promissory, and normative work of national initiatives, which can reshape expectations and so have wider material effects.

## Conclusion

The words that are chosen to denote any approach within biomedicine (or elsewhere) function to delineate, in different ways, what the purpose of the approach is or should be, as well as signaling what it is not. Particularly in relation to large investment endeavors, where choices made are highly structured by intermingled political and scientific considerations, words are not chosen at random. Practitioner communities working in and around such initiatives have their own reflexive understandings of how and why terminological choices are made, while also bringing to bear their own considerations (also shaped by professional and epistemic interests) on how and why to (not) use particular terms—embroiling them within processes of performative nominalism. In the case of precision/personalized medicine, different terms emerge as reflecting diverse views around what targeted or tailored approaches can or should deliver. As such, the notions of ‘precision’ and ‘personalization’ are variously leveraged to invoke and mobilize characterizations of novelty, technoscientific expectations, and different associations about what medicine could or should look like. If—at least to some extent - ‘precision’ and ‘personalized medicine’ are “different words for the same things” (UK11), the words that are used also convey the potential to performatively contribute to shaping these endeavors in different—albeit connected and overlapping—ways in an unfolding future that is always embroiled with the language that precedes and constitutes it.



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