De-anthropocentrising Healthcare Design

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ABSTRACT
In design research and design practice we can see new ideas emerging around de-anthropocentrising design in order to rebalance our place and sustainability within the global ecosystem. Ideas including Posthumanism, Actor Network Theory, Object Orientated Ontology, Xenodesign, and Multi Species Design begin to show new perspectives for how we design and where we place humans in value chains. Current healthcare design models put the human at the top of the pyramid with effects on the wider downstream ecosystem through negative outputs like medical waste being one of the consequences. Here we ask how this challenges the future of design in healthcare and begin to explore the new types of methods and thinking that we may need to adopt in order to realise the potential of this new approach. Our conclusions raise a number of key questions for meta level healthcare design approaches, ethics, value chains and gaps in new methods and practices that need to be considered for adoption.

Keywords: *Healthcare Design, de-anthropocentrisation, design methods, health futures, posthumanism*

1.Introduction

Not so long ago it would have been considered absurd to question the position of humans at the top of the value chain in healthcare design. Design has been delivering user centred designs and innovations to great success and its clear there is a huge project remaining where straightforward user centred solutions can create great benefits and impact in improving health and healthcare. One could be accused of seeing this question as a first world issue as a preoccupation of people living in good healthcare systems with long lifespans. Recent global healthcare and climate related events have begun to shift the role of design and healthcare and question human centredness.

Our research therefore addresses the following question: ‘How can we remove the human from the top of the value chain in healthcare design to rebalance global ecosystems and continue to maintain advances in improving healthcare?’ or to put it more directly ‘Are we too busy saving ourselves to save the planet?

Recent global shifts in the direct impact of climate change on human populations have changed the perception of human centredness and accelerated the need to question all of our activities against a wider global picture incorporating the human into a much more complex set of relations and balances with the wider ecosystem. For example hurricane Katrina in 2005 flooded 11 hospitals (Gray *et al*, 2006) while the Massachusetts General

Hospital and Brigham and Women's Hospital lost $2m in overtime costs and millions more in lost surgery following just one winters storm in 2015 (Health Care Without Harm and PWC, 2018) demonstrating the direct risk to healthcare infrastructure from climate events. The term Anthropocene is the ultimate recognition that we have changed the planet to such an extent that we have created an entirely new epoch of time – the human epoch - (Waters et al, 2016) along with its resultant issues of climate and species impact. Alongside this change created by human supremacy are difficult questions for the future of health and healthcare design. Questions that will radically change how we value of ourselves and our place in the environment. Addressing this scale of impact and the ethical dilemmas that entail will require a wholehearted revaluation of our notions of healthcare and how design has anthropocentrised the quality of life, upgrades and longevity of humans at the expense of a wider concept of circularity and sustainability.

Following an overview of healthcare impact our investigation begins by reviewing concepts of de-anthropocentrisation followed by a consideration of the issues raised, we then review related methods for tackling these issues. We draw the discussion towards healthcare design related perspectives on remaining gaps in knowledge, methods and ethics and conclude with recommendations for strategies and further steps for the de-anthropocentrisation of healthcare.

2. Healthcare Impact

At the end of the twentieth century and into the 21st we have increasingly questioned human's position at the 'top of the pyramid' in favour of more sophisticated relationships with other species and the environment. Healthcare design has produced a large number of quality improvements, life-saving, and life extending products and services that have created great benefits to billions of people around the globe. This impact has also created a great quantity of pollution, waste and degraded other living species and is part of the effects that drive climate change. The World Economic Forum (WEF, 2019) estimates 4% of the world's carbon footprint is the result of healthcare. Of the countries reviewed (WEF, 2019) the National Heath Carbon Footprints (HCF) vary widely with the Netherlands at the top along with the USA with the greatest national impact (HCF 8) and Mexico and India were the lowest (HCF 3), with the UK placed 13th (HCF 5.5). The UK's National Health Service (NHS) was the world's first major healthcare provider to establish a carbon reduction strategy in 2009 (Naylor, 2019) and was again the first major national provider to set an objective of a net zero impact by 2040 (NHS, 2020). Lenzen *et al* (2020) writing in the Lancet point out that there is no comprehensive global survey of the impact of healthcare on climate change and their research estimates vary from 1-5% of global impact pointing to the fact that we have

yet to establish comprehensive data sets to work with. Although at a global scale anything from 1-5% remains a very significant level of ecological impact.

Although promoted as a universal measure of sustainability and impact, carbon footprint has been criticised for weaknesses in a number of areas. The concept of offsetting (paying a fee to a company to invest in carbon reduction projects to equal the carbon used) can fail to deal with localised pollution issues and it also creates the idea that pollution can be 'paid for' and does not address the major behaviour and lifestyle changes necessary to bring our ecosystem back into balance (Hyams, 2013). We also know that the links to pollution may be indirect and other types of environmental damage to other species like upsetting migratory patterns can still be achieved with offset or even zero emission energy systems. Complexity (Lenzen *et al*, 2020) and trusting that materials, technologies and services are delivered with carbon reducing or net carbon zero impact in both built and performance stages is one of the current challenges in designing in complex healthcare systems.

High quality healthcare systems also represent a significant and growing economic burden; In 2018, US healthcare expenditure rose to 20% of GDP at $3.6tn (Altarum, 2018) equal to around $10,000 per person per year, (OECD,2018) while in the UK expenditure in 2016 was £191.7bn. £152bn of this sum was funded by the UK government, accounting for just under 10% of GDP (ONS, 2018) and a $4,200 cost per person annually (OECD, 2018). While these figures are not a direct indicator of impact, they do demonstrate a very significant level of national human centred resource and effort attached to which are energy use and other environmental impacts.

3. De-anthropocentrisation

Our assumption of humans residing at the top level of being and the relationship between humans and other living systems has been positioned at the top of the phylogenetic tree as the 'Great chain of being' (Wilson, 1987) and as Nee (2005) points out there are many evolutionary and biological reasons to question why this should be so, and also reasons to speculate that we need to psychologically view ourselves as masters of all that we survey.

The evolution of industrial and product design of which healthcare is a specialisation has broadly followed three phases. Initially industrial designers were trained as experts in generating industrially realisable forms. This led to improved commercial success and manufacturability of designs, yet it highlighted an emerging set of user related issues including function, safety and interaction as products grew in complexity. Designers began

including users in focus groups in a process which eventually evolved from user centred into participatory and codesign.

An early example of user centred healthcare design was Bruce Archer's NHS Hospital Bed designed in 1960 which used an innovative scissors mechanism for height adjusting the bed responding to discussions with hospital staff (Ghislane, 2001). The design specifically addressed back issues from nurses and staff helping patients in and out of fixed height beds and was an early exemplar of design with user's inputs. A significant amount of further work on co-design and user centred design has continued including moving from user centred to participatory design that includes the user in the design process (Sanders, 2002) and a framework for tools and techniques in participatory design (Sanders & Binder, 2010) amongst a large body of research. User, participatory and co-design are widely recognised as good practice and are still the dominant good practice model for healthcare design. Criticism of user centred design describes the difficulties that can arise with its use within complex systems, tackling wicked problems (Rittel and Webber, 1973; Buchanan, 1992), power relations and cultural factors alongside issues reconciling design expertise with levels of user driven insights and norming (Gulliksen, Lantz and Boivie, 2011). All of these issues specifically relate to human centredness within complex systems and having to deal with multiple stakeholders with different viewpoints, complex technologies, locating project spaces and deciding what success looks like.

While many areas of industrial and product design are important or crucial to safety and reducing risk, it could be argued that healthcare design is one of the most, if not *the* most significant application of design for human good, longevity, quality of life and wellbeing. This is precisely why it is so important to ask the question of anthropocentrisation in healthcare design and recognise that it poses some potentially very difficult questions about how we design in the future and uncovers a whole raft of ethical questions and difficult choices that could significantly change how we design in this field.

Currently healthcare designers put human value at the top of the pyramid where we exclusively focus on human wellbeing as the priority of the vast majority of our activity. This is to be expected and in many parts of the world simple user centred design solutions to common healthcare problems are missing or are in very short supply, either as a result of skills shortages, economic resources, regulatory, monopolistic, cultural or governance issues. Moreover, challenging the human dominance of healthcare could be seen as an elitist first world endeavour with generally good healthcare systems which allow us the luxury of asking these longer-term questions when short term lifesaving solutions are badly needed

elsewhere. Yet the long-term imperative of balancing ecosystems requires another major change in the way that we design to questioning and potentially usurping humans from the sole position at the top of the value chain. This necessitates adding an additional level of concern by developing methods and approaches that deliver new values and perspectives. This can be articulated as a chain of increasing design awareness as we have gone from designer as expert to user centred and co-design towards our realisation of the need to de-anthropocentrise healthcare design as a value inversion proposed by the authors below (Fig.1).

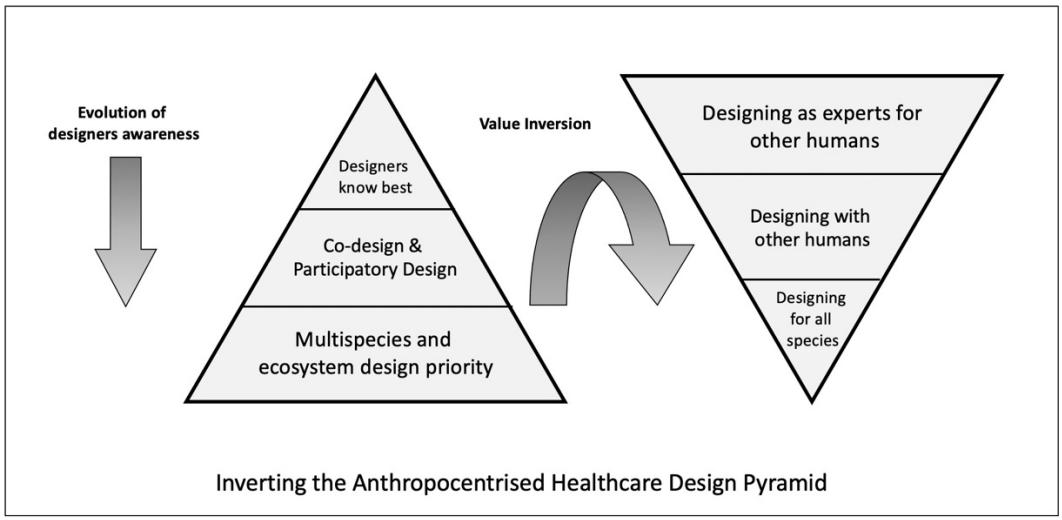

Figure 1. De-anthropocentrising Healthcare Design Values

In healthcare design there are an emerging set of concepts and practices that are of interest to us concerning design and the practice of designing with an adjusted set of values that do not always include the human at the top or that proposes the inclusion of 'others' and other species.

Posthumanism is a broad term used both in design research and emerging into design practice as a way of addressing a number of developments that have questioned human centrality. An emerging set of idea are attempting to decentre the human from the top of the great chain of being by conceiving new relationships between objects, networks, connections, scales and hierarchies. Wakkary (2020) for example proposed a nomadic approach to counter humanistic design practices as a posthuman theory for knowing design. Theories from adjacent disciplines including actor network theory and object orientated ontology have been used to develop new design perspectives on decolonisation, race, feminism and the inclusion of the other (Forlano, 2017). Critiques of posthumanism point to the lack of inclusivity in the concept and mindset of posthumanism arguing that diverse

gender, race and cultural inclusivity in the voices and concerns that drive its development are underrepresented (Forlano, 2017).

From an opposite direction new technology including biotechnology, artificial intelligence and robotics are producing human enhancements that challenge the notion that humans alone have a unique position at the top of the phylogenic tree as new forms of intelligence, computation and complexity emerge. Some of these technologies are black boxes (Ashby, 1956) where we cannot know the full functioning detail of the technology (AI) we have evolved and can only relate to it by comparing inputs and outputs. Questioning the nature of the relationship between humans and machines has a long history and the implications on hierarchy in the modern era was highlighted by Wiener in the Human Use of Human Beings (1954) and much earlier by Hobbes in the Leviathan (1651). George Dyson (1997) in Darwin Among the Machines explored the emerging scale of computational intelligence beyond the human eventually speculating that the internet could be seen as a new global form of distributed computational intelligence. The current focus therefore follows a long historical trail yet there is one significant difference. Previous concerns about human machine hierarchy were driven by religious implications (Hobbes) or loss of control (Dyson and Wiener) whereas our current concern is much more pressing and primarily concerns the question of if we can survive, and if so what is the quality of our environmental relationship?

The following is a limited review of a number of ideas within a general understanding of post-humanism that seek to question, reframe and balance the relationship between humans and the environment with a specific interest in their relationship to healthcare design.

Bruno Latour's actor network theory (ANT) proposes the flattening and decentring of human interests by creating a network composed of actors and connections whereby the actors can be human or non-human and range from living entities to concepts, technologies or institutions (Latour, 2005). The aim of ANT is not to explain or define a system but to allow a de(human)centred study of relationships. ANT can be applied to design to change social, psychological and economic factors and in terms of healthcare design and particularly service healthcare design it allows us to see new sets of relationships and opportunities for seeing relationships with the other. Limitations of ANT include punctualisation where a complex technology like AI or a robot may contain a vast array of possible states and connections that we can see past. Additionally, punctuation resides at the edge of a network however there are no rules for identifying the edge and actors just beyond may still have significant impact and relations with the network.

In a similar way object orientated ontology (OOO) is a closely related theory of existence where everything (objects) have equal status and where in effect, we can de-anthropocentrise relationships between things at all scales. It functions as a powerful constructive starting point to requestion human desires and projections and allows new perspectives and critiques of relationships to emerge. Criticism of OOO cites the impossibility of recognising an object outside of where the object lies and attendant assumptions and relations within (Wilde, 2020). Moreover, objects are equal to their relations and it is the nature and value of relations to objects that drives human centredness and anthropocentrisation.

ANT and OOO can be inspirational for design yet distant for designing in that they can enrich at an epistemological level and inspire new thoughts and motivations to question relations yet other concrete methods are needed to sit between these ideas and healthcare design scenarios. Lindley *et al* confirm this in their conclusions to Design Research and Object Orientated Ontology and point towards a possible transferred use for healthcare design:

> '…that OOO can be used in a generative mode. In this way it is an ideation tool, a way of helping to drive original thought. In our case the context was to help drive original thought and ideas relating to the design of an IoT product, but one assumes that a similar process can be transferred elsewhere.'
> (Lindley, Akmal, Coulton 2020, p.39)

There are continuing debates in ANT and OOO around the limits and boundaries of an agent/object and how to decide if something is an agent/object or connector/relationship. issues that are crucial to understand if we are to design de-centred human relationships via more applied design attributes like affordances and signifiers for products and services.

Johanna Schmeer's Xenodesignerly ways of knowing (2019) (Xeno meaning 'other' and 'designerly' building on Nigel Cross's 2006 seminal paper 'Designerly ways of knowing') and subsequent doctoral thesis (Schmeer, 2021) addresses the inclusion of the other in design practices by combining ideas and practices from speculative realism, xeno discourses and speculative design. The anthropocentrisation of design is characterised as:

> 'The difficulty with a human-centered approach to design is that it often fails to look beyond the immediate user, toward the ''other'' that might be affected by a design —

> not only other humans, but other-than-humans: ecologies, bacteria, air, soil, artificial intelligences, etc.' (Schmeer, 2019, p.1)

Four common problems with human centred design are identified including: unsustainable modes of production and consumption, ignores ecological and non-human participants, focus on human experience limits other inclusions, risks more imaginative solutions by being (participatory/user) consensus driven. This leads to the recognition of a lack of frameworks for practices that move beyond human centred design. Schmeer proposes using xeno theories and speculative design to address non-human questions in complex interconnected relationships within systems.

Three approaches are proposed as starting points towards a xenodesignerly way of knowing for developing a new de-anthropocentrised design practice. Object Centred Design borrows from object orientated ontology as a means of flattening and decentring human agency. Hyperobjects, perspective descriptions and ontography are concepts that allow new relationships of scale and interaction for loosing human centredness. Discursive approximations are provocations that aim to stretch human perspectives and acceptance. Critical use describes a genre of design outputs that seek to change our relations to ideas and things by provoking discussion and action around particular xenodesignerly issues. Object centred design, discursive approximations and critical use are proposed as approaches which can interact and overlap with each other to explore new ways that design can help humans see, empathise and act with the other.

Xenodesign builds on speculative and critical design but moves away from its traditional human centred focus and illustrative futures outputs and extends this toward notions of the other, collaboration and stronger actions for impact from design outcomes. In terms of healthcare design, it provides new propositions for how we collaboratively envisage future health for human and non-human participants and powerful tools for interrogating the relationships between us and other in the ecosystem. Schmeer proposes it as a platform for testing alternative decentred design practices. The value for healthcare design practices that include the other are obvious and the new critical angles can inspire new directions and thinking while the challenge will remain how to engage this approach for delivering value for humans and others and the challenges that lie in the decisions relating to impact. Whether we can for example extrapolate more applied uses for the human and others values for the design of a ventilator, robotic brain surgery or predictive health AI platforms remains a future goal.

The Lancaster care charter emerged after a series of explorstory workshops and events and investigates new perspectives for design responsibility and asks ‘Does design care?’ and if so, about what and how? The charter states:

> ‘We see a need for a practice of design that is oriented to care as a commitment to human and nonhuman co-existence—that brings to the surface its entanglement with caring ecologies. Design-with-care shifts away from a model of the “designer-as-hero,”…. We envision a mode of design practice that moves beyond incremental and isolated making-preferable, instead acting to give form to the practices of caring ecologies that encompasses multiple, entangled actors across scales.’
> (Rodgers *et al,* 2019, p.73)

The charter goers on to propose the following three conditions for the design of possible futures:

> (1) We call the first condition “Care of Complexity”—to design with-care being sensitive and responsive to the boundaries between human and non-human (i.e., artifacts, animals, nature), local, global, and temporal contexts, and the value in both the commonality and diversity in post-global, postnational, and post-individual contexts.
>
> (2) The second condition is “Care of the Project”—to design-with-care acknowledging the complex network of relationships between the material and immaterial, and challenging the dichotomy between human and non-human worlds. To achieve this, design must shift its existing paradigm and lead fundamental shifts in other disciplines.
>
> (3) The third condition is “Care of Relations”—to design-with-care asserting that people today must repair, instead of cutting off, the relationship between people, things, environments, and ecology, not only to maintain a good balance, but also to emphasize the interdependence between these entities. (Rodgers et al, 2019, p.76)

Of particular interest here is the first condition which includes care of complexity and non-humans from local to global contexts while the second recognises the dichotomy between the human and non-human worlds while the third encourages the repairing of relations between people and environment for good balance and restoring interdependence.

Although not exhaustive it is clear that a number of concepts, some of which overlap can clarify approaches to design concerns and designing which argue for the decentring of the human in value chains across the global ecosystem. All of these point towards a posthuman conceptual platform for designing that provides emerging epistemologies, frameworks and approaches that can conceptually invert the human centred healthcare design pyramid and add a layer of caring for the other. The conclusion in Lindley *et al* (2020) that Object Orientated Ontology can provide a generative capacity for creative processes aligns with Schmeer's (2019) set of xenodesignerly approaches in highlighting, questioning and critiquing human centricity. A gap remains between the conceptually driven and inspirational approaches to de-anthropocentrisation and the roles, issues, permissions and problems that many healthcare designers face in practice. The bias risk of using posthuman concepts delivered though human centred methods remain. A methods gap emerges between conceptually driven design and research, and applied design practice for healthcare. Alongside the methods gap sits another set of questions around the impacts, ethical issues and questions for healthcare designers in a new de-anthropocentrised practice.

4. Issues for Healthcare Design Methods

The shift from a user-participatory design approach to de-anthropocentrised will require a major shift in design methods and some substantial develops in a number of areas. Although user centred and participatory design are by no means universal and in some areas are still considered innovative and ground breaking the methods of focus groups, co-design workshops, design ethnography and design anthropology are relatively straight forwards and can be adopted by same species characteristics. Moving towards the other with the inclusion of other species and living systems will require much greater empathic tools on the behalf of designers and asks major questions about whether we could of should attempt to empathise with other non-human beings and whether we could even escape a human centred view of these relationships. If not, could this be good enough? Could we conceptually position ourselves into a de-anthropocentrised mindset with all the risks of conscious and unconscious bias and cognitive dissonance (Festinger, 1957) and deliver successful projects in the same was as a designer might use various design tools to put themselves in a mindset of a person with a different gender and age range with a life changing disability in order to design a successful solution? Can we transcribe the design tools for mono species for multi-species empathic insight or do we need a whole new set of tools?

The alternative to this bottom-up approach is through data driven models of energy usage like carbon footprint and striving for net zero impact as discussed previously above. The issues here lie in the assumption that top-down models of energy usage and data driven

models of impact are accurate enough and from a design perspective relatable and usable. For example, could we be reassured that a net zero carbon impact of a new ventilator design was a successful example of de-anthropocentrisation in healthcare design if all the suppliers used recycled and net zero processes even if they were offsetting? The answer is unlikely to be convincing.

Further ethical issues will emerge as we realise that human de centring will need balancing and potentially difficult trade-offs. This could mean that products are detuned for human priority and retuned for ecological balance at the perceived expense of a particular set of individuals while we successfully argue that it will create a far greater advantage for future generations. These conversations rarely exist between designers and clients or institutions as designers are ill prepared to negotiate this emerging ethical landscape in an industry which has traditionally struggled to project its voice on impact and leadership in an ethical landscape.

Fundamentally this asks the question of wellness at what expense? A humanistic anthropocentrised view leaves no stone unturned in improving the quality and longevity of life for others through healthcare design.

5. Current methods

We can look at current design methods to see if there are approaches that fill this gap with a win-win model for both humans and non-humans.

In industrial design and therefor healthcare design there are two groups of related ides and methods. The first deals directly with climate change and include: design for disassembly (making sure that products can be taken apart so that different material groups can be recycled), subtractive design (removing as much material as possible from a design to optimise performance and material use often with generative software and 3d printers), design dematerialisation (converting physical to digital or hybridising objects and functions), sustainable design (design for circularity and ecosystem balance), distributed design (lowering the cost and impact and empowering users and local customisation and production of designs), transition design (long term design in complex systems seeking to rebalance humans and ecosystem) etc. While these concepts and methods deal directly with the reduction of negative impact and the issues of climate change, they can all be conducted by leaving the human at the top decision maker in the value chain. It is this assumption of humans at the top and its inherent skewing of the value landscape and necessity of returning to global equilibrium that is questioned by de-anthropocentrisation. This second set

is less developed and has primarily emerged more recently seeking to question the top position of humans or offer alternative empathic models for greater inclusivity of species.

Daniel Metcalfe's research on multispecies design (2015) developed a method of designing for non-humans using a series of cards for including at key stages of the design process for designing for animals. The four areas are: Animal Clients with participatory animal design and extending responsibility; Representing Animals in the design process includes finding animal spokespeople, researching animals including learning the science, proxy interviews and somatic design; Human Animal Interactions includes soft reservations, identifying cultural baggage, avoiding domestication, opening communication channels and seeking synergies; Design Like an Ecosystem addresses the system level tools including open ended design, ecology of reference and embracing complexity. Representation is an interesting alternative to empathy as it avoids the issues of false connections or invented anthropocentric behaviours and instead seeks a representational model which can succeed in empowering without fully understanding. In terms of healthcare design one of the issues becomes abstraction of context for healthcare products from the greater environment. De-anthropocentrisation is likely to be less about directly designing with animals and more about seeking various ways to represent multi-species impact and agency where there are identifiable connecting points to products and services. Metcalfe's multi species tools contains some useful ideas which could be investigated further in healthcare design including animal representation, seeking synergies, open ended design, designing like an ecosystem and embracing complexity. It also shows how we could also move from designing for other species into designing with thereby producing a 4th layer of design values (in Fig. 1).

Speculative design has a long history of projects questioning relationships between humans and other species including Lingxizhou Meng's hybrid animal pets (2014) and Thomas Thwaites living as a goat (2016). It has provided a fruitful conceptual space for examining future issues that are removed from contemporary limitations. Schmeer's Xenodesign developed from speculative-critical practices and demonstrates potential for the inclusion of others going beyond conceptual models using new design frameworks and tools. A limitation in using critical speculative design for applied healthcare practices has been its avoidance of industrial collaborations and agenda's which on the one hand has freed creative potential and future imagination, while on the other has reduced feedback loops to applied designing.

In terms of healthcare design and systems second order cybernetics (Glanville, 2002) offers a model of both acting and observing in systems allowing potential scope for questioning the

relationship between humans and non-humans. There is also an argument that length of life and keeping a high quality as long as possible has been part of our concept of ourselves as linear beings rather than being part of circularities of living (Tree of life). Extending this argument could place linear thinking at heart of anthropocentrisation and that de-anthropocentrisation seeks to restore the role of healthcare design within a recognition of circularities. McArthur's circular economy model (2021) puts the economy at the centre of energy and materials cycles encouraging as little input as possible into production cycles in order to move towards closed loop production cycles and sustainability. In terms of intervening in systems Meadows leverage points in a system (1999) provides powerful tools for designers to intervene yet both McArthur and Meadows models assume human centredness and do not argue or make place for the other although both could very justifiably be used on behalf of others or with additional tools have others included.

We are left with a question about how we can address the gaps and connect the posthuman concepts via reappropriating methods from some aspects of non-human design alongside adapted methods from design systems alongside new methods.

6. Discussion

Win-win methods are clearly needed for human and non-human centred design yet the path to adoption is far less clear that that which took place between designer as expert and user centred-participatory design practices. While there are good conceptual models and framework emerging the underpinning methods and practices have yet to emerge to connect this gap. In addition, the abstracted quality of healthcare design and healthcare systems challenges us to reconsider where and how design cares. Primarily these can be summarised are four main gaps that currently prevent us from accessing applied healthcare design practices that can successfully include the other.

1.Methods

Applied design methods which enable us to identify which aspects of de-anthropocentrised concepts are relevant to individual service and products design projects and how to represent the other in value chains. New ethical models linking impact to accountability and recognition of different goals in terms of what counts as life quality in health.

2.Empathy

New empathy and representation tools with either proxies, spokespeople or other methods for including non-humans and most importantly findings ways to know which non-humans and at what stage of the design process do inputs take place and values change? A

consideration of what does representation of non-humans looks like in a healthcare design project?

3.Impact data

Designers will need processes that can incorporate mass data and qualitative evidence on a continuing ongoing basis to enable changing values for healthcare design alongside building on impact data produced by materials, systems and service suppliers.

4.System complexity

A recognition that increasing recognition of complexity in designing within systems requires design as an ongoing activity rather than a start-finish process. Moving beyond human centres leverage points and including non-humans in second order cybernetic acting and observing. Ethics of roles and responsibilities for design decisions and the ramification of these throughout system complexity over time.

These gaps are captures in the diagram below (Fig. 2) as an illustration of the evolution of designers concerns from expertise to designing with other humans and designing for all species.

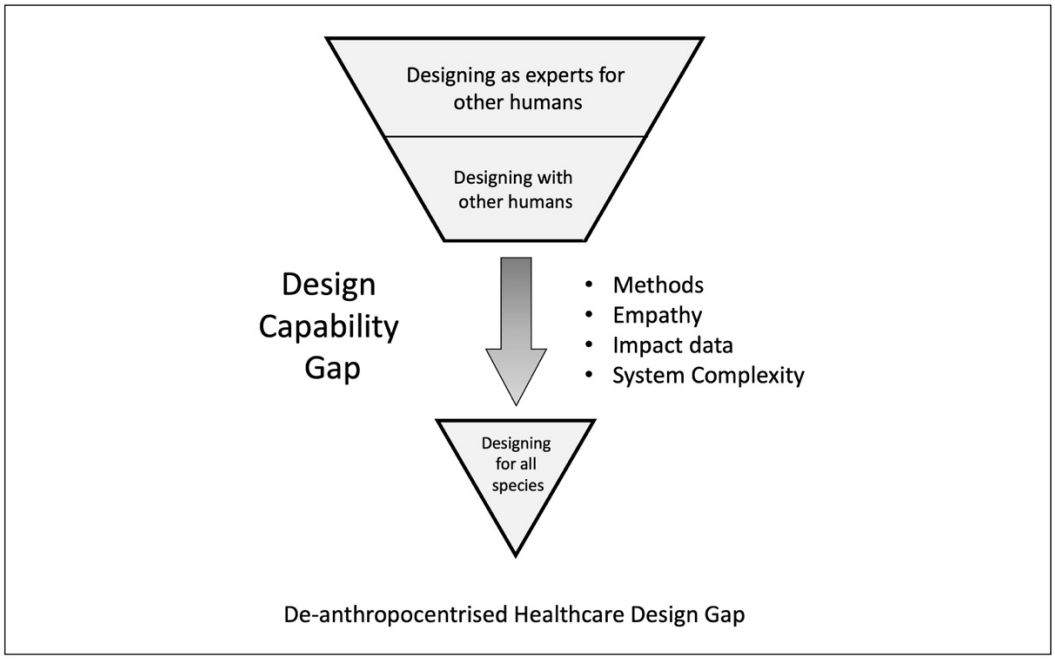

Figure 2. De-anthropocentrising Healthcare Design Gap

In 1994 Hancock and Bezold formulated the futures cone based on Canadian futurist Norman Henchey's 4 futures of: possible, plausible, probable and preferable to describe a new model for a world health organisation consultation aiming for an overview of the health

futures field. Design is always acting for transforming the future and while these types of futures models still stand, the question of which values from others can be included into deciding between a possible, plausible, probable of preferable future will depend on the new models of healthcare design engagement.

7. Conclusion and recommendations

We have investigated a series of concepts and theories for de-anthropocentrising healthcare design within a broad interpretation of posthumanism including actor network theory, object orientated ontology, xenodesign and design care via the Lancaster charter and found that there exists a strong set of concepts that can inspire designers and provide frameworks and new approaches. In term of applied healthcare design we find value in multispecies design and relevance from ideas in systems design that would need adapting to include the voices of other. This leads to a series of four major gaps of methods, empathy, impact and system complexity currently preventing successful implementation. We recommend that these are explored through the evolution of new design and research methods that can help designers understand when and where non-humans can be represented and accounted for in healthcare design while we recognise the complexity and ongoing responsibility for our actions in the ramifications of impact on systems over time.

We would welcome and recommend more healthcare design research focussed on this area and initial probes and experimental methods beginning to stake out more detailed questions for how we can finally evolve design methods and practices that represent the ecological voices as a whole rather than the priorities of a single species.

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去人类中心化的医疗保健设计

De-anthropocentrising Healthcare Design

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内容摘要：在设计研究与设计实践中，为重新定位人类在全球生态系统中的地位并保持可持续发展，设计师提出了去人类中心化的设计新思想。这些新思想包括后人文主义、行动者网络理论、面向对象的本体论、异种设计和多物种设计等，为设计师如何在设计中定义人类在价值链中的地位提出新的研究视角。当前的医疗保健设计模式将人类置于金字塔的顶端，通过负面输出（如医疗废物）对更广泛的下游生态系统产生负面影响。针对以上情况对未来的医疗设计产生的挑战，本研究开始探索新的设计方法和思想，以期发挥这种新方法的潜力。为此，本文提出了元层次医疗设计方法、伦理、价值链，以及新方法与设计实践存在的差距等一系列关键问题。

关键词：健康设计、去人类中心化、设计方法、未来健康、后人文主义

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一、引言

不久前，质疑人类在医疗保健设计的价值链顶端地位会被认为是可笑的。以用户为中心进行设计和创新，取得了巨大的成功。而设计项目的巨大成功证明，以用户为中心的设计解决方案，可以很明显地改善医疗保健健康行业，同时创造巨大的收益和影响。现在将这个问题视为第一世界的问题可能会被质疑，是因为大多数人认为这是生活在良好的医疗保健体系中、寿命较长的人们才会考虑的主要因素。但最近全球医疗保健与相关气候事件的发生，开始改变设计与医疗的角色，人们开始质疑以人为本进行设计的正确性。

基于以上背景，本研究拟解决以下问题：“在医疗保健设计中，如何将‘人’从价值链顶端移除，让全球生态系统得以重新平衡，同时能够保持医疗保健设计的不断完善。”或者更直接地说：“我们是不是太忙于拯救自己而无法拯救地球。”

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近年来全球气候变化对人口的直接影响，改变了人们以人为中心的观念，加速了人们对人类所有活动的质疑，开始提出需要有更广阔全球视野的观点，将人类纳入更广泛的生态系统体系与更为复杂的关系进行整体的平衡。例如，2005年的卡特里娜（Katrina）飓风淹没了11家医院（Gray等，2006年），而马萨诸塞州总医院、百翰医院和妇产科医院仅在2015年的一场冬季风暴之后，就损失了200万美元的加班费和数百万美元的手术费（《无公害医疗保健》和普华永道，2018）。以上案例证明气候事件对基础医疗设施存在直接风险。“人类世”一词是人类改变地球的最终认知，人类创造了一个全新的时代——人类时代（Waters等，2016年）。正因如此，演变出各种气候和物种受到影响的表现。除了“人类最高地位”带来这种影响，未来健康和医疗保健设计也面临着一些难题。这些难题将从根本上改变人类如何看待自己，以及人类如何评估自身在生态环境中的地位。要解决这一问题和存在的道德困境，需要对现有的医疗保健理念重新进行全面评估，即以人类为中心的设计方法，仅考虑人类生活质量和延长人类寿命，而忽视了更广泛的生态循环性和可持续性发展的理念，这也是人类的道德困境。

在对医疗保健整体环境进行概述后，本研究首先回顾了“去人类中心化”的概念，然后考虑了需要提出的问题，继而对解决这些问题的相关方法进行评估。本研究从医疗设计相关视角探讨了知识、方法和伦理方面的差异，最后对医疗保健设计提出“去人类中心化”的战略和建议。

二、医疗保健的影响

20世纪末到21世纪初，人类“金字塔顶端”地位受到越来越多的质疑，本研究主张人类应与其他物种和环境建立更为复杂的关系。医疗保健设计提供大量的产品和服务，用以改进生活质量、挽救生命和延长寿命，为全球数十亿人带来了巨大的好处，也因此造成了大面积的污染、浪费并导致其他生物物种退化，这也是导致气候变化的主要影响因素之一。世界经济论坛（WEF，2019）估计，全球4%的碳排放来自医疗保健。在所评估的国家中，不同的国家健康碳排放

（HCF）差异很大，荷兰位居榜首，其次是美国（HCF 8），最低是墨西哥和印度（HCF 3），英国排名第 13 位（HCF 5.5）。2009 年，英国国家卫生服务局（NHS）是世界上第一个提出碳减排战略的主要医疗机构（Naylor，2019 年），也是第一个将碳减排计划制订为“2040 年零排放影响目标”的主要医疗机构（NHS，2020 年）。Lenzen 等人（2020 年）在《柳叶刀》上撰文指出，目前尚无关于医疗保健对全球性气候变化影响的综合研究，仅有研究提出医疗保健占全球气候影响因素的 1% ~ 5%，表明目前没有健全的数据库对这一影响进行深入的研究。但全球 1% ~ 5% 的比例，仍然会对生态环境产生非常显著的影响。

尽管碳排放标准在衡量可持续性和环境影响研究领域得到普遍认可，但仍存在多方面不足，导致碳排放标准一直被诟病。补偿的概念（例如向一家公司支付一笔费用，即投资于碳减排项目的的金额与所使用的碳对环境的消耗相等）并不能解决当地的污染问题，还会让企业产生污染可以通过付费“抵消”的错觉。想让生态系统重新恢复平衡，人类必须要改变主要行为模式和生活方式（Hyams，2013 年）。众所周知，污染也可以通过间接的形式产生，对其他类型环境的改变和影响会对其他物种造成损害（如破坏迁徙模式），但仍可以通过补偿或零碳排放降低对生态系统的损害。（Lenzen 等，2020 年）材料、技术和服务的复杂性、可信度在构建和执行阶段都能通过设计减少碳排放或实现零碳排放，但如何实现零碳排放，是当前复杂的医疗保健系统设计面临的重大挑战之一。

高质量的医疗保健系统也意味着庞大且不断增长的经济负担。2018 年，美国医疗保健支出占美国 GDP 比例为 20%，即 36 亿美元（Altarum，2018 年），相当于年人均 1 万美元左右（OECD，2018 年）。而英国 2016 年的相关支出为 1917 亿英镑，其中 1520 亿英镑由英国政府出资，占国内生产总值的 10% 以下（国家统计局，2018 年），年人均成本为 4200 美元（经合组织，2018 年）。虽然这些不是影响环境的直接数据指标，但数据显著地显示了各国家以人为中心所付出的资源和努力，包括能源使用和对其他物种环境的影响。

三、去人类中心化

有的研究假设人类处于生物链的顶端，并且将人类定位在所有生物系统进化树的顶层，如同“存在锁链”（Great Chain of Being）（Wilson，1987）。Nee（2005）指出，进化学和生物学视角中人类顶端理念常被质疑，但人类在心理层面往往将自身视为一切事物的主人。

医疗保健相关的工业产品设计发展大致经历了三个阶段。最初是将工业设计师培养成工业化形式的专家，设计的可塑造性随着商业的成功得到提高。随着工业产品设计复杂性的增加，开始出现一系列用户相关的新问题，例如功能性、安全性和交互性等问题。设计师开始将用户纳入焦点小组进行设计。最终，设计过程从以用户为中心逐渐演变为用户参与式设计和协同设计。

早期以用户为中心的医疗保健设计案例是 1960 年 Bruce Archer 设计的 NHS 病床，该病床使用创新的剪刀机制调整病床的高度，以解决医院工作人员所反映的病床问题（Ghislane，2001）。该设计专门用来帮助护士和医生解决患者病床需要调整和固定高度的问题，是将用户因素引入设计的早期范例。之后，协同设计和以用户为中心设计开始大批量涌现，包括以用户为中心设计转向参与式设计、设计过程中的用户参与（Sanders，2002）和参与式设计中的工具与技术参与框架的设计（Sanders、Binder，2010）等。用户参与式设计和协同设计在设计实践中得到广泛应用，也是医疗保健设计中占主导地位的最佳设计实践模式。一些批判者指出了以用户为中心设计会产生的困难，如在复杂系统中的应用和解决一些棘手问题（Rittel、Webber，1973；Buchanan，1992），以及将设计专业知识与用户驱动的见解和规范水平相协调问题的权力关系与文化因素之间的权衡等（Gulliksen、Lantz、Boivie，2011）。所有这些问题都与复杂系统中的以人为本有关，这样的设计方式必须同时面对具有不同观点和复杂技术的多方利益相关者，在确定项目的情况后才能决定采取何种设计模式能够取得成功。

虽然工业设计和产品设计一致认为高安全性与降低风险都至关重要，但医疗保健设计可谓是长寿、生活质量和福祉改进最重要的应用领域之一（如果不是对人类有益设计的话）。正因为如此，在医疗保健设计中提出去人类中心化议题，也是因为人们意识到这一设计理念会给未来的设计提出潜在的难题，并揭示了一系列道德伦理问题及人类面临的艰难选择，因为这些难题和选择可能会显著改变这一领域的设计方式。

目前，医疗保健设计把人的价值放在金字塔的顶端，会把关注人类福祉作为绝大多数活动的优先考虑事项。由于技能缺乏、经济资源紧张、监管、垄断、文化或政府治理等问题，意料之中的是，世界上许多国家在医疗保健设计中缺少或极度缺乏以用户为中心的基本设计解决方案。此外，挑战人类在医疗保健领域的主导地位，也是相对发达国家的研究者们努力的结果。由于拥有普遍良好的医疗保健体系，使我们能够在其他国家仍急需挽救生命的短期解决方案时，奢侈地提出这些长期问题。然而，平衡生态系统必须要对设计方式进行重大改变和长期规划，因为质疑原有的设计方法会夺取人类在价值链顶端的唯一地位。因此，需要通过开发新设计方法和新途径创造新价值和新视角，增加额外的关注层面，尽量避免争端。这可以被视为一个不断提升的设计意识链条，因为我们已经从以专业设计师为主，转变为以用户为中心和协同设计，并进一步导向笔者所提出的新的价值转向——去人类中心化的医疗保健设计。（图 1）

在医疗保健设计中，创造一套新兴的理念和

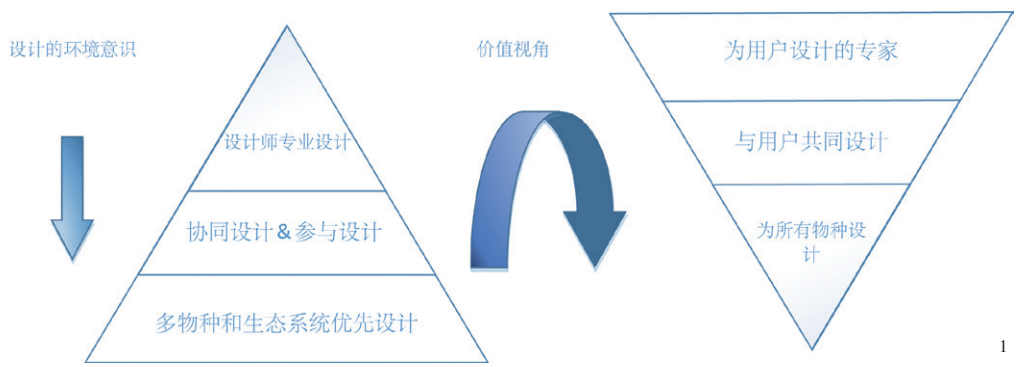

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图 1. 去人类中心化医疗保健设计价值观

实践是本研究的兴趣点，研究涉及设计理念和设计实践，以及一套调整后完整的价值观体系。这一价值观不会永远把人放在首位，而是建议将“其他人”和其他物种放在医疗保健设计的主要考虑范围内。

后人文主义是设计研究和设计实践中的一个广泛术语，是质疑以人类为中心发展问题的一种解答。新的理念试图通过构建物体、网络、联结、尺度和等级之间的新关系，将人类从生物大链的顶端分离出来。例如，作为一种理解设计的后人文理论，Wakkary（2020）提出了一种游牧式的方法来对抗人文主义设计实践。邻近学科的理论，包括行动者网络理论和面向对象的本体论，都成为开发关于非殖民化、种族、女性主义和其他包容性设计新视角（Forlano，2017）。后人文主义的批评家指出，后人文主义的概念和思维方式缺乏包容性，学者认为在关注和推动其发展的声音中，对于不同性别、种族和文化包容性的代表性案例采样不足（Forlano，2017）。

从另一个视角看，包括生物技术、人工智能和机器人技术在内的新技术使人类能力不断增强，这挑战了以下观念，即随着新形式的智能、计算和系统复杂性的出现，人类在系统进化树顶端的独特地位受到了挑战。其中一些技术成为了黑匣子（Ashby，1956），人类无法明晰已经演化出技术（AI）的全部功能细节，因此只能通过比较输入和输出的区别得出结论。长久以来，人类一直没有放弃质疑人与机器之间关系，Wiener在《人有人的用处》（1954年）和Hobbes在《海怪》（1651年）中都强调了机器对现代等级制度的影响。Georgedyson（1997）在《达尔文在机器》一书中探讨了计算智能超越人类的新兴规模，并推测互联网最终会形成一种新的全球式分布计算智能。虽然本研究的关注点有很长的历史轨迹可循，但与前述研究显著不同的是，早期对人类与机器的等级关注是由宗教暗示（Hobbes）或失控（Dyson和Wiener）驱动的，而本研究目前的关注目的则更为紧迫，主要关注的问题是人类能否生存，人类与环境之间的关系质量如何。

以下是对后人文主义现有研究的回顾，这些研究试图质疑、重构和平衡人与环境之间的关系，特别是当这些关系对医疗保健设计产生显著影响时。

Bruno Latour的行动者网络理论（ANT）创建了一个由行动者和“关系”组成的网络，提出人类利益的扁平化和去中心化，即行动者即可以是人，也可以是非人类的存在和力量，行动者可以是活体、概念体、技术或机构（Latour，2005）。行动者网络理论的目的不是解释或定义一个系统，而是允许对“关系”进行以人类非中心化形式进行研究。行动者网络理论被应用于设计时，可以改变社会、心理和经济因素。在医疗保健设计方面，特别是医疗保健服务方面，笔者看到了设计为人类与其他物种之间创建新联结的机会。但行动者网络理论存在准时化这一局限性，在这种情况下，像人工智能或机器人这样的复杂技术，会包含大量人类能够看到的过往状态和连接情况。此外，标点符号驻留在关联网络的边缘，但却没有边缘的识别规则，且不在关联范围的行动者仍可能关联网络并对网络产生重大影响。

类似地，物异向本体论（Object Oriented Ontology，OOO）是一种与存在密切相关的理论，在这种理论中，所有事物（对象）都具有同等的地位。实际上，人类可以在所有事件中去除物与人之间的人类中心化关系。物异向本体论作为一个强大的、具有建设性的起点，既可满足人类的愿望和推测，也允许新观点和批判关系的存在。但批评家指出，物异向本体论不可能识别出物体所处环境之外的物体，或与之相关的假设及物种的内部关系（Wilde，2020）。此外，本体论的观点认为物之间的关系是平等的，正是与物之间关系的特性和价值驱动着人类中心和人类中心化。

ANT和OOO可以激发设计灵感，但对于设计而言却遥不可及，因为理论可以在认识论层面上充实并激发新的思想和动机来质疑关系，但思想与医疗保健设计方案之间的关联还需要其他具体方法进行支撑和联结。Lindley等人在其对“设计研究”和“物异向本体论”的结论中证实了这一点，并指出医疗设计用途的可转移性：

“……OOO可以在生成模式下使用，是帮助推动原创思维的一种思维工具。在本研究提出的案例中，可以用来帮助推动与物联网产品设计相关的原始思想和想法，但也假设类似的过程转移到其他地方也可以得到应用。”（Lindley，Akmal，Coulton 2020，第39页）

在ANT和OOO中，围绕代理/对象的限制和边界，以及如何确定某个对象是代理/对象，还是连接器/关系，一直存在争议。如果本研究通过使用更多设计属性（如产品和服务的供给和能指方法）来设计去人类中心化的关系形式，那么理解这些问题对于未来的设计至关重要。

Johanna Schmeer的《异种设计师式认知》（*Xenodesignerly Ways of Knowing*，2019年）（Xeno的意思是“其他”，“Designerly”则源于Nigel Cross 2006年的开创性论文《设计师式认知》）和Schmeer（2021）的博士论文通过结合思辨实在论、异种理论、思辨设计的想法和设计实践，探讨了设计实践中蕴含的其他问题，提出人类中心化设计特征如下：

“以人为中心的设计方法的困难在于，无法越过直接用户着眼于可能受设计影响的‘其他人’——不仅是其他人类，而是人类以外的一切：生态、细菌、空气、土壤、人工智能等。”（Schmeer，2019，第1页）。

以人为中心的设计存在四个常见问题：不可持续的生产和消费模式；忽视生态和非人类的参与者；关注人类经验而限制对其他物种的包容性；通过（参与性/用户）共识驱动的更富想象力的解决方案存在一定风险。人们认识到，设计中缺乏能够超越以人为中心设计方法的实践框架。Schmeer建议使用异种理论和思辨设计来解决系统内复杂互联关系中存在的非人类问题。

这里提出的三种方法，以开发新的去人类中心化设计实践的异种（类）设计知识为起点。物异向设计借鉴了物异向本体论，将其作为一种扁平化和去人类中心化能动性的手段。超对象、透视描述、本体论和交互概念都允许去人类中心化的新尺度关系的存在，旨在扩展人类视角和接受度。批判性使用描述了一种设计输出类型，它试图通过围绕特定的异种设计问题引发讨论和对设计行为的改变，以改变人类与既定概念和事物之间的关系。物异向设计、话语近似和批判性设计等使用方法彼此交互和重叠，通过探索新的设计方式帮助人们相互看到、相互理解和采取行动。

异种设计建立在思辨性和批判性设计的基础上，但脱离了传统的以人为中心的关注点和对未来说明性的输出，并扩展到其他领域的概念和协作中，采用更强有力的行动来影响设计结果。在医疗保健设计方面，为人类和非人类参与者如何共同建设未来健康环境提供新的主张，并提供了帮助人类审视生态系统中“其他人”与人之间关系的强有力工具。Schmeer建议，将异种设计作为测试其他去中心化设计实践平台的主要设计方法。医疗保健设计实践（包括其他实践）的价值是显而易见的，新的批判主义视角可以提供新的

思考方向，而如何使用这种方法为人类和“人以外的其他物种”创造价值，以及敲定与之相关的设计决策，都是目前人类面临的挑战。人类能否创造出更多可以同时造福于人类和其他物种的应用类设计，例如呼吸机设计、机器人脑外科手术或 AI 健康预测平台设计等，都是未来人类面临的设计挑战。

Lancaster 医疗宪章是经历了一系列探索性研讨会和活动之后产生的，宪章对如何定义设计责任的新观点进行了调研，并提出“设计是否存在关怀？”这一问题。如果设计存在关怀，是关于什么的关怀以及表现形式为何？《宪章》规定：

“我们认为需要一种以医疗为导向的设计实践，作为对人类和非人类共存的承诺形式，让医疗生态的连带关系更加鲜明。关怀设计摆脱了‘设计师是英雄’的设计模式……我们设想了一种设计实践模式，这种模式超越了渐进式和孤立式的设计方法，取而代之形成一种医疗生态行为，这一行为涵盖了多个不同规模、相互联动的行动者。”（Rodgers 等，2019，第 73 页）

《宪章》还提出以下三个未来设计可能需要的条件：

（1）第一个条件是“复杂性关怀”——关怀设计需要对人类和非人类（即人工制品、动物、自然）、区域、全球、时间语境、后全球、后国家和后个人环境中的共同性与多样性价值具有高度敏感和谨慎的设计。

（2）第二个条件是“项目式关怀”——关怀设计承认物质和非物质之间复杂的关系网络，挑战人类世界和非人类世界之间的二分法。为了实现这一点，设计必须改变现有的范式，并引导其他学科从根本理念上进行转变。

（3）第三个条件是“关系关怀”——关怀设计主张当今人类必须修复而非切断人、物、环境和生态之间的关系，不仅要维持良好的平衡，同时强调这些实体之间相互依存的关系（Rodgers 等，2019，第 76 页）。

这里第一个条件特别引人注目，其中包括从本土到全球范围内，对环境复杂性和非人类物种的关心；第二个条件承认人类世界与非人类世界之间的二分法；第三个条件则推崇人与自然之间的关系需要进行良好修复、平衡并恢复相互依存关系。

虽然并非详尽无遗（其中一些概念出现重叠现象），但这些概念很明显可以澄清在全球生态系统的价值链中采取去人类中心化的设计观点和方法的主张。所有这些都指向一个后人文概念的设计平台，它提供了新兴的认识论、框架和方法，从概念上颠覆了以人为中心的医疗保健设计金字塔，并增加了对非人类物种的设计关怀。Lindley 等人（2020）的结论是，物异向本体论可以为创造性过程提供生成能力，这与 Schmeer（2019）强调、质疑和批判人类中心性的一套异化（类）设计方法是一致的。以概念驱动和鼓舞人心的去人类中心化设计方法，在解决医疗保健设计人员在实践中面临的角色、问题、权限等所寻求的解决方案之间，仍然存在一定差距。在以人为中心的大环境下，使用后人文概念必然存在偏见和风险。换言之，概念驱动的设计和研究，与医疗保健的应用设计实践之间出现了使用方法上的差距。除了方法差距之外，还有关于影响和伦理的一系列问题，以及新的非人类中心实践中医疗保健设计师的问题。

四、医疗保健设计方法的问题

从用户参与式设计方法到去人类中心化设计方法的转变，需要设计方法的重大变革，并需要在许多其他领域取得实质性进展。尽管以用户为中心设计和参与式设计并未得到全球普及，在某些领域甚至被认定为具有创新性和突破性的方法，但焦点小组、协同设计研讨会、设计民族志和设计人类学的方法逻辑是相对一致的，可以被具有同样特征的物种所采用。随着其他物种和生命系统的融合而产生的新世界，更需要设计师大量使用移情工具，并提出一些重要问题，例如人类是否可以尝试移情于其他非人类物种？人类是否能够摆脱这种以人为中心的关系观？如果人类无法做到去人类中心化，现有的状态能否满足可持续发展？假定人类得知人类去中心化设计方法实施时，心态是否会存在有意识或无意识的偏见？是否存在认知失调的风险（Festinger，1957）？与以往成功的设计项目进行对比，例如设计师使用各种设计工具，将自己置身于一个具有不同性别和不同年龄人的心态环境中，能否成功地设计出一个从设计视角帮助障碍人群生活的解决方案？人类是否可以将单物种的设计工具转变成一整套新的、可以适用于多物种的、具有同理心和洞察力的工具？

这种自下而上的替代方法，是通过使用数据模型驱动能源，如碳排放 足迹），来实现上文所述的零排放。这里的问题基于以下假设，即从设计视角来看，自上而下的能源使用模型和数据驱动影响模型足够精准，且数据是高度相关和可用的。例如，如果所有供应商都采用回收和碳零排放的工艺使环境得到补偿，人类能否放心将零排放新呼吸机设计安置到现有的医疗保健设计中去？研究结果似乎并不理想。

当意识到去人类中心化存在艰难选择权衡时，会涌现出更多的道德问题。这可能意味着，人类失去了使用产品的优先地位，生态系统若想平衡，打乱重新调整必然会牺牲特定群体的利益。乐观主义认为，这会为人类后代创造更大的环境优势。设计师、用户和机构之间很少会对以上想法进行沟通。设计行业一直努力在道德领域产生影响，同时希望在领导地位上发出自己的声音，但设计师显然对这一新兴道德领域的谈判准备不足。

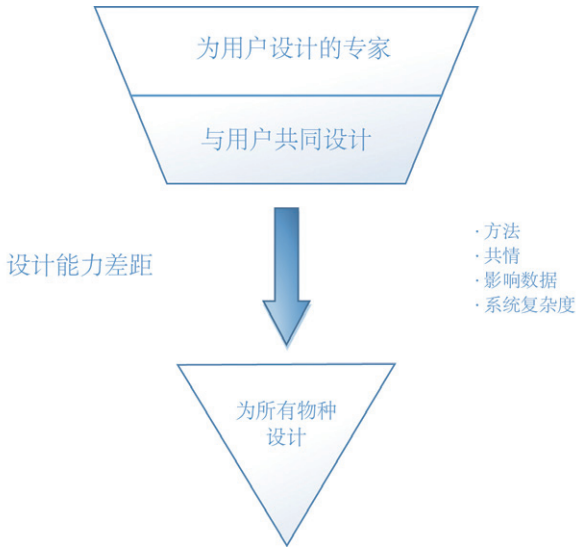
从根本上说，这个难题的本质是人类为了健康需要环境付出什么样代价？因为以人为中心的人性化观点，本质上是通过医疗保健设计千方百计提高人类的生活质量和寿命。

五、现有的设计方法

本研究意在发掘在当前的设计方法中，是否存在一个或多个能够让人类和人类以外的其他物种建立双赢的方法模型，以期填补上文所述的设计空白。

在工业设计和医疗保健设计中，有两组相关的思想和方法。第一个直接涉及气候变化，包括拆卸设计（确保产品可以被分解，以便不同的材料组可以回收）、减法设计（从设计中尽可能多地减去材料，以优化材料使用和产品性能，通常使用生成性软件和 3D 打印机）、设计非物质化（将物理对象和功能转换为数字或将对象和功能混合在一起进行设计）、可持续设计（循环性和生态系统平衡设计）、分布式设计（降低成本和影响，并授权用户设计并进行本地定制和生产）、过渡设计（寻求人类和生态系统再平衡的复杂系统中的长期设计）等。虽然以上概念和方法会直接减少对环境的负面影响和对气候变化的影响，但它们都需要以人为价值链中的最高决策者来进行。面对全球生态系统回归平衡的急迫性，正是这种人类处于顶端，固有的、扭曲的价值格局现状，致使现有设计方法受到了去人类中心化的质疑。第二组主要是最近出现的较不完善的体系，目的是质

2. 去人类中心化医疗保健设计差距



2

疑人类的最高地位，或为更大的物种包容性提供其他移情模式的设计。

Daniel Metcalfe（2015）通过对多物种设计的研究，开发了一种为非人类设计的方法，运用一系列卡片，以动物视角对设计的关键阶段进行调整。这四个领域是：具有动物参与设计并承担延续责任；在设计过程中代表动物（包括寻找动物代言人）、研究动物（包括学习动物科学、代理访谈和仿生设计）；人与动物的互动，包括软性保留、识别文化包、避免驯化、开放交流渠道和寻求协同作用；模仿生态系统设计，系统工具包括开放式设计、参考生态系统和包容性设计。表示法是移情设计有趣的替代方法，因为它避免了以人类为中心行为导致的错误关联或虚构关联产生的后续问题，转而寻求一种在没有充分理解的情况下，可以成功地赋权的表示法模型。就医疗保健设计而言，其中较为严峻的一个问题是如何从更大的环境中抽象出医疗保健产品的背景。去人类中心化不能直接用动物的想法进行设计，需要寻求各种其他方式对多物种进行代理，因此更加需要有可识别的产品和服务作为人与动物的连接点。Metcalfe 的多物种工具提出了一些有用的想法，这些想法可以对医疗保健设计下一步研究产生帮助，包括动物表示法、寻求协同效应、开放式设计、模仿生态系统设计和包容性设计。他还展示了人类如何从为其他物种设计转换成为第四层的价值层进行设计。（图 1）

思辨性设计项目历史悠久，这一设计一直质疑人类和其他物种之间关系，其中包括 Lingxizhou Meng 杂交宠物的研究（2014）和以研究山羊为生的 Thomas Thwaites（2016）。思辨性设计提供了一个富有成效的概念空间，在摆脱当代环境限制的情况下测验未来可能存在的问题。Schmeer 的异种设计是从思辨的批判性实践发展而来的，展示了运用新的设计框架和工具，将概念模型之外的其他设计纳入异种设计后的潜力爆发。批判视角的应用型医疗保健实践中，批判性思辨设计存在的局限是，因为避免了工业合作和议程，虽然释放了创造性潜力和未来想象力，但相应减少了应用设计的反馈循环这一过程。

在医疗保健设计和系统设计方面，二阶控制论（Glanville，2002）提供了一个在系统中可以对行动进行观察的模型，为质疑人类和非人类之间的关系提供了潜在的研究空间。还有一种观点认为，长寿和高质量生活是人类线性生命概念的一部分，而不是生命循环（生命树）的一部分。为扩展这一论点，可以将线性思维作为人类中心主义的核心，去人类中心化主义试图在承认生命循环的前提下，加强医疗保健设计的作用。McArthur 的循环经济模型（2021 年）将经济置于能源和材料循环的中心，鼓励将尽可能少的资源投入到生产循环中，以实现闭环生产的循环可持续性。在干预系统方面，Meadows 系统中的杠杆作用点（1999）为设计师提供了强大的干预工具，然而 McArthur 和 Meadows 模型都假定了以人为本的设计理念，并且不兼容其他模型。尽管这两个方法模型都可以非常合理地代表其物种或与其他工具共同使用。

现在面临的问题是，如何通过将去人类中心化设计的某些部分和设计系统中已存在的方法进行整合和重组，以形成一套新的方法来解决这些差距带来的问题，以及如何关联后人文主义概念。

六、讨论

对于以人为本和非以人为本的设计，双赢的方法显然是必要的。然而，应该采用的途径和方法远不如设计师作为专家和以用户为中心的参与式设计实践那样清晰明了。虽然现存一些良好的概念模型和框架，但并未出现能够完美地弥补这一差距的基础方法和设计实践。此外，由于医疗保健设计和医疗保健系统质量的抽象性特质，导致人们开始重新思考如何关注和使用设计。主要可以归纳出以下四个方面的差距，这些差距阻碍人们将医疗保健设计实践的经验运用到其他领域中去。

（1）方法

应用设计方法让人们能够确定，去人类中心化概念的哪些方面与单个服务和产品设计项目相关，以及在价值链的其他方面会以何种形式呈现。新道德模式将责任与影响结果联系在一起，并根据健康生活质量对目标进行识别。

（2）移情

新的移情和表达工具，包括代理人、代言人或其他表达方法以及非人类表达方法，发现了一些重要方法，能够帮助人类了解，哪些非人类在设计过程的哪个阶段会产生输入和价值观的变化？在医疗保健设计项目中非人类的表现如何？

（3）影响数据

在设计流程中，设计师需要持续不断地整合大量数据和定性证据，以便在材料、系统和服务供应商给予的影响数据的基础上，改变医疗保健设计的价值和地位。

（4）复杂系统

很显然，越来越多的人认识到系统内设计的复杂性，设计需要成为一项持续的活动，而不是一个开始即结束的项目。设计开始成为超越人类中心的杠杆点，包括对非人类在二阶控制论中的行动和观察。随着时间的推移，设计决策角色和对责任伦理的影响将贯穿整个复杂系统。

图 2 展现了某些设计缺失，阐述了设计师关注的问题从“专业知识”“与其他人一起设计”到“为所有物种设计”的演变过程。

1994 年，Hancock 和 Bezold 根据加拿大未来学家 Norman Henchey 的《4 种未来：可能、看似可信、可信和更好》与世界卫生组织（World

Health Organization）提出未来健康领域设计的新模式。设计总是在改变未来，虽然以上类型的未来模型仍然存在问题，但在决定一个可能的、合理的、可信的、更好的医疗保健设计未来时，非人类物种参与新模型的设计也极具设计研究价值。

七、结论与建议

通过 Lancaster 宪章对后人类主义进行的广泛解释，包括行动者网络理论、物异向本体论、异种设计和设计关怀，笔者研究了一系列用于非人类中心化医疗保健设计的概念和理论，发现存在着一套强有力的概念，可以启发设计师的设计并提供设计框架和新方法。在应用医疗保健设计方面，本研究发现了多物种设计的价值，以及系统设计中想法的关联性，这些想法需要根据其他物种的发声进行调整。在方法、移情、数据影响和复杂系统方面存在的差距，是阻碍目前医疗保健设计成功实施转型的四大主要影响因素。本研究建议通过发展新的设计和研究方法来探索这些问题的答案，以帮助设计师了解何时何地，可以在医疗保健设计中为非人类做代表和为他们发声。同时，本研究认识到，人类设计行为的复杂性和责任的持续性，会随着时间的推移对整体生态系统产生影响。

本研究欢迎并推荐更多研究学者关注医疗保健设计领域的研究，通过对现有研究的初步探索和对实践实验方法的研究，后续的研究会提出更详细的问题，并对设计方法和实践最终的导向进行阐述，以期能够代表整个环境生态系统发声，而不是行使人类单一物种的优先权。

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