

# Assisted gestative technologies

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## ABSTRACT

A large body of literature considers the ethico-legal and regulatory issues surrounding assisted conception. Surrogacy, however, within this body of literature is an odd-fit. It involves a unique demand of another person—a form of reproductive labour—that many other aspects of assisted conception, such as gamete donation do not involve. Surrogacy is a form of assisted gestation. The potential alternatives for individuals who want a genetically related child but who do not have the capacity to gestate are ever increasing: with the advent of uterus transplantation (UTx), and the anticipated development of artificial placentas. In this paper, I highlight the pertinent conceptual differences between technologies assisting conception and those assisting gestation to demonstrate that distinct issues arise when assisted gestative technologies (AGTs) are used. I argue that there is utility in considering AGTs as a genus of technologies. These technologies perform the same function from the perspective of putative parents and might exist on a spectrum of alternatives when they become more available. Moreover, since many of the same or very similar ethical, social and legal issues are raised by surrogacy, UTx and ectogestation, analysis of these issues will be better contextualised by considering these technologies together. Many of the matters currently being highlighted for reform in the context of surrogacy will inevitably impact on how other forms of assisted gestation are governed. The conversation should be broadened; we should consider how far other emerging technologies might be accommodated in revised regulatory schemes.

‘Life is usually just a condition of existence; in gestation it is creation; but it is a strange creation that takes place in contingency and facticity’ (De Beauvoir, *The Second Sex*)

## INTRODUCTION

Assisted gestation has existed for as long as human reproduction in various forms of surrogacy.<sup>i</sup> However, technology is seemingly bringing us to ‘the third reproductive revolution’<sup>1</sup> with the increasing availability of multiple forms of assisted gestation. Technological developments have enabled gestational surrogacy, in which one individual can undertake gestation for others where they are not biologically related to the fetus.<sup>ii</sup>

<sup>i</sup>Traditional/genetic surrogacy, in which a person sustains a pregnancy where they are genetically related to the fetus with the intention that the resulting child be raised by others, has long been practised as a form of family formation.

<sup>ii</sup>Gestational surrogacy is to be contrasted with genetic/traditional surrogacy in that the surrogate does not contribute their own gametes.

Uterus transplantation (UTx)<sup>iii</sup> has enabled individuals to assist in gestation by donating their uterus to another person (who does not have one) so the recipient can undertake gestation themselves. There is growing speculation about the possible development of artificial placenta technology,<sup>iv</sup> which could have the capacity to ‘take over’ gestation of a fetus when a pregnant person can no longer (or is no longer willing to) continue gestating.<sup>v</sup> These technologies are all forms of assisted gestation: they ‘involve some technological intervention that allows persons who want to reproduce, potentially using their own genetic material, but are unable, or potentially unwilling, to undertake gestation (or the entirety of gestation themselves) for a variety of reasons: whether biological or social’ to gestate, or to have another person or device perform that labour on their behalf.<sup>4</sup>

I argue that it is useful to consider ‘assisted gestative technologies’ (AGTs)<sup>4</sup> as a genus,<sup>v</sup> and that these technologies collectively raise distinct ethical, legal and social issues from those related to assisted conception. Considering these technologies together will improve our conceptual understanding of gestation and assisted gestation. Moreover, conclusions made about the legality/permissibility of one AGT could impact on how other AGTs are accessed.

The science of AGTs is moving quickly. We need to think proactively about new technologies to ensure an appropriate regulatory response to them if/when they come to fruition.<sup>4-7</sup> There is growing recognition of the need for law reform. In the UK, the Surrogacy Arrangements Act 1985, alongside some provisions in the Human Fertilisation and Embryology Acts (HFEAs) 1990 and 2008, have been criticised for failing to reflect the lived experiences of

<sup>iii</sup>In December 2014, the first live birth from a transplanted uterus was recorded in Sweden. Since this success, uterus transplants have been performed world-wide using uteruses donated from both live and deceased donors.

<sup>iv</sup>Commonly referred to as ‘artificial womb technology’. For an explanation as to function see Romanis (2018) and as to why this is better referred to as an artificial placenta, rather than an artificial womb, see Kingma and Finn (2020).

<sup>v</sup>The term genus is borrowed from the concept in taxonomy. Genus is derived from the word ‘type’ in latin and is used to describe a group of entities that have common attributes and are structurally similar in evolutionary development. In this paper I advocate that AGTs are a genus because they have common attributes in how they are used, and although they operate differently, they have been developed for the purpose of enabling people who are limited in their abilities to gestate— for whatever reason – to access an alternative means of becoming a parent by assisting with the generative process of human entities.



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those involved in surrogacy arrangements.<sup>8,9</sup> The All-party Parliamentary Group on Surrogacy recently recommended revisiting birth registration/legal parenthood and the non-enforceability of surrogacy arrangements.<sup>10</sup> The HFEAs focus on those regulatory issues (evident from the name) relating to embryo research and technologically assisted conception. The Acts do not address the critical, and distinct, issues that arise from AGT, which has been noted by commentators considering surrogacy,<sup>8,11,12</sup> UTx<sup>5,13</sup> and artificial placentas.<sup>5,14–16</sup> Alhrani described the HFEA 2008 as a ‘missed opportunity’ because it failed to account for possibilities like UTx and artificial placentas.<sup>17</sup> The HFEAs, however, have their focus clearly set on conception and so they might not fairly be considered a failure for not addressing matters related to gestation. It truly would be a missed opportunity, however, if current conversation about surrogacy law reform did not make space for consideration of assisted gestation more broadly.

### ASSISTED GESTATIVE TECHNOLOGIES

For some time,<sup>vi</sup> assisted gestation has been an option for those unable/unwilling to gestate in the form of surrogacy.<sup>vii</sup> However, this option has been inaccessible to many for legal,<sup>viii</sup> or financial reasons.<sup>ix</sup> For many, surrogacy is also ‘less than ideal’: if they want to experience pregnancy/undertake gestation themselves,<sup>18</sup> or find the legal uncertainty<sup>x</sup> off-putting.<sup>19,20</sup> Future AGTs—when/if available—could be highly sought after<sup>20</sup> both as an alternative to surrogacy, and on their own terms for the specific benefits they offer. UTx would allow an individual born without a functioning uterus to undertake gestational labour themselves.<sup>18,19</sup> An artificial placenta (capable of facilitating partial ectogestation) might enable those persons worried about their capacity to complete gestation—for health or other reasons<sup>16,21</sup>—to begin a pregnancy confident that assistance is available later in term if/when necessary. Surrogacy is unlikely to be made redundant by future AGTs as it is preferable to putative parents worried about the potential health implications associated with UTx<sup>19</sup> or artificial placentas<sup>3,4,22</sup> (both involve major surgeries). AGTs could exist as a spectrum of options regarding how gestation is assisted,<sup>20</sup> much like how a person seeking assistance with conception has an array of options (artificial insemination, IVF, etc, and using their own or donated gametes).<sup>xi</sup>

AGTs work in different ways; some can be utilised to help a given person, A, have a biologically related child without gestating (surrogacy or complete ectogestation) or only partially

gestating (partial ectogestation); others enable A to gestate themselves where they would otherwise be unable (UTx). Some AGTs work by demanding significant labour on the part of another person—UTx, for example, involves another person, B, donating an organ, and surrogacy requires B to sustain a pregnancy.<sup>19</sup> Other AGTs do not require bodily labour on the part of another person, as gestational labour is technologically assisted, for example, ectogestation. However, ectogestation still relies on the labour of others—for example, carers monitoring an artificial placenta. It might be questioned why some technologies that do not enable A to gestate themselves should be classed as ‘assisted gestation’. These technologies might be thought of instead as ‘alternative gestation’ since they do not enable the service user to undertake the gestation themselves.<sup>xii</sup> However, that the technology does not result in the individual (A) gestating in themselves does not mean that the technology is not assisting A with the performance of gestational labour; where this is undertaken by another person or by a machine it is still done so at the request of the intended parent who is ‘being assisted’ in a task they cannot/will not perform themselves. We term In Vitro Fertilisation (IVF) ‘assisted conception,’ despite the assistance provided not enabling the person to conceive in themselves—conception in IVF does not happen occur where it occurs ‘naturally’ in the body (it takes place *ex vivo*). That AGTs all work differently also does not prevent them being categorised together. They perform the same function from the perspective of a potential service user.<sup>4</sup> Furthermore, they raise the similar complex ethico-legal and socio-political issues distinct from those involving assisted conception<sup>4</sup> because gestation is such a unique and demanding form of labour.

### CONCEPTION VERSUS GESTATION

There are relevant critical distinctions between the processes of conception and gestation when considering how we might conceptualise technological interventions into these processes. Fundamentally, ethico-legal questions about conception often relate to matters of who should/can come into existence. For example, there is much debate about whether there is a moral duty to have certain types of children,<sup>23,24</sup> or who can become a genetic parent.<sup>25</sup> Questions about gestation, however, are not about which entities come into existence, and/or who they are genetically related to, but instead about how a human entity is sustained and supported (in the process of becoming) after conception until birth.

Conception is the process in which an ovum fuses with a sperm cell to form a human zygote.<sup>26</sup> While conception is often described as singular event (‘the point of conception’)—the process actually takes around 24 hours.<sup>26</sup> Conception can occur naturally in the oviduct of a human person with typically female physiology following sexual intercourse that resulted in the deposit of sperm in the vagina.<sup>26</sup> Biological innovation resulted in the development of techniques to assist with fertilisation outside of a female body. IVF is conception in artificial conditions; ovum are fertilised and grown *in vitro* before being implanted into a person with female physiology.<sup>xiii</sup> Conception

<sup>vi</sup>Gestational surrogacy has been practised since the mid-1980s. Genetic/traditional surrogacy has been used to form families for much longer (see i).

<sup>vii</sup>Gestational surrogacy also involves some assisted conception—this will be discussed later. The fact that conception is assisted does not prevent the process from being labelled as an instance of assisted gestation. This is because conception takes place as a separate event first—though it is assisted, and the assistance with gestation takes place afterward and can be separated out as a distinct element of the reproductive process.

<sup>viii</sup>For example, in England and Wales, it has only just become legally possible for single males to become parents by surrogacy.

<sup>ix</sup>It is common practice for parents to go overseas to access surrogacy (pre-pandemic) in jurisdictions where there is more legal certainty about the rights of intended parents. This is obviously incredibly expensive—often there is a fee to be paid to a surrogate, but also the logistics of the operation including travel and securing legal representation all add up.

<sup>x</sup>There can be considerable anxiety for intended mothers about their rights following the birth of a child by surrogacy.

<sup>xi</sup>This is all assuming *access* to these options.

<sup>xii</sup>I am grateful to Professor Emma Cave for raising this potential objection.

<sup>xiii</sup>The law in England and Wales currently specifies that embryos can only be implanted into women. Hammond-Browning (2019) explains that as written the Human Fertilisation and Embryology Act 1990 (as amended) prohibits implantation in a person who was not born with physiology that is assigned as female.

is not a stage of a pregnancy; pregnancy begins at the point that a formed embryo is successfully implanted into the uterine wall some 3–4 days after conception.<sup>26</sup>

Human gestation is the generative process between conception and birth. It has been a seemingly immutable fact of human reproduction that gestation was confined to the uterus and sustained by a pregnant person.<sup>27</sup> The ‘coming into existence’ of humans and other mammals does not happen in a vacuum, but occurs in... intimate intertwinement with another organism:’ the pregnant person.<sup>28</sup> Gestation usually results in a human entity that, when the process is complete, is capable of existing as a live, unique organism in the external environment.<sup>xiv</sup> The period of human gestation—around 266 days<sup>29</sup>—encompasses several stages including embryogenesis (embryo formation), and many phases of fetal development.

Gestation as a generative/creative process is much lengthier than conception and, because of biological realities yet to be transcended by scientific endeavour, is much more physically demanding of a person who facilitates it by them having to sustain a pregnancy. Gestation, as currently sustained by a person, is not just a process of formation of a human entity, but also of physical and structural changes to an existing person. While being a part of the pregnant person’s uterus,<sup>28</sup> the forming human entity becomes a new *part* of the pregnant person.<sup>30</sup> This affects that person’s corporeality substantially because of changes to their *entire* physiology and physicality. There suddenly exists a new organ (as well as a new part); the placenta—formed partly of tissue from the forming human entity and the pregnant person.<sup>31</sup> The genetic make-up of the pregnant person is also altered by microchimerism across the placenta.<sup>32 33</sup> Cells originating from the gestating entity are known to remain in a (formerly pregnant) person for decades.<sup>xv</sup> Gestation, facilitated by pregnancy, is the biological genesis of the ‘making and remaking of each other’ as a continuous process.<sup>34</sup>

There are ‘distinct and at times dramatic changes to a woman’s somatic experience’ during pregnancy.<sup>35</sup> As de Beauvoir puts it, ‘pregnancy is above all a drama playing itself out in the woman between her and herself’.<sup>36</sup> Pregnancy is not always experienced by individuals as (wholly) negative—the point is just that, it is a unique form of labour affecting many aspects of how an individual feels *in* themselves and *about* themselves as their body transcends itself. Hormonal changes affect how a person feels and how they perceive and interact with everything, and everyone, around them. The materiality of the body is also altered in a cultural sense. Huge expectations are placed on gestating people in terms of ‘public ownership’ of gestation,<sup>37</sup> and subsequently of appropriate behaviour in pregnancy.<sup>38</sup> In western cultures, pregnancy excludes embodied privacy; details of one’s physical self/condition become perceived as public knowledge; strangers routinely ask questions of the duration of gestation, of fetal sex, and to touch the ‘bump’.<sup>39</sup> Medical and social recommendations about how to behave during pregnancy abound

on everything from what (not) to eat and drink, where (not) to go, how (not) to exercise etc<sup>40</sup> such that choices in daily routine can feel subsumed by expectation. Failure to comply can lead to being labelled a ‘substandard’ gestator.<sup>41 42</sup>

While conception involves physical and emotional labour, it is not to the same degree. Where conception is naturally occurring, it could be something an individual has limited awareness of. This is not universally true because following sexual intercourse a person that has the physiology to become pregnant might experience anxiety/anticipation about whether they have become pregnant (meaning conception has occurred and the result has successfully implanted into their uterus) depending on their perspective on reproducing at that particular time.<sup>xvi</sup> This experience is more existential than related to the physical process that may be happening inside their oviduct. While many people have to try to conceive over a period of time, the actual process of conception itself is short relative to the rest of the time span of reproducing—24 hours (compared with 266 days of gestation). Conception (where it is not technologically assisted) is not something that many people would describe experiencing in a physical sense; the events surrounding conception are, but not the conception itself. Where artificial, conception takes time and can be physically, physiologically and emotionally taxing on people producing ovum, as a result of the necessary medical interventions including (but not limited to) the hormone treatment needed for oocyte stimulation. These taxing events are more preparatory to conception and implantation, although these are a big part of the way conception is experienced. It is not to downplay the significant physical undertaking in assisted conception to say that this labour does not comparably alter the physicality of the person as gestation does; there are not the same degree of physical changes (eg, the literal formation of a new organ) and there is not the same transcendence. Because gestation currently necessarily involves a pregnancy, there is a more significant form of physical (technically assisted) labour on the part of one person. Importantly, in the case of AGTs, this person could be an individual other than the intended parent.

That some persons will access technology both to assist with conception and subsequently gestation does not detract from the fact that the two process are distinct. The ethical issues that relate to the two elements of the process raise different ethical questions. Assisted conception allows the formation of a new human entity and potentially some control over the genetic make-up of a potential future entity (because of technologies like mitochondrial replacement techniques). In contrast, assisted gestation enables control as to how that entity (already formed in or ex utero) becomes fully formed in the generative process before birth such that it (might) be capable of being born alive.

## ETHICO-LEGAL ISSUES

In this section, I outline some of the unique ethical issues arising from the potential use of AGTs. The issues highlighted are by no means exhaustive, but they illustrate the overlap in the ethico-legal questions that might/should be asked about individual AGTs, and thus the usefulness of considering them collectively. Examination of AGTs as a *genus* will help improve our conceptual clarity on the relevant matters and is important because, seemingly inevitably, decisions made in one context will have

<sup>xiv</sup> Where gestation is sustained by a pregnancy the gestating entity is not a unique organism because it remains a part of the pregnant person’s body (Kingma 2019). Thus, it becomes a unique entity when delivered. This does not, however, mean that there could never be entities undergoing gestation that are unique entities. Where the entity is gestating extra uterum (facilitated by a machine) it will be a unique organism (because it is not a part of another living organism) even though still undergoing the process of ‘being created’ (Romanis 2019).

<sup>xv</sup> The opposite is also true: cells originating from the person who gestated remain in the child born alive for decades.

<sup>xvi</sup> I am grateful to Jordan Parsons for discussions on this point.

a broader impact as other technologies become increasingly available. On each issue, I begin with the current legal position. While law is not a source of ethical ideals, it is a good place to begin ethical inquiry as it provides ‘a statement of the status quo for evaluation’.<sup>4</sup>

### Access to technology: legal and ethical limitations

The law has long limited groups of people’s access to reproductive technologies. Until 2019, single people were indirectly prevented from using surrogacy in the UK because it was much more legally complex for them.<sup>xvii</sup> Ethical and socio-political debates about access to surrogacy are ongoing,<sup>xviii</sup> and similar questions are raised about access to UTx<sup>13 43 44</sup> and artificial placentas.<sup>16 21</sup> This context serves to illustrate the extent to which the law dictates who can access reproductive technologies (including assisted gestation) already. AGTs in development raise some new questions building on these live debates.

An artificial placenta introduces a form of ending a pregnancy without ending gestation.<sup>3 16</sup> This technology has enormous potential in aiding pregnant people experiencing a dangerous, but wanted, pregnancy.<sup>3 16</sup> There is also speculation about its use in broader circumstances (for social or personal reasons),<sup>21</sup> which raises the question about when pregnant people would,<sup>16</sup> and should,<sup>21</sup> be empowered to opt-out of gestation. While these might be ethical questions, examining the circumstances in which technology ought to be used speaks to how current law needs to be reformed—or how future regulation needs to be envisaged.

This question about a moral right to opt out of gestation,<sup>xix</sup> can actually be described as a much broader one—is there a moral right to access any form of assisted gestation where it is not strictly clinically necessary? However, that this right has been framed differently in different contexts has meant that how it may have been conceptualised does not marry. For example, some have argued that any person (carrying a pregnancy) should be afforded the right to access artificial placenta technology with no qualification on the reasons for that choice.<sup>16 21 45</sup> Some have specifically argued that artificial placentas are a form of assistance healthcare that all people with female physiology are entitled to because of the ‘pathological nature of gestation and childbirth’.<sup>45</sup> However, to couch a right to use an artificial placenta in

these terms has problematic implications. It does not reflect the lived experiences of all pregnant people (though some feel this way)<sup>46</sup> and denigrates claims made about the value of pursuing pregnancy/gestation and thus potentially access to other forms of AGT.<sup>46</sup> This framing could have a serious negative impact on how pregnant people are treated because ‘alternatives’ are available.<sup>46 47</sup> Pain and suffering in pregnancy/childbirth would consequently not be attended to/treated as willingly (and note there are already problems with the extent to which pain is not appropriately treated in birth,<sup>48</sup> especially among minorities)<sup>49</sup> given that it could be conceptualised as a choice a person has made. Furthermore, such framing has serious implications for how we conceptualise of other AGTs. It might make UTx and surrogacy harder to justify as they would more explicitly be seen only as a cause of pain and suffering—and in the case of surrogacy specifically on the part of another person.<sup>xx</sup> Some scholars would accept these consequences as they argue explicitly that surrogacy/UTx is problematic.<sup>50</sup> However, such an approach denies the lived experiences of people who willingly undertake surrogacy for others,<sup>51</sup> or those who want to experience pregnancy through UTx.<sup>18</sup> Thus, framing the right to opt out of gestation in this way is not a good basis for enabling access to AGTs based on its minimisation of different individual needs and preferences.

Alternatively, this question of a right to assistance with gestation is also explored in the UTx literature, though the question is put differently; is there a positive right to experience gestation that people can rely on to claim a right to UTx in place of gestational surrogacy?<sup>43</sup> Alghrani has conceptualised this right as a possible natural extension of the principle of procreative liberty.<sup>43</sup> O’Donovan, centring the subjective experience of those who need assistance to gestate, has explored the experiential value of UTx as allowing individuals to experience gestation themselves.<sup>18</sup> Conceptualising of the right to assistance as being based on the right to experience the embodiment of gestation needs further interrogation for its potential consequences. Does this overvalue pregnancy to the degree that it ‘shames’ individuals who do not/cannot physically gestate? Such framing might have the unintended consequence of amplifying specific social narratives of pronatalism and of shaming certain technological assistance in pregnancy and birthing (this already impacts on people who have a caesarean rather than vaginal delivery).<sup>52</sup> Persons who opt for surrogacy or artificial placenta rather than UTx could be ‘shamed’ for not having sustained gestation themselves.

Perhaps the moral right to carry/or not to carry a pregnancy can be considered as a part of the moral/legal right to become a parent. But this still leaves questions; if this is how a right to make decisions about *how* to gestate, much like how parents are socially afforded significant freedom to parent in different ways,<sup>53</sup> is grounded, this could have a negative impact on surrogates and their bodily autonomy because of the implication that intended parents ought to be involved in matters of the gestation. Furthermore, it would likely be a conceptual failure to characterise a decision about gestation as a matter related to ‘parenting’ in any sense since before birth there is no entity that can be ‘parented’ as such.<sup>54</sup>

There has also been discussion on the limits of any (potential) moral right to seek assistance with gestation. Concerns

<sup>xvii</sup>This was because they would be unable to obtain a parental order after the birth of the child resulting from surrogacy. This was remedied in the passing of the Human Fertilisation and Embryology Act 2008 (Remedial) Order 2018, which made amendments to the Human Fertilisation and Embryology Act 2008.

<sup>xviii</sup>In England and Wales, there has never been a direct prohibition on certain groups accessing surrogacy, but certain groups—such as single people—were not able to apply for a parental order after a surrogate birth. This made the process more complicated as these people had to adopt the child. I am grateful to an anonymous reviewer for discussions of the nuances of this. In some jurisdictions, intended parents must be married, or undergo a welfare assessment to consider their suitability to parent. See Robertson (2016).

<sup>xix</sup>It is to be emphasised here that this is an ethical question because English law is clear, following *Burke v General Medical Council* [2005] EWCA Civ 1003, that patients do not have a right to demand one form of care over another and in the absence of an emergency a doctor cannot be compelled to perform a particular medical intervention. I would argue that there is a moral right to opt-out of gestation if a person no longer wants to perform this labour, but still wants to reproduce, and the technology is available. But—I do not have the space to defend this here.

<sup>xx</sup>I am grateful to Victoria Adkins for discussion on these points.

about the invasiveness of the fetal extraction process for gestation *extra uterum* in an artificial placenta are most often raised as reasons why artificial placentas are not an alternative to abortion.<sup>6 23 46 55 56</sup> These same concerns, however, might also be raised when questioning whether it is justified in instances when pregnancy is progressing well, but a person wants to opt-out of pregnancy in favour of *extra uterum* gestation. Alghrani has questioned whether partial ectogestation should be restricted only to those pregnant persons who have a demonstrable medical need for assistance with gestation during their pregnancy.<sup>57</sup> These concerns about the justification of the use of technology echo those raised in the UTx literature about the invasiveness and riskiness of the procedure (for donor and recipient)<sup>44</sup> when there are other forms of AGTs (gestational surrogacy) available – though these will not always be available or desirable alternatives.<sup>18 43</sup> The concern in the context of surrogacy is that the risk of another person potentially being exploited might outweigh any claim to a right to assistance with gestation.<sup>58</sup> It is clear that separate debates are ongoing about the ‘appropriate’ use of these assistance technologies where they are not understood to be, in narrow clinical terms or on the basis of some particular social conventions, ‘necessary.’ These debates would benefit from convergence. At root, these questions are fundamentally the same; they are about rights to assistance with gestation, how this might be understood and framed, and potential limitations.

Ultimately, it is difficult to reach any conclusions about rights to undertake or to forego gestation (in ethical or legal terms) in the case of any one form of AGT without this necessarily, by virtue of consistency, impacting on conclusions about access to other AGTs.<sup>4</sup> Without considering these technologies as a genus there is the potential for a hierarchy of assisted gestations to be established where conceptualisations of rights to or not to gestate are at odds. Further, rights to opt-in or opt-out might be thought dependent on the absence of *comparable* alternatives.<sup>44</sup> What ‘comparable’ means to individuals will be up for debate. Surrogacy, for people wanting to become parents, might be considered an alternative route to *parenthood*, but not to some of the more physical aspects of being an ‘expectant parent’ because of the absence of the experience of gestation. There is ethical debate about the ethics of using a surrogate when UTx is available (and vice versa),<sup>18 19 59</sup> the same discussions would likely surround the advent of artificial placentas,<sup>4</sup> considering the ethics of using a surrogate where a person could themselves be pregnant<sup>58</sup> a short time before opting for machine assistance.

The use of AGTs, and how such uses are ethico-medically and socially explained and justified, may also change the way that gestation is broadly conceptualised. Some have expressed concern that alternatives in this context, including surrogacy and ectogestation, enable more public interference in human creation, could be to the detriment of pregnant people’s rights. In particular, the expectations placed on them.<sup>41 42 46 47 60</sup> Specifically surrogacy<sup>61</sup> and ectogestation<sup>46 62</sup> may intensify the ‘maternal-fetal conflict’ model of pregnancy that ‘implies the existence of two mutually distinct and disinterested patients with potentially hostile interests’<sup>61</sup> and results in pregnant people being coerced into behaving in ways that prioritise the fetus over themselves. Since there is more control that can be exercised over gestation when machine-facilitated, the conceptual separation of gestation from pregnancy is imperative to prevent excessive social and legal regulation of pregnant people. How this conceptual distinction might be socially and legally cemented needs investigation.

### Access to technologies: social and financial limitations

In addition to whether options are/ought to be legally accessible, there are broader questions about access. These result from the fact that AGTs (especially where the use is for ‘non-clinical reasons’) may not be publicly funded.<sup>42 60 63</sup> This is not to say that public funding for ‘non-clinical reasons’ should be precluded, especially since what would be determined a ‘clinical reason’ might be construed narrowly to the detriment of the lived experience of individuals needing assistance with gestation.<sup>16</sup> However, in a publically funded health system where there is competition for resources AGTs for less urgent clinical reasons (or social reasons) are unlikely to be prioritised.<sup>42 60</sup> Thus they would only be available to people able to afford them, which could have huge ramifications for equality.<sup>21</sup> If ectogestation is only available to wealthier people, this could increase disparities that already exist in pregnancy outcomes.<sup>60</sup> Richer people would have choice about how much of the physical and physiological burden of reproductive labour to bear and poorer people would not, potentially even when their pregnancy is difficult. Similarly, UTx offers a choice about pregnancy that if only available to richer people results in an unequal disparity of reproductive experience. Equally, there exist concerns about who surrogacy is accessible to, and the resulting demands that are made of socially disadvantaged people in order to assist. Surrogacy can be expensive, and so some argue that it enables richer people to pressure poorer people into performing gestational labour for them.<sup>64</sup>

Concerns about inequality of access to choices about gestation, and associated wider implications, arise in the context of all AGTs. Given that from the perspective of a service user surrogacy, AGTs may exist as a spectrum of options, there is a need to be attentive to the realities of who they are accessible to so that a genuine choice can be made, both by the person seeking assistance and a potential other person willing to render assistance.<sup>19</sup> For this reason, an investigation of these technologies collectively that examines them in a manner attentive to their wider social implications will enrich conversation about equality of access.

### Birth registration: parenthood and origins

Questions of parentage and origins that arise from the use/potential use of AGTs speak to important aspects of individual identity including who they are, and how they are defined in relation to others. Concerns about the attribution of legal parenthood, and specifically motherhood, have long been apparent in the surrogacy context and are emerging about UTx. In the UK, a mother is the person who undertakes gestation.<sup>xxi</sup> This attribution of motherhood has been widely criticised in the surrogacy context for failing to account for the intentions of both intended parent(s) and surrogates assisting in gestation.<sup>8 65</sup> A strictly biological definition fails to account for the broader circumstances surrounding reproduction, and privileges heteronormative accounts of reproduction in which a person with female physiology can undertake gestation themselves. It also fails to recognise the care work that goes into the rearing of children beyond gestating.<sup>41 60</sup> In response to potential concerns about the absence of a ‘mother’ if the person who gestates as a surrogate is not recorded on a birth certificate, the Law Commission/Scottish Law Commission notes that ‘there already exist “legal

<sup>xxi</sup> *Amphill Peerage Case* [1977] AC 547; *Re G (Residence: Same Sex Partner)* [2006] UKHL 43; Human Fertilisation and Embryology Act 2008, s.33 (1); this legal principle dates back to Roman law which emphasised that *mater semper certa est* (the mother is always certain).

fiction” around parenthood.<sup>9</sup> There are proposals to recognise ‘at birth legal parenthood’ for intended parents.<sup>10</sup>

Questions have also been raised about legal parentage when gestation is undertaken by a machine. Most commentators consider the case of complete ectogestation in which gestation takes place entirely extra uterum, where a gestateling<sup>3</sup> <sup>xxii</sup> might appear legally ‘motherless’, or, to have a machine for a mother.<sup>5 66</sup> In partial ectogestation, the initial gestation of the human entity in the pregnant person’s body (before the artificial placenta ‘took over’) would likely be sufficient to identify that person as the legal mother.<sup>5 67</sup> Though there would still be the matter of when legal parentage is afforded. There are reasons to believe that a gestateling would not be recognised as ‘born alive’ even though delivered from a pregnancy<sup>15 68 69</sup> (though this is a disputed claim).<sup>70</sup> Parenthood is a relational status<sup>54 55</sup> assigned on the basis of a person’s caring relationship with an existing entity. It is therefore arguable that legal parental rights/responsibilities cannot be assigned, since there is no ‘born child’ to which they would relate, as a gestateling remains isolated and ‘unborn’ because they are not interacting with their external environment.<sup>2 69</sup> The potential use of AGTs raises questions about who the parents are in different ways, but the important point is that given that gestation is how legally a person’s relationship as a ‘mother’ is recognised, a lot is at stake for individuals in how these technologies are used.

There is scope for assisted gestation to reorient our thinking about the relationships and identities produced *throughout* gestation in non-gender-essentialising ways.<sup>71</sup> The definition of legal mother has been claimed to be ‘de-gendered’ in that a mother is the person who gestates irrespective of their gender.<sup>xxiii</sup> However, this has forced some trans-men into being formally identified as mothers when they want to be recognised as fathers.<sup>xxiv</sup> The ‘mother is always certain’ demonstrates the reinforcement of gender in reiterating a link between having the physiology to become pregnant and a term that remains gendered in its widespread use.<sup>4 72 73</sup> <sup>xxv</sup> The legal definition of mother has ramifications for UTx if this enables cis-men to undertake gestation in reproduction<sup>xxvi</sup> since they might find themselves both legal

mother because of their role in gestation and legal father because of a genetic contribution.<sup>xxvii</sup> Thinking about innovative applications for AGTs can enhance conceptual discussion about gestation and gender. As Horn argues, imagining how ectogestation could redistribute reproductive labour ‘will be most generative if we begin the project of disentangling gender from reproduction by rejecting binary understandings of human reproductive roles’ and acknowledge ‘that we already live in a world in which men, non-binary and gender-queer people give birth and in which many women cannot or do not gestate’.<sup>71</sup>

Where AGTs are used there are also questions about a ‘right to know’ gestational origins.<sup>74 75</sup> Wade has suggested that the birth certificate could have annotations to provide additional, relevant information to individuals ‘about the manner of their birth’,<sup>75</sup> and of who may have contributed to their creation. This information, where it relates to a donated uterus or a machine, might be thought *as important* to individuals as knowing about the involvement of a surrogate in their birth. Legal and social issues about the assignment of parenthood, the social importance that might be placed on (information about) gestational origins, and the impact on potential future children, affect all forms of AGTs and require further investigation. Considering these technologies together in this investigation will help the development of a more coherent account of whether there is (and to what extent there is) a right to know about one’s gestational—as opposed to genetic—origins.

### Agreements: making and enforcing arrangements

Since the use of AGTs will often involve the labour of other persons; whether a person donating an organ, performing reproductive labour for another, or a person responsible for the management of an artificial placenta, it will inevitably involve arrangements made between persons. Conversations about the extent to which there is interference with the private arrangements in this context are ongoing, but should be broadened to encompass new possibilities. Both the Law Commission and the All-party Parliamentary Group on surrogacy have recommended that the law rendering surrogacy agreements unenforceable<sup>xxviii</sup> be revisited as it renders all stakeholders vulnerable.<sup>9 10</sup> There are other plausible agreements that individuals could make surrounding other AGTs. For example, people could attempt to make conditional their uterus donation, or an intended parent might ask a surrogate to opt for extra uterum gestation after a period of time. Legal interference with such arrangements requires consideration; this is especially important if these technologies are not publicly funded, or funds are limited to cases deemed (socially or clinically) to be more important. There remains a lively debate about the extent to which surrogates should be compensated because of the potential for exploitation and the exacerbation of certain inequalities.<sup>76</sup> Fundamentally, conversation about how private arrangements can be made are about where there may need to be some ethical/legal limitations

that, ‘despite a number of anatomical, hormonal, fertility and obstetric considerations that require consideration, there is no overwhelming clinical argument against performing UTx as part of (gender reassignment)’. Benjamin Jones and others, ‘Uterine transplantation in transgender women,’ (2019) 126 *British Journal of Obstetrics and Gynaecology* 152.

<sup>xxvii</sup> A man is a father where they are the genetic progenitor (contributed sperm): *Leeds Teaching Hospital NHS Trust v A* [2003] EWHC 259, where they adopt the child, or where the statutory provisions in the HFEA 2008 apply.

<sup>xxviii</sup> Surrogacy Arrangements Act, s.1A as inserted by the Human Fertilisation and Embryology Act 1990, s.36(1).

<sup>xxii</sup> A gestateling is the term used to refer to the subject of the artificial placenta. See Romanis (2018).

<sup>xxiii</sup> In *R (on the application of TT)* [2019] EWHC 2384 and *R (on the application of McConnell)* [2020] EWCA Civ 559 the Court emphasised that ‘mother’ is not intended to be a gender-specific term but to identify the person who gestated and birthed a child.

<sup>xxiv</sup> The Gender Recognition Act 2004, s.12 states that ‘the fact that a person’s gender has become the acquired gender under this Act does not affect the status of the person as the father or mother of a child’.

<sup>xxv</sup> The term ‘father’ also appears to be similarly gendered in the law as only a man can be a father: *J v C* [2006] EWCA Civ 551 confirming *X, Y, Z v UK* [1997] ECHR 20. The Human Fertilisation and Embryology Act 2008 allows for the recognition of a ‘second parent’ in the case of same-sex couples – but not an additional mother/father.

<sup>xxvi</sup> Cis-gendered men, might also be interested in the possibility of receiving a transplanted uterus in order to undertake gestation and experience pregnancy. Sparrow argues that if male pregnancy were to become possible (he does not explicitly discuss UTx but other potential avenues) that ‘it would be extremely hard to deny’ that reproductive liberty should extend to allow male pregnancy: Robert Sparrow, ‘Is it Every Man’s Right to Have Babies if He Wants Them? Male Pregnancy and the Limits of Procreative Liberty’ (2008) 18 *Kennedy Institute of Ethics Journal* 275. There has not yet been an attempt to transplant a uterus into a non-biologically designated female person, but a group of gynaecological surgeons based in the UK conclude

on the uses of technologies because of the potential vulnerability of involved parties. Additionally, if use of one technology is limited, this might lead to a use of another as the service user seeing them as alternatives may see this as performing a function in the event that their intended use in another context is not permitted. If there is a prohibition on payment for uterus donation, this could increase the likelihood of that person being asked to act as surrogate instead (or vice versa). Consequently, it is useful to think about private arrangements concerning AGTs within the context of these as a potential spectrum of options.

## CONCLUSION

As surrogacy law reform is being considered, it is a pertinent time for a broader conversation about assisted gestation. This should include reflection on some of the conceptual issues that AGTs raise, specifically in terms of the bodily labour AGTs do (or do not) demand of others, and practical legal questions—many of which are already being debated in the surrogacy context.

In the UK, the HFEAs 1990 and 2008 (supplemented by the Surrogacy Arrangements Act 1985) were intended to introduce a comprehensive regulatory scheme to govern reproduction. However, this scheme does not address the issues arising from AGTs.<sup>17</sup> The convergence of many of the outlined issues concerning AGTs, and of the likelihood that decisions made now about surrogacy law reform will have implications for the introduction and use of other technologies, suggest the pressing need to think about, and suggest any potential regulatory solutions for, AGTs as a genus. Approaching issues arising from the use of AGTs in this way will enhance the conceptual clarity of ethical scholarship in this area.

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