View metadata, citation and similar papers at core.ac.uk
brought to you by CORE
provided by LSBU Research Open

This is an accepted manuscript forthcoming in the *Journal of Medical Ethics*, 2020. Please cite the published version: http://dx.doi.org/10.1136/medethics-2020-106708

GESTATICIDE: KILLING THE SUBJECT OF AN ARTIFICIAL WOMB

ABSTRACT

The rapid development of artificial womb technologies means that we must consider if and when it is permissible to kill the human subject of ectogestation—recently termed a 'gestateling' by Elizabeth Chloe Romanis—prior to 'birth'. We describe the act of deliberately killing the gestateling as *gestaticide*, and argue that there are good reasons to maintain that gestaticide is morally equivalent to infanticide, which we consider to be morally impermissible. First, we argue that gestaticide is harder to justify than abortion, primarily because the gestateling is completely independent of its biological parents. Second, we argue that gestaticide is morally equivalent to infanticide. To demonstrate this, we explain that gestatelings are born in a straightforward sense, which entails that killing them is morally equivalent to infanticide. However, to strengthen our overall claim, we also show that if gestatelings are not considered to have been born, killing them is still equivalent to killing neonates with congenital anomalies and disabilities, which again is infanticide. We conclude by considering how our discussion of gestaticide has implications for the permissibility of withdrawing life-sustaining treatment from gestatelings.

INTRODUCTION

Development of artificial womb technology (AWT) and related technologies are rapidly progressing, generating new ethical challenges.[1,2] The term *gestateling* has been coined by Elizabeth Chloe Romanis to describe the human subject of a period of *ex utero* artificial gestation—or ectogestation—thus distinguishing it from a fetus or preterm neonate.[3] One pertinent question is whether it is permissible to end the life of a gestateling.[1] Here, we refer to the act of deliberately killing the gestateling as *gestaticide*. Gestaticide seems related to abortion and infanticide: each involves killing a human being during its early developmental stages. But, *prima facie*, gestaticide does not fit into either category. Here, we examine the comparative morality of induced abortion, infanticide, and gestaticide. We defend two claims: first, that morally speaking, gestaticide is harder to justify than abortion. Second, that morally speaking, gestaticide is as hard

[1] Recently, Victoria Adkins raised—but did not answer—the question of how current legislation 'could be applied to a request to terminate an ectogenic fetus,' while suggesting that 'reform or new legislation' is needed to handle those requests.[33] We focus on the morality of killing gestatelings, rather than the legality, but the issues are often connected.

to justify as infanticide.[2] We show that if infanticide—particularly when carried out against developmentally immature neonates—is immoral, then gestaticide is immoral in the same way. If one wishes to defend the permissibility of gestaticide, therefore, one must accept the permissibility of infanticide in many cases. We end by considering implications for the (im)permissibility of withdrawing life-sustaining treatment from gestatelings.

Ectogestation will require a surgical procedure to transfer the fetus from the pregnant woman to an artificial womb. It seems likely there will be instances of ectogestation where, at some point, the gestateling will no longer be wanted. The reasons women give for procuring abortions are multiple and diverse, and it is likely that similar reasons will be nominated for gestaticide. These might include financial stress, a change in relationship with a partner, illness, gestateling ill-health or disability, or another change in circumstances that means the gestateling is no longer desired.[3] However, in such cases, gestaticide is not the only option available—the parents could choose to offer it up for adoption. For gestaticide to be considered, therefore, it must be that its parents do not wish for the gestateling to exist at all.[4] When is it permissible to act on this wish? By comparing gestaticide to abortion and infanticide, we provide an answer.

GESTATICIDE IS HARDER TO JUSTIFY THAN ABORTION

There are significant moral differences between abortion and gestaticide. Suppose that fetuses and gestatelings of the same gestational ages have equivalent moral statuses, whether equivalent to the moral status of newborns or not.

First, arguments for abortion predicated on bodily autonomy or self-defence fail to justify gestaticide. The subject of abortion is a fetus, which is developing within a pregnant woman, while the subject of gestaticide is a gestateling, which resides within an artificial womb (AW) and is completely independent from its biological parents. A pregnant woman gestating a fetus makes significant sacrifices with regard to bodily autonomy—the parents of a gestateling do not. Judith Jarvis Thomson argues that in many cases, the sacrifices of pregnancy entail there is no moral obligation for a woman to offer her body as a life support system for the fetus, and this implies abortion is permissible, even if the fetus is granted the moral status of a person.[4] A gestateling's

---

[2] If infanticide is harder to justify than abortion, then the second claim entails the first. We split the two claims to emphasise that even if we fail to defend the second, the first may remain intact.

[3] People may also seek the death of the gestateling for the antinatalist reason suggested by Räsänen—that it will be better off not existing, as it will avoid the inevitable suffering that comes with life.[34] Or, like Räsänen argues elsewhere, some may claim that one's right to "not be a parent" gives one the right to practice gestaticide.[5] The argument presented below challenges this latter claim, however, in that one's right to not be a parent cannot justify gestaticide any more than it can justify infanticide.

[4] The death of gestatelings may be sought for other reasons. For example, Savulescu, Tooley, and Stirton all suggest we use AWT to grow human organisms for the purpose of harvesting their organs and tissues for therapeutic purposes.[35-38]

life support, however, is provided by the AW it is contained within, not its parent's body. So, even if Thomson's argument provides some justification for abortion, it cannot justify gestaticide in the same way.

Second, AWT allows for an option other than death. Currently, abortions do not—the fetus invariably dies, even if the goal is to end pregnancy rather than kill the fetus. Supposing a gestateling has a moral status equivalent to that of an adult, it cannot be permissible to end its life—its right to life prohibits this. If we only grant the gestateling *some* moral status, it is less clear whether the gestateling's life can be ended. Joona Räsänen, for example, argues that there is a right to the death of the gestateling once it is extracted from its parent.[5] Räsänen predicates this on three other rights: the right not to be a genetic parent, the right to genetic privacy, and property rights. Numerous philosophers have argued that Räsänen is unsuccessful in establishing a right to the death of the fetus whether AWT is viable or not.[6-9] Importantly, Thomson herself argues that there is no right to the death of the fetus. Mary Anne Warren makes a similar point: if a pregnancy could be ended without killing the fetus then there is no right to the fetus' death.[5][10]

Because the parent's bodily autonomy is not a consideration and there is no clear right to the death of the gestateling, therefore, it is considerably more difficult to justify gestaticide than it is to justify abortion. Justifications for abortion are either not relevant or lack the cogency and scope to also justify gestaticide.

GESTATICIDE AND INFANTICIDE

The arguments we developed above also imply that infanticide is harder to justify than abortion: a widely—but not universally—shared moral intuition. This does not automatically mean that gestaticide and infanticide are morally on a par, however. To compare them, we must examine two possibilities: first, that gestaticide *is* a form of infanticide, and second, that gestaticide is not infanticide, but something different.

GESTATICIDE IS INFANTICIDE

Nicholas Colgrove defends the view that gestaticide is a form of infanticide.[11,12] Assuming current international standards of 'live birth' in legal and medical communities are correct, subjects of ectogestation—those that have been extracted from their mothers' bodies and placed in an

---

[5] If that is correct, then questions arise concerning whether such transfers should be mandatory, how they would harm women, etc.[39] If fetuses are persons, parents may be required to make relevant sacrifices to ensure the fetus's survival.[40] If fetuses have only partial moral status, the issue is less clear. Whether mandatory extraction is morally sound is tangential to our project, however, so we will set it aside.

AW—have literally been born.[6][11,13-17] If so, then to kill a gestateling is to kill a neonate. Hence, gestaticide is a form of infanticide.

Even if gestaticide is a *form* of infanticide, however, that does not entail that it is *as wrong*—or as difficult to justify—as infanticide. Perhaps gestaticide is a morally 'less bad' species of infanticide because gestatelings are different from other neonates in morally relevant ways.[7]

Romanis, and Kingma and Finn, for example, argue that gestatelings and neonates in the NICU are relevantly different because they function differently.[18,19] According to Kingma and Finn, gestatelings exist ex utero, but function *like fetuses*, whereas neonates in the NICU exist ex utero and function *like neonates*. For Kingma and Finn, 'fetuses and neonates do not just have different physiological but different physical characteristics.'[19] Physically, fetuses have extra organs and structures that neonates do not—a placenta, umbilical cord, etc. Physiologically, fetuses and neonates differ in that 'fetuses do not breathe but oxygenate their blood via the placenta,' each possesses 'a completely different cardiovascular set-up: the fetal heart functions as a single (rather than, in neonates, a double) pump; ... and so on.'[19] Let 'fetal-function' refer to relevant physical and physiological characteristics typical of fetuses, while 'neonatal-function' refers to relevant characteristics typical of neonates.[8]

Gestatelings have not transitioned from fetal-function to neonatal-function. Is this difference enough to show that gestaticide is easier to justify than infanticide? No. After all, Kingma and Finn recognise that there are *currently* neonates in the NICU that have failed to transition from fetal-function to neonatal-function.[19] In such cases, the 'baby cannot, or struggles to, perform certain physiological requirements of babies that weren't required for fetal physiology.'[19] To insist that the transition from fetal-function to neonatal-function is so morally relevant as to justify gestaticide but not infanticide, one would have to accept that killing *these* neonates is easier to justify in the same way.[9]

By Kingma and Finn's account, neonates that have failed to make the relevant transition include many with 'lung-problems, cardiac defects, etc.'[19] This suggests that neonates who struggle to function *as neonates*—including many with congenital defects—are judged to be more justifiably killed than their healthy, term counterparts. This point becomes more apparent when considering the metaphysics in Kingma's proposal more broadly. For her, fetuses are part of their mothers'

---

[6] This leaves out subjects of complete ectogestation—those that are conceived via IVF and immediately placed in an AW. For simplicity, we focus on subjects of partial ectogestation throughout this project (unless otherwise noted).

[7] 'Other' neonates because we are supposing (for now) that gestatelings have been born.

[8] For a detailed explanation of the transition from fetal-function to neonatal-function, see Morton and Brodsky.[41]

[9] Kingma and Finn need not argue that the difference in function grounds a moral difference between gestaticide and infanticide. But, as we explain below, on Kingma's preferred metaphysics, it seems hard to resist the claim that the difference in function has moral import. Also, if the difference in function makes no moral difference, then those who think gestaticide is easier to justify than (standard cases of) infanticide still owe us an explanation as to why.

bodies.[20] Hence, individuals that have failed to transition from fetus-function to neonatal-function are comparable to 'detached body part[s].'[19,20] Thus, whether it is justifiable to 'dispose' of gestatelings and affected neonates raises similar questions to whether it is justifiable to dispose of one's detached body parts (e.g., gametes, blood, etc.).[10][19]

So, if gestaticide is infanticide, we are faced with two options. First: accept that gestaticide is as hard to justify as (standard cases of) infanticide. Alternatively, distinguish between gestatelings and (other) neonates in a way that explains why killing the former is easier to justify than the latter. A plausible way of doing so—as offered by Romanis and Kingma and Finn—is to focus on the distinction between fetal-function and neonatal-function.[11] On that view, however, one must accept that killing many neonates with congenital anomalies and disabilities is more justifiable than killing 'normally-functioning' neonates. This view is morally dubious.[12] Reasons to reject those claims, therefore, are reasons to reject the claim that gestaticide is a 'less bad' species of infanticide. Romanis and Kingma and Finn may object: gestaticide cannot be thought of as infanticide at all because *gestatelings have not been born*.[18,19] This raises the second possibility, that gestaticide is not infanticide.

GESTATICIDE IS NOT INFANTICIDE

If gestaticide is not infanticide, then gestatelings have not been born. We begin by arguing that the reasons for thinking gestatelings have not been born are unpersuasive. Hence, gestaticide is infanticide. But suppose we are wrong and gestatelings really have not been born. If so, one must either accept that gestaticide is as hard to justify as infanticide or accept the morally dubious claim that it is more jusitifiable, morally speaking, to kill neonates with congenital anomalies than their 'normally-functioning' counterparts. Whether gestatelings have been born or not, therefore, there are good reasons to conclude that gestaticide is as hard to justify as infanticide.

GESTATELINGS, 'BIRTH' AND METAMORPHOSIS

Why think that gestatelings have not been born? Romanis claims gestatelings are 'born only in a geographical sense' and so, have 'not completed all of birth.'[18] Kingma and Finn unpack

---

[10] There may be ableist overtones here, since a lesser moral status is assigned to neonates with various anomalies, 'defects,' and disabilities. A full treatment of this issue goes beyond the scope of our essay, however.

[11] Kingma and Finn reject various other ways of drawing the distinction (which were proposed by Romanis).[3,19] Assuming they are right, this makes the fetal-function/neonatal-function distinction the only real candidate for distinguishing gestatelings from (other) neonates.

[12] The view that termination of 'defective' neonates—e.g., those with 'lung-problems, heart defects, etc.'[19]—is 'easier' to justify than termination of 'normally-functioning' neonates is vehemently rejected by many.[42-45] and has dubious heritage [46,47]

Romanis's claim, distinguishing between two events: the 'born-by-location-change' and the 'born-by-physiology-change.'[19]

Birth 'by-location' occurs when fetuses are extracted from the bodies of their mothers and remain alive. This is no different than current international (medical and legal) definitions of 'birth.'[13-17] Subjects of partial ectogestation, therefore, have undergone the 'born-by-location-change.'[12,18,19] The 'born-by-physiology-change' is more complicated. To complete this change, developing humans must fully transition from fetal-function to neonatal-function. Gestatelings have not completed this transition. Hence, they are not yet born.

Why think that transitioning from fetal-function to neonatal-function is a necessary part of *birth*? Kingma and Finn note that typically (and historically) the two transitions have tended to occur at roughly the same time.[19] But this does not imply the transitions occur together out of necessity. In fact, what ectogestation shows is that the two transitions coincide *accidentally*, since AWT would allow the location-change to occur while substantially delaying changes in gestatelings' physical and physiological features. Furthermore, the transition from fetal-function to neonatal-function more closely resembles another kind of naturally-occurring phenomenon: metamorphosis.

As Ronca et al. put it, 'The metamorphosis from fetus to newborn constitutes the most profound developmental transformation in a mammal's life...To ensure its survival at birth, the newborn mammal must swiftly recruit a veritable constellation of novel physiological and behavioral responses.'[13][21] Moreover, there are striking similarities between metamorphosis and mammalian birth; Daniel Buchholz describes how a frog metamorphosis model can help understand human perinatal development.[22] Since 'metamorphosis' is a precise biological term, we will describe the relevant transition as 'Homometamorphosis' or 'H-metamorphosis' to indicate that it applies specifically to humans undergoing the transition from fetal-function to neonatal-function.[14]

For Kingma and Finn, birth 'marks the transition from being part of another organism, to no longer being such a part.'[15][19] H-metamorphosis is not required for this transition. Recall the neonates who complete birth 'by-location' but not H-metamorphosis.[19] If completing H-metamorphosis is required for birth, then gestatelings have not been born, but neither have many neonates with serious congenital anomalies. On Kingma's account of pregnancy, gestatelings and many neonates with serious congenital anomalies would still be parts of their mothers' bodies.[19,20] Claims that

---

[13] They also list the same kinds of changes Kingma and Finn list as essential to the 'born-by-physiology-change,' so it is clear the authors are speaking about the same transition.[19,21]

[14] Describing the transition from fetal-function to neonatal-function as metamorphosis fits with some of Kingma and Finn's own illustrations. When describing the 'born-by-physiology-change,' for example, they compare it to 'tadpoles los[ing] their tail as they become frogs' and caterpillars becoming butterflies.[19]

[15] At least if we accept Kingma's preferred account of the metaphysics of 'birth.'[20]

neonates with serious congenital anomalies are 'detached body parts' or 'have not been born' will seem highly implausible to many people.

Kingma and Finn will likely accuse us of begging the question here: the main reason many people think these 'babies' have been born is due to the historical and cultural dominance of the 'fetal container model' of pregnancy.[19] Maybe so. But just because a belief arises from culturally dominant presuppositions does not render that belief false. Kingma and Finn may explain the genealogy of the relevant belief, but have not undermined its validity.

Critically, we need a reason to believe that H-metamorphosis is required for birth. The following observations are insufficient: (a) fetus-function differs from neonatal-function, (b) gestatelings function in the former way whereas (most) neonates function in the latter way, and (c) H-metamorphosis and birth-by-location often occur in close succession. We can accept (a)-(c) while still denying Kingma and Finn's claim that 'birth is not just a change of location.'[19] That is, none of these observations establish a necessary connection between birth and H-metamorphosis.[16]

Finally, given the stakes, we need a *very* compelling argument for why H-metamorphosis is essential to birth. Such a claim runs contrary to widely accepted, international—legal and medical—standards of 'birth' and would have serious practical implications if true. Legally, birth is deeply intertwined with personhood (i.e., having rights). If completing H-metamorphosis is essential to birth, therefore, then the completion of H-metamorphosis becomes the new standard for legal personhood (rather than birth-by-location). This makes the standard for legal personhood far more subjective and less useful as a legal instrument. It is relatively easy to assess when a human being has been extracted and is alive compared to assessing whether or not it has completed the transition from fetal-function to neonatal-function. When this transition takes days—which Kingma and Finn suggest is fairly common[19]—relevant human subjects would seemingly have their legal personhood (including rights and citizenship) held in limbo.[17]

Further, making H-metamorphosis the standard for *moral* personhood would seemingly allow the possibility that killing neonates with serious congenital anomolies would be, in Kingma and Finn's words, morally akin to destroying a 'detached' body part.[19] Killing such neonates would literally be a kind of 'after-birth abortion.'[18][23,24] The concept of 'after-birth abortion' has been widely criticised as nothing other than infanticide,[25-29] though some authors have continued to defend

---

[16] Consider, for example, Hume's observation that constant conjunction of two events is insufficient reason to infer that a necessary connection holds between them.[48] This point is especially relevant to (c).

[17] Romanis considers inventing a 'third [legal] status' for 'partially born' humans, including gestatelings.[49] This is sensible only if gestatelings have not been legally born in a 'complete' sense, however. But gestatelings unequivocally satisfy the current legal standards for 'birth.'.[13-17] So, invention of a third legal status does not seem warranted.

[18] Where 'birth' in 'after-birth abortion' is understood as 'birth-by-location' only.

it.[19][30] Claiming that many neonates with congenital anomalies are merely 'detached body parts' would likely be met with the same charge and rejection. Widespread rejection does not make the view false, of course. But since the view is at odds with foundational (and international) legal standards *and* at odds with widely held moral beliefs and intuitions, it carries a very high cost. Convincing an audience to accept these costs will require an exceptionally strong argument. Appeals to observations (a)-(c) fall far below that standard.

SUPPOSE THAT GESTATICIDE IS NOT INFANTICIDE

If gestaticide is not infanticide it must be that gestatelings have not been born. Kingma and Finn explain that gestatelings have not completed (what we term) 'H-metamorphosis,' but fail to explain why completing it is essential to birth.[19] Imagine, however, that we discover a sound argument for the claim that gestatelings have not been born. Is killing gestatelings thereby easier to justify than killing otherwise comparable neonates? Why think that? There seem to be two options: gestaticide is easier to justify (i) because gestatelings have not completed 'birth,' while neonates have, or, (ii) because gestatelings have not completed H-metamorphosis, while neonates have. Both options fail.

Regarding the first option, according to Kingma and Finn, birth is 'morally relevant' precisely because subjects that are born 'can now be accessed, interacted with, treated and kept alive without having to consider the mother's rights to bodily integrity/physical autonomy.'[19] Gestatelings embody all of these features: they exist and can be kept alive independently of their mothers' bodies, etc. Even if gestatelings have not been born, therefore, they possess the exact same features that make birth morally relevant in the first place. So appeals to birth as making a relevant moral difference between gestatelings and neonates does not work.

The second option—the claim that completion of H-metamorphosis is what makes the moral difference—also fails. Gestatelings have not completed H-metamorphosis, but the same goes for many neonates with congenital anomalies and disabilities. Suppose completion of H-metamorphosis is what makes the moral difference between gestaticide and infanticide. Assuming that gestaticide is easier to justify than infanticide, it follows that killing neonates with congenital anomolies or disibilities is easier to justify as well (since many of them have not completed H-metamorphosis either). If completion of H-metamorphosis is what makes the moral difference, therefore, one must accept highly dubious moral claims about the relative permissibility of killing neonates with congenital anomalies. Since there are good reasons to reject those claims, there are good reasons to maintain that gestaticide is as hard to justify as infanticide.

---

[19] One reviewer presses this point, noting that other authors have defended the permissibility of infanticide to some degree or another.[30,50,51] Assessing the permissibility of infanticide in detail goes beyond the scope of our essay. For the time being, our argument rests on the claim that infanticide is widely rejected (which is compatible with it being defended by a fairly small group of academics).

BEYOND KILLING: IMPLICATIONS FOR WITHDRAWING LIFE-SUSTAINING TREATMENT

We have argued that gestaticide is harder to justify than abortion and that there are good reasons to think that gestaticide is as hard to justify as infanticide (whether gestatelings have been born or not). What about cases in which life-sustaining treatment is withdrawn and this results in death? Not every such case will count as gestaticide, nor will every such case be impermissible. This matters because cases of withdrawing life-sustaining treatment like this are not uncommon in neonatal care;[31] doing so is commonly thought to be justified when the neonate's death is imminent and continued treatment is judged to be futile (or excessively burdensome).[32]

For example,[20] suppose a premature neonate is being kept alive by life-sustaining treatment (e.g. intubation and mechanical ventilation), despite having suffered from an extensive and catastrophic brain-injury. The medical team concludes that this neonate's death is imminent and inevitable. It may, in this case, be permissible to withdraw life-sustaining treatment from the neonate even though doing so will hasten death. Death, in this case, is not intended and withdrawal of life-sustaining treatment is not rightly thought of as an act of killing.[21][32]

In other words, 'infanticide' as we understand it, does not obviously refer to acts of withdrawing life-sustaning treatment where death is not intended (even though withdrawing care might result in or hasten death).[32] Likewise, 'gestaticide' does not refer to every case in which a gestateling dies after life-sustaining treatment is withdrawn. Withdrawing life-sustaining treatment from a gestateling with the intention that it dies may count as gestaticide. Withdrawing life-sustaining treatment in cases where the gestateling is having some serious health problem(s)—specifically, where continued treatment is futile, death is imminent, and the death of the gestateling is not intended—would not count as gestaticide. These suggestions render two hypotheses plausible. We will discuss each, but cannot defend them at length here.

First, when it is permissible to withdraw life-sustaining treatment from neonates in the NICU, it will be permissible to withdraw it from *comparable* gestatelings (where all else is equal insofar as is possible). Suppose, for example, that it is permissible to withdraw life-sustaining treatment from neonates when doing so is futile. We may infer that when continued treatment of gestatelings is futile *in the same way*, withdrawing life-sustaining treatment is permissible in those cases as well.

---

[20] Much of our argument here relies on inferences and arguments quite common within discussions of intention and the Doctrine of Double-Effect.[32,52]

[21] Alternatively, if life-sustaining treatment is withdrawn with the intent that the patient dies, that does seem to constitute an act of killing. These claims are not novel; for the same kinds of arguments and distinctions, see Kaczor's discussion of 'double-effect reasoning.'[53]

Second, when it is impermissible to withdraw life-sustaining treatment from neonates, it will be impermissible to do so from *comparable* gestatelings (all else being equal insofar as is possible). For example, it is morally impermissible to withdraw life-sustaining treatment from a neonate simply because that neonate has congenital anomalies. We may infer that withdrawing life-sustaining treatment from gestatelings simply because they have congenital anomalies is morally impermissible for the same reasons.

To block these hypotheses, one must show that gestatelings and comparable neonates are different in some morally relevant way. Birth 'by-location' is clearly of no use here, since gestatelings and neonates have both completed that transition. Appeals to the completion of H-metamorphosis fail as well, because a human subject's failure to complete H-metamorphosis by itself is insufficient justification for withdrawing life-sustaining treatment from them. Recall that many neonates today have not completed H-metamorphosis; for Kingma and Finn, these include many neonates with certain 'lung-problems, heart defects, etc.'[19] Having these kinds of issues is not *by itself* reason to withdraw life-sustaining treatment. Doing so, in many cases, is rightly regarded as immoral.[22] In fact, whether or not a subject has completed H-metamorphosis has no real bearing on whether or not it would be permissible to withdraw life-sustaining treatment from that subject. We do not withdraw life-sustaining treatment from neonates in cases where they simply have failed to complete what we have termed H-metamorphosis. Rather, treatment can only be justifiably withdrawn when its continuation is futile, and death is imminent, etc. Whether H-metamorphosis has been completed or not is irrelevant, therefore. What matters is whether treatment is futile or whether death is imminent. But if completion of H-metamorphosis is irrelevant in the case of withdrawing life-sustaining treatment from neonates, it should be irrelevant in the case of withdrawing life support from gestatelings.

Put differently, if we accept that failure to complete H-metamorphosis is sufficient reason to withdraw life support from gestatelings, then we are justified all the same when withdrawing life-sustaining treatment from neonates who have not yet completed H-metamorphosis. This holds even in cases where these neonates will complete the relevant processes soon. But we do not allow withdrawal of life-sustaining treatment from neonates under these circumstances. So, we should not allow withdrawal of life support from gestatelings in the same condition. Hence, failure to complete H-metamorphosis cannot be sufficient justification for gestaticide but not infanticide. If we allow gestaticide on this basis, we must also allow infanticide. Whatever reasons we have for rejecting infanticide in these cases, therefore, serve as reasons for rejecting gestaticide as well.

Finally, if failure to complete H-metamorphosis is—by itself—sufficient justification for the withdrawal of life-sustaining treatment, then one must accept that withdrawing support from any neonate that has not completed H-metamorphosis is permissible. Yet again, this means embracing morally dubious claims regarding the permissibility of withdrawing life-sustaining treatment from

[22] In fact,, such acts would typically be illegal in the US, constituting clear cases of 'medical neglect.'[54]

neonates simply because they are affected by congenital anomalies. To resist those claims—which we have good reason to do—one must accept that it is just as hard to justify withdrawing life-sustaining treatment from gestatelings as it is to justify withdrawing life-sustaining treatment from neonates. Hence, we have good reasons to think that withdrawing life-sustaining treatment from gestatelings is as hard to justify as withdrawing it from neonates without appropriate medical indication to do so.

What about *extremely* young gestatelings? If it is permissible to withdraw life-sustaining treatment from anencephalic neonates, for example, maybe it is permissible to do so from gestatelings whose brains have not yet developed. After all, anencephalic neonates are comparable to extremely young gestatelings in that neither have developed brains. This would seemingly justify withdrawal of life-sustaining treatment from *any* gestateling up until a particular point in development. However, young gestatelings *will* develop brains in typical cases whereas anencephalic neonates will not. Young gestatelings are, therefore, more comparable to neonates in the NICU that have neurological conditions which *we fully expect will resolve* in the near future. If it is impermissible to withdraw life-sustaining treatment from those neonates, therefore, it seems impermissible to withdraw life-sustaining treatment from very young gestatelings.[23]

CONCLUSION

Gestaticide is the deliberate killing of gestatelings, which, we have argued, should be considered as morally serious as infanticide. This holds whether gestatelings have been born or not (i.e., whether gestaticide is a literal form of infanticide or not). So, while we have argued that claims that gestatelings have not been born are largely unpersuasive, our conclusion does not *require* a commitment to the claim that gestatelings have been born. We ended by arguing that withdrawing life-sustaining treatment from gestatelings seems to be as difficult to justify as withdrawing it from neonates as well. As AWT becomes available, we must therefore prohibit the deliberate killing of gestatelings—in the same way we prohibit infanticide. We must also ensure that withdrawal of life support from gestatelings occurs in only the most serious of circumstances (where treatment is futile and death is imminent), in the same way that we permit withdrawal of life-sustaining treatment from neonates in only extreme circumstances as well.

REFERENCES

[23] If a gradualist view of moral status is held to, it might be that very young gestatelings are regarded as having a very low moral status that entails it is permissible to withdraw life-sustaining treatment. This would still be more difficult to justify than abortion at a comparable stage of gestation, given the absence of bodily autonomy issues.

[1] Eindhoven University of Technology. Artificial womb: perinatal life support system, 2020.
https://www.tue.nl/en/research/research-groups/cardiovascular-biomechanics/artificial-womb (accessed 11 Jul 2020).

[2] Partridge EA, Davey MG, Hornick MA, Homick M, *et al*. An extra-uterine system to physiologically support the extreme premature lamb. *Nat Commun* 2017;8:1–15.

[3] Romanis EC. Artificial womb technology and the frontiers of human reproduction: conceptual differences and potential implications. *J Med Ethics* 2018;44:751-55.

[4] Thomson JJ. A defense of abortion. *Philos Pub Aff* 1971;1(1):47-66.

[5] Räsänen J. Ectogenesis, abortion, and a right to the death of the fetus. *Bioethics* 2017;31:350–352.

[6] Mathison E, Davis J. Is there a right to the death of the foetus? *Bioethics* 2017;31:313-20.

[7] Blackshaw BP, Rodger D. Ectogenesis and the case against the right to the death of the foetus. *Bioethics* 2019;33(1):76– 81.

[8] Kaczor C. A dubious defense of 'after-birth abortion': a reply to Räsänen. *Bioethics* 2018;32(2):132–137.

[9] Hendricks P. There is no right to the death of the fetus. *Bioethics* 2018;32(6):395-397.

[10] Warren MA. On the moral and legal status of abortion. *Monist* 1973;57:43-61.

[11] Colgrove N. Subjects of ectogenesis: are "gestatelings" fetuses, newborns, or neither? *J Med Ethics* 2019;45:723-6.

[12] Colgrove N. Artificial wombs, birth and 'birth': a response to Romanis. *J Med Ethics* 2019;46:554-6.

[13]. Maternal mortality ratio. World Health Organization: health statistics and information systems. 2019. https://www.who.int/healthinfo/statistics/indmaternalmortality/en/ (accessed 2 Jul 2020).

[14]. Natality. In *United Nations statistics division*, 2017. https://www.who.int/healthinfo/statistics/indmaternalmortality/en/ (accessed 2 Jul 2020).

[15]. Born-alive infants protection act. In *An act to protect infants who are born alive*, 107th Congress of the United States, 2002. https://www.govinfo.gov/content/pkg/PLAW-107publ207/html/PLAW-107publ207.htm (accessed 2 Jul 2020).

[16]. Funai EF, Norwitz ER. Management of normal labor and delivery. *UpToDate*, 2019. https://www.uptodate.com/contents/management-of-normal-labor-and-delivery (accessed 2 Jul 2020).

[17]. Martin E. *Concise medical dictionary*. Oxford: Oxford University Press, 2015.

[18] Romanis EC. Artificial womb technology and the significance of birth: why gestatelings are not newborns (or fetuses). *J Med Ethics* 2019;45:728-31.

[19] Kingma E, Finn S. Neonatal incubator or artificial womb? Distinguishing ectogestation and ectogenesis using the metaphysics of pregnancy. *Bioethics* 2020;34:354-63.

[20] Kingma E. Were you part of your mother? *Mind* 2019;128:609-646.

[21] Ronca AE, Abel RA, Ronan PJ, *et al*. Effects of labor contractions on catecholamine release and breathing frequency in newborn rats. *Behav Neurosci* 2006;120:1308-14.

[22] Buchholz DR. More similar than you might think: frog metamorphosis as a model of human perinatal endocrinology. *Dev Biol* 2015;408:188-95.

[23] Giubilini A, Minerva F. After-birth abortion: why should the baby live? *J Med Ethics* 2013;39:261-3.

[24] Giubilini A, Minerva F. Defending after-birth abortion: Responses to some critics. *Monash Bioethics Review* 2012;30(2):49-61.

[25] Manninen BA. Yes, the baby should live: a pro-choice response to Giubilini and Minerva. *J Med Ethics* 2013;39(5):330-5.

[26] George RP. Infanticide and madness. *J Med Ethics* 2013;39:299-301.

[27] Porter L. Abortion, infanticide and moral context. *J Med Ethics* 2013;39:350-2.

[28] Laing JA. Infanticide: a reply to Giubilini and Minerva. *J Med Ethics* 2013;39:336-40.

[29] Camosy C. Concern for our vulnerable prenatal and neonatal children: a brief reply to Giubilini and Minerva. *J Med Ethics* 2013;39:296-8.

[30] Räsänen J . Pro-life arguments against infanticide and why they are not convincing. *Bioethics* 2016;30:656–62.

[31] Warrick C, Perera L, Murdoch E, Nicholl RM. Guidance for withdrawal and withholding of intensive care as part of neonatal end-of-life care. *Br Med Bull* 2011;98:99–113.

[32] Wee M. Euthanasia, withdrawing treatment and the concept of intention. *Law Justice* 2019;7:7-24.

[33] Adkins V. Impact of ectogenesis on the medicalisation of pregnancy and childbirth. J Med Ethics 2020. doi: 10.1136/medethics-2019-106004 [Epub ahead of print: 9 Jul 2020].

[34] Räsänen J. Against the impairment argument: A reply to Hendricks. *Bioethics* 2020 (Epub ahead of print: 03 Feb 2020).

[35] Savulescu J. Should we clone human beings? Cloning as a source of tissue for transplantation. *J Med Ethics* 1999;25:87-98.

[36] McMahan J. Cloning, killing, and identity. *J Med Ethics* 1999;25:77-86.

[37] Tooley M. The moral status of the cloning of humans. In Kuhse H, Schüklenk U, Singer P, eds. *Bioethics: an anthology*, 3rd Ed. Malden, MA: Wiley Blackwell, 2016:156-170.

[38] Stirton R. No pain, all gain: the case for farming organs in brainless humans. *J Med Ethics Blog*, 2017 https://blogs.bmj.com/medical-ethics/2017/06/10/no-pain-all-gain-the-case-for-farming-organs-in-brainless-humans/ (accessed 10 Jul 2020).

[39] Alghrani A. *Regulating assisted reproductive technologies: new horizons*. Cambridge: Cambridge University Press, 2018.

[40] McMahan J. Infanticide. *Utilitas* 2007;19:131-59.

[41] Morton S, Brodsky D. Fetal physiology and the transition to extrauterine life. *Clin Perinatol* 2016;43:395-407.

[42] Smith WJ. *Culture of death: the age of 'do harm' medicine*. New York: Encounter Books.

[43] Vizcarrondo FE. Neonatal euthanasia: the Groningen protocol. *Linacre Q* 2014;81:388-392.

[44] Davis A. Right to life of handicapped. *J Med Ethics* 1983;9:181.

[45] Barnes E. *The minority body: a theory of disability*. Oxford: Oxford University Press, 2016.

[46] Binding A, Hoche K. *Allowing the destruction of life unworthy of life: its measure and form*. Greenwood, WI: Suzeteo Enterprises, 2012.

[47] Shapiro A. *Everybody belongs: changing negative attitudes toward classmates with disabilities*. London: Routledge, 2000.

[48] Hume D. *An enquiry concerning human understanding*, 2nd Ed. Indianapolis, IN: Hackett, 1993.

[49] Romanis EC. Challenging the 'born alive' threshold: fetal surgery, artificial wombs, and the english approach to legal personhood. *Med Law Rev* 2020;28:93-123.

[50] Hassoun N, Kriegel U. Consciousness and the moral permissibility of infanticide.J *Appl Philos* 2008;25:45-55.

[51] Kuhse H, Singer P. *Should the baby live? The problem of handicapped infants*. Oxford University Press, 1985.

[52] McIntyre A. Doctrine of double effect. *The Stanford Encyclopedia of Philosophy*. Edward N. Zalta (ed.), 2019. https://plato.stanford.edu/archives/spr2019/entries/double-effect/ (accessed 28 Sept 2020).

[53] Kaczor C. *The ethics of abortion: women's rights, human life, and the question of justice*. 2nd Edition. New York, NY: Routledge, 2015.

[54] 45 C.F.R. § 1340.15(2) (2012).