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Teenagers and gender identity: the evidence base

Part 2: Treatment and outcomes

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Contents

Sex Matters is a UK-based not-for-profit organisation with one aim: to re-establish that sex matters in rules, laws, policies, language and culture, in order to protect everybody's human rights. sex-matters.org | info@sex-matters.org

This paper is the second of a three-part series summarising the evidence base on teenagers and gender identity for parents. This part looks at treatment and outcomes. It has an accompanying technical paper, which details the approach to analysing the effect of gender medications on mental health and how that compares with the placebo effect. Part 1 looked at why teenagers might start to question their gender. Part 3, which will be published in 2023, will look at evidence-based recommendations and suggestions for parents with a gender-questioning teenager.

Introduction

This is the second part of a three-part series looking at gender identity in teenagers. The first part looked at the reasons teenagers might start to question their gender. It covered underlying factors – teenagers who are same-sex attracted, who have a neurodevelopmental condition and who have underlying mental-health conditions are all more likely to question their gender. It also looked at social and developmental factors that may contribute: the role of puberty and gender stereotypes, the natural process of teenage identity exploration, and external influences on children's internal perceptions of gender, including friends, schools and the internet.

The first part of the paper made the argument that teenagers' gender identity is made up of a constellation of different factors, and that immediate affirmation risks making a passing state concrete, loses us the opportunity to help teenagers with mental-health concerns and other vulnerabilities that might be driving their distress, and turns same-sex attraction into something out of which teenagers may believe they can transition. It also made the point that a phenomenon that is, commonly, socially driven has irreversible physical consequences for many of the teenagers caught up in it.

This second part of the paper looks at treatment and outcomes. It examines medical treatment for gender distress in teenagers – namely puberty blockers and hormone treatment[1] – and associated mental and physical health outcomes. Medical transition is much less likely in England than it was previously, with a significant review of gender-identity services in play, but the medical model may be resurrected in future. It's also pertinent to Scotland and many other countries, warranting its examination here. An in-depth examination of the available evidence supporting this medical model finds it lacking. There is little in the way of mental-health benefit, and what there is does not do more than taking a placebo pill – and yet it leads to significant, irreversible physical harm. Other elements of physical treatment are examined too – namely breast-binding and genital tucking, which teenagers may choose to do at home, often without parents' knowledge.

Social and psychological treatments are also examined. Social transition, where a child is affirmed in a new identity by the adults around them (for example, with a new name and different pronouns), is part of the model of so-called gender-affirming care. It, too, falls down under scrutiny. Children who are socially transitioned are far more likely to see their dysphoria persist, putting them on a potential medical pathway as they get older.

The role of psychotherapy, and what I am terming "supportive waiting", is explored. A model of "watchful waiting" has previously been suggested by clinicians and researchers, but it often includes the provision of puberty blockers – which are shown here to have little mental-health benefit, to put children on a transition pathway and to cause physical harm. The model proposed by this paper retains the beneficial aspects of watchful waiting, including full acceptance of a child's interests, dress sense and personality, and support for any mental-health concerns or other vulnerabilities that may be underlying their distress. The paper concludes with some thoughts concerning ethics and consent.

A note on the available research

The evidence base in this area is poor. Many of the studies follow children who developed gender dysphoria before they were teenagers; teenage-onset gender dysphoria is a recent phenomenon, which leaves it under-researched. Even a study published in 2021 is based on the data of children who transitioned, on average, in 1989 at the age of seven.[2] Those children would be around 40 now. Given the huge recent changes in the profile of children who question their gender, their stories are likely to be of little relevance to the current generation of teenagers.

I have excluded studies on adults, unless I am looking at long-term outcomes. The main focus is research encompassing adolescents published since 2010, with preference given to the most recent (as it is most likely to capture those who became dysphoric during their teenage years). I have prioritised findings from longitudinal clinic-based studies over those that are cross-sectional in nature, but even the longitudinal studies have significant flaws. The appendix has more details on these.

A further problem with the research specifically on puberty blockers and hormone treatment is a lack of studies following those who take them into adulthood and beyond. The long-term effects of medicalisation would still need a serious cost-benefit analysis if the short-term effects on mental health and functioning were overwhelmingly positive. They are not, though, and long-term effects are unknown.

Perhaps the most critical issue with the evidence base is that findings are often reported in the academic literature as fact,[3] when going back to the original research shows them to be as flimsy as a house of cards. These "facts" are then cited by another study on the basis of how they were reported, not on what the research actually shows. One group of scholars describes this as a game of Telephone "in which a message is whispered from person to person distorting the original meaning of the message. However, this is not a game, and these types of errors can cause harm."[4]

Physical approaches to treatment

Medical transition

Overview

One treatment model for gender dysphoria involves giving puberty blockers – drugs that delay the onset of puberty – to older children and younger teenagers, then hormone treatment at age 16 and surgery from the age of 18.[5] This is part of the model of "gender-affirming care".

Puberty blockers are given to gender-questioning children for three main reasons: to stop them feeling distressed as a result of body changes in puberty, to give them time to decide whether to undertake further medical interventions and to make it easier, later, for them to pass as the other sex.[6] Some gender-questioning children see puberty blockers as a balm for their fear of puberty and developing a body they believe to be, in some way, abhorrent.[7]

Hormone treatment for gender-questioning teenagers aims to facilitate the development of physical sex characteristics that match the desired sex of the young person in question, working to the theory that doing so will support mental health and quality of life. A type of oestrogen is given to natal boys, and a type of testosterone to natal girls. They were previously commonly prescribed by the Gender Identity Development Service (GIDS) to gender-questioning teenagers who met certain criteria from the age of around 16,[8] although with the announcement that GIDS will close and that support services will focus more on psychotherapy in future,[9] it is likely this will shift in England.

This section of the paper goes into greater depth than any of the others. The treatment approach is life-altering, so the bar for the quality of evidence on which it is based should be high. I wanted to spend some time pulling apart the evidence to see whether – as implied by the model of gender-affirming care – negative physical impacts are outweighed by positive mental-health benefits for the children to whom puberty blockers and hormone treatment are prescribed.

Clinicians and researchers tend to look at the reported benefits of gender-affirming care in three ways:

1. Acceptance without either questioning the approach or interrogating the underlying data. This is common. I have lost count of the number of research papers citing gender-affirming care as being the gold standard, evidence-based treatment paradigm for gender-questioning children. These papers either cite directly and uncritically the studies I have examined in this paper, or they cite other studies that cite these original studies directly and uncritically.

2. The second approach has been led by well-resourced journalists in the United States, who have gone through each original study line by line, showing every questionable move, limitation or misrepresentation of data.[10]

3. The third approach is taken by more critical researchers, who assess study elements on their own merits when reporting on their current highly specialised topic of interest.

There may be occasional approaches that fall outside the boundaries of these three divisions, but the vast majority of work I have seen falls within them. The approach I have chosen to take here is a different one again: to critically assess the evidence underpinning this medical model, but from a bird's eye perspective – what does the weight of the evidence say when taken as a whole, and allowing for its limitations? This section demonstrates that the evidence does not clear the high bar needed to justify medical treatment for gender dysphoria. It does not, in fact, even clear a low one.

Mental-health outcomes

This section examines longitudinal studies, or those that measure outcomes for gender-questioning teenagers over time. It shows the evidence in this area to be weak, with studies demonstrating very limited mental-health impacts.

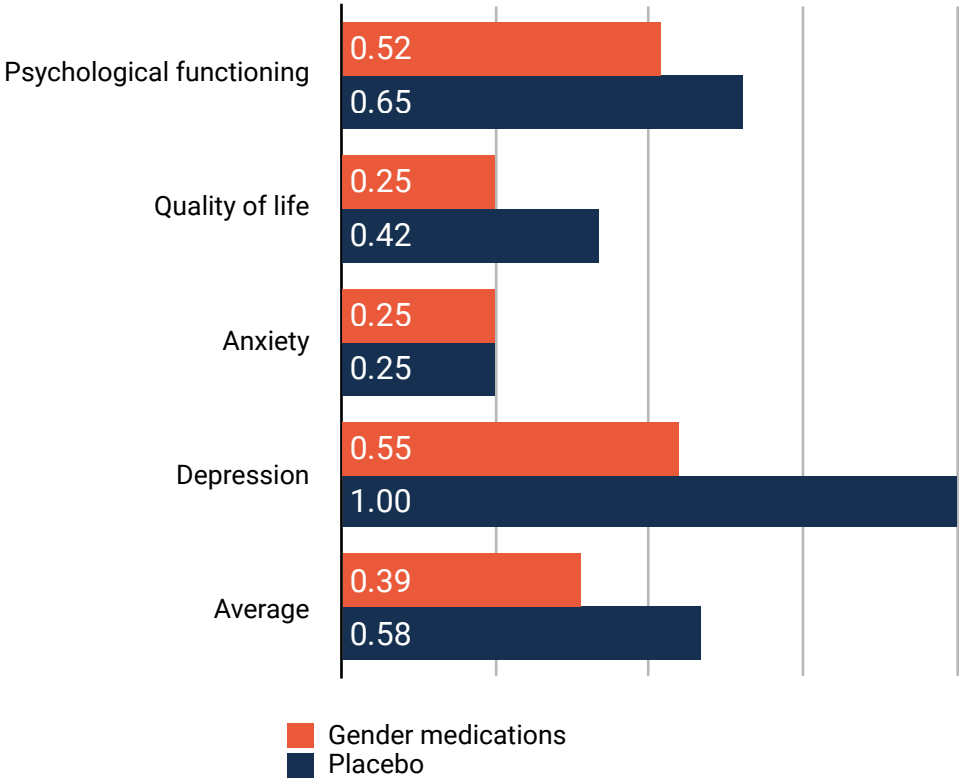
There has been occasional mention of a potential placebo effect in papers taking a more critical view of gender-affirming care and its purported positive mental-health effects.

I wanted to test this using available longitudinal data by comparing it to the placebo effect as seen in a similar group of teenagers: those being treated for mental-health conditions, including anxiety, depression, irritability, obsessive-compulsive disorder, schizophrenia and post-traumatic stress disorder.

The placebo arm of these trials was analysed in cases in which the same scales were used to test mental health outcomes as those employed by the gender medication studies. This data was used to compare the placebo effect with the effect of puberty blockers and hormone treatment on mental health. The details of this analysis – including the limitations, such as poor-quality evidence and small samples in both sets of studies – are set out in an accompanying technical paper, which can be accessed here.[11]

The mental-health impact of puberty blockers and hormone treatment should, arguably, be better than the placebo effect in order to justify their use. It is not better. It is worse, according to the headline data.The average effect size of gender medication on mental health in this analysis is 0.39, compared with 0.58 for placebo. Anxiety is the only area where the effect size is similar. In all other cases – psychological functioning, quality of life and depression – the summary analysis shows a larger effect for placebo than for gender medication. We do not have the data in a form that would allow us to rule out pure chance as a reason for gender medications under-performing the placebo effect, but we can say that they are certainly not better than placebo in alleviating teenagers' distress.

Effect size of gender medication (puberty blockers and hormone treatment) vs placebo on teenagers' mental health



Gender medication comprises puberty blockers and/or hormone treatment for gender-questioning teenagers. Uses all comparable, longitudinal data since 2010. Scales are reversed where appropriate to show positive change.

These findings are striking despite the studies underpinning them suffering from serious limitations and design flaws, which have probably led to the benefits of medicalisation being over-stated. There are eight studies looking at mental-health outcomes for teenagers taking puberty blockers and hormone treatment over time that meet some basic criteria.[12/13] The table below shows their main limitations; the appendix outlines these in more detail.

Limitations of longitudinal studies on gender medications and mental health

Study issues	A	B	C	D	E	F	G	H
Confounds psychotherapy	●		●	●	?		●	
Final treatment group size <80	●	●	●		●	●	●	●
Final treatment group size <40		●			●		●	
Doesn't report significance testing for all variables				●		●	●	●
Study drop-out rate of more than a third		●		●		●	●	●
Includes drop-outs in analysis		●					●	●
Obscures key results in reporting				●		●		●

Given these extensive design flaws, we might expect the data to tell us a reassuring story of improved mental-health outcomes from puberty blockers and hormone treatment. Worth particular mention here is the role of psychotherapeutic support, which several studies did not control for, alongside the placebo effect. This is not the story that emerges, however, as the comparison with placebo demonstrates.

Gender dysphoria

Measures of gender dysphoria and body dissatisfaction were not included in the main analysis of mental-health outcomes, as no comparator studies look at these areas. Another issue with assessing gender dysphoria is that the main scale used to measure it, the Utrecht Gender Dysphoria Scale, is often reversed for girls and boys after treatment. This means that a natal girl uncomfortable with puberty may receive a score at the start of treatment for agreeing with "I hate menstruating because it makes me feel like a girl" and "I hate having breasts," and score zero for the equivalent follow-up questions as biology makes them irrelevant: "I dislike urinating in a standing position" or "I dislike having erections."

In other words, the data is presented as if an improvement in scores represents a relief in feelings of gender dysphoria, when improvements in scores may just reflect changes in what is being asked. At the end of treatment, transitioned female teenagers no longer show dysphoria relating to their breasts or to menstruating when surveyed, as they are not asked about these areas; and they cannot show dysphoria relating to disliking having erections, as they are physically incapable of having them. Similarly, a male teenager may show dysphoria relating to disliking urinating in a standing position at the start of treatment, and get a score for this; and will disagree with any question at the end of treatment asking about discomfort relating to menstruating, as it is not part of any physical reality. Dysphoria in both cases has been shown to improve on this reversed scale, but the improvement is meaningless.

Of the four studies that looked at gender dysphoria and/or body image, two showed no significant change over treatment and two showed a positive, statistically significant change. I do not think we can know if this is meaningful, though, without a measure that takes account of gender dysphoria as it relates to underlying biology, and that asks the same questions at the start and the end of treatment.

A note on suicide

Suicide is an inevitable and serious concern for parents with a gender-questioning teenager, with messaging from campaigning charities that children must transition, otherwise they risk death.[14] A desire to die by suicide is somewhat higher in gender-questioning teenagers than it is in other teenagers referred for mental-health conditions, and much higher than it is for teenagers in general.[15] Actual suicide rates, though, are low. The number of suicides out of the 15,000 young people who went through the UK's Gender Identity Development Service over 10 years was four, or 0.03%.[16] That is not to say it does not matter. Of course it does, but the risk is nothing like that claimed by campaigning charities – which is based on one tiny, highly problematic survey.[17]

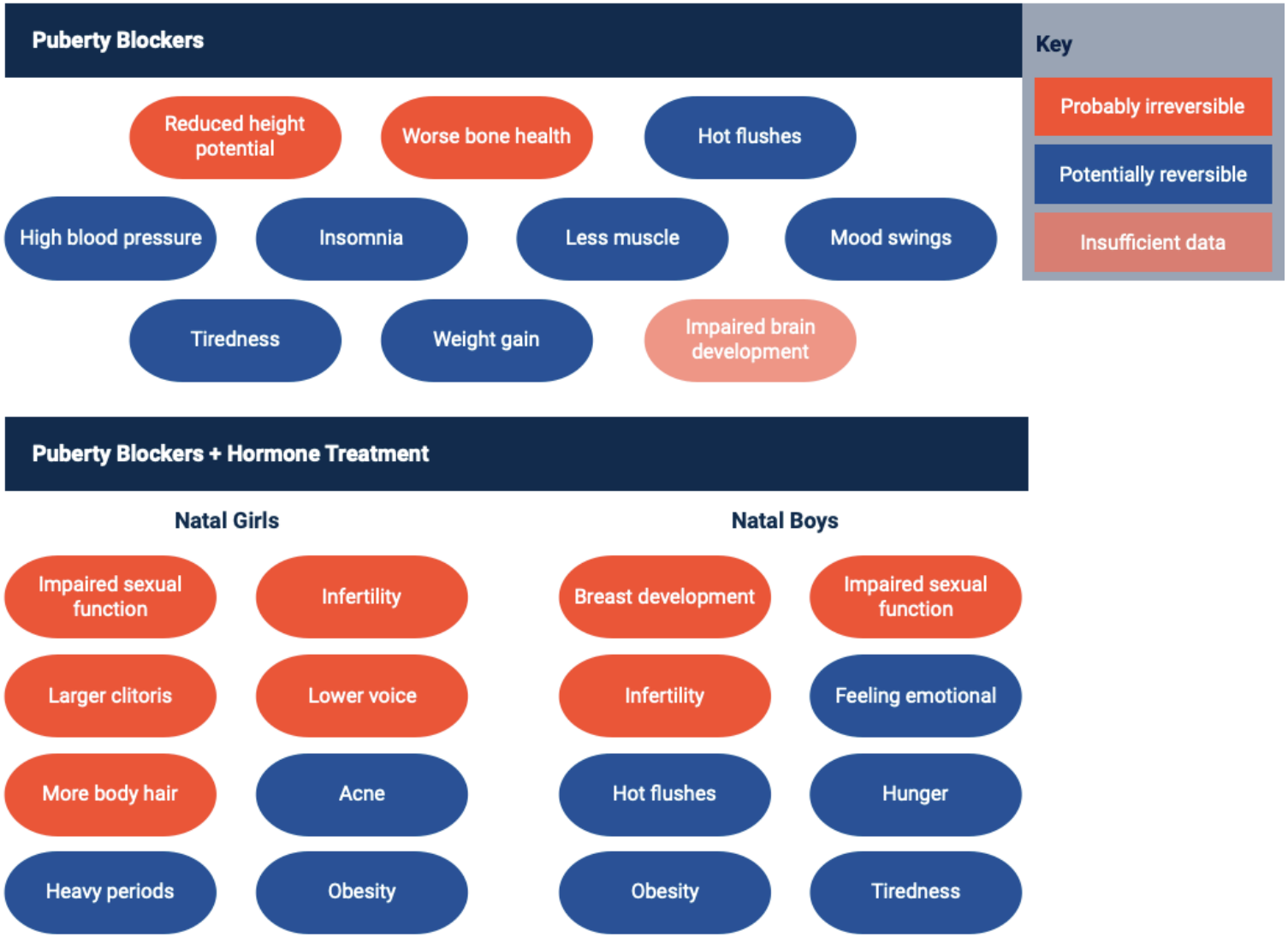
The data I have just mentioned is for teenagers who are receiving treatment, so it does not tell us whether transition reduces the desire to die by suicide. There is nothing definitive to say it does, though. I have chosen to focus on the eight longitudinal studies that assess mental-health outcomes of gender-affirming care in teenagers (see the main text on mental health above and the appendix for details of these studies). They have serious limitations, but they are of higher quality than alternative studies. They take independent measurements of suicidality over time, rather than relying on people to remember how they felt years before, and the sampling is more representative: samples are made up of young people attending clinics, not of those who have opted in to a survey.

Four of these studies looked at a desire to die by suicide, suicide attempts and/or self-harm. Only one study showed a statistically significant reduction in any of these areas,[18] and it confounded psychotherapy – in other words, any improvement in feelings of distress could have been as a result of psychotherapy offered to the young people over the course of treatment, not as a result of the treatment itself. Alternatively, psychotherapy may have had no impact – but the methodological shortcomings mean that we do not know if this is the case. In the other three studies that looked at suicidality or self-harm, no statistically significant improvements were seen over the course of treatment.

The lines used by campaigning charities to pressure parents into treatment cannot be backed up.

Physical-health outcomes

Physical effects of puberty blockers and hormone treatment[19]



Medical outcomes are less equivocal, at least in the short term. Unsurprisingly, some physical effects of puberty blockers and hormone treatment are the ones for which their prescription is intended. Puberty blockers reduce levels of sex hormones in the body. In natal boys, testicle size is reduced; in natal girls, periods stop, and the hormones that trigger ovulation are reduced.[20] Side effects of puberty blockers include weight gain, hot flushes, mood swings, insomnia, tiredness and memory loss.[21/22/23] Certain blockers can also cause high blood pressure.[24]

While there is less known about the longer-term outcomes, there are clear effects on body development and bone health. Teenagers on puberty blockers are shorter than their peers, on average, and they have both less muscle and more body fat.[25] They tend to have lower bone density than other teenagers,[26] an effect that remains even once they no longer take puberty blockers.[27] Although bone density may increase during hormone treatment,[28] young people who have been on a combination of puberty blockers and hormones have lower bone density than they would have done without treatment.[29] Adolescence is a key period for the development of bone mineral, meaning these teenagers may be at higher risk of developing osteoporosis when they are older.[30]

The effects of puberty blockers on brain development are not yet known,[31] but they may be negative.[32] One large-scale study of British teenagers finds that those who go through a late puberty have lower cognitive skills and worse educational attainment than their peers;[33] while this shows correlation, not causation, it is worth noting in the absence of studies specific to the long-term effects of puberty blockers. According to scholars who reviewed existing research in this area, "The combination of animal neurobehavioral research and human behavior studies supports the notion that puberty may be a *sensitive* period for brain organization: that is, a limited phase when developing neural connections are uniquely shaped by hormonal and experiential factors, with potentially life-long consequences for cognitive and emotional health."[34]

While loss of fertility is not an impact of puberty blockers if children resume normal puberty after taking them, there is no way for them to become fertile as adults if they have never been through the puberty that relates to their sex. This is because the cells that go on to form ovaries and sperm will not have been able to mature.[35] And as almost all children who take puberty blockers go on to take hormone treatment (see the next section), later infertility, which is a key impact of hormone treatment, is almost inevitable. Taking oestrogen affects the healthy future development of sperm in those with a male reproductive system, and testosterone stops egg-bearing follicles developing in those with a female one.[36]

For those who have already been through puberty, there is little data so far on the long-term effects on fertility of taking high levels of testosterone for extended periods.[37] Some transmen who took testosterone later became pregnant.[38] There is no published data on how often this happens.[39] Additionally, it is not possible to extrapolate what is likely to happen to teenagers' fertility from studies that look at adults who have been on hormones for relatively short periods of time.[40]

Hormone treatment encourages breast development in natal boys, and leads to a lower voice, larger clitoris and more body hair in natal girls,[41] and a potential to develop male-pattern baldness.[42] Side effects of hormone treatment in natal boys include tender breasts, feeling emotional, hunger, tiredness and hot flushes. In natal girls, they include acne and heavy periods.[43] Teenagers who have been on hormone treatment are more likely than their peers to be obese by their early 20s.[44]

There is no knowledge, yet, about the effects of taking hormone treatment over the course of a lifetime, bar what we know about the irreversible effects in adolescence (see diagram above), nor knowledge about what puberty blockers prevent or amplify when the brain is rewired during adolescence.[45] According to the UK's National Institute for Health and Care Excellence, "any potential benefits of gender-affirming hormones must be weighed against the largely unknown long-term safety profile of these treatments in children and adolescents with gender dysphoria".[46]

The lack of knowledge about some potential long-term consequences contrasts worryingly with the fact that, in other areas, consequences are known, significant and permanent.

Transition inevitability

Puberty blockers are often presented as a temporary, reversible intervention that give children time to think about what they want, but the outcome is inevitable – and it is not reconciling happily with their birth sex. Puberty blockers place children on an almost unavoidable pathway to hormone treatment. 98% of teenagers on puberty blockers go on to take such life-altering treatment,[47] and hormones are often a precursor to surgery.[48]

You could interpret these findings in two ways. You could see them as reflecting the skill of the medical profession in correctly prescribing puberty blockers to children who are sufficiently gender-dysphoric that they do not later change their minds. Alternatively, you could see puberty blockers as drugs that affirm children in their dysphoria and make it impossible to step off the transition pathway. Either may be true, but if there is even a chance that the second explanation is the correct one, the justification of gender-affirming care when set against the known detriments to children's healthy bodies becomes tissue-thin.

Binding and tucking

Breast-binding and genital tucking are sometimes done by gender-questioning teenagers in order to remove obvious signifiers of their sex. Breast-binding involves compressing breasts to ease feelings of discomfort in natal girls and women who identify as male or non-binary.[49] Binding methods include commercial binders, tape and bandages.[50] With genital tucking, the penis and scrotum are tucked between the buttocks in order to make them less apparent. Side effects of tucking in adults include itching and rashes, pain and infection.[51] There is less written on this practice than there is on binding, and most of the research in both areas looks at adults, not teenagers.

Young people tend to learn how to bind their breasts online.[52] Medical-sounding sites[53]– patient.info, webmd.com, medicalnewstoday.com, GenderGP – offer advice on breast-binding, often failing to highlight safety concerns. Sites such as WikiHow give children advice on how to ask parents for a binder: "I would be really happy if I got one and it would make me feel confident," and on what to do if parents refuse: "Ask someone else you trust for a binder… if they have the money." Curious teenagers have access to around 3,000 videos on YouTube about breast-binding, as well as many more on other platforms.

The lack of adolescent-specific research means there's uncertainty about the impact of binding on developing breasts or on levels of teenage gender dysphoria. A study of 1,800 adults who practise breast-binding found that 97% experience negative side-effects.[54] Binding is linked to compromised lung function, with binders potentially affecting the volume of air the lungs can take in.[55] Most people using binders experience back or chest pain, shortness of breath, overheating and bad posture. Other symptoms include acne, itching and rashes.[56] The most common symptoms tend to occur within the first month of using a binder. Rarer symptoms, such as fractured ribs, infections and muscle wastage, most often occur after binding for more than a year.[57]

Risks are most prevalent with commercial binders; individuals also place themselves at risk when they bind their breasts with bandages or duct tape, or when they wrap them in plastic. For teenagers determined to bind, sports bras are the safest method.[58]

Social and psychotherapeutic approaches to treatment

Social transition

Some experts recommend supporting gender-questioning teenagers to transition socially, or treating them as if they were the sex they wish to be. The idea is that social transition supports teenagers in their chosen identity while avoiding taking the more drastic, permanent route of medical transition. This seems pretty benign in theory. What is the harm, we might ask, in following a child's lead as to how they want to be addressed and treated? As this section shows, though, continuing gender dysphoria is more likely to last in those who have socially transitioned, potentially placing children at greater risk of ending up on a pathway to medical transition – the harms and lack of benefits of which we have already seen.

Common elements of social transition are name changes and a shift in pronouns. A teenage natal girl, for example, might ask to be referred to as he and him. Some definitions of social transition also include changes to clothing or hairstyle. These seem less relevant than pronouns and name changes, as they are not really about gender. If a girl feels more comfortable with short hair and wearing biker boots, and is able to do this while not feeling she has to change sex, things are going well. It should also be relatively easy for children to present in a gender non-conforming way – although boys in dresses still, unfortunately, raise more eyebrows than girls in trousers.

And such varying definitions make the research harder to interpret. In some cases, definitions may even be problematic. In one paper, for example, social transition is defined as including allowing children to choose "play… that they feel congruent with their affirmed gender".[59] This indicates a belief that some forms of play are more or less appropriate according to sex or gender, implying stereotyping. By "social transition" in the rest of this section, I mean pronoun and name changes, not things that can be linked to stereotypes, such as the way teenagers choose to dress or cut their hair.

There are some serious issues with research suggesting that social transition has positive benefits. One commonly cited study looked at younger children (aged 3 to 12 – a lot of the work on social transition looks at those who transitioned as younger children, not teenagers). It failed to compare their mental health before transition and after it, and relied on the reports of those who were already invested in this transition.[60] Another study purporting to show lower depressive symptoms along with decreased suicidal ideation and behaviour in those whose family and friends use their chosen name, not their birth name, shows nothing of the kind.[61/62] This is an example of a paper that has stated conclusions at odds with its own data.

Research showing neutral or negative outcomes for social transition can be problematic too. One recent study compared the outcomes of those who had socially transitioned as young children (aged three to nine), teenagers (aged 10 to 17) and adulthood. It found that those who had socially transitioned as teenagers had a higher lifetime suicide risk than those who had socially transitioned as adults, something likely related to the extent of bullying they had encountered at school.[63] This was based on a survey of adults, though, and memory can be fallible. A separate study – with a cross-sectional design, meaning no causal conclusions can be drawn – found no association between mental health or behavioural outcomes and whether younger children (aged 5 to 11) had transitioned socially.[64]

The evidence base for either positive or negative outcomes of social transition, then, is shaky. The same could be argued for evidence on the real potential harm, which is that social transition may cement distress. There is certainly a link here – gender dysphoria is more likely to persist in younger children who have socially transitioned[65] (we do not know yet if the same is true for teenagers who become gender-questioning in adolescence). This connection is backed up by a 2022 longitudinal study showing that only 7% of socially transitioned younger children changed their minds over a five-year period.[66] What we don't know is whether this link is causal or driven by some unknown factor.[67] Given the risk of harm for children who are unable to resolve their dysphoria, though, we should be treating social transition with caution, not as a benign act of affirmation.

What might the reasons be for this link between social transition and persistent gender dysphoria? The psychotherapist Lisa Marchiano argues that teenagers who have experienced social transition, and as a result have spent time thinking they are a different gender, are more likely to feel pressure to stay that way.[68] Social transition can make it stressful to change tack and identify with birth sex; teenagers may be concerned about teasing and feel shame about changing their minds.[69] The American College of Pediatricians puts it this way: "Purely from a social learning point of view, the repeated [behaviour] of impersonating and being treated as the opposite sex will make identity alignment with the child's biologic sex less likely."[70] Detransitioners describe the stigma they experience as a consequence of having done so.[71] Teenagers may find it easier to engage in exploratory treatment if they have not socially transitioned, as they have not yet definitively latched on to a particular identity.[72] Social transition can also reinforce children's sense that there is something wrong with their bodies.[73] Dysphoria may increase as young people become more and more concerned about being able to pass as the opposite sex.[74]

Much research underpinning this section is of low quality, and causal links have not yet been tested. But the uncertainty itself is important in working out the right thing to do. As Dr Hilary Cass, who has been running an independent review of gender-identity services for children and young people in England, says: "There are different views on the benefits versus the harms of early social transition. Whatever position one takes, it is important to acknowledge that it is not a neutral act, and better information is needed about outcomes."[75]

Psychotherapy

Psychotherapy is sometimes used to support children with issues that may be underlying their gender dysphoria, such as anxiety, depression or trauma. Exploratory psychotherapy for gender-questioning teenagers has been criticised by many supporters of gender-affirming care. It relies, according to one account, on unproven assumptions. One is that gender identity is not necessarily fixed in childhood and has the potential to be influenced by external factors; another is that gender-questioning children may benefit from aligning themselves with their sex.[76] I would argue, though, that both these assumptions can be demonstrated as fact. The first has been demonstrated in the first part of this paper; the second seems a fair, evidenced conclusion, given that the main alternative – as proposed by the gender-affirming care model – is medical treatment that results in infertility and an eventual inability to enjoy sexual activity.

Exploratory psychotherapy in relation to gender identity is seen by some as conversion therapy.[77] This has been in the news in the United Kingdom following government proposals – and a later row-back – to ban conversion therapy relating to gender identity. While a proposed ban might sound laudable in theory, in practice it subsumes exploratory therapy that might help gender-questioning children and adults to scrutinise what is happening underneath their dysphoria. What happens if, for example, a therapist sees a depressed, lonely and gender-questioning teenager who has been caught up in online worlds, and the therapist believes the child's interests would best be served by unpicking some of this?

A paper in the Royal College of Psychiatrists' journal points out that current definitions of conversion therapy, and related guidance from professional bodies, could make medical transition the de facto end-point of any treatment.[78] Similar concerns have led the Equality and Human Rights Commission to state that any legislation "must be carefully drafted in order not to catch legitimate and appropriate counselling, therapy or support which enables a person to explore their… gender dysphoria".[79] And while this section deals with psychotherapy, a definition of conversion therapy that is widely drawn could also catch other adults who are helping gender-questioning teenagers, such as teachers or club leaders.

It is difficult to work out what the outcomes are from psychotherapy. They are likely to vary based on whether children are immediately affirmed in their chosen gender identity or whether they are seen by therapists who take a more exploratory approach. Guidelines from some professional bodies, including the UK Council for Psychotherapy[80] and the British Association for Counselling and Psychotherapy,[81] expressly forbid therapists from doing anything that might change a client's gender identity. A memorandum of understanding on conversion therapy – signed by organisations such as NHS England, NHS Scotland and the Royal College of Psychiatrists – makes a nod to exploratory psychotherapy within the limits of avoiding steps that might support clients to realign their gender identity, but talks widely of conversion therapy, requires therapists to acknowledge "the broad spectrum" of gender identities and forbids

them to work with the express purpose of supporting clients to become more comfortable with their sex.[82]

We might expect this kind of treatment to be linked to more transitions, given the evidence suggesting gender-affirming care locks in gender dysphoria.[83] A more exploratory approach may shift children away from their initial desire to transition.[84] Given these two outcomes are contradictory, and in the absence of research comparing different modes of care, it seems unlikely that we will see decent evidence of outcomes. We do not even have much in the general realm of research on outcomes from psychotherapy for this age group and in this area.

As in much other research in this area, studies purporting to contribute to the evidence base are deeply flawed. Some research papers make an assumption that gender-affirming psychotherapy is the only acceptable treatment model, without assessing outcomes or interrogating this assumption.

Others are more notable for their flaws than they are for the light they shine into unexplored corners of these issues. One study found, for example, that so-called conversion therapy (including exploratory psychotherapy) was linked to worse later mental health,[85] but this link may instead be due to people with worse mental health being less likely to be affirmed in their chosen gender identity, or a pretty dreadful study design,[86] or the fact that the study authors confounded religious conversion therapy with exploratory psychotherapy.

A qualitative study found that teenagers seeking medical transition assess gender-affirming therapists as satisfactory and those whom they view as non-affirming as unhelpful.[87] It is arguable, though, that teenagers who are well on the pathway to medical transition are invested in having therapists who affirm their identities. This study also tells us nothing about the link between gender-affirming therapy and teenagers' gender dysphoria.

Research indicating the potential utility of psychotherapy for gender-questioning teenagers tends to be from very small studies. Such studies suggest that attachment-based family therapy may be helpful for gender-questioning teenagers who are feeling suicidal. This type of therapy focuses on building family relationships and repairing ruptures.[88/89] And a qualitative study run through the UK's Gender Identity Development Service found that an exploratory assessment process with teenagers may have "provided a platform through which issues of homophobia and internalised shame, familial narratives and relational ruptures, and beliefs and fantasies associated with mid-adolescence… could be meaningfully thought about and integrated into a story of who one is becoming".[90] This nuanced analysis shows there are people working within the gender-affirming care model who remain open to complexity.

Research, then, on outcomes from psychotherapy for gender-questioning teenagers is extremely limited, and should be a priority for future research. Therapists attached to a gender-affirming model may unwittingly solidify gender dysphoria through what is, effectively, their social transition of gender-questioning teenage patients.[91] Therapy, though, can be useful for teenagers with underlying mental health issues.[92] Parents should ensure they understand, and agree with, a therapist's approach before engaging them.

Supportive waiting

This section looks at a slight variation on the approach known as "watchful waiting". Watchful waiting does not prejudge where a gender-questioning child will end up, but instead prioritises their well-being and general state of mind. It assumes that some cases of gender dysphoria will resolve themselves, so affirming interventions are not appropriate, but also that it is fine for a child to express themselves however they please (apart from where it may be unsafe for them to do so[93] – for example, a boy who goes to school wearing a dress may place himself at risk of bullying). It may be made clear to a child that, while it is fine to express themselves as they choose, it is not possible literally to change sex.[94]

It has occasionally been argued that watchful waiting includes the prescription of puberty blockers from the age of 12,[95] but this is not the interpretation I want to use here. As this paper demonstrates, almost all children who take puberty blockers go on to take hormone treatment – so puberty blockers do not give them the 'pause' to work out whether their gender identity persists or desists that so many studies say they do. It is not watchful waiting if a medicalised pathway is baked in. I have therefore used the term "supportive waiting" to remove any potential overlap with social and medical transition.

I want to be very clear about the *supportive* element of my own definition here. There is a sense among some quarters that parents and other caregivers are rejecting children if they do not affirm them through social or medical transition.[96] I believe we are not supporting children if we are leading them towards physical harm when they are not old enough to understand its consequences, particularly given how little we know about long-term effects. On an inverse view of the same point, we are not rejecting them by moving away from the gender-affirmative model.

Support can show itself in many other ways. These will be covered in full in part three of the paper, but briefly, they include – for parents – working on building strong relationships with their children, helping them to feel comfortable in their bodies and to lose any sense of physical disconnection they might be feeling (for example, by giving them opportunities to play sports they enjoy), helping them to set healthy boundaries around internet use, and recognising and validating them for the things they think, feel and do.

Watchful waiting has been criticised by some for pathologising gender identity and for assuming that gender identity becomes fixed at a certain age – perhaps in early adulthood. (These scholars argue that it is incorrect to assume gender identity becomes fixed at any point – but they recommend medical interventions to children whose identity they have stated may change.)[97]

Watchful (or supportive) waiting is not about an assumption that identity is fluid until it is fixed, though. It is, instead, about waiting until decisions can be made as consenting adults about very complex interventions with significant physical consequences, some of which are not yet fully understood, and a recognition that even decisions made as adults may later be rescinded.

The main argument for supportive waiting, as I have defined it here, is that identity is fluid throughout the teenage years,[98] and social and medical transition may make it concrete.[99] This is not an approach for gender-questioning teenagers that has been tested through research as yet, although I very much hope it will be. But there is evidence to show that the various elements of it – for example, strong family relationships[100] and a healthy body image[101] – are linked to good mental health and quality of life. We know that physical transition causes harm to otherwise healthy bodies; we know that these supportive elements are linked to positive well-being.

Desistance and detransition

This section looks at desistance, in which gender dysphoria gets better, and detransition, where people identify once again with their birth sex after social, legal or medical transition, or where they choose to stop transitioning for other reasons (for example, health concerns or a lack of social support).[102]

Rates

One of the crucial questions to which there is no comprehensive research answer is, of children who identify as a gender that does not match their biological sex, how many later change their minds? If the answer is high – or perhaps any, depending on your point of view – there is a good argument for avoiding a medicalised pathway in childhood, because it would lock some of them into a permanent state they later regret. Unfortunately, there has been very little research on the numbers of people who detransition. Reasons may include fears among scholars, academic institutions and journals that they will be subject to negative attention if they are involved with research that does not centre the gender-affirmative model. Individuals may fear participating in studies for similar reasons.[103/104]

The limited information we have suggests that the majority of children desist and/or detransition eventually.[105/106] Rates are hotly contested by different groups of scholars, leading to some fairly public spats.[107] The most recent study I can find, of around 1,000 gender-questioning children (those without a formal diagnosis), showed that the vast majority change their minds. Only around 30% went on to get a formal diagnosis of gender dysphoria. It also showed that the younger children were when they initially presented as gender-questioning, the less likely they were eventually to get a formal diagnosis – only 16% of three- to nine-year-olds went on to get diagnosed, compared with 28% of 10- to 14-year-olds and 37% of those aged 15 and over. Natal girls were more likely to get a formal diagnosis than natal boys.[108]

While the proportion of adults who later change their minds may be much lower than the figure for children,[109] the subreddit for detransitioners (an online discussion forum) has over 40,000 members at the time of writing. Some of these may be interested parties, not detransitioners, although the board guidelines states that non-detransitioner content – with the exception of medical and legal professionals – will be removed.[110]

Most studies on desistance draw on old and incomplete data. In terms of its relevance to teenage-onset gender dysphoria, the research does not take account of two key things: the potentially different nature of teenagers who become dysphoric when compared with younger children, and the fact that widespread social transition is likely to be deflating rates of desistance.

There is also no accurate way of measuring the numbers of children who later detransition without a proper measure of gender identity: some researchers have suggested that relatively high rates of detransition may be because children are inaccurately labelled as trans,[111] due to older, looser diagnostic criteria that may have captured children who were merely gender non-conforming. If this criticism holds water, it is unlikely to affect the overall direction of findings significantly, given the range of studies showing that most children who are labelled trans eventually – at some point during their teenage years – become accepting of their biological sex.[112] And unless the new diagnostic criteria are freshly watertight, and prevent children who are gender non-conforming but not gender dysphoric from getting misdiagnosed (which those criteria currently do not, in my view),[113] the very idea that the wrong children are being caught up in definitions should be enough to give pause to those who believe in the model of gender-affirming care.

Who desists/detransitions, and why?

There are two main groups of detransitioners: those who re-identify with their birth sex, and those for whom the transition experience is too difficult to bear.[114] Some researchers caution against binary thinking in this area, suggesting that persistence and desistance may be on more of a continuum: people who are or who have been gender-questioning may move back and forth along it.[115]

This idea of fluidity again gives rise to a determination that we should not be making concrete, through irreversible changes, something that might otherwise have been a passing state. I do not make this argument for consenting adults (although the wafer-thin evidence base has been misrepresented, limiting the extent to which anyone can meaningfully consent) – but it is hard to see how parents or medical professionals can legitimately consent on teenagers' behalf when there is a possibility they may later change their minds.

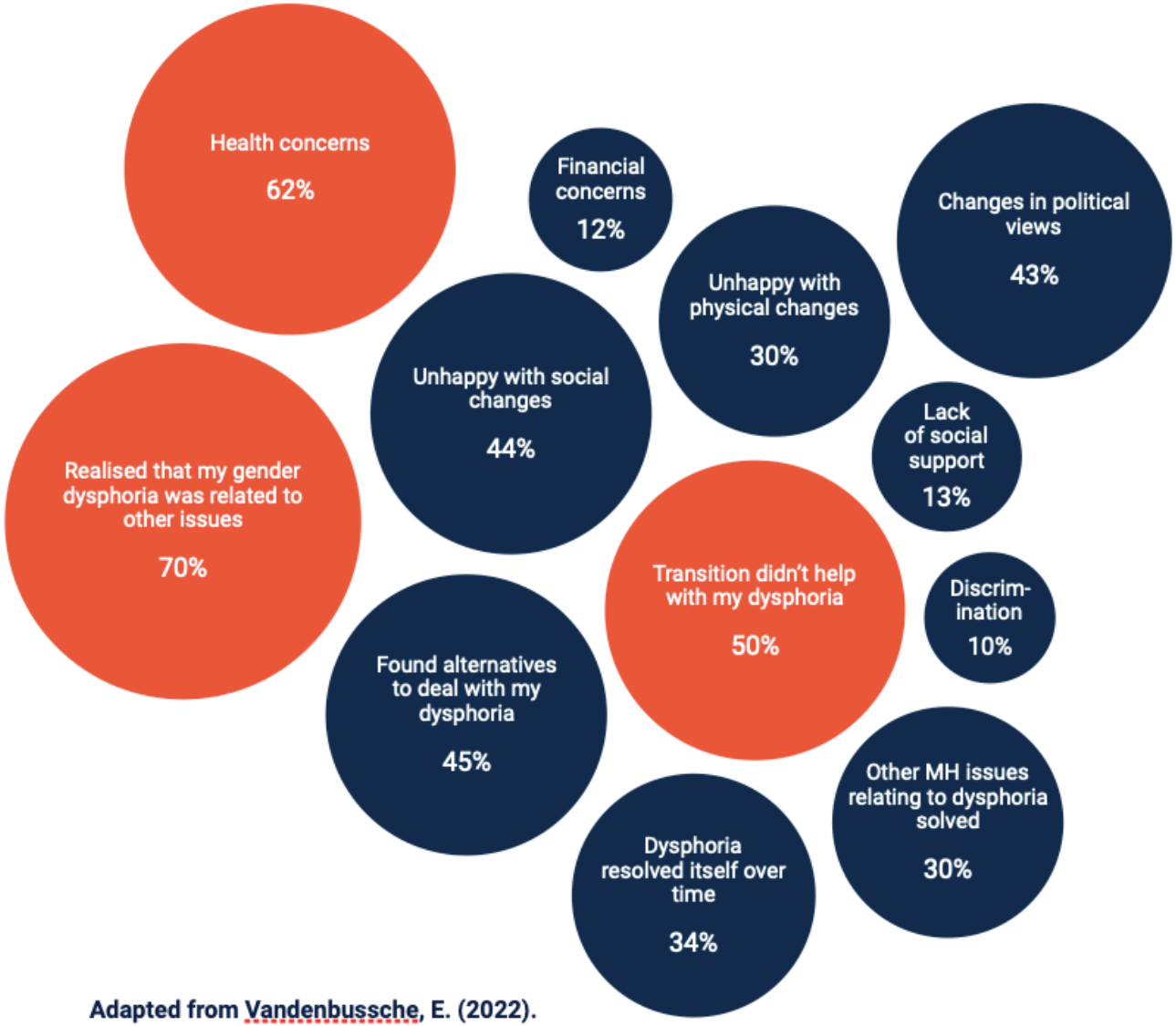
One study has found that a child is more likely to desist if he was born a boy, his dysphoria was not strong and he was not socially transitioned.[116] As already discussed, social transition may be a particular barrier to children being able, later, to change their minds; a recent study of younger children who were socially transitioned found that only 7% had changed their minds five years later.[117]

Two female detransitioners, writing anonymously due to the opprobrium attached to leaving the trans community, have developed a model of what happens to mental health over the transition period. This model is based on their experience and the experience of other detransitioners they know.

Their model shows mental health plummeting among teenage girls who identify as trans and rising sharply again after medical transition (a "spike of euphoria"). Mental health levels then fall continuously once more, as a result of things these girls did not expect – perhaps they still have feelings of dysphoria, they feel alone, they can no longer access spaces dedicated to women and girls, they have underlying, untreated trauma or they have long-term physical impacts from surgery.

Realising, post-surgery, that it is not literally possible to change sex is another hit to well-being. They say: "For each step towards transition taken, we've noticed that many get a temporary feeling of satisfaction, a small relief, but never a lasting one. In fact, our steps towards transition faced us with constant frustration and disappointment which ultimately intensified criticism of our body, thereby developing a compacted and severe body dysphoria."[118]

Main reasons for detransitioning[119]



Adapted from Vandenbussche, E. (2022).

A recent survey of 237 detransitioners (a self-selected survey, which has limitations; decent data is not currently held about detransitioners) found that the most common reasons for detransitioning were realising that their gender dysphoria was related to other issues, health concerns, and finding that transition didn't help with their dysphoria. These and other reasons are shown on the previous page.[120]

These findings supplement information from an earlier study of 100 detransitioners finding more than half had detransitioned, at least in part, because they had become more comfortable with their birth sex.[121] An analysis of a national survey aimed at transgender people identified external factors such as pressure from parents or stigma as the main reasons for detransition.[122] It is unlikely that this survey was representative or meaningful, though, as it was aimed at people who are transgender – not at those who no longer identify that way.

Needs of and support for detransitioners

The limited research on detransitioners means that doctors and psychotherapists know little about how best to support them.[123] We do know that many have complex needs, including managing feelings of regret, ongoing gender dysphoria, co-existing conditions and internalised homophobia. Many also have medical needs relating to hormone treatment, surgical reversal and medical complications.[124]

The existence of detransitioners points to a need for non-medical treatments for gender-questioning teenagers.[125] The fact that some people later change their minds makes the common model of treatment, where children are affirmed if they adopt a new gender – with all the difficulties and possible eventual medicalisation that entails – seem cavalier.

A note on ethics and consent

Can children understand what it means to consent to treatment that means they will be unable to have their own children in future and to enjoy sex one day? Are parents able to consent to such treatment on their behalf?

There are plenty of researchers who think they can.[126] This viewpoint takes the perspective that these costs are worth paying – that it is better for a child to place a halt on puberty and to develop some characteristics of the opposite sex in order to "pass" once they become adults. This perspective requires taking at face value the studies (already covered in this paper) that supposedly show positive mental-health effects of medical treatment.

The views of researchers and clinicians vary on what is an acceptable outcome. Two scholars who have written widely on the purported benefits of gender-affirming care state: "Although gender affirming hormones can cause some irreversible changes, such as body fat redistribution and vocal changes, these effects are primarily cosmetic."[127] The implication is that such cosmetic changes are relatively minor and therefore do not matter.

This may be news to many detransitioners and others experiencing regret, who have been clear that cosmetic changes such as receding hairlines do, in fact, matter greatly.[128] It ignores the non-cosmetic changes of medical treatment, such as fertility and sexual functioning, and omits any consideration of children's rights outside the narrowly defined sphere of gender-related considerations. These rights might include the right to avoid surgery on healthy bodies, and to preserve future fertility and sexual function. There is arguably a right, too, to be able to go through puberty with peers, with all the developmental and social advantages that implies, and not to get left behind in some kind of liminal state.

If we accept the definition of an experiment as something conducted under controlled conditions to test a hypothesis or to unearth previously unknown effects, the lack of long-term data on outcomes means that medical treatment for children in this area is experimental.[129] Children are not fully able to understand the long-term consequences of medical treatment, so they cannot meaningfully consent to it.[130] Co-existing mental health conditions may also undermine their ability to consent.[131]

The exceptionally poor quality of the evidence base relating to mental health outcomes,[132] as already explored, means that families are being asked to give consent to treatment of uncertain benefit in the short term, and even more so in the longer term. We know more about negative physical consequences. There is still much we do not know, though, about long-term repercussions.

There are also ethical questions attached to giving treatment that harms physically healthy bodies based on symptoms, for a condition (an internal dissonant sense of gender identity) that cannot be seen or verified.

There is no other branch of medicine that does anything similar. Diagnoses of mental health conditions rely similarly on internal reports, but medications and treatments – while they may have side-effects – do not, for the vast majority of people taking them, have long-term physical consequences. Anorexic patients might be given a great deal of support through individual and family therapy to deal with some of the underlying issues, and to develop a sense of reconnection with their bodies. And treatments with irreversible effects outside the world of gender medicine are targeted at physical symptoms and states for which relatively objective measures exist. Radiotherapy might be offered to a woman with breast cancer, for example, after laboratory testing of a tumour.

A final point centres on the ethics of cementing a passing state. Teenagers go through various iterations of identity – on one level, that is what puberty is – that social or medical transition set in stone. They arguably have a right to experiment and get things wrong without adults smoothing the path to making such exploration permanent.

Concluding thoughts

The argument that gender-affirming care improves gender-questioning teenagers' mental health is not credible, at least not on current evidence. Putting children on a transition pathway is not a solution to their feelings of distress and may mask other issues.[133] The lack of unambiguously positive mental-health effects suggests a need for an urgent reappraisal of the gender-affirming care model.

A key issue is how uncritical much of the research is that supports affirming children in their chosen gender. There is an onus on researchers to check bias and assumptions. I know that the scepticism I feel towards research supporting medical transition makes me more likely to see the flaws in the studies that promote it – it is this awareness that makes me attempt to be equally critical to studies showing the opposite. No doubt I have not done this perfectly, but recognition that there is another viewpoint forces my standards upwards. Conversely, being uncritical means that there is no opportunity to check or challenge bias.

The body of evidence has been formed by researchers who write things like: "Unbounded social transition and ready access to puberty blockers ought to be treated as the default option, and support should be offered to parents who may have difficulty accepting their youth."[134]

The author of this statement has not challenged herself to consider that the parents whose approach she wants to realign may, in fact, be more accepting than those who support transition – they have decided to accept their children as who they are, with their likes and dislikes, their personality quirks, their damage and their hopes, without feeling they have to change their bodies to match.

It is these parents who have the space to self-reflect, to become alert to the factors that may underlie their children's gender dysphoria[135] and to help them with these issues, rather than unwittingly papering over the cracks.

Appendix

This appendix examines some of the limitations of studies looking at medical treatment and mental-health outcomes (the eight longitudinal studies whose summary analysis forms the backbone of the section of this paper on mental health).

Psychotherapy naturally often accompanies medical treatment, but half the studies made no attempt to account for this. In other words, they were measuring mental-health outcomes that purported to be a result of medical treatment, but did not consider that the accompanying psychotherapy some of the teenagers received may have been influential.

Half the studies failed to report significance testing consistently for all variables. Were the findings inconvenient? Was it just an oversight on the part of the research teams? On average, a third of teenagers had dropped out of each study by the time it finished. Three studies included drop-outs in their analysis; mental-health data related to a slightly different group of teenagers at the start of treatment than it did at the end. Where did these teenagers go? Did they stop treatment because they did not get on well with it? Were they the really unhappy ones whose sadness overrode the social conformity needed to answer a questionnaire?

Three studies used a comparison group. None of these was in any way useful. One group consisted of teenagers who did not qualify for puberty blockers because they had serious mental-health issues, making any comparison with the treatment group meaningless (it has been shown elsewhere that teenagers with worse mental-health outcomes are more likely to continue to have problems after medical treatment for gender dysphoria).[136] Another study used "healthy cisgender controls" who had volunteered for the study – again, not really a comparison group in any meaningful sense. The final study used an endline comparison group consisting of seven (7) teenagers, a data set wholly incapable of providing any meaningful comparison.

Most alarmingly, three of the eight studies obscured results, whether unwittingly or otherwise, to an unsettling degree. In two of these studies, this related to reporting suicidal ideation – something it is crucial to get right, to avoid falsely alarming parents or teenagers. In one study, a review of accompanying data tables showed incidence of suicidal ideation going up from 33 people before the initial assessment to 51 people in the follow-up period. These periods were not the same, making the data not comparable anyway, but this did not prevent the study authors from making a less alarming comparison between similarly incomparable follow-up rates and lifetime rates. A separate study reported that suicidal ideation fell over treatment, but no significance tests were reported, and the actual numbers involved were so small as to suggest that statistical tests would not show a significant difference.

The final instance of dubious reporting was in the most recent study, where data tables showing no obviously significant change in mental health between the start of treatment and the end of it contrasted with the study authors' assertions they had provided "evidence that access to [puberty blockers] or [gender-affirming hormones] in a multidisciplinary gender-affirming setting was associated with mental health improvements".[137/138]

I will spend less time on other, cross-sectional studies, as longitudinal studies can tell us more about how mental health shifts over time: asking people to recall how they felt at a previous moment is less reliable than asking them at the time. These studies do warrant a brief mention, though, as they are often used to back up the gender-affirmative treatment model. But retrospective studies showing a link with suicide or poor mental health can also be misleading.

One large survey of transgender adults compared outcomes for teenagers who had wanted puberty blockers but not been given them with those who wanted and were given puberty blockers. It found that this second group were less likely to have suicidal thoughts.[139] There were a number of issues with the study, a key one of which was that those teenagers with the worst mental health – and therefore those most likely to have suicidal thoughts[140] – were unlikely to have been eligible for puberty blockers and so would naturally have been part of the first group.[141] You cannot reasonably say that puberty blockers prevent suicidal thoughts if those most likely to have suicidal thoughts are in the comparison group.

Three authors from that paper contributed to a similar study in early 2022 on hormone treatment, a headline finding of which was that teenagers who have access to hormone treatment are less likely, as adults, to have mental-health problems or a desire to die by suicide than those who wanted hormone treatment but were unable to access it.[142] Re-analysis of their data contradicts this finding.[143] The study also suffers from the same key limitation as their earlier one (those who have more severe mental-health conditions as teenagers are less likely to be eligible for hormone treatment, making them more likely to suffer from poor mental health as adults); so do other similar studies.[144] There are many more instances of poor research and poor reporting – I have mentioned just a fraction of what I have seen.

The issues are not just on the side of research supporting gender affirmation (although broadly they are, as that is what gets funded). A study purporting to show that puberty blockers and hormone treatment increase suicide rates in young people,[145] for example, is equally poor.[146] The point is that studies showing both that there is a positive effect on mental health of medical treatment, and that there is a negative effect or no effect, are generally of low quality. I am not claiming that either side is definitive: quite the opposite. But what is in no doubt is that studies that have been sold as medical fact – those claiming that puberty blockers and hormone treatment have a positive effect on gender-questioning teenagers' mental health – do not stand up to scrutiny.

Endnotes

[1] Surgery has not been included in this paper, as it is usually offered only to adults.

[2] Singh, D., Bradley, S. J., & Zucker, K. J. (2021). A follow-up study of boys with gender identity disorder. *Frontiers in Psychiatry*, *12*, 287.

[3] See, for example, the uncritical reporting of mental health effects here, with no mention of the substantial study limitations (see (a) the section later in this paper on mental health effects and (b) the appendix for details of these): "Overall, [gender-affirming care] can be helpful in decreasing gender dysphoria and have been associated with better mental health." Puckett, J. A., Cleary, P., Rossman, K., Mustanski, B., & Newcomb, M. E. (2018). Barriers to gender-affirming care for transgender and gender nonconforming individuals. *Sexuality Research and Social Policy*, *15*(1), 48-59.

[4] Clayton, A., Malone, W. J., Clarke, P., Mason, J., & D'Angelo, R. (2022). Commentary: The signal and the noise—questioning the benefits of puberty blockers for youth with gender dysphoria—a commentary on Rew et al.(2021). *Child and Adolescent Mental Health*, *27*(3), 259-262.

[5] Zucker, K. J. (2019). Adolescents with gender dysphoria: Reflections on some contemporary clinical and research issues. *Archives of Sexual Behavior*, *48*(7), 1983-1992.

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[7] Horton, C. (2022). Experiences of Puberty and Puberty Blockers: Insights From Trans Children, Trans Adolescents, and Their Parents. *Journal of Adolescent Research*, 07435584221100591.

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[9] For further information, please see the Cass Review's website: https://cass.independent-review.uk/publications/ (accessed 8th September 2022).

[10] See the work of Jesse Singal (https://jessesingal.substack.com) and Leor Sapir (https://www.manhattan-institute.org/expert/leor-sapir).

[11] Gosling, M. (2022). *Technical paper: Gender-questioning teenagers: puberty blockers and hormone treatment vs placebo.* London: Sex Matters.

[12] Criteria for inclusion were: (a) a longitudinal (prospective) design; in other words, one that measures outcomes for the same group of people at different points in time; (b) a focus on teenagers; (c) inclusion of statistical testing to measure differences; and (d) a design that allows outcomes for puberty blockers and/or hormone treatment to be looked at independently of surgery.

[13] A. De Vries, A. L., Steensma, T. D., Doreleijers, T. A., & Cohen-Kettenis, P. T. (2011). Puberty suppression in adolescents with gender identity disorder: A prospective follow-up study. *The Journal of Sexual Medicine*, *8*(8), 2276-2283.

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D. Kuper, L. E., Stewart, S., Preston, S., Lau, M., & Lopez, X. (2020). Body dissatisfaction and mental health outcomes of youth on gender-affirming hormone therapy. *Pediatrics*, *145*(4).

E. de Lara, D. L., Rodríguez, O. P., Flores, I. C., Masa, J. L. P., Campos-Muñoz, L., Hernández, M. C., & Amador, J. T. R. (2020). Psychosocial assessment in transgender adolescents. *Anales de Pediatría (English Edition)*, *93*(1), 41-48.

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Review notes: I have compared baseline and endline measurements in all cases; I am interested in long-term outcomes, not interim ones. Sample sizes are taken from data tables specific to mental-health outcomes, not headline reporting of group sizes.

[14] For example Mermaids (2019). An open letter from Mermaids on World Suicide Prevention Day. https://mermaidsuk.org.uk/news/world-suicide-prevention-day/ (accessed 26th July 2022).

[15] de Graaf, N. M., Steensma, T. D., Carmichael, P., VanderLaan, D. P., Aitken, M., Cohen-Kettenis, P. T., ... & Zucker, K. J. (2020). Suicidality in clinic-referred transgender adolescents. *European Child & Adolescent Psychiatry*, 1-17.

[16] Biggs, M. (2022). Suicide by clinic-referred transgender adolescents in the United Kingdom. *Archives of Sexual Behavior*, *51*(2), 685-690.

[17] See here for analysis of why this study is so problematic: Transgender Trend: *Suicide Facts and Myths*. https://www.transgendertrend.com/the-suicide-myth/ (accessed 11th November 2022).

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[19] Sources: taken from studies cited in the remainder of this section.

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[26] Schagen, S. E., Wouters, F. M., Cohen-Kettenis, P. T., Gooren, L. J., & Hannema, S. E. (2020). Bone development in transgender adolescents treated with GnRH analogues and subsequent gender-affirming hormones. *The Journal of Clinical Endocrinology & Metabolism*, *105*(12), e4252-e4263.

[27] Vlot, M. C., Klink, D. T., den Heijer, M., Blankenstein, M. A., Rotteveel, J., & Heijboer, A. C. (2017). Effect of pubertal suppression and cross-sex hormone therapy on bone turnover markers and bone mineral apparent density (BMAD) in transgender adolescents. *Bone*, *95*, 11-19.

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Published 15th December 2022