



Transgender Research: Five Things Every Parent and Policy-Maker Should Know[©]

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The past 10 years have seen an exponential rise in the occurrence of gender confusion or gender dysphoria (also called transgender or gender non-conforming)* among young people worldwide, especially among teenage girls. The distress of these young people is real, and the causes of this unprecedented trend are unclear, raising difficult questions about compassionate, ethical, and effective ways to respond. Experts disagree, with some recommending watchful waiting plus counseling and some asserting that cross-sex medical procedures are necessary in order to prevent suicide. The U.S. federal policy of the current administration, which endorses “early gender affirming care” for “children and adolescents” (HHS, 2022), is considered controversial by many. And the dramatic rise in use of cross-sex hormones and surgery for young people has been the focus of heated debate, causing uncertainty in patients, parents, physicians, and policy-makers as to what is best. Below is a compilation of research evidence on five key questions about these issues, shared in the hope of helping gender-confused young people receive the best care.

1. What does research show about the benefits and harms of cross-sex medical treatment for minors?

Research does not support medical intervention for gender-confused minors. Scientific evidence has not shown that cross-sex medical treatments are beneficial to children or adolescents. The body of research making these claims is not scientifically reliable. Rather, there is evidence of harmful impact. Consequently, a growing number of scientific agencies do not recommend such treatments. Instead, they recommend counseling and watchful waiting for gender-confused youth.

Summary of Evidence:

Many scientific agencies—both U.S. and international—do not recommend medical “transition” for minor youth because the research evidence claiming to show positive effects from cross-sex hormones or surgery is not scientifically adequate. Many studies are flawed and not reliable. Their limitations include lack of comparison groups, small sample sizes, nongeneralizable study populations, short follow-up times, and high numbers lost to follow-up. However, reliable studies have shown harmful effects. “Watchful waiting,” is the option recommended by a number of scientific agencies. It means deferring transgender interventions for gender-confused minors for an extended time during which counseling can occur and a natural desistance or persistence process can play out.

Highlights from Published Research (studies are listed by first author and year):

Sweden National Board of Health & Welfare (NBHW), 2022; Sweden Systematic Review, Ludvigsson, 2023

- “For adolescents...the NBHW deems that the risks of puberty suppressing treatment...and gender-affirming hormonal treatment currently outweigh the possible benefits...based on...continued lack of reliable scientific evidence concerning the efficacy and the safety of both treatments” (2022). “Long-term effects of hormone therapy on psychosocial health [of minor children] are unknown. [Puberty blockers] should be considered experimental treatment...rather than standard procedure” (2023).

Norway Healthcare Investigation Board (UKOM), 2023

- “Research-based knowledge for gender-affirming treatment (hormonal and surgical) is deficient and the long-term effects are little known ... UKOM recommends that puberty delaying treatment (puberty blockers) and hormonal and surgical gender confirmation treatment for children and young people are defined as experimental treatment,” and not considered to be the standard of care.

England, National Health Service (NHS)/The Cass Evidence Review, 2022

- An independent evidence review found: that “gender incongruence [usually] does not persist into adolescence,” that “psychological support” and “a watchful approach” are generally recommended instead of “social transition” due to its risks, that puberty blockers/cross-sex hormones will not be given to minors (unless in a research study).

British Medical Journal (BMJ): Evidence Review, Heneghan, 2019; Investigation, Block, 2023

The prestigious scientific publication found:

- “Puberty blockers are being used in the context of profound scientific ignorance...treatments for under 18 gender dysphoric children and adolescents remain largely experimental. There are a large number of unanswered questions that include ... long term effects on mental health, quality of life, bone mineral density, osteoporosis and cognition... The current evidence base does not support informed decision making and safe practice in children.”
- There appears to be a lack of credible scientific evidence undergirding endorsements of medical gender transition for minors by the American Academy of Pediatrics, the Endocrine Society, and WPATH.

Finland Board for Selection of Choices for Health Care (PALKO / COHERE Finland), 2020

- “The first-line treatment for gender dysphoria [in minors] is psychosocial support and, as necessary, psychotherapy and treatment of possible comorbid psychiatric disorders.”
- “The reliability of the existing studies with no control groups is highly uncertain ... no decisions should be made that can permanently alter a still-maturing minor’s mental and physical development ... gender reassignment of minors is an experimental practice...no irreversible treatment should be initiated.”

U.S. Food & Drug Administration (FDA), 2022

- The FDA added a warning to the labeling for puberty blocking hormones (GnRH agonists): “to monitor patients taking GnRH agonists for signs and symptoms of pseudotumor cerebri, including headache, papilledema, blurred or loss of vision, diplopia, pain behind the eye or pain with eye movement, tinnitus, dizziness and nausea.”
- “These hormones [puberty blockers] have FDA approval only for the treatment of precocious puberty [not gender dysphoria] in pediatric patients.” They are not approved for...halting normally timed puberty. (AbbVie, 2018).

U.S. Medicare National Coverage Analysis (NCA) – Decision Memo, 2016

- “Based on an extensive assessment of the clinical evidence...there is not enough high-quality evidence to determine whether gender reassignment surgery improves health outcomes...”

Hruz, 2020; GRADE Rating System

“Deficiencies in Scientific Evidence for Medical Management of Gender Dysphoria.”

- “It is important to recognize the low quality of scientific evidence used in generating treatment recommendations ... [For example], nearly all of the recommendations made by the Endocrine Society were based upon “low” or “very low” quality evidence [according to the G.R.A.D.E. rating system]... The limitations of the published studies in...transgender medicine are many. They include a general lack of randomized controlled trial design, small sample sizes, high potential for recruitment bias, ...nongeneralizable population groups, relatively short follow-up, [and] high numbers of patients lost to follow-up... The only data that reached the level of “moderate” quality were related to adverse [i.e., harmful] medical outcomes...risks include low bone density, altered adult height, and impaired spatial memory (de Vries et al. 2011; Hough et al. 2017).”
- The G.R.A.D.E. rating system is the most widely adopted tool for grading the quality of [research] evidence.

de Vries, 2014

This is an example of a weak study widely cited, unfortunately, as evidence that cross-sex hormones are beneficial to youth.

- It had no control group, used a non-representative sample, had an inadequate sample size (only 32 patients for mental health outcomes with key results based on subgroups as small as 15) and error in a key outcome measure.
- Thus, questionable results of 15-32 patients have been widely used to justify giving cross-sex hormones to minors.

Chen, 2023

One of the most recent studies claiming positive impact on youth by cross-sex hormones raises issues of research quality:

- The study had a recruited sample; with no control/comparison group it was not able to test causal impact.
- There was no control for the documented receipt of psychotherapy and psychotropic medication by trans patients.
- The study Abstract did not report that there was no improvement in mental health (life satisfaction, depression, anxiety) for biological males (i.e., “designated male at birth”) who took cross-sex hormones, but only for females.
- With 65% of the analytic sample biological females, it likely enabled the study to show significant improvement in mental health for the “full sample” due to this imbalance by sex, even though there was no improvement for males.
- The study reported 2 patient suicides (a high rate) but not the hormones’ impact on suicidality, a serious oversight.

van der Loos, 2023

This study is an example of a trend in trans research where claims in the Abstract do not always match up with study data.

- The Abstract states “a substantial number of adolescents did not start [hormone] treatment.” Yet the data show 2 of 3 patients who initiated treatment after age 10 (the vast majority of patients since 2012) did start puberty blockers.
- The Abstract claims the low de-transitioning by those on puberty blockers gives “support for medical [transition],” despite the study’s admission: “one cannot exclude the possibility that starting GnRHa in itself makes adolescents more likely to continue medical transition.” This view, that puberty blockers actually interfere with the natural high desistance rate for childhood gender dysphoria, is supported by several other studies (see section 3, below).
- With no measures of mental health effects, the study provides no support for medical transition on these grounds. 2

Levine, 2022

- “In the context of providing puberty blockers and cross-sex hormones, the [G.R.A.D.E.] designation of ‘very low certainty’ signals that the body of evidence asserting the benefits of these interventions is highly unreliable...there is a high likelihood that the patients will not experience the [claimed] effects (Balslem et al., 2011).”
- “In contrast, several negative effects are quite certain. For example, puberty blockade followed by cross-sex hormones leads to infertility and sterility (Laidlaw, Van Meter, Hruz, Van Mol, & Malone, 2019). Surgeries to remove breasts or sex organs are irreversible. Other health risks includ[e] risks to bone and cardiovascular health.”

Alzahrani, 2019; Nota, 2019; Getahun, 2018

- At least three studies suggest that transgender adults who have received cross-sex hormone treatment have significantly elevated rates of acute cardiovascular events (such as blood clots, heart attacks and strokes).

Turner, 2022

An investigation of England’s Gender Identity Development Service (GIDS) for *The Times Magazine* found:

- “A barely pubescent child prescribed [puberty] blockers who goes on to take cross-sex hormones—as almost every patient does—will be infertile and unable to orgasm.”
- Transgender lobby groups influenced GIDS in favor of medical transition of children, despite scientific evidence.
- The National Health Service decided to close the GIDS clinic for concerns about patient safety (Glebova, 2022).

Cantor, 2019

- “Although almost all clinics and professional associations in the world use what’s called the watchful waiting approach to helping transgender and gender diverse (GD) children, the AAP [American Academy of Pediatrics] statement rejected that consensus, endorsing only gender affirmation. That is, where the consensus is to delay any transitions [until] after the onset of puberty, AAP instead rejected waiting before transition... As I read the works on which they based their policy, I was...alarmed: These documents simply did not say what AAP claimed they did. In fact, the references that AAP cited as the basis of their policy instead outright contradicted that policy, repeatedly endorsing watchful waiting.”

The Society for Evidence-Based Gender Medicine, 2022

- A review of the cited scientific support for the U.S. Department of Health & Human Services recent policy statement that “For transgender and nonbinary children and adolescents, early gender affirming care is crucial to overall health and well-being” (HHS Office of Population Affairs, 2022) found misstatements of study findings, use of one flawed study as evidence for major claims, misrepresentation of treatment “reversibility,” lack of evidence for the claims made, a failure to discuss the well-documented risks, and no presentation of alternatives.

2. What does research on medical gender transition tell us about preventing suicide in trans youth?

Medical transition procedures have not been shown to reduce transgender suicide. In fact, there is some evidence that medical transition may increase suicide risk in gender-confused teens.

Summary of Evidence:

The “transition or suicide” claim—that parents must choose between a “live trans son or a dead daughter” (or vice-versa)—is not supported by scientific evidence. Widely cited studies claiming that suicidality in gender-confused youth is reduced by cross-sex hormonal and surgical interventions have been found to have significant flaws and therefore cannot be relied on. Scientifically sound research shows either no reduction or in some instances an increase in transgender suicidality after the receipt of cross-sex medical procedures.

Highlights from Published Research:

Dhejne, 2011

A Swedish study recognized as a landmark 30-year longitudinal study of life after transgender surgery found that...

- Ten years after sex reassignment surgery, the transgender patients were 19 times more likely to die from suicide than the typical Swedish population, after accounting for differences in individual mental illness before surgery.
- Transitioning “male-to-female [is] at higher risk for suicide attempts after sex reassignment” than female-to-male.
- The study authors concluded: “...surgery and hormonal therapy...is apparently not sufficient to remedy the high rates of [mental illness] and mortality found among transsexual persons... Our findings suggest that sex reassignment, although alleviating gender dysphoria, may not suffice as treatment for transsexualism...”
- A U.S. Medicare National Coverage Analysis (NCA) Decision Memo (2016), which reviewed this Dhejne study,

stated: “we cannot exclude therapeutic interventions [i.e., transgender surgery] *as a cause* of the observed excess [mental illness] and mortality” (p. 62, emphasis added).

Heylens, 2014

- Although the study reported a reduction in patients’ psychological distress, there was no reduction in suicide attempts at any step in the process of cross-sex medical intervention.

Bauer, 2015

- Although there was a decrease in “suicidal thoughts” after cross-sex hormonal intervention, among those who did have suicidal thoughts, cross-sex medical treatment was associated with a three-fold increase in suicide attempts.

Adams, 2017

A meta-analysis of 42 studies of suicidality in transgender adults reported...

- Suicidal thoughts appeared to increase after medical transition and suicide attempts did not appear to decrease.

Branstrom, 2020b

A 10-year study on the impact of cross-sex surgery on mental health, had to retract its original claims and acknowledge:

- “...the results demonstrated no [positive effects] of surgery in relation to subsequent mood or anxiety disorder-related health care visits or prescriptions or hospitalizations following suicide attempts,” for transgender patients.

Wiepjes, 2020

- “An important finding was that the incidence for observed suicide deaths was almost equally distributed over the different stages of treatment” (i.e., the suicide rate was roughly the same before and after cross-sex surgery).

Turban, 2020

A weak study widely cited as showing that puberty blockers reduce suicidality, actually obscured contradictory findings:

- The study had a correlational research design (not able to test causality) and a non-representative sample.
- The study Abstract (summary) reported that puberty blockers had reduced Suicidal Thoughts in adolescents, but the author failed to include in the Abstract that there was no reduction in the more serious measures of suicidality: Suicide Attempts, Lifetime Suicide Attempts, and Suicide Attempts Resulting in Hospitalization—all key findings.
- The study results suggest that recent suicide attempts may have increased after puberty blockers, although not significant due to small numbers. And 75% of those who received puberty blockers still had suicidal thoughts.

Carmichael, 2021

- A recent study, seeking to replicate an early weaker study that said puberty blockers improved mental health in transgender youth (deVries, 2011), found puberty blockers had no positive effect on mental health or suicidality.

Turban, 2022

A study often named as showing cross-sex hormones during adolescence reduce suicidality in transgender adults, obscured contradictory findings and seemed to downplay evidence suggesting increased suicidality for 16-17-year-old patients:

- Study weaknesses included: a cross-sectional research design, non-representative sample, inadequate controls for pre-existing mental health, and conflating the effects of two very different hormones (testosterone and estrogen).
- The study Abstract reported a reduction in Suicidal Thoughts for those starting cross-sex hormones by age 17 as evidence of “favorable outcomes” from this treatment. But there was no reduction in the more serious measures of suicidality—Suicidal Thoughts with Plan, Suicide Attempt, or Suicide Attempt requiring Hospitalization—related to the use of cross-sex hormones at any age. As in his previous study (Turban, 2020), the author failed to include these important contradictory findings in the Abstract, where key results/non-results are typically reported.
- Adults who received hormones at 16-17 years old were twice as likely to report a “past-year suicide attempt requiring inpatient hospitalization” (aOR=2.2, p<.01). But by setting the cut-off for statistical significance much higher than is standard in empirical research (i.e., at p<.001 instead of p<.05—a debatable Bonferroni correction) the study avoided reporting a significant increase in suicide attempts related to hormone therapy in adolescence.

Biggs, 2022a

Another analysis of the same dataset used in Turban, 2022 (above entry), by a different researcher, found...

- Use of cross-sex hormones was related to a significant increase in suicidality for biological males receiving estrogen—increases in Suicidal Thoughts with Plan, Suicide Attempt, and Suicide Attempt Requiring Hospitalization (a roughly two-fold increase)—when biological males and females were analyzed separately.
- Receiving puberty blockers in adolescence was not related to a reduction in any measure of suicidality.

Tordoff, 2022; Reddit 2022

This questionable study is purported to show that cross-sex hormones reduced depression and suicidality in 57 adolescents:

- However, the study did not find any significant reduction in these rates from baseline to the 12-month follow-up; they remained high, at 56% depressed and 37% with suicidal thoughts, after 12 months of hormonal treatment.
- The hormonal “reductions” were claimed because the rates did not *increase* as they did for the group not receiving hormones, averaged over the 12-month follow-up. But unlike the hormone group, this group had 80% drop out of the study, reducing it to only 7 youth. Such high differential attrition and small ‘n,’ along with the lack of control for the confounding impact of anti-depressant medication, raise questions about the validity of study conclusions.
- These non-confirmatory findings were only reported in the online study Supplement, not the study article.

Biggs, 2022b

Longitudinal analysis of patient records from the world’s largest clinic for transgender youth:

- There was no difference in the suicide rate for those who had not yet received treatment and those who had received treatment (puberty blockers and/or cross-sex hormones).
- “It is irresponsible to exaggerate the prevalence of suicide... Data from the world’s largest clinic for transgender youth, accumulated over an 11-year period, [found that] ... The proportion of individual patients who died by suicide was 0.03% [or 3 out of 10,000], which is orders of magnitude smaller than the proportion of transgender adolescents who report attempting suicide when surveyed.” Thus, actual deaths were much rarer than perceived.

Levine, 2022

- “The ‘transition or suicide’ narrative falsely implies that transition will prevent suicides... [Yet,] neither hormones nor surgeries have been shown to reduce suicidality in the long-term... [Thus,] the ‘transition or die’ narrative, whereby parents are told that their only choice is between a “live trans daughter or a dead son” (or vice-versa), is both factually inaccurate and ethically wrong.”

3. Is gender dysphoria in children a permanent condition, and one that requires medical treatment?

Research shows childhood gender dysphoria usually dissipates on its own by young adulthood if “transition” is not encouraged. This avoids the harmful effects of cross-sex medical interventions.

Summary of Evidence:

There is strong evidence showing that a majority of children (between 70% and 90%) who experience gender dysphoria tend to resolve their gender identity confusion and accept their biological sex by the time they reach young adulthood, that is, if they are not subjected to “social transition” or cross-sex medical intervention. For those who are the subject of transition efforts, the large majority appear likely to persist in a “trans” identity. (Social transition refers to name/pronoun change, cross-sex dressing and reinforcement of a transgender identity for children by adults.)

Highlights from Published Research:

Steensma, 2015

- “In long-term follow-up [into young adulthood], the childhood sample showed 66.7% desistance.” That is, by young adulthood, two-thirds of those with childhood gender dysphoria did not identify as transgender.

Ristori & Steensma, 2016

- A review of 10 studies measuring the persistence of childhood gender dysphoria found that, by the follow-up time in adolescence or young adulthood, 2% to 39% of cases had persisted in gender dysphoria or transgender identity, resulting in an average of 85% who identified with their biological sex at that point.

Zucker, 2018

- Results of four studies: “Among children meeting the diagnostic criteria for “Gender Dysphoria” ...67% were no longer gender-dysphoric as adults; the rate of natural resolution for gender dysphoria was 93% for children whose gender dysphoria was significant but [did not reach a medical] diagnosis” (as quoted by Levine, 2022).

Singh, 2021

- 88% of boys with childhood gender dysphoria did not identify as transgender by young adulthood.

Steensma, 2013; Olson, 2022

- Young children who experience early “social transitioning” (i.e., name and pronoun changes, cross-sex dressing, and “affirmation” of a transgender role by adults) are more likely to persist in a transgender identity.

de Vries, 2011; van der Loos, 2022

- These study results suggest that puberty blockers disrupt the natural desistance process, funneling kids into an irreversible path of cross-sex hormones (whose negative side-effects include infertility, see Cheng, et al., 2019).

Boyd, 2022; Roberts, 2022

- Between 20% to 30% of young patients discontinued cross-sex hormone treatments in 4 years, suggesting that a sizable number of those undergoing medical transition procedures change their mind within a few years.

4. Can young people be influenced to identify as transgender, or is it all biologically determined?

The dramatic rise in gender dysphoria in the past decade is likely influenced by non-biological factors.

Scientific evidence indicates that the causes of gender dysphoria are complex. Social, cultural, and psychological factors appear capable of influencing a young person toward transgender identity.

Summary of Evidence:

Genetic studies show gender identity development is a complex process with bio-psycho-social components. Recent unprecedented increases in transgender identity worldwide, and a reversal in the male-to-female ratio, suggest the influence of non-biological factors. Young people appear susceptible to social, educational, and cultural influences.

Highlights from Published Research:

Heylans, 2012

A systematic review of research on identical twins and gender dysphoria...

- Concluded that the 39% concordance rate for transgender identity in identical twins (i.e., where both were transgender) was “consistent with a genetic influence...although shared and nonshared environmental factors cannot be ruled out... [Gender identity development] is a complex process of biopsychosocial components.”
- This suggests “a role for genetic factors” as well as a significant role played by social/environmental factors.
- The study found the influence of social factors was greater for biological females than males.

Jones, 2021; Williams Institute, 2022

- In the U.S., the percent of Generation Z adults (born 1997 – 2002) who identify as transgender has increased by 800% over Generation X (born 1965 – 1980). Now, 1.4% of U.S. teens (300,000 youth) say they are transgender.

The Economist, 2020; Turner, 2022

- In Great Britain, between 2010 and 2020, the number of teenage girls referred for gender dysphoria (GD) to the largest pediatric gender clinic in the world, increased more than 4000%, while the rates for girls under age 12 saw only small increases. Rates for teenage boys also increased dramatically, although much less than for girls, with similarly small increases for boys under 12. In Sweden, GD in teen girls has risen 1500% in a similar time span.
- This pattern suggests that the explosive increase in GD for teen girls (not occurring in preteens or boys) may be due to social influence, i.e., transgender identity promotion, rather than merely an increase in public acceptance.

Zucker, 2019; Littman, 2018 & 2019

- There has been a recent dramatic reversal in the male-to-female ratio of transgender youth, with biological females now far out-numbering males (the previous consistent ratio of 2:1 has changed to a ratio ranging from 1:2 to 1:7).

Downey, 2022; Mason, 2022

- A popular researcher advocating for the use of puberty blockers in children claims to have shown that social influence is not a cause of the recent worldwide explosion in rates of gender dysphoria. However, his research has been criticized for its use of an invalid survey measure, for using only U.S. data, and for a conflict of interest.

Becerra-Culqui, 2018; Figueredo, 2020

- Up to 70% of gender-confused youth have mental health issues: depression, autism, ADHD, anorexia, abuse, etc.

5. What does research tell us about teaching sex education and gender ideology to young children?

Teaching about sexuality, transgender identity, and sexual orientation in early elementary school has not been shown by scientific research to be beneficial, nor has it been tested for harmful effects.

Summary of Evidence:

Studies to date have not produced sound scientific evidence to back up the claim that teaching sex education to young children in early elementary school, including content about transgender ideology and homosexuality, is beneficial to them or reduces rates of child sex abuse. It is also unknown whether this is harmful. And research has not shown reliable evidence that sex education classes which teach these topics to older youth produce any psychosocial benefit.

Highlights from Published Research

Goldfarb & Lieberman, 2021; critique of Goldfarb & Lieberman by Ericksen & Weed, 2023

Contrary to its claims, a wide-ranging review of research on school-based sex education in the U.S. and internationally...

- Showed no credible scientific evidence that sexuality education is beneficial to children in early elementary school or that it reduces child sex abuse. Child sex abuse prevention classes show some benefits but not actual reductions.
- Found no scientifically credible research demonstrating that teaching young children about transgender ideology or homosexuality in early elementary school is beneficial to them. No scientifically sound studies were found on this question, or that tested possible negative impacts. Thus, it is unknown whether such teaching is harmful.
- Cited studies to show that teaching about gender ideology and homosexuality in older grades was beneficial, but the studies were not scientifically capable of measuring this impact and also showed conflicting results.

* GLOSSARY of TERMS

For the purposes of this paper, we use the following definitions:

Gender Dysphoria: A diagnostic term for a person experiencing profound discomfort with their biological/natal sex.

Gender Confusion: A nonclinical term that refers to a person's feeling of not identifying with his or her biological sex.

Transgender: This refers to a person whose declared gender identity does not match that person's biological sex at birth.

Gender Non-Conforming: This term refers to a person whose behavior or appearance does not conform to prevailing cultural and social expectations about what is appropriate for their biological sex at birth.

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