Use of puberty-blocking hormones for gender dysphoria in New Zealand: descriptive analysis and international comparisons

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ABSTRACT

AIM: To investigate use of puberty-blocking hormones (gonadotropin-releasing hormone analogues [GnRHa]) for gender dysphoria in New Zealand. Specifically, to describe demographic characteristics and time trends in the prevalence and incidence of prescribing, and to calculate cumulative incidence (proportion) of first prescribing of GnRHa for gender dysphoria in order to make valid international comparisons.

METHOD: The national Pharmaceutical Collection was used to identify all dispensing from 2006 to 2023 to those aged <18, by sex/gender and age. Cumulative incidence of first prescriptions between ages 12 and 17 (which largely excludes prescribing for other indications) was calculated and compared with the Netherlands and England and Wales.

RESULTS: In New Zealand, prescription of GnRHa for gender dysphoria started around 2011; prevalence of use increased to 2014, then more steeply to 2022, followed by a decline. Incidence data show the decline started from 2021. New Zealand, compared to the Netherlands (which started prescribing in the 1990s), had 1.7 times the cumulative incidence of first prescriptions by 2018. Compared to England and Wales up to 2020, New Zealand had 3.5–6.9 times the cumulative incidence.

CONCLUSION: The high rate of prescribing for probable gender dysphoria in New Zealand, and the decline after 2021, require further investigation.

There is medical and public interest internationally in understanding the extent of use of puberty-blocking hormones (gonadotropin-releasing hormone analogues [GnRHa]) by children and young people with gender dysphoria. In New Zealand, puberty blockers are reported to have become "*more accessible here than in many countries.*"[1] But no information has been published to support that claim.

Internationally, there has been a dramatic increase in children and young people referred with gender dysphoria (distress caused by a mismatch between their experienced gender and birth sex—gender here referring to an inner sense of being male, female or non-binary).[2] Puberty blockers are being increasingly prescribed for this indication.

These hormones were first used in the 1980s to delay central precocious puberty (before age 8 for girls and 9 for boys) primarily to improve final height;[3] this remains the approved indication by Medsafe, the FDA and other regulators. They are also used to treat idiopathic short stature.[4] The first use for gender dysphoria was reported in 1998,[5] and the "Dutch Protocol" was formalised in 2006.[6] According to this protocol, a small group of children (predominately natal boys) who had "*lifelong extreme gender dysphoria*", were psychologically stable and who had supportive families were eligible for treatment. The reasons for treatment were to reduce suffering from gender dysphoria, to suppress the development of secondary sex characteristics so it would be easier to pass in the adult gender role and to buy time to allow exploration of gender identity. In the last decade, international guidelines have widened eligibility for treatment away from the original strict Dutch Protocol.[7,8]

There are polarised views of the appropriate care for children with gender dysphoria. New Zealand guidelines follow the World Professional Association for Transgender Health (WPATH),[9,8] and recommend GnRHa for children with "*persistent and well documented gender dysphoria,*"[10] though no details are given of the diagnostic process. There has been a further widening of eligibility in 2023.[11]

In contrast, a growing number of European countries, including Sweden, Finland, France, England and Wales, and Denmark have signalled moves to restrict access to puberty-blocking hormones for gender dysphoria because of uncertainty about the natural course of gender dysphoria, a paucity of evidence about long-term benefits and harms and uncertainty that children can consent in this situation.[12–17] The National Health Service (NHS) England has recently banned the routine use of puberty-blocking hormones for gender dysphoria on the basis that there is "*not enough evidence to support* [their] s*afety or clinical effectiveness*."[18] In the United States (US), 22 states have banned use for this indication for anyone under age 18.[19]

Despite the dramatic increase internationally in children being referred to specialist services,[2,20,21] no countries have reported national figures for use of GnRHa for gender dysphoria in a way that makes for easy comparison across countries. Nevertheless, numerator data are available from published sources, which can be used to calculate cumulative incidence of first prescriptions.

New Zealand has an excellent source of national data on publicly funded dispensed medicines—the Pharmaceutical Collection. In New Zealand, GnRHa are funded by the national drug-buying agency Pharmac, despite not being approved by the regulator, Medsafe, for use for gender dysphoria.

The aims of this investigation are: 1) to describe demographic characteristics and time trends in the prevalence and incidence of prescribing GnRHa to people under age 18 in New Zealand, and 2) to calculate the cumulative incidence (proportion) of first prescribing of GnRHa for gender dysphoria from age 12 in order to make valid international comparisons.

Method

The number of individuals prescribed GnRHa, for age groups 0–11 and 12–17 by sex/gender (as recorded on the National Health Index [NHI]) each year from 2006 to 2023 (prevalence of use), was obtained from the Pharmaceutical Collection through *Official Information Act* requests to Pharmac.[22] Numbers of individuals *first* prescribed GnRHa in each year (incidence) were also obtained. (Pharmac data do not include exact numbers for cells <6 to prevent deductive identification; hence, 3 was used for these cells.) Until 2013, natal sex was recorded on the NHI; from May 2013 gender was recorded. The data include all publicly funded, community-dispensed pharmaceuticals. Excluded are bulk and hospital dispensings and those without a match to the NHI. Data in the Pharmaceutical Collection do not include information on specific indications for use. Hence, data on use of GnRHa include prescribing for central precocious puberty and short stature. Note: the data for New Zealand are for dispensing but "prescribing" has been used for ease of understanding and comparison with other countries that report prescribing data. They are likely to be very similar.

Information on total prescribing of GnRHa for gender dysphoria in England and Wales for those aged 9–17, 2008–2021, was obtained from published sources. These are based on people referred to the Gender Identity Development Service (GIDS) who were referred to the two English paediatric endocrine liaison clinics (at University College London Hospital and Leeds Children's Hospital) and who had been discharged from GIDS.[23] The Cass Review also includes an audit of patients referred to the same endocrine clinics and discharged from GIDS from April 2018 to 2022.[15] Both data sources include only those *discharged* from GIDS after receiving GnRHa in overlapping periods. Using the age distribution of first receiving GnRHa from the Cass Review, and assuming patients were discharged at age 18, we estimated the total number of first prescriptions from 2008 to 2020. Information from the Netherlands was also obtained from published sources.[24–26] The main clinic in the Netherlands is estimated to treat 95% of such children.

Cumulative incidence of starting GnRHa aged 12–17 for New Zealand was calculated to compare with the overseas data—from 2009 to 2015, 2009 to 2018 and from 2008 to 2020 (using 2010 as estimated first use for gender dysphoria). Cumulative incidence (or proportion) is the number of people starting GnRHa over a certain period divided by the population at risk at the start of the period.[27] Users younger than 12 years were excluded to remove the great majority of use for other indications.

For England and Wales and the Netherlands, cumulative incidence was calculated as the total number of first prescriptions in the time period divided by the population aged 12–17 at the beginning of the time period from census data.[28,29] For England and Wales, seven children were excluded because they were referred for

endocrine assessment before age 12.[23] For the Netherlands, an uncertain number of children under age 12 will be included because, though initially use was only from age 12, later *"the protocol was adapted so that adolescents could start GnRHa before age 12 if puberty had started."*[24]

Results

From 2006 to 2009, the prevalence of prescribing GnRHa up to 17 years was stable (a mean of 74 per year) in New Zealand, representing use for other indications, as shown in Figure 1. From 2010, use increased slowly to 2014, then more steeply to 2022, followed by a decline. Among those aged 12–17, the increase was steeper from 2016; among those aged under 12, a steep increase was not seen until after 2018. The decline was similar in those 12 and older and those younger than 12.

The pattern of all prescribing according to age and sex/gender is shown in Figure 2. Up to 2011, the highest prescribing was in the 0–11 age group, and was much higher for females than males. From 2012 to 2016, and again from 2018 to 2022, there were substantial increases for females ages 0–11, such that the highest prescribing for females was in this age group. In contrast, there was only a small increase for males, from 2018. The number of females and males aged 12–17 prescribed GnRHa increased from 2012 to 2016, then, with similar numbers of males and females, more steeply to 2022. Since 2022, prescribing has fallen for both genders.

Figure 3 shows that the number of people aged 0–11 receiving a *first* prescription of GnRHa (incidence) was stable until around 2012, then increased slowly until 2018, when use increased markedly to 2021 and has subsequently dropped steeply. For those aged 12–17 receiving a first prescription of GnRHa—expected to be almost all for gender dysphoria—was less than six each year from 2006 to 2008, started to increase in 2009 then more steeply from 2016 to 2021 (148) before declining.

Table 1 presents estimates of cumulative incidence of people aged 12–17 prescribed GnRHa for gender dysphoria comparing New Zealand, England and Wales, and the Netherlands for

Figure 1: Total number of people aged <18 prescribed GnRHa each year and according to age group, in New Zealand, 2006–2023.

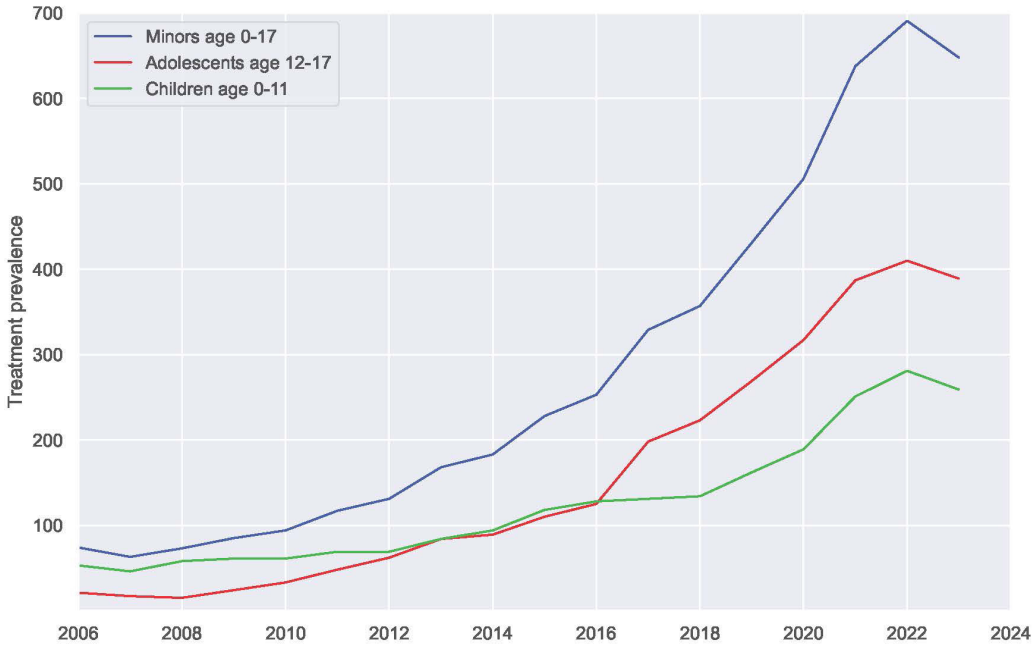

Figure 2: Number of people aged <18 prescribed GnRHa each year by age group and recorded sex/gender, in New Zealand, 2006–2023.

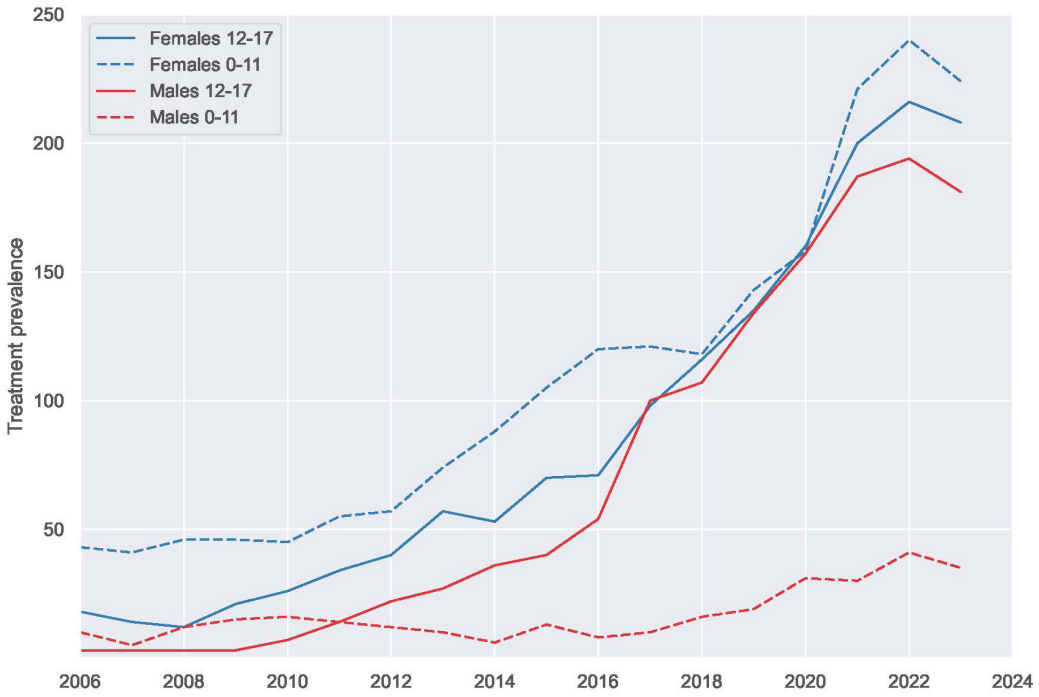

Figure 3: Number of people aged <18 newly prescribed GnRHa each year in New Zealand, 2006–2023.

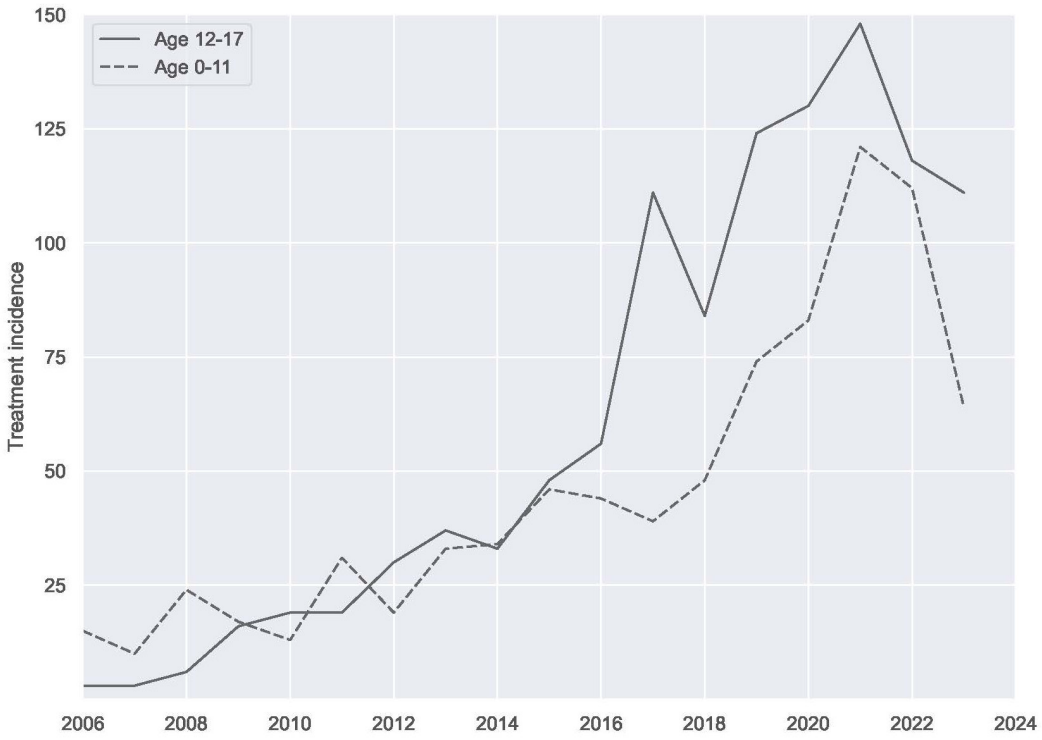

Table 1: Cumulative incidence of starting on GnRHa for gender dysphoria per 100,000 adolescents aged 12–17* (total number of individuals). Dates determined by comparison data availability.

	New Zealand	England and Wales	Netherlands
2009–2015	50.0 (186)		36.6 (436)
2009–2018	117.5 (437)		69.8 (831)
2008–2020	183.0 (691)	26.6 (1100)	

*For the Netherlands, this will include a small number starting before age 12.

comparable time periods. From 2009 to 2015, New Zealand had a higher cumulative incidence than the Netherlands, even though the Netherlands was the first country in the world to use GnRHa for gender dysphoria, starting much earlier than New Zealand in the 1990s. Over the whole duration from 2009 to 2018, use was 1.7 times higher in New Zealand, reflecting a much steeper increase in prescribing in New Zealand from 2015 to 2018. Compared to England and Wales from 2008 to 2020, the estimated cumulative incidence was 6.9 times higher in New Zealand.

Discussion

The prevalence of prescribing puberty-blocking hormones in New Zealand increased from 2011 (when the first New Zealand guidelines were published)[30] to 2016 and then more steeply from 2016 to 2022, before declining. The increase in the latter period had been most marked among those aged 12–17 (a more than threefold increase) that must be very largely attributable to use for gender dysphoria. Incidence data show the decline among those aged 12–17 started from 2021; use also declined steeply among those under age 12 at the same time.

For those younger than 12, use has been mainly among females, as expected for precocious puberty.[31] But in this age group, use has increased markedly among females, especially since 2018, when New Zealand guidelines recommending GnRHa for gender dysphoria from Tanner 2 were published.[10] Thus, some of this use is likely to be for gender dysphoria as Tanner 2 (puberty onset) is before age 12 for the majority of girls.[32] A small increase in prescribing for central precocious puberty might be expected from 2010 to 2023 because of a decline in age at puberty.[33] For similar reasons, there is likely to have been an increase in prescribing for short stature. Nevertheless, the size of the recent increase as shown in the incidence data implies some prescribing for gender dysphoria before age 12, though the extent is unknown.

Comparisons of cumulative incidence among countries demonstrate that New Zealand started out and quickly attained a similar pattern of prescribing to the Netherlands, which first started the so-called "Dutch Protocol" for gender dysphoria in the 1990s, then overtook it to 1.7 times the cumulative incidence by 2018. The difference was even more marked compared to England and Wales up to 2020, such that New Zealand had 6.9 times the cumulative incidence of prescribing. Note: the latter comparison included prescribing only up to the end of 2020, when restrictions were introduced following the High Court judgement "Bell v Tavistock" in the United Kingdom.[15]

There are a number of limitations. First, the New Zealand data do not include indication for prescribing. For that reason, to make a conservative comparison with other countries, the New Zealand data on cumulative incidence have been restricted to age 12 and over, past the age of *first* prescription for precocious puberty or for short stature. On the other hand, the restriction to children aged 12 and over will fail to account for some prescribing for gender dysphoria at younger ages; hence, the comparison across countries of use for gender dysphoria will be conservative.

In the New Zealand prevalence data (but not the incidence data), those aged 12 and over may include a few children who were prescribed GnRHa for precocious puberty or short stature and have continued to age 12 or 13. Nevertheless, use will be largely for gender dysphoria.

Second, because gender (not sex) has been recorded on the NHI since May 2013 and can be changed at the request of the patient and natal

sex is not retained, (personal communication, Joel Brown, Te Whatu Ora) there are great uncertainties about how this information is related to natal sex. Hence, overall usage, and use by age group, are more reliable than use by sex/gender.

Third, though data available for New Zealand allow for a relatively complete picture of prescribing, there might be an under-estimate, as hospital dispensing is not included. But it is likely to be small, because dispensings are generally from the hospital outpatient pharmacy and thus are captured in the Pharmaceutical Collection.

Finally, the England and Wales incidence of GnRHa use of 1,100 was estimated from published sources for people discharged from the service, with assumptions about age at first prescription and age at discharge. As an alternative, we used journalist Hannah Barnes' estimate of 2,000 children referred for puberty blockers.[34] As this included data to 2023, though not all of those will have been prescribed GnRHa, we used 1,800 children to 2020. This reduced the comparative incidence from 6.9 to 4.2 times. A further source of uncertainty is possible use outside the two NHS clinics that GIDS referred to. GIDS has been the only provider of specialist services for children in England and Wales,[35] but there have been private gender clinics that treat children—though they are expensive. We have estimated a further 20 percent of children received GnRHa privately. This reduces the comparative incidence from 6.9 to 5.7, or from 4.2 to 3.5 using the Barnes' estimate. In the Netherlands, a further 5% of prescribing was estimated. This reduced the comparative incidence only slightly from 1.7 to 1.6. These considerations show that the finding of much higher prescribing in New Zealand is robust—though there are uncertainties about the exact figure. Confirmation of the size of the comparative difference with England and Wales comes from data on the prevalence of prescribing of GnRHa for gender dysphoria there of "approximately 378" or 9.2/100,000[36] compared to 410 or 104/100,000 in New Zealand, in 2022, among those aged 12–17. Current prevalence of use in New Zealand is 11 times higher, reflecting a sharp decline in use in England and Wales following the judicial review of treatment practices in 2020.[15]

It is unclear whether any other countries have such high prescribing rates as New Zealand. Australia has no national data. In the US, national insurance claims show 4,780 children aged 6–17 started GnRHa for gender dysphoria from 2017 to 2021, among 40 million children.[37] The estimated cumulative incidence is 12 per 100,000 (compared to 162 per 100,000 aged 12–17 in New Zealand over the same time period). Nevertheless, the US data will be under-estimated as they don't include patients not covered by insurance or those without a recorded gender dysphoria diagnosis, and includes a wider age range. In Denmark, a centralised gender service for young people was established in 2016, prescribing GnRHa to 219 people up to January 2023.[38] The cumulative incidence for 2016–2022 was 52 per 100,000 aged 12–17, compared to 210 per 100,000 for New Zealand over the same period; cumulative incidence was 3.9 times higher in New Zealand.

Why is prescribing so high in New Zealand and why has it increased so rapidly? One possibility could be a steeper rise in the prevalence of adolescent gender dysphoria or transgender identity in New Zealand. But, surprisingly, there is no evidence for a rise in transgender identity from 2012 to 2019 in the Youth Health 2000 surveys.[39,40] Nevertheless, a strikingly high proportion of girls in the Growing Up in New Zealand study, aged 12 in 2021/2022, reported a non-binary or transgender identity (8.2% of natal girls and 1.5% of natal boys).[41] This suggests a very recent increase among children. Because of a lack of standard survey methods across countries, it is impossible to make reliable cross-country comparisons.

The main reasons for higher prescribing are likely to be found in our health system. These could be: a) easier access to assessment, b) a lower threshold for diagnosis of gender dysphoria, or c) greater likelihood of recommending treatment with GnRHa than other treatment options. In England and Wales there have been long wait lists for specialist services and these have served to restrict access. Moreover, in both England and Wales and the Netherlands, specialist services have developed detailed protocols for the diagnosis of gender dysphoria and for psychological assessment[42,43] that are lacking in New Zealand. Indeed, the direction has been to prioritise access over assessment and psychological support.[44] Nevertheless, it is unknown whether there is a greater likelihood of recommending GnRHa treatment versus psychological approaches in New Zealand.

The decline in prescribing from 2021 is surprising. It could be a chance occurrence, but incidence data show it has continued to decline over 2 years. If it is real, it is not explained by a decline in gender dysphoria/incongruence in recent cohorts[41] nor,

so far as we can tell, by any recent restriction on accessing services. We tentatively suggest that clinicians and parents may be becoming aware of more cautious approaches overseas to prescribing GnRHa for gender dysphoria, leading to a decline.

The Ministry of Health should investigate the very high rates of prescribing GnRHa in New Zealand and the much higher cumulative incidence of use compared to other countries. Differences in health service factors across countries require special consideration. The Ministry of Health is undertaking an evidence review.[45] An essential first part of any review is to establish the facts.

The findings are robust but have unavoidable limitations. Most important is the lack of available information about indications for prescribing GnRHa. Nevertheless, by confining the comparative analysis to those commencing GnRHa at age 12 and over, this limitation is largely overcome. It remains a limitation to interpreting the striking increase in the prescribing of GnRHa to children under age 12. Estimating cumulative incidence of first prescriptions is a feasible way of making comparisons among countries across time.

COMPETING INTERESTS
No conflicts or competing interests.

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