

How electronically available referral guidelines for primary medical practitioners can improve the timeliness of orchidopexy

Erika M Stark, Spencer W Beasley, Alison Campbell

ABSTRACT

AIM: This study determined whether easily used guidelines and an electronic referral process could decrease the age of referral of suspected undescended testes (UDT). An online resource for primary medical practitioners was introduced for which the UDT guideline advises referral to paediatric surgery for testes not sitting spontaneously in the scrotum at three-months corrected age.

METHOD: Data were collected prospectively for boys referred with UDT over a seven-year period (2012–2018), during which time agreed GP guidelines on the Community HealthPathways website for referral were introduced. Trends in the age at referral and age at orchidopexy were analysed.

RESULTS: Complete data were obtained for 212 boys. Referral before age six months increased from 13% to 61%, and before 12 months from 48% to 78%. Orchidopexy by 12 months increased from 16% to 39%, and by 18 months from 48% to 74%, during the same period. Median age at orchidopexy for this 2012–2018 cohort was 21.6 months compared with 31.1 months from 1997–2007.

DISCUSSION: These data demonstrate earlier referral of boys with UDT and earlier orchidopexy corresponded to the introduction of the GP Community HealthPathways website. A similar resource available in other regions or countries also might be expected to reduce the age of referral of suspected UDT from primary care providers.

Primary undescended testis (UDT) is a common presentation to general practitioners (GPs, primary medical practitioners). When UDT is suspected or confirmed, affected children should be referred to a paediatric surgeon for orchidopexy. Recent studies suggest that orchidopexy by one year provides the best chance of preserving fertility and reducing later development of malignancy.¹ Studies published in 2008 and 2012 on boys who underwent orchidopexy between 1997 and 2007 by our paediatric surgical service showed a moderate trend towards lower age at orchidopexy from 2003 onwards, yet the mean age at surgery remained above the recommended age of <18 months.^{2,3} This suggested that an initiative

to achieve earlier diagnosis and referral was vital if orchidopexy was to be performed at the optimal age for our population—that is, the South Island of New Zealand, which is home to just over one million people living in both cities and rural communities.

Initiated in 2008, the Canterbury Community HealthPathways (CPH) website (<https://Canterbury.communityhealthpathways.org>) provides an up-to-date, online resource that GPs and allied health professionals throughout the South Island of New Zealand can use to aid in the diagnosis of a variety of conditions. CPH also provides guidelines for the subsequent referral to specialty services. The UDT guideline advises referral to a paediatric surgeon if testes

do not sit spontaneously in the scrotum at three-months corrected age. The sole paediatric surgical service for the South Island of New Zealand is based in Christchurch. Its surgeons travel to provincial hospitals where they conduct regular clinics and elective surgery, including for conditions such as orchidopexy.

This study reviewed the age at which boys with UDT were referred to this service in relation to the introduction and increased use of the CHP website. The purpose of the study was to determine whether there was any evidence that the CHP has been effective in reducing the age of referral of UDT so orchidopexy is performed at an earlier age.

Methods

Data were obtained from a prospectively collected database of demographic, clinical and surgical information on all boys who had orchidopexy carried out by our regional paediatric surgical service during a seven-year period following the introduction of GP guidelines in 2008 for referral for UDT as part of the CHP initiative. All boys (<16 years of age) who had an orchidopexy between January 2012 and August 2018 for UDT were reviewed.

Diagnostic information was gathered for all boys from operation notes and clinical letters. Patients who had an orchidopexy for reasons other than UDT were excluded relying on the expert opinion of specialists. Exclusion criteria included: post testicular torsion, post herniotomy (acquired cryptorchidism), impalpable, ascending, re-do or staged orchidopexies. Where there was ambiguity about the referral date, a date was approximated from the day of their first outpatient clinic visit.

Age at orchidopexy was compared with the data relating to the age at orchidopexy from our previously published series, which were published prior to the introduction of CHP.³ The same inclusion criteria were used to better validate comparison to our previous series.

Results

Since the UDT guideline was placed on the Community HealthPathways website, there was a progressive increase in its use. Its use has now plateaued. Table 1 demonstrates the number of GP “hits” on the undescended testis site in CHP for the period 2016–2018 in the three regions served by the service (Table 1).

Of the 797 boys who had an orchidopexy in our regional child health service during this time period, inclusion criteria were met by, and complete data were obtained for, 212 boys.

There was a trend towards earlier referral of boys under six months of age between 2012 and 2018 (Figure 1). Referral before the age of six months increased from 13% in 2012 to 61% in 2018, and before 12 months increased from 48% in 2012 to 78% in 2018. The estimated median age for referral at the beginning of 2012 was 297 days (95% CI 252 to 368 days). The median age at referral decreased by about 26 days (95% CI 18 to 41 days) each year between 2012 and 2018 ($p=0.001$).

A trend towards younger age at surgery was also demonstrated. Orchidopexy by 12 months increased from 16% in 2012 to 39% by 2018, and referral by 18 months increased from 44% in 2012 to 68% by 2018. The estimated median age for surgery at the beginning of 2012 was 568 days (95% CI 527

Table 1: Extent to which the UDT pathway is being accessed and used.

Annual figures for use of UDT pathway on Community HealthPathways			
	2016	2017	2018
Canterbury	644	608	452
Nelson Marlborough	214	220	199
Southern	136	201	201

to 636 days). The median age at orchidopexy decreased by about 30 days (95% CI 20 to 49 days) each year between 2012 and 2018 ($p < 0.001$) (Figure 2).

A notable difference in our recent data has been a leftward shift towards younger age at orchidopexy since introduction of CHP in 2008 (Figure 3).

Median age at orchidopexy for the 2012–2018 (post CHP) cohort was 21.6 months compared with 31.1 months for 1997–2007 (pre CHP) (Figure 4). The largest difference was the decline in boys older than two years of age at the time of orchidopexy.

Wait time for operation was the time that lapsed between the age at referral and age at orchidopexy. This time period remained constant, roughly 3–6 weeks, across both studies, such that surgical waitlist times are not a significant contributor to the time of orchidopexy.

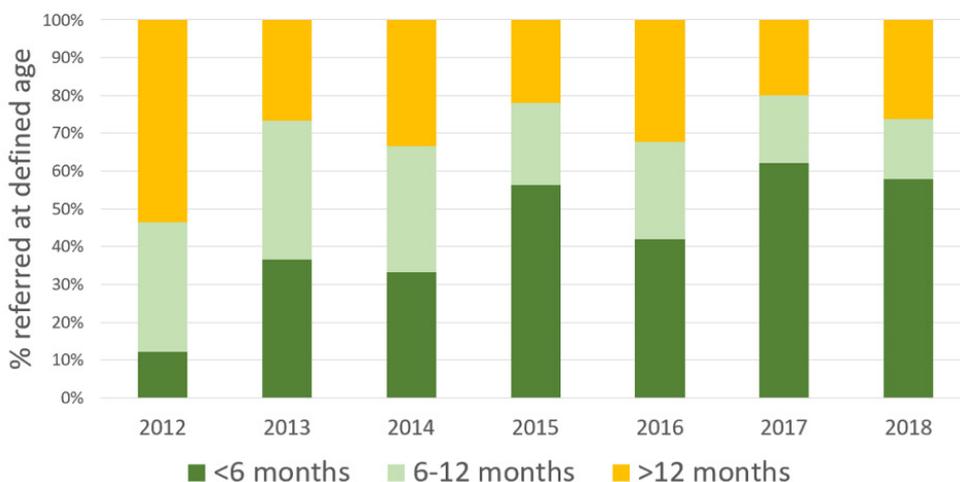
Discussion

Cryptorchidism affects 1–2% of boys.¹ Guidelines for the timing of surgery for affected testes aim to maximise subsequent fertility and decrease the risk of later malignancy.^{4,5,6} British Association of Paediatric Urologists (BAPU) consensus guideline (2011) recommend paediatric urology referral of undescended testes by six months of age and completion of surgery by age 12 months.⁷ However, a UK-wide

audit of orchidopexy in 2016 demonstrated that only 12% of boys with undescended testes were having surgery completed by 12 months of age (ORCHESTRA).⁸ These findings are similar to those of Hensel et al 2015, who demonstrated that less than 30% of boys in Germany were having surgery before the age of 2, despite European Society for Paediatric Urology (ESPU) guidelines recommending surgery before 18 months.^{1,9}

A previous study in our centre (1997–2007) demonstrated a modest trend towards earlier orchidopexy, with the median age considerably lower than that reported in Europe, but still greater than 18 months.³ This study identified that the age of the boy at time of primary care referral was the major contributing factor to the older-than-ideal age at orchidopexy. Following the introduction of the readily accessible Community HealthPathways guideline for referral of UDT, we demonstrated a progressive and much more pronounced improvement in the age at referral, with a year-on-year trend to earlier referral. By 2018, more than 60% of UDTs were referred before the age of six months, with about 40% of patients having surgery before 12 months of age (2016–2018) and 86% by age 2 years (2012–2018). This is similar to the findings of a recent publication from another New Zealand centre where the median age at referral

Figure 1: Age of boys referred for UDT in the period 2012–2018.



was 5.3 months for the years 2014–2016 and 12.6 months for surgery.¹⁰

Our data suggest that education of primary care physicians and the ready availability of diagnostic and referral guidelines has resulted in earlier referral, and that has enabled earlier surgery. The potential value of this earlier age of referral for UDT may ultimately be expressed in improved fertility and a decreased incidence of malignancy.

The evidence provided here suggests that easily accessible, website-based guidelines for primary medical practitioners referring boys with UDT may lead to surgery being performed closer to the optimal age.

Conclusion

These data demonstrate a trend to earlier referral and surgery for undescended testes that correlates with the introduction of website guidelines for the diagnosis and referral of boys with UDT. The Community HealthPathways would appear to have led to a substantial improvement in the quality of our regional child health services. A similar resource made available in other regions or countries also might be expected to reduce the age of referral for this condition. This would enable orchidopexy to be performed more often at the optimal age for the procedure and allow for the best long-term outcomes to be obtained.

Figure 2: Age distribution of boys who underwent orchidopexy in our regional child services in the period 2012–2018.

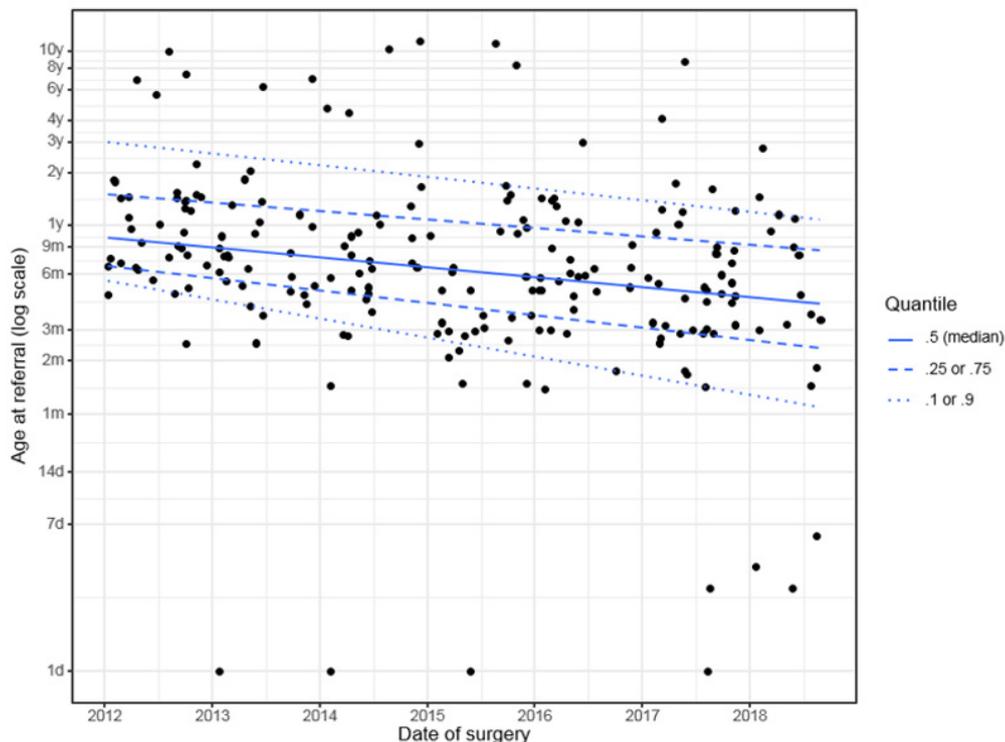


Figure 3: Cumulative age distribution of boys undergoing orchidopexy pre CHP (1997–2007) and post CHP (2012–2018).

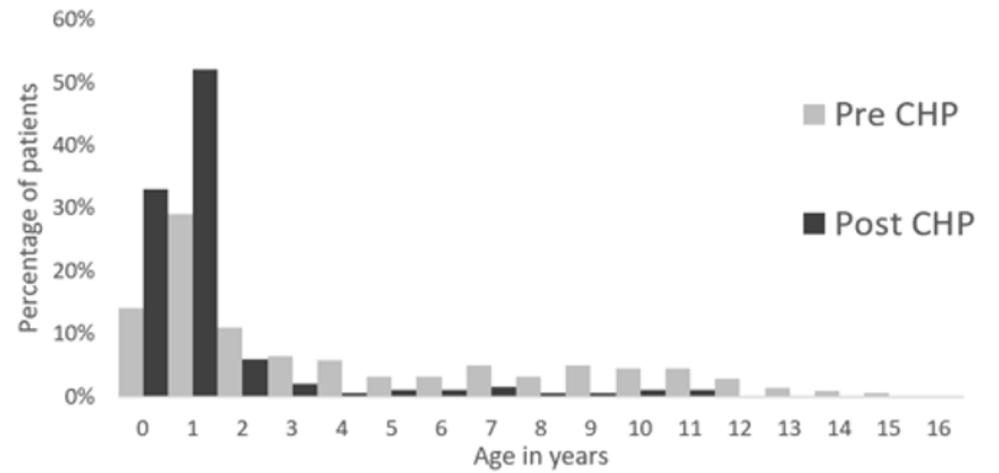
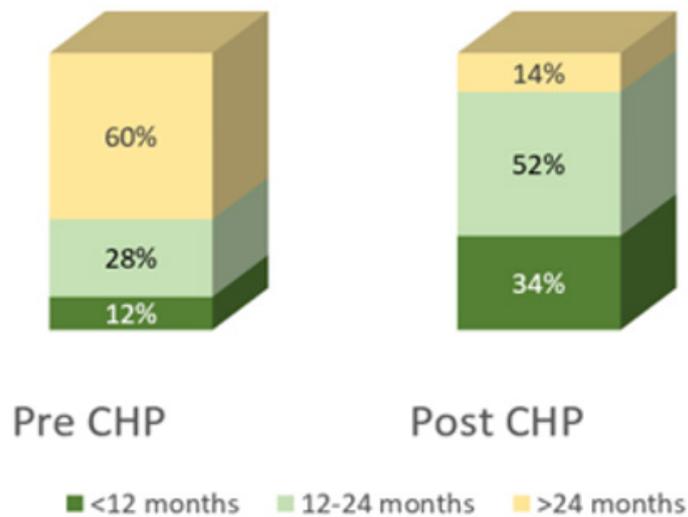


Figure 4: Comparison of age at orchidopexy pre and post introduction of CHP.



Competing interests:

Nil.

Author information:

Erika M Stark: Resident Medical Officer, Canterbury District Health Board.

Spencer W Beasley: Clinical Director, Department of Paediatric Surgery, Christchurch Hospital, and Professor of Paediatric Surgery, University of Otago, Christchurch.

Alison Campbell: Senior Registrar Paediatric Surgery, Sheffield Children's NHS Foundation Trust.

Corresponding author:

Erika M Stark, Resident Medical Officer, Canterbury District Health Board, 0273152480

Erika.stark@cdhb.health.nz

URL:www.nzma.org.nz/journal-articles/how-electronically-available-referral-guidelines-for-primary-medical-practitioners-can-improve-the-timeliness-of-orchidopexy**REFERENCES**

- Niedzielski JK, Oszukowska E, Słowikowska-Hilcz J. Undescended testis - current trends and guidelines: a review of the literature. *Arch Med Sci.* 2016;12(3):667-77. doi:10.5114/aoms.2016.59940
- Bruijnen CJP, Vogels HDE, Beasley SW. Review of the extent to which orchidopexy is performed at the optimal age: Implications for health services. *ANZ J Surg.* 2008;78:1006-9. Doi:10.1111/j.1445-2197.2008.04745.x
- Bruijnen CJ, Vogels H De, Beasley SW. Age at orchidopexy as an indicator of the quality of regional child health services. *J Paediatric Child Health.* 2012;48:556-9. Doi:10.1111/j.1440-1754.2011.02202.x
- Hadziselimovic F, Herzog B. The importance of both an early orchidopexy and germ cell maturation for fertility. *Lancet.* 2001;358(9288):1156-7.
- Carson JS, Cusick R, Mercer A, et al. Undescended testes: does age at orchidopexy affect survival of the testis? *J Pediatr Surg.* 2014;49(5):770-3.
- Nah SA, Yeo CSW, How GY, Allen JC, Lakshmi NK, Yap TL, et al. Undescended testis: 513 patients' characteristics, age at orchidopexy and patterns of referral. *Arch Dis Child.* 2014;00:401-6. Doi:10.1136/archdischild-2013-305225
- Holland AJA, Hassar N, Schnueuer FJ. Undescended testes: An update. *Curr Opin Pediatr.* 2016;28:388-94. Doi:10.1097/MOP
- Paediatric Surgical Trainees Research Network (PSTRN); Organizing and Writing Group: Timing of orchidopexy and its relationship to postoperative testicular atrophy: results from the ORCHESTRA study. *BJS Open.* 2012;5(1):zraa052. doi:10.1093/bjsopen/zraa052
- Hensel KO, Caspers T, Jenke AC, Schuler E, Wirth S. Operative management of cryptorchidism: guidelines and reality – a 10-year observational analysis of 3587 cases. *BMC Pediatr.* 2015;15:116. Doi:10.1186/s12887-015-0429-1
- Bajaj M, Upadhyay V. age at referral for undescended testes: has anything change in a decade. 2017;130:45-9.