Downloaded from adc.bmj.com on 27 August 2008

# Birth prevalence of Prader-Willi syndrome in Australia

A Smith, J Egan, G Ridley, E Haan, P Montgomery, K Williams and E Elliott

*Arch. Dis. Child.* 2003;88;263-264
doi:10.1136/adc.88.3.263

Updated information and services can be found at:
http://adc.bmj.com/cgi/content/full/88/3/263

*These include:*

**References** This article cites 6 articles, 2 of which can be accessed free at:
http://adc.bmj.com/cgi/content/full/88/3/263#BIBL

3 online articles that cite this article can be accessed at:
http://adc.bmj.com/cgi/content/full/88/3/263#otherarticles

**Rapid responses** You can respond to this article at:
http://adc.bmj.com/cgi/eletter-submit/88/3/263

**Email alerting service** Receive free email alerts when new articles cite this article - sign up in the box at the top right corner of the article

**Notes**

To order reprints of this article go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to *Archives of Disease in Childhood* go to:
http://journals.bmj.com/subscriptions/

Downloaded from adc.bmj.com on 27 August 2008



SHORT REPORT

# Birth prevalence of Prader-Willi syndrome in Australia

**A Smith, J Egan, G Ridley, E Haan, P Montgomery, K Williams, E Elliott**

*Arch Dis Child* 2003;**88**:263–264

This is the first population based study to estimate the birth prevalence of DNA proven Prader-Willi syndrome. Thirty infants were reported to the Australian Paediatric Surveillance Unit between 1998 and 2000, a prevalence of 4 per 100 000 live births or ~1/25 000 live births per annum.

Early genetic testing for Prader-Willi syndrome (PWS) relies on recognition of the typical clinical features.[1] In neonates with PWS, notable hypotonia, hypogonadism, and poor feeding are the main manifestations. In later childhood, features include gross obesity, hyperphagia, dysmorphic facial features, short stature, micromelia, and mental handicap. Without genetic testing, under diagnosis occurs in young children and over diagnosis occurs in obese retarded adolescents.[1] If the diagnosis is missed in infancy it may be delayed into adulthood.

Genetic mechanisms resulting in the PWS phenotype include paternal deletion of the imprinted region on chromosome 15(q11–13), maternal uniparental disomy, or an imprinting defect for this region.[2] Methylation analysis will accurately diagnose PWS, and fluorescence in situ hybridisation (FISH) and DNA polymorphisms will identify the mechanism of the genetic abnormality.[2]

Inclusion in previous studies of individuals without genetic confirmation of the diagnosis of PWS and with "atypical PWS", is likely to have led to over estimation of the frequency of PWS. No reliable estimates of birth prevalence are available for PWS from prospective studies. All published studies examine prevalence or estimate incidence retrospectively.[3–5] In this paper we report infants diagnosed with PWS in Australia over a three year period, the method of diagnosis, and provide an estimate of birth prevalence.

## METHODS

Infants diagnosed with PWS were reported to the Australian Paediatric Surveillance Unit (APSU)[6] between January 1998 and December 2000 inclusive by paediatricians and child health specialists. Clinicians on the APSU mailing list were asked to report "any child less than 15 years of age, seen in the last month with newly diagnosed Prader-Willi syndrome, in whom the diagnosis was made either clinically or following genetic investigation". Clinicians were provided with the internationally recognised clinical diagnostic criteria for PWS.[1] Clinicians reporting cases were then sent a reply paid questionnaire, requesting de-identified information including perinatal/neonatal history, clinical features, demographic data, growth, and genetic tests. Children diagnosed outside the study period, who had another diagnosis or were duplicate cases were excluded. In this report we have included only children diagnosed under the age of 1 year. Descriptive and comparative analyses were performed using SPSS for Windows version 10 and Epi Info version 6. Birth prevalence estimates and 95% confidence intervals were calculated using Stat Exact, and population data from the Australian Bureau of Statistics was used for the number of live births during the study period. The study was approved by the Children's Hospital at Westmead Research Ethics Committee.

## RESULTS

In the three year study period 126 notifications of children with PWS were received. Questionnaires were returned providing detailed information on 94 (75%) cases notified. Nineteen notifications were duplicates and 33 were reporting errors. In total, 42 cases of PWS were confirmed in children under 15 years. Thirty (71%) of these were infants. The median age of the infants at diagnosis was 1 month (interquartile range 0.51–4.98 months) and 18 (60%) of these were males. DNA testing, including methylation, FISH, and DNA polymorphisms confirmed the diagnosis of PWS in all infants. A deletion was identified in 21/30 (70%) infants and uniparental disomy in three (10%). In six infants the mechanism for PWS was not established; the methylation test was positive and FISH was not deleted, but no further testing was done. On the basis of the 30 cases diagnosed in infancy, the birth prevalence was 4 per 100 000 live births (95% CI 2.7 to 5.7) or ~ 1/25 000 live births per annum.

## DISCUSSION

The first attempt to estimate the prevalence of PWS, in 1968, involved identification of known cases in a small, well defined catchment area, and found a low frequency—1/280 000 males.[3] Prevalence figures reported since then have varied widely depending on the population sampled and the study design. The most recent population based study, from a region in the UK, found a minimum prevalence of 1/52 000 and estimated a minimum birth incidence of 1/29 000.[4] DNA studies had not been performed in all these patients. Unlike previous studies, PWS was confirmed by DNA testing in all children included in our report. Thus, we provide the first estimate of a national birth prevalence for DNA proven PWS. The rate of 1 case per 25 000 live births in Australia is comparable to the rate reported in the UK study.[4]

We acknowledge that our figure is a minimum estimate of birth prevalence. Although the mean monthly return rate of cards to the APSU was 97% during the study period, a questionnaire was returned for 75% of notifications of children under 15 years. We have no information on the other 12 (25%) notifications, some of which may be true infant cases. However, cross checking with several laboratories throughout Australia did not identify additional cases of PWS of any age. Indeed, a considerable number of duplicate reports were received for some cases. Another potential reason for under estimating birth prevalence is that PWS may be missed clinically in infancy and not be diagnosed until well into adulthood.[1] There is only one other published series of PWS in Australia. In a group of 32 patients diagnosed clinically in Sydney in 1989,[5] the age at diagnosis ranged from 1 week to 36

**Abbreviations:** APSU, Australian Paediatric Surveillance Unit; FISH, fluorescence in situ hybridisation; PWS, Prader-Willi syndrome

Downloaded from adc.bmj.com on 27 August 2008



years with a mean of 3.8 years for males and 8.8 years for females. This contrasts with our study, in which 71% of reported cases were diagnosed in the first year of life and all were confirmed by genetic testing.

## ACKNOWLEDGEMENTS

We thank Prof. Garry Warne and Dr Margaret Rowell (Children's Hospital, Parkville, Melbourne), Dr John McMillan and Dr Christine Oley (Children's Hospital, Herston, Brisbane) for assistance with data collection and the many paediatricians who notified patients. During this study, the APSU was funded by the Commonwealth Department of Health and Aged Care and the Financial Markets Foundation for Children.

### Authors' affiliations

**A Smith,** Department of Cytogenetics, Children's Hospital at Westmead
**J Egan,** Children's Hospital at Westmead, Sydney
**G Ridley, E Elliott,** The Australian Paediatric Surveillance Unit
**E Haan,** The South Australian Clinical Genetics Service
**P Montgomery,** Irrabeena, Perth
**K Williams,** Department of Clinical Epidemiology, Children's Hospital at Westmead

Correspondence to: Dr A Smith, Department of Cytogenetics, Children's Hospital at Westmead, Locked Bag 4001, Westmead NSW 2145, Australia; ellies@chw.edu.au

Accepted 23 September 2002

## REFERENCES

1 **Holm VA**, Cassidy SB, Butler MG, *et al*. Prader-Willi syndrome: consensus diagnostic criteria. *Pediatrics* 1993;**91**:398–402.
2 American Society of Human Genetics/American College of Medical Genetics Test and Technology Transfer Committee. Diagnostic testing for Prader-Willi and Angelman syndromes: report of the ASHG/ACMG test and technology transfer committee. *Am J Hum Genet* 1996;**97**:784–93.
3 **Spencer DA**. Prader-Willi syndrome. *Lancet* 1968;**2**:571.
4 **Whittington JE**, Holland AJ, Webb T, *et al*. Population prevalence and estimated birth incidence and mortality rate for people with Prader-Willi syndrome in one UK health region. *J Med Genet* 2001;**38**:792–8.
5 **Gavranich J**, Selikowitz M. A survey of 22 individuals with Prader-Willi syndrome in New South Wales. *Aust Paediatr J* 1989;**25**:43–6.
6 **Morris A**, Ridley GF, Elliott EJ. Australian Paediatric Surveillance Unit: progress report. *J Paediatr Child Health* 2002;**38**:8–15.

# IMAGES IN PAEDIATRICS

## A Rapunzel with a difference

An 8 year old girl with a severe language disorder and a background of fetal valproate syndrome presented with a three month history of abdominal pain, significant weight loss, and anorexia. Routine bloods and an abdominal ultrasound were normal. Upper gastrointestinal endoscopy revealed a mass of hair obstructing the pylorus with its extension into the duodenum (fig 1) necessitating surgical removal. A barium meal revealed a filling defect in the stomach (fig 2).

Trichobezoars are composed of huge amounts of entwined hair and undigested food. This forms an obstructive foreign body. They can extend into the small intestine, with a tail (Rapunzel syndrome).[1–3]

Trichotillomania (pulling at one's own hair) and trichophagia are closely related and can lead to a trichobezoar. They predominantly affect females in early childhood or adolescence.[4 5] Our patient had developed a bald patch due to obsessive hair pulling. Trichobezoars cause abdominal symptoms, suchas postprandial fullness, intermittent vomiting, and abdominal pain. Surgery is indicated to relieve obstruction and pressure necrosis.[6] A multidisciplinary approach should be adopted to prevent recurrence. In patients with learning difficulties and gastrointestinal symptoms a low threshold for upper gastrointestinal endoscopy should be maintained.

**N Ramadan, N A Pandya, B Bhaduri**
Maidstone Hospital, Maidstone ME16 9QQ, UK;
ankur.pandya@virgin.net

### References

1 **Andrus CH**, Ponsky JL. Bezoars: classification, pathophysiology, and treatment. *Am J Gastroenterol* 1988;**83**:476–8.
2 **Wang YG**, Seitz U, Li ZL. Endocopic management of huge bezoars. *Endoscopy 1998*;**30**:371–4.
3 **Singla SL**, Rattan KN, Kaushik N, *et al*. Rapunzel syndrome—a case report. *Am J Gastroenterol* 1999;**94**:1970–1.
4 **Sharma NL**, Sharma SC, Mahajan VK, *et al*. Trichotillomania and trichophagia leading to trichobezoar. *J Dermatol* 2000;**27**:24–6.
5 **Christenson GA**, Mackenzie TB, Mitchell JE, *et al*. Characteristics of 60 adult chronic hair pullers. *Am J Psychiatry* 1991;**148**:365–70.
6 **Rao PLNG**, Mitra SK, Pathak IC. Trichobezoars in children. *Intern Surg* 1981;**66**:63–5.

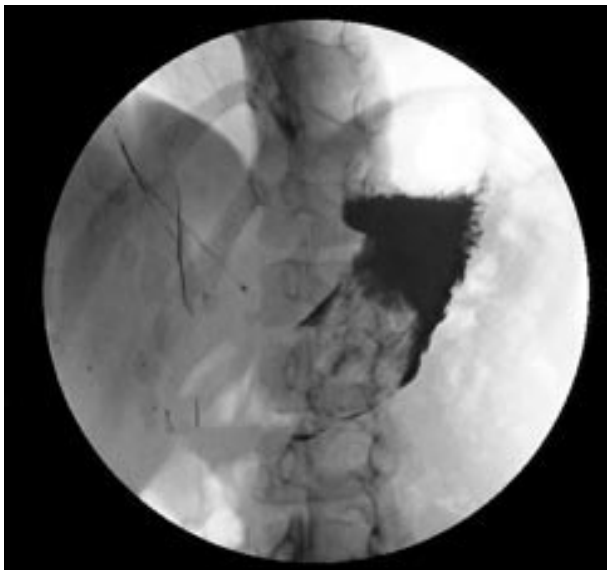

Figure 1

Figure 2