

The ADHD Birthdate Lottery

How a child's month of birth effects their chances of being medicated for Attention Deficit Hyperactivity Disorder

(and other surprising drivers of ADHD prescribing)

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The ADHD CONTROVERSY

Attention Deficit Hyperactivity Disorder (ADHD) is the most commonly diagnosed and medicated childhood psychiatric disorder in the world.[1,2] There are large variations in international, state and localised ADHD medication prescribing rates.[3] Both the diagnosis and treatment of ADHD are controversial and the subject of considerable debate within the psychiatric, paediatric and general medical professions, the media, and the public.

The controversy centres around three issues:

- 1. The validity of the diagnosis**
- 2. The safety and efficacy of ADHD medications**
- 3. The relationship between ADHD and drug abuse.**

Western Australia's ADHD story offers insights (and the opportunity for research) into all three aspects.

1. Inyang Takon (2011), 'Clinical use of a modified release methylphenidate in the treatment of childhood attention deficit hyperactivity disorder', *Annals of General Psychiatry*, 10:25. Available at <http://www.annals-general-psychiatry.com/content/10/1/25>; and US National Library of Medicine, 'Attention Deficit Hyperactivity Disorder', *Medline Plus*, 11 April 2011. Available at <http://www.nlm.nih.gov/medlineplus/ency/article/001551.htm> (accessed 13 December 2011).

2. Sung V, Hiscock H, Sciberras E, Efron D. (2008), 'Sleep problems in children with attention-deficit/hyperactivity disorder: Prevalence and the effect on the child and family', *Archives of Pediatrics and Adolescent Medicine*, 162(4): pp. 336-342.

3. Philip Hazell (1995), 'Stimulant treatment for attention deficit hyperactivity disorder', *Australian Prescriber: an independent review*, 18:60-3; Available: <http://www.australianprescriber.com/magazine/18/3/60/3/> (accessed 13 December 2011); I McKenzie, C Wurr (2004), 'Diagnosing and treating attentional difficulties: a nationwide survey', *Archives of Disease in Childhood*, Vol 89;10 :pp. 913-916.

Extract from **DSM-5 Diagnostic Criteria for ADHD**

American Psychiatric Association (2013), *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, (DSM-5)*

Either six or more (at least 5 for those aged 17+) of the following symptoms of inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

Inattention

- a. often fails to give close attention to details or **makes careless mistakes in schoolwork**, work, or other activities
- b. often has **difficulty sustaining attention** in tasks or play activities
- c. often **does not seem to listen** when spoken to directly
- d. often does not follow through on instructions and **fails to finish schoolwork, chores**, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
- e. often has **difficulty organizing tasks** and activities
- f. often avoids, **dislikes**, or is reluctant to engage in tasks that require sustained mental effort (such as **schoolwork or homework**)
- g. often **loses things** necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)
- h. is often easily **distracted by extraneous stimuli**
- i. is often **forgetful** in daily activities

Extract from **DSM-5 Diagnostic Criteria for ADHD**

American Psychiatric Association (2013), *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, (DSM-5)*

Or six or more (five for those aged 17+) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

Hyperactivity/Impulsivity

- a. often **fidgets** with hands or feet **or squirms in seat**
- b. often **leaves seat in classroom** or in other situations in which remaining seated is expected
- c. often **runs about or climbs excessively** in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
- d. often **has difficulty playing** or engaging in leisure activities **quietly**
- e. is often **“on the go”** or often acts as if **“driven by a motor”**
- f. often **talks excessively**
- g. often **blurts out answers** before questions have been completed
- h. often **has difficulty awaiting turn**
- i. often **interrupts** or intrudes on others (e.g., butts into conversations or games)

‘No biological marker is diagnostic for ADHD’

3 perspectives on ADHD - Under-Diagnosed, Over-Diagnosed or Unscientific Harmful Label?

The Enthusiasts

Proponents believe ADHD is a common genetically determined neurobiological disorder, that is, a biochemical brain imbalance, which is under-diagnosed and under-medicated.

The Critics

Concerned Critics - some critics take a centrist view, that ADHD is a rare but real condition, that is over-diagnosed and over-prescribed.

Convinced Critics - Some critics (myself included) argue ADHD is a dumbed down label that robs understanding of a child's individual circumstances and that the use of amphetamines and other psychotropic drugs to 'treat' ADHD creates far more ongoing harm than benefit.

ADHD is “a developmental failure in brain circuitry that underlies inhibition and self-control. This loss of self-control in turn impairs other important brain functions crucial for maintaining attention.”

Dr Russel Barkley

Quoted in Smith A (2004), *The Brains Behind It: New Knowledge about the Brain and Learning*, revised edn, Network Educational Press Limited, Stafford, p.121.

“The vast majority of kids on ADHD drugs are on drugs unnecessarily. They are just naughty little boys and they would have been coped with before but they are now being medicalised.”

Professor Fiona Stanley

Transcript from Australian Parliamentary Conference
Parliament House, Perth Western Australia
Friday, 6 November 2009 pp35-36

About Dr Martin Whitely

1959: **Born active, inattentive and impulsive**

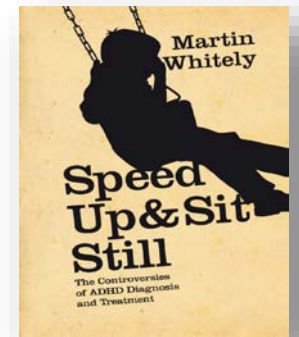
1995-2001: **A teacher at a wealthy all boys high school in an area with very high rates of ADHD prescribing**

2001-2013: **A politician representing electorates with high rates of ADHD prescribing**

2013- Now: A mental health advocate and researcher

Author of numerous items on ADHD including:

- *Speed Up & Sit Still, the controversies of ADHD* (UWA Publishing 2010)
- A website and blog on ADHD: www.speedupsitstill.com
- PhD Thesis *Attention Deficit Hyperactivity Disorder Policy, Practice and Regulatory Capture in Australia 1992–2012* <http://speedupsitstill.com/wp-content/uploads/2015/11/Martin-Whitely-PhD-Thesis-Copy-ADHD-and-Regulatory-Capture-in-Australia-PDF1.pdf>
- Whitely M, Lester L, Phillimore J, Robinson S, **Influence of birth month on the probability of Western Australian children being treated for ADHD** *Medical Journal of Australia*, January 2017. <https://www.mja.com.au/journal/2017/206/2/influence-birth-month-probability-western-australian-children-being-treated-adhd>



“Psychiatry is more like a two-party political system with the biological and environmental parties constantly vying for power. Biological psychiatry is now the party in power.”

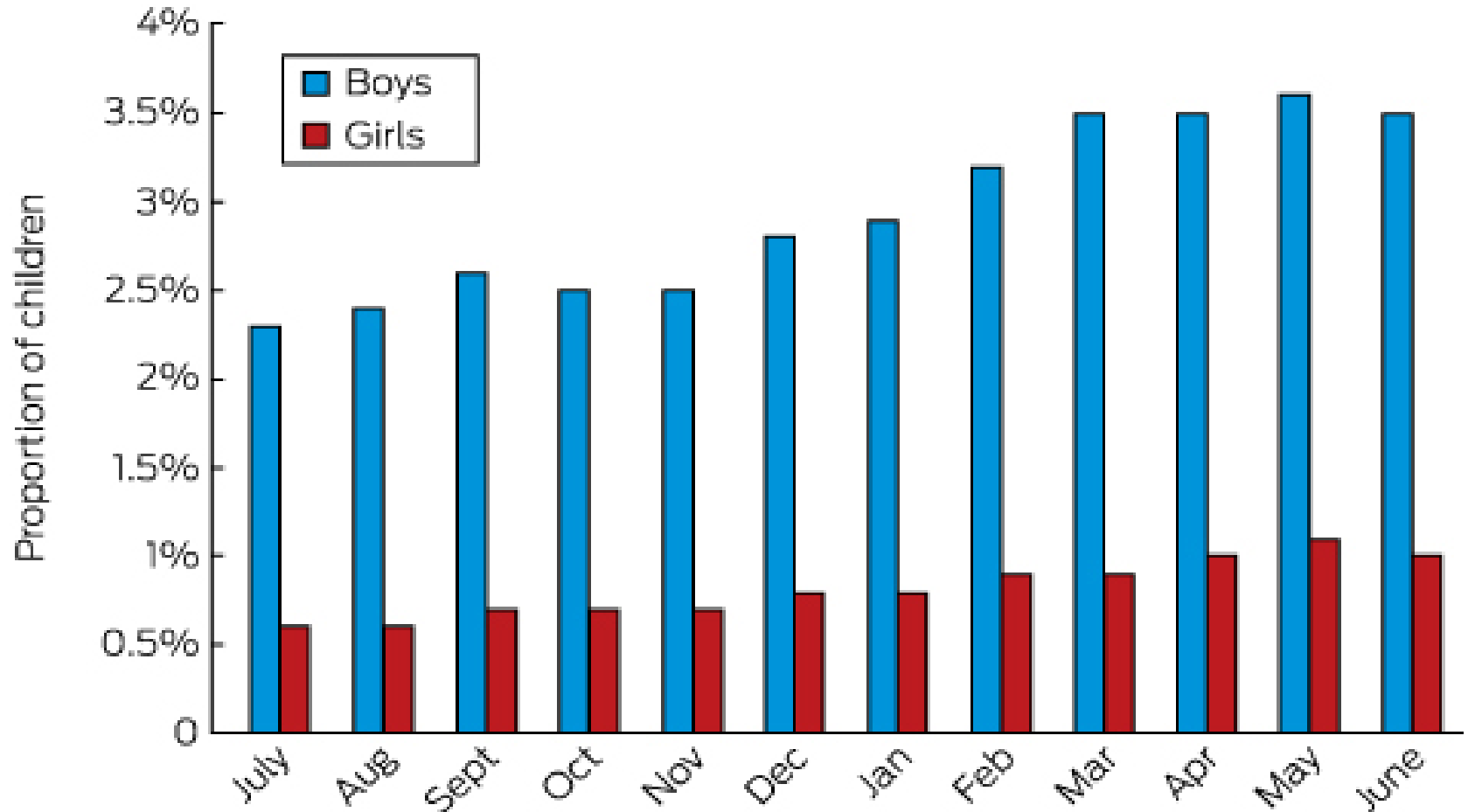
American psychiatrist **Peter R. Breggin M.D.** (1998),
Talking back to Ritalin, Common Courage Press

Findings of 'Influence of birth month on the probability of Western Australian children being treated for ADHD'

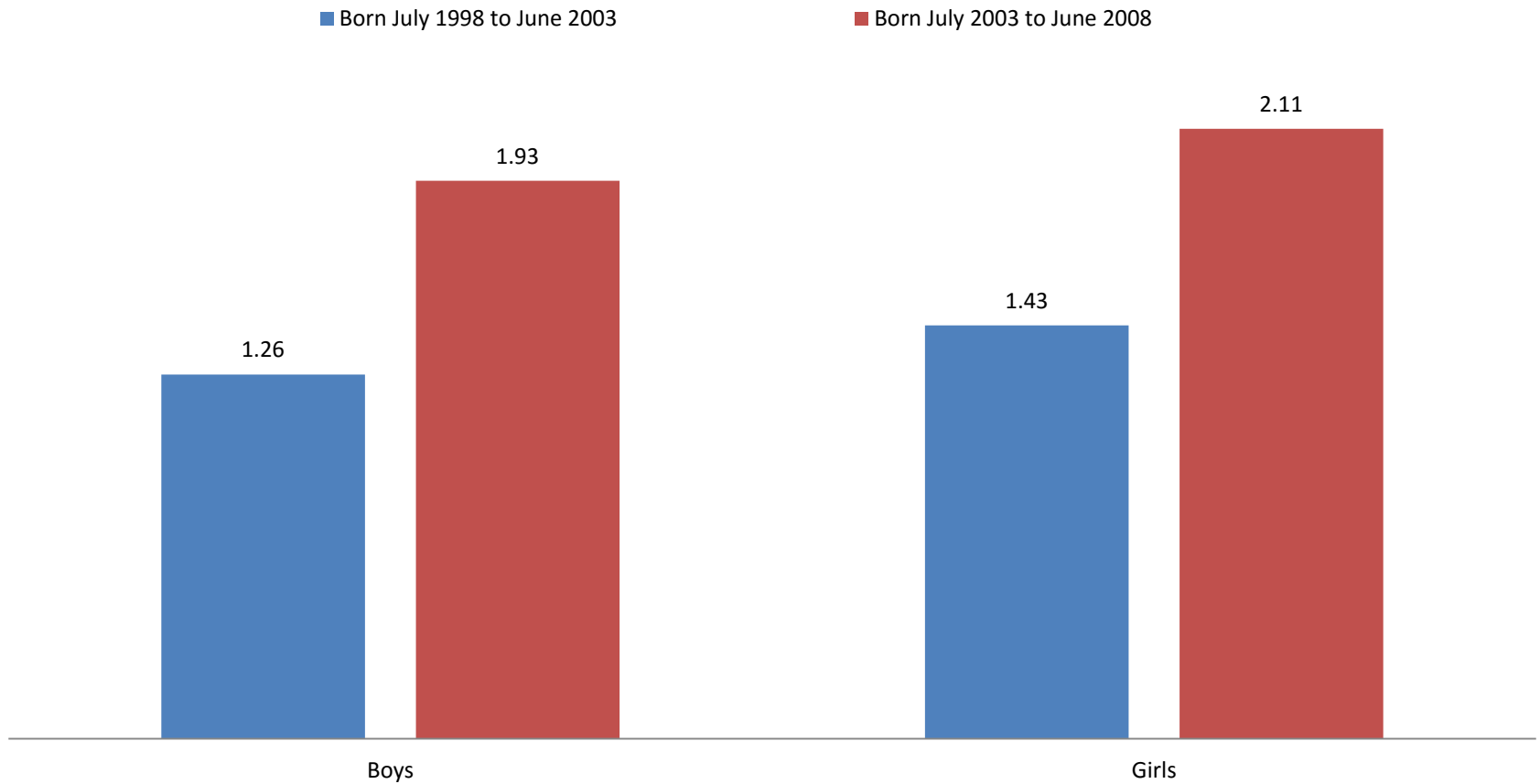
Medical Journal of Australia, January 2017 <https://www.mja.com.au/journal/2017/206/2/influence-birth-month-probability-western-australian-children-being-treated-adhd>

- **For children aged 6-10, those born in June**, the last month of any recommended school year intake, **were approximately twice as likely** (boys +93%, girls +111%) **to have received medication as those born in the first month (the previous July).**
- For children aged 11-15 the effect was less but still significant (boys +26%, girls +43%). Similar trends were demonstrated when comparing children born in the first three (or six) months and the last three (or six) months of the school year intake. **These results are consistent with the earlier four international studies** in the USA (x2), Canada and Taiwan.

Percentage of WA Children (aged 6-15) by month of birth receiving at least one government subsidised ADHD medication prescription in 2013



Relative risk of receiving ADHD medication for youngest WA children in a schoolyear (last month versus first month)



Percentages of Western Australian boys and girls born between 1 July 1998 and 30 June 2008 who received at least one prescription of an ADHD medication in the 2013 calendar year

(Note: Month 1 is July, the first month in the school year intake, and month 12 is June, the last month in the school year intake)

Note: CI = confidence interval, RD = risk difference, RR = relative risk

%	Boys	Girls
Month 1	2.3	0.6
Month 2	2.4	0.6
Month 3	2.6	0.7
Month 4	2.5	0.7
Month 5	2.5	0.7
Month 6	2.8	0.8
Month 7	2.9	0.8
Month 8	3.2	0.9
Month 9	3.5	0.9
Month 10	3.5	1.0
Month 11	3.6	1.1
Month 12	3.5	1.0
Overall	2.9	0.8
Trend test (p value)*	42.866 (<0.001)	11.417 (<0.001)
RD (95% CI)	1.21 (0.81,1.63)	0.45 (0.23,0.68)
RR (95% CI)	1.52 (1.32,1.75)	1.75 (1.32,2.32)

What is the likely mechanism for the ADHD late birthdate effect?

A 2003 US study demonstrated ‘that in the majority of cases teachers are the first to suggest a diagnosis of ADHD’.* Even when teachers are not the first to suggest a diagnosis, they still play a central role in the process. Teachers are usually asked to complete a check list (of ADHD behavioural diagnostic criteria) for a suspected ‘ADHD child’.

The mechanism driving the late birthdate effect is likely to be teachers mistaking age-determined immaturity for ADHD symptoms in some of the youngest children in their class. Some teachers rate them against their classroom norms without due regard to their birthdate, resulting in higher rates of diagnosis (and subsequent medication) than are warranted amongst younger class members.

*Sax L, Kautz KJ. Who First Suggests the Diagnosis of Attention-Deficit/Hyperactivity Disorder? *Annals of Family Medicine*. 2003; 1 (3):171-174. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1466583/>

Prof Allen Frances: A concerned critic's view of the ADHD late birthdate effect and the legitimacy of the diagnosis

Prof Allen Frances, who led the DSM-IV development taskforce of the American Psychiatric Association, argued that similar findings in North America indicate that developmental immaturity is mislabelled as a mental disorder and unnecessarily treated with stimulant medication:

“Perfectly appropriate developmental immaturity is being mislabelled as a mental disorder and treated with unnecessary, expensive, and potentially harmful pills.”

Frances A. No Child Left Undiagnosed. Psychology Today. Available from <https://www.questia.com/magazine/1P3-3408221111/no-child-left-undiagnosed> (accessed 5 June 2015)

While Frances considers ADHD to be a legitimate diagnosis, he asserted that it is over-diagnosed and over-medicated, estimating that a:

“diagnostic rate of around 2%would best balance harms and benefits.”

Frances A. Don't throw out the baby with the bath water, *Australian & New Zealand Journal of Psychiatry* 49(6) · April 2015 DOI: 10.1177/0004867415579467

https://www.researchgate.net/publication/275661711_Don't_throw_out_the_baby_with_the_bath_water

The ADHD Late Birthdate Effect – does it support concerned critics (over-diagnosed and over-medicated) or confirmed critics (invalid diagnosis)?

‘The prescribing rate for children in our study was 1.9%, comparable with that reported by a Taiwanese study (1.6%). The late birth date effects identified in WA and Taiwan were of similar strength to those in the three North American studies, where the reported prescribing rates for the periods analysed were at least twice as high (4.5%, 5.8%, 3.6%). **This indicates that even at relatively low rates of prescribing there are significant concerns about the validity of ADHD as a diagnosis.**’

Whitely M, Lester L, Phillimore J, Robinson S, Influence of birth month on the probability of Western Australian children being treated for ADHD *Medical Journal of Australia*, January 2017.

What about other jurisdictions?

	Total child pop	Medicated Children	% medicated	Author and Year
West Australia	311,384	5,937	1.9%	Whitely et al (2017)
Youngest month approximately double risk for those aged 6 to 10 and a third greater risk for those aged 11-15				
Taiwan	378,881	6,062	1.6%	Chen et al (2016)
Among those aged 4-17 years +65% increased risk for youngest month. Strongest in primary school children.				
Sweden	2,037,252	19,263	0.9%	Halder et al (2014)
Children aged 6 and 7 born in November and December (the youngest) had a 70% higher risk of being medicated than the oldest (born in January and February)				
Canada	937,943	33,775	3.6%	Morrow et al (2012)
Among those aged 6-12 years there was an increased risk of being medicated for those in the youngest month (Boys+41%, Girls+77%)				
Iceland	11,785	740	6.3%*	Zoega et al (2012)
Children in the youngest third of a class (last 4 months) had double the risk of the oldest third (first 4 months) of ever having received medication between ages 7 and 14 (* 6.3% is medication rate over 6 years)				
USA	34,173	1,982	5.8%	Evans et al (2010)
Covers 33 different U.S. states with differing methodology - concludes children born just after the cut off are 'at a much lower risk [of] being diagnosed with ADHD and being prescribed stimulants'.				
USA	11,784	530	4.5%	Elder et al (2009)
Youngest month approximately double risk at ages 10 and 13				
Total	3,723,202	68,289	1.8%	

Birthdate Effects: A Review of the Literature from 1990-on

Elizabeth D A Sykes PhD John F Bell Carmen Vidal Rodeiro PhD February 2009 (Amended January 2016)

<http://www.cambridgeassessment.org.uk/Images/109784-birthdate-effects-a-review-of-the-literature-from-1990-on.pdf>

1. There is robust evidence from around the world that, on average, the youngest children in their year group at school perform at a lower level than their older classmates (the 'birthdate effect').
2. In the UK, where the school year starts on September 1st, the disadvantage is greatest for children born during the summer months (June, July, August). The effect of being the youngest in the year group holds in other countries where the school year begins at other times in the calendar year. This evidence rules out medical / seasonality hypotheses regarding pre-natal exposure to viral infections during the winter months for Summer-born children.
3. The birthdate effect is most pronounced during infant and primary school but the magnitude of the effect gradually and continually decreases through Key Stage (KS) 3, 4, and A level. Despite this decrease, the effect remains significant at GCSE, A level and in respect of entry into higher education.
4. The birthdate effect is evident in the relative proportions of students who undertake higher education... September-born students are 20% more likely to go to university than their August-born peers.
5. A disproportionately high percentage of relatively young children in the school year also are referred for special educational needs and many of these appear to be misdiagnosed.
6. The birthdate effect is also seen, worldwide, in other areas of endeavour such as sporting achievement.

Media coverage of MJA birthdate effect article

A media monitoring service used by Curtin University estimated there was a mainstream media audience of over 8.5 million people for coverage of the MJA article in the week after publication on January 24.

Total mainstream media audience estimated - 8,520,220 made up of:

- TV 3,913,000
- AM Radio 3,026,000
- Newspaper 1,123,633
- FM Radio 348,300
- Online News 109,287
- Social media audience is not included

Estimated ASR (Advertising Space Rate) value \$1,118,915

ASR is a measurement methodology that incorporates data on audience, content style, advertising rates, size, language scaling and placement to provide comparable advertising space rates.

WA's ADHD Story – 9 Key Facts and **Research Opportunities**

1. Childhood ADHD – **Perth is the world's first ADHD child prescribing hot spot to see a large decline in per capita child prescribing rates.** (50% between 2002 and 2010). However, recently child per capita prescribing rates have rebounded significantly. (In 2015 they were approximately 20% lower than the 2002 peak). Research Opportunity – **Why has the child prescribing rebound occurred?**
2. Adult ADHD - **WA has consistently had the highest adult prescribing rates in Australia.** In 2002 WA adults were prescribed government subsidised ADHD medications at 7.1 times the national rate (excluding WA). By 2011 there had been a closing of the gap but WA's rate was still 3.3 times the national rate. Research Opportunity – **Why has WA been an Adult ADHD outlier and what has happened since 2011?**
3. **Individual heavy prescribers have contributed significantly to overall WA prescribing rates and huge geographical variations in ADHD prescribing rates.** In 2003-2004 a single paediatrician prescribed ADHD stimulants to 2,077 children in 17 months and in 2014 a single psychiatrist prescribed to 1,812 adults in 12 months. In 2015 one psychiatrist prescribed to 2,074 primarily adult patients. Research Opportunity – **Why does this occur and along with significant differences in geographical prescribing rates what are the consequences of such divergent prescribing practices?**

WA's ADHD Story – 9 Key Facts and **Research Opportunities** (continued)

4. **WA adults are prescribed dexamphetamine (rather than Ritalin)** at a grossly disproportionate rate compared to other Australian jurisdictions. Research Opportunity – **Is this driven by patient demand or prescriber preference? To what extent if any is this driven by prescription drug abuse seeking behaviour?**
5. There appears to have been a strong **correlation between ADHD prescribing rates and amphetamine and other drug abuse rates for both adults and teenagers in WA**. Research Opportunity – **What do the publicly available West Australian, Australian and International numbers tell us about the contested relationship between ADHD and drug misuse?**
6. In 2010 the Raine Study provided a unique **long term data source for research which associated long term ADHD stimulant use with school failure and permanently raised blood pressure** (when comparing 'medicated' with 'never medicated' ADHD diagnosed children). Research Opportunity – **What does the data subsequently collected in the Raine Study and in other long term child wellbeing studies reveal about the course of the 'disorder' and the long term safety and efficacy of ADHD medications?**

ADHD – 9 Key Facts and **Research Opportunities** (continued)

7. International research has indicated that along with birthdate (relevant to classroom peers), race, gender, IQ, genetics, treating clinician speciality (paediatrics v psychiatry), teacher attitude, parent attitude and socio-economic status all influence a child's likelihood of being medicated for ADHD. Research Opportunity – **What does the published research tell us about the relative importance of these factors in determining the likelihood of a child being medicated for ADHD?**
8. In Australia 'regulatory capture' of ADHD policy by the ADHD Industry is the 'norm'. Research Opportunity – **What is the extent and impact of 'regulatory capture' on Australian medical and psychiatric practice? And what mechanisms can be developed to ensure that medical, psychiatric and general scientific evidence gathering processes that drive policy and practice are bias-free or at least bias-managed?**
9. Like children in the USA, Canada and Taiwan - WA children also demonstrate a strong "ADHD late birthdate effect". Research Opportunity – **Do other Australian jurisdictions with greater flexibility for parents in deciding when children begin school have a stronger or weaker ADHD late birthdate effect?**

Difference or DISEASE

makes careless mistakes, has difficulty sustaining attention, does not seem to listen, fails to finish schoolwork or chores, has difficulty organizing tasks and activities, dislikes...schoolwork or homework, loses things, easily distracted, forgetful, fidgets or squirms in seat, leaves seat in classroom, runs about or climbs excessively, has difficulty playing... quietly, “on the go” or...acts as if “driven by a motor, talks excessively, blurts out answers, has difficulty awaiting turn, interrupts