

Alcohol and Fetal Alcohol Spectrum Disorders

Clinical Associate Professor
Raewyn Mutch

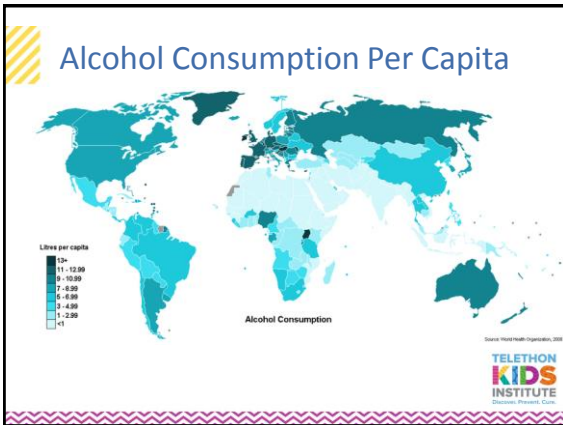


Proudly supported by the people of Western Australia through Channel 7's Teletthon

Percentage of Global Disability Adjusted Life Years (total: 1.53 billion)

<ol style="list-style-type: none"> 1. Childhood underweight 2. Unsafe sex 3. Alcohol use 4. Unsafe water, sanitation, hygiene 5. High blood pressure 6. Tobacco use 7. Suboptimal breastfeeding 8. High blood glucose 9. Indoor smoke from solid fuels 10. Overweight and obesity 11. Physical inactivity 12. High cholesterol 13. Occupational risks 14. Vitamin A deficiency 15. Iron deficiency 16. Low fruit and vegetable intake 17. Zinc deficiency 18. Illicit drugs 19. Unmet contraceptive need 	<p>Conservative estimates:</p> <ul style="list-style-type: none"> 3.2% of the global deaths 4.0% of the global DALYs. <p>unintentional injuries contributed most to alcohol-attributable mortality burden</p> <p>neuropsychiatric diseases contributed most to alcohol-attributable disease burden</p>
---	--

Alcohol as a Risk Factor for Global Burden of Disease
Rehm K¹, Rehm K¹, Monteiro M², Geisler C³, Graham K⁴, Rehm K⁵, Samtani C^{1,7}, Jernigan D⁸, Adhikari Research Institute, Zurich, Switzerland; ¹Center for Addictions and Mental Health, Toronto, Ont., Canada; ²University of Toronto, Toronto, Ont., Canada; ³Center for Health Services Research and Policy, University of Toronto, Toronto, Ont., Canada; ⁴Management of Substance Dependence, World Health Organization (WHO), Geneva, Switzerland; ⁵Research Institute for Alcohol Problems of Alcohol and Other Drug Problems, Leuven, Switzerland; ⁶University of Western Ontario, London, Ont., Canada; ⁷University of Buffalo, Buffalo, NY, USA; ⁸Health Policy Institute, Georgetown University, Washington, D.C., USA
doi:10.1186/1475-2875-12-122



Australia clearly has a drinking problem

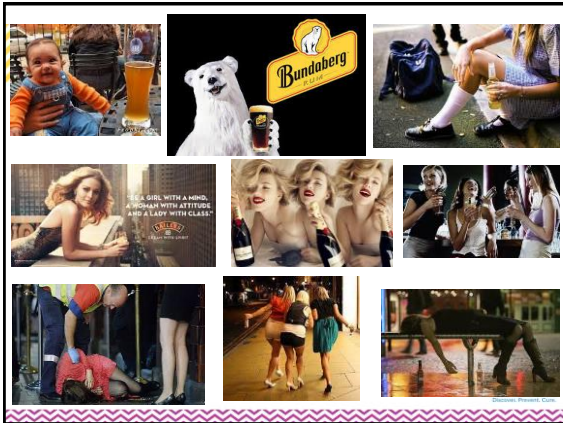
- 20% of Australians drink at risky levels for long term harm > 2 std drinks per day (1)
- 40% of Australians drink at risky levels for short term harm > 4 drinks during a single drinking occasion (1)
- The cost to the community of alcohol consumption in Australia was estimated to be \$15.3 billion in 2004/05 (2)

1. (ARHW), 2.(Collins and Lapsley 2008)



Throughout the Life course



GAME ON MANLY!

WHAT IS CRICKET AUSTRALIA SELLING YOUR FAMILY?

DEMAND HEALTHY ADVERTISING IN CRICKET

Effects of Drinking at Risky Levels:

Male	Female
0.05% BAC	0.04% BAC
0.08% BAC	0.06% BAC
0.12% BAC	0.09% BAC
0.15% BAC	0.11% BAC
0.20% BAC	0.14% BAC
0.25% BAC	0.17% BAC
0.30% BAC	0.20% BAC
0.35% BAC	0.23% BAC
0.40% BAC	0.26% BAC
0.45% BAC	0.29% BAC
0.50% BAC	0.32% BAC
0.55% BAC	0.35% BAC
0.60% BAC	0.38% BAC
0.65% BAC	0.41% BAC
0.70% BAC	0.44% BAC
0.75% BAC	0.47% BAC
0.80% BAC	0.50% BAC
0.85% BAC	0.53% BAC
0.90% BAC	0.56% BAC
0.95% BAC	0.59% BAC
1.00% BAC	0.62% BAC
1.05% BAC	0.65% BAC
1.10% BAC	0.68% BAC
1.15% BAC	0.71% BAC
1.20% BAC	0.74% BAC
1.25% BAC	0.77% BAC
1.30% BAC	0.80% BAC
1.35% BAC	0.83% BAC
1.40% BAC	0.86% BAC
1.45% BAC	0.89% BAC
1.50% BAC	0.92% BAC
1.55% BAC	0.95% BAC
1.60% BAC	0.98% BAC
1.65% BAC	1.01% BAC
1.70% BAC	1.04% BAC
1.75% BAC	1.07% BAC
1.80% BAC	1.10% BAC
1.85% BAC	1.13% BAC
1.90% BAC	1.16% BAC
1.95% BAC	1.19% BAC
2.00% BAC	1.22% BAC
2.05% BAC	1.25% BAC
2.10% BAC	1.28% BAC
2.15% BAC	1.31% BAC
2.20% BAC	1.34% BAC
2.25% BAC	1.37% BAC
2.30% BAC	1.40% BAC
2.35% BAC	1.43% BAC
2.40% BAC	1.46% BAC
2.45% BAC	1.49% BAC
2.50% BAC	1.52% BAC
2.55% BAC	1.55% BAC
2.60% BAC	1.58% BAC
2.65% BAC	1.61% BAC
2.70% BAC	1.64% BAC
2.75% BAC	1.67% BAC
2.80% BAC	1.70% BAC
2.85% BAC	1.73% BAC
2.90% BAC	1.76% BAC
2.95% BAC	1.79% BAC
3.00% BAC	1.82% BAC
3.05% BAC	1.85% BAC
3.10% BAC	1.88% BAC
3.15% BAC	1.91% BAC
3.20% BAC	1.94% BAC
3.25% BAC	1.97% BAC
3.30% BAC	2.00% BAC
3.35% BAC	2.03% BAC
3.40% BAC	2.06% BAC
3.45% BAC	2.09% BAC
3.50% BAC	2.12% BAC
3.55% BAC	2.15% BAC
3.60% BAC	2.18% BAC
3.65% BAC	2.21% BAC
3.70% BAC	2.24% BAC
3.75% BAC	2.27% BAC
3.80% BAC	2.30% BAC
3.85% BAC	2.33% BAC
3.90% BAC	2.36% BAC
3.95% BAC	2.39% BAC
4.00% BAC	2.42% BAC
4.05% BAC	2.45% BAC
4.10% BAC	2.48% BAC
4.15% BAC	2.51% BAC
4.20% BAC	2.54% BAC
4.25% BAC	2.57% BAC
4.30% BAC	2.60% BAC
4.35% BAC	2.63% BAC
4.40% BAC	2.66% BAC
4.45% BAC	2.69% BAC
4.50% BAC	2.72% BAC
4.55% BAC	2.75% BAC
4.60% BAC	2.78% BAC
4.65% BAC	2.81% BAC
4.70% BAC	2.84% BAC
4.75% BAC	2.87% BAC
4.80% BAC	2.90% BAC
4.85% BAC	2.93% BAC
4.90% BAC	2.96% BAC
4.95% BAC	2.99% BAC
5.00% BAC	3.02% BAC

JAY Z
BUYER'S HELP
RECOGNITION

There is an association between alcohol advertising exposure and alcohol expectancies

- beliefs about the effects of alcohol
 - (Lipsitz et al. 1993; Stacy et al. 2004)
- drinking intentions
 - (Grube and Wallack 1994; Kelly and Edwards 1998)
- current or future drinking
 - (Casswell and Zhang 1998; Wylie et al. 1998)

17.4% students aged 12-17 years are current drinkers

- Involvement with alcohol increased with age
 - 8% of 13-year-olds
 - 37% of 17-year-olds.
- All older students, lower proportion drinking > 4 std drinks on any one occasion
 - 2005 (23%)
 - 2008 (18%)
 - 2011 (16%)

TELETHON
KIDS
INSTITUTE
Discover. Prevent. Care.

Current drinkers

- Greater than 1/3rd (37.0%) drank at risky levels > 4 std drinks *on any one occasion*
- Average no., of std drinks *on any one occasion*
 - 7.6 drinks by males
 - 5.6 by females
- 45.1% of 16-17 year olds "intend to get drunk"

TELETHON
KIDS
INSTITUTE
Discover. Prevent. Care.

Youth: overall use of alcohol has declined-risky drinking continued

Overall use of alcohol has been declining for the past six years

86% in 2005 to 74% in 2011 "ever consumed alcohol"

"drinking patterns of adolescents in the final years of secondary school can be predictive of their drinking levels in the early years of adulthood"

http://www.nationaldrugstrategy.gov.au/Internet/drugstrategy/Publishing.nsf/content/9C8F682C638F1202CA257AC00020E35C5File/National%20report_FINAL_ASSAD_7.12.pdf

TELETHON
KIDS
INSTITUTE
Discover. Prevent. Care.

Fetal Alcohol Spectrum Disorders

TELETHON
KIDS
INSTITUTE
Discover. Prevent. Care.

Proudly supported by the people of Western Australia through Channel 7's Telethon

"Of all the substances of abuse, including cocaine, heroin, and marijuana, alcohol produces by far the most serious neurobehavioral effects in the fetus."

IOM Report to Congress, 1996



In-utero exposure to alcohol

- Almost 50% of pregnancies are unplanned
- "Normal" Rates of drinking among a percentage of women is at a binge level
- Aboriginal women drink less than Non-Aboriginal women
- Asking about alcohol use difficult ~ stigma

TELETHON
KIDS
INSTITUTE
Discover. Prevent. Care.

Alcohol is a teratogen - interrupts or alters the normal development of a fetus, including the development of the brain or other major organs

TELETHON KIDS INSTITUTE
Disasters, Prevention, Cure

Animal Studies

Volume	Color	Order	Mid	Based on	Voxels
1,108,528	Blue	1	100	100	100
545,881	Green	2	100	100	100
486,779	Yellow	3	100	100	100
14,676	Red	4	100	100	100
1,014,332	Blue	5	100	100	100
288,812	Green	6	100	100	100
448,881	Yellow	7	100	100	100
31,660	Red	8	100	100	100
822,260	Blue	9	100	100	100
205,788	Green	10	100	100	100
424,771	Yellow	11	100	100	100
13,100	Red	12	100	100	100

- Dr K Sulik and team, University of North Carolina
- Limitations of animal studies

TELETHON KIDS INSTITUTE
Disasters, Prevention, Cure

How much alcohol?

- We don't know how much alcohol, if any, is safe to drink during pregnancy
- Evidence: risk of harm to the fetus is greater the more alcohol the mother consumes; binge drinking is harmful
- Not all children exposed to alcohol during pregnancy will be affected or affected to the same degree
- The level of risk to the fetus is hard to predict
 - broad range of effects are possible

TELETHON KIDS INSTITUTE
Disasters, Prevention, Cure

How much alcohol?

- Timing (gestation) When during the development
- Frequency (throughout pregnancy) How often was there exposure
- Quantity (at each exposure) How much alcohol at each exposure

TELETHON KIDS INSTITUTE
Disasters, Prevention, Cure

Example of dose and timing

- 10% random sample live births 1995-1996
 - 61% follow-up at 8 years
 - Postpartum alcohol questionnaire (+3m)
 - CBCL
- Outcomes
 - High level alcohol 1st trimester
 - Anxiety/depression (OR 2.82), somatic complaints (OR 2.74)
 - Moderate levels of alcohol
 - Anxiety/depression (OR 2.24)
- O'Leary et al. Evidence of a complex association between dose, pattern and timing of prenatal alcohol exposure and child behavioral problems. ADDICTION 105, 74-86

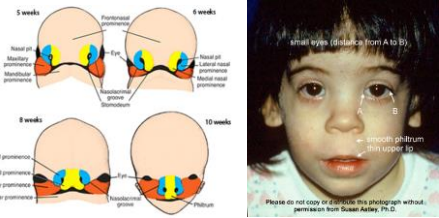
TELETHON KIDS INSTITUTE
Disasters, Prevention, Cure

Fetal Alcohol Spectrum Disorders

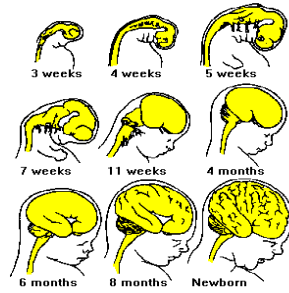
- Fetal Alcohol Syndrome
- Partial Fetal Alcohol Syndrome
- Neuro-developmental disorders

TELETHON KIDS INSTITUTE
Disasters, Prevention, Cure

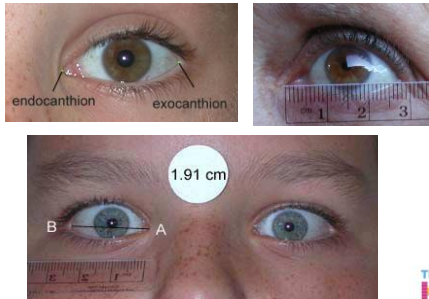
Clinical Features of Fetal Alcohol Syndrome (FAS)



Embryology-time frame for the Brain



Palpebral Fissure



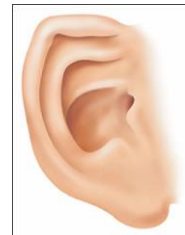
Cranston, M. E., A. A. Mhanni, et al. (2009). "Concordance of three methods for palpebral fissure length measurement in the assessment of fetal alcohol spectrum disorder." *Canadian Journal of Clinical Pharmacology* 16(11): e234-e241

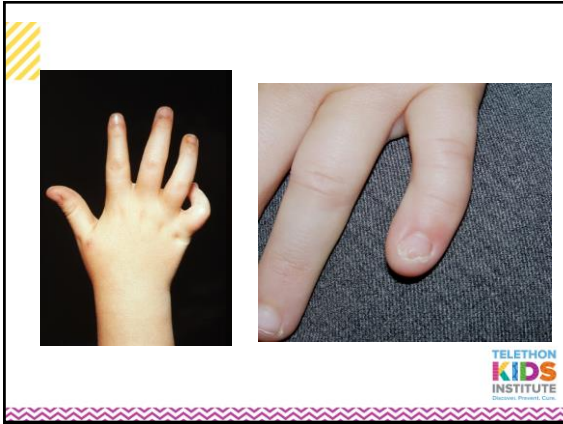


Facial Photography



Lip Circularity






TELETHON
KIDS
INSTITUTE
Discover. Prevent. Cure.




TELETHON
KIDS
INSTITUTE
Discover. Prevent. Cure.

Neurodevelopmental disorders



- Look 'normal'
- Maybe verbal
- Often do NOT have a low IQ
- Say they know what to do
- Non-compliant and uncooperative
- Considered to be 'bad'
- Poor understanding of time
- Negative self image and lack social skills



TELETHON
KIDS
INSTITUTE
Discover. Prevent. Cure.

Is there any point diagnosing FASD?

TELETHON
KIDS
INSTITUTE
Discover. Prevent. Cure.

Proudly supported by the people of Western Australia through Channel 7's Telethon

Consequences of undiagnosed FASD

- **Consequences of undiagnosed FASD**
 - Broad and far reaching effects
- **Undiagnosed FASD adversely affects their development**
 - Loss of education
 - Loss of opportunities
- **In turn affects whole families and the wider community**
 - Increased costs of health
 - Increased costs of welfare services
 - Reduced educational opportunities
 - Reduced employment

TELETHON
KIDS
INSTITUTE
Discover. Prevent. Cure.

Consequence of early engagement with juvenile justice (ABS statistics)

- **Consequences of youth offending and youth victimisation**
 - Broad and far reaching effects
- **Youth victims and youth offenders have adverse effects on development**
 - Loss of education
 - Loss of opportunities
- **In turn affects whole families and the wider community**
 - Increased costs of health
 - Increased costs of welfare services
 - Reduced educational opportunities
 - Reduced employment

TELETHON
KIDS
INSTITUTE
Discover. Prevent. Cure.

Develop: 2^o...3^o... 4^o Disabilities

- Low self esteem
- Social exclusion
- Academic failure
- Unemployment
- Inability to live independently
- Mental health disorders
- Addiction
- Sexual deviance
- Problems with the justice system
 - Encounters with the law
 - Confinement



Executive Functioning



- Individuals with FASD have Executive Functioning problems
 - First encoding, memory, learning and recall
 - problem solving, remembering, changing
 - difficulties socializing with peers + sharing
 - managing conflicts, managing time
- Failures result in Rejection
 - higher probability of associating with other rejected children
 - higher probability will be involved in delinquent behaviors
 - higher probability will have problems with the law.



Diffusion tensor imaging (DTI) revealed structural abnormalities

- Delayed white matter development during childhood and adolescence in FASD
- Longitudinal DTI and T1 weighted MRI
 - completed in 17 participants with FASD and 27 controls
 - aged 5–15 years
 - 2–3 scans each over 2–4 years
- three major white matter tracts most affected :
 - superior longitudinal fasciculus
 - superior fronto-occipital fasciculus
 - inferior fronto-occipital fasciculus.
- Reduced total brain, white, cortical gray, and deep gray matter volumes
- Fewer significant age-related volume increases in the FASD group

Trett et al. The Journal of Neuroscience. June 12 2013 33(24): 8088-8099



Areas of dysfunction

- Central Nervous System
 - Below average intelligence
 - Delayed milestones
 - Motor abnormalities
 - Neurobehavioral disorders
 - Perceptual problems
- Neurobehavioural Disorders
 - Hyperactivity
 - Poor attention span
 - Perceptual problems
 - Poor impulse control
- Language
 - Late onset
 - Delayed use of sentences
 - Uneven expressive and receptive skills
 - Low quality masked by high fluency
- Behavioural
 - Social inappropriateness
 - Persistent temper tantrums
 - Excessive friendliness
 - Fearlessness
 - Poor response inhibition
 - Processing deficits
 - Input-output, integration deficits
 - Short-term memory loss
 - Sensory hypersensitivity
 - Perseveration

<http://www.cde.state.co.us/faso/default.asp?cid=6&cid=6&cid=6>



Primary Difficulties 1.

- **1. Compromised executive functioning;**
 - difficulty planning, predicting, organizing, prioritizing, sequencing, initiating, and following through. Difficulty setting goals, complying with contractual expectations, being on time, or adhering to a schedule.
- **2. Difficulty with memory;**
 - information input, integration, forming associations, retrieval, and output. Difficulty learning from past experiences. Often repeats the same mistake over and over again in spite of increasingly severe punishment.
- **3. Inconsistent memory or performance;**
 - may remember on Monday but forget by Tuesday.

http://www.cde.state.co.us/sites/default/files/fasd_anotherlook_schoolpsychologistscounselors.pdf



Primary Difficulties 2.

- **4. Difficulty with abstract concepts**
 - such as time, math, or money.
- **5. Impaired judgment;**
 - often unable to make decisions. Difficulty understanding safety and danger, friend from stranger; of differentiating fantasy from reality.
- **6. Inability to generalize information;**
 - difficulty forming links and associations, unable to apply a learned rule in new setting.
- **7. Communication challenges;**
 - appears to understand instructions, nods and agrees, but is not able to comprehend. Often repeats rules verbatim, then fails to apply them.


<http://www.cde.state.co.us/faso/default.asp?cid=6&cid=6&cid=6>



Primary Difficulties 3.

- **8. Language problems;**
 - difficulty comprehending the meaning of language and accurately answering questions. May agree or confabulate—comply or fill in the blanks. May talk excessively, yet be unable to engage in a meaningful exchange. The sheer volume of words may create the impression of competence.
- **9. Slow cognitive pace;**
 - may think more slowly, say “I don’t know,” shut down, or require minutes to generate an answer rather than seconds. Those with FASD are “ten-second people in a one-second world.”
- **10. Slow auditory pace;**
 - central auditory delays means language is processed more slowly, requiring more time to comprehend. Many students only grasp every third word of normally paced speech.
- **11. Perseveration;**
 - may be rigid, get stuck, have difficulty switching gears, stopping an activity, or transitioning to a new one. Often reacts strongly to changes in setting, program, or personnel.


http://www.cde.state.co.us/sites/default/files/fasd_anotherlook_schoolpsychologists.pdf



Primary Difficulties 4.

- **12. Dismaturity;**
 - often functions socially, emotionally, and cognitively at a much younger level developmentally than chronological age. A five-year-old may be developmentally more like a two-year-old, a twelve-year old more like a six-year old.
- **13. Impulsivity coupled with inability to abstract and predict outcomes;**
 - acts first and then is able to see the problem after the fact.
- **14. Sensory systems dysfunctions;**
 - may be over-reactive to stimuli—e.g., tactile defensiveness, may be easily overwhelmed by sensory input, may be unable to filter out extraneous stimuli, symptoms of which appear as increased agitation, irritability, or aggression. May be under-reactive to pain, may not complain of earaches, broken bones, and may be unable to experience painful stimuli

http://www.cde.state.co.us/sites/default/files/fasd_anotherlook_schoolpsychologistsoursions.pdf



“These behaviours
 are **not** intentional;
 they are the result of
 permanent brain damage.”




Proudly supported by the people of Western Australia through Channel 7's Telethon

Secondary Difficulties 1.

<ol style="list-style-type: none"> 1. Inappropriate humour; class clown 2. Pseudo-sophistication; may echo words, phrases, manners, and dress in order to “pass” as competent beyond their actual ability, often to their detriment 3. Fatigued, irritable, resistant, argumentative 4. Anxious, fearful, chronically overwhelmed 5. Frustrated, angry, defensive, destructive 	<ol style="list-style-type: none"> 6. Poor self concept, often masked by unrealistic goals or self-aggrandizement 7. Isolated, few friends, picked-on 8. Family or school problems including fighting, suspension, or expulsion 9. May run away or use other methods of avoidance 10. Trouble with the law, addictions 11. Depressed, may be self-destructive, suicidal
--	---

“At some time between the ages of 6 and 12 years,
 94% of children with FASD
 are diagnosed with a mental health disorder.”



Dr. Ira Chasnoff. October 18, 2007, Albany, NY.



Proudly supported by the people of Western Australia through Channel 7's Telethon

University of Washington; Children with a FASD

- 60% had a history of trouble with the law
- 50% had a history of confinement
 - jail, prison, residential drug treatment facility, or psychiatric hospital
- The average age beginning to have trouble = 12.8 years
 - easily led by others and tend to be impulsive.

Comparisons with common comorbidities

Behaviour and response	FASD	ADHD	ODD
Takes Risks	Does not perceive danger	Acts impulsively	Pushes the envelope; feels omnipotent
response	Provide mentor; utilize a lot of repeated role play	Utilize behavioural approaches (e.g., stop and count to 10)	Psychotherapy to address issues; protect from harm

TELETHON KIDS INSTITUTE
Discipline. Present. Grow.

Dan Dubovsky, SAMHSA FASD Center for Excellence http://www.cde.state.co.us/sites/default/files/fasd_anotherbook_schoolpsychologistsconnection

Behaviour and response	FASD	ADHD	ODD
Does not complete tasks	May or may not take in information; cannot recall information when needed; cannot remember what to do	Takes in information; can recall information when needed; gets distracted	Takes in information; can recall information when needed; choose not to do what they are told
response	Provide one direction at a time	Limit stimuli and provide cues	Provide positive sense of control; limits and consequences

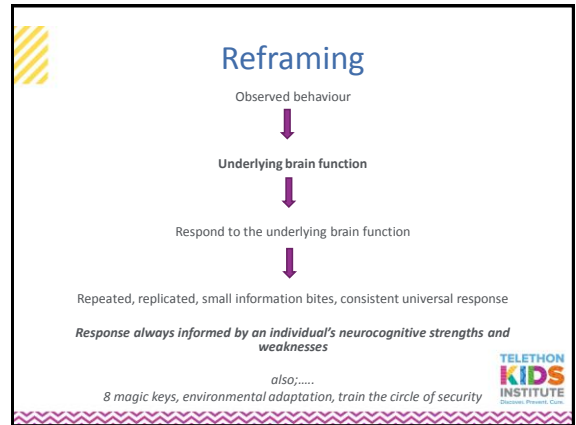
TELETHON KIDS INSTITUTE
Discipline. Present. Grow.

Dan Dubovsky, SAMHSA FASD Center for Excellence http://www.cde.state.co.us/sites/default/files/fasd_anotherbook_schoolpsychologistsconnection

Behaviour and response	FASD	ADHD	ODD
Hits Others	Someone told them to; misinterprets intentions of others; may sense bump as attack; may respond from history of abuse	Frequently an impulsive act	Plans to hurt others; misinterprets intentions of others as attack or impending attack
response	Deal with misinterpretations at the time; one-to one support	Behavioural approaches to address impulsivity	Consequences; cognitive behavioural approaches

TELETHON KIDS INSTITUTE
Discipline. Present. Grow.

Dan Dubovsky, SAMHSA FASD Center for Excellence http://www.cde.state.co.us/sites/default/files/fasd_anotherbook_schoolpsychologistsconnection



- ### Some resources
- Teaching students with FASD
- <http://www.fidoe.org/ese/pdf/fetalco.pdf>
 - Eight Magic Keys
- <http://www.fasdcenter.samhsa.gov/documents/EightMagicKeys.pdf>
 - NOFASD
- <http://www.nofasd.org.au/>
- <http://www.fasdotreach.ca/files/downloads/Churchill%20Report.pdf>
- TELETHON KIDS INSTITUTE**
Discipline. Present. Grow.

- ### Eight Magic Keys
1. Concrete
 2. Consistency
 3. Repetition
 4. Routine
 5. Simplicity
 6. Specific
 7. Structure
 8. Supervision
- Deb Evensen and Jan Lutke 1997
TELETHON KIDS INSTITUTE
Discipline. Present. Grow.

How much alcohol?

Guideline 3: Children and young people under 18 years of age

- under 18 years of age, not drinking alcohol is the safest option.

Guideline 4: Pregnancy and breastfeeding

- Maternal alcohol consumption can harm the developing fetus or breastfeeding baby.
 - A. For women who are pregnant or planning a pregnancy, not drinking is the safest option.
 - B. For women who are breastfeeding, not drinking is the safest option.

- <https://www.nhmrc.gov.au/your-health/alcohol-guidelines>



AUDIT-C Questionnaire

1. How often do you have a drink containing alcohol?
 - a. Never
 - b. Monthly or less
 - c. 2-4 times a month
 - d. 2-3 times a week
 - e. 4 or more times a week
2. How many standard drinks containing alcohol do you have on a typical day?
 - a. 1 or 2
 - b. 3 or 4
 - c. 5 or 6
 - d. 7 to 9
 - e. 10 or more
3. How often do you have six or more drinks on one occasion?
 - a. Never
 - b. Less than monthly
 - c. Monthly
 - d. Weekly
 - e. Daily or almost daily



TELETHON
KIDS
INSTITUTE
Discover. Prevent. Cure.

Three starter questions for asking about alcohol use in pregnancy

- Was your pregnancy planned?
- How many weeks were you when you recognised that you were pregnant?
- Did you change any of your lifestyle factors once you recognised that you were pregnant?
 - embed timing, frequency and dose of risk and protective factors eg: alcohol with exercise, iron, omega 3, smoking, etc

TELETHON
KIDS
INSTITUTE
Discover. Prevent. Cure.

Links

- <http://telethonkids.org.au/>
- <http://alcoholpregnancy.telethonkids.org.au/>
- <http://www.nofasd.org.au/resources/useful-links#iarft>
- <http://rffada.org/>
- <http://www.fare.org.au/research-development/featured-research/foetal-alcohol-spectrum-disorders-2/>

TELETHON
KIDS
INSTITUTE

TELETHON
KIDS
INSTITUTE
Discover. Prevent. Cure.

Thank you Questions?

raewyn.mutch@health.wa.gov.au

raewyn.mutch@telethonkids.org.au

@RaewynMutch

TELETHON
KIDS
INSTITUTE
Discover. Prevent. Cure.

Proudly supported by the
people of Western Australia
through Channel 7's Telethon