Researching the Prevalence and Characteristics of FASD in International Settings

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Simple View of Causation: QFT and the Severity of Damage

- An individual child's traits of FASD are completely influenced by:

  Quantity (amount) of alcohol consumed by mother during pregnancy.

  Frequency (how often) that she drinks.

  Timing of the drinking during gestation of the fetus.

Blood Alcohol Concentration: Threshold for FAS or PFAS?

- Cannot be extrapolated to humans from animal models.
- Is limited by human research methods (e.g. clinical trials with pregnant women are not ethical).
- Is affected by other maternal traits (co-factors of risk).
- Varies greatly with each, individual human.

It's Not That Simple

- There are a number of **co-factors**, exclusive of alcohol, that increase, mediate, or mitigate risk for FASD in a particular:
  - Child
  - Mother
  - Pregnancy
  - Community

Some Known Co-Factors of Maternal Risk and Fetal Damage

Biological:

- Nutrition, life long and during index pregnancy.
- Body mass (BMI) and weight of the mother.
- Genetic - Alcohol metabolism, liver genotype, and liver phenotype.
- Race and Ethnicity

Demographic, Childbearing, and Socio-cultural:

- Maternal age, gravidity, parity, and birth order.
- Socioeconomic status (SES): including maternal education, income, and home environment.
- Spirituality/religiosity.
- Familial issues, psychological distress, and other traits.

Peak BAC Levels of South African Women: Estimated from Interviews

	Drinking Mothers of Children who are:		
	FAS	**PFAS**	**Controls**
1st trimester			
D.D.D.**	5.7	3.9	3.8
BAC (SD) ***	0.197 (.17)	0.155 (.07)	0.122* (.11)
2nd trimester			
D.D.D.	5.7	3.2	3.7 *
BAC (SD)	0.200 (.17)	0.124 (.09)	0.084* (.09)
3rd trimester			
D.D.D.	5.5	2.7	3.7
BAC (SD)	0.191 (.17)	0.102 (.12)	0.076*(.09)

*p < .05 **D.D.D. = drinks per drinking day *** BAC = grams per deciliter, estimated by BACCuS (w/ sex, wgt., quantity, duration) Source: May et al., 2008

Height, Weight, and Body Mass Index of South African Women

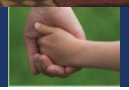
Mothers of Children with:

	FAS	PFAS	Controls
Height (cm.)	154.7	155.2	157.6*
Weight (kg.)	53.9	56.7	68.3 *
Head Cir. (cm.)	54.8	54.9	54.9
BMI	22.5	23.5	27.4*

Source: May et al., 2008

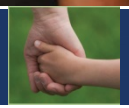
*p <.001

South African Clinical Team, May, 2008



South African Clinical Research Team
BRAM: March, 2009


Core Prevention Research Field Team,
South Africa, 2008



Three Major Methods for Studying the Prevalence of FAS and FASD

- Surveillance and Record Collection Systems:
  - Birth certificates, registries, & capture studies.
- Clinic-based studies:
  - Antenatal alcohol screens & dx. of newborns.
- Active Case Ascertainment studies:
  - Specialty referral clinics with active outreach.
  - In-school studies.

Prevalence of **FAS** Produced by Various Methods (avg. per 1,000 children)

Method	n	Mean	Median
Surveillance	15	0.85	0.27
Clinic Based	>50	1.8	1.9
Active Case Ascertainment (does not include in-school studies)	8	15.6	8.5

Prevalence of FASD Produced by Various Methods (avg. per 1,000 children)

Method	n	Mean	Median
Surveillance	0	---	---
Clinic Based	3	6.2 (0.6%)	4.8 (0.5%)
Active Case Ascertainment (excluding in-school studies)	8	38.2 (3.8%)	19.0 (1.9%)

Most Quoted **Current** Estimates of FAS and FASD

Diagnosis	Per 1,000	Per Cent	Source
FAS	0.5 – 2.0	0.05 - 0.2%	May & Gossage, 2001 (Literature review)
FAS	0.5 – 3.0	0.05 - 0.3%	Stratton, et al., 1996 (avg. –IOM Report)
FASD	9.1	1%	Sampson, et al., 1997 (clinic-based study)

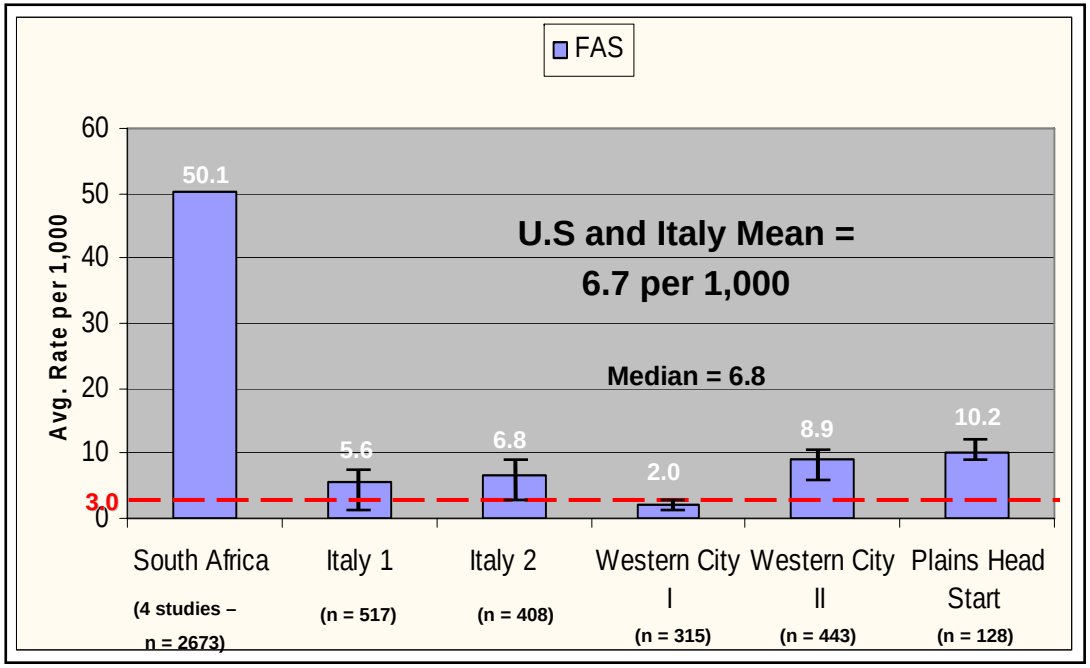
In-School Prevalence Studies

- Provide access for a team of specialists to a general population of children.
- Children in first grade are at an optimal stage of life (6-7 years) for an accurate diagnosis within the realm of FASD.
  - Dysmoprphology and growth are well known and documented.
  - Solid neurobehavioral tests apply.
  - Retrospective maternal interviews are less stressful and are more accurate (TLFB methods).
  - Early identification makes early intervention possible
- Active consent from parents can be an obstacle.

Italy, 2005

Italy, 2006

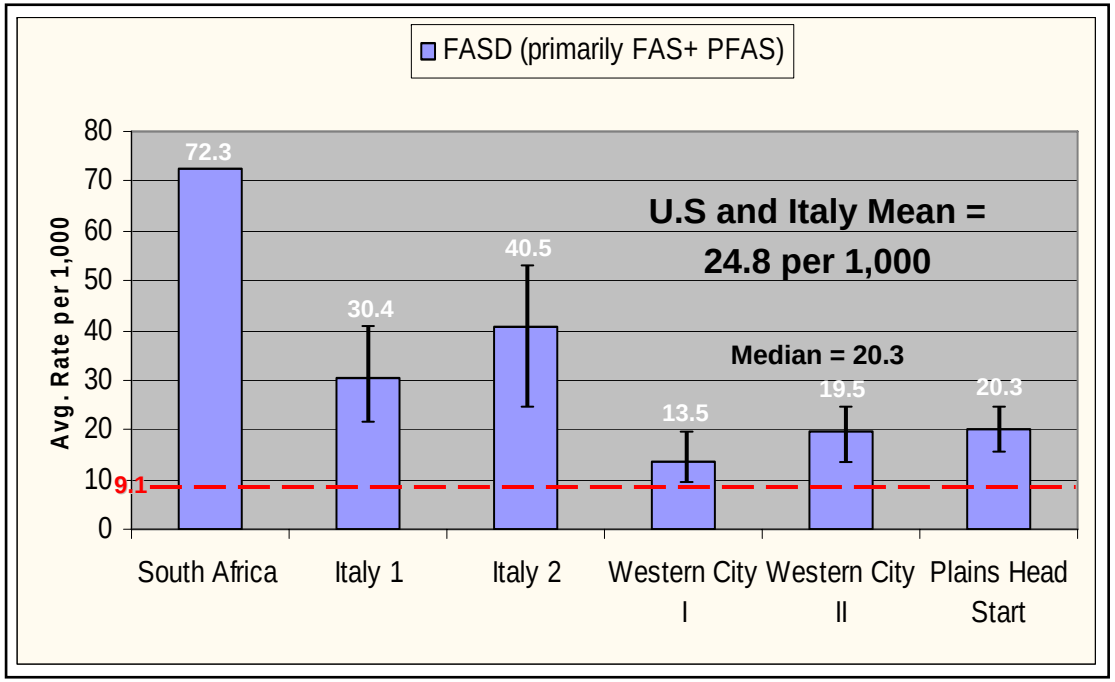
Prevalence of **FAS** from In-School Studies



Current (high) estimate

Source: May et al., DDRR, 2009.

Prevalence of **FASD** from In-School Studies



Current estimate

Source: May et al., DDRR, 2009.

New General Population Prevalence Estimates of FASD: In-School Studies

Estimates per 1,000:

	Current	In-school
FAS	0.5 – 3.0	2.0 – 7.0
FASD	9.1 (1%)	20 – 50 (2-5%)

Source: May et al., DDRR, 2009.

Is This a Substantial Public Health Problem? Background

- I was a skeptic of high rates of FASD in the first part of my career.
- Even with active case ascertainment studies using referral to special clinics, many cases of FASD are missed, especially those not meeting growth criteria.
- In-school studies take specialists to the general population look for cases of FASD.
- **Yes,** it is a larger problem than many of us expected.

Why Are We Not Doing More Research in Human Populations?

- Public health is often lost in the zeal for specific FASD research and solutions that are reductionist in nature ("magic bullets").
- The search for etiology often overpowers practical, basic considerations like the prevalence and characteristics of FASD.
- Most people don't want to look for the problem.
- Stigma makes everyone ultra sensitive and uncomfortable.

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Conclusions

- If we don't actively seek FASD cases, we won't find the majority of them, especially the less severe cases.
- FASD **is** the leading cause of mental deficiency in many modern societies.

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