WA State FAS Diagnostic & Prevention Network (FAS DPN)

Profiles of 1,400 Patients Evaluated for FASD at the WA FAS DPN by Interdisciplinary Teams using the 4-Digit Code

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WA State FAS DPN Patient Profile (n = 1,400)

The Washington State FAS DPN electronic clinical / research database was utilized to construct a comprehensive profile of all 1,400 WA State residents (birth through adult) who received an interdisciplinary FASD diagnostic evaluation using the FASD 4-Digit Diagnostic Code at one of the 7 WA FAS DPN clinics in the first 13 years (1993-2005) of operation. All had prenatal alcohol exposure.

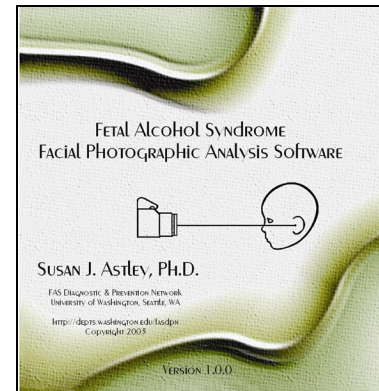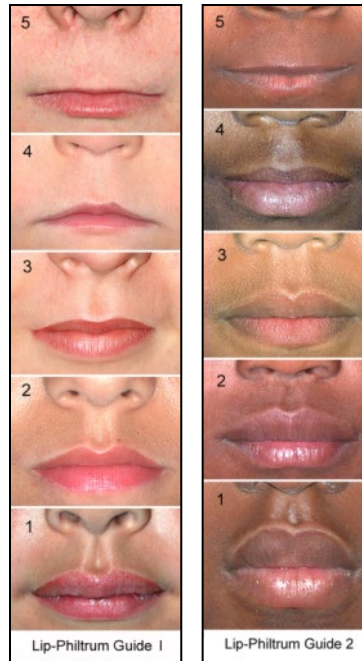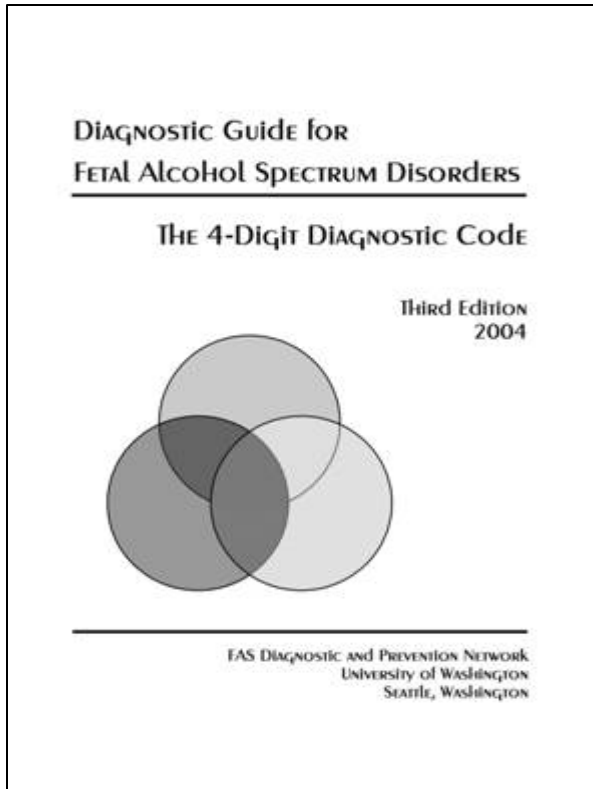# WA State FAS DPN Patient Profile (n = 1,400)

The outcomes are reported in:

Astley SJ.   Profile of the first 1,400 patients receiving diagnostic evaluations for fetal alcohol spectrum disorder at the WA State Fetal Alcohol Syndrome Diagnostic & Prevention Network.

Can J Clin Pharmacol Vol 17(1) Winter 2010:e132-e164; March 26, 2010.

www.fasdpn.org/pdfs/astley-profile-2010.pdf

FASD 4-Digit Diagnostic Code

All Diagnostic Tools and Courses available at cost or free on the web.
www.fasdpn.org

Interdisciplinary FASD Diagnostic Team

Team includes:
- Pediatrician
- 2 psychologists
- SLP
- OT
- Social Worker
- family advocate

FASD diagnostic evaluation conducted in one 4-hour appointment.

FASDPN Clinics located statewide.
Core clinic at Center on Human Development & Disability, UW
fasdpn.org
Contact: (206) 598-7666   fasdclin@uw.edu

Abbreviated Case-Definitions of 4-Digit Code

	3	**4**	**3**		**4**	
4	≤ 2 %	All 3 features	Structural / Neurological Abnormalities		Confirmed High	**4**
3	3 - 5 %	2 features	Severe Dysfunction		Confirmed Moderate	**3**
2	6 -10 %	1 feature	Moderate Dysfunction		Unknown	**2**
1	> 10 %	No features	No Dysfunction		Confirmed Absent	**1**
	Growth	Face	CNS		Alcohol	

R a n k

3434 is one of twelve 4-Digit Codes for FAS

Example of 4-Digit Codes for FAS and PFAS

A   **FAS (alcohol exposed)**

2433	3433	4433
2434	3434	4434
2443	3443	4443
2444	3444	4444

B   **FAS (alcohol exposure unknown)**

2432	3432	4432
2442	3442	4442

C   **Partial FAS (alcohol exposed)**

1333	1433	2333	3333	4333
1334	1434	2334	3334	4334
1343	1443	2343	3343	4343
1344	1444	2344	3344	4344

3 Diagnostic Facial Features of FAS

1) Short PFL   <= -2 SD
2) Smooth Philtrum   Rank 4 or 5
3) Thin Upper Lip   Rank 4 or 5

FAS

en ——————— ex
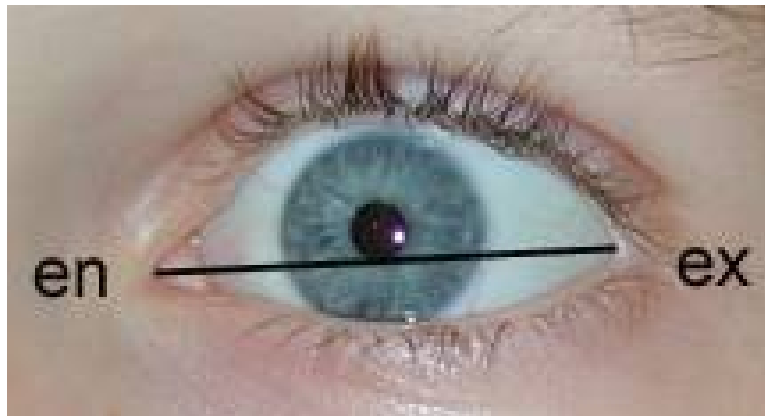
Palpebral fissure length (PFL) =
endoncanthion to exocanthion

Lip-Philtrum Guide I   Lip-Philtrum Guide 2
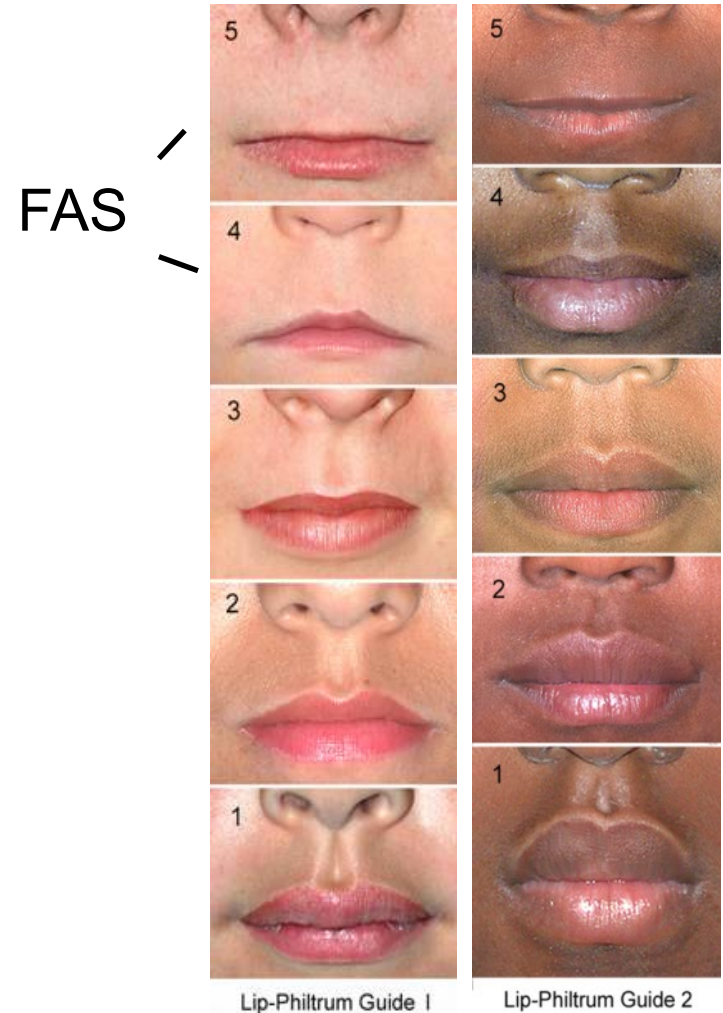
FASD Diagnostic Outcomes for 1,400 Patients

4-Digit Code FASD Diagnostic Categories	N	%
A. **FAS** / Alc Exposed	52	3.7
B. **FAS** / Alc Unknown	7	0.5
C. **PFAS** / Alc Exposed	95	6.8
E. Sentinel Physical Findings / **Static Encephalopathy** / Alc Exposed	95	6.8
F. **Static Encephalopathy** / Alc Exposed	299	21.4
G. Sentinel Physical Findings / **Neurobehavioral Disorder** / Alc Exposed	160	11.4
H. **Neurobehavioral Disorder** / Alc Exposed	562	40.1
I. Sentinel Physical Findings / Alc Exposed	34	2.4
J. No Sentinel Physical Findings or CNS Abnormalities / Alc Exposed	96	6.9

Bar chart:
- FAS/PFAS: 7.3
- SE/AE: 28.1
- ND/AE: 51.6
- Norm CNS/AE: 9.3
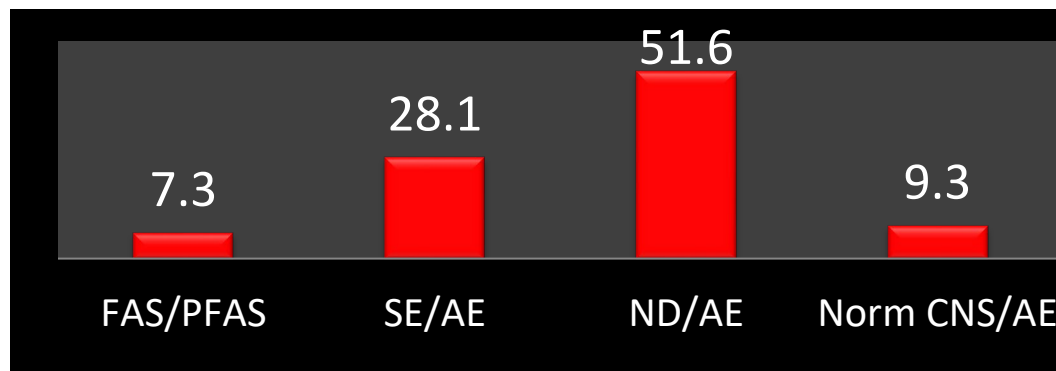
Data Support 3 Distinct FASD Subclassifications based on FASD 4-Digit Code

1. **<u>FAS / PFAS</u>**
   Diagnostic Categories A, B, C

2. **<u>SD/AE</u>** (Static Encephalopathy/Alcohol Exposed)
   Diagnostic Categories E, F
   '*severe ARND*'

3. **<u>ND/AE</u>** (Neurobehavioral Disorder/Alcohol Exposed)
   Diagnostic Categories G, H
   '*moderate ARND*'

Diagnostic Group Abbreviations/Definitions

Diagnostic Groups	FAS Face	CNS		Alcohol
FAS / PFAS	**face**	**severe**		**alc**
SE/AE (severe ARND) Static Encephalopathy/Alc Exposed		**severe**		**alc**
ND/AE (moderate ARND) Neurobehavioral Disorder/Alc Exposed			**moderate**	**alc**
Normal CNS/AE				**alc**
Control (from MRI study)				**No alc**

Two FASD populations are presented throughout these slides:

1. WA FASDPN Clinical population (n = 1,400)
2. MRI FASD study population drawn from the FAS DPN (n = 81)

MRI-fMRI-MRS Study

Primary Hypotheses

The following will differ between children with FAS/D and healthy/unexposed children:

- neuro-structure (size of specific brain structures)

- neuro-function (as measured by psychological, psychiatric, and fMRI assessment)

- neuro-chemistry (neurometabolites: choline and n-acetyl-aspartate)

Are the 4-Digit Code diagnostic categories (FAS, SE/AE, ND/AE) clinically distinct?
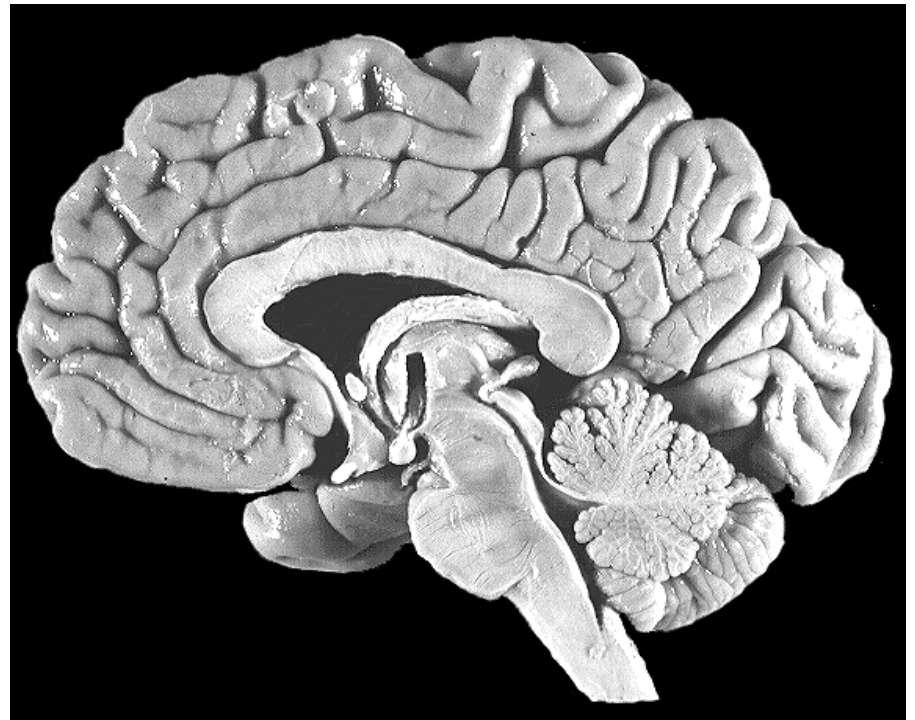
MRI-fMRI-MRS Study

MRI: Structure

Volumes

caudate
putamen
hippocampus
frontal lobe
frontal gray matter
frontal white matter
total brain

Midsaggital Area

corpus callosum
cerebellar vermis
total brain

MRI-fMRI-MRS Study

fMRI: Functional Assessment in the Scanner

Whole brain scan for activity levels while child is participating in a N-back working memory task.

Child is presented photos of faces while in the scanner.

Child responds to task by pushing a button.

0-Back Task

Push the button when you see a man's face.

1-Back Task

Push the button when the face you are looking at matches the face you saw <u>one slide back</u>.

2-Back Task

Push the button when the face you are looking at matches the face you saw <u>two slides back</u>.

Sociodemographic Profile of 1,400

Characteristic		N	%
Gender:	male	812	58
Race:	White	684	49
	Black	92	7
	American Indian/Native Alaskan	115	8
	Other	509	36
Age at diagnosis (yrs):	0-3	258	18
	4-5	233	17
	6-10	482	34
	11-15	286	20
	16+	141	10
Annual Income less than $35,0000		385	65

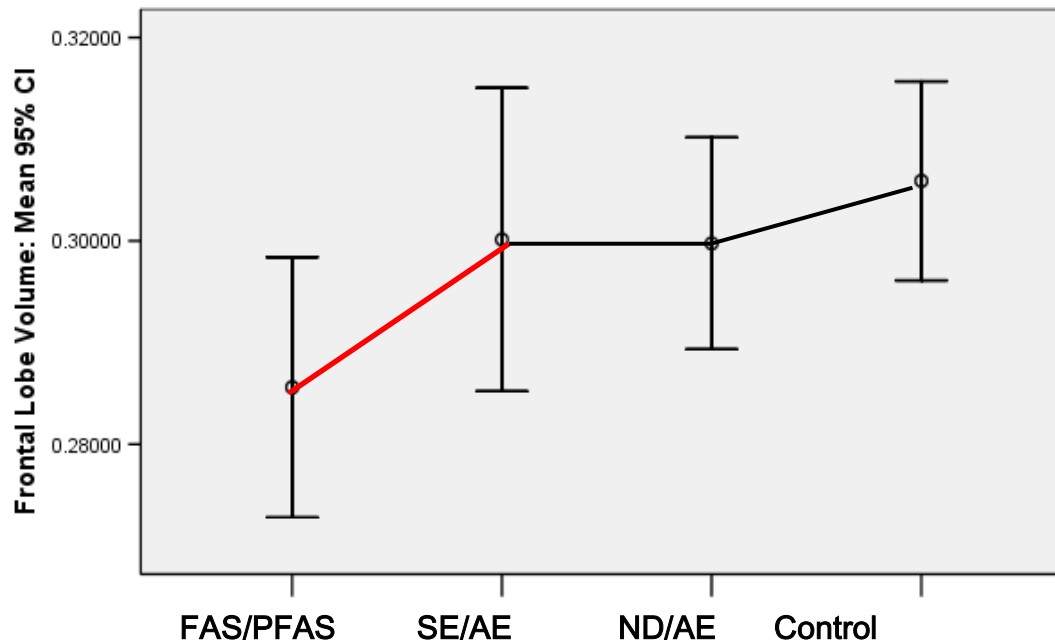# Growth, Face, CNS, and Alcohol Ranks of 1,400
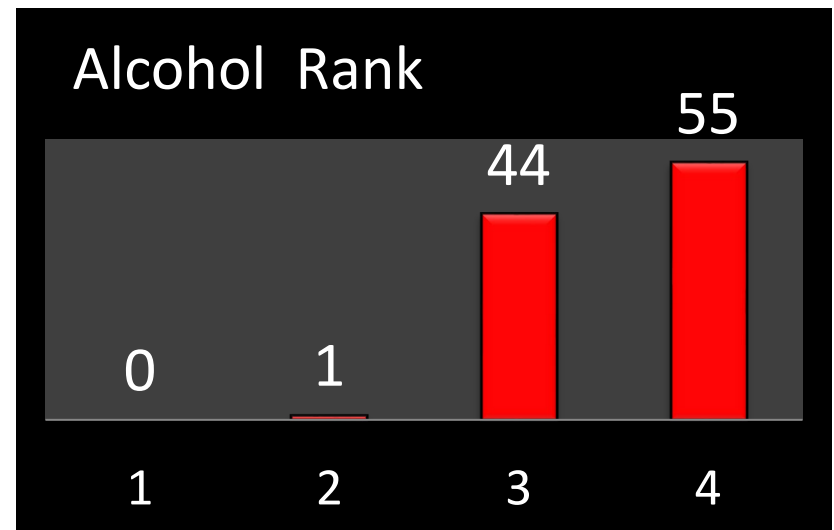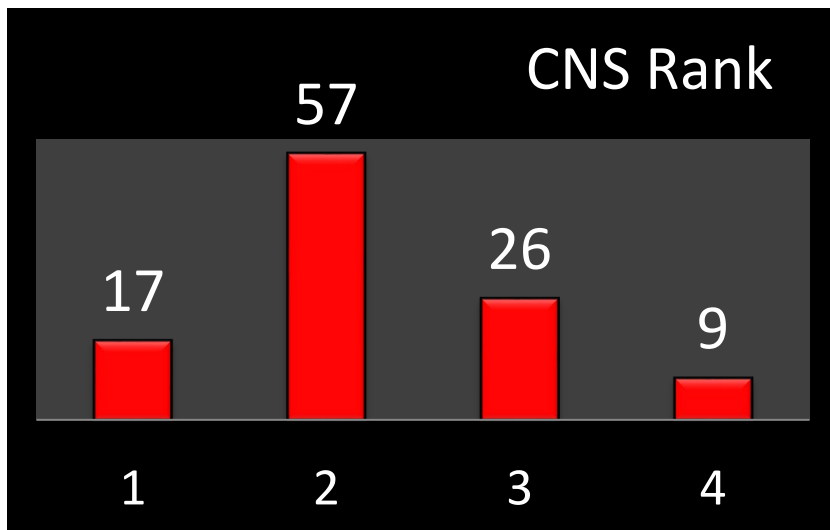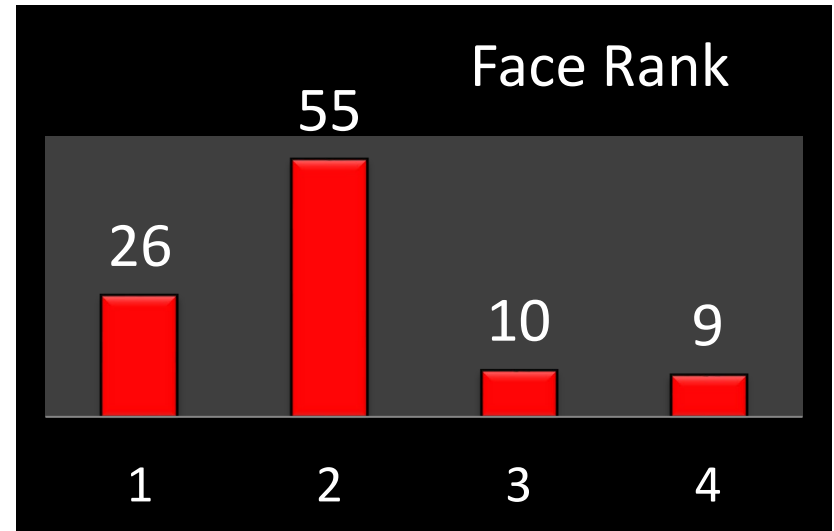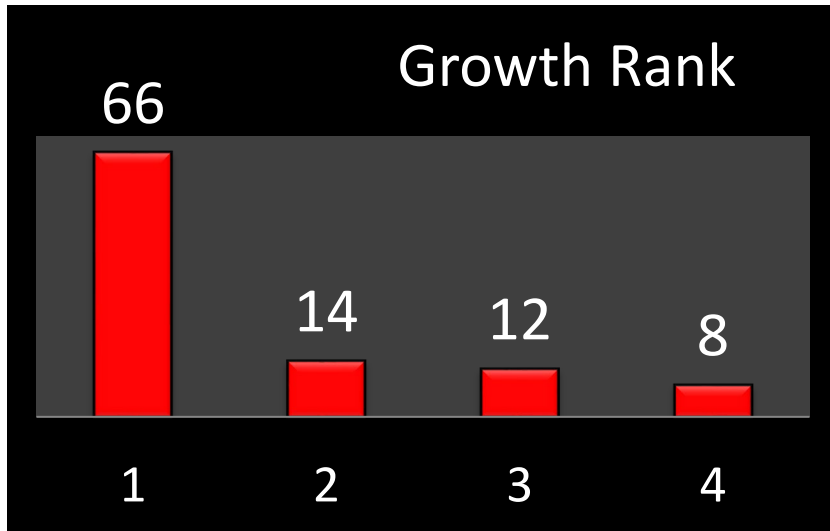
4-Digit Face Rank Predicts Brain among 1,400
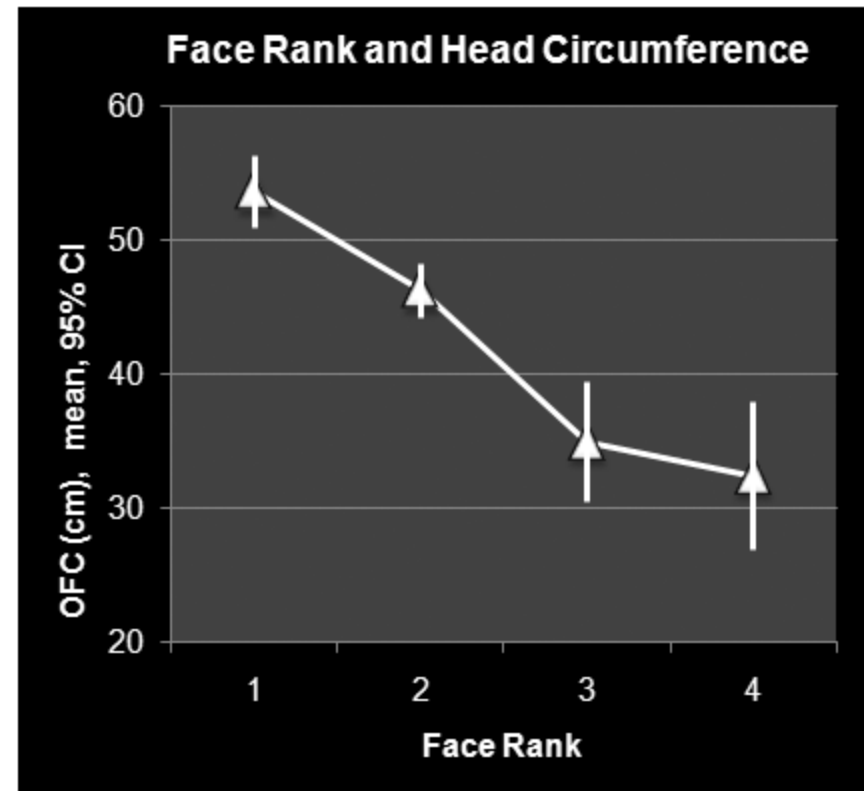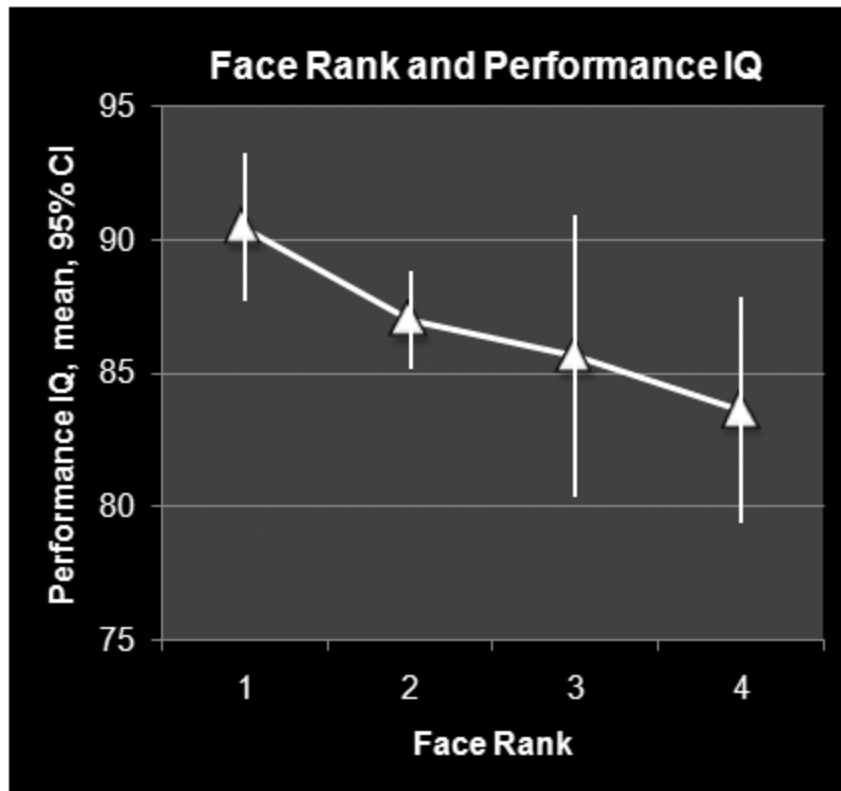
- The FAS facial phenotype presents along a continuum.
- The more severe the FAS face, the more severe the CNS structural/functional abnormality.

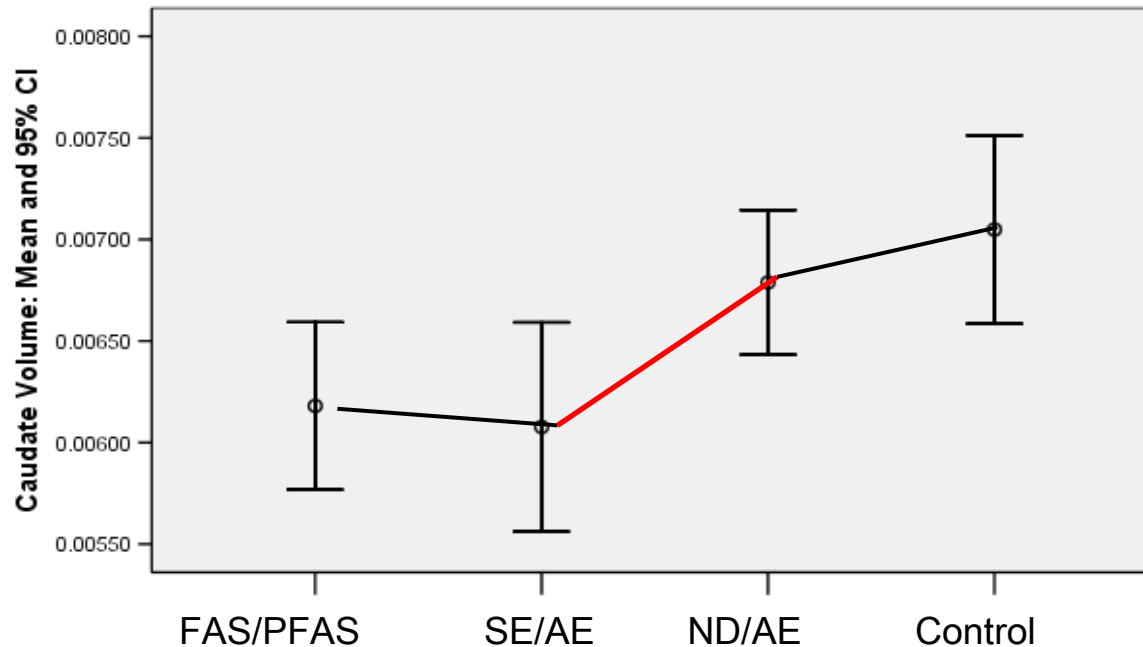# Rank 4 FAS Face   :   Smaller Frontal Lobe

Frontal Lobe (adjusted for brain size) Across 4 Groups

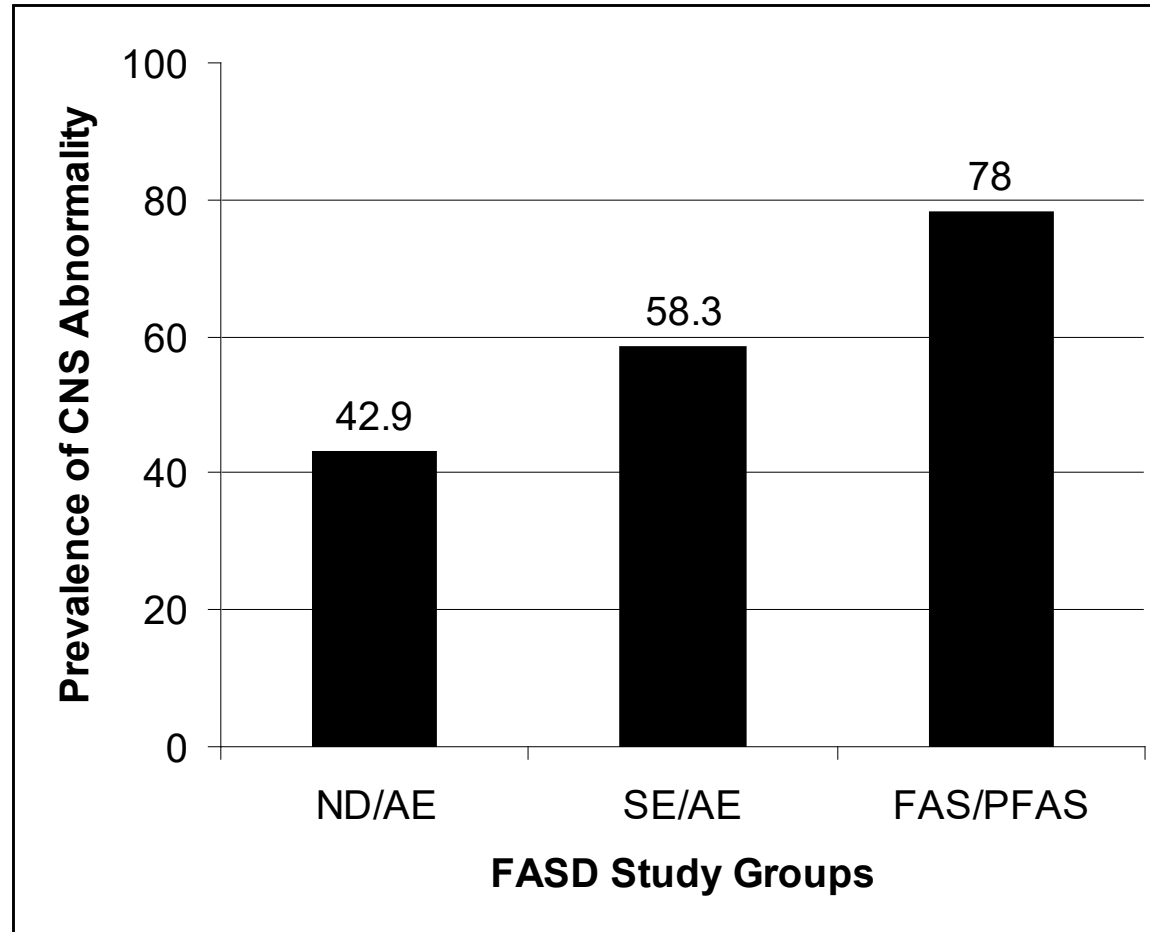MRI Study: Those with FAS/PFAS had disproportionately smaller frontal lobe volumes

CNS Ranks 3,4 : Smaller Caudate

Caudate Size (adjusted for brain size) across the 4 Groups

MRI Study: Those with FAS/PFAS and SE/AE had disproportionately smaller caudate volumes

Prevalence of CNS Structural Abnormalities

MRI Study: The prevalence of subjects with 1 or more brain regions that are significantly smaller than the healthy Control Group increases as severity of FASD diagnostic classification increases.

4-Digit CNS Rank Correlates with Caudate Volume
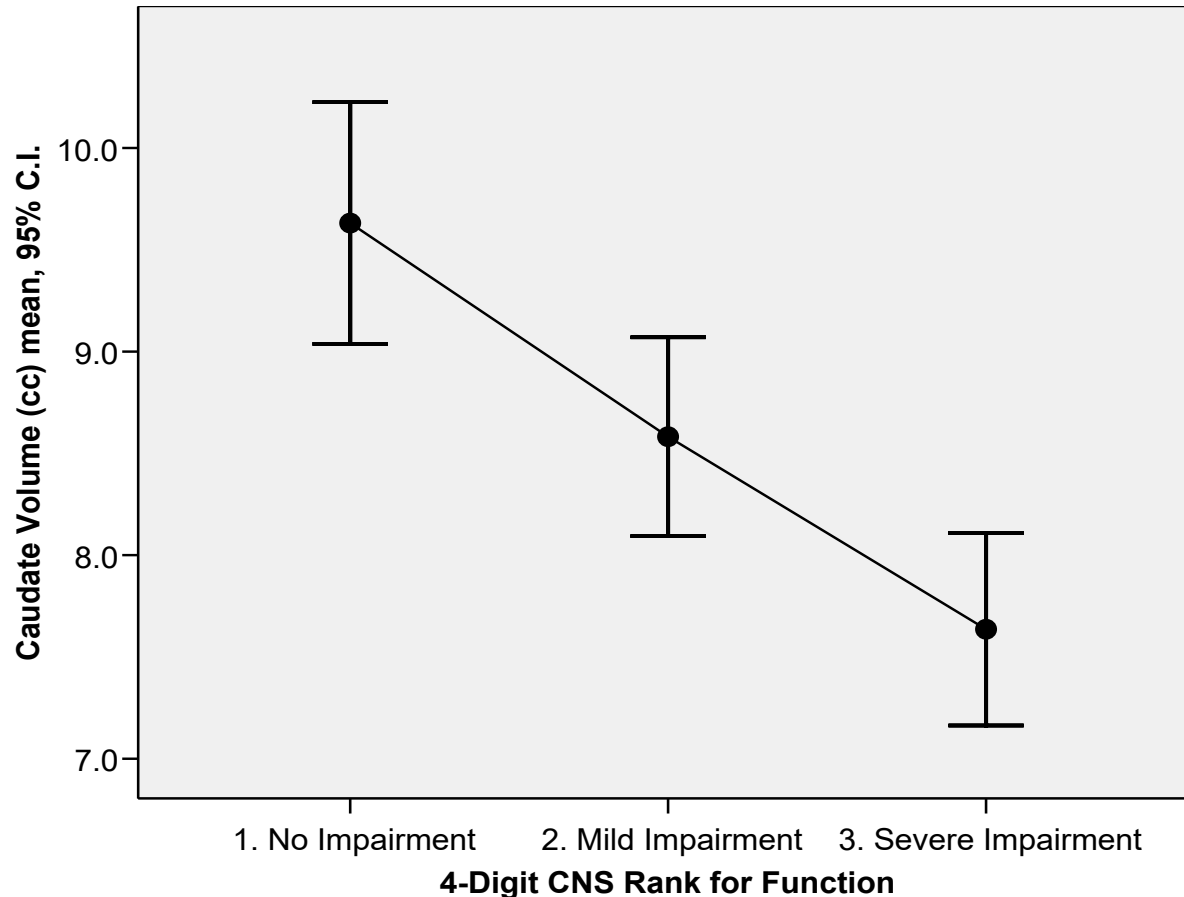
MRI Study: Caudate volume decreases significantly
as CNS Functional Rank increases from
1) no impairment, to 2) mild impairment, to 3) severe impairment.

9.3% Exposed, but Unaffected

- Of the 1,400 subjects with alcohol exposure, 9.3% had no evidence of CNS abnormality.

- Their alcohol exposure levels were comparable to the SE/AE and ND/AE groups.

<u>3 features distinguished them from the affected subjects</u>.

1. More likely to be female
2. More likely to be younger
3. Less likely to experience adverse postnatal events