Introduction to foetal alcohol spectrum disorder and FASD research at the University of Salford

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https://hub.salford.ac.uk/fasd/

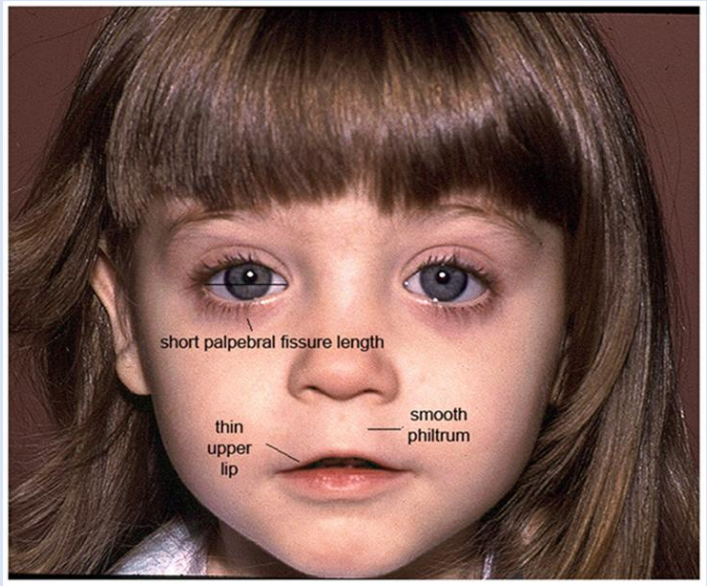
What is FASD?

FASD stands for Foetal Alcohol Spectrum Disorder.

It is a common neurodevelopmental disorder, caused by prenatal alcohol exposure.

People with FASD have many strengths but they also need support in certain areas.

About 10% of people with FASD also have a set of characteristic facial features which can be helpful for diagnosis but do not necessarily mean their difficulties are more severe.



For more information and support, see these websites →

NATIONAL ORGANISATION FOR FASD

FASD Network UK

Sunday
22.7.01 EVE

Continue Game

Nick

Competitions

Nations & Clubs

Find

Game Options

Action

I. Fabien Barthez (Man Utd)

Profile | Injuries & Bans | Contract | Transfer | History

Born 28.6.71 (Age 30). French (52 caps).

Acceleration	6	Flair	10	Set Pieces	17	Adaptability	14
Aggression	16	Handling	19	Stamina	13	Big Matches	18
Agility	18	Heading	9	Strength	9	Consistency	12
Anticipation	17	Influence	17	Tackling	14	Corners	10
Balance	16	Jumping	12	Teamwork	2	Dirtiness	9
Bravery	19	Long Shots	13	Technique	8	Fitness	9
Creativity	5	Marking	2	Work Rate	5	Injury Prone	9
Crossing	2	Off The Ball	4	Preferred Foot	Left	Loyalty	13
Decisions	15	Pace	15	Form	-	One on Ones	17
Determination	12	Passing	13	Morale	Good	Penalties	15
Dribbling	4	Positioning	17	Condition	74%	Versatility	15
Finishing	2	Reflexes	17				

	Apps	Con	Asts	MoM	Pass	Tck	Drb	Sh Tar	Av R
Non Competitive									
League									
Cup									

Strengths and difficulties in FASD

People with FASD tend to be good at –

Things that interest them, creative arts, sports, music, caring, expressive language and vocabulary, functioning in a well-structured environment, self-awareness, building and mechanical skills, learning second languages, resilience, adaptability, motivation, determination, and kindness.

People with FASD can struggle with –

Understanding abstract concepts, cognitively shifting from one task to another, processing information quickly, making decisions based on multiple considerations, understanding social cues, linking cause with effect, recalling episodic memories, handling sensory input, regulating their emotional state.

How is FASD caused?

FASD is caused by prenatal alcohol exposure.

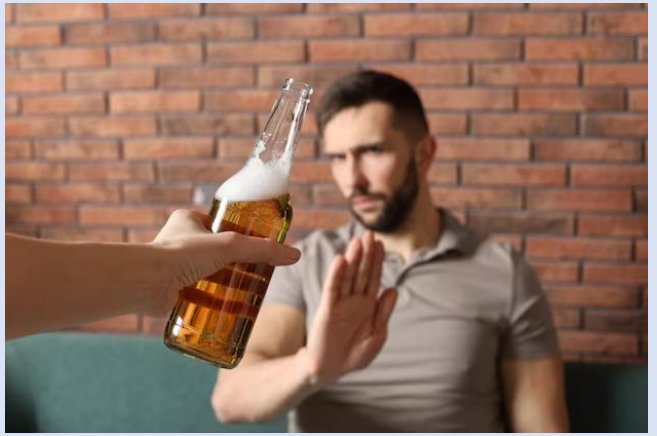
Alcohol can pass though the placenta and into the amniotic fluid where the foetus is developing.

Alcohol can damage or destroy some cells, interfere with hormonal activity which is related to development, disrupt cell division and migration, and change the way genes are expressed.

We try to avoid stigmatising language like “drinking alcohol in pregnancy”.

Prenatal alcohol exposure might happen because the birth parent(s) were not aware of the risks, they may have been given bad advice, or they may not have realised they were pregnant.

Emerging data from animal studies is showing a larger contribution of pre-conception **paternal** alcohol exposure on FASD-related features than we previously realised.



How is FASD diagnosed?

Dr Christie Ulleland

FASD was first identified in the early 1970s by Dr Christie Ulleland, a junior paediatrician in Seattle, USA. Her colleagues Ken Jones and David Smith later coined the term 'foetal alcohol syndrome'

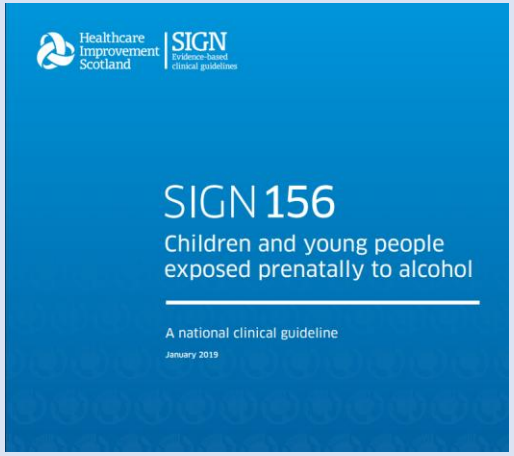
By the late 1990s, we realised there was a much wider spectrum of effects, and several other diagnostic labels were used under the umbrella of "foetal alcohol spectrum disorders" (FASDs)

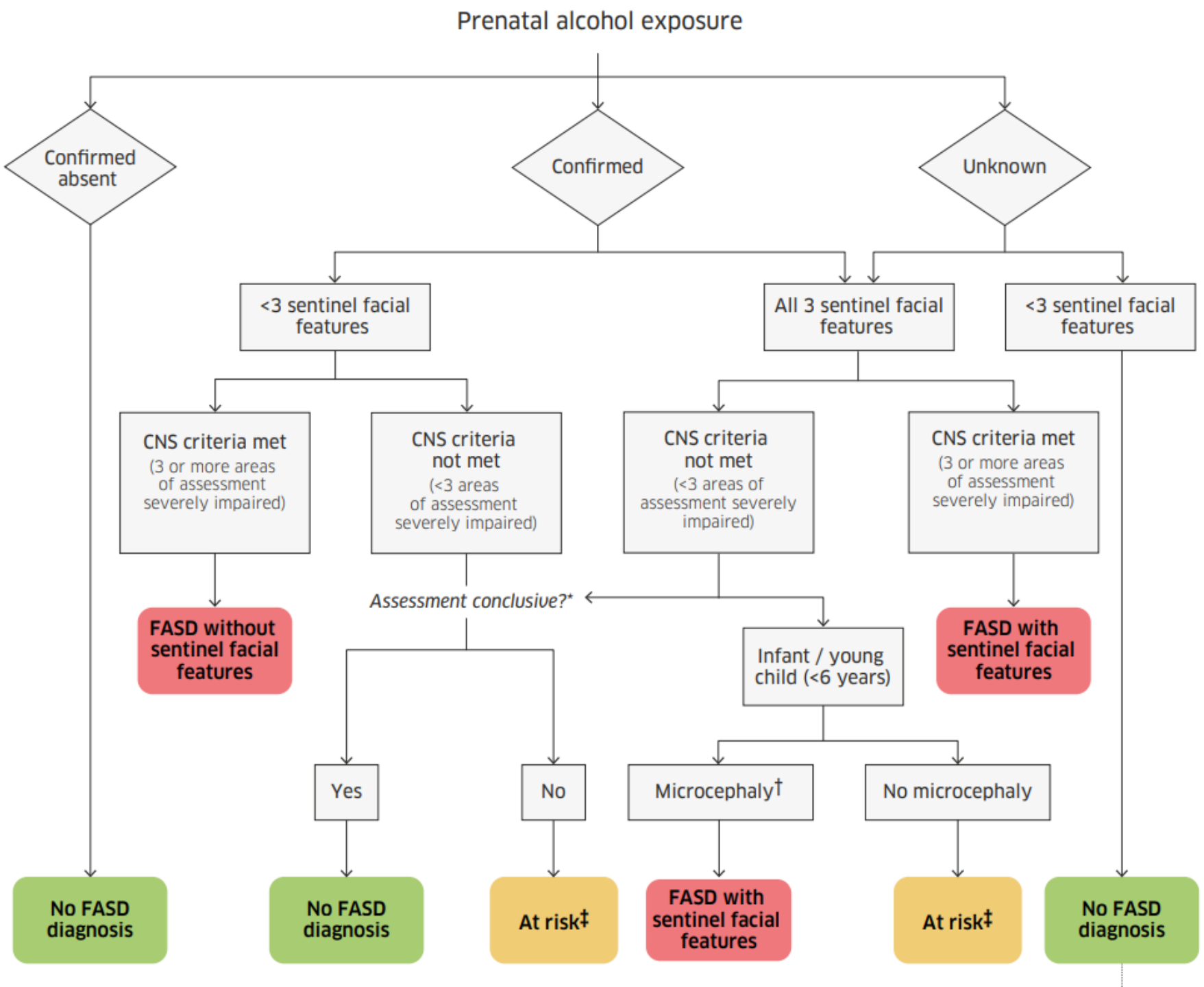
In the late 2010s, Canada, Australia and the UK adopted FASD as a diagnostic term, with the qualifier: with or without sentinel facial features.

The UK guide for diagnosis is called SIGN156, published by Healthcare Improvement Scotland. This was adopted by NICE in 2022.

UK diagnoses

FASD with sentinel facial features
FASD without sentinel facial features




Prenatal alcohol exposure
Confirmed absent
Confirmed
Unknown
<3 sentinel facial features
All 3 sentinel facial features
<3 sentinel facial features
CNS criteria met (3 or more areas of assessment severely impaired)
CNS criteria not met (<3 areas of assessment severely impaired)
CNS criteria not met (<3 areas of assessment severely impaired)
CNS criteria met (3 or more areas of assessment severely impaired)
FASD without sentinel facial features
Assessment conclusive?*
FASD with sentinel facial features
Infant / young child (<6 years)
Yes
No
Microcephaly†
No microcephaly
No FASD diagnosis
No FASD diagnosis
At risk‡
FASD with sentinel facial features
At risk‡
No FASD diagnosis

How is PAE detected?

This is needed for diagnosis in most cases

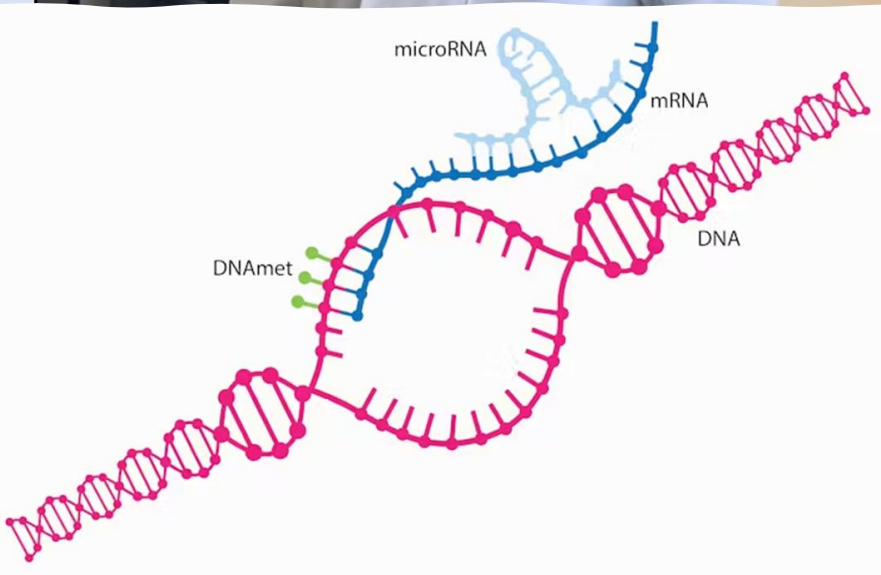
Mostly it is done through official records or careful interviewing of parents

Often, that information is missing by the time an adopted child comes for an FASD assessment

PAE can be detected at birth, but not later on

What if there was a blood test?

Ongoing project at University of Salford, led by geneticist Professor Arijit Mukhopadhyay



How common is FASD?

FASD is common but it is not commonly diagnosed

Passive Case Ascertainment (e.g. by accessing clinical statistics) shows the diagnosis is given to well under 0.1% of the population (Burleigh et al, 2023)

However, **Active Case Ascertainment** (where new cases are identified in a population sample) tend to show prevalence rates in the region of 2-5% in Western countries

Country	Prevalence rate	Study link
United Kingdom	1.8-3.6%	McCarthy et al, 2021
United States	1.1-5%	May et al, 2018
Canada	2.9%	Popova et al, 2019
Sweden	5.5%	Landgren et al, 2025
Italy	2.3-6.3%	May et al, 2011
Croatia	6.7%	Petković et al, 2013
South Africa	2.9-29%	Olivier et al, 2016
Australia*	2.91% - 4.41%	Tsang et al, 2025

* Estimated by meta-analysis, not ACA study

FASD in subpopulations

International Meta Analysis (Popova et al, 2019)

Indigenous / Aboriginal: Up to **6.1%**

Special educational settings: Up to **8.4%**

Prisons: Up to **15%**

Childcare settings: Up to **31%**

Looked After Children's paediatric assessments in the UK

34% had PAE (Peterborough) (Gregory et al, 2015)

25% had PAE (London) (Nitsch, 2024)

58% (16% confirmed, 42% suspected) had PAE (London) (Dawson et al, 2025)

Comorbid and secondary conditions

It is common for people with FASD to have multiple additional conditions.

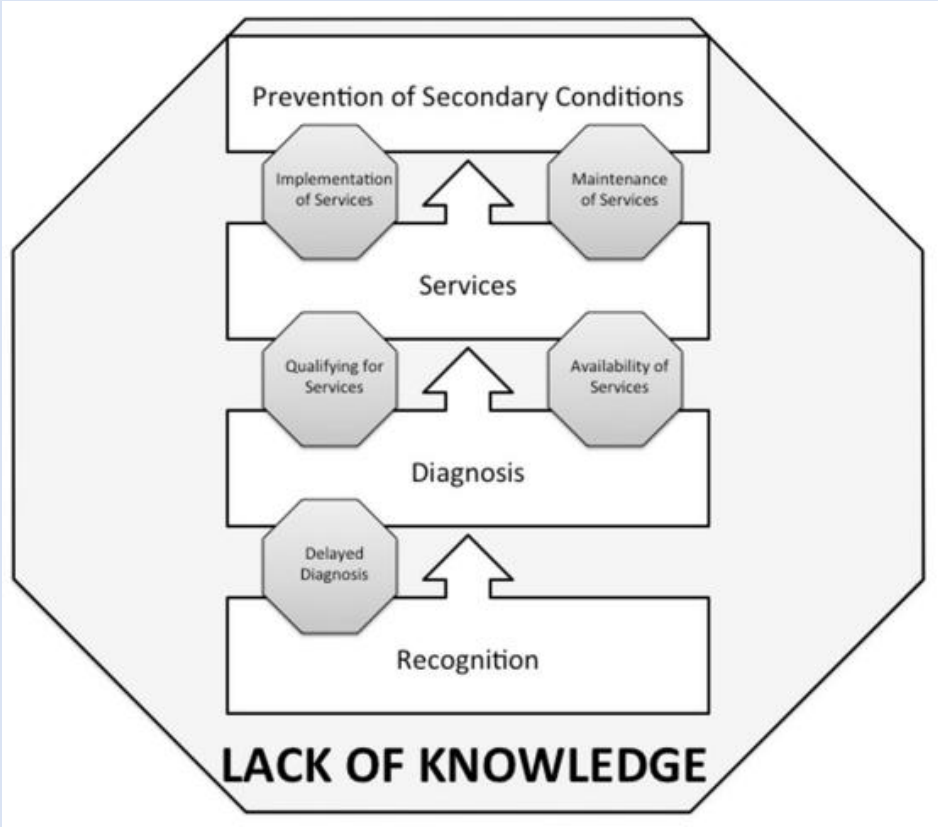
A meta-analysis published in 2016 found **428** different conditions diagnosed alongside FASD.

Around 50% of people with FASD will also meet diagnostic criteria for ADHD.

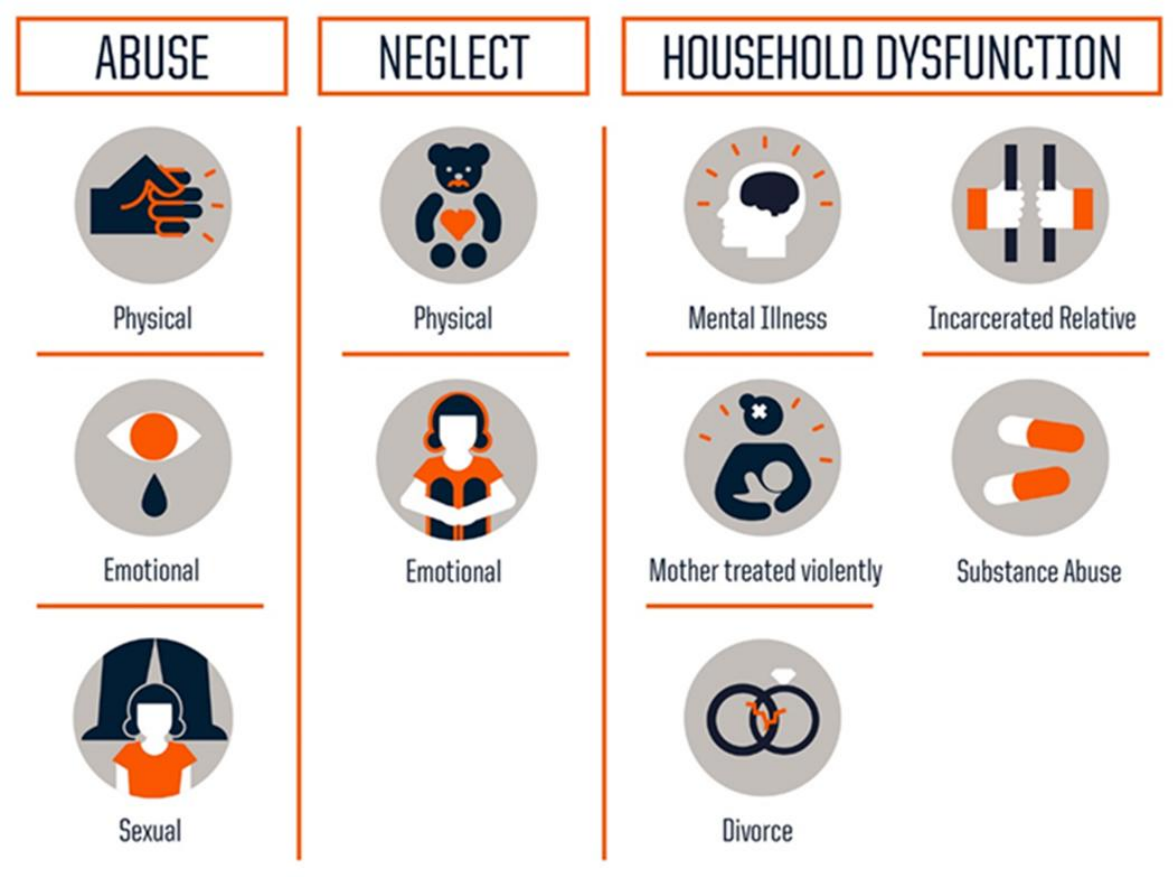
Older children, teens and adults with FASD, have an increased risk of:

- School exclusion
- Addictions
- Being a victim of crime
- Being a perpetrator of a crime
- Being taken advantage of, for example by criminal gangs
- Struggling to maintain social relationships
- Mental health difficulties
- Unemployment

But early recognition and support can improve outcomes



FASD and early life adversity



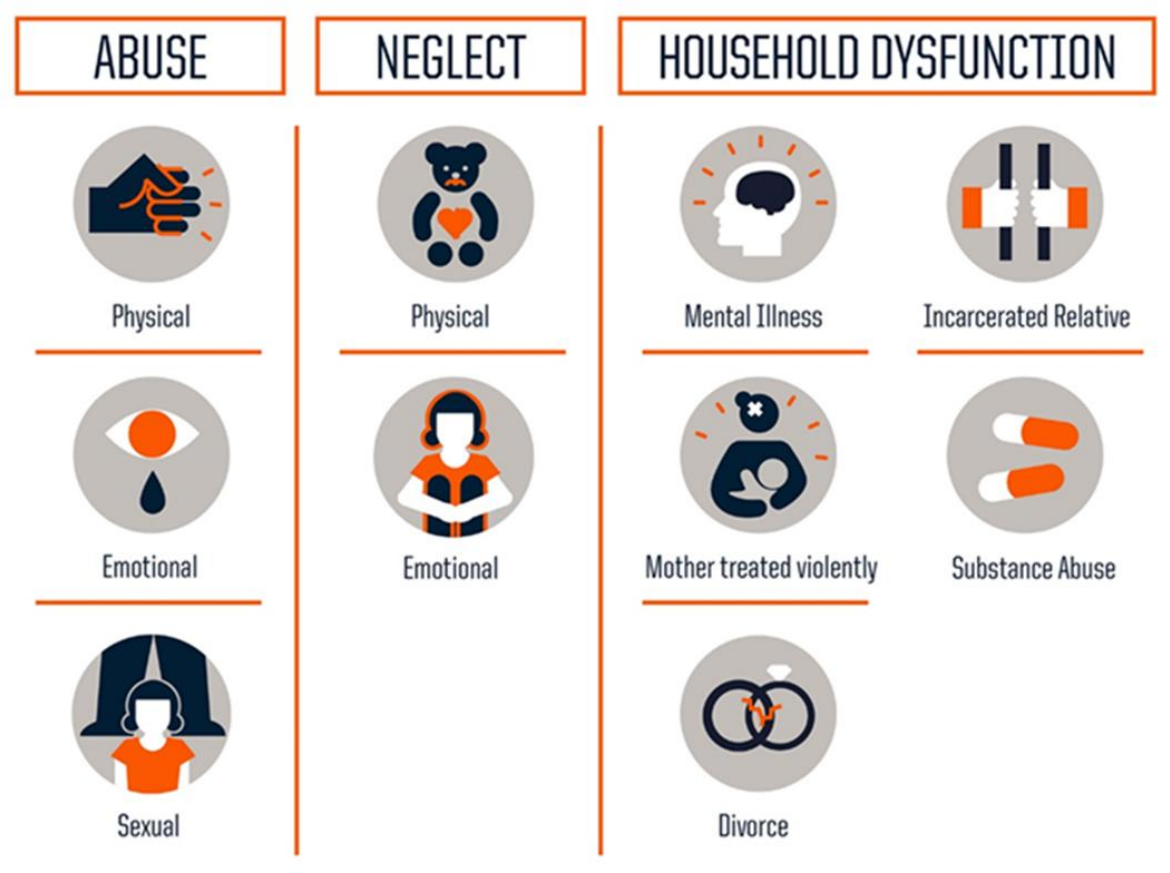
In the general population, around **15%** of people have an ACE score of 4+

In the FASD population, over **40%** of people have an ACE score of 4+

Studies of people with both FASD and ACEs show that prenatal alcohol is a major predictor, often greater than neglect and abuse, in predicting adverse outcomes

References
Madigan et al (2023) Adverse childhood experiences: A meta-analysis of prevalence and moderators among half a million adults in 206 studies
Flannigan et al (2021) Characterizing adverse childhood experiences among children and adolescents with prenatal alcohol exposure and Fetal Alcohol Spectrum Disorder
Tan et al (2021) Adverse Childhood Experiences, Associated Stressors and Comorbidities in Children and Youth with Fetal Alcohol Spectrum Disorder across the Child Protection and Justice Settings in Western Australia.
Price (2019) The Impact of Traumatic Childhood Experiences on Cognitive and Behavioural Functioning in Children with Foetal Alcohol Spectrum Disorders

FASD and early life adversity



In one large clinical study, PAE was shown to predict the following to a greater extent than abuse or household dysfunction:

- Frontal lobe size
- Hippocampus size
- IQ
- Processing speed
- Memory
- Executive function
- Academic achievement
- Behavorial problems
- Anxiety disorder
- ADHD
- Conduct disorder

Reference
Astley-Hemmingway et al (2020) What proportion of the brain structural and functional abnormalities observed among children with fetal alcohol spectrum disorder is explained by their prenatal alcohol exposure and their other prenatal and postnatal risks?

Astley-Hemingway et al 2020

BRAIN STRUCTURE

	Brain Outcome	Proportion of variance explained: Adjusted R^2	Prenatal Risks: Alc: days/ wk	Alc: all 3 Tri	gender	cigs	cocaine	mj	any illicit drugs	Postnatal Risks: # homes	not w/ birth parent	SES: educ	SES: occup	SES: low income	phys abuse	sex abuse
Brain:	Total brain volume (cm3)	.17 .31	2		1											
	Total brain midsaggital area (cm2)	. 20	1													
	Current OFC (cm)	0.26	1													
Frontal Lobe:	Frontal lobe gray matter volume (cm3)	.20 .29 .35 .43	1		2			3							4	
	Frontal lobe white matter volume (cm3)	. 13	1													
	Frontal lobe volume (cm3)	.21 .28	1		2											
Caudate:	R. Caudate volume (cm3)	.30 .39		1					2							
	L. Caudate volume (cm3)	.29 .38		1					2							
	Total Caudate volume (cm3)	.30 .40		1					2							
Putamen:	R. Putamen volume (cm3)	. 08							1							
	L. Putamen volume (cm3)	. 12									1					
	Total Putamen volume (cm3)	. 10									1					
Hippocampus:	R. Hippocampus volume (cm3)	. 34	1													
	L. Hippocampus volume (cm3)	.28 .32	1								2					
	Total Hippocampus volume (cm3)	. 33	1													
Cerebellar Vermis:	Total CV: midsagittal area (cm2)	. 10													1	
	CV: lobules I–V midsagittal area (cm2)	.10 .18 .29			3		2		1							
	CV: lobules VI–VII midsagittal area (cm2)	. 09													1	
	CV: lobules VIII–X midsagittal area (cm2)	. 15				1										
Corpus Callusom:	CC: midsagittal area (cm2)	.13 .23												2		1
	CC: Region 1 (genu) (cm2)	.16 .26												1		2
	CC: Region 2 (cm2)	. 10														1
	CC: Region 3 (cm2)	. 10														1
	CC: Region 4 (cm2)	. 11												1		
	CC: Region 5 (splenium) (cm2)	. 10							1							
	CC: Length (cm)*	.20 (.26)	1													

BRAIN FUNCTION

Soft Neurologic Signs:	QNST-II: Total Score (raw)	. 24	1														
General Intellectual Function:	WISC III Full Scale IQ (ss)	.46 .54 .58	1	3									2				
	WISC III Verbal IQ (ss)	.43 .56 .62	1	3									2				
	WISC III Performance IQ (ss)	.40 .47 .51	1									3			2		
	WISC III Freedom fromDistractability (ss)	.42 .49	1	2													
	WISC III Processing Speed (ss)	.30 .40		1		2											
Academic Acheivement:	WIAT Basic Reading (ss)	. 37		1													
	KeyMath Total (ss)	.42 .53		1									2				
Visuospatial Skills, Visual Memory, Organization:	VMI: Total (ss)	.28 .34		1		2											
	RCFT: Copy (raw)	.19 .25 .32	1								3			2			
	RCFT: Immediate Recall (T)	.28 .38	1											2			
	RCFT: Delayed Recall (T)	.44 .52	1											2			
Executive Function:	DKEFS: Tower, Total Achievement (ss)	. 20											1				
	D-KEFS: Tower, Total RuleViolation (cumulative %tile Rank)	.22 .30 .36												3	1	2	
	D-KEFS: Verbal Fluency Conds 1-3 % Switch Accuracy (ss)	.22 .29			2								1				
	D-KEFS: Color Word Inhibit/Switch Complete Time (ss)	. 12		1													
	D-KEFS: Trails, #/Letter Switch Complete Time (ss)	.31 .42		2		1							1				
	WCST: Total Errors (ss)	.22 .34		1										2			
Visual Memory:	CVLT-C: List A, Total Trials #Correct (T)	.35 .45 .50 .53	1		3								2	4			
	CVLT-C: List A, Trial 1, Free Recall (T)	. 17	1														
Attention:	IVA: Full Response Control Quotient (ss)	.14 .21				1								2			
Language:	TOWK & TOLD (ss)	.40 .48 .55	1	2									3				
	TLC 1 & 2 (ss)	.41 .55		1		2											
Adaptive Behavior:	VABS: Adaptive Behav. Composite (ss)	.46 .52 .56	2	1	3												
	VABS: Socialization (ss)	.46 .50	2	1													
Behavioral Problems:	CBCL: Social Problems (T)	.24 .31		1												2	
	CBCL: Attention Problems (T)	.49 .56	1												2		
	CBCL: Internalizing Problems (T)	.31 .39	2													1	
	CBCL: Externalizing Problems (T)	.29 .34	1						2								
	CBCL: Total Competence (T)	.40 .46 .51	1						3							2	
Caregiver Report of Behavior:	BRIEF: Gen.Execut. Composite (T)	.44 .48	1	2													
	BRIEF: Behavioral Regulation Index (T)	.39 .43	1									2					
Mental Health: DISC # symptoms	Panic Disorder	none															
	Social Phobia	.36 .46			2											1	
	Obsessive Compulsive Disorder	. 20														1	
	Post Traumatic Stress Disorder	. 19														1	
	Schizophrenia	.22 .28											2			1	
	Mania / Hypomania	.41 .47 .52	1										2			3	
	Generalized Anxiety Disorder	.34 .45 .49	2						3				1				
	Attention Deficit/Hyperactivity Disorder	.47 .51	1	2													
	Separation Anxiety Disorder	. 17	1														
	Conduct Disorder	.30 .35	1													2	
	Oppositional Defiant Disorder	. 13	1														

FASD and postnatal adversity

Key messages on FASD and postnatal adversity:

1. Prenatal and postnatal adversity often co-occur
2. When present, prenatal alcohol is likely to be a major part of the reason for cognitive and behavioural differences
3. We (researchers, doctors, social workers, educators, legal/CJS professionals) need to acknowledge the impact of prenatal adversity as well as childhood adversity
4. Someone with a history of adversity may have additional cognitive difficulties that are the result of prenatal brain damage

New paper coming soon from large international group: Future directions in FASD and postnatal adversity; towards a model of **Pre and Postnatal Adversity (PPNA)**

Prenatal	Trauma	Household
Alcohol	Physical abuse	Parent in prison
Drugs	Sexual abuse	Domestic violence
Maternal stress	Emotional abuse	Mental illness
	Physical neglect	Addiction
	Emotional neglect	Separation

SPECIFiC

Stronger support for improved FASD outcomes

Salford Parents and carers Education Course for Improvements in FASD outcomes in Children

Manualised programme

Small, online group sessions with 2 facilitators, about 6-10 participants

Brain-based approach

Written and delivered by people with real life experience

Currently applying for funding for RCT

SPECIFiC

Stronger support for improved FASD outcomes

Parenting programme for caregivers of children with FASD

Parent based on functional age rather than cognitive age

Remember difficulties are due to brain differences

Remember to look after yourself

Provide a lot of structure, routine and consistency so your child knows what to expect and what to do

Identify your child's strengths and interests and help them to pursue them – this could lead to a fruitful hobby or vocation later on

Therapy for children with FASD and early life adversity

No published therapy for this specific population

Chrysalis Associates (Yorks) adapted therapeutic package by reducing talking-based approaches and adding sensory work and parenting component

Theraplay, DDP, EMDR and others

Service evaluations show improvements in children's mental health

Plans underway for development and evaluation project

Chrysalis Associates

Growing Me

Therapeutic Life Story Work delivered by caregiver or other trusted adult

Developed by Growing Me CIC

Grant application submitted to NIHR for phase 2 feasibility trial

- https://growingme.org.uk/

The Animation Curriculum

- Inclusive classroom intervention for neurodiverse children (primary school)
- Developed by Dr Jessica Rutherford
- Funded by The Mohapatra Family Foundation
- Phase 1 (2 classes) complete
- Canada and UK
- Plans for phase 2: *n*=30 schools, funder interested but we need another one…
- https://theanimationcurriculum.com/

Salford FASD https://hub.salford.ac.uk/fasd/

Visit our website to learn more about our research