FASD, Do I need to know about it?

Dr Raja Mukherjee  
Consultant Psychiatrist  
Lead Clinician FASD Behavioural Clinic  
Surrey and Borders Partnership NHS trust  
Raja.mukherjee@sabp.nhs.uk  

www.fasdclinic.com
What is it?
And how can we know it exists?
1. **Fetal Alcohol Syndrome: Confirmed alcohol exposure:**
   • Alcohol Exposure
     • Facial pattern of Short palpebral fissures ≤ 10 percentile, Thin upper lip vermillion, Smooth philtrum
     • Evidence of pre/postnatal growth retardation
     • Evidence of Neurocognitive deficits

2. **Fetal Alcohol Syndrome: No confirmed alcohol exposure**
   • As above but no alcohol exposure found

3. **Partial Fetal Alcohol Syndrome: Confirmed Alcohol Exposure**
   • Not all of the above features are present but neurocognitive and some facial features needed

4. **Alcohol Related Birth Defect (ARBD)**
   • Confirmed maternal alcohol consumption as well as some but not all of the facial features are present however the behavioural features or structural abnormalities are more pronounced.

5. **Alcohol Related Neurodevelopmental Disorder (ARND)**
   • Confirmed maternal alcohol consumption with the absence of growth retardation or facial features and with the neurocognitive features being prominent.

6. **Fetal Alcohol Spectrum Disorders**
   • Umbrella term. Not a diagnostic term

**Other Terms to be discussed later**
Countries where FASD has been assessed in literature:
And shows a similar profile
BRIEF Scores from UK and Canada (Mohamed et al 2017)

For a better life
Alcohol as a Teratogen
A risk factor damaging brain and body
How genetics works

- Genes
- Amino Acids
- Proteins
- Organs
Abnormal genetics

Genes Faulty

Amino – Acids
coded incorrectly

Incorrect Proteins

Organs Malformed
How a Teratogen has effect

Genes

Amino Acids

Teratogen e.g.
Alcohol

Abnormal Proteins
So how much is too much?
And if so which groups?
Global prevalence of alcohol consumption in pregnancy
Popova et al 2017

Top 5 countries % consumption
• Ireland 60.4
• Belarus 46.6
• Denmark 45.8
• UK 41.3
• Russia 36.5
Alcohol health risks – how much is too much?

Men who regularly* drink:
- over 8 Units per day (over 50 units per week) → HIGHER RISK
- over 3-4 Units per day → INCREASING RISK
- no more than 3-4 Units per day → LOWER RISK

Women who regularly* drink:
- over 6 Units per day (over 35 units per day) → HIGHER RISK
- over 2-3 Units per day → INCREASING RISK
- no more than 2-3 Units per day → LOWER RISK

Table 1

<table>
<thead>
<tr>
<th>Condition</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liver cirrhosis</td>
<td>13.0 times</td>
<td>13.0 times</td>
</tr>
<tr>
<td>Mouth cancer</td>
<td>5.4 times</td>
<td>5.4 times</td>
</tr>
<tr>
<td>Larynx cancer</td>
<td>4.9 times</td>
<td>4.9 times</td>
</tr>
<tr>
<td>Oesophagus cancer</td>
<td>4.4 times</td>
<td>4.4 times</td>
</tr>
<tr>
<td>Hypertension</td>
<td>4.1 times</td>
<td>2.0 times</td>
</tr>
<tr>
<td>Liver cancer</td>
<td>3.6 times</td>
<td>3.6 times</td>
</tr>
<tr>
<td>Haemorrhagic stroke</td>
<td>3.6 times</td>
<td>3.3 times</td>
</tr>
<tr>
<td>Ischaemic stroke</td>
<td>3.0 times</td>
<td>2.7 times</td>
</tr>
<tr>
<td>Cardiac arrhythmias</td>
<td>2.2 times</td>
<td>2.2 times</td>
</tr>
<tr>
<td>Breast cancer (women)</td>
<td>–</td>
<td>1.6 times</td>
</tr>
<tr>
<td>Coronary heart disease (CHD in middle age)</td>
<td>1.7 times</td>
<td>1.3 times</td>
</tr>
<tr>
<td>Colo-rectal cancer</td>
<td>1.5 times</td>
<td>1.4 times</td>
</tr>
</tbody>
</table>

Figures are for men drinking 60g+/day and women drinking 40g+/day; relative risk compared with zero drinking, except for CHD (which is compared to occasional or very light drinkers). Source: P. Anderson (2008) (Unpublished, DH).
My Doctor said "Only 1 glass of alcohol a day". I can live with that.
Mukherjee et al 2011

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Alcohol and Myelin

- Clinically delayed myelination it has been observed
- Riikonen et al., 1999

- alcohol-induced delayed myelination are due to the delayed expression of myelin basic protein (MBP) and transferrin
- Ozer et al., 2000

- Effect is decreased speed of neural processing
2. Migration

Note that differentiation is going on as neurons migrate.

 Courtesy of Diana S. Woodruff-Pak, Ph.D.
Alcohol effects migration of cortical neurons

Control

Alcohol

Courtesy of MW Miller
CIFASD DTI studies

Fiber tract reconstruction of the corpus callosum

Control  Prenatal ethanol exposure
The greater the demand the more the challenge

- Cognitive flexibility is an issue
- When combined with wider executive deficits leads to problems, e.g. holding and manipulating information
- Also affected by wider ability
fMRI

Controls | ARND | Dys PAE
---|---|---
Left hand response to Same side stimulation (LS)

Right hand response to Same side stimulation (RS)

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Results: ‘Opposite’ Condition

<table>
<thead>
<tr>
<th>Controls</th>
<th>ARND</th>
<th>Dys PAE (FAS)</th>
</tr>
</thead>
</table>

Left hand response to Opposite side stimulation (LO)

Significant difference between FAS and Control groups in premotor area

<table>
<thead>
<tr>
<th>Controls</th>
<th>ARND</th>
<th>Dys PAE (FAS)</th>
</tr>
</thead>
</table>

Right hand response to Opposite side stimulation (RO)

Significant difference between FAS and Control groups in primary motor (arrows) and premotor areas

Slide courtesy of CIFASD and E Riley
FASD fail to fully engage frontal and parietal cortex in the processing of CS+.

Enhanced activation to US reflects lack of prediction of the CS+/US relationship.
Conclusions about risk (not safety)

- High Levels High Risk
- Low Levels Low Risk
- No Alcohol No Risk

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Drinking guidance update

This is what 14 units looks like:
- 6 pints of 4% beer
- 6 glasses of 13% wine

**BUT** don’t ‘save up’ your 14 units, it’s best to spread evenly across the week & have regular drink-free days.

If you’re pregnant you shouldn’t drink alcohol at all

Keep the short-term health risks low by:
- limiting the total amount of alcohol in one session
- drinking more slowly, alternating with food and/or water

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Is it common then
Examples of recent prevalence studies

<table>
<thead>
<tr>
<th></th>
<th>Prevalence Rates /1000 population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FAS</td>
</tr>
<tr>
<td>S Africa</td>
<td>59.2</td>
</tr>
<tr>
<td>Western Cape 2002</td>
<td></td>
</tr>
<tr>
<td>Italy 2006</td>
<td>6.2</td>
</tr>
<tr>
<td>Croatia 2010</td>
<td>6.4</td>
</tr>
</tbody>
</table>
Prevalence in LAC/ adoption group

- Prevalence study using 4 digit assessment tool USA, 10-15/1000 (Astley et al 2002)
- 30% of ethic minority adopted population thought to have prenatal alcohol exposure (Selwyn and Wijedesa 2011)
- Data collected 547 foster and adopted children. 156 met criteria FASD (29%) of which 86.5% undiagnosed (Charnoff 2015)
- Meta analysis 16% LAC FASD (Popova 2015)
- Peterborough 55/160(34%) LAC group and 34/45 adoption reports (75%) FASD (Gregory 2015)
- ALSPAC data (Mcguire 2017 conference presentation)
How it presents

Mukherjee et al JRSM 2006
Gray and Mukherjee JMHLD 2007
Comorbidity of FASD

Svetlana Popova PhD*1,2,3,4, Shannon Lange MPH1,4, Kevin Shield MHSc1,4, Alanna Mihic MSc2, Albert E. Chudley MD5, Raja A. S. Mukherjee, PhD6, Dennis Bekmuradov BA7, and Jürgen Rehm PhD1,2,4,8

The Lancet Jan 5 2016
Main findings

- 5068 studies identified of which 127 met criteria for inclusion
- 428 comorbid conditions linked to FASD
- From 18/22 chapters of ICD10
- Important consideration clinically and research
Co morbidity pooled estimates 1

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Co morbidity pooled estimates 2

Visual impairments

Hearing issues

Surgical issues e.g. hernia

Other congenital abnormalities

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Developmental Divergence by age

For a better life
Diagnostic process
Comparison between diagnostic Tools

<table>
<thead>
<tr>
<th></th>
<th>CDC</th>
<th>IOM revised</th>
<th>Canadian</th>
<th>4 Digit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Face</strong></td>
<td>10&lt;sup&gt;th&lt;/sup&gt; percentile PFL and rank 4/5 on lip philtrum</td>
<td>10&lt;sup&gt;th&lt;/sup&gt; percentile PFL and rank 4/5 on lip philtrum</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; percentile PFL and rank 4/5 on lip philtrum</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; percentile PFL and rank 4/5 on lip philtrum</td>
</tr>
<tr>
<td><strong>Growth</strong></td>
<td>Pre / post natal growth below 10&lt;sup&gt;th&lt;/sup&gt; percentile</td>
<td>Pre / post natal growth below 10&lt;sup&gt;th&lt;/sup&gt; percentile</td>
<td>Pre / post natal growth below 10&lt;sup&gt;th&lt;/sup&gt; percentile</td>
<td>Pre / post natal growth below 10&lt;sup&gt;th&lt;/sup&gt; percentile</td>
</tr>
<tr>
<td><strong>Neurological</strong></td>
<td>1 out of several brain parameters including OFC &lt;10 %, CNS deficits</td>
<td>1 out of I brain parameters including OFC &lt;10 %, CNS deficits</td>
<td>3+ soft hard neurological signs</td>
<td>1 out of several brain parameters including OFC &lt;3 %, CNS deficits</td>
</tr>
<tr>
<td><strong>Alcohol</strong></td>
<td>Confirmed or unknown</td>
<td>Confirmed to be excessive or unknown</td>
<td>Confirmed or unknown</td>
<td>Confirmed or unknown</td>
</tr>
</tbody>
</table>
New proposed Criteria DSM V

- DSM V included FASD for first time
- FAS had been in ICD but not ARND
- Not main category
- Condition for more study

- Neurobehavioural Disorder associated with PAE I (NBD PAE)
- Effectively ARND
- 7 Domains
Facial features

THE FACE OF FETAL ALCOHOL SYNDROME

Features on the left side of the illustration are considered definitive of FAS. Characteristics on the right side are associated with FAS, but not enough to determine the presence of the syndrome. These facial features only occur during specific days in pregnancy. If a mother does not drink at that time, the discriminating FAS features will not appear.

Discriminating Features
- Head circumference below 3%
- Microcephaly
- Short eye slits
- Short palpebral fissures
- Flat midface
- Absent groove
- Indistinct philtrum
- Thin upper lip

Associated Features
- Skin folds on inner eye corner
- Epicanthal folds
- Low nasal bridge
- Low set, pointed ears
- Minor ear anomalies
- Short nose
- Smaller jaw
- Micrognathia

In the young child. Streissguth and Little (1984)
Critical periods and facial features

Normal  Alc--Day 7  Alc--Day 8

Fetus

Neonate

Modified from Sulik et al.

Slides Courtesy of Professor E Riley University of San Diego
Development of the Embryo

Coles, 1994
The next stage: 3D
Areas to consider

What else you need to think about
Diagnostic pathway: information gathering

Reliable evidence of alcohol exposure y/n

Have other disorders been excluded y/n

Collate previous Cognitive and educational information

Obtain all past records that are allowed

Clinical genetics for CGH array and/or facial diagnosis

Insufficiently robust evidence Cannot make diagnosis

Enter assessment phase
Other factors to consider

- Smoking
  - Size and brainstem mainly

- Opiates
  - Opiate and ACH in Limbic system

- Cocaine
  - Frontal dopamine circuits

- Others

- Principle: Know biological effects and see if they fit but need to rule out

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### TABLE 2  Summary of Effects of Prenatal Drug Exposure

<table>
<thead>
<tr>
<th></th>
<th>Nicotine</th>
<th>Alcohol</th>
<th>Marijuana</th>
<th>Opiates</th>
<th>Cocaine</th>
<th>Methamphetamine</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short-term effects/birth outcome</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fetal growth</td>
<td>Effect</td>
<td>Strong effect</td>
<td>No effect</td>
<td>Effect</td>
<td>Effect</td>
<td>Effect</td>
</tr>
<tr>
<td>Anomalies</td>
<td>No consensus on effect</td>
<td>Strong effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
</tr>
<tr>
<td>Withdrawal</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>Strong effect</td>
<td>No effect</td>
<td>*</td>
</tr>
<tr>
<td>Neurobehavior</td>
<td>Effect</td>
<td>Effect</td>
<td>Effect</td>
<td>Effect</td>
<td>Effect</td>
<td>Effect</td>
</tr>
<tr>
<td><strong>Long-term effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth</td>
<td>No consensus on effect</td>
<td>Strong effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No consensus on effect</td>
<td>*</td>
</tr>
<tr>
<td>Behavior</td>
<td>Effect</td>
<td>Strong effect</td>
<td>Effect</td>
<td>Effect</td>
<td>Effect</td>
<td>Effect</td>
</tr>
<tr>
<td>Cognition</td>
<td>Effect</td>
<td>Strong effect</td>
<td>Effect</td>
<td>No consensus on effect</td>
<td>Effect</td>
<td>*</td>
</tr>
<tr>
<td>Language</td>
<td>Effect</td>
<td>Effect</td>
<td>No effect</td>
<td>*</td>
<td>Effect</td>
<td>*</td>
</tr>
<tr>
<td>Achievement</td>
<td>Effect</td>
<td>Strong effect</td>
<td>Effect</td>
<td>*</td>
<td>No consensus on effect</td>
<td>*</td>
</tr>
</tbody>
</table>

* Limited or no data available.
Exploring the impact of Neglect and FASD

PAE

Both

Neglect

Outcomes
Exploring the impact of Neglect and FASD
Neurodevelopmental outcomes seen (no significant difference between groups)

<table>
<thead>
<tr>
<th>Neurodevelopmental outcome</th>
<th>No neglect</th>
<th>Some neglect (up to 6 months)</th>
<th>Prolonged neglect</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Autism spectrum disorder (ASD) or social communication disorder (SCD)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No ASD/SCD</td>
<td>10 (34.5%)</td>
<td>5 (35.5%)</td>
<td>14 (26.6%)</td>
<td>29 (31.9%)</td>
</tr>
<tr>
<td>ASD/SCD</td>
<td>19 (65.5%)</td>
<td>8 (61.5%)</td>
<td>35 (71.4%)</td>
<td>62 (68.1%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>29</td>
<td>13</td>
<td>49</td>
<td>91</td>
</tr>
<tr>
<td><strong>Attention deficit hyperactivity disorder (ADHD)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No ADHD</td>
<td>9 (28.1%)</td>
<td>3 (23.1%)</td>
<td>13 (25.0%)</td>
<td>25 (25.8%)</td>
</tr>
<tr>
<td>ADHD</td>
<td>23 (71.9%)</td>
<td>10 (76.9%)</td>
<td>39 (75.0%)</td>
<td>72 (74.2%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>32</td>
<td>13</td>
<td>52</td>
<td>97</td>
</tr>
</tbody>
</table>
Short Sensory profile (no significant differences seen)
Exploring the impact of Neglect and FASD

PAE

Both

Neglect

Outcomes

For a better life
Henry et al 2007

- Specialist MDT assessment of children
  - PAE + Neglect
  - Neglect alone

- Both had been studied but not together

- Retrospective study 274 children 6-16 Michigan area

Comparing PAE with Neglect to neglect alone

- severe neurodevelopmental deficits in language, memory, visual processing, motor skills, and attention greater oppositional/defiant behaviour,
- inattention, hyperactivity, impulsivity
- social problem
Cause or Effect?
Aetiology vs phenomenology

Fitting into a neurodevelopmental profile
Top down or bottom up?

Top Down: Phenomenology

Symptoms / Function

Bottom Up: Aetiology

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Cluster of Symptoms

- Inattention
- Poor Planning
- Receptive language deficits
- Hyperactivity
- Cognitive flexibility problems
- Poor imagination
- Impulsivity
- Poor social understanding
- obsessionality
- Expressive language deficits
- Tics
- Working Memory deficits

For a better life
Cluster of Symptoms: ADHD

Inattention  Hyperactivity  Impulsivity

Poor Planning  Tics

Cognitive flexibility problems

Receptive language deficits

Expressive language deficits

Poor social understanding

Poor imagination  obsessionality  Working Memory deficits

For a better life
Cluster of Symptoms: ASD

Inattention

Impulsivity

Hyperactivity

Poor Planning

Inattention

Impulsivity

Hyperactivity

Poor Planning

Obsessionality

Receptive language deficits

Expressive language deficits

Poor social understanding

Cognitive flexibility problems

Poor imagination

For a better life
Cluster of Symptoms: ASD / ADHD

- Inattention
- Hyperactivity
- Impulsivity

- Receptive language deficits
- Expressive language deficits
- Poor social understanding
- Poor imagination

- Poor Planning
- Cognitive flexibility problems
- obsessionality
- Tics
- Working Memory deficits
Cluster of Symptoms: FASD

- Inattention
- Hyperactivity
- Impulsivity
- Obsessionality
- Tics
- Poor Planning
- Receptive language deficits
- Cognitive flexibility problems
- Working Memory deficits
- Expressive language deficits
- Poor social understanding
- Poor imagination

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Relationship between disorders

(Relationship between disorders)

(Chapter 13 FASD Inter professional perspectives Raja Mukherjee)
57.4% of group meet criteria for DSMV ASD using DISCO

**SCQ % scoring**
- 46.7 >15
- 54.7 >13
- 62.7 >11
- Median 15
- IQR 11
- Range 1-32

No difference by Age, Gender, IQ level or parent type

---

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An example of complexity that needs to be understood

Different types of social functioning in people on the Autistic Spectrum

- Angelmans
- Runbenstein Taybi
- Fragile X

High

Low

Oliver et al 2012
Type of Social Impairment
From DISCO scoring

Wider ASD spectrum

For a better life
An example of complexity that needs to be understood

Different types of social functioning
In people on the Autistic Spectrum

- Angelmans
- Runbenstein Taybi
- Cornelia De Lange
- Fragile X
- FASD

Oliver et al 2012
ADHD

72.1% present with ADHD

N=86

No significant difference by age or diagnosis

<table>
<thead>
<tr>
<th>DSM V 314.01 ADHD Combined</th>
<th>DSM V 314.00 ADHD Inattentive Type</th>
<th>DSM V ADHD Hyperactive Impulsive type 314.01</th>
<th>Did not meet criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>41</td>
<td>2</td>
<td>24</td>
</tr>
</tbody>
</table>

Chi 2= 6.306, df =2, p= 0.043
### Single item analysis of ADHD diagnostic criteria: inattentive symptoms

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Percentage of Group meeting Criteria (%)</th>
<th>Total in group (86)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not pay attention</td>
<td>50 (58.1)</td>
<td></td>
</tr>
<tr>
<td>Fail to stick at task</td>
<td>13 (15.1) Can stick to self directed activity</td>
<td></td>
</tr>
<tr>
<td>Not listen when spoken to</td>
<td>47 (54.7)</td>
<td></td>
</tr>
<tr>
<td>Fail to Finish an instruction</td>
<td>61 (70.9)</td>
<td></td>
</tr>
<tr>
<td>Difficulties planning</td>
<td>75 (87.5)</td>
<td></td>
</tr>
<tr>
<td>Avoid areas find difficult</td>
<td>74 (86)</td>
<td></td>
</tr>
<tr>
<td>Loose things needed for task</td>
<td>63 (73.3)</td>
<td></td>
</tr>
<tr>
<td>Easily distracted</td>
<td>77 (89.5)</td>
<td></td>
</tr>
<tr>
<td>Forgetful</td>
<td>66 (76.7)</td>
<td></td>
</tr>
</tbody>
</table>
## Single item analysis of ADHD diagnostic criteria: Hyperactive impulsive criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Percentage of Group meeting Criteria (%)</th>
<th>Total in group (86)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sits fidgeting</td>
<td>55 (64)</td>
<td></td>
</tr>
<tr>
<td>Gets up when should sit down</td>
<td>30 (34.9)</td>
<td></td>
</tr>
<tr>
<td>Not stay still / squirm</td>
<td>29 (33.7)</td>
<td></td>
</tr>
<tr>
<td>Cannot be quiet</td>
<td>31 (36)</td>
<td></td>
</tr>
<tr>
<td>Driven by a motor</td>
<td>19 (22.1)</td>
<td></td>
</tr>
<tr>
<td>Talk excessively</td>
<td>32 (37.2)</td>
<td></td>
</tr>
<tr>
<td>Blurt out answers</td>
<td>55 (64)</td>
<td></td>
</tr>
<tr>
<td>Difficulties waiting turn</td>
<td>48 (55.8)</td>
<td></td>
</tr>
<tr>
<td>Interrupts others</td>
<td>71 (82.6)</td>
<td></td>
</tr>
</tbody>
</table>
Short Sensory profile (W.Dunn) n=48
The problem single clinic pathways : 1/4 missed

ADHD

27

73

ASD

40

60

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So what if we miss it?
It is everything getting on top on the person that leads to them kicking off!

Person with FASD over aroused

- Trauma
- Auditory filtering
- Cognitive flexibility problems
- Executive deficits
- Social communication difficulties
- Sensation seeking
- Communication

For a better life
## Vineland adaptive behaviour schedule: adaptive age scores (n=51)

<table>
<thead>
<tr>
<th>Domain</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>6.10</td>
<td>16.00</td>
<td>9.93 (95%CI)</td>
</tr>
<tr>
<td><strong>Receptive language</strong></td>
<td>1.1</td>
<td>8.6</td>
<td>3.3 (2.8-3.6)</td>
</tr>
<tr>
<td><strong>Expressive language</strong></td>
<td>2.9</td>
<td>13.0</td>
<td>5.4 (4.9-5.9)</td>
</tr>
<tr>
<td><strong>Written Language</strong></td>
<td>4.5</td>
<td>14</td>
<td>8.1 (7.4-8.8)</td>
</tr>
<tr>
<td><strong>Personal Daily living Skills</strong></td>
<td>2.9</td>
<td>11.3</td>
<td>5.4 (4.8-6.0)</td>
</tr>
<tr>
<td><strong>Domestic Daily living skills</strong></td>
<td>1.0</td>
<td>20</td>
<td>6.2 (5.3-7.1)</td>
</tr>
<tr>
<td><strong>Community skills</strong></td>
<td>2.5</td>
<td>16.3</td>
<td>6.9 (6.2-7.6)</td>
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<tr>
<td><strong>Interpersonal skills</strong></td>
<td>0.9</td>
<td>13.6</td>
<td>4.3 (3.7-5.0)</td>
</tr>
<tr>
<td><strong>Play/ leisure socialisation</strong></td>
<td>1.1</td>
<td>13.6</td>
<td>4.7 (3.9-5.5)</td>
</tr>
<tr>
<td><strong>Coping</strong></td>
<td>1.1</td>
<td>12.6</td>
<td>4.4 (3.8-5.1)</td>
</tr>
</tbody>
</table>
## Secondary Disabilities

<table>
<thead>
<tr>
<th>Disability</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychiatric problem</td>
<td>90</td>
</tr>
<tr>
<td>Disrupted School experience</td>
<td>60</td>
</tr>
<tr>
<td>Trouble with the law</td>
<td>60</td>
</tr>
<tr>
<td>Confinement</td>
<td>50</td>
</tr>
<tr>
<td>Inappropriate sexual behaviour</td>
<td>50</td>
</tr>
<tr>
<td>Alcohol /Drug problems</td>
<td>30</td>
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</tbody>
</table>

Streissguth et al 1996, 2000
An estimate of the cost of FAS/FASD in the UK, England and Blue Light partner areas
Alcohol Concern 2014

<table>
<thead>
<tr>
<th>Area of usual residence</th>
<th>Total live births 2012</th>
<th>FAS births</th>
<th>FASD births</th>
<th>Annual of cost FAS to area</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNITED KINGDOM</td>
<td>812,970</td>
<td>1625.9</td>
<td>7316.7</td>
<td>£2,438,850,000</td>
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<tr>
<td>ENGLAND</td>
<td>694,241</td>
<td>1388.5</td>
<td>6248.2</td>
<td>£2,082,750,000</td>
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<tr>
<td>Northumberland UA</td>
<td>3,151</td>
<td>6.3</td>
<td>28.4</td>
<td>£9,450,000</td>
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<tr>
<td>Newcastle upon Tyne</td>
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<td>6.6</td>
<td>30.8</td>
<td>£10,200,000</td>
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<tr>
<td>South Tyneside</td>
<td>1,675</td>
<td>3.4</td>
<td>15.1</td>
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<tr>
<td>Blackpool UA</td>
<td>1,770</td>
<td>3.5</td>
<td>15.9</td>
<td>£5,250,000</td>
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<tr>
<td>Wigan</td>
<td>3,731</td>
<td>7.5</td>
<td>33.6</td>
<td>£11,250,000</td>
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<tr>
<td>Liverpool</td>
<td>5,942</td>
<td>11.9</td>
<td>53.5</td>
<td>£17,850,000</td>
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<tr>
<td>North Lincolnshire UA</td>
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<td>3.9</td>
<td>17.6</td>
<td>£5,850,000</td>
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<tr>
<td>Lincolnshire</td>
<td>8,008</td>
<td>16.0</td>
<td>72.1</td>
<td>£24,000,000</td>
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<tr>
<td>Herefordshire, County of UA</td>
<td>1,906</td>
<td>3.8</td>
<td>17.2</td>
<td>£5,700,000</td>
</tr>
<tr>
<td>Shropshire UA</td>
<td>2,912</td>
<td>5.8</td>
<td>26.2</td>
<td>£8,700,000</td>
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<tr>
<td>Warwickshire</td>
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<tr>
<td>Dudley</td>
<td>3,966</td>
<td>7.9</td>
<td>35.7</td>
<td>£11,850,000</td>
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<tr>
<td>Southend-on-Sea UA</td>
<td>2,345</td>
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<tr>
<td>Thurrock UA</td>
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<tr>
<td>Suffolk</td>
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<td>16.6</td>
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<td>£24,900,000</td>
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<tr>
<td>Hackney and City of London</td>
<td>4,585</td>
<td>9.2</td>
<td>41.3</td>
<td>£13,800,000</td>
</tr>
<tr>
<td>Medway UA</td>
<td>3,693</td>
<td>7.4</td>
<td>33.2</td>
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<tr>
<td>Hampshire</td>
<td>15,400</td>
<td>30.8</td>
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<td>£46,200,000</td>
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<tr>
<td>Surrey</td>
<td>14,237</td>
<td>28.5</td>
<td>128.1</td>
<td>£42,750,000</td>
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<tr>
<td>Bath and North East Somerset UA</td>
<td>1,867</td>
<td>3.7</td>
<td>16.8</td>
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</tr>
<tr>
<td>Wiltshire UA</td>
<td>5,378</td>
<td>10.8</td>
<td>48.4</td>
<td>£16,200,000</td>
</tr>
</tbody>
</table>
The “So what” question!!
How will it change my management
New publication on management Young et al 2016
Available on my research gate site

For a better life
Intervention areas

Psychological
Social
Educational
Biological

For a better life
Intervention areas

Psychological

Social

Educational

Biological

For a better life
Red Flags

Rarely present as FASD but knowing FASD modifies treatment response

- Complex NDD
- Non typical response to medication
- Hx of LAC / adoption and fostering
- Inattentive/ impulsive subtype with higher level of social communication issues and sensory problems than typical ADHD
Treatment pathway
Principles

» Try non pharmacological strategies first

» Then if well try stimulant
  » Principle of when needed and dose release
  » Methylphenidate / dexamphetamine choice

» If not working then re think and look if other things affecting situation

» Then change/ add
Additions if more complex presentation

Review, re-assess and consider alternative medications and treatments

**ASD**
- Stop stimulant
- Atomoxetine
- Clonadine
- Guanfacine

**Mood/Anxiety**
- Add low dose of liquid fluoxetine
- Atomoxetine

**Complex learning disorder**
- Use an educational and neuropsychology intervention

**Intermittent Explosive Disorder**
- Add mood stabiliser

**Conduct Disorder**
- Add mood stabiliser
FASD Clinic

Welcome to our Foetal Alcohol Spectrum Disorders clinic

Foetal Alcohol Spectrum Disorders (FASDs) describes a range of effects that can occur in an individual who was exposed to alcohol in the womb.

For a better life