

# Prevalence of ASD in Prisons

Louise Robinson

Consultant Forensic Psychiatrist Lancashire Care NHS Foundation  
Trust and Honorary Senior Lecturer UOM

Royal College of Psychiatrists  
Forensic Faculty Conference 2019

# Outline

- Research on one screening instrument
- Review prevalence literature: 4 prevalence studies

## Background

- Concerns possible high rates/ under-diagnosis in prisons (Hawes 2003, Myers 2004, Ashworth BMJ 2016)
- Community prevalence 1 % adults (Brugha et al 2011), higher in men 1.8% (Brugha 2009)

# Prevalence Studies

- Representative sample
- Reliable and valid assessments

# **Evaluation of a Screening Instrument for Autism Spectrum Disorders in Prisons Robinson et al 2012**

Is a tool designed to screen for ASD in prisons effective in the Scottish prison population?

# Screening Instrument

- Wing L., Howlin P., Cullen C., Crocombe J., Brugha T, Mills R.
- Based on Asperger Syndrome (and High Functioning Autism) Diagnostic Interview (ASDI)(Gillberg 2001)
- Prison officers, 20 items, 1.5 minutes

# Validation

- Adult Autism Spectrum Quotient (AQ) (Baron-Cohen et al);
- Asperger Syndrome (and High-Functioning Autism) Diagnostic Interview (ASDI) (Gillberg et al, 2001)
- Ekman 60 faces Test (Young et al, 2002, Sprengelmeyer et al 2006)

# Adult Autism Spectrum Quotient (AQ)

(Baron-Cohen et al 2001)

- 50 item self-report questionnaire
- Mild autistic traits in adults of normal intelligence
- 80% ASD 32+/ 2% random controls in general population  
Level where further ix recommended by authors
- Not designed for forensic populations, evidence for use forensic secure services



# Asperger Syndrome (and High-Functioning Autism) Diagnostic Interview (ASDI)

- Structured clinical interview
- First-degree relative

# The Ekman 60 Test

## Facial Emotion Recognition (Young et al., 2002; Sprengelmeyer et al., 1996)

Anger

Happiness

Fear

Sadness

Surprise

Disgust



## Methods

- Staff screened prisoners on wings
- Scored tool
- Interview group scoring above cut-off on tool with measures
- Compare with those scoring 0
- Interview within a week

# Results

**12** publicly-run prisons



**2458** screened (40%)



126 interviews (AQ and Ekman)



44 relative interviews (ASDI)

# Screening Tool Scores (All Prisons)

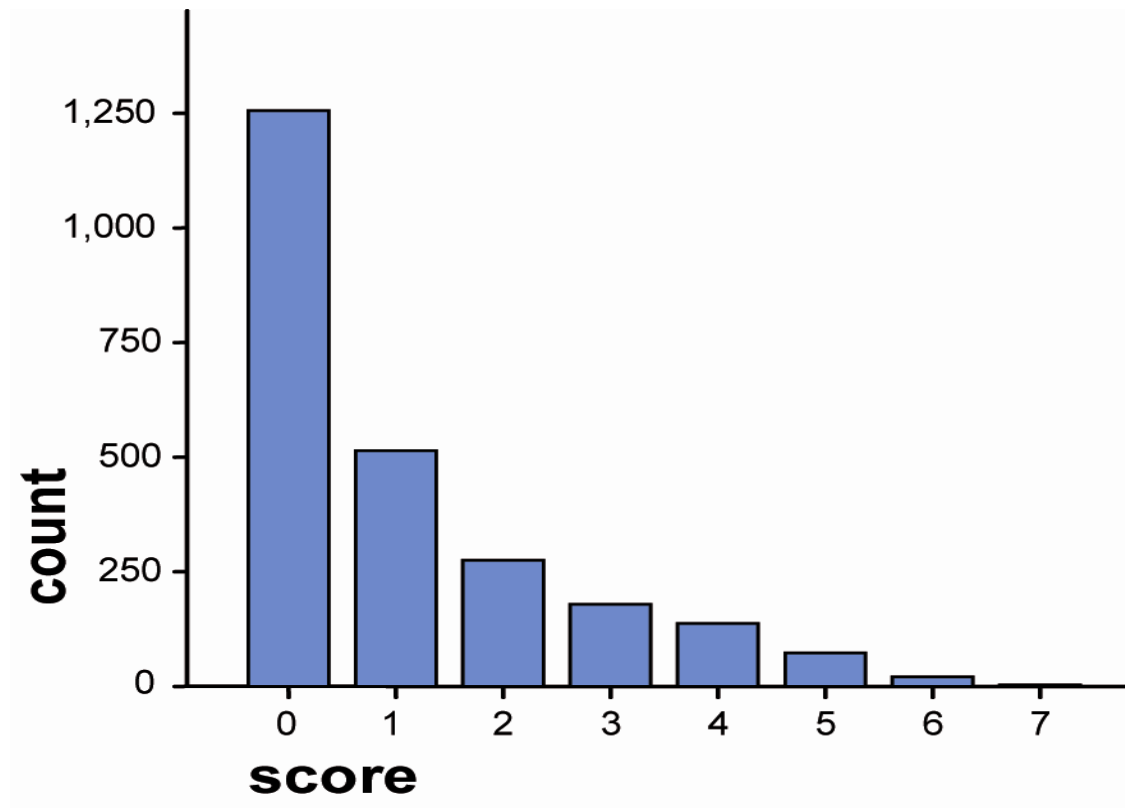
N=2458

Median 0

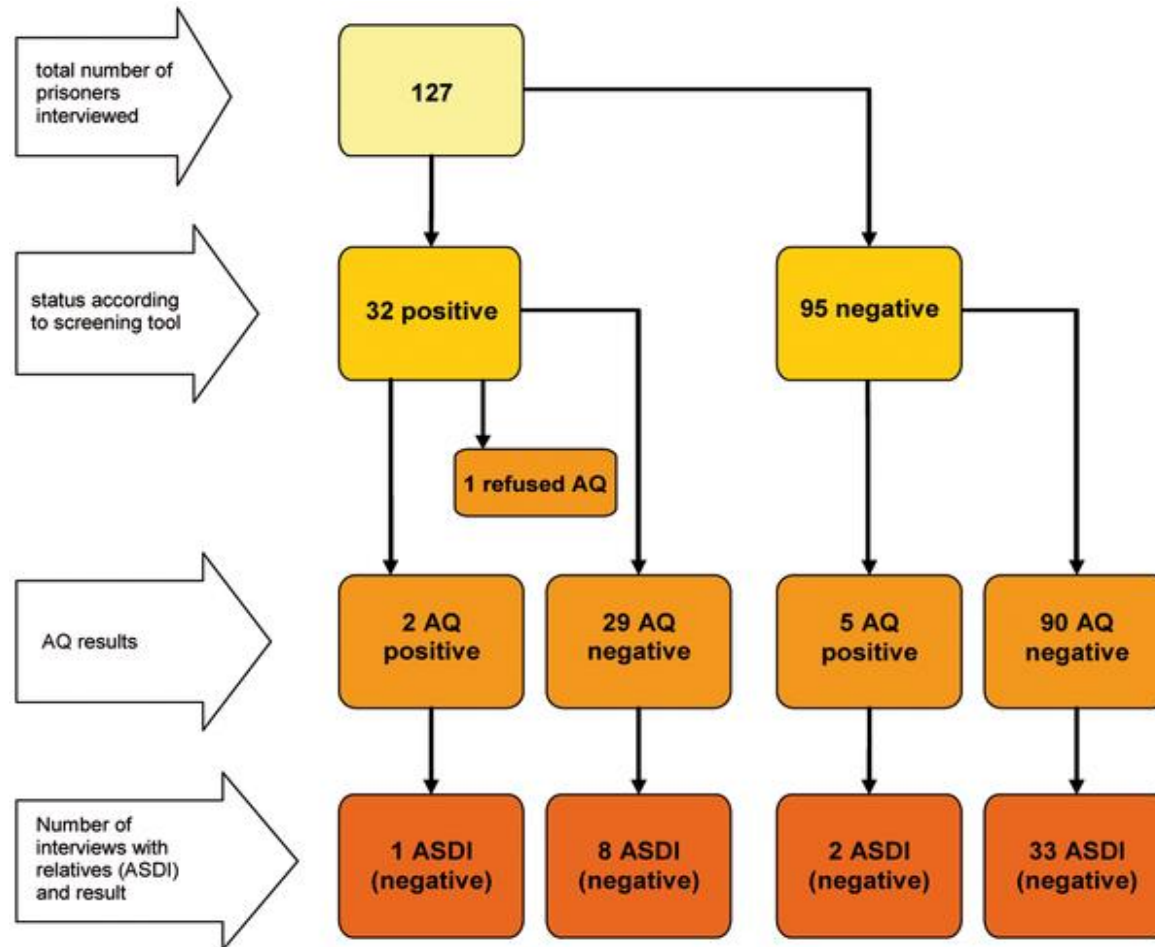
IQ range 0-2

**4% (98) 5 or more**

Reliability ICC<0



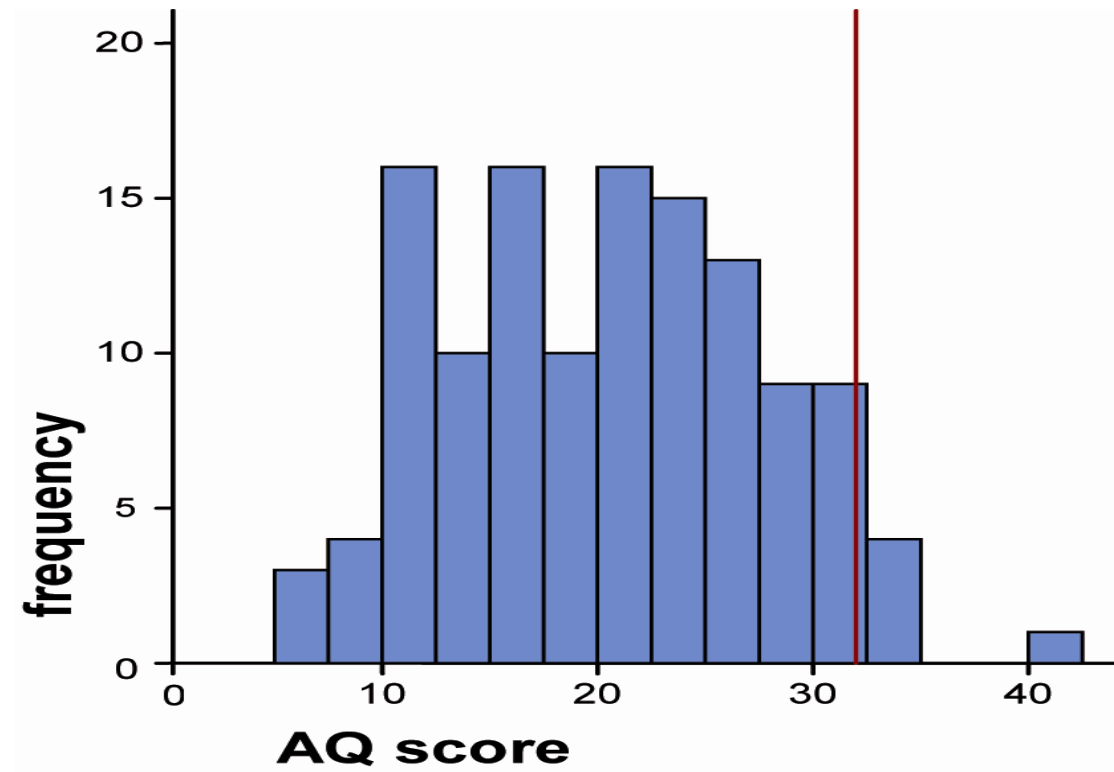
# Summary of screening tool, AQ and ASDI results



# Adult Autism Quotient (AQ) Score

Mean 20.1 (6-41)

7 of 126 (5.7%)  
scored 32 or  
above



# Screening Tool

- Correlated with AQ  $r_s = 0.177$  ( $p < 0.05$ ), ASDI  $r_s = 0.470$  ( $p < 0.01$ )
- No correlation IQ or Ekman

Where AQ 32 or more=case

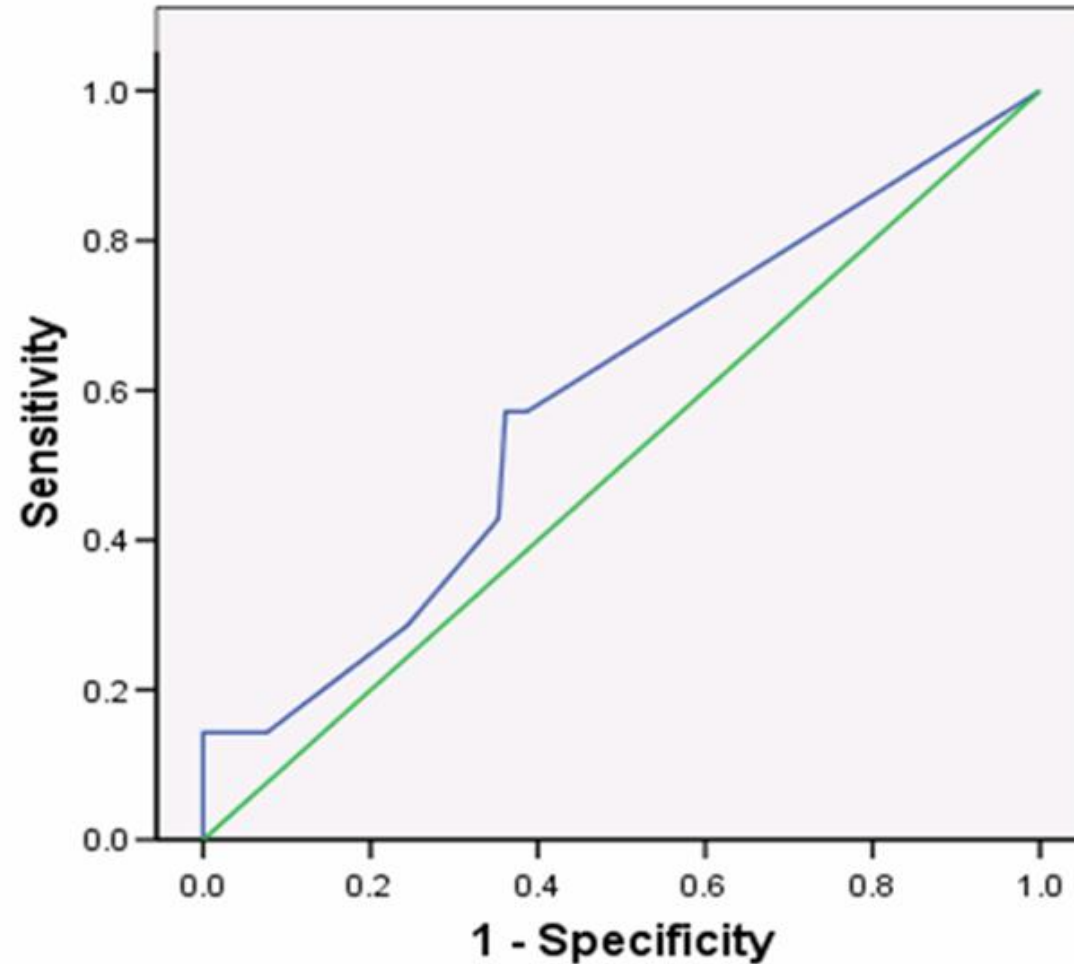
- **Sensitivity** (true positive rate- how many with condition are identified) **28.6%**
- **Specificity** (true negative rate- how many without condition are correctly identified) **75.6%**



# Screening Tool

AUC 59.6%

At cut-off of 5:  
sensitivity 28.6%  
specificity 75.6%



# Conclusions

- Low sensitivity for finding those with AQ over 32
- Not recommended
- 7 of 126 (total interviewed, selected group) scored 32 or above on AQ **5.7%**
- No positive ASDI (44) even in those scoring over 32 on AQ (9)
- Still no effective validated screening tool

## Ginsberg 2010

- ADHD prevalence study
- High-secure prison Sweden
- 30 men with ADHD
- 7 ASD

## Fazio et al 2012

- US high-secure prison study
- AQ
- N= 431 men
- Cut-off score  $\geq 32$
- 4.4% scored 32 or above

## Underwood et al 2016

240 male prisoners in London, including staff/self-referral

AQ-20 screen; if scored  $\geq 10$ :

- Autism Diagnostic Observation Schedule (adapted)(ADOS)(Lord et al 1989)
  - Autism Diagnostic Interview (ADI-R) (Lord et al 1989)- with parent
- ‘ASD’ if met criteria on ADOS and ADI (if carried out)  
Or if neither carried out but had diagnosis in record

## Underwood Results

- **39** / 240 (16%) scored  $\geq 10$  on AQ-20 ('significant autistic traits')
- 32 /39 assessed: **11** met criteria (8 ADOS no ADI, 1 ADOS +ADI, 2 previous diagnoses)
- **70%** who screened + AQ-20 didn't meet criteria (false positive)

## Underwood Results

### General prison population

- **10%** screen positive, **2%** met diagnostic criteria – similar to male population (80% false positive)
- No difference in mean AQ score in comparison with male population sample

## Underwood Conclusions

- not higher rates in prison than community
- If 2% around 1600 men and 120 women
- Adaptation of ADOS not validated



## Loureiro et al 2018

- High-security male prison Portugal
- AQ
- n=101
- Comparison with control group (age, sex, education matched)
- Prisoners scored more highly than controls OR1.13
- Mean score 20.6 v 18.1

## Young et al 2018

- 390 male prisoners one prison in Scotland
- AQ
- cut-off  $\geq 26$ : **8.5%**  
 $\geq 32$  **2.1%**
- 'Prevalence rate of 9% ASD' in prison

# Summary

Authors/date	n	AQ cut off	% sample above	
Fazio et al 2012	431	AQ $\geq 32$	<b>4.4%</b>	
Underwood et al 2016	240	AQ-20 $\geq 10$	<b>10%</b>	<b>2% met diagnostic criteria</b>
Loureiro et al 2018	101			Prisoners higher mean AQ than controls
Young et al 2018	390	AQ $\geq 26$ $\geq 32$	<b>8.5%</b> <b>2.1%</b>	

# Why the variation?

## 1. Sampling

- Selection bias- convenience sample, representative? (all men)
- Small samples

# Why the variation?

## 2. Screening/ diagnostic methods

- Self-report (bias, over-estimates)
- AQ as screen: validity in prison and even community (Ashwood et al 2016 scores non-prediction of dx n=476)
- AQ used as diagnosis, different cut-offs 32 or 26
- ADOS adjusted/not validated for prison

# Conclusions

- Several studies attempting to measure prevalence
- Methodological limitations- challenges of environment
- Significant variation in estimates

# References

- Robinson L, Spencer MD, Thomson LDG, Stanfield AC, Owens DGC, Hall J, et al. (2012) Evaluation of a Screening Instrument for Autism Spectrum Disorders in Prisoners. *PLoS ONE* 7(5): e36078. <https://doi.org/10.1371/journal.pone.0036078>
- Robinson L, Spencer MD, Thomson LDG, Sprengelmeyer R, Owens DGC, Hall J, Baig BJ, McIntyre DJ, McKechnie A, Johnstone E. *Facial Emotion Recognition in Scottish Prisoners* *International Journal of Law and Psychiatry* 35 (2012), pp. 57-61. DOI : 10.1016/j.ijlp.2011.11.009
- Brugha T, McManus S, Bankart J, Scott F, Purdon S, et al. (2011) Epidemiology of Autism Spectrum Disorders in Adults in the Community in England. *Arch Gen Psychiatry* 68: 459–466.
- Gillberg C, Rastam M, Wentz E (2001) The Asperger Syndrome (and high-functioning autism) Diagnostic Interview (ASDI): a preliminary study of a new structured clinical interview. *Autism* 5: 57–66.
- Baron-Cohen S, Wheelwright S, Skinner R, Martin J, Clubley E (2001) The autism-spectrum quotient (AQ): evidence from Asperger syndrome/high-functioning autism, males and females, scientists and mathematicians. *J Autism Dev Disord* 31: 5–17.
- Myers F (2004) *On the Borderline? Secure People with Learning Disabilities and/or Autistic Spectrum Disorders in Forensic and Other Specialist Settings*. Edinburgh: Scottish Development Centre for Mental Health, The Stationery Office
- Rachel L. Fazio, Christina A. Pietz, and Robert L. Denney An Estimate of the Prevalence of Autism-Spectrum Disorders in an Incarcerated Population *Open Access Journal of Forensic Psychology* <http://www.forensicpsychologyunbound.ws/> -- 2012: 69-80
- Diana Loureiro · Ana Machado · Tânia Silva · Tânia Veigas · Carlos Ramalheira · Joaquim Cerejeira, Higher Autistic Traits Among Criminals, But No Link to Psychopathy: Findings from a High-Security Prison in Portugal *Journal of Autism and Developmental Disorders* (2018) 48:3010–3020 <https://doi.org/10.1007/s10803-018-3576-z>
- NICE 2018 Identifying, assessing and diagnosing autism spectrum disorder in adults <https://pathways.nice.org.uk/pathways/autism-spectrum-disorder>
- Underwood, L., McCarthy, J., Chaplin, E., Forrester, A., Mills, R., and Murphy, D. (2016). Autism spectrum disorder traits among prisoners. *Advances in Autism*, 2(3), 106-117. doi: <https://doi.org/10.1108/AIA-11-2015-0023>
- Young S.; Gonzalez R.A.; Gudjonsson G.H.; Mullens H.; Mutch L. et al. Young S.; Gonzalez R.A.; Gudjonsson G.H.; Mullens H.; Mutch L.; Malet-Lambert I. Neurodevelopmental disorders in prison inmates: comorbidity and combined associations with psychiatric symptoms and behavioural disturbance *Psychiatry Research*; Mar 2018; vol. 261 ; p. 109-115

- [Louise.Robinson@Manchester.ac.uk](mailto:Louise.Robinson@Manchester.ac.uk)