



*Discharge planning and clinical pathways:
Using outcome measure information in
CAMHS - the emerging picture*

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Brief Presentation of the Results of Two Pieces of Work from WA

- 2009: What do the NOCC outcome measures we have collected in WA suggest to us about how well we are doing in CAMHS – and with whom and what?

Karina Allen and Marg Jones

Looked at the differences in initial clinical trajectory for four main diagnostic groups present in ambulatory care using Honosca and the SDQ

- 2010: Discharge Planning Using Outcome Measure Information in CAMHS ***Vaike Vohma and Marg Jones***

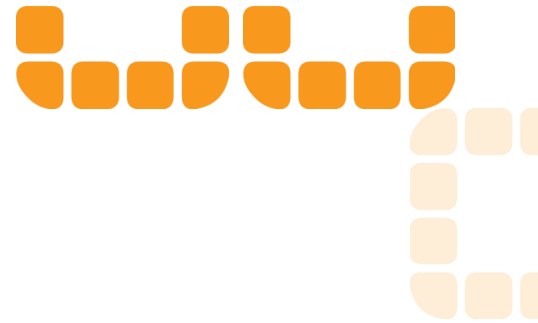
Looked at the larger trajectory over time for the four main diagnostic groups present in ambulatory care using all NOCC instruments from admission to discharge



2009: Allen and Jones, SDQ and Honosca

- Health of the Nation Outcomes Scale, Child/Adolescent version (HoNOSCA)
 - Admission & follow-up data for 1,236 children/adolescents in WA (2003 to 2007)
 - 52% male, mean age at admission = 12.6yrs
- Strengths and Difficulties Questionnaire (SDQ)
 - Parent-report 4-10y/o form: Admission & f/up data for 81 children (69% male, mean age = 8.1yrs)
 - Parent-report 11-14y/o form: Admission & f/up data for 114 children (54% male, mean age = 13.5yrs)
 - Youth self-report 11-17y/o form: Admission & f/up data for 117 adolescents (46% male, mean age = 14.1yrs)





HoNOSCA



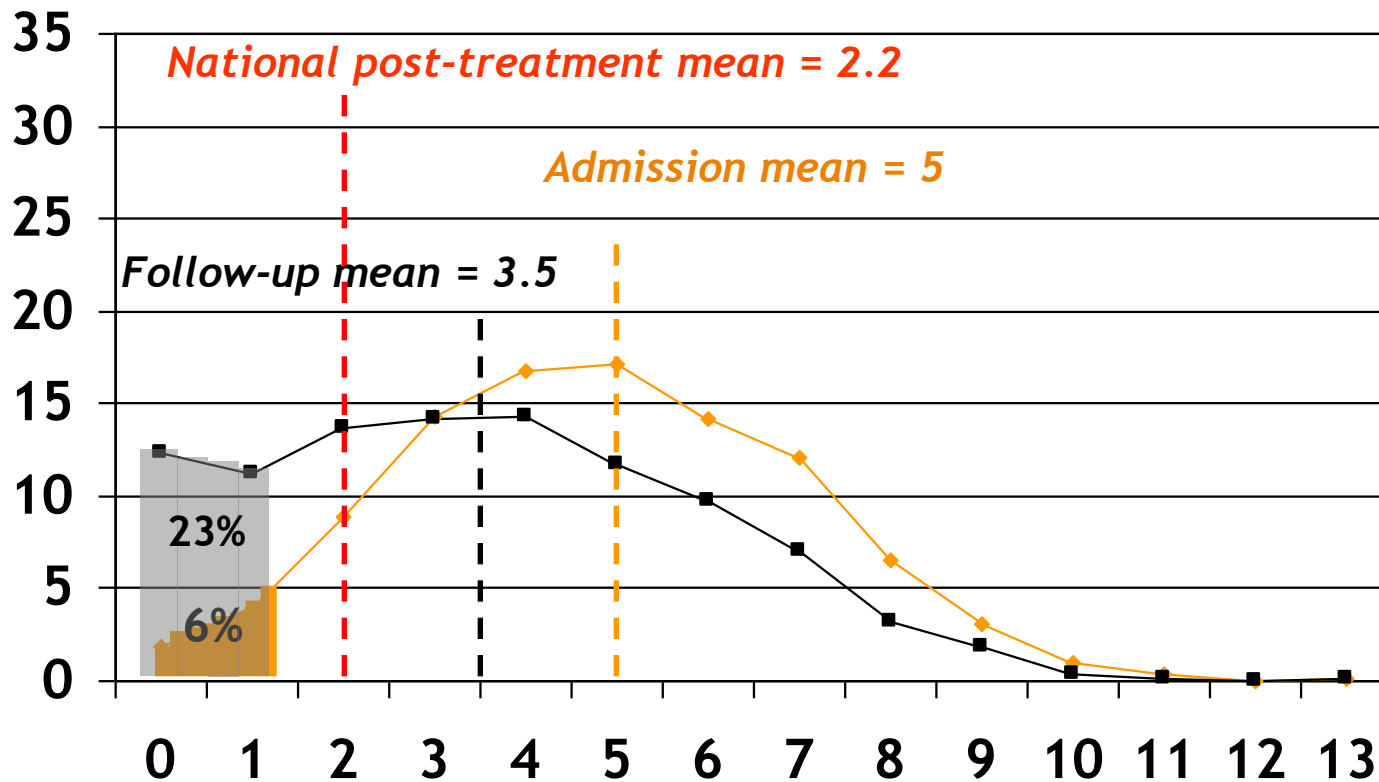
HoNOSCA: Statistical change

- Mean HoNOSCA scores decreased significantly from admission to follow-up for all 13 core items
- Moderate effect sizes for two items:
 - Self-injury
 - Emotional symptoms





Total number of HoNOSCA items in the clinical range at admission and 3-month follow-up:



—◆— Admission —■— Follow-up



HoNOSCA: Which subgroups?

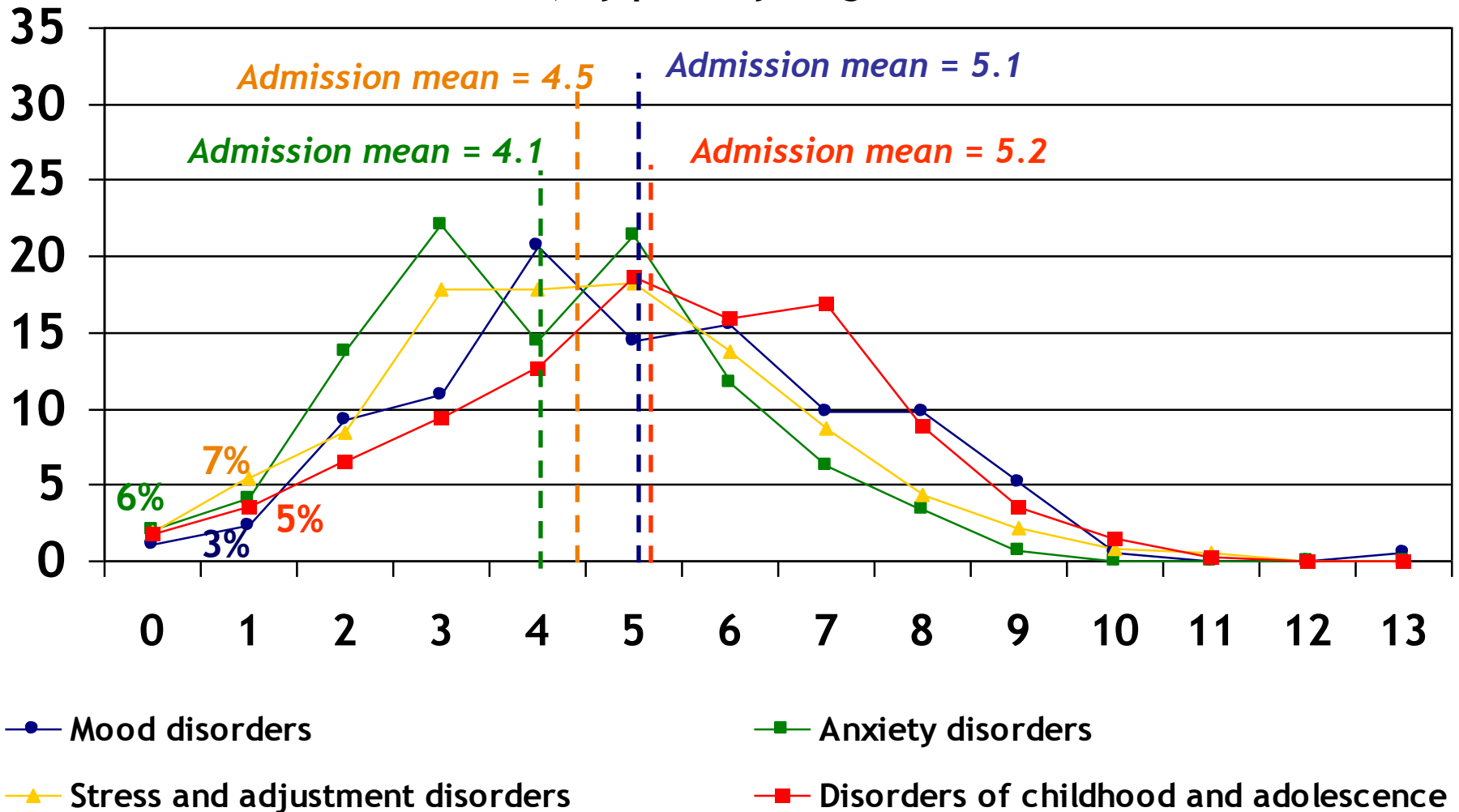
Primary diagnosis

- Primary **mood disorder** diagnosis:
 - Greater symptom reduction on the self-harm item than other groups
- Primary **anxiety disorder** diagnosis:
 - Greater symptom reduction on the emotional symptoms item than other groups
- Primary **disorders of childhood and adolescence** diagnosis :
 - Greater symptom reduction on the disruptive behaviour item than other groups





Total number of HoNOSCA items in the clinical range at admission, by primary diagnosis:



Percentage with ≤ 1 rating in the clinical range:

24% vs. 3%

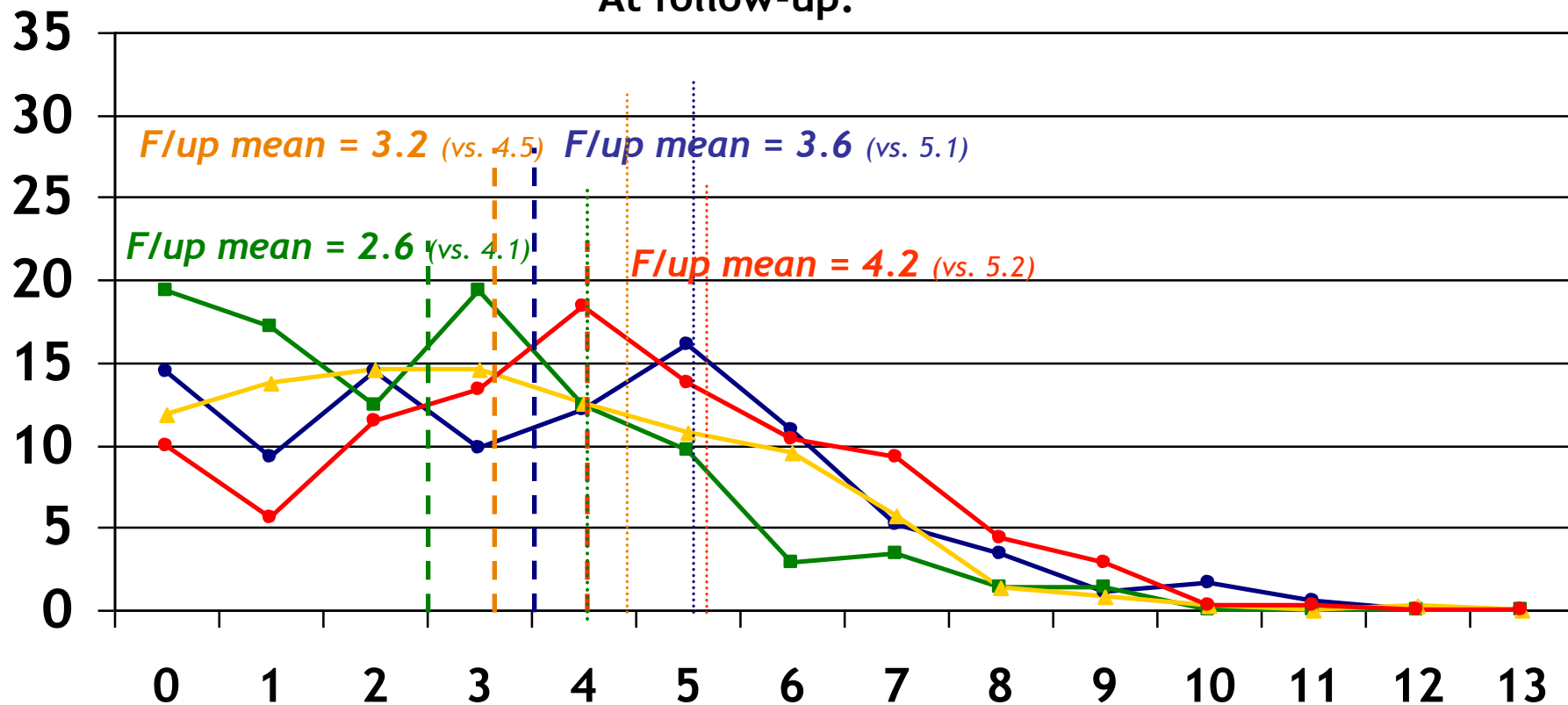
37% vs. 6%

26% vs. 7%

16% vs. 5%



At follow-up:



F/up mean = 3.2 (vs. 4.5)

F/up mean = 3.6 (vs. 5.1)

F/up mean = 2.6 (vs. 4.1)

F/up mean = 4.2 (vs. 5.2)

● Mood disorders

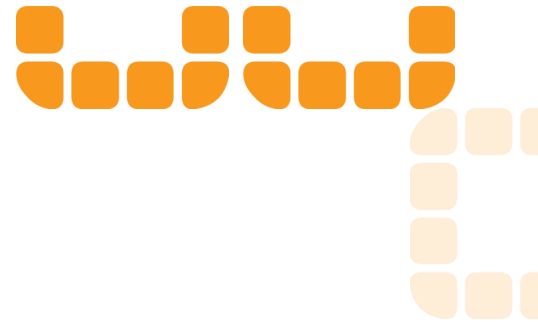
■ Anxiety disorders

▲ Stress and adjustment disorders

● Disorders of childhood and adolescence

lia





SDQ



SDQ: Which subgroups?



	Mood Disorders	Anxiety Disorders	Stress/ Adjustment Disorders	Disorders of Childhood/ Adolescence
Total Difficulties				
Emotional Symptoms				
Conduct Problems				
Hyperactivity/ Inattention				
Peer Problems				
Prosocial Behaviour				

Primary diagnosis



	Mood Disorders	Anxiety Disorders	Stress/ Adjustment Disorders	Disorders of Childhood/ Adolescence
Total Difficulties	11-17y/o			
Emotional Symptoms	-			
Conduct Problems	11-17y/o			
Hyperactivity/ Inattention	-			
Peer Problems	11-14y/o 11-17y/o			
Prosocial Behaviour	-			

Primary diagnosis



	Mood Disorders	Anxiety Disorders	Stress/ Adjustment Disorders	Disorders of Childhood/ Adolescence
Total Difficulties	11-17y/o	4-10y/o		
Emotional Symptoms	-	4-10y/o		
Conduct Problems	11-17y/o	4-10y/o		
Hyperactivity/ Inattention	-	-		
Peer Problems	11-14y/o 11-17y/o	-		
Prosocial Behaviour	-	-		

Primary diagnosis



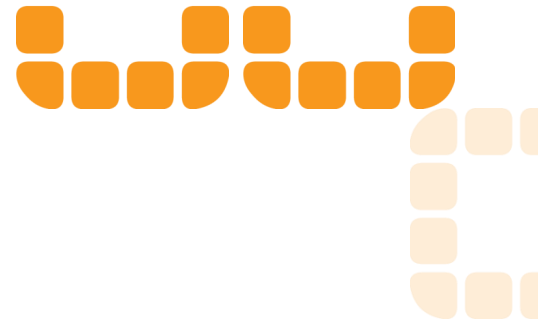
	Mood Disorders	Anxiety Disorders	Stress/ Adjustment Disorders	Disorders of Childhood/ Adolescence
Total Difficulties	11-17y/o	4-10y/o	11-14y/o 11-17y/o	
Emotional Symptoms	-	4-10y/o	11-14y/o 11-17y/o	
Conduct Problems	11-17y/o	4-10y/o	11-14y/o 11-17y/o	
Hyperactivity/ Inattention	-	-	-	
Peer Problems	11-14y/o 11-17y/o	-	11-17y/o	
Prosocial Behaviour	-	-	-	

Primary diagnosis



	Mood Disorders	Anxiety Disorders	Stress/ Adjustment Disorders	Disorders of Childhood/ Adolescence
Total Difficulties	11-17y/o	4-10y/o	11-14y/o 11-17y/o	4-10y/o 11-14y/o 11-17y/o
Emotional Symptoms	-	4-10y/o	11-14y/o 11-17y/o	4-10y/o 11-14y/o
Conduct Problems	11-17y/o	4-10y/o	11-14y/o 11-17y/o	11-14y/o 11-17y/o
Hyperactivity/ Inattention	-	-	-	4-10y/o 11-17y/o
Peer Problems	11-14y/o 11-17y/o	-	11-17y/o	-
Prosocial Behaviour	-	-	-	-





How does WA compare with elsewhere?



Benchmarking

- National Child and Adolescent Benchmarking dataset (Brann, 2008)
 - Six outpatient CAMHS from across Australia (2006 – 2007)
 - Admission through discharge data for 2,331 patients

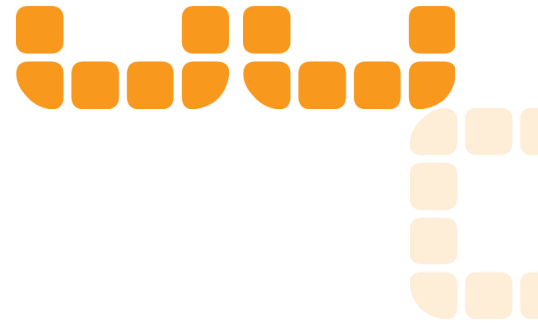
	National CAMHS	WA CAMHS
Mean time to discharge	34.3 weeks	30.8 weeks
≤1 rating in the clinical range at admission	2%	3%
≤1 rating in the clinical range at discharge	30%	29%



Benchmarking comparisons for the Total Difficulties scale:

Parent 4-10y/o and 11-14y/o SDQ combined

	National CAMHS	WA CAMHS
Mean time to discharge	34.3 weeks	30.8 weeks
% clinical at admission	50%	77%
% clinical at discharge	22%	40%
% borderline at admission	7%	11%
% borderline at discharge	18%	15%
% average at admission	43%	12%
% average at discharge	60%	46%



Vohma and Jones, 2010
WA CAMHS Services 2005-2009
An Overview



The Dataset

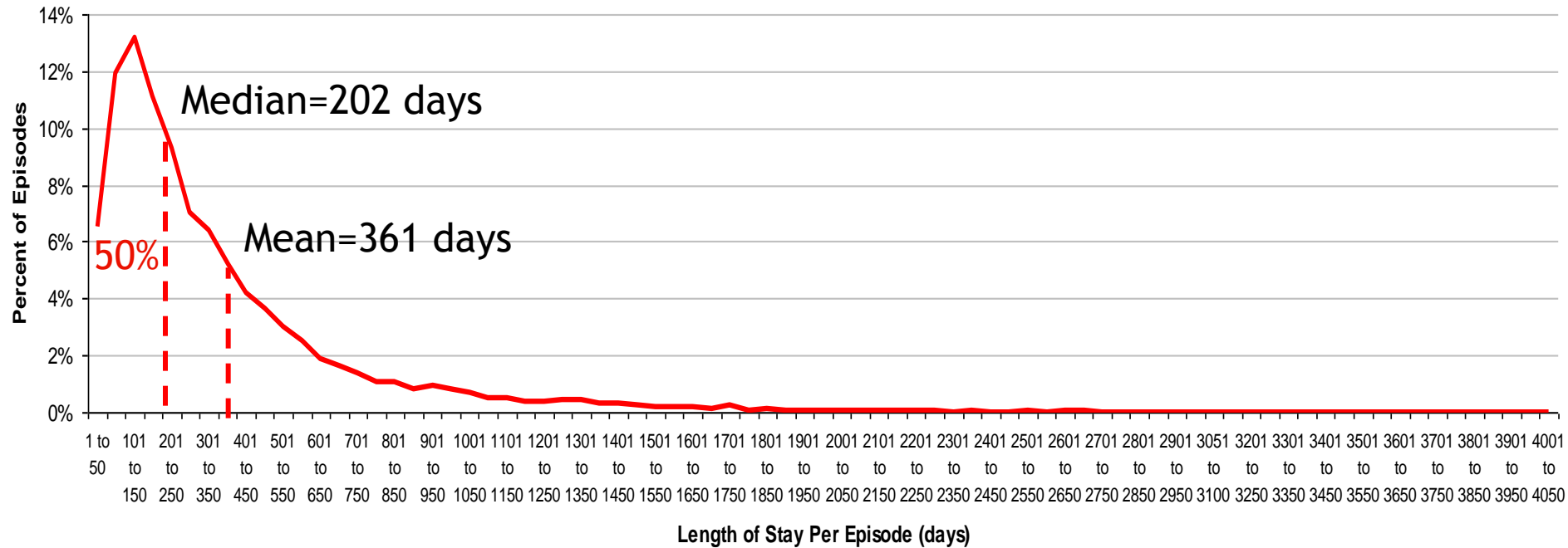
- 8089 NOCC activated ambulatory admissions (79.5% of all CAMHS outcome measure activated activity).
- Mean age at admission was 12.6 years for ambulatory services with median age being 13 years
- 52.6% were male.



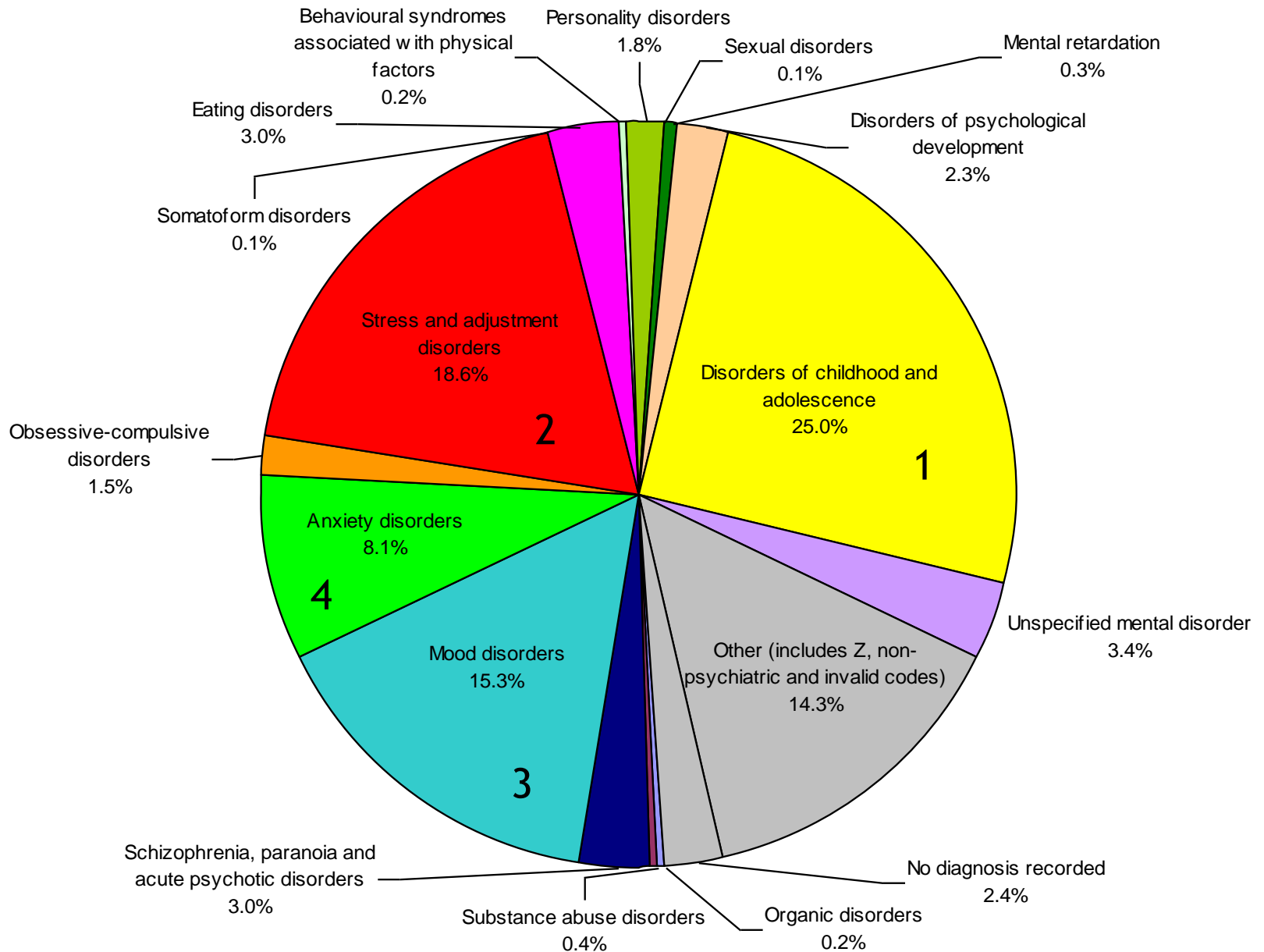
WA CAMHS Length of Stay 2005-2009: Ambulatory



WA CAMHS Length of Stay 2005-2009: Ambulatory Services Only



WA CAMHS Diagnoses at Admission 2005-2009



Possible Predictors for Length of Stay

What can we use to predict length of stay at admission for ambulatory services?

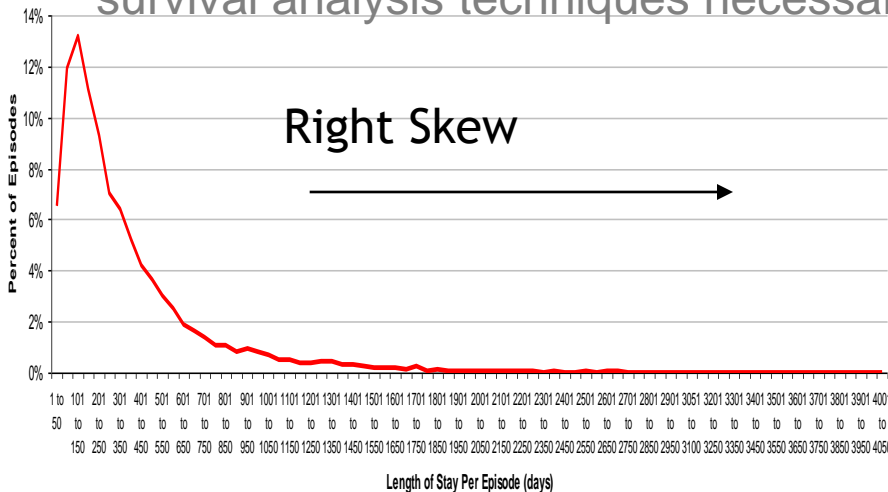
1. Gender
2. Diagnosis at Admission
3. Severity at Admission (HoNOSCA)
4. Total Difficulties at Admission (SDQ)
5. Case Complexity at Admission (FIHS, CGAS)
6. Frequency of Occasions of Service
7. Service program child is admitted to

Treatment Effect would influence LOS as well, but cannot be measured at admission

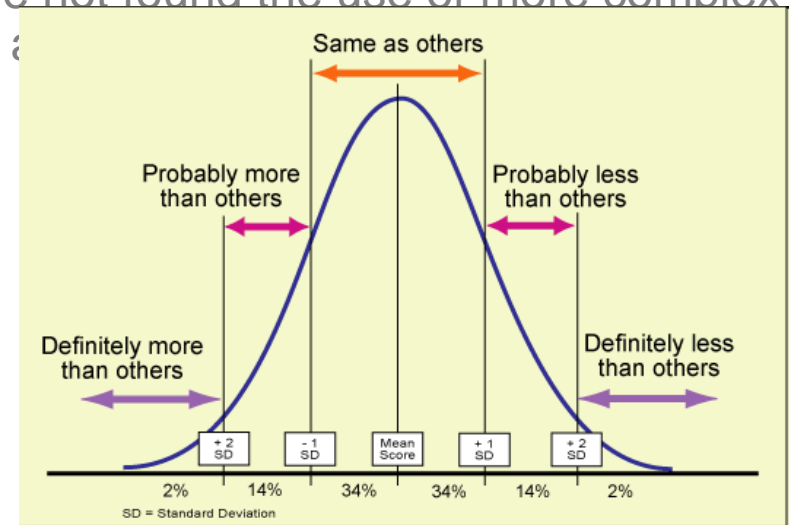


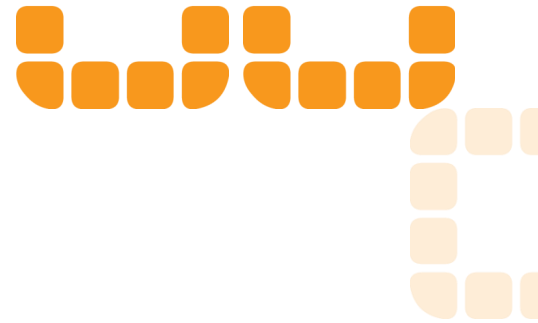
Stop - Caveat! (the fine print...)

The p-values that are shown from here on assume the sampling distribution is normally distributed, however as we saw earlier, the sampling distribution for length of stay does not look like an ordinary bell curve, but is instead skewed largely to the right. This sort of data is called time-to-event data and we usually use survival analysis techniques to analyse it. I have however found it being approximated by usual linear techniques in the literature and what follows is not meant to be a final predictive model for length of stay, but an exploration of the possible variables we would use to possibly incorporate into such a model. So I have not found the use of more complex survival analysis techniques necessary &



Normal Curve





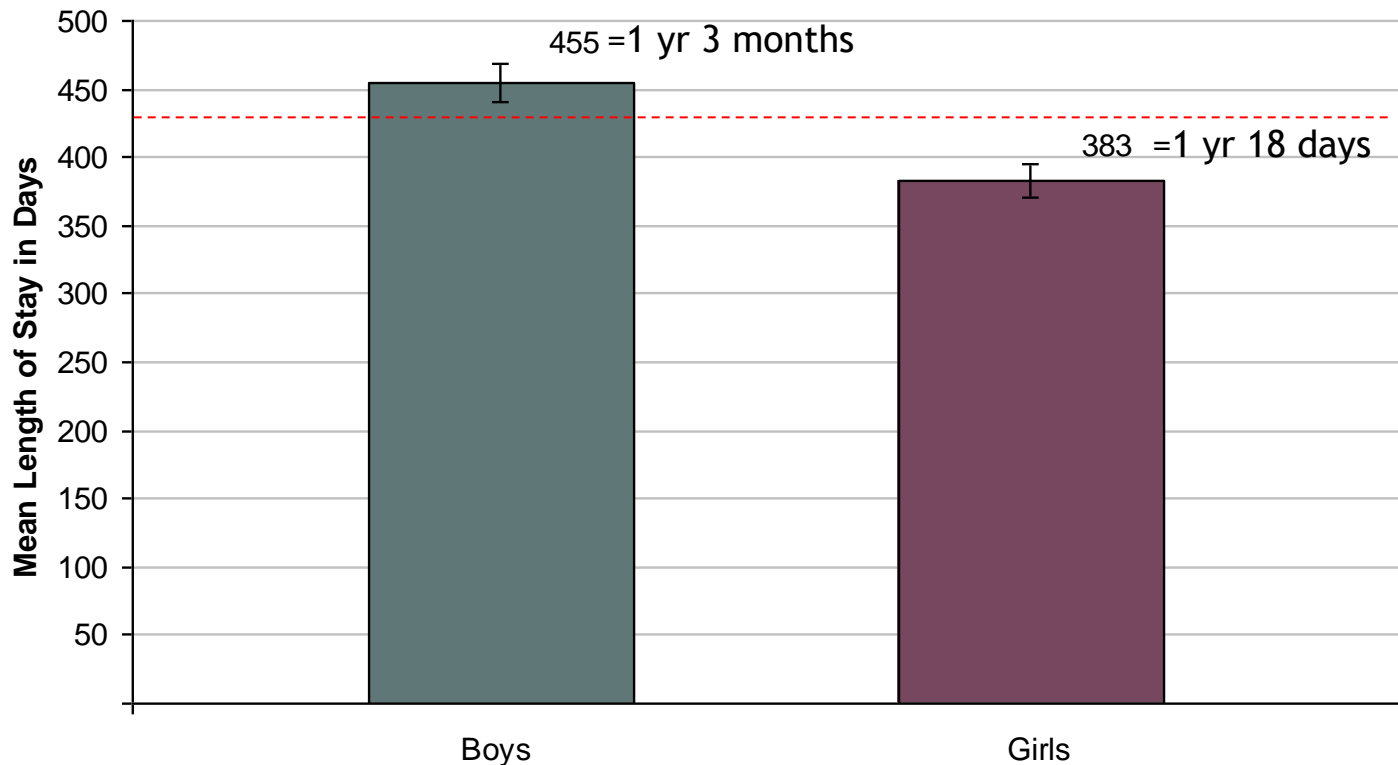
1. Gender



WA CAMHS Ambulatory 2005-2009: Gender and Length of Stay



WA CAMHS Ambulatory 2005-2009 - LOS and Gender



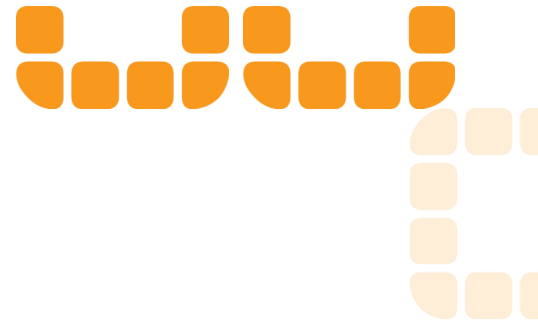
T-test

$p < 0.001$

% variance explained = .9%

Get 72 days more if a boy!





2. Primary Diagnosis at Admission



ANOVA

$p < 0.001$

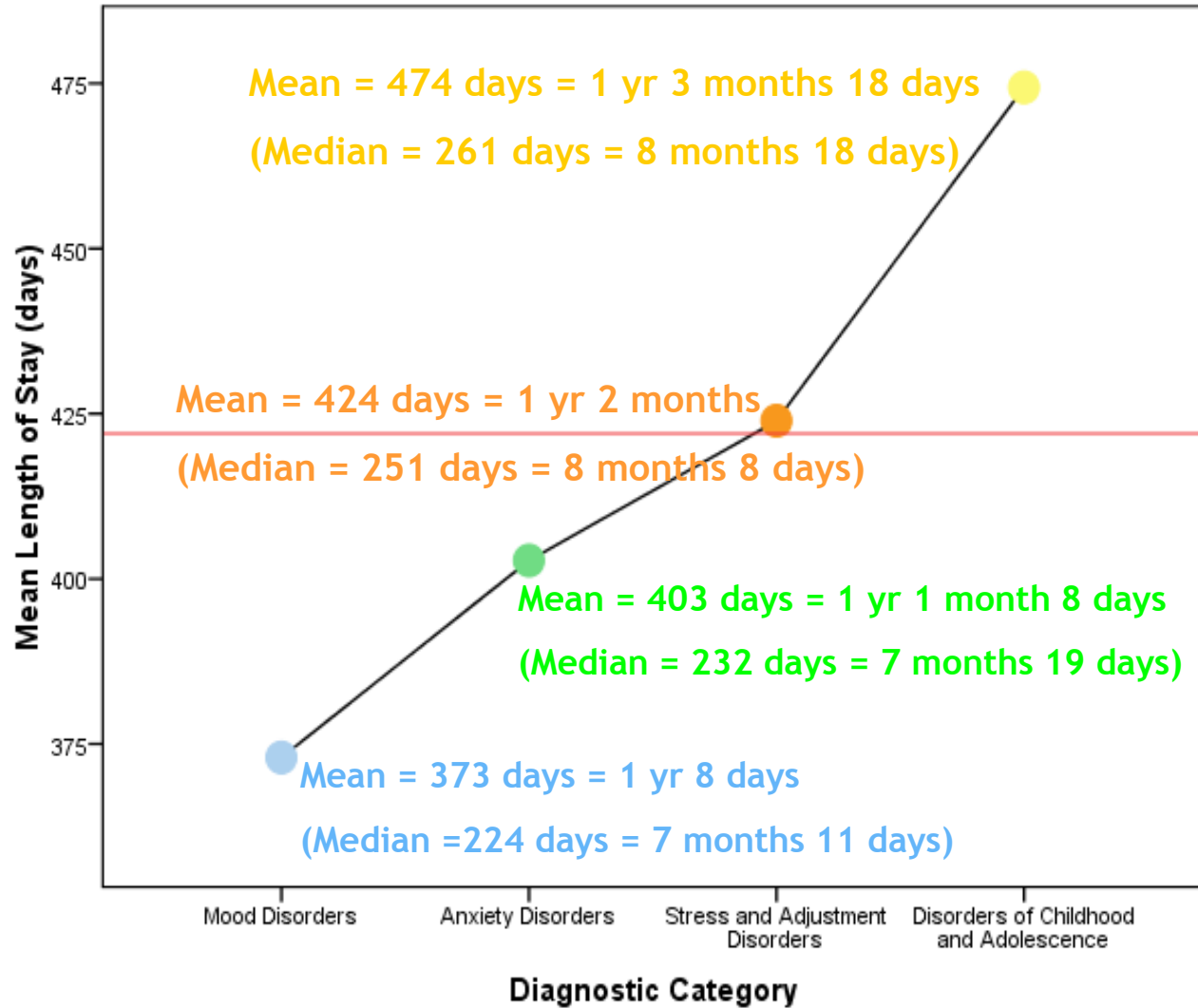
% variation explained = 3.3%

Disorders of Childhood and Adolescence are significantly higher than the other three groups.

Stress and adjustment was significantly different to mood disorders but not anxiety disorders.

Anxiety disorders was not significantly different to either of stress and adjustment and mood disorders.

Mean Length of Stay by Diagnosis - WA CAMHS Ambulatory Services 2005-2009



3. Severity at Admission (HoNOSCA)

Severity is derived from the first 13 items of complete HoNOSCA.

Severity Levels

Sub-clinical: Each item is scored 1 or 0

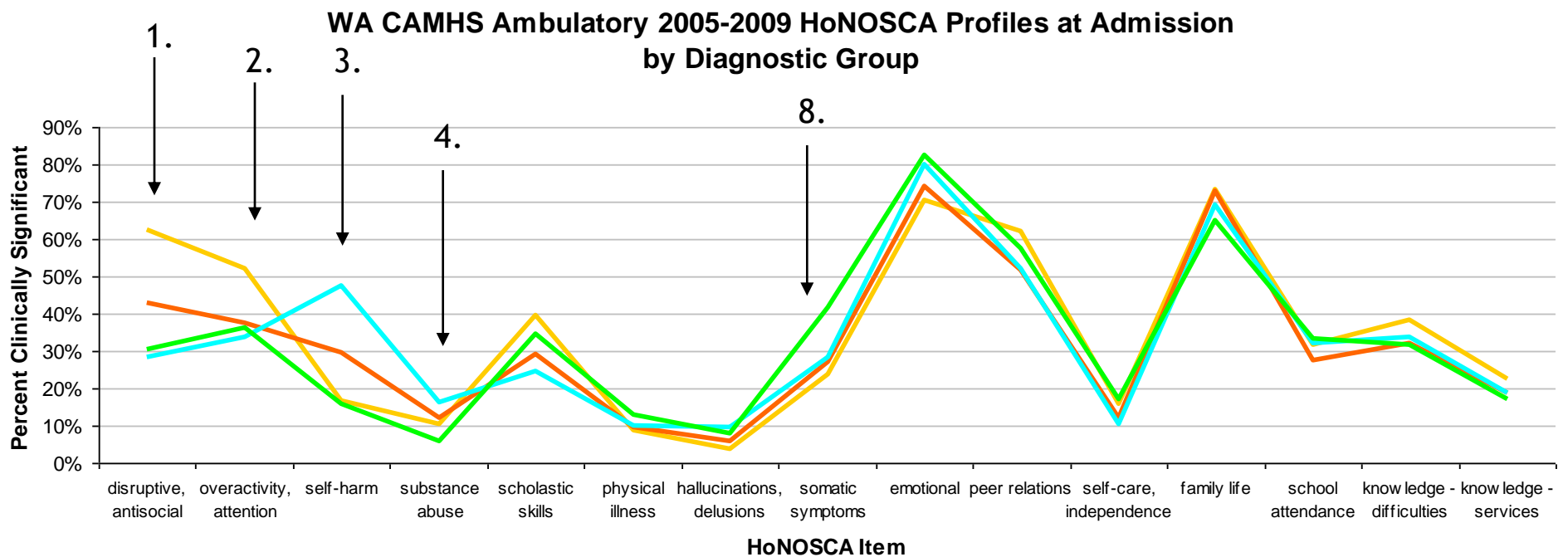
Mild: At least one item is scored as 2 but not higher

Moderately Severe: Scores of 3 or 4 on only one item

Very Severe: Scores of 3 or 4 on two or more items



CAMHS Ambulatory HoNOSCA Profile at Admission by Diagnostic Group



— DISORDERS OF CHILDHOOD AND ADOLESCENCE
 — STRESS AND ADJUSTMENT DISORDERS
 — MOOD DISORDERS
 — ANXIETY DISORDERS

Mean # of clinically significant items:

6.14

5.72

6.07

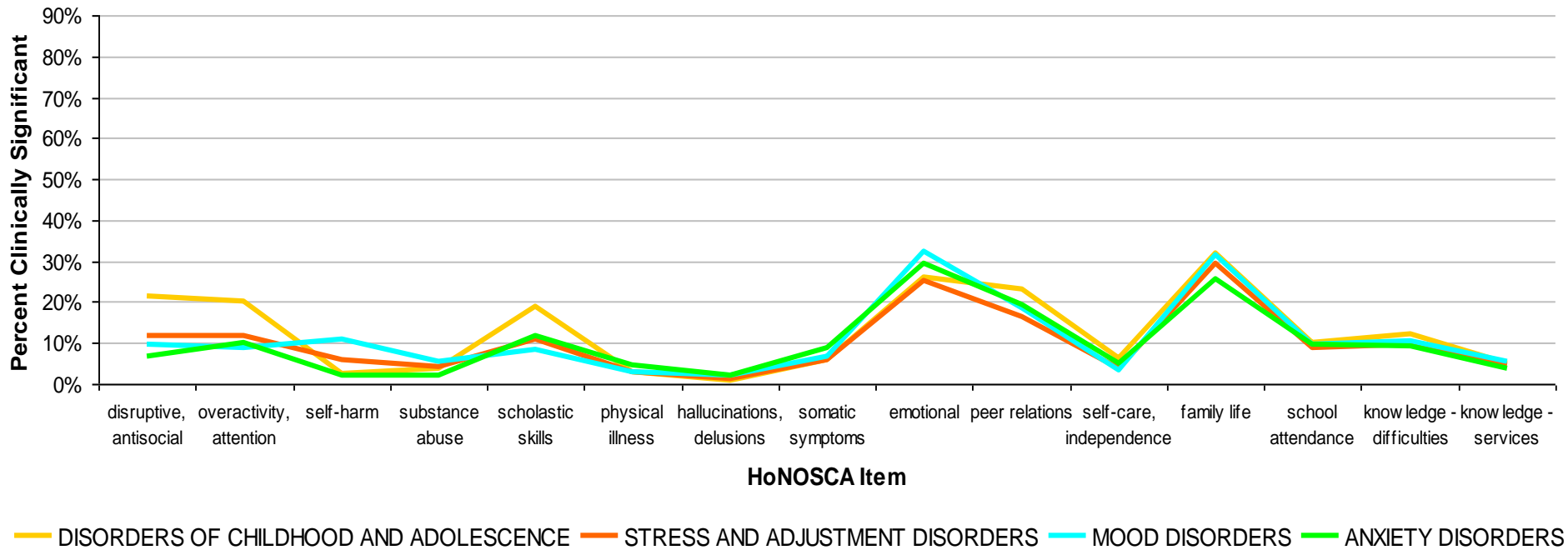
5.46



Government of **Western Australia**
Department of **Health**

CAMHS Ambulatory HoNOSCA Profile at Discharge by Diagnostic Group

WA CAMHS Ambulatory 2005-2009 HoNOSCA Profiles at Discharge by Diagnostic Group



Severity and LOS



ANOVA

p-value<0.001

% variation explained=0.6%

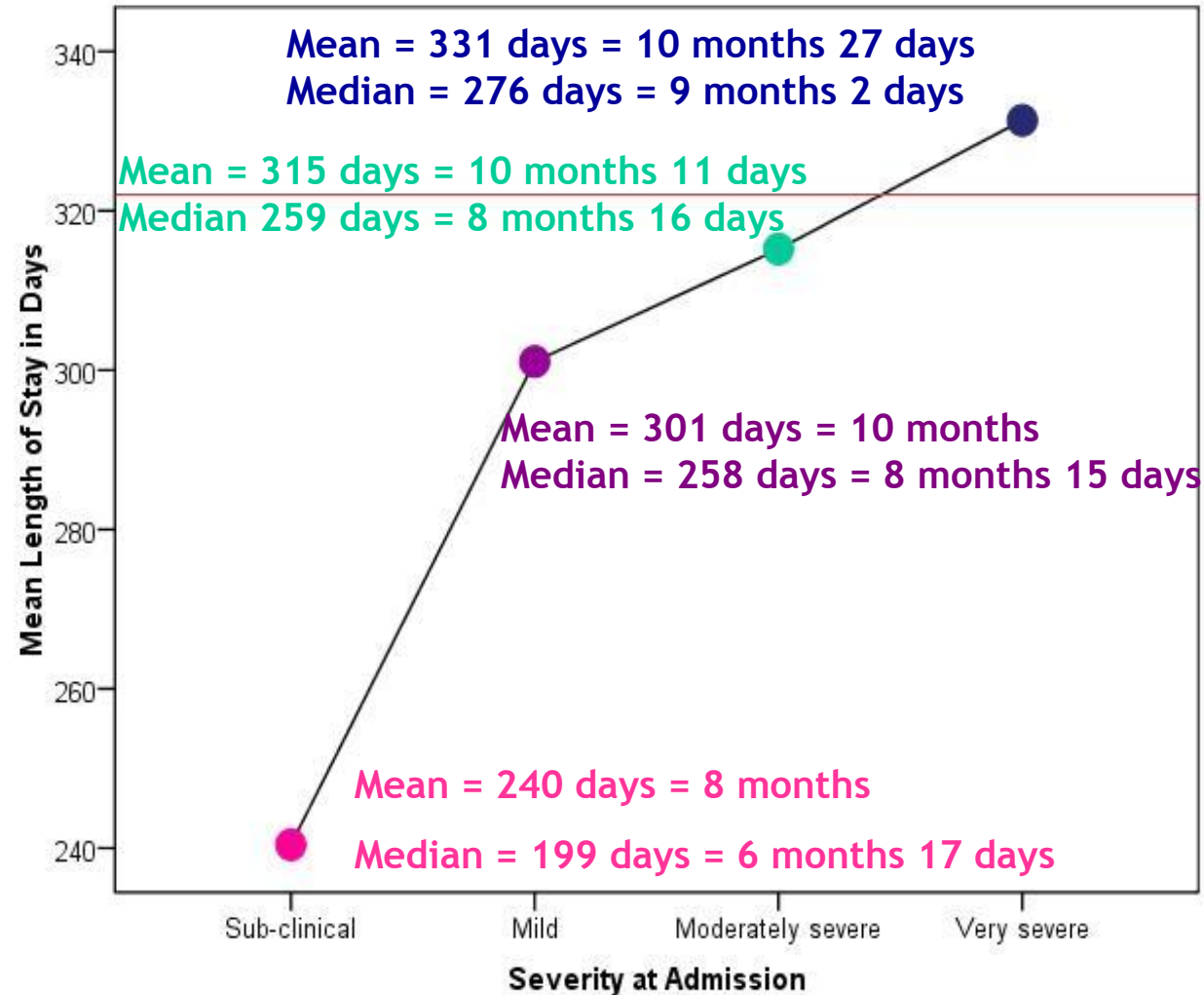
The **sub-clinical** group is significantly smaller than the other groups.

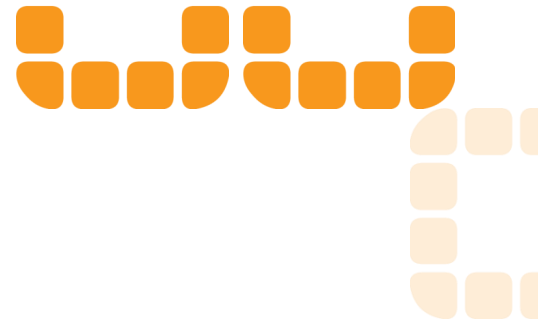
The **mild** group is significantly different to the sub-clinical and very severe groups.

The **moderately severe** group is significantly higher than the sub-clinical group.

The **very severe** group stays significantly longer than the sub-clinical and mild groups.

WA CAMHS Ambulatory 2005-2009: Mean Length of Stay by Severity Category

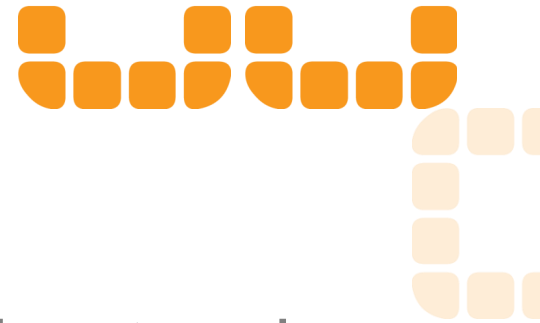




5. Total Difficulties at Admission: Strengths and Difficulties Questionnaire (Consumer-rated)



How do we get the Total Difficulties Score?



Child/Parent answers questions e.g. How true is this statement of your child: “Often loses temper?”

Answer 0=not true, 1=somewhat true, 2=certainly true

Total Score is summed and converted according to SDQ form used to:

- 1 – **Average**: Significant problems unlikely
- 2 – **Raised**: May reflect clinically significant problems
- 3 – **High**: Substantial risk of clinically significant problems



SDQ Total Difficulties Score and LOS



Linear Regression
and ANOVA

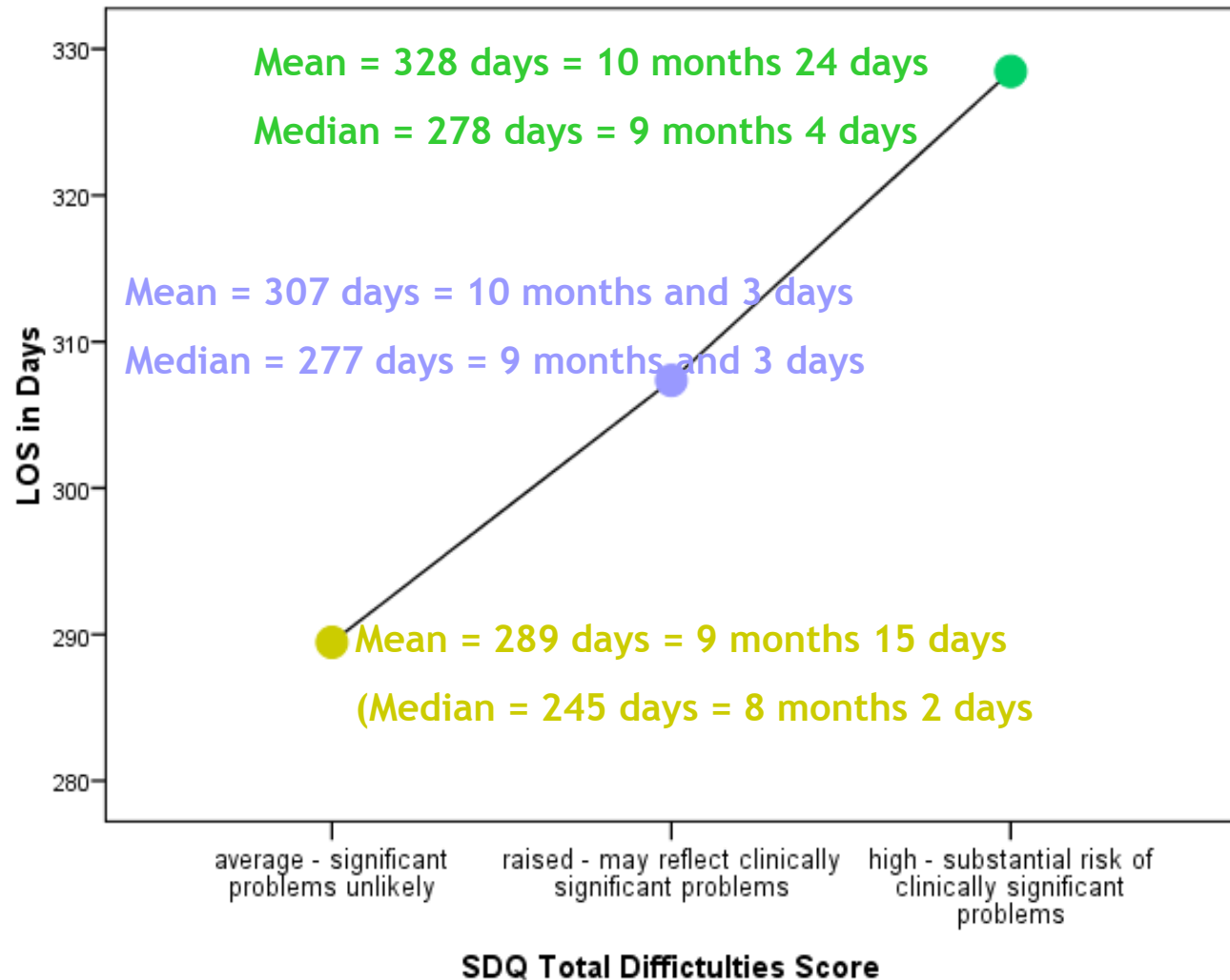
p-value<0.001

% variation
explained=0.6%

The **high** group is significantly higher than both the other groups.

The **raised** and **average** groups are not significantly different to each other.

WA CAMHS Ambulatory 2005-2009: SDQ Total Difficulties Score and Length of Stay





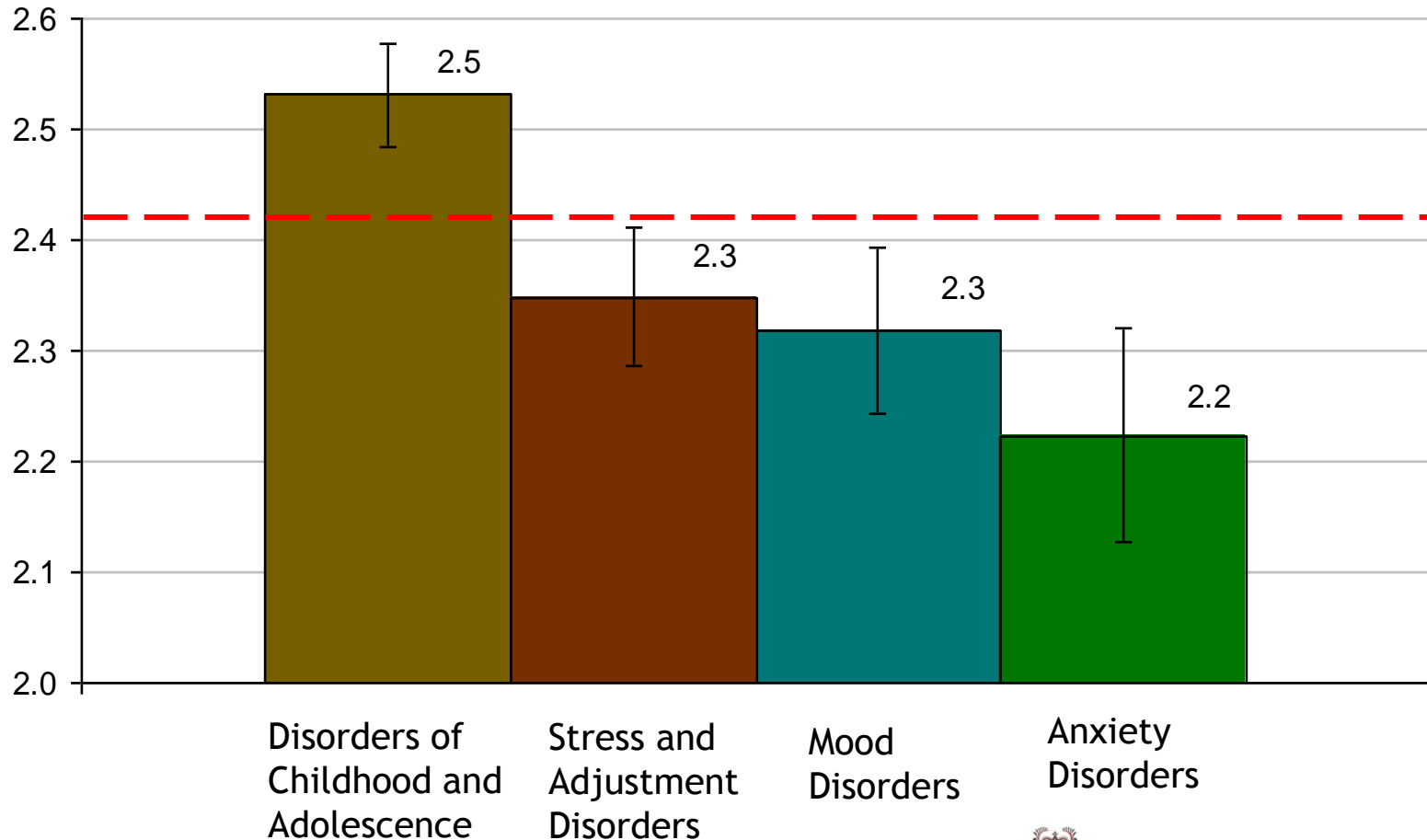
SDQ Subscales by Diagnostic Group

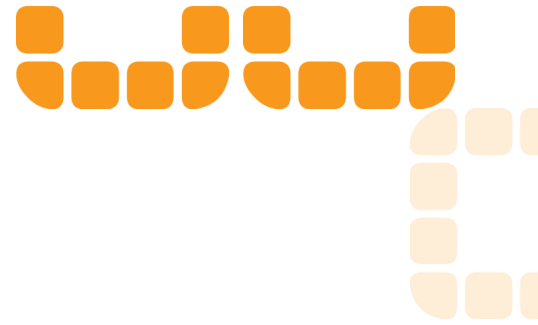
- 1 = This score is close to average – clinically significant problems in this area are unlikely
- 2 = This score is slightly raised, which may reflect clinically significant problems
- 3 = This score is high – there is a substantial risk of clinically significant problems





WA CAMHS Ambulatory 2005-2009: SDQ TOTAL DIFFICULTIES Scores by Diagnostic Category





4. Case Complexity (FIHS, CGAS)



Factors Influencing Health Status- Complexity Measure

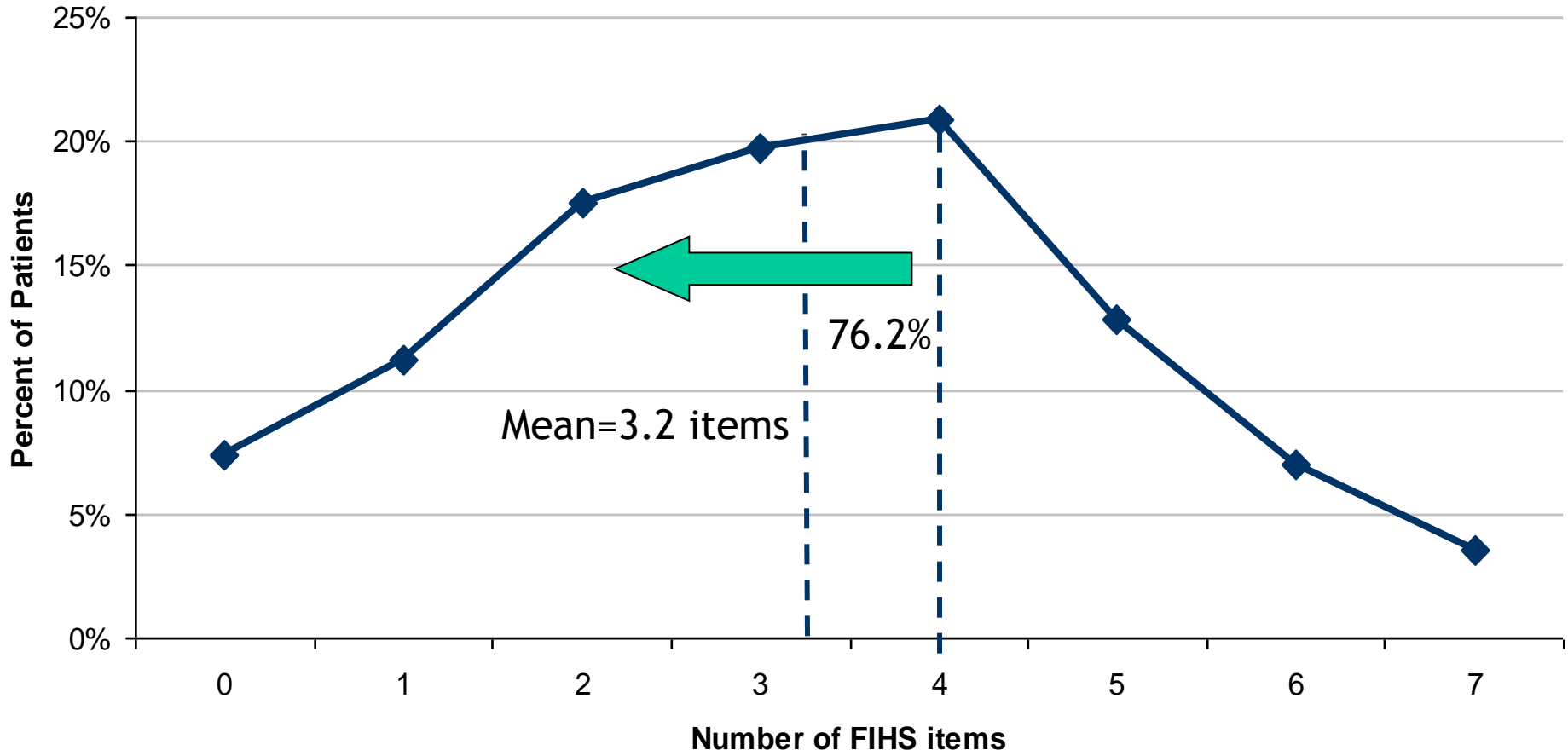


Children are scored as having or not having (yes/no) the following at review and discharge.

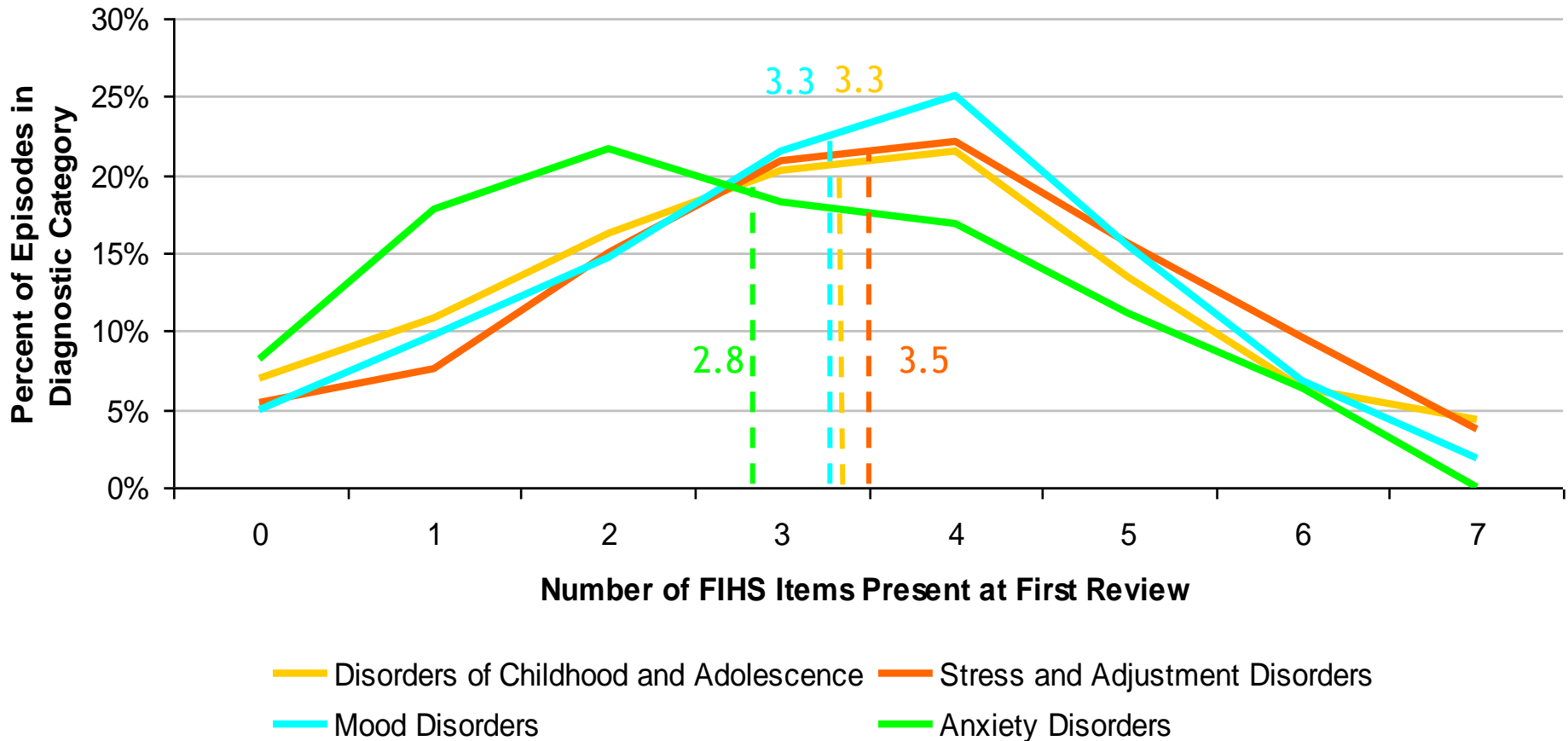
- 1 – Maltreatment syndromes (neglect, abuse, etc)
- 2 – Problems related to negative life events in childhood (Loss of love relationship, removal from home, etc)
- 3 – Problems related to upbringing (inadequate parental supervision, overprotection, emotional neglect)
- 4 – Problems related to primary support group (problems in relationship with parents, loss of parent)
- 5 – Problems related to social environment (social exclusion, problems adjusting to life cycle transitions)
- 6 – Problems related to certain psychosocial circumstances (problems related to unwanted pregnancy, seeking chemical/nutritional/chemical interventions that are harmful)
- 7 – Problems related to other psychosocial circumstances (civil/criminal conviction, victim of crime/disaster, imprisonment, exposure to disaster).



WA CAMHS Ambulatory 2005-2009: Case Complexity No of FIHS Factors Present



WA CAMHS Ambulatory 2005-2009 Number of FIHS Items Present at First Review by Diagnostic Category



Number of FIHS Items Present at First Review and Length of Stay



ANOVA

p-value=.039

% variance explained=0.7%

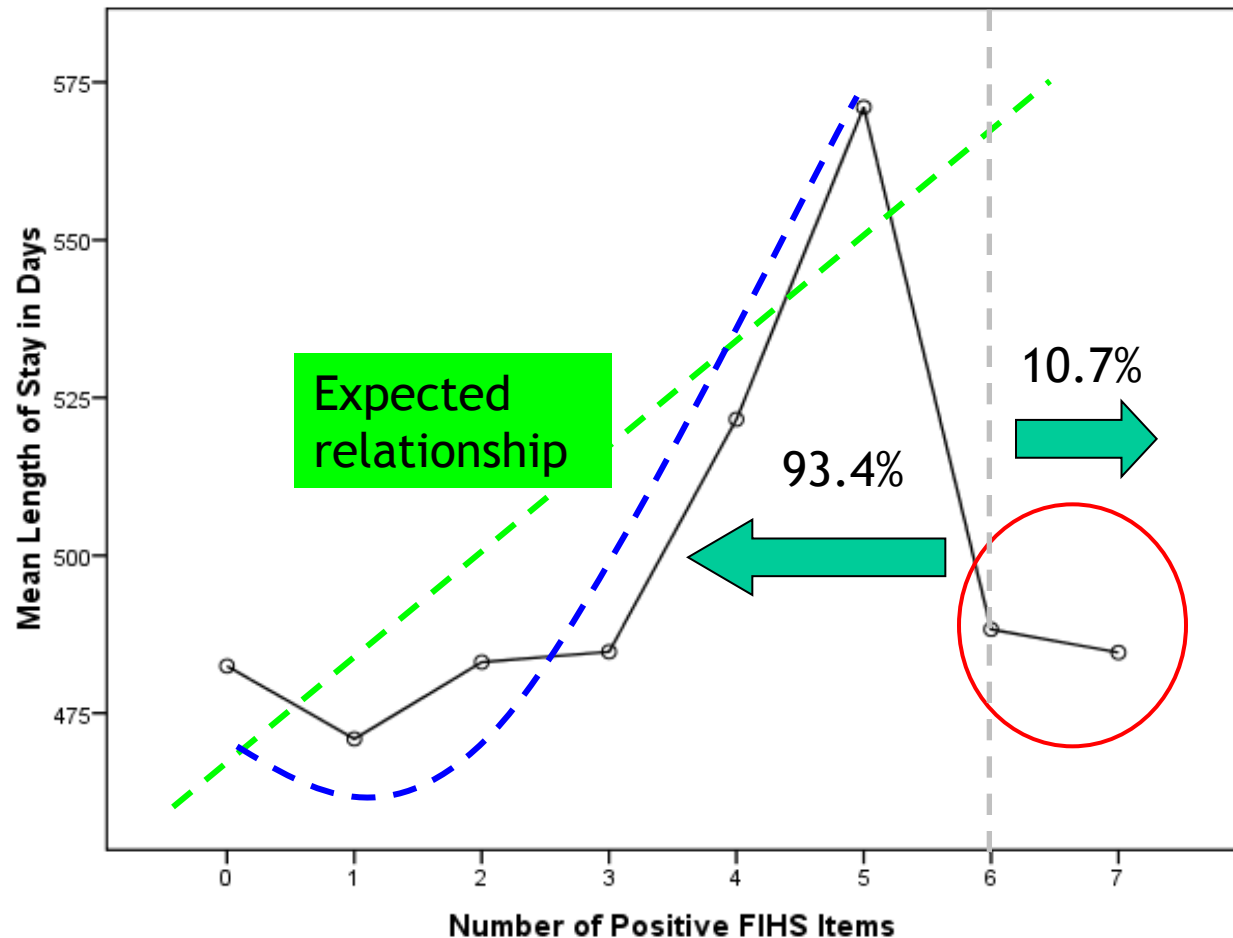
Possibly fit an exponential curve?

P-value=0.001

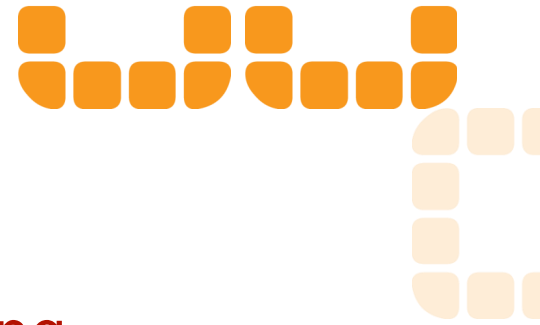
% variance explained=0.5%

What's going on with the most adversely affected groups, 6 and 7 ??

WA CAMHS Ambulatory 2005-2009: Length of Stay and Number of Positive FIHS Items at First Review in Period



CGAS – Children’s Global Assessment Scale



CGAS – Key measure of the level of functioning.

Children and adolescents are given a score between 1 and 100.

1-10: Needs constant supervision ...

21-30: Unable to function in almost all areas (e.g. stays at home, in ward, or in bed all day)

31-40: Major impairment of functioning in most social areas or severe impairment of function in one area (e.g. such as might result from suicidal preoccupations, forms of anxiety, obsessive rituals, anxiety attaches etc)....

41-50: ...

.

91-100: Superior functioning

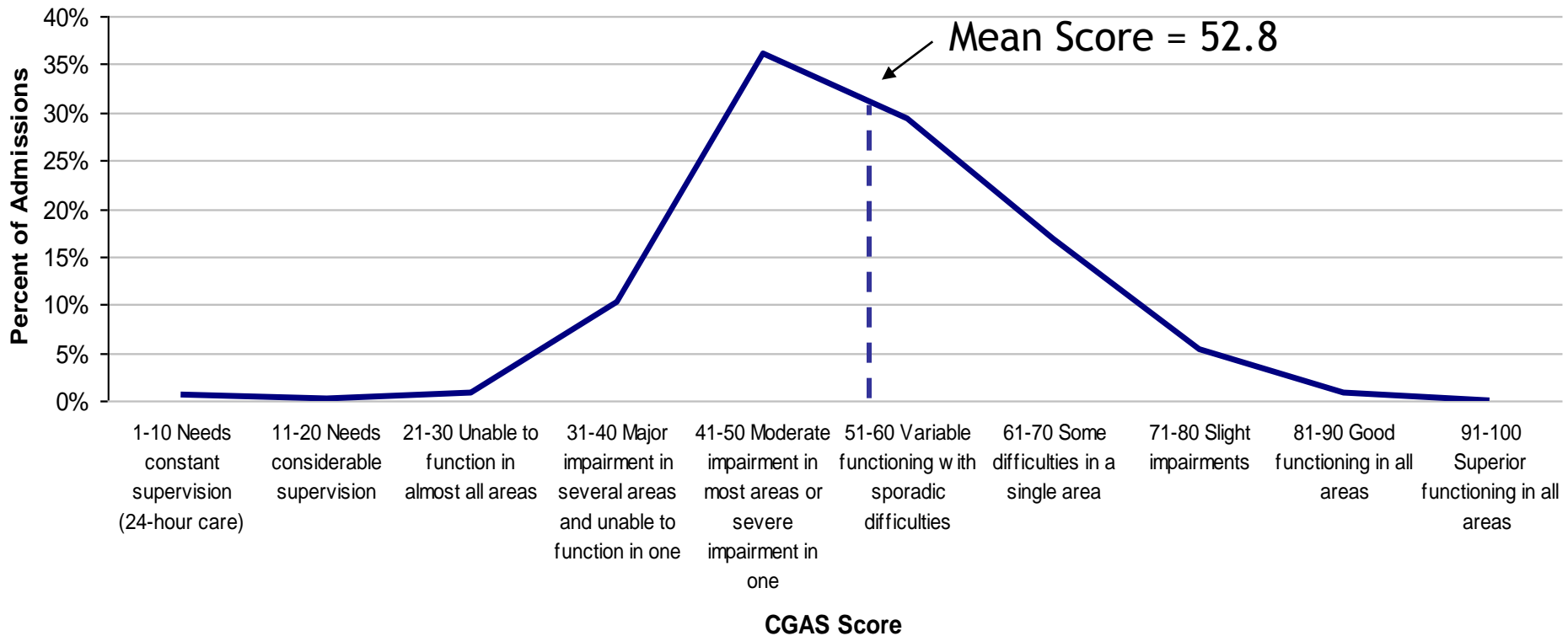
Rating occurs at admission and review.



WA CAMHS Ambulatory CGAS Scores at Admission

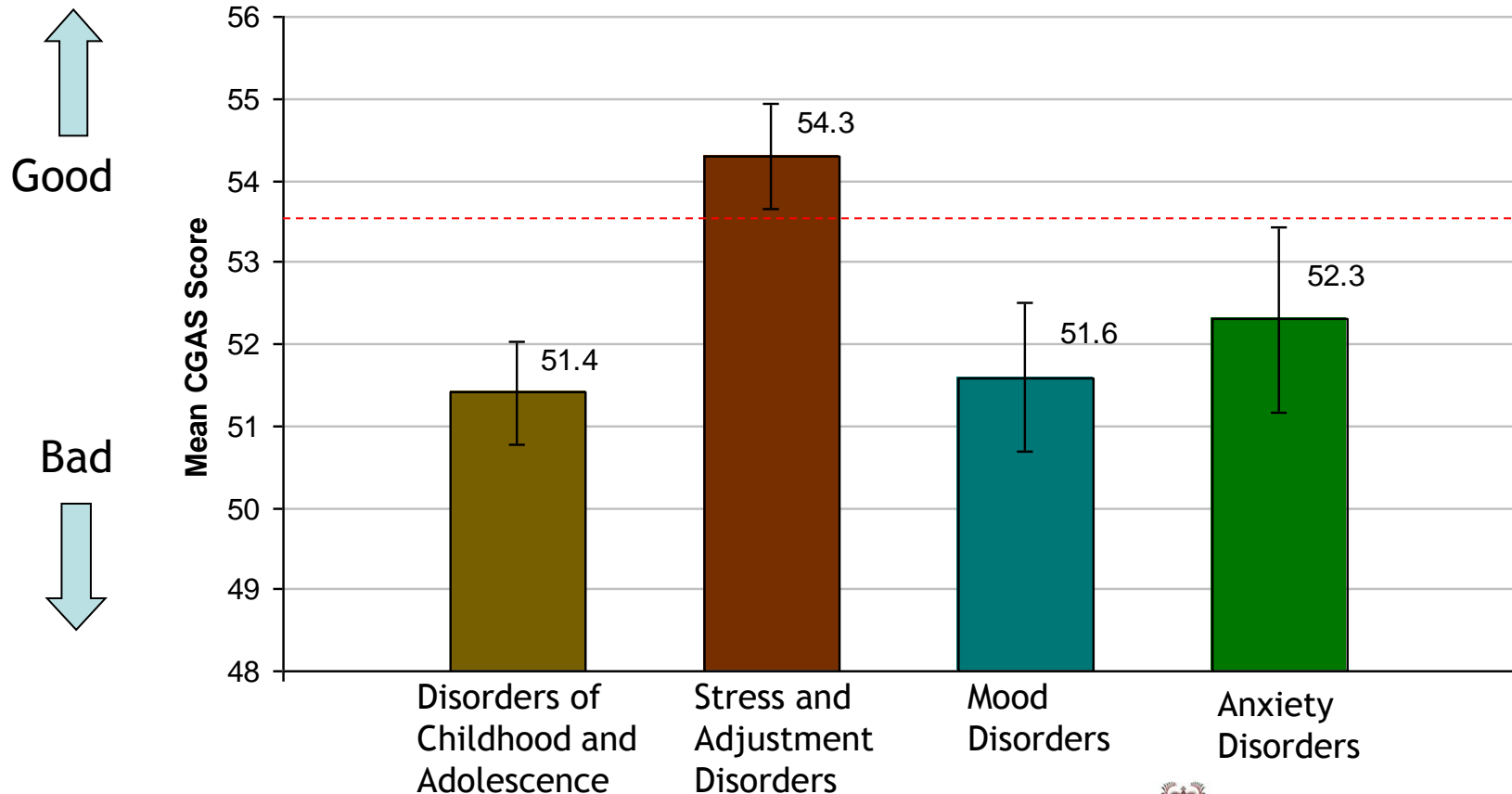


WA CAMHS Ambulatory CGAS Scores at Admission 2005-2009

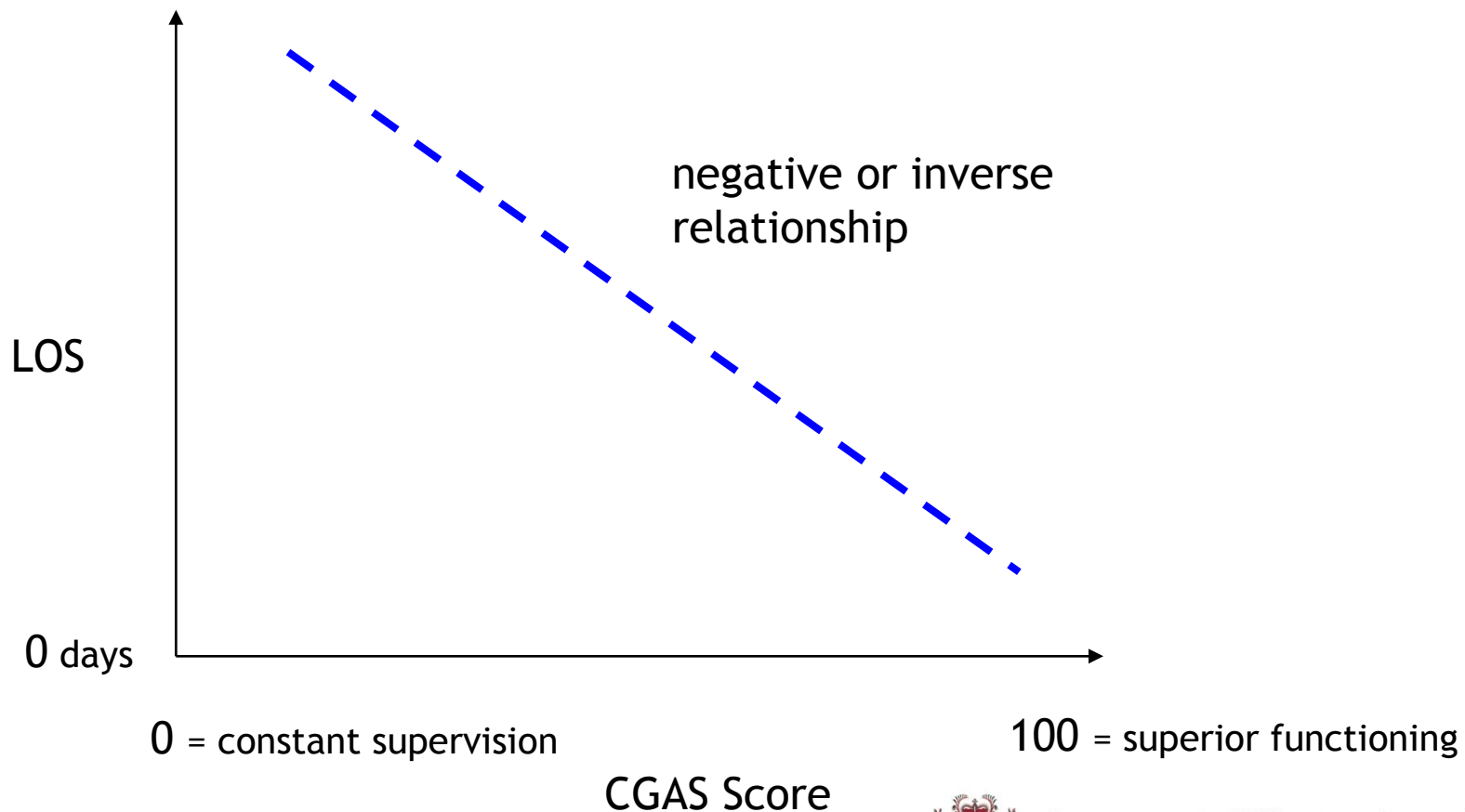


CGAS Scores by Diagnostic Category

WA CAMHS Ambulatory CGAS Scores by Diagnosis 2005-2009



What relationship would we expect between the CGAS and Length of Stay?



CGAS and LOS



Correlation

$p < 0.001$

Coefficient = -0.102

Simple Regression

$p < 0.001$

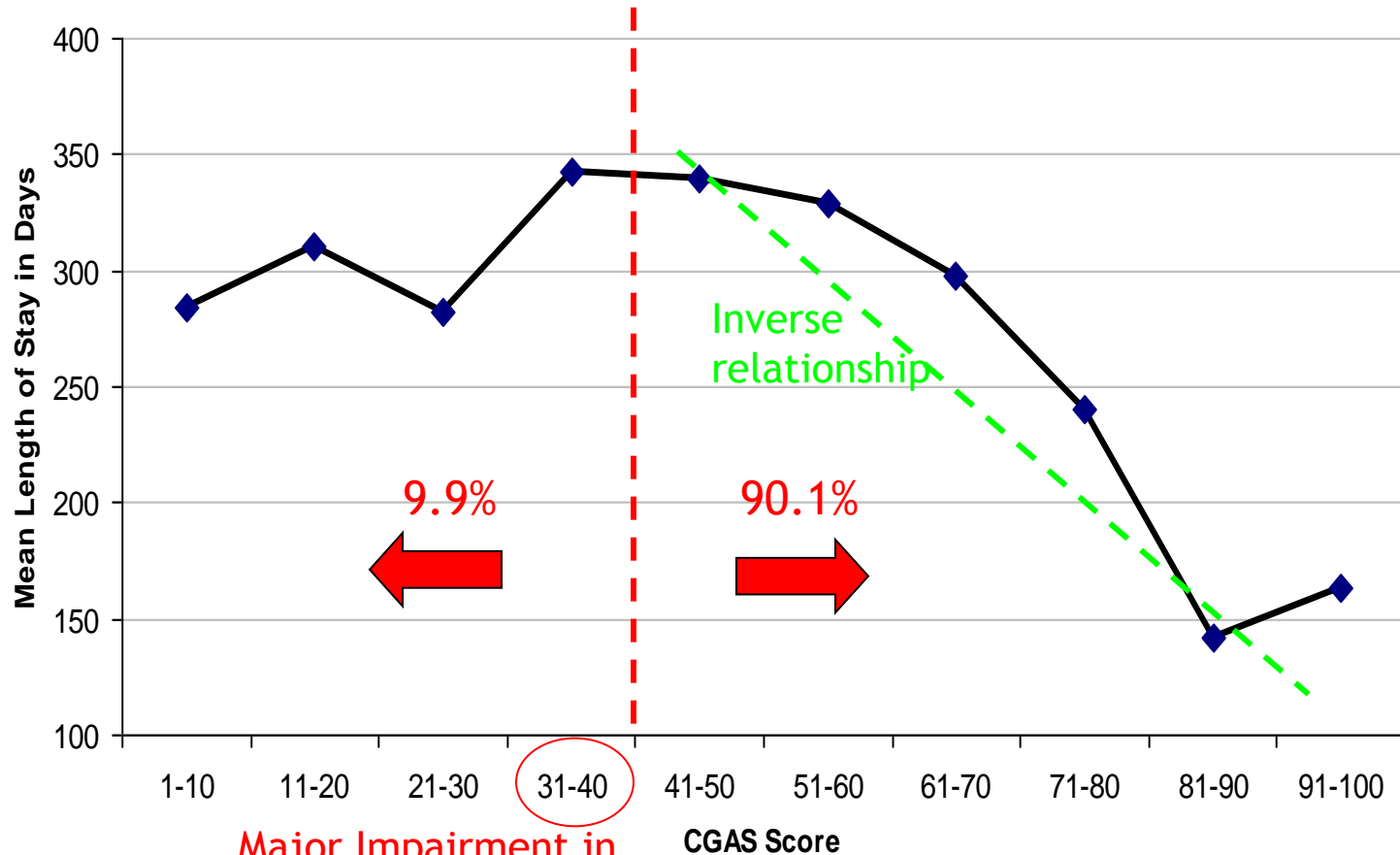
% variance explained = 1%

ANOVA

$p < 0.001$

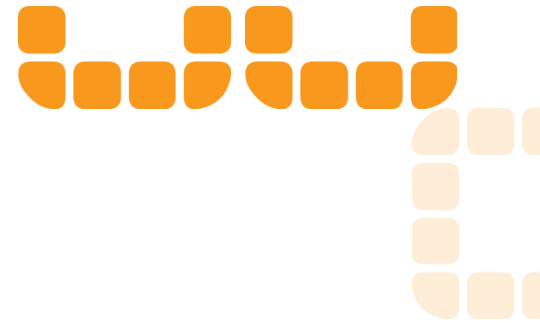
% variance explained = 1.8%

WA CAMHS Ambulatory 2005-2009: CGAS Score at Admission and Length of Stay



Major Impairment in most social areas or severe impairment in one.





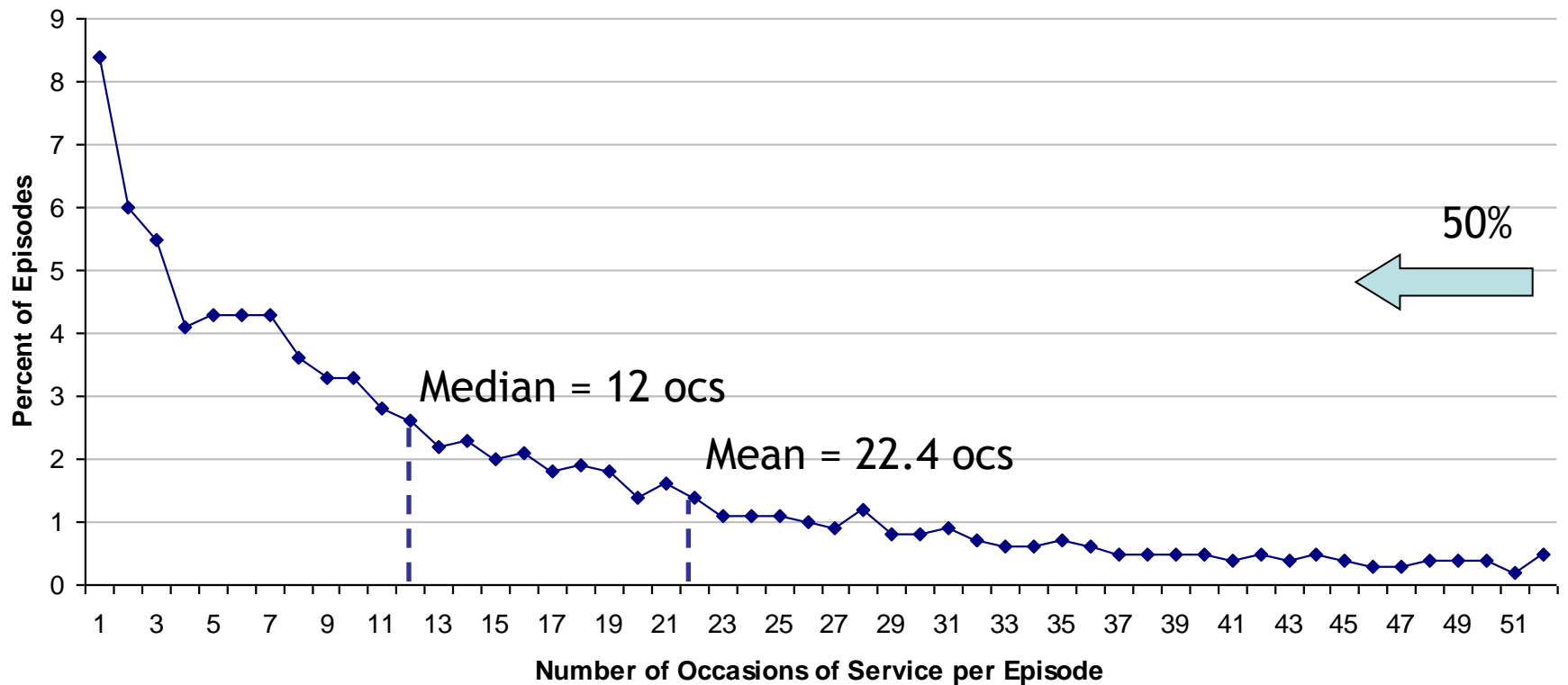
6. Frequency of Occasions of Service



Distribution of Number of Occasions of Service per Episode



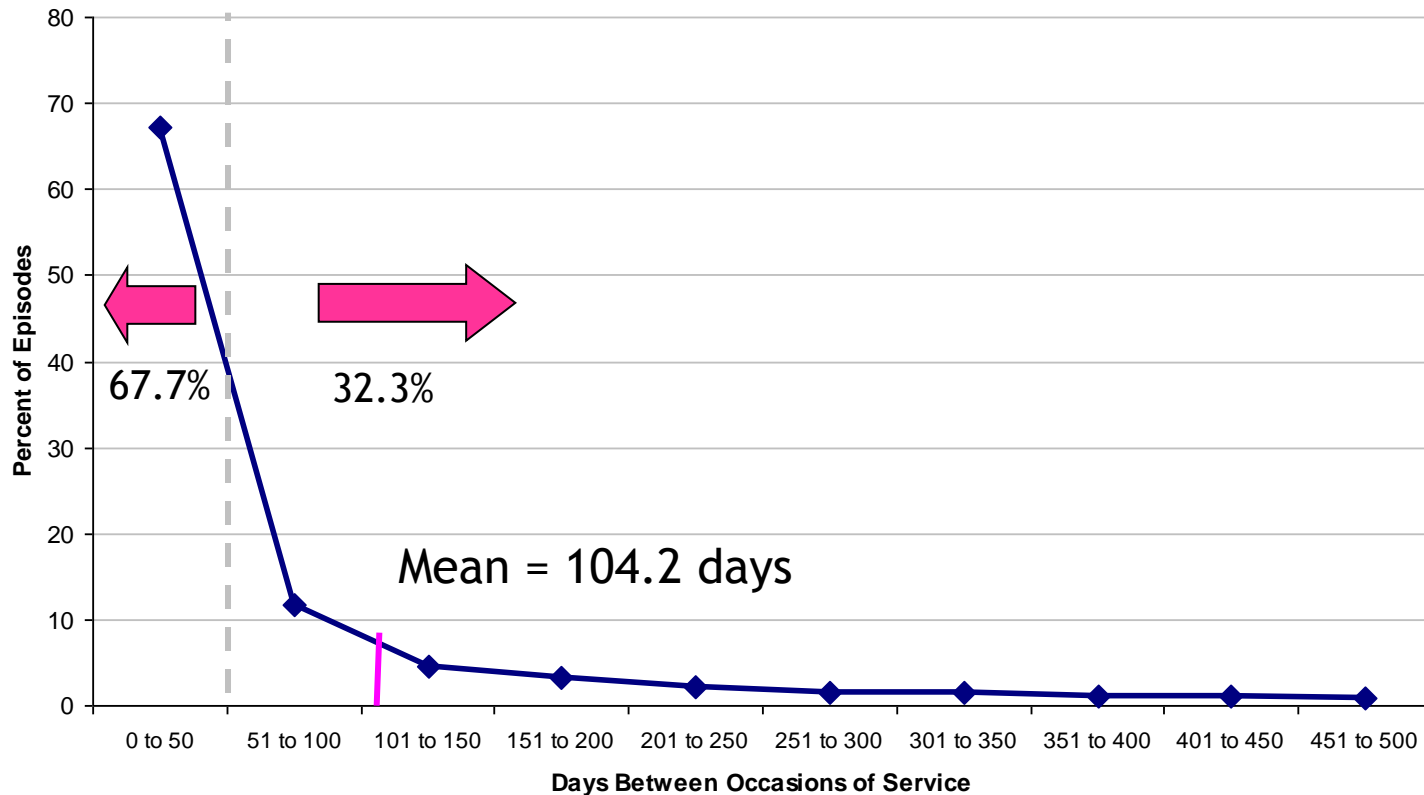
WA CAMHS Ambulatory 2005-2009: Number of Occasions of Service per Episode

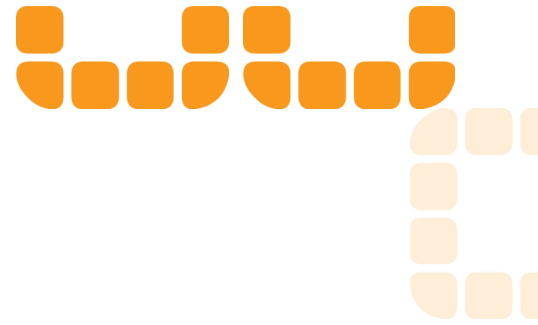


Distribution of Days Between Occasions of Service



WA CAMHS Ambulatory 2005-2009: Frequency of Occasions of Service





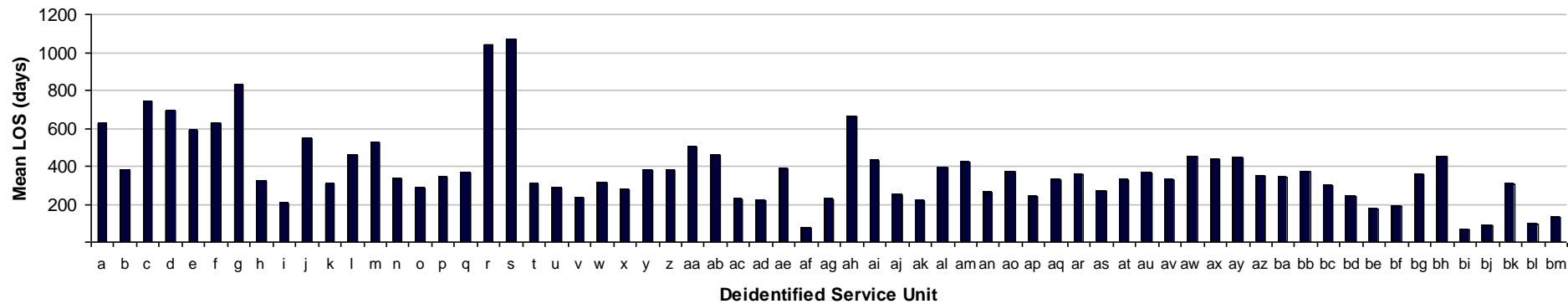
7. Service program child is admitted to



Mean LOS per Program



WA CAMHS AMBUALTRY 2005-2009: Mean Length of Stay and Service Unit



ANOVA

$p < 0.001$

% variance explained=21.2%





Possible Predictors for Length of Stay

What can we use to predict length of stay at admission?

- Gender ✓
- Diagnosis at Admission ✓
- Severity at Admission (HoNOSCA) ✓
- Total Difficulties at Admission (SDQ) ✓
- Case Complexity at Admission (FIHS, CGAS) FIHS ✓ CGAS ✓
- Frequency of Occasions of Service ?
- Program Attended ✓

Future Considerations: Possibility of interaction effects

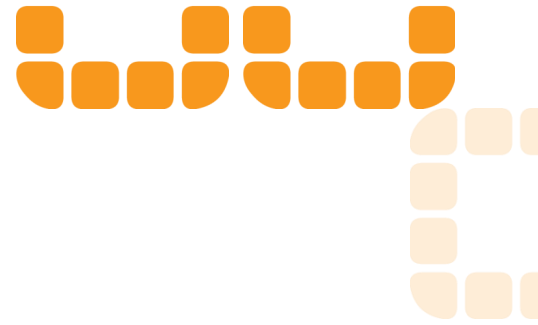
e.g. If frequency of occasions of service increases for children with disorders of childhood and adolescence, does LOS decrease as well?



Next Steps

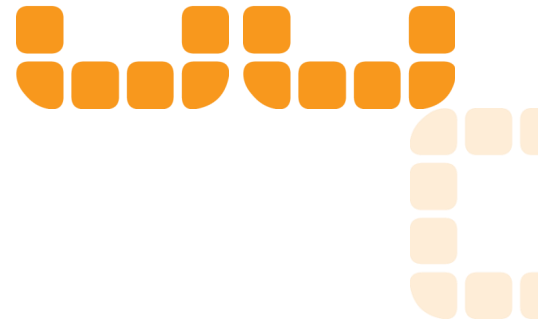
- More advanced statistical analysis – survival analysis
- Understand the 10% rating highest on the measures of complexity better
- Examine relationship between inpatient admissions and ambulatory admissions
- Look at developing a model of length of case (LOC)
- ***Replication elsewhere***





The End –
Thank you very much for listening.

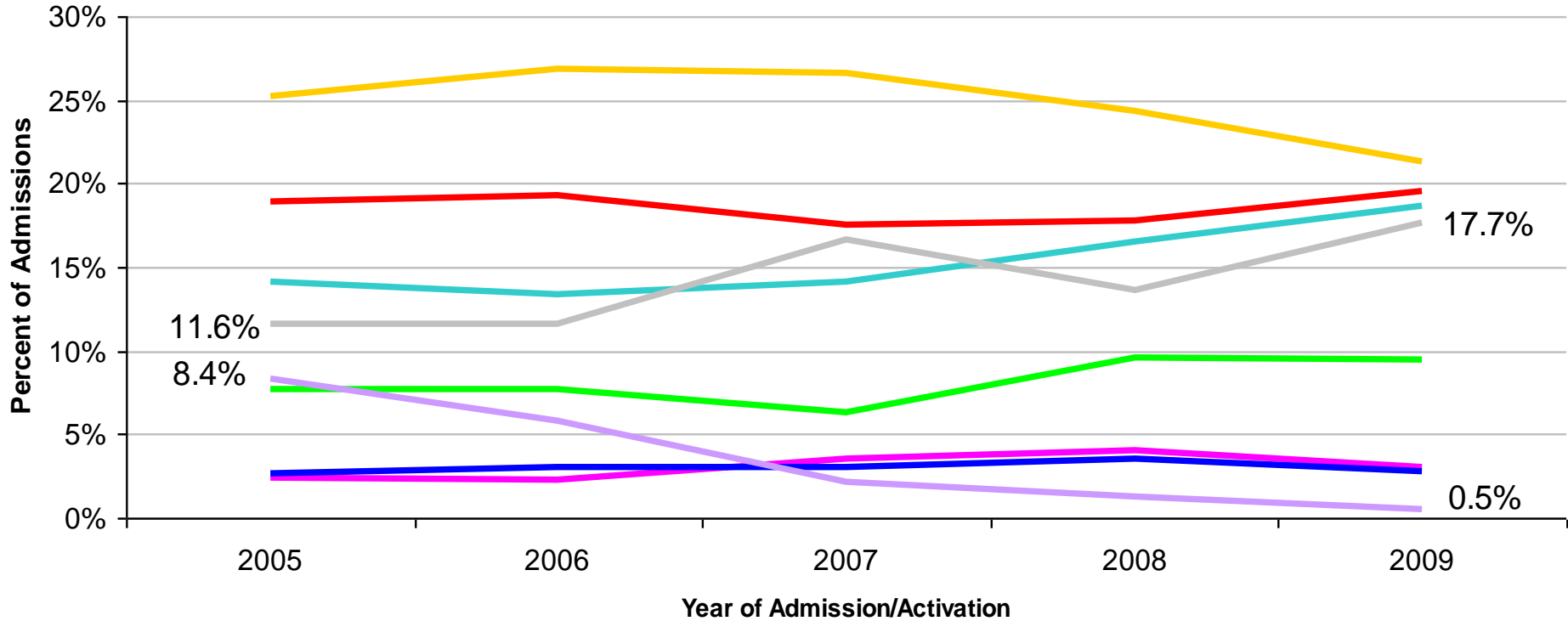




After Presentation Slides (extras)



WA CAMHS Diagnoses at Admission 2005-2009 by Year



Disorders of childhood and adolescence

Mood disorders

Eating disorders

Unspecified mental disorder

Stress and adjustment disorders

Anxiety disorders

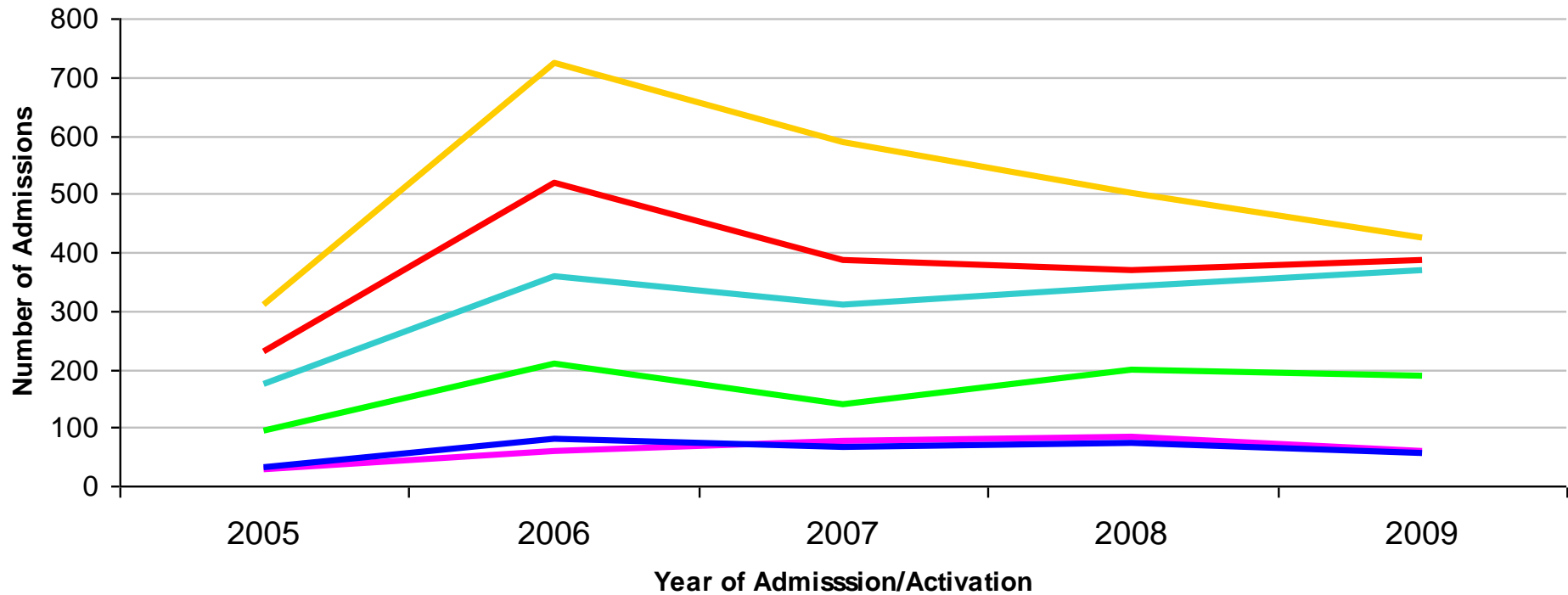
Schizophrenia, paranoia and acute psychotic disorders

Other (includes Z, non-psychiatric and invalid codes)





WA CAMHS Diagnoses at Admission 2005-2009 (Excluding 'other' and 'unspecified')



Disorders of childhood and adolescence

Stress and adjustment disorders

Mood disorders

Anxiety disorders

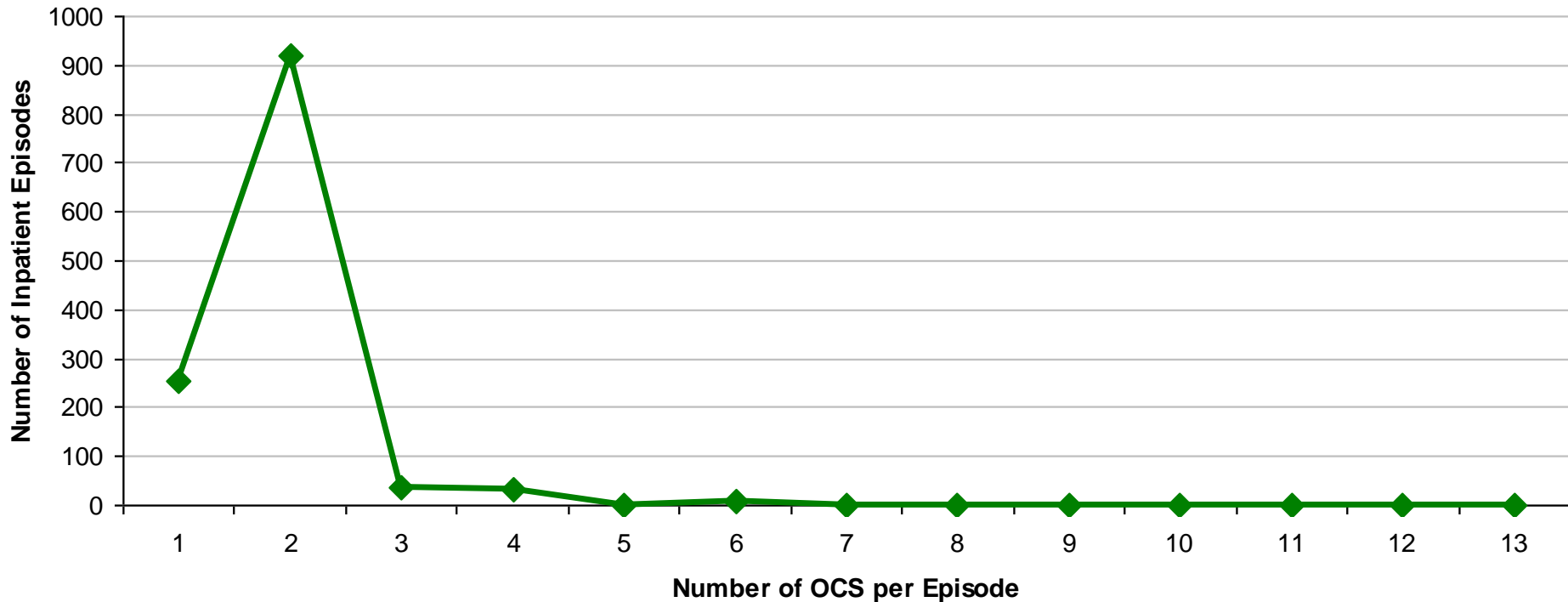
Eating disorders

Schizophrenia, paranoia and acute psychotic disorders



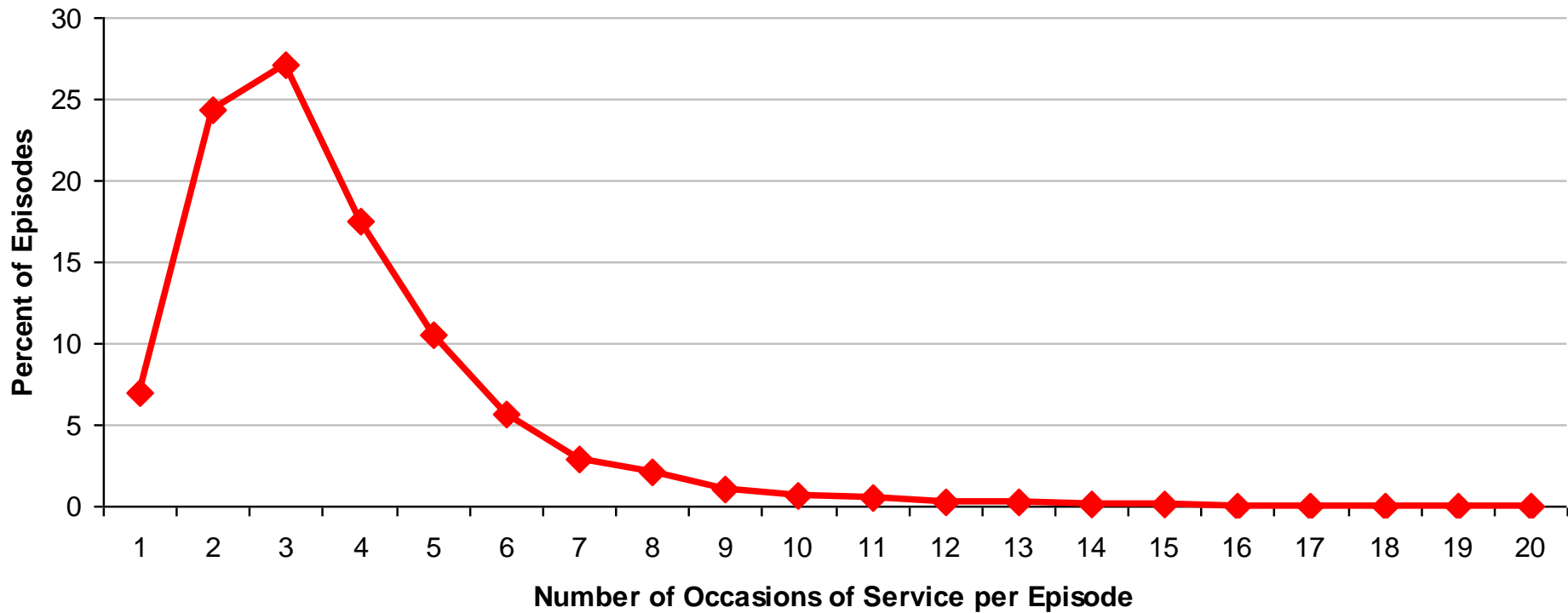
WA CAMHS 2005-2009 Number of NOCC Collection Occasions Per Episode: Inpatient

WA CAMHS 2005-2009 NOCC Collection Occasions Per Episode: Inpatient Only



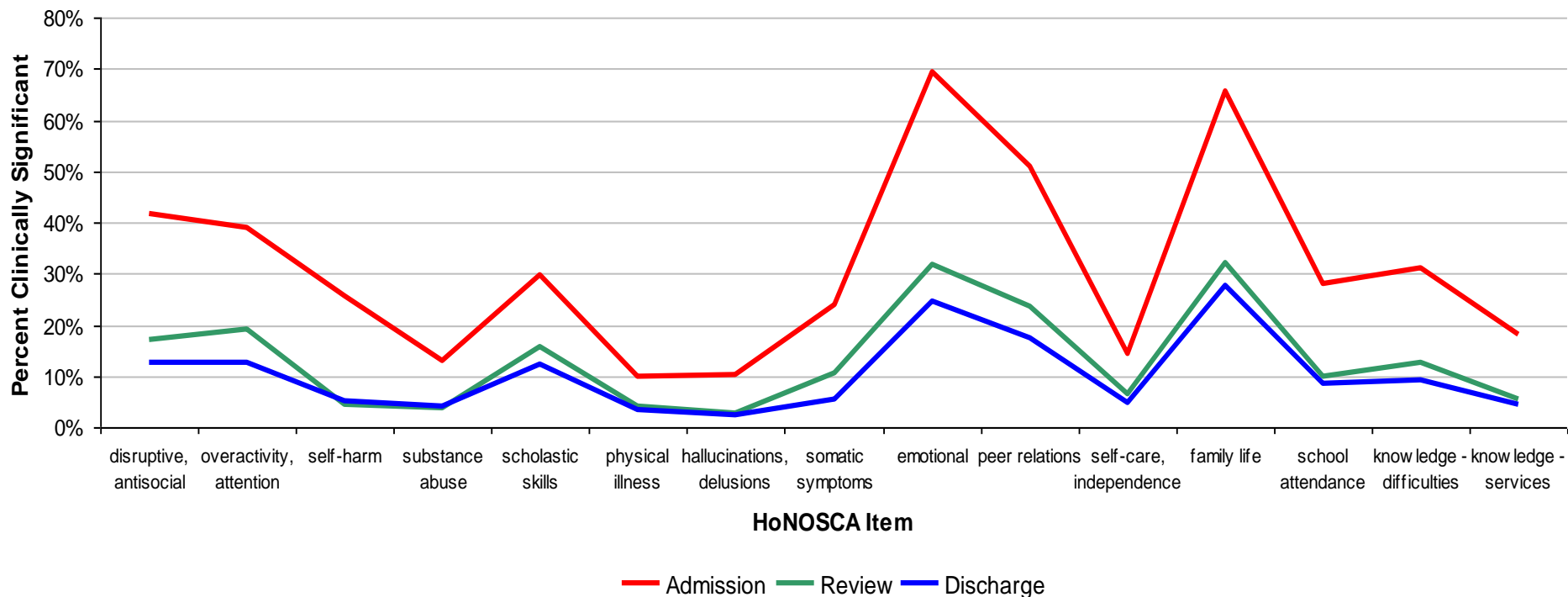
WA CAMHS 2005-2009 Number of NOCC Collection Occasions Per Episode: Ambulatory

**WA CAMHS 2005-2009 NOCC Collection Occasions Per Episode:
Ambulatory Only**



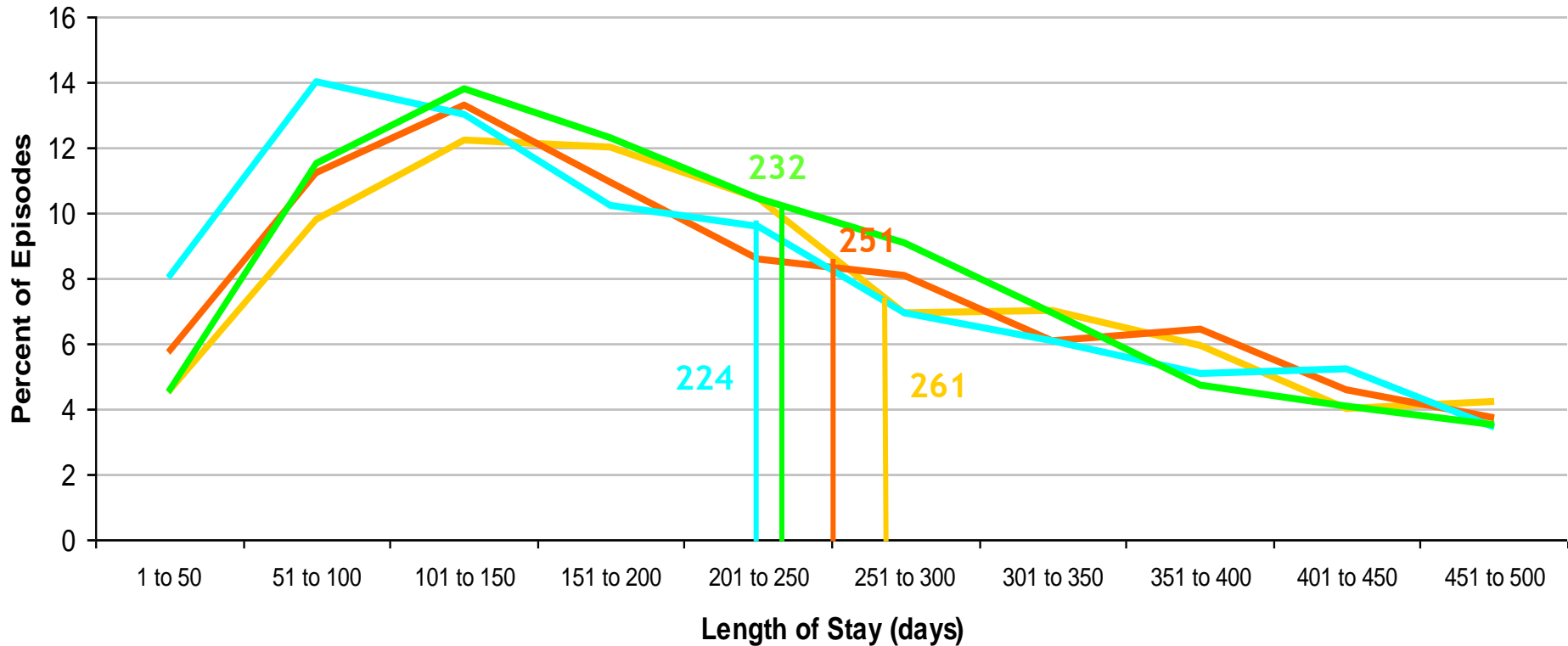
CAMHS Ambulatory Disorders of Childhood and Adolescence: HoNOSCA Profile

WA CAMHS Ambulatory 2005-2009 HoNOSCA Profile - Overall





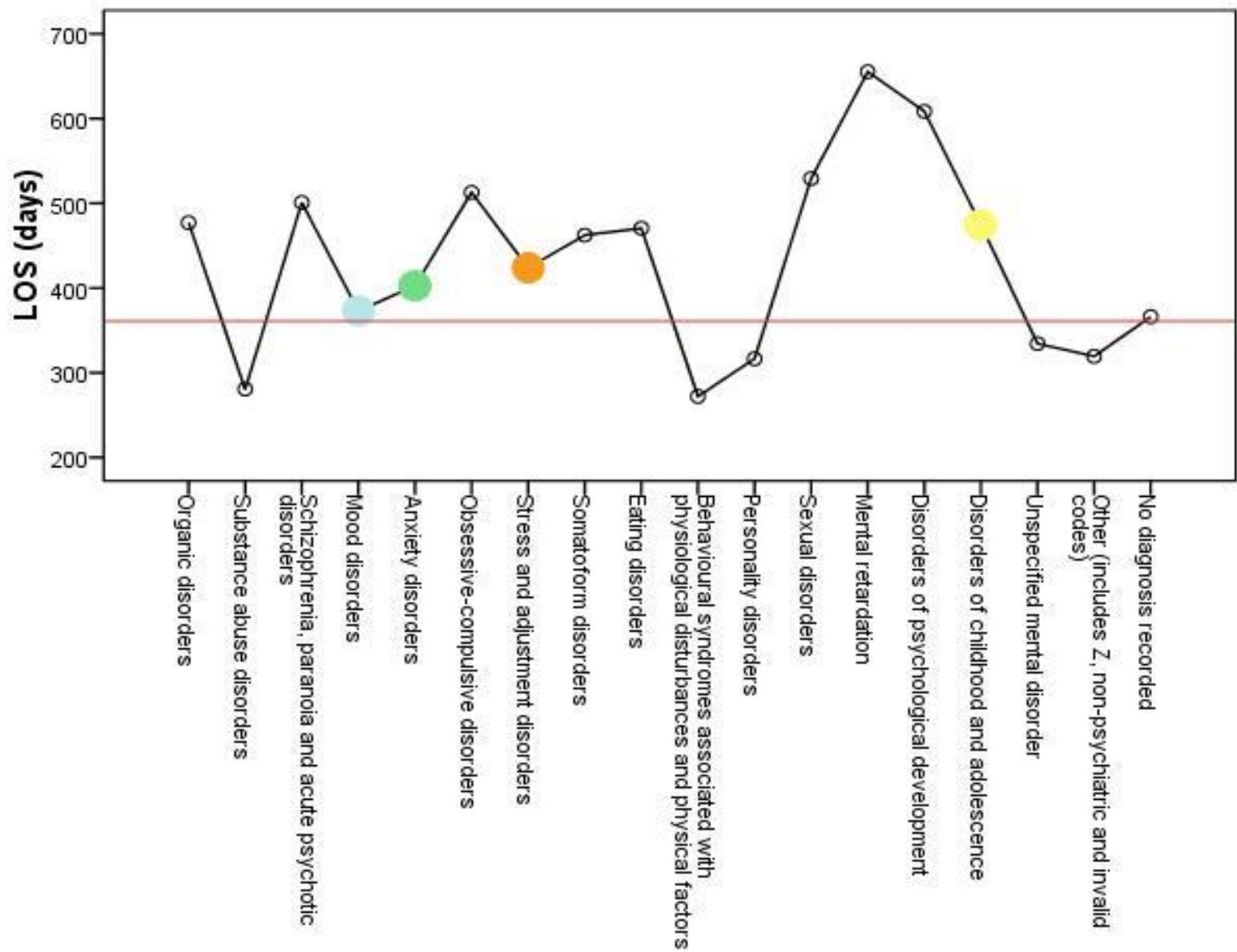
WA CAMHS Ambulatory Length of Stay 2005-2009 by Diagnosis



- DISRODERS OF CHILDHOOD AND ADOLESCENCE
- MOOD DISORDERS
- STRESS AND ADJUSTMENT DISORDERS
- ANXIETY DISORDERS

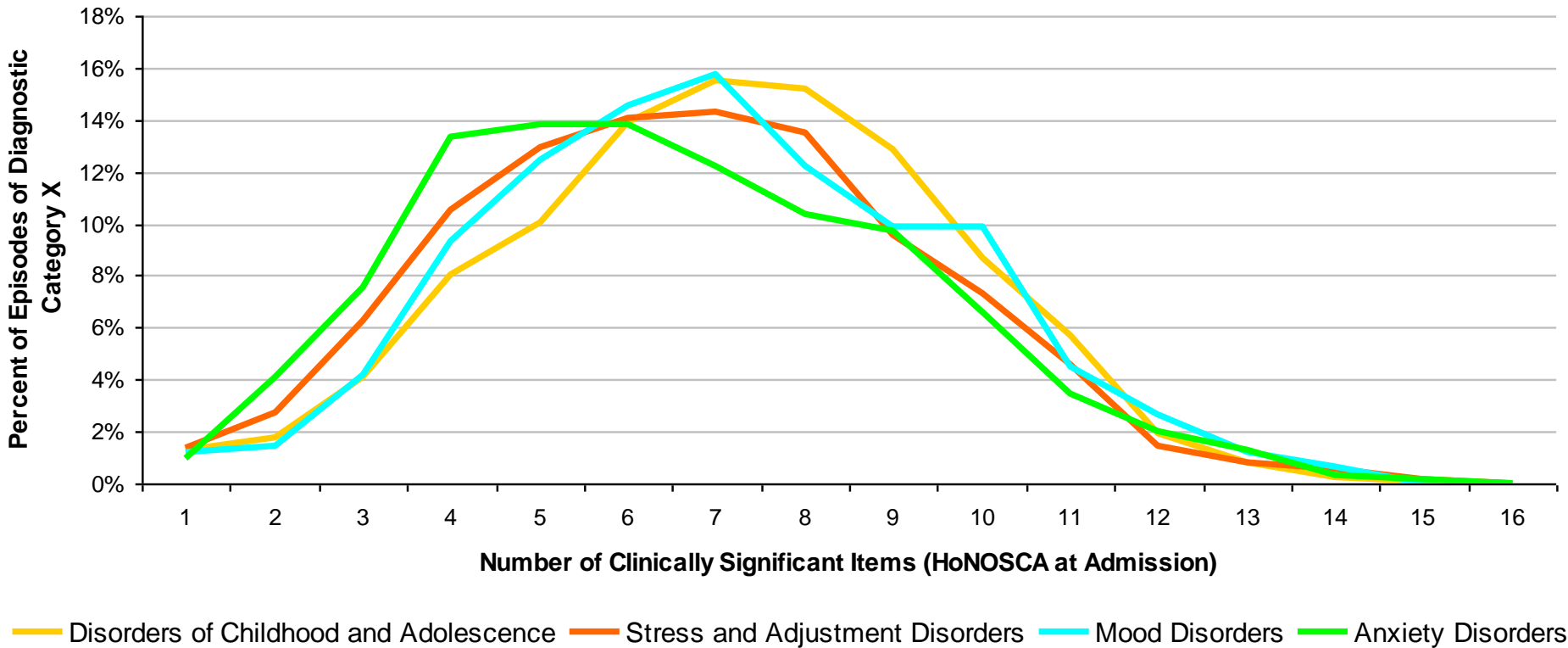


Mean Length of Stay by Diagnosis - CAMHS Ambulatory Services 2005-2009



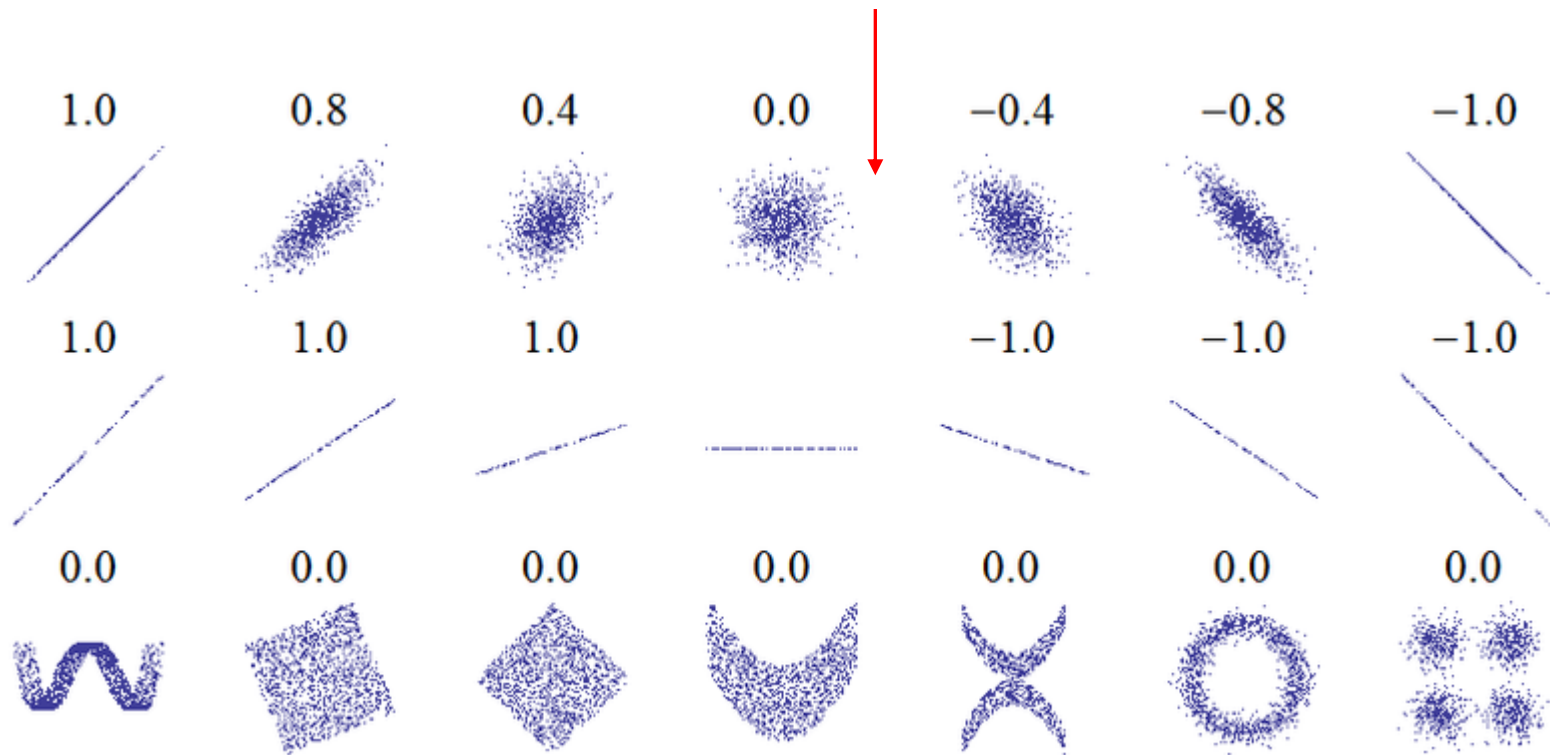
Number of Clinically Significant Items by Diagnostic Category

WA CAMHS Ambulatory 2005-2009: Number of Clinically Significant Items by Diagnostic Category





Correlation Coefficients and What They Mean

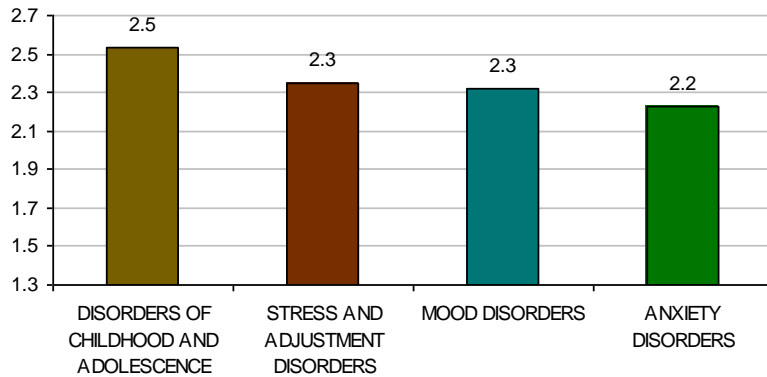


Not a practically significant association,
but it does exist.

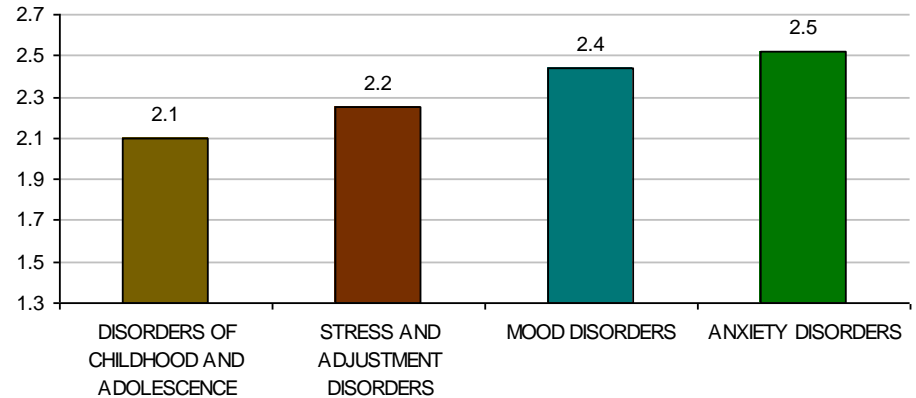




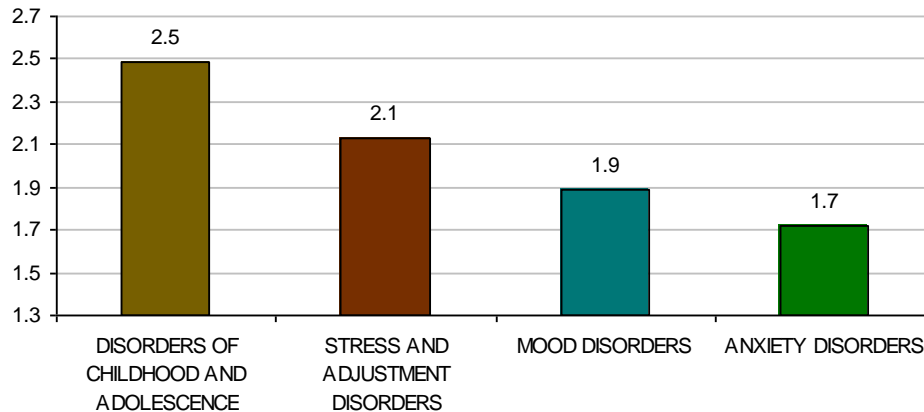
WA CAMHS Ambulatory 2005-2009: SDQ Total Difficulties Scores by Diagnostic Category



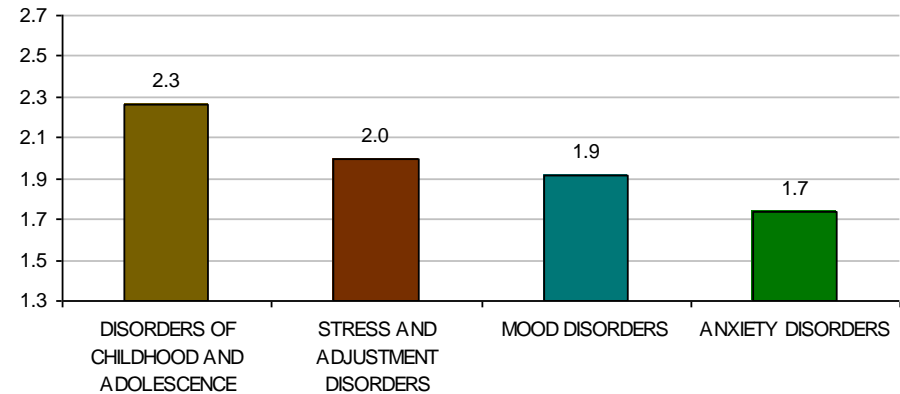
WA CAMHS Ambulatory 2005-2009: SDQ Emotional Symptoms Subscale by Diagnostic Category

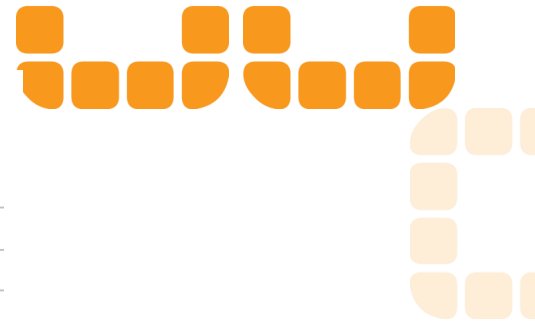


WA CAMHS Ambulatory 2005-2009: SDQ Conduct Problems Subscale by Diagnostic Category

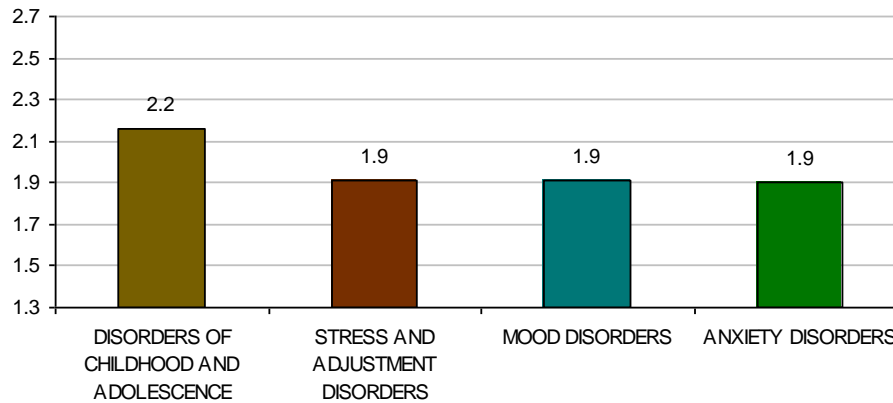


WA CAMHS Ambulatory 2005-2009: SDQ Hyperactivity Symptoms Subscale by Diagnostic Category

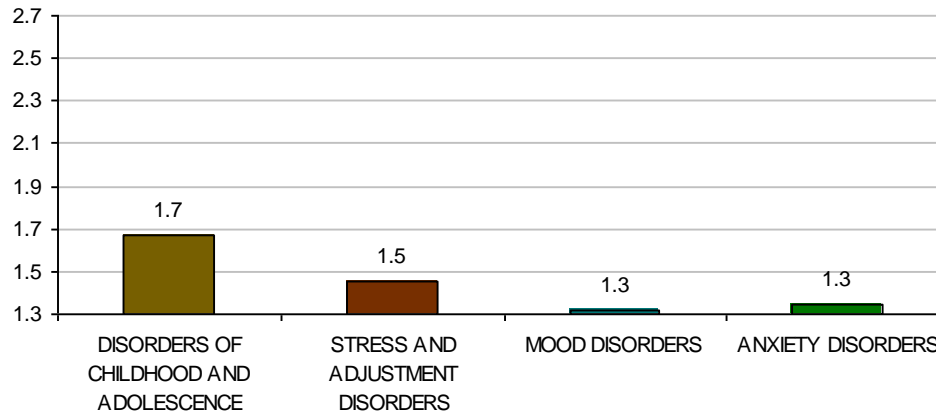




WA CAMHS Ambulatory 2005-2009: SDQ Peer Problems Subscale by Diagnostic Category

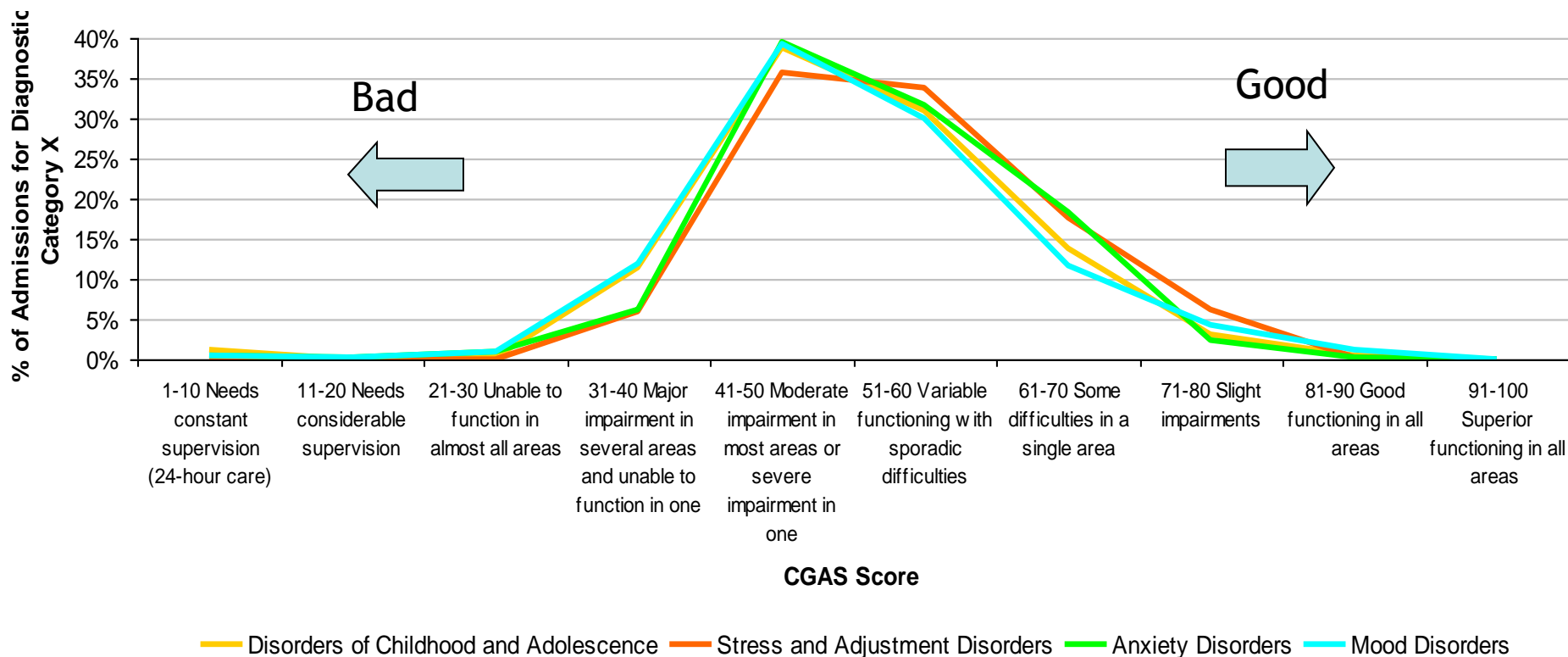


WA CAMHS Ambulatory 2005-2009: SDQ Prosocial Behaviour Problems Subscale by Diagnostic Category



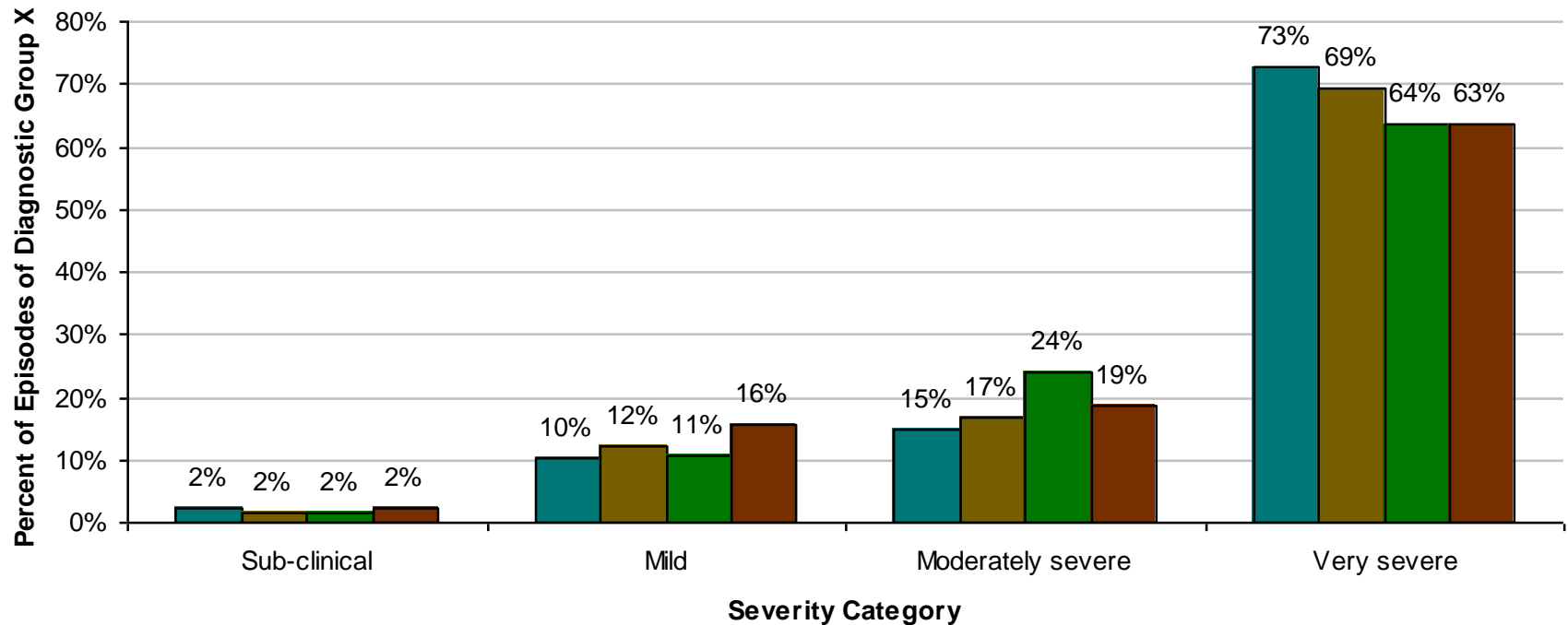
WA CAMHS Ambulatory CGAS Scores at Admission by Diagnostic Category

WA CAMHS Ambulatory 2005-2009: CGAS Scores by Diagnostic Category



Severity by Diagnostic Group

WA CAMHS Ambulatory 2005-2009: Severity by Diagnostic Group



■ Mood Disorders
■ Anxiety Disorders

■ Disorders of Childhood and Adolescence
■ Stress and Adjustment Disorders

