Gastrointestinal Symptoms in 2- to 5-Year-Old Children

Interagency Autism Coordinating Committee

Full Committee Meeting

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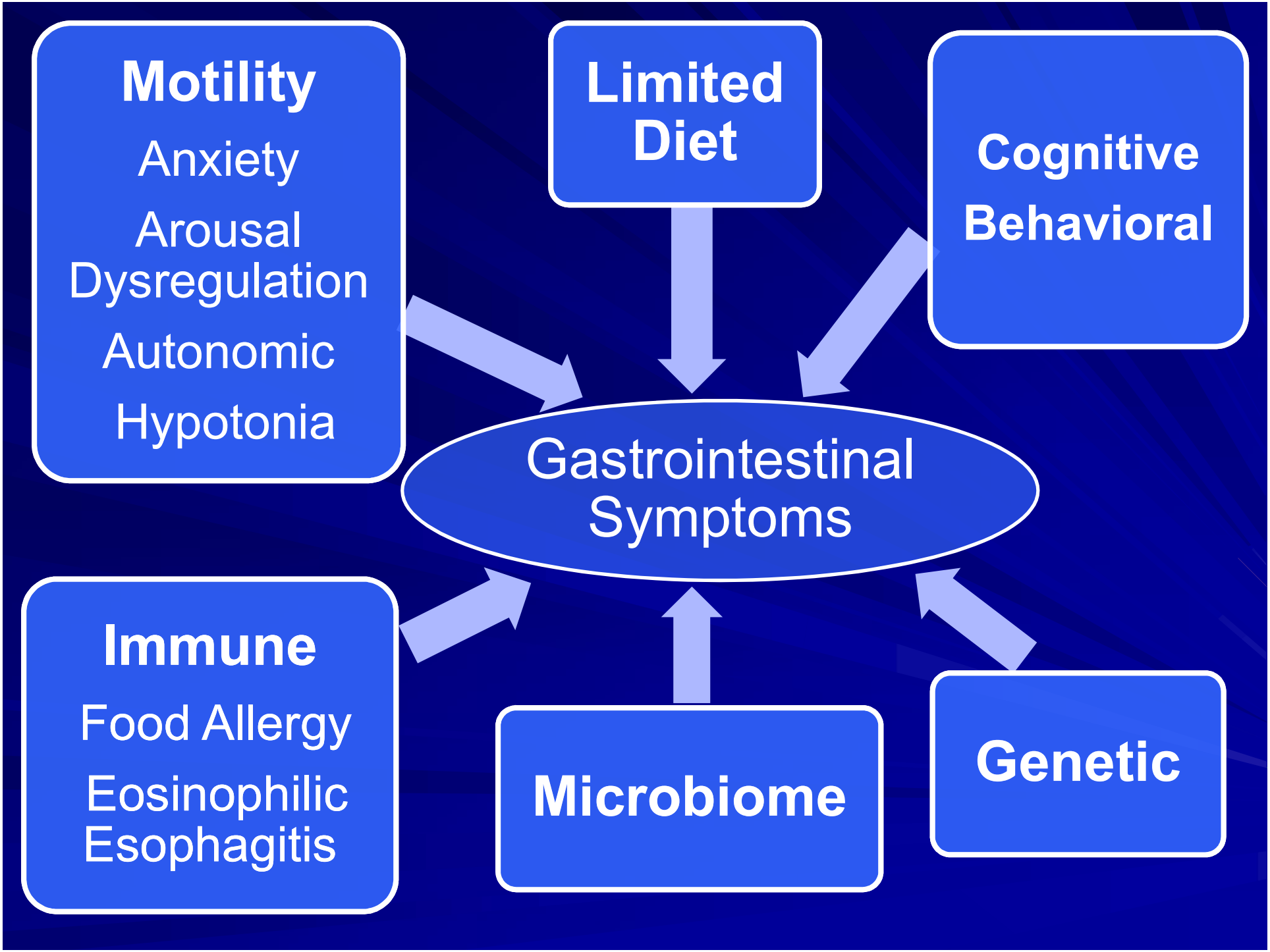
Gastrointestinal Symptoms (GIS) in ASD

- Questions
  - Prevalence ranges from 9-70%
  - Etiology
  - Phenotypic subtype
- Needs
  - Diverse, non-clinic based sample
  - Large sample with comparison groups
  - Well characterized sample


Motility
Anxiety
Arousal Dysregulation
Autonomic
Hypotonia
Limited Diet
Cognitive Behavioral
Gastrointestinal Symptoms
Immune
Food Allergy
Eosinophilic Esophagitis
Microbiome
Genetic

Methods

- Sample
  - ASD (n=672), DD (n=938), POP (n=851)
  - Stool diary: ASD (n=423), DD (n=551), and POP (n=597)
- GI symptoms
  - Parent Completed Gastrointestinal Questionnaire (yes/no)
  - Stool Diary using Bristol Stool Scale (7 point Likert Scale)
  - GI Medications used in previous month
- Associations with GIS
  - ADOS Calibrated Severity Scale - ASD only
  - ADI-R Regression Questions - ASD only
  - Child Behavior Checklist (CBCL)
  - Children's Sleep Habits Questionnaire (CSHQ)

GI Symptoms Methods

Parent Report

- Any GIS
- Diarrhea
- Loose Stools
- Constipation
- Loose Stool alternating w/constipation
- Vomiting
- Abdominal pain
- Gas

Parent Report Plus Stool Diary

- Stool Consistency
- Stool Frequency
- Laxative or Stool Softener use
- Vomiting
- Abdominal Pain
- Gas

GIS Diagnosis (+/-)

Analysis

- Multivariable logistic regression generalized estimating equation (GEE) models
- All models adjusted for
  - Maternal race/ethnicity, education level, and age at child's birth
  - Child sex and cognitive skills
  - Site

GIS Prevalence in SEED

	ASD	DD	POP	ASD vs DD Adjusted OR (95% CI)	ASD vs POP Adjusted OR (95% CI)
Parent Report Only					
GIS	34.6%	22.1%	12.0%	1.85 (1.54-2.22)*	3.42 (2.11-5.54)*
Parent Report with Stool Diary					
GIS	50.4%	42.6%	30.6%	1.29 (1.07-1.56)**	2.22 (1.56-3.14)*

* p-value < 0.001, ** p-value < 0.05

Association between GIS and regression and autism severity in Children with ASD

- Children with ASD and Regression are 1.5 times more likely to have GIS
  - Adjusted Odds Ratio = 1.53 (95% CI, 1.33-1.77), $p<0.05$
- No Difference in Autism Severity Score in Children with ASD with and without GIS

Association between GIS and behavior

	Mean Difference (95% CI)	p-value
CBCL - Anxious Depressed Subscale		
ASD	0.74(0.22-1.27)	0.0056
DD	0.66(0.31-1)	0.0002
POP	0.73(0.27-1.18)	0.0017
CBCL - Aggressive Behavior Subscale		
ASD	2.35(1.58-3.12)	<.0001
DD	2.87(1.82-3.91)	<.0001
POP	2.13(1.32-2.94)	<.0001

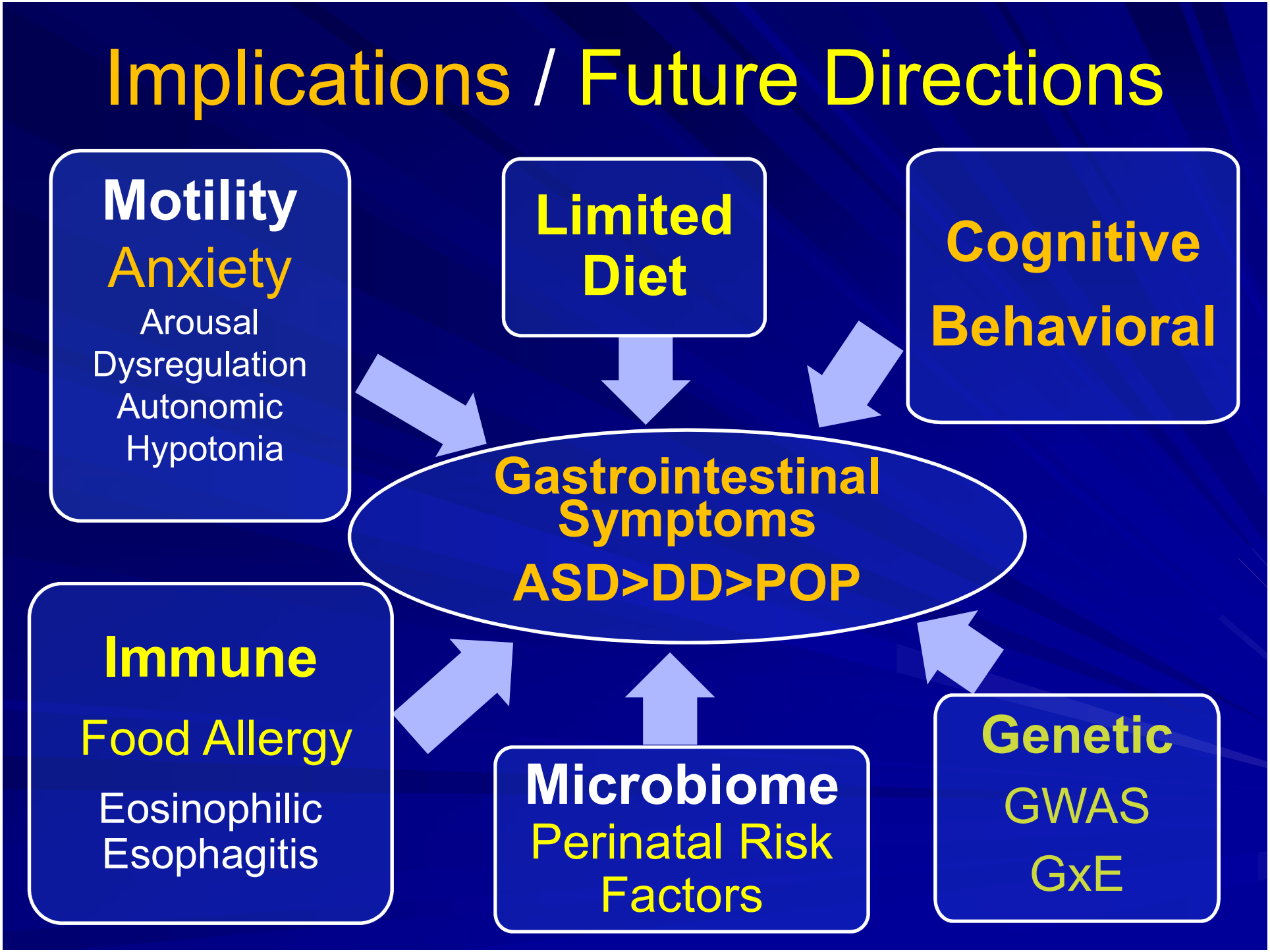
Sleep Concerns and GIS

CSHQ Score > 48		
	OR (95% CI)	p-value
Case	2.07(1.57-2.71)	<0.0001
DD	1.67(1.18-2.36)	0.004
POP	2.08(1.36-3.18)	0.0007

Limitations

- No clinical diagnosis of GIS
- Questionnaire has not been validated
- Stool Diary
  - Differences in demographic variables
  - 51% completed SD during a typical week
  - Children with ASD using treatment for constipation were less likely to have a SD
  - Children with ASD were more likely to use a treatment for constipation other than a laxative or stool softener

Implications / Future Directions



Thank You

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Center for Autism and Developmental Disabilities Research and Epidemiology

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