



Sleep Issues in Children and Adolescents with FASD

Presenters:

- Dr. Louise Scott, Paediatric Neuropsychologist
- Wilma Veenhof, C. Psych. Associate
(Supervised Practice)
- Karen Huber, Clinic Coordinator
- Janet Carioni, Occupational Therapist
- Melanie Gravel, Speech-Language Pathologist

Dr. Kuldip Malhotra, Paediatrician

Dr. Louise Scott, Paediatric Neuropsychologist





Sleep Issues in Children and Adolescents with FASD

Waterloo Region FASD Diagnostic Team

Dr. Kuldip Malhotra, Paediatrician

Dr. Louise Scott, Paediatric Neuropsychologist





OUTLINE

- Waterloo Region Diagnostic Team – *Karen Huber*
- Sleep Hygiene – *Janet Carioni*
- Normal Sleep – *Wilma Veenhof*
- The Results – *Dr. Louise Scott*
- Where We Go From Here - *Dr. L. Scott*



INTRODUCTION

- Noticed sleep issues were reported frequently in FASD
- How to measure sleep quality?
- Importance of full sleep studies in FASD



WHY SLEEP?

- The quality of sleep impacts learning, memory, executive functioning, attention, mood regulation, behaviour etc.
- parents are questioned about the quality of the child/youth's sleep



WATERLOO REGION FASD DIAGNOSTIC TEAM

- Steering Committee
- Diagnostic Team
- Current Practice for Identifying Sleep Issues in the Assessment Process



STEERING COMMITTEE

- Steering Committee consists of program managers of involved agencies as well as representatives from the diagnostic team.
- Diagnostic team and Steering Committee provide “in kind” services- 10 clinics a year.
- Presently, only those agencies and practitioners involved in Steering Committee or Diagnostic team can make referrals to the Waterloo Region FASD clinic.



DIAGNOSTIC TEAM

- Paediatrician
 - Paediatric Neuropsychologist/ Psychologist
 - Occupational Therapist
 - Speech-Language Pathologist
 - Clinic Co-ordinator
-
- Follow Canadian Guidelines (CMAJ, 2005) and emerging Best Practice Guidelines.
 - Assessment of Brain Domains according to Best Practice Guidelines



SCREENING FOR SLEEP PROBLEMS AT INTAKE

- Referrals processed by Clinic Co-ordinator
- Collateral information is requested from community partners.
- Co-ordinator meets with individuals and families to complete an intake assessment and to prepare them for participation in the diagnostic process.



INCORPORATING ASSESSMENT OF SLEEP PROBLEMS INTO THE INTAKE PROCESS

- Clinic Co-ordinator now asks screening questions about the child/youth's sleep based on practice parameters from the American Academy of Sleep Medicine.



SAMPLE OF PAEDIATRIC SLEEP QUESTIONS ASKED

Does your child...

- Snore?
- Stop breathing during the night?
- Have restless sleep? Where are the covers in the morning?
- Have “growing pains”?
- Kicks one or both legs
- Become sweaty, or do the pyjamas usually become wet with perspiration?
- Get out of bed to urinate?



SAMPLE OF PAEDIATRIC SLEEP QUESTIONS ASKED

Does your child...

- Sleep with mouth open?
- Have a “stuffy nose”?
- Grind teeth
- Walk during sleep
- Talk during sleep
- Have trouble falling asleep (30 minutes or more)
- Have nightmares?
- Drink caffeinated beverages? How many?



SAMPLE OF PAEDIATRIC SLEEP QUESTIONS ASKED

Has your child ever...

- Woke up feeling un-refreshed in the morning?
- Had problems with sleepiness during the day?
- Had surgery before?
- Had tonsils removed?
- Been diagnosed with ADHD or taken medication for such?



SAMPLE OF PAEDIATRIC SLEEP QUESTIONS ASKED

- Based on the answers to these questions a referral will be made for a comprehensive Sleep Study.
- The sleep study will be completed before the FASD clinic day so the information can be incorporated into the assessment.



Comprehensive Sleep Study includes:

Polysomnographic Sleep Study:

- sleeping overnight in a laboratory bedroom with specialized equipment that monitors brain waves, eye movements, respiration, heart rate and rhythm, and leg movements
- Video and audio recording matched to brain and body activity monitoring.



Comprehensive Sleep Study Includes:

Daytime Testing:

- **MSLT (Multiple Sleep Latency Test):**
 - 4-5 nap opportunities (20 min each) every two hours during the day.
 - measures the severity of sleepiness as well as the presence of REM sleep episodes.
- **MWT (Maintenance of Wakefulness Test):**
 - Consists of 4 sessions, 2 hours apart
 - patients are seated in a dark room and asked to remain awake for twenty minutes. This test is a measure of alertness.



Comprehensive Sleep Study Includes:

The Dim Light Melatonin Onset

- Saliva samples are taken every hour in a darkened room beginning early in the evening and ending in the early morning. Melatonin levels are analyzed and it is determined when melatonin is being secreted by the brain.



SLEEP and FASD

- Children who have had prenatal alcohol exposure have many challenges and difficulties.
- Behavioural, emotional and cognitive difficulties are compounded by sleep disruption, which is extremely common in this population group.



Sleep Hygiene

Defined as the promotion of optimal sleep health practices through environmental management

Sleep hygiene includes:

- Scheduling of sleep
- Improved sleep environment
- Use of various sleep-promoting practices



Sleep Hygiene and FASD

Needs to be individually tailored to:

- Neurodevelopmental disabilities
- Cognitive needs
- Health issues
- Sensory processing difficulties

Will be challenging to implement and is only one piece of the puzzle



Sensory Processing and Sleep

Pilot study conducted by Clinic for Alcohol and Drug Exposed Children at Children's Hospital in Winnipeg
(Fjeldsted & Hanlon-Dearman, 2009)

- More active and sensation seeking = Slept less during the day
- Avoidant of sensory stimuli = Awake more in night



Sensory Strategies for Sleep

In FASD, sensory channels **do not** have filters. Sensory information comes in at the same intensity.

- Two-four week trial
- Sleep journal and log

Changing the environment:

- Reducing stimuli
- Manipulating sensory input
- Self-regulation strategies



Sensory Strategies for Sleep

“A good night’s sleep begins in the morning.” (Kurchinka, 2006)

Sensory Diet:

- Method for waking in the morning
- What to serve for breakfast
- Regularly scheduled movement breaks and “heavy work”
- Calming snacks and deep pressure input at bedtime



Sensory Strategies for Sleep

Environmental adaptations

Visual

- Calm and uncluttered bedroom
- Room darkening/sound dampening curtains
- Sleep in a small tent

Auditory

- White noise

Tactile

- Pyjama fabric
- Remove tags



Sensory Strategies for Sleep

Environmental adaptations

Proprioception and Vestibular

- Deep pressure/massage
- Sleeping bag
- Surrounded by stuffed animals
- Slow rhythmical linear rocking

Olfactory

- Laundry soap for sheets, blankets and PJs
- Toothpaste
- Bath soap & shampoo



Circadian Rhythms

- Daily pattern of sleep and wakefulness
- Jet lag, shift work issues, Seasonal Affective Disorder (SAD) are all examples of disrupted circadian rhythms
- Influenced by internal and external factors
 - Exposure to light and darkness
 - Melatonin production and secretion
 - Body temperature
 - Hormone levels (e.g., cortisol)



Melatonin

- Hormone produced in the body
- Production influenced by a person's exposure to light and dark
- Secreted by pineal gland in the brain
- Acts on the Supra-Chiasmatic Nucleus (SCN), a master time keeper for a number of body rhythms
- Influences brain mechanisms for memory and learning



Developmental progression of sleep patterns

○ Infancy

- Lacks well defined stages but can be broken into quiet and active sleep stages
- Sleeps 16-20 hours per day in 1-4 hour periods
- 50% of sleep time is active (REM)



Developmental progression of sleep patterns

- Preschool (ages 3-6)
 - Classic sleep stages evident
 - Stages 1-4 & REM
 - Require 10-11 hours sleep
 - Most children no longer nap by age 5



Developmental progression of sleep patterns

- Latency age (6-12 years)
 - Require 10-11 hours sleep
 - Daytime sleepiness is rare
- Adolescent (13-19 years)
 - Require 8-9 hours sleep; not often achieved
 - Daytime sleepiness frequent; Phase delay develops



Developmental progression of sleep patterns

- Adult
 - Require 6-7 hours sleep
 - Chronic sleep deprivation is common
- Elderly
 - Sleep becomes more fragmented (not consolidated into one night time period)
 - difficult to maintain sleep

● ● ● | Typical Sleep Cycle

Sleep Stages Through The Night

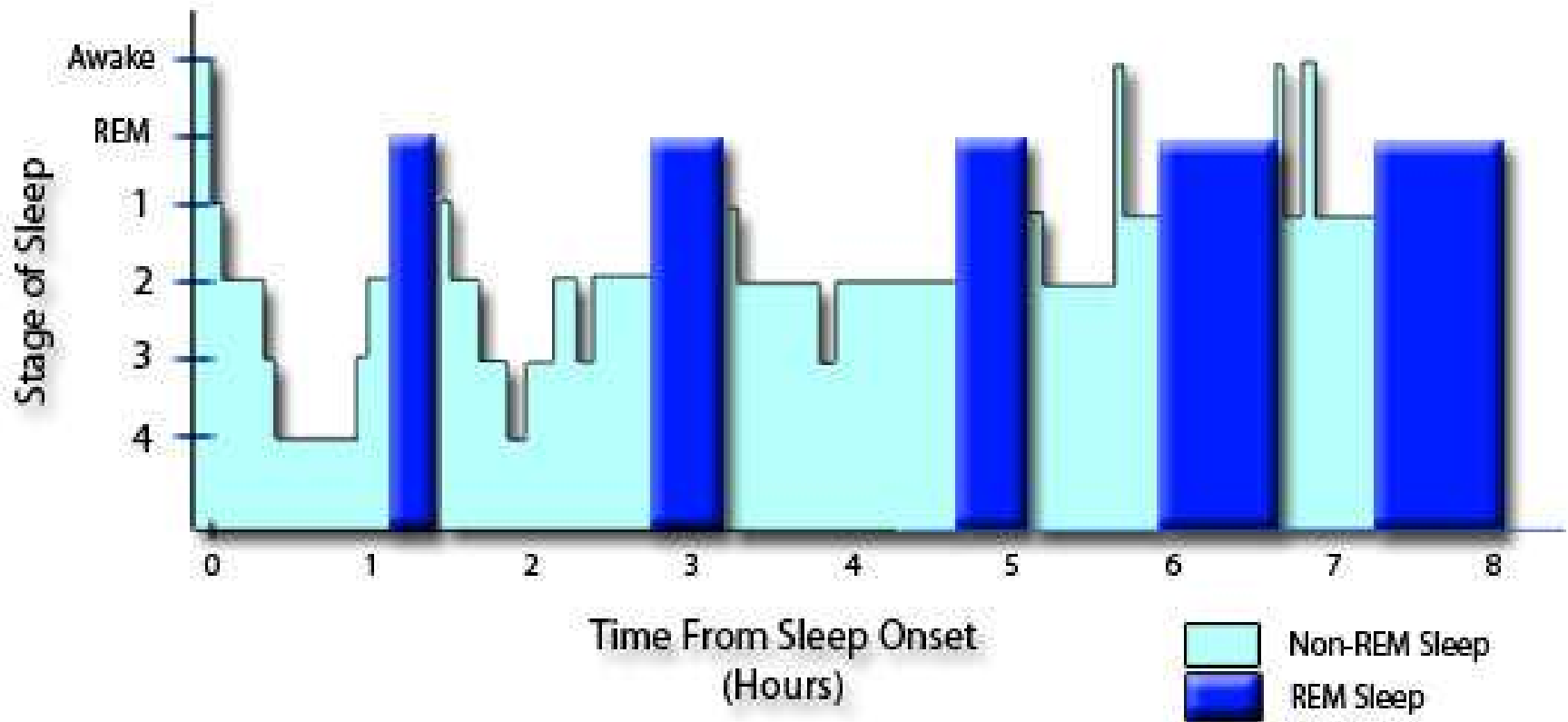


Figure from:
<http://www.end-your-sleep-deprivation.com/stages-of-sleep.html#journey>

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Normal Sleep Architecture in Children 6-12 years

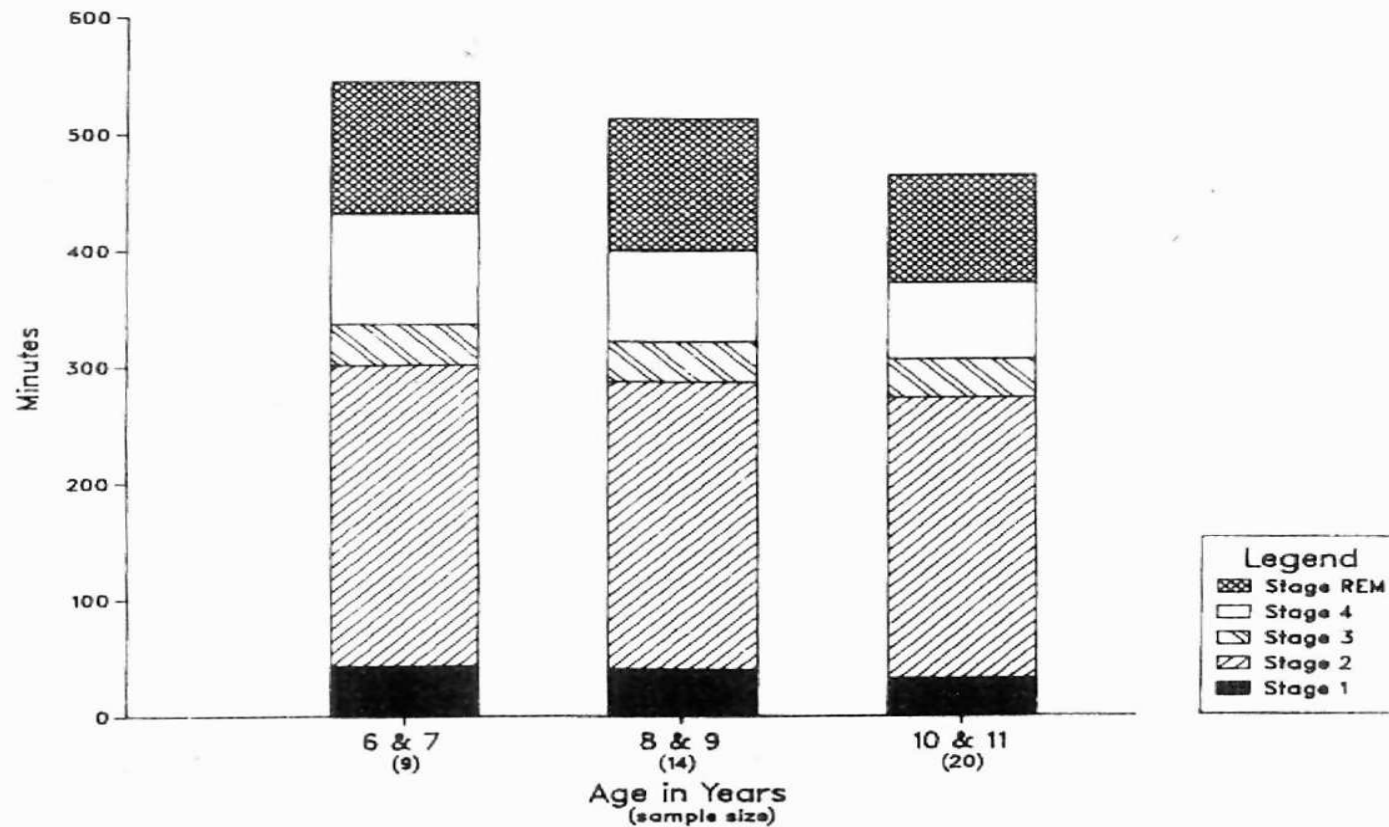
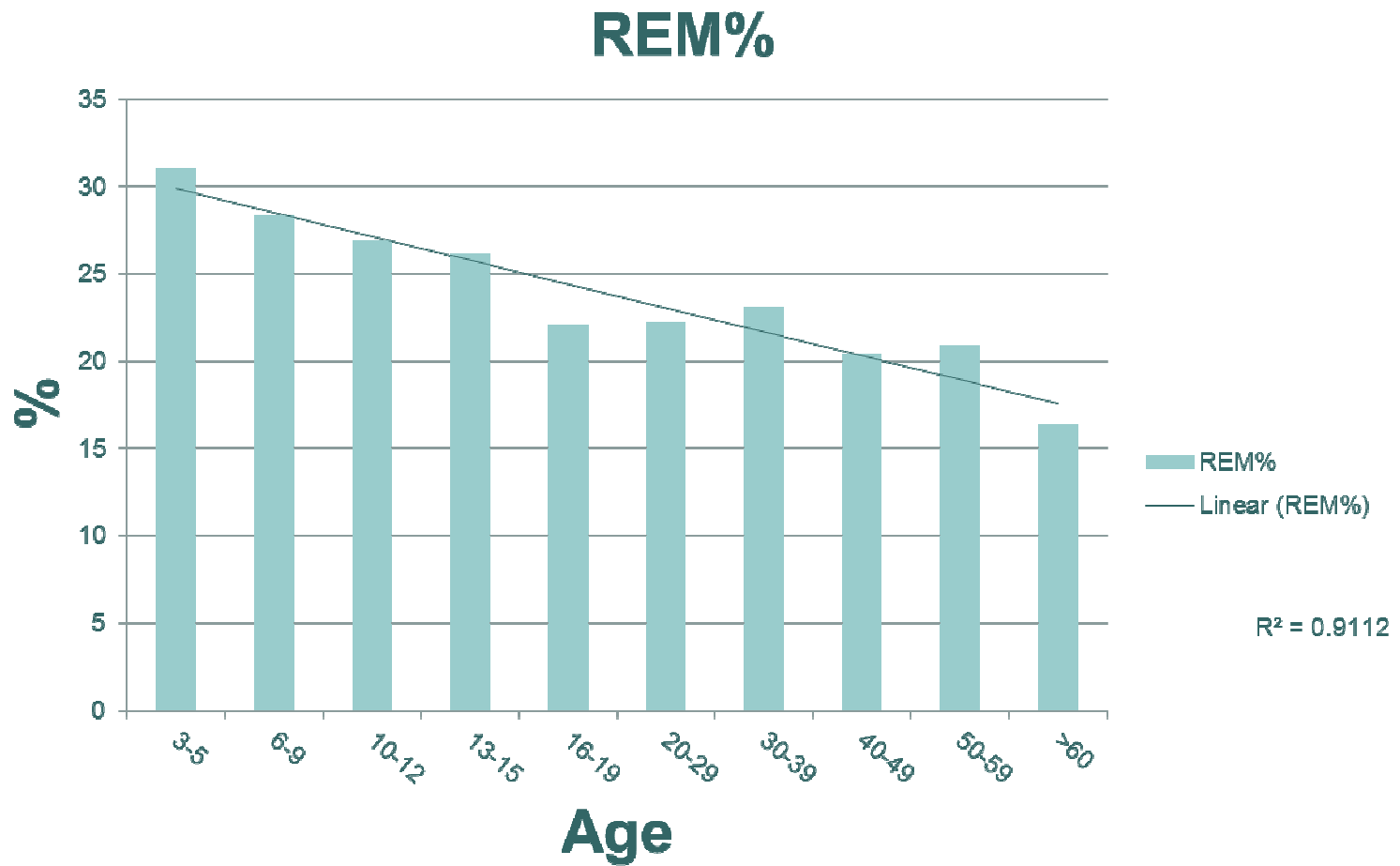


Fig. 1. Time spent asleep (minutes) by sleep stage in healthy latency-aged children (6 to 12 years old): mean of nights 2 and 3. ANOVA results significant for: time spent asleep (TSA), $p < 0.001$; stage 2 percent, $p < 0.05$; stage 4 percent, $p < 0.01$.

From: Guilleminault, C. (1987) (Ed). *Sleep and Its Disorders in Children*. New York, Raven Press. P. 34

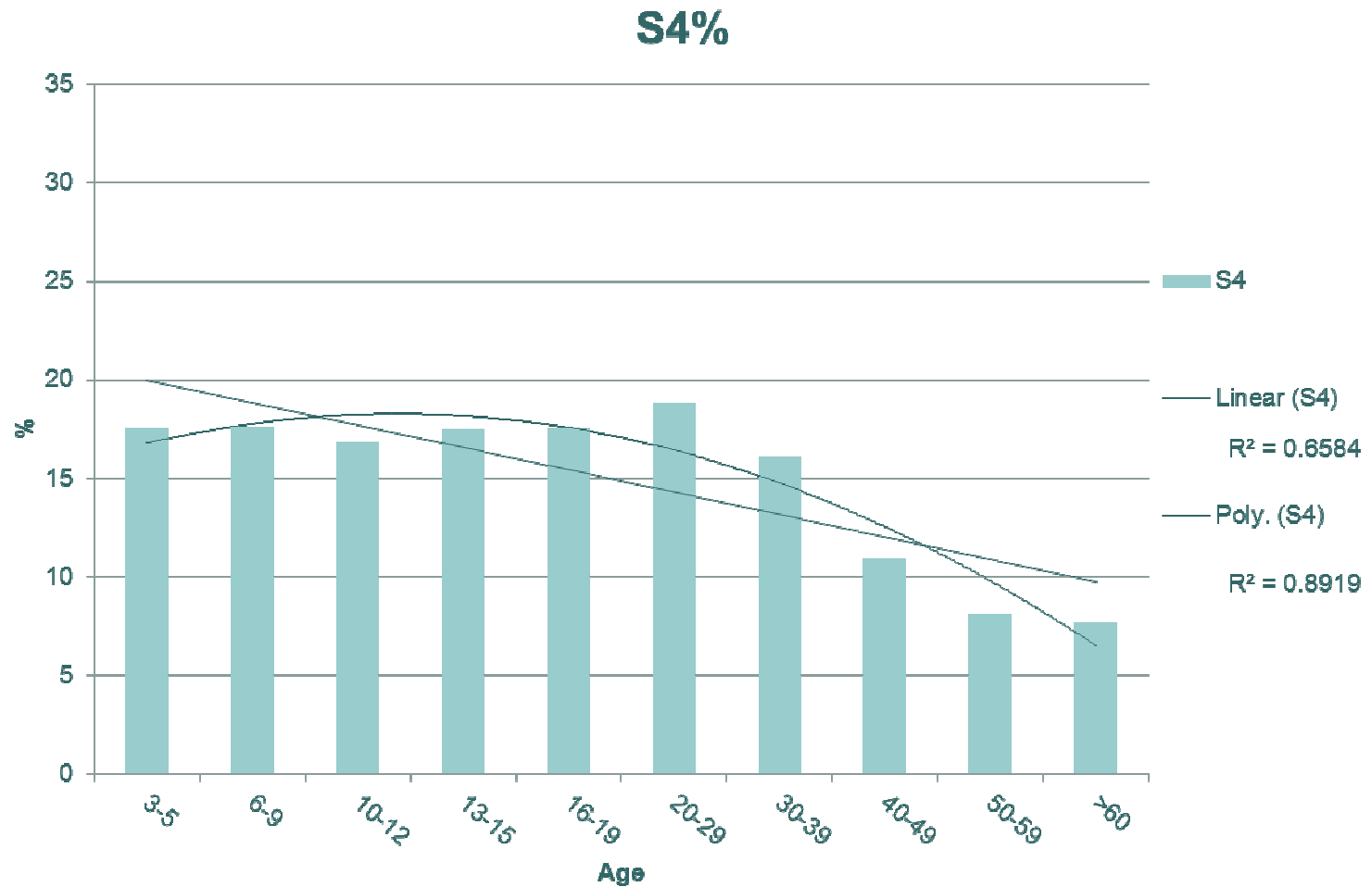


Normal REM % - Lifespan



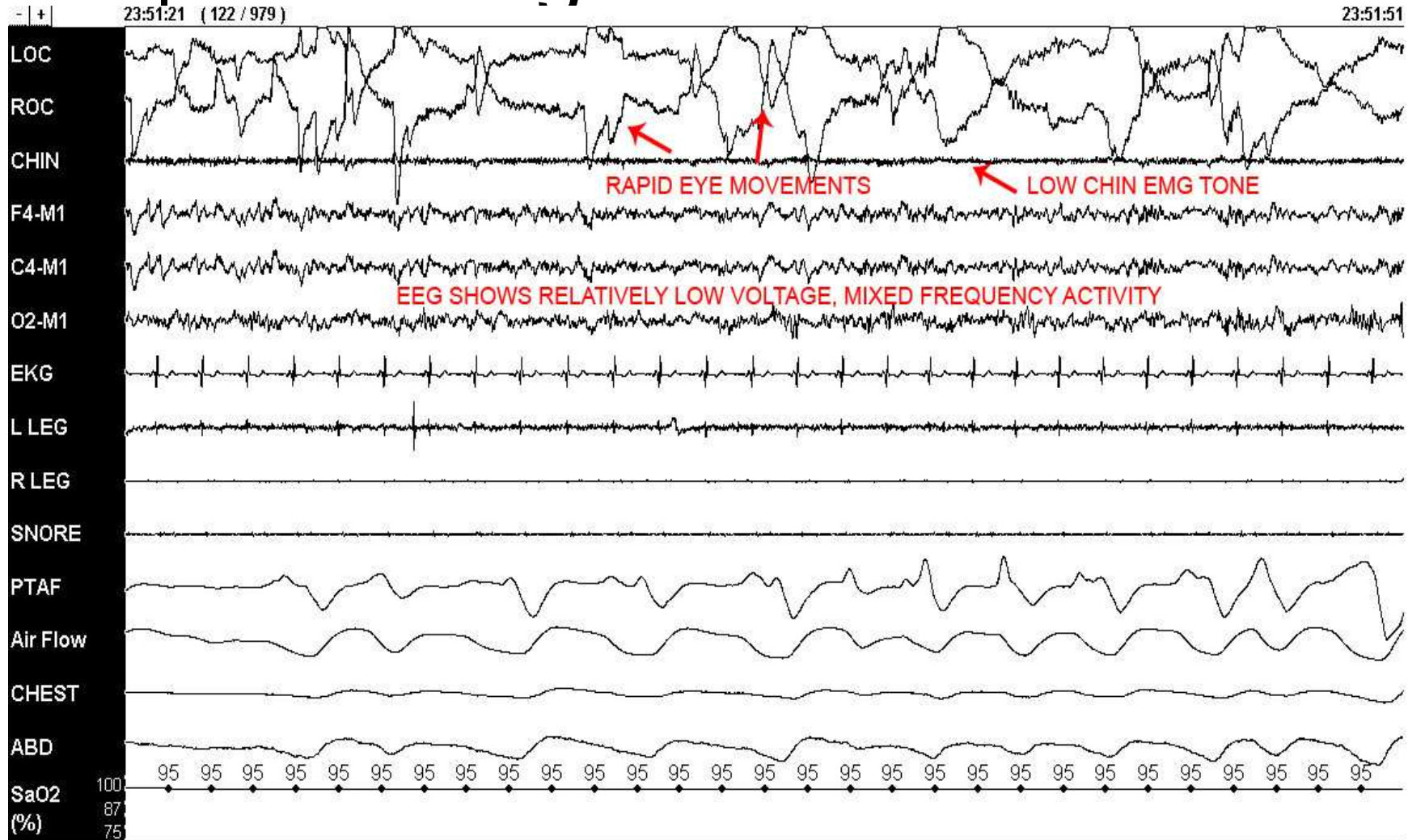


Normal S4% - Lifespan



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Sample REM period recording





DATA TRENDS

- Thank you to Shery Goril, M.Sc. Candidate, Neurosciences
- And to the WR FASD Diagnostic Team for following me down this path



DATA TRENDS

- Demographics:
 - 12/14 referred to Youthdale
 - 5/14 completed sleep study
 - 4/5 consented to this presentation
- 2 groups within data identified:
 - 5-12 yrs (C) and over 12 yrs (A)



DATA TRENDS

- Demographics:

Child Group:	5 males
	2 females
	M = 7.4 years
Adolescent:	2 males
	3 females
	M = 15 years



Diagnoses Reported

○ Child

NREM Arousal	2 (29%)
Delayed Sleep Onset	3 (43%)
Sleep Apnea	1 (14%)
REM Parasomnia	2 (29%)

○ Adolescent

Sig daytime sleepiness	3(60%)
Fragmented Sleep	3(60%)
Insomnia	2(40%)

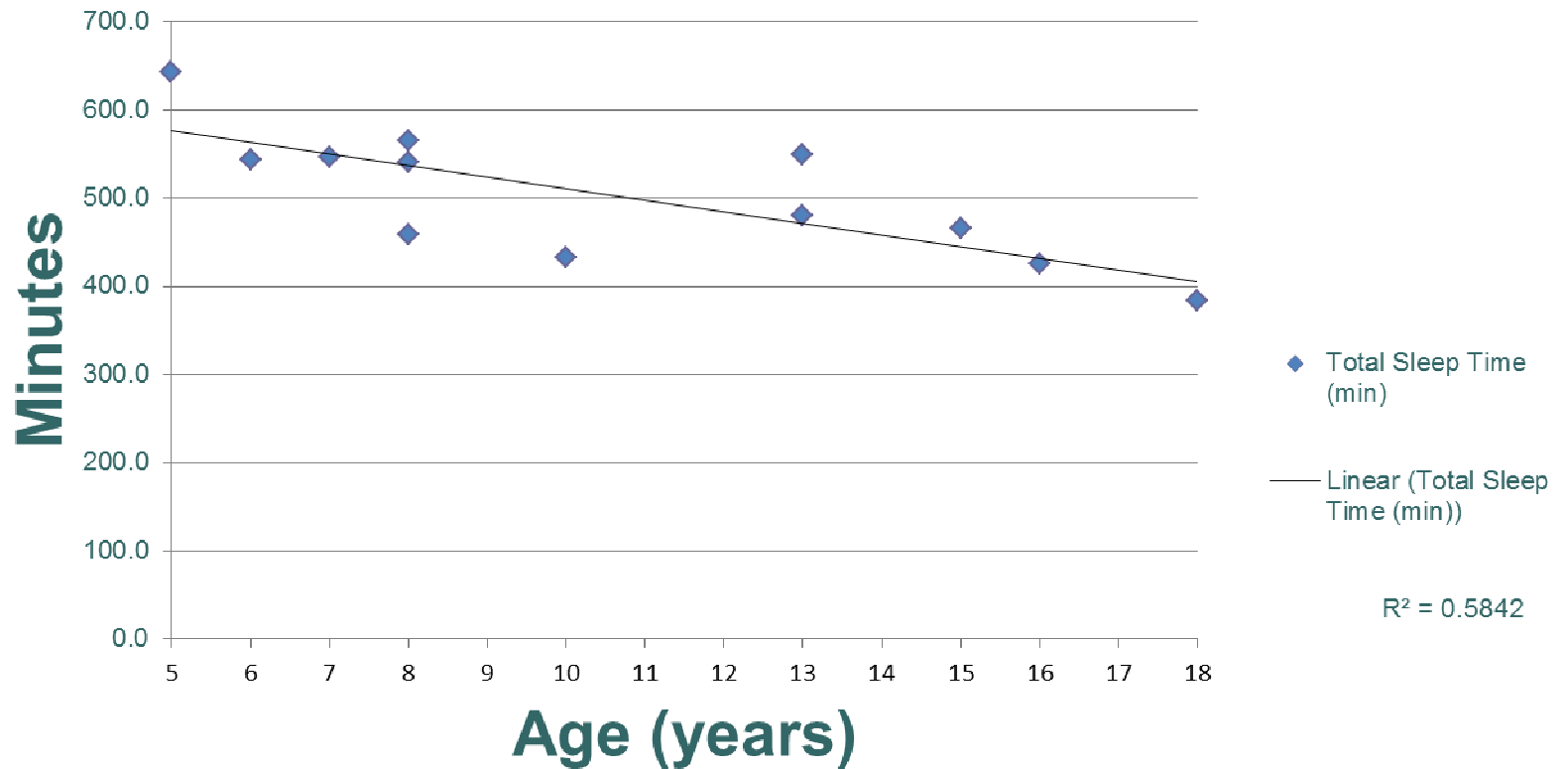


Secondary Diagnosis	Child	Adolescent
↑ Sleep onset latency	4 (57%)	2 (40%)
↑ Arousals	7 (100%)	4 (80%)
↓ sleep efficiency	2 (29%)	3 (60%)
↓ REM onset	1 (14%)	0
Abnormal EEG	2 (29%)	1 (20%)
↓ sleep efficiency	2 (29%)	3 (60%)
↑ sleep onset latency	4 (57%)	2 (40%)
↑ amt REM & ↓ REM onset latency	1 (14%)	2 (40%)
(?depression)		
?narcolepsy	0	1 (20%)
↑ PLM	0	1 (20%)
Daytime sleepiness	0	2 (40%)



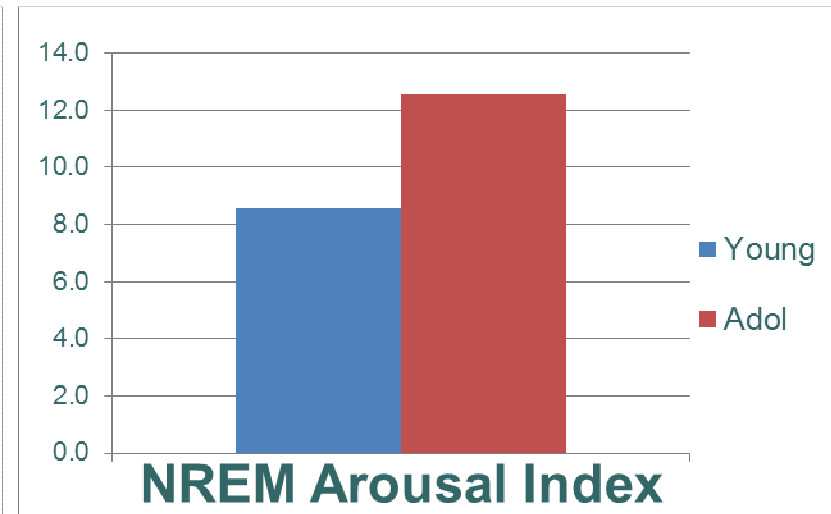
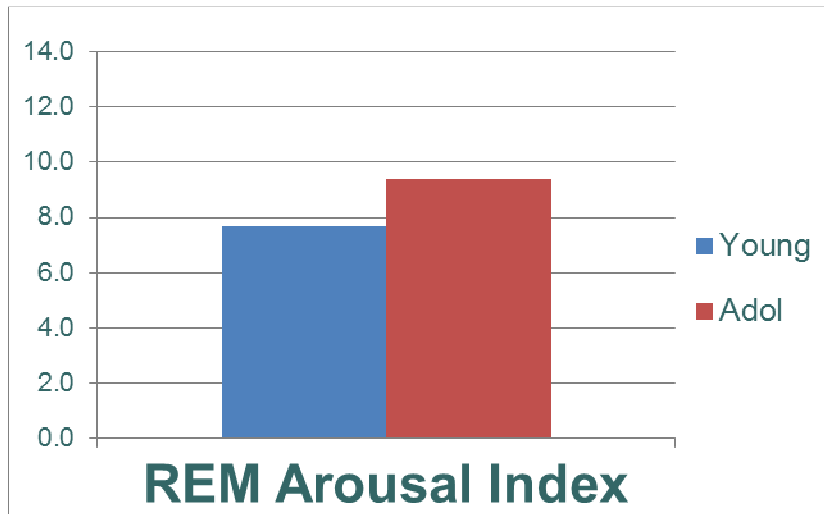
FASD Total Sleep Time

Total Sleep Time



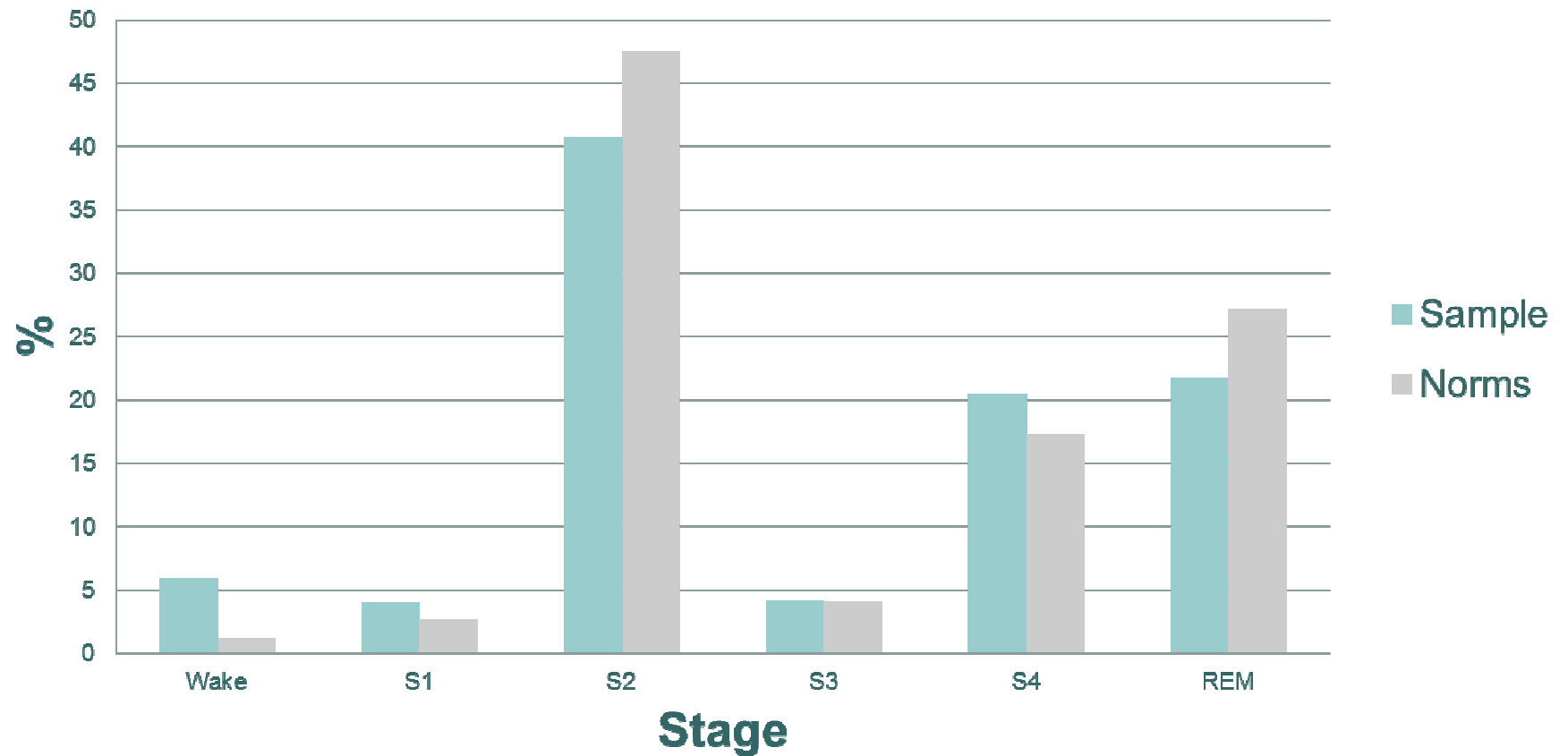


Arousal Index



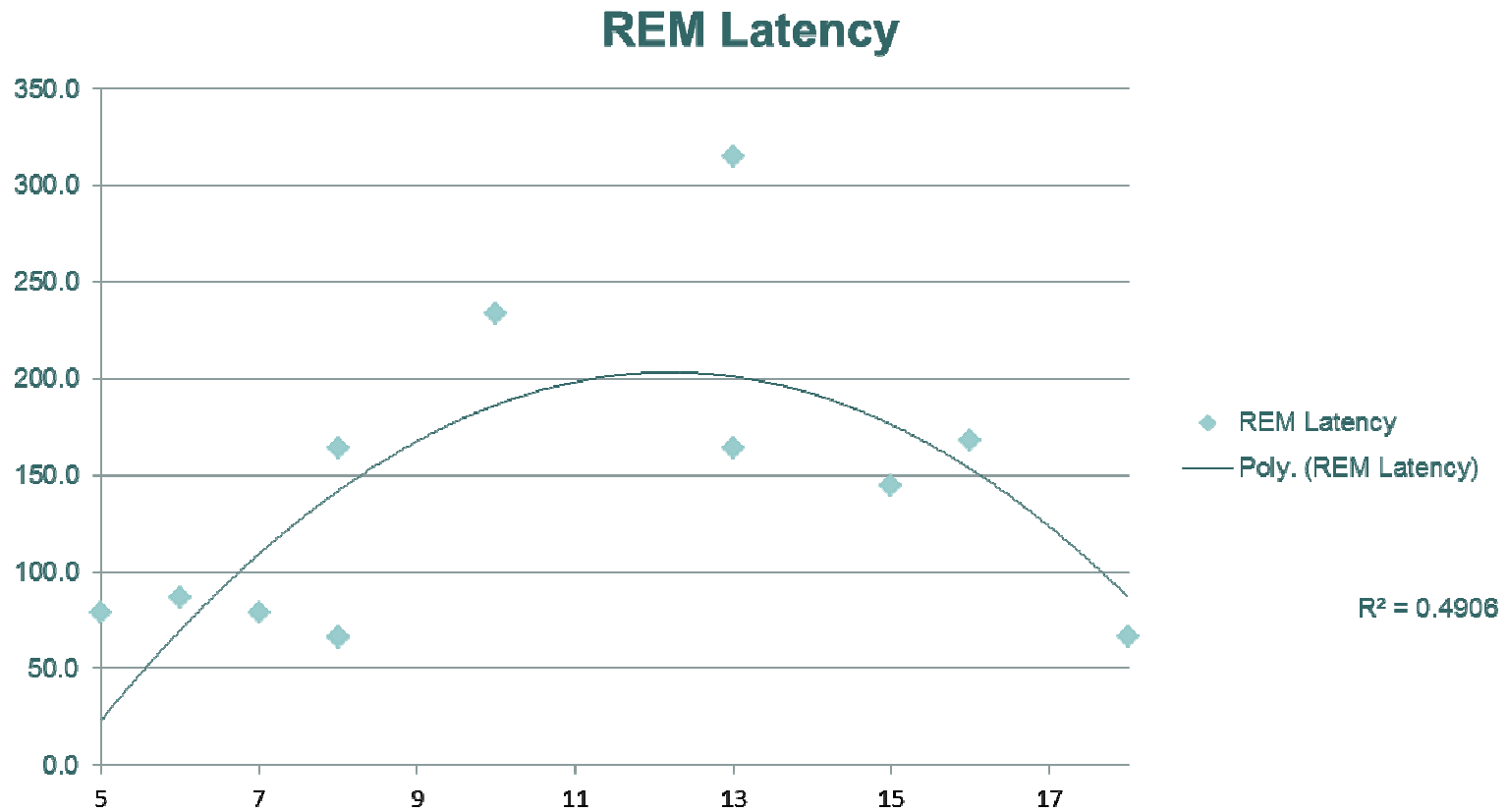
Norms vs our Sample

Sleep Stages Comparison





Why delayed REM onset in early adolescence?





Summary

- There are different sleep diagnoses between children and adolescents with FASD
- Different secondary diagnoses and arousal indices
- Pattern of stages is different than normal sleep architecture



Summary

- Perhaps more phase shifts than controls (more fragmented sleep)
- Only one child with apnea
- All others had at least one sleep diagnosis
- Using questionnaire to measure sleep quality not working well in our clinic
- Compliance with Youthdale referral continues to be problematic



Summary

- Comprehensive sleep studies reveal at least one diagnosis for each participant in our sample
- Therefore, evidence for need for sleep studies in FASD *and*,
- Screening for sleep problems is necessary



Next Steps

- Continue to screen as part of Intake by Co-ordinator
- Refer to Youthdale FASD Study
- Continue to investigate opening Youthdale Sleep Centre branch in Waterloo Region



REFERENCES & RESOURCES

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<http://youthdalesleep.com/>



REFERENCES & RESOURCES

If you wish an electronic version of this presentation please contact:

Dr. L. A. Scott: drscottassociates@execulink.com

OR

Ms Karen Huber: khuber@lutherwood.ca