Comparison of Utilization of Interventional Therapies Between Moderately Preterm and Very Preterm Infants at 12 Months Corrected Age

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Background

- In the last two decades, the prematurity rate has risen by more than 30%
- A classification system of premature babies[1]
  - Preterm   <37 weeks gestation
  - Late preterm 34-36 weeks gestation
  - Moderately preterm 32-36 weeks gestation
  - Very preterm < 32 weeks gestation

[1]Mathews TJ et al. Natl Vital Stat Rep 2004

Moderately Preterm

- <u>Moderately preterm</u> infants (32-36 weeks gestation) comprise over 80% of preterm births and are the fastest growing subgroup of preterm infants[2]

- Their morbidity rates are higher than term infants

- Brain weight at 34 weeks is only 65% of the brain weight of full term babies[3]

- Few data are published addressing their developmental outcomes and follow up needs

[2]Davidoff MJ et al. Semin Perinatol 2006
[3]Guihard-Costa AM et al. Early Hum Dev 1990

Early Intervention

- Early Intervention (EI) was created by Congress in 1986 under the Individuals with Disabilities Education Act (IDEA)

- To be eligible for services a child must be < 3 years old with one of the following:
  - 12 month delay in 1 functional area
  - 33% delay in 1 functional area
  - 25% delay in each of 2 areas (physical, cognitive, communication, social-emotional, adaptive)

Objective

Compare the enrollment in EI and the utilization of therapeutic services between <u>moderately preterm</u> (32-36 weeks gestation) and <u>very preterm</u> (<32 weeks gestation) infants at 12 months ± 2 months corrected age
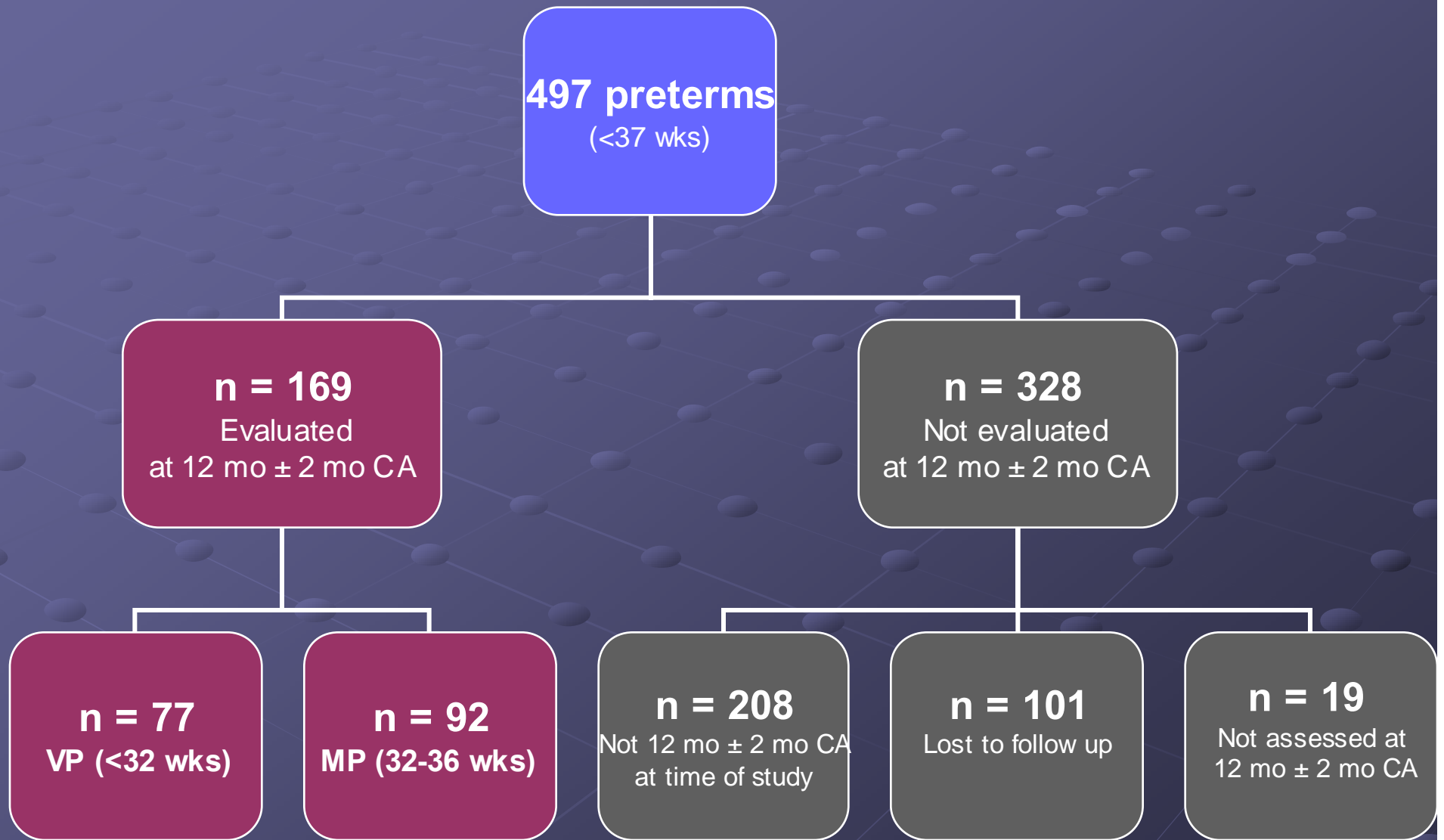
Methods

- Preterm infants followed at the Regional Neonatal Follow-up Clinic in White Plains, NY from Jan 2005 through Oct 2006
- Included all patients <37 weeks gestation who had an evaluation at 12 months ± 2 months corrected age (CA)
- Stratified into moderately preterm (32-36 weeks gestation) and very preterm (<32 weeks gestation) groups
- Antenatal, maternal, and neonatal variables obtained by NICU discharge summaries and parental report

Methods

- Logistic regression used to compare moderately preterm to very preterm enrollment into early intervention (EI), physical therapy (PT), occupational therapy (OT), speech therapy (ST), and special education, controlling for antenatal, sociodemographic, and neonatal factors

- Chi square and Fisher's exact tests were used to compare characteristics of the very preterm (VP) and moderately preterm (MP) infants with significance of $p<0.05$

Results

497 preterms
(<37 wks)

n = 169
Evaluated
at 12 mo ± 2 mo CA

n = 328
Not evaluated
at 12 mo ± 2 mo CA

n = 77
VP (<32 wks)

n = 92
MP (32-36 wks)

n = 208
Not 12 mo ± 2 mo CA
at time of study

n = 101
Lost to follow up

n = 19
Not assessed at
12 mo ± 2 mo CA

Patient Characteristics

	Moderately Preterm	Very Preterm	p value
Gestational age (weeks) #	34 ± 1	28 ± 2	<0.001
Birth wt (grams) #	2124 ± 493	1114 ± 374	<0.001
Length of stay (weeks) #	2.3 ± 2.0	8.9 ± 5.4	<0.001
5 min Apgar ^	9 (6,9)	7 (1,9)	<0.001
Sex, n (%)			NS
Male	55 (60)	37 (48)	
Female	37 (40)	40 (52)	
Delivery type, n (%)			NS
NSVD	27 (32)	20 (26)	
C/S	40 (48)	39 (51)	
Stat C/S	17 (20)	18 (23)	

\# mean ± SD ,   ^median (min,max),   NS = not significant

Patient Demographics

	Moderately Preterm	Very Preterm	p value
Multiple gestation, n (%)			0.02
Singleton	62 (67)	60 (78)	
Twins	21 (22)	17 (22)	
Triplets	9 (10)	0 (0)	
Medicaid, n (%)	80 (87)	71(92)	NS
Maternal age (years) [#]	31 ± 7	29 ± 7	NS
Maternal race, n (%)			0.01
Caucasian	34 (38)	14 (18)	
African American	20 (22)	21 (28)	
Hispanic	30 (33)	26 (34)	
Other	6 (7)	15 (20)	
Maternal substance abuse, n (%)	8 (9)	7 (9)	NS

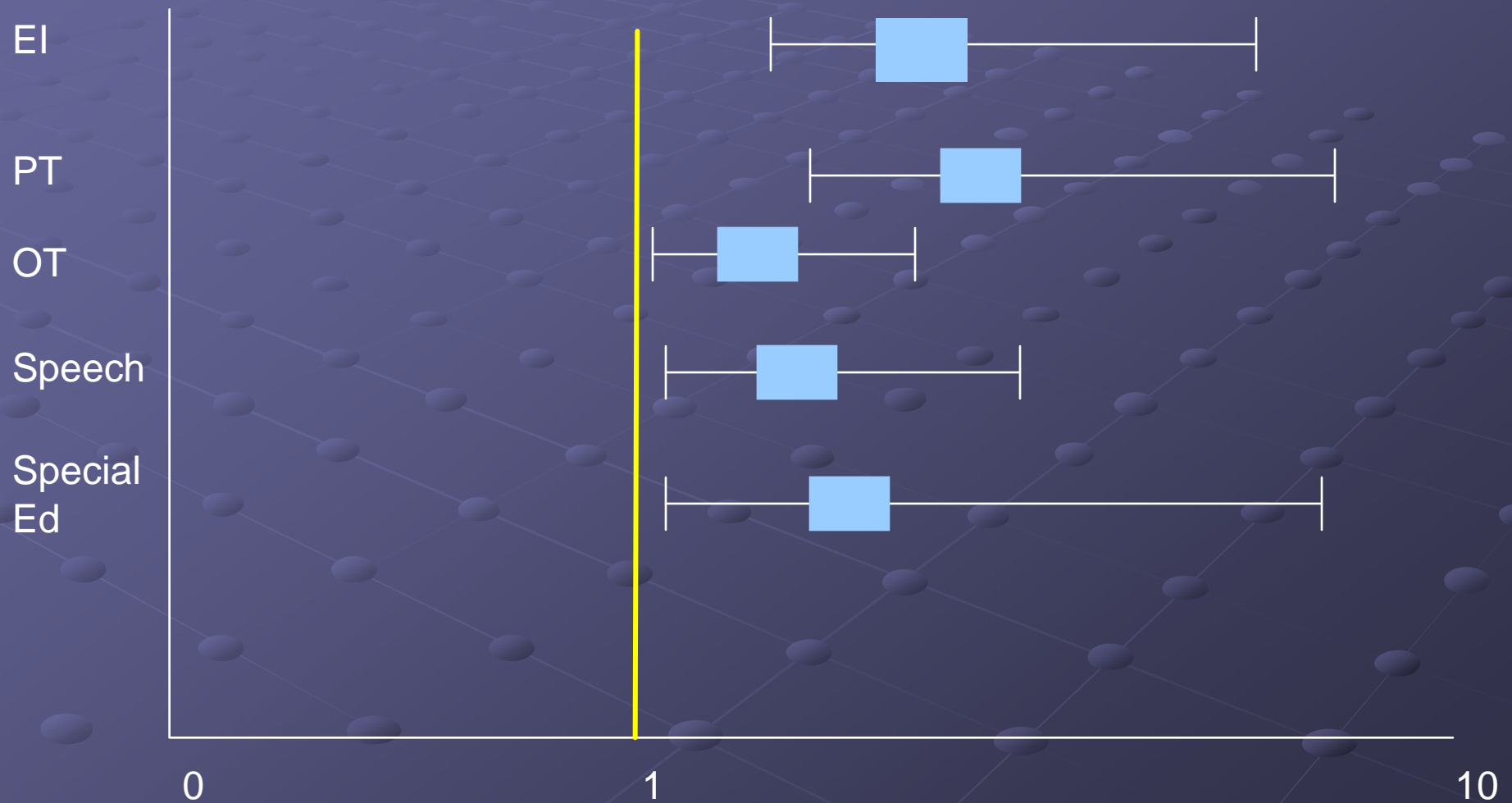[#] mean ± SD , NS = not significant

Patient Co-Morbidities

	Moderately Preterm	Very Preterm	p value
BPD, n (%)	0 (0)	18 (23)	<0.001
Caffeine, n (%)	10 (11)	60 (79)	<0.001
Genetic disorder, n(%)	2 (2)	1 (1)	NS
Hydrocephalus, n (%)	3 (3)	4 (5)	NS
NEC, n (%)	0 (0)	5 (6)	0.020
RDS, n (%)	33 (36)	70 (91)	<0.001
Congenital heart disease, n (%)	3 (3)	2 (3)	NS
Neurologic disorder, n (%)	7 (8)	6 (8)	NS
PVL, n (%)	0 (0)	2 (2)	NS
ROP, n (%)	0 (0)	7 (9)	0.003
IVH Grade ≥ III, n (%)	0 (0)	4 (6)	NS

NS = not significant

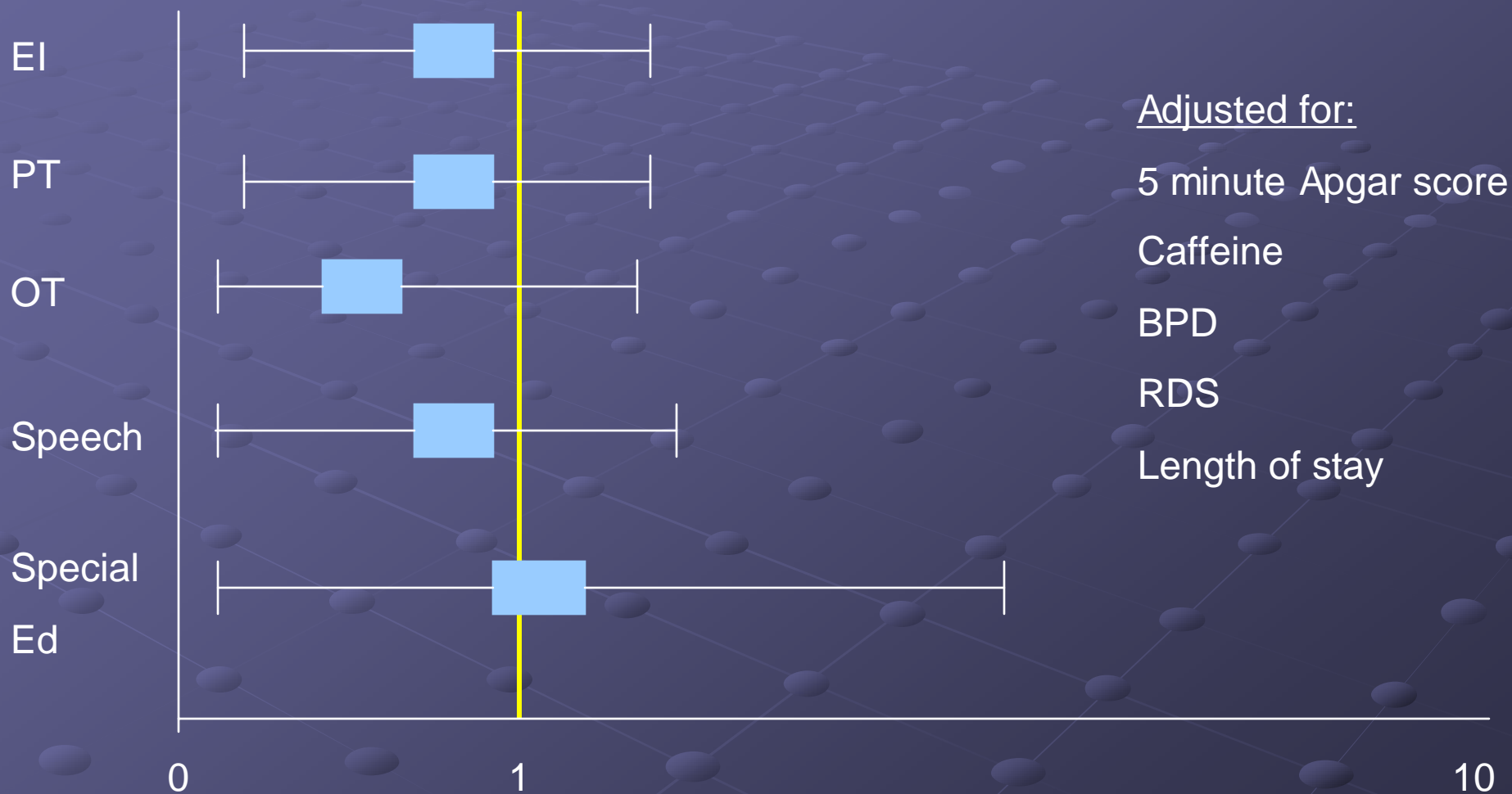# Rate of Therapy Use
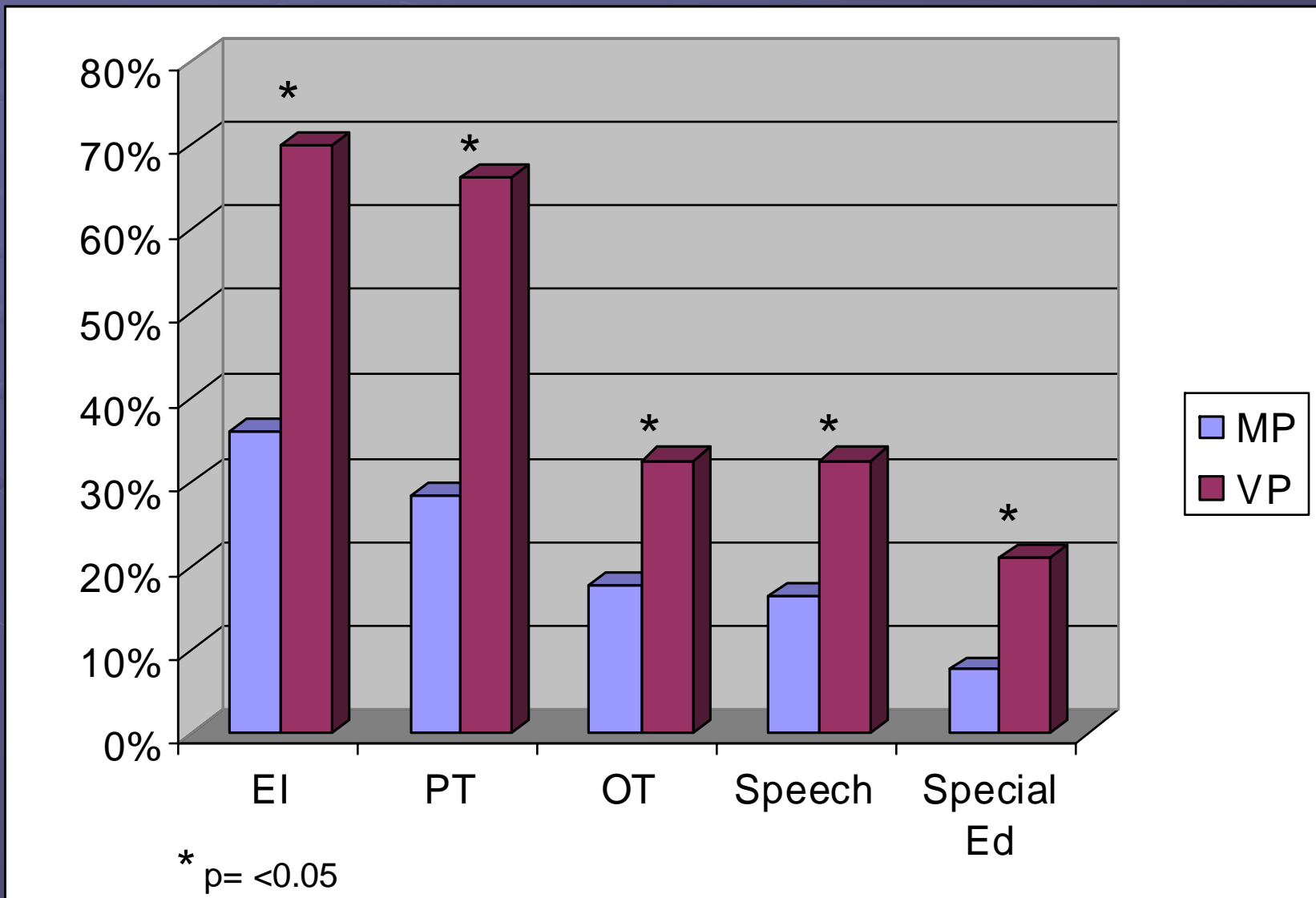
Very Preterm vs. Moderately Preterm Odds Ratios

Very Preterm vs. Moderately Preterm Adjusted Odds Ratios

Adjusted for:

5 minute Apgar score

Caffeine

BPD

RDS

Length of stay

EI

PT

OT

Speech

Special Ed

0   1   10

Summary

- Over 1/3 of moderately preterm infants were enrolled in EI and 28% received physical therapy

- When adjusting the odds ratios for neonatal factors, there was no difference in the odds of utilizing therapies between the two gestational age groups

Conclusion

- Moderately preterm babies are <u>at risk</u> and must be <u>screened</u> and referred for interventional therapies

- They should not be considered "small" full term infants

Implications

- If our results could be extrapolated to the general population, there would be 150,000 moderately preterm and 75,000 very preterm infants enrolled in EI per year

Acknowlegements

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Back up slides

Moderately Preterm Services Utilized

Gestational Age	Early Intervention n (%)	Physical Therapy n (%)
32 weeks	7 (44)	4 (25)
33 weeks	6 (30)	3 (15)
34 weeks	6 (19)	6 (19)
35 weeks	6 (40)	6 (40)
36 weeks	8 (80)	7 (70)

Hospital of Birth

Bon Secours	0.6%	Phelps Memorial	0.6%
Horton Hospital	3.0%	Putnam Hospital	4.2%
Hudson Valley	1.8%	Sound Shore	12.4%
Lawrence Hospital	0.6%	St. Anthony's	0.6%
Nyack Hospital	1.2%	St. John's Riverside	4.2%
Our Lady of Mercy	2.4%	St. Luke's	1.8%
		Westchester Medical Center	**66.9%**

Excluded patients

328 babies not evaluated

- 19 babies with no assessment at 12 months ± 2 months corrected age
- 208 babies were not yet 12 months ± 2 months corrected age at time of study
- 101 babies lost to follow-up (20%)

Characteristics of moderately preterm infants

	Excluded Moderate Preterms	Included Moderate Preterms	p value
Gestational age (weeks) *	34 ± 1	34 ± 1	0.71
Birth wt (grams)*	2152 ± 465	2124 ± 492	0.65
Length of stay (weeks)*	2.6 ± 4.3	2.3 ± 2.0	0.34
Sex, n (%)			0.44
male	104 (54)	55 (60)	
female	88 (45)	37 (40)	
Delivery type, n (%)			0.45
nsvd	73 (39)	27 (32)	
c/s	84 (45)	40 (47)	
stat c/s	29 (16)	17 (20)	

* Mean ± SD

Characteristics of moderately preterm infants

	Excluded moderately preterm	Included moderately preterm	p value
Multiple gestation, n (%)			0.002
singleton	147 (77)	62 (67)	
twins	42 (22)	21 (22)	
triplets	2 (1)	9 (10)	
Medicaid, n (%)	123 (64)	80 (86)	<0.001
Maternal age (years)	30 ± 6	31 ± 7	0.808
Maternal race, n (%)			0.448
Caucasian	81 (44)	35 (39)	
African American	28 (15)	21 (23)	
Hispanic	59 (32)	30 (33)	
Other	17 (9)	4 (4)	
Maternal substance abuse, n (%)	11 (6)	8 (8)	0.446

Characteristics of moderately preterm infants

	Excluded Moderately Preterm	Included Moderately Preterm	p value
BPD, n (%)	1 (53)	0 (0)	0.675
Caffeine, n (%)	19 (10)	10 (11)	0.833
Genetic disorder, n (%)	7 (4)	2 (2)	0.723
Hydrocephalus, n (%)	2 (1)	3 (3)	0.334
NEC, n (%)	1 (0.5)	0 (0)	0.680
RDS, n (%)	81 (43)	33 (36)	0.364
Congenital heart disease, n (%)	15 (8)	3 (3)	0.274
PVL, n (%)	1 (0.5)	0 (0)	0.675

Characteristics of very preterm infants

	Excluded Very Preterms	Included Very Preterms	p value
Gestational age (weeks)*	28 ± 2	28 ± 2	0.330
Birth wt (grams) *	1184 ± 409	1114 ± 374	0.204
Length of stay (weeks)*	8.8 ± 5.3	8.9 ± 5.4	0.920
Sex, n (%)			0.670
male	70 (51)	37 (48)	
female	66 (48)	40 (52)	
Delivery type, n (%)			0.454
nsvd	41 (31)	20 (26)	
c/s	55 (41)	39 (51)	
stat c/s	37 (28)	18 (23)	

* mean, SD

Characteristics of very preterms

	Excluded Very Preterms	Included Very Preterms	p value
Multiple gestation, n (%)			0.591
singleton	101 (74)	60 (78)	
twins	32 (24)	17 (22)	
triplets	3 (2)	0 (0)	
Medicaid , n (%)	108 (79)	71 (92)	0.018
Maternal age (years)**	28 ± 6	29 ± 7	0.400
Maternal race, n (%)			0.131
Caucasian	40 (32)	16 (21)	
African American	27 (21)	21 (28)	
Hispanic	48 (38)	26 (34)	
Other	11 (9)	13 (17)	
Maternal substance abuse, n (%)	2 (1)	7 (9)	0.012

** mean, SD

Characteristics of very preterms

	Excluded Very Preterms	Included Very Preterms	p value
BPD, n (%)	28 (21)	18 (23)	0.731
Caffeine, n (%)	100 (76)	60 (78)	0.863
Genetic disorder, n (%)	1 (1)	1 (1)	0.596
Hydrocephalus, n (%)	4 (3)	4 (5)	0.468
NEC, n (%)	14 (10)	5 (6)	0.655
RDS, n (%)	120 (90)	70 (90)	0.816
Congenital heart disease, n (%)	9 (7)	2 (3)	0.335
PVL, n (%)	1 (1)	2 (3)	0.556
ROP, n (%)	14 (10)	7 (9)	0.824