



The Deirdre Imus Environmental Center for Pediatric Oncology®

St. Anthony's Project

**Study Summary
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Description of Study

INTRODUCTION

June 2007: Concerns raised by teachers at St. Anthony's School
PVH town hall meeting with Dr. Rosen and DIEC staff
Dr. Rosen met with Superintendent (Dr. Jan Furman) and other school representatives
July 2007: Letters sent out to current and former St. Anthony's staff
Survey developed, received IRB approval from HUMC
August-September 2007: Interviews with 34 staff members who responded
Sept 2007: Northvale control group surveyed
October 2007: Data analysis and presentation

Phase I Purpose: Confirmation of anecdotal reports.

Are there a significantly greater number of children with autism or other N/D disorders born to faculty at St. Anthony's than would be expected?

METHODS

- Interviews with staff from St. Anthony's School (Study Group)
- Survey of Northvale control group
- Comparison of study group with local, state historical and national historical controls

Study Group:

Descriptions of school, PIE/Valley program and Northvale
34 subjects responded for interviews
One hour interview in person or by phone with Dr. Rosen and/or Karen Overgaard
All surveys reviewed by Dr. Rosen
10 subjects excluded due to no children, or no children born since working at school
24 included (female) had at least one child born during or after time working at school.
All included subjects worked at St. Anthony's within past 10 years (all but one started ≤ 13 years ago)
11 teachers, 7 aides, 6 other therapist (SLP, OT, Behavioral consultant)
Mean maternal age 35 yrs old, mean child age 7 yrs old
Towns of residence: 20 (18/24 subjects - Bergen County)

Controls Groups:

Local: Northvale public elementary school (Nathan Hale School)
Survey was a one page brief version of the one used for the study group.
7 subjects (all female classroom teachers) with children born during or after time working at school
Mean maternal age 34 yrs old, mean child age 4 yrs old
State and national: Data on autism and ND disorders from Centers for Disease Control published statistics

RESULTS

Study Group:

To the 24 included subjects, there were 42 children born during or after their time working at St. Anthony's.

Of the 42 children, 24 (57%) were diagnosed with ND issues. 10 (24%) were diagnosed with an autism spectrum disorder. The other 14 affected children had the following primary diagnoses: 6 with hypotonia, 3 with speech disorders, 1 with learning disability, 1 with ADHD, 1 with sensory integration disorder, 2 (IVF twin boys) with a rare neurological auditory disorder.

16 of these 24 women (67%) had children with diagnosed neurodevelopmental issues (ND+). 8 of these women (33%) did not (ND-).

Of the 16 subjects with ND+ kids, 5/16 (31%) reported a family history of ND diagnoses (none with autism). Of the 8 subjects with ND- kids, 2/8 (25%) reported a family history of ND diagnoses (both with autism). This difference is not statistically significant (see Section 3 for more details).

Autism Spectrum Disorder (ASD) subgroup (N=10)

- 10 children to 7 women staff
- 9/10 boys
- 3 sets of non-IVF twins
- 7 subjects: all no family history of ASD
- 6/7 (86%) full-time teachers

Control Groups:

Local (Northvale):

The 7 subjects interviewed had 15 children in that time frame.

Of these 15 children, 2 (13%) have been diagnosed with a ND disorder (speech disorder, "other neurological disorder"). None were diagnosed with an autism spectrum disorder.

State (NJ): 1/100 autism*

National: 1/150 autism*, 1/6 ND**

Sources:

*<http://www.cdc.gov/mmwr/pdf/ss/ss5601.pdf>

**<http://www.cdc.gov/ncbddd/dd/ddsurv.htm>

CONCLUSIONS (see section 2 for details)

The differences between % of children with ASD in the study group (24%) and the control groups (local 0%, state 1%, national 0.67%) were highly statistically significant (p<0.01).

The differences between % of children with ND disorders in the study group (57%) and the control groups (local 13%, national 16.7%) were highly statistically significant (p<0.01).

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Statistical Tests – By Children

-- Statistical Consulting by Jason Maikos, PhD, Research Fellow, HUMC --

2.1 Chi-Square Testing

Chi-Square testing compares the observed frequencies in each category of a contingency table with the expected frequencies. It is used to determine whether the deviations between the observed and the expected counts are too large to be attributed to chance.

In this situation, we want to determine whether there is a difference in the percent of children with neurodevelopmental (ND) disorders whose mothers work(ed) at St. Anthony's compared with a control school chosen in the same town (Northvale). To determine this, the null hypothesis was tested:

H₀: The proportion of women who have children with ND disorders among the population of women who have children at St. Anthony's is equal to the proportion of women have children with ND disorders at another Northvale school.

against the alternative:

H_A: The proportion of women who have children with ND disorders are not equivalent in the 2 populations.

Statistical tests were performed using the number of children with and without disorders in both schools.

Counts (Children)

	ND+	ND-
St. Anthony's	24	18
Control	2	13

Analyses:

1) *ND disorders: Compared the number of children with ND disorders in the study group to the control group.*

Chi-Square testing showed a **highly significant difference** between the 2 populations (the proportions of children with disorders in the 2 groups are significantly different).

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.551 ^a	1	.003		
Continuity Correction ^b	6.876	1	.009		
Likelihood Ratio	9.435	1	.002		
Fisher's Exact Test				.006	.003
N of Valid Cases ^b	57				

2) *Autism: Compared the number of children with ASD in the study group to the control group.*

Chi-Square testing showed a **highly significant difference** between the 2 populations.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.331 ^a	1	.037		
Continuity Correction ^b	2.842	1	.092		
Likelihood Ratio	6.837	1	.009		
Fisher's Exact Test				.049	.034
N of Valid Cases ^b	57				

2.2 Binomial Testing

The binomial test is useful for determining if the proportion of people in one of two categories is different from a specified amount. The specified amount in this case was the control proportion of ND disorders by child (13%). This value can be substituted for the national value.

Analyses:

1) *Binomial test performed based on children with ND disorders vs. local rate*

Binomial testing shows that the proportion of children with ND disorders is **highly significantly different** than the specified local control proportion (2/15=13%).

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (1-tailed)
ND	Group 1	YES	24	.57	.13	.000^a
	Group 2	NO	18	.43		
	Total		42	1.00		

2) *Binomial test performed based on children with ND disorders vs. national rate*

This test shows that the proportion of children with disorders is **highly significantly different** than the national average (1/6=16.7%).

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (1-tailed)
ND1	Group 1	YES	24	.571429	.167000	.000^a
	Group 2	NO	18	.428571		
	Total		42	1.000000		

3) *Binomial test performed based on children with autism vs. NJ state rate*

This test shows that the proportion of children with autism is **highly significantly different** than the NJ average (1/100=1%).

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (1-tailed)
Aut1	Group 1	YES	10	.24	.01	.000^a
	Group 2	NO	32	.76		
	Total		42	1.00		

4) Binomial test performed based on children with autism vs. national average

This test shows that the proportion of children with autism is **highly significantly different** than the national average (1/150=0.67%).

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (1-tailed)
Aut1	Group 1	YES	10	.238095	.007000	.000^a
	Group 2	NO	32	.761905		
	Total		42	1.000000		

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Statistical Tests – By Women

3.1 Chi-Square Testing

Statistical tests were performed using the number of women in the study group who had children with (16) and without (8) neurodevelopmental disorders.

Analysis:

1) *Family history - compared family history of ND in the study group for affected and unaffected women.*

Chi-Square testing showed **no significant difference** between the 2 groups.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.101 ^a	1	.751		
Continuity Correction ^b	.000	1	1.000		
Likelihood Ratio	.102	1	.749		
Fisher's Exact Test				1.000	.572
N of Valid Cases ^b	24				