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Sex Differences in Pediatric Exploratory Exposures: A Retrospective Review of National Poison Data System (NPDS) Exposures 2007-2016

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BACKGROUND

Children develop by exploring their environment, thus placing them at risk for unintentional toxicologic exposures. Little is known about sex differences among pediatric exploratory ingestions.

METHODS

National Poison Data System (NPDS) data were extracted for all unintentional exposures (single or multiple substances) for children age 0-5 years, for all exposures categorized as more serious (outcome = moderate, major, or death), between January 1, 2007, and December 31, 2016. Descriptive statistics, graphical displays, linear regression, and multivariate analysis of variance were performed for exposure year and sex (male versus female) using SAS JMP version 12.0.1 (Cary, NC).

CONCLUSIONS

Among patients age 0-5 years, unintentional exposures with more severe (outcome = moderate, major, or death), occurred in more males than females. These results may guide both provider awareness, and parental education in preventing serious pediatric exploratory ingestion. More research is needed into the underlying cause of the male predominance in unintentional poisonings.

RESULTS

For 2007-2016, NPDS reported 113,128 exposures with more serious outcomes among those age 0-5 years, including 49,932 females, 62,929 males, and 267 of unknown sex. Of the males and females, 9,240 were unintentional-general or unintentional-unknown, of which 99.6% were general, and 0.38% unknown. Exploratory exposures showed no consistent changes over time for this decade ($p < 0.05$) for either sex or total (males + females). From the multivariate analysis, R^2 was 0.967, LogWorth for sex was 13.2 and year 0.131 (ns) with a male:female ratio of 1.24.

Fig. 1: Overlay Plot of Exposures by Year Reported to NPDS by Sex for Age Group 0-5 years from 2007-2016.

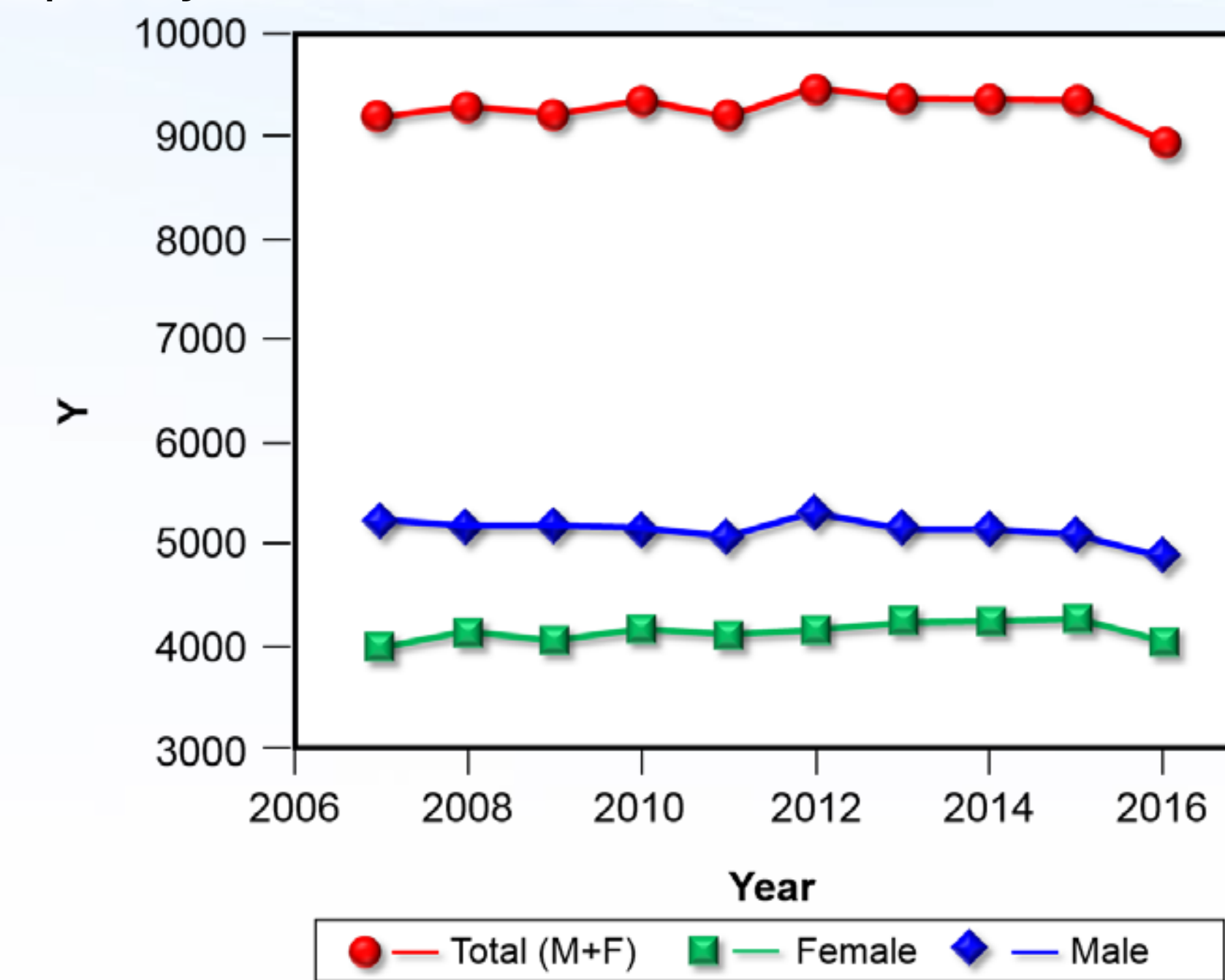


Fig. 2b: Bivariate Fit of Exposures/Year for age group 0-5 Years with Female Sex.

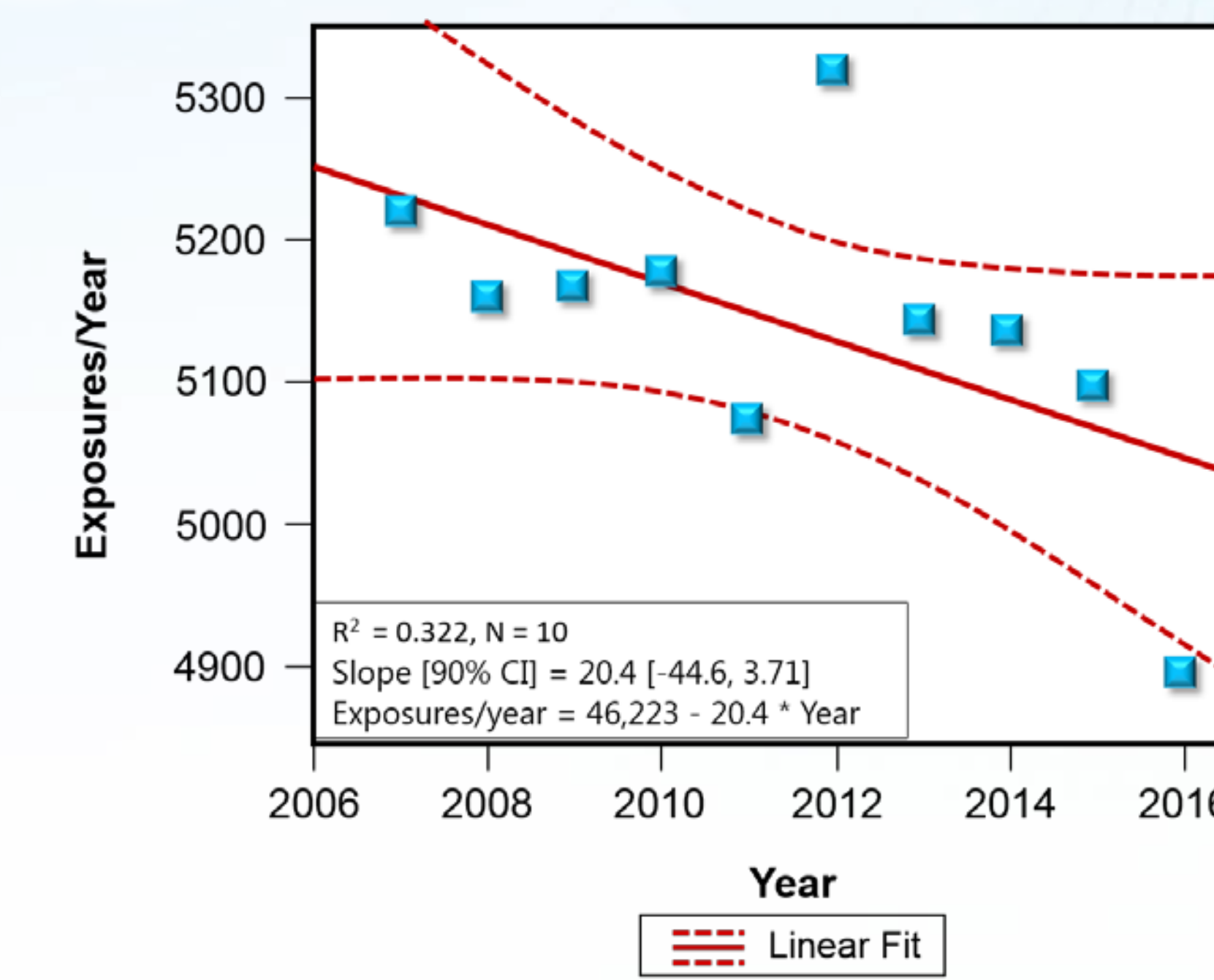


Fig. 2a: Bivariate Fit of Exposures/Year for age group 0-5 Years with Female Sex.

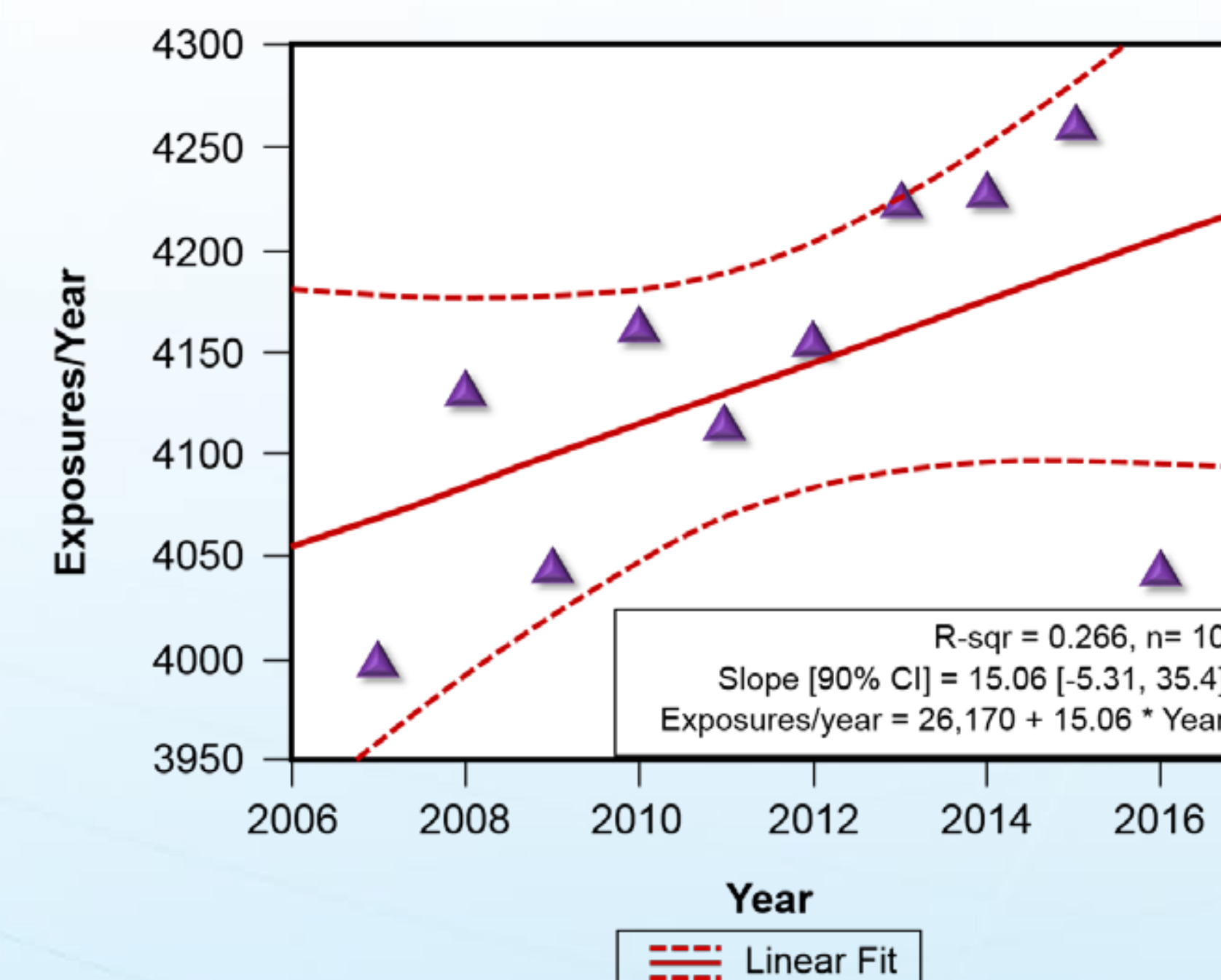


Fig. 3: One Way Analysis of Exposures/Year Reported to NPDS by Sex for Age Group 0-5 years from 2007-2016.

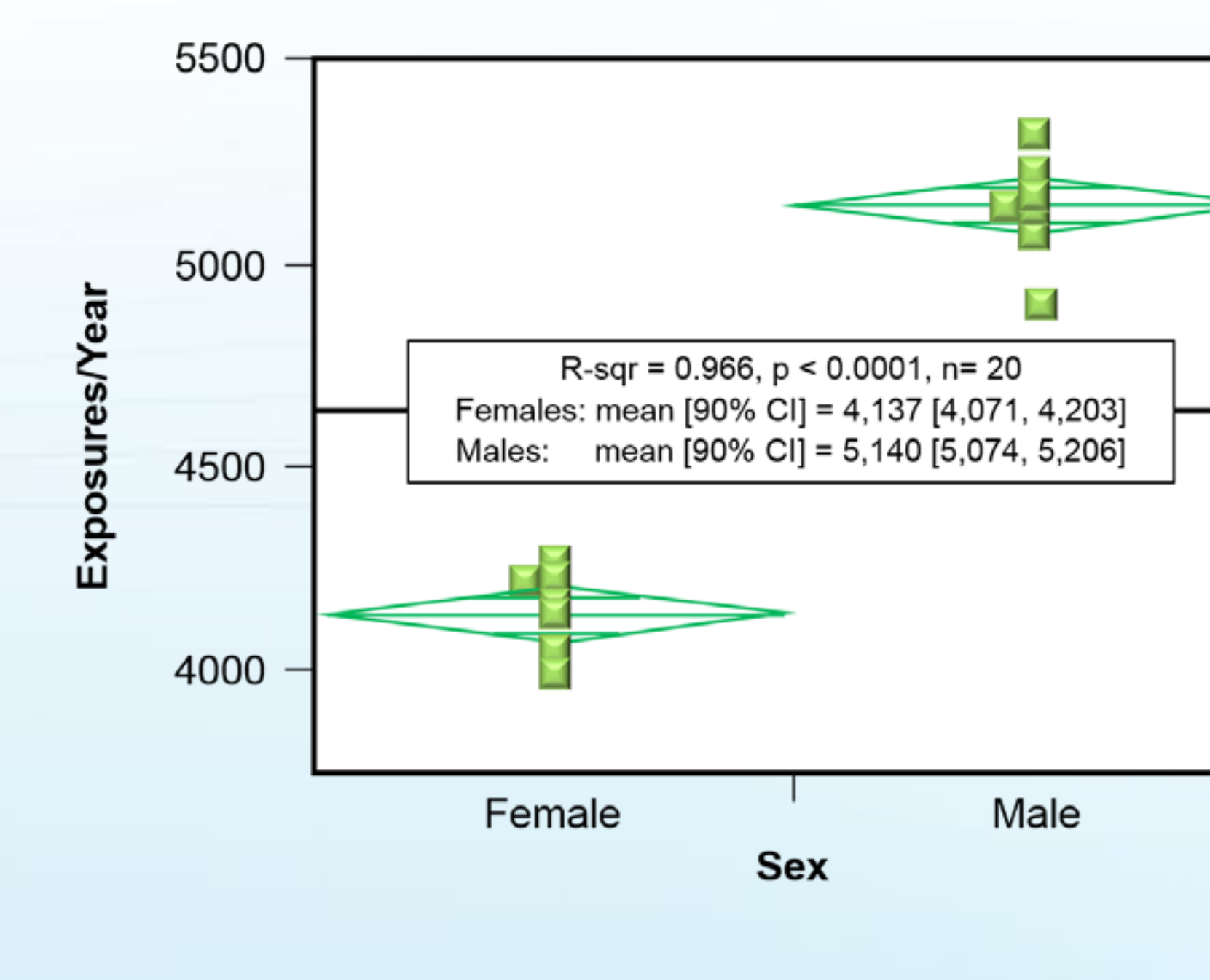


Fig. 4: Multivariate Regression Model Plot for Exposures/Year vs. Gender and Reporting Year for More Serious Exposures in Children Age Group 0-5 years old (Effect Summary, Regression Plot, Actual by Predicted Plot).

Fig 4a: Effect Summary

Source	LogWorth	PValue
Gender	13.221	0.00000
Year	0.131	0.73921

Fig 4b: Regression Plot.

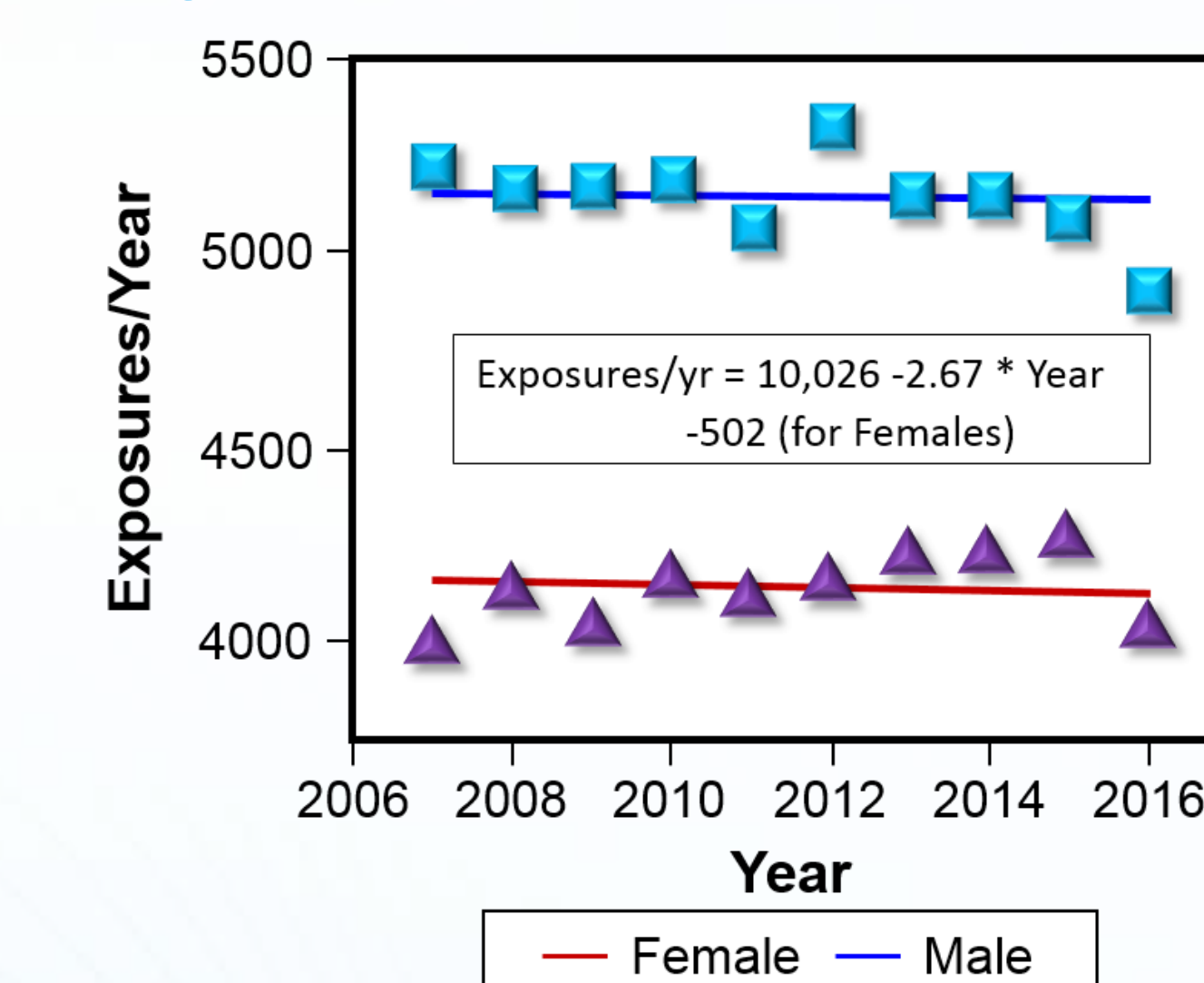
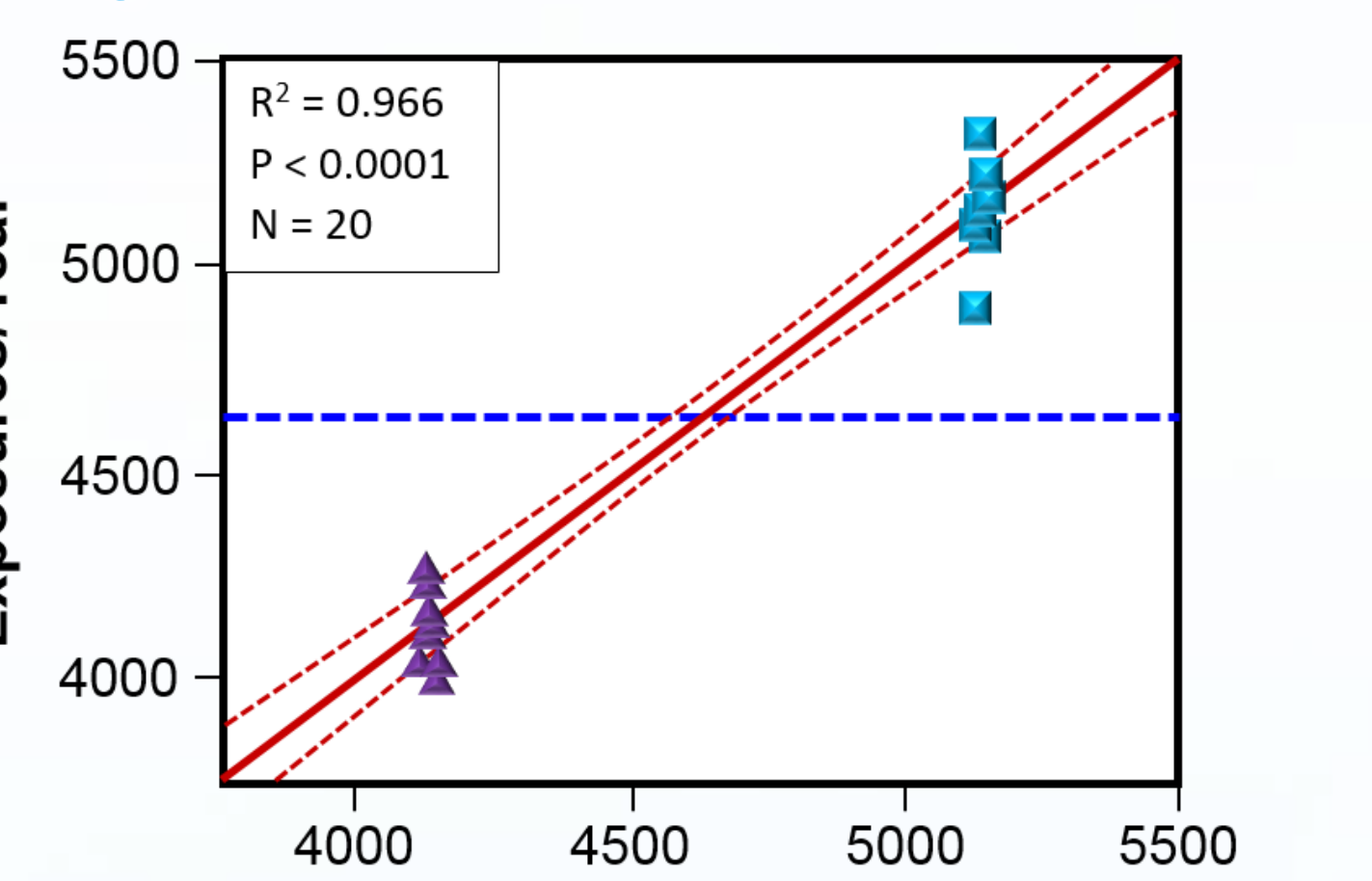


Fig 4c: Actual by Predicted Plot



All Exposures Over Time	ADEs		Slope and 95% Confidence Interval		
	Mean/year	%/year	#/year	95% CI	Rsquare
Females	4,137	0.36%	15.1	[-5.31, 35.4]	0.267
Males	5,140	-0.40%	-20.4	[-44.6, 3.71]	0.322
Males+Females	9,276	-0.06%	-5.35	[-44.7, 34.0]	0.012

Table 1: Pediatric Exposures with Serious Outcomes Reported to NPDS 2007-2016 with Mean Exposures per Year, and Percent Change in Number of Exposures per Year over Time.