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Reproductive development in sons of female Greenhouse workers

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Background and hypothesis: Several pesticides possess endocrine disrupting properties, and might interfere with reproductive development. Many women in fertile age groups are working within horticulture in greenhouses. We hypothesized that women who become pregnant while working in greenhouses where pesticides are applied, have an increased risk to give birth to a boy with abnormal development of the reproductive organs.

Methods: Pregnant women employed in greenhouses were consecutively recruited between 1996 and 2000 and 113 mother-son pairs were included. The mothers were categorized as exposed or unexposed to pesticides during pregnancy. Testicular position and volume, penile length, and position of urethral opening were determined at 3 months of age and concentrations of reproductive hormones in serum were analysed.

Results: Boys of pesticide-exposed mothers showed decreased penile length, testis volume, serum concentrations of testosterone, and inhibin B. Serum concentrations of sex hormone-binding globulin, follicle stimulating hormone and the luteinizing hormone/testosterone ratio were increased compared to boys of non-exposed mothers. For individual parameters, only the decreased penile length was statistically significant. However, all observed effects were in the anticipated direction, and a joint multivariate test showed that this finding had a p-value of 0.012. The prevalence of cryptorchidism at 3 months of age was considerably higher in this cohort than among Danish boys born in the Copenhagen area and all cases had pesticide-exposed mothers.

Implications: Our findings suggest an adverse effect of maternal occupational pesticide exposure on reproductive development in the sons despite current greenhouse safeguards and special measures to protect pregnant women.