

A Case-Control Study Of Childhood Brain Tumors And Fathers' Hobbies

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Introduction

- Primitive neuroectodermal tumor (PNET) and medulloblastoma (MB)
 - Second most common forms of pediatric brain tumors (20% of all childhood CNS cancers)
 - Incidence peaks between birth and 4 years
 - Low five-year survival rates – 20-55%
 - Negative health & cognitive sequelae
 - Little is known about the etiology
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Background

Why look at paternal hobbies?

- Exposures common to some hobbies have been implicated from occupational and other studies
- Pathways of paternal exposures
 - Mutagenic/epigenetic changes to sperm
 - Transfer to mother – conception/pregnancy
 - Transfer to child after birth

Methods - Overview

- Primary goal to look at maternal diet and supplements
- Additional information collected from fathers
- Cases (n=318; 57% of identified eligible)
 - Under age 6 at diagnosis
 - Diagnosed with MB or PNET between 1991-97
 - Registered with Children's Cancer Group
 - Exclusions included other cancer diagnoses, misdiagnosis after pathological review, no consent
- Controls (n=318)
 - Enrolled through random digit dialling
 - Matched on area code, race, date of birth

Methods – Data Collection

- Structured phone interviews conducted
- Mothers completed some fathers' interviews as proxy
- Median time between reference age and interview was 1.6 years
- Final sample
 - Cases: $n = 283$ (89% of sample)
 - Controls: $n = 262$ (82% of sample)

Methods – Data Collection Tool

- Stripping paint off furniture or woodwork?
 - Car repair?
 - Home repair or remodelling?
 - Painting? (either artistic or home)
 - Pottery, ceramics, or glazing?
 - Photographic developing?
 - Gardening or lawn care using insecticides, bug, or weed killer?
 - Model building?
 - Silk screen printing or painting?
 - Electronics or ham radio operation?
 - TV, radio, stereo or other electronic repair?
 - Sewing with a sewing machine?
 - Working with large power tools such as a lathe, table saw or band saw?
 - Target shooting or hunting?
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Methods – Data Collection Tool

- For each hobby the following questions were asked:
 - “Did you do ... during the pregnancy?”
 - How often?
 - less than 5 times
 - 6-10 times
 - 1-3 times/month
 - 1-3 times/week
 - most days
 - Did you do ... after (child)’s birth before he/she was (ref. age)?
 - How often?
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Methods – Data Analysis

- Multiple logistic regression performed
 - Hobby participation was coded as yes/no
 - Variables included in final model:
 - date of father's interview
 - child's age at interview
 - whether a proxy interview was conducted
 - father's race
 - geographic region
 - the child's gender
 - father's smoking status
 - child's birth season
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Sample Characteristics

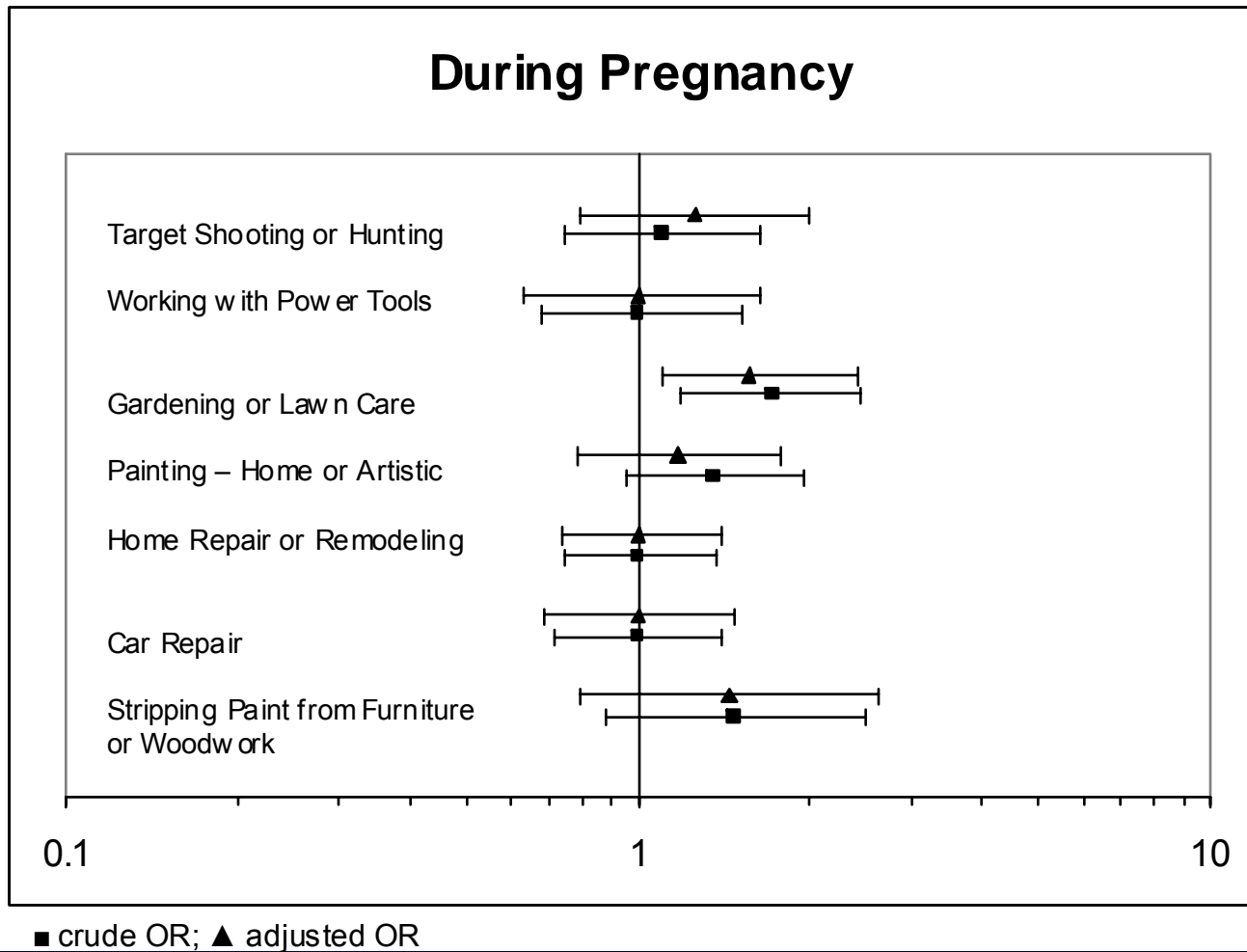
- Control children were older at the interview on average
 - Cases were less likely to have had a proxy interview and were more likely to be male
 - Fathers of cases were less likely to smoke and had higher incomes
 - An increase in risk was seen in children born in the summer months compared with those born in the fall, with winter and spring being intermediate
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Adjusted Analyses

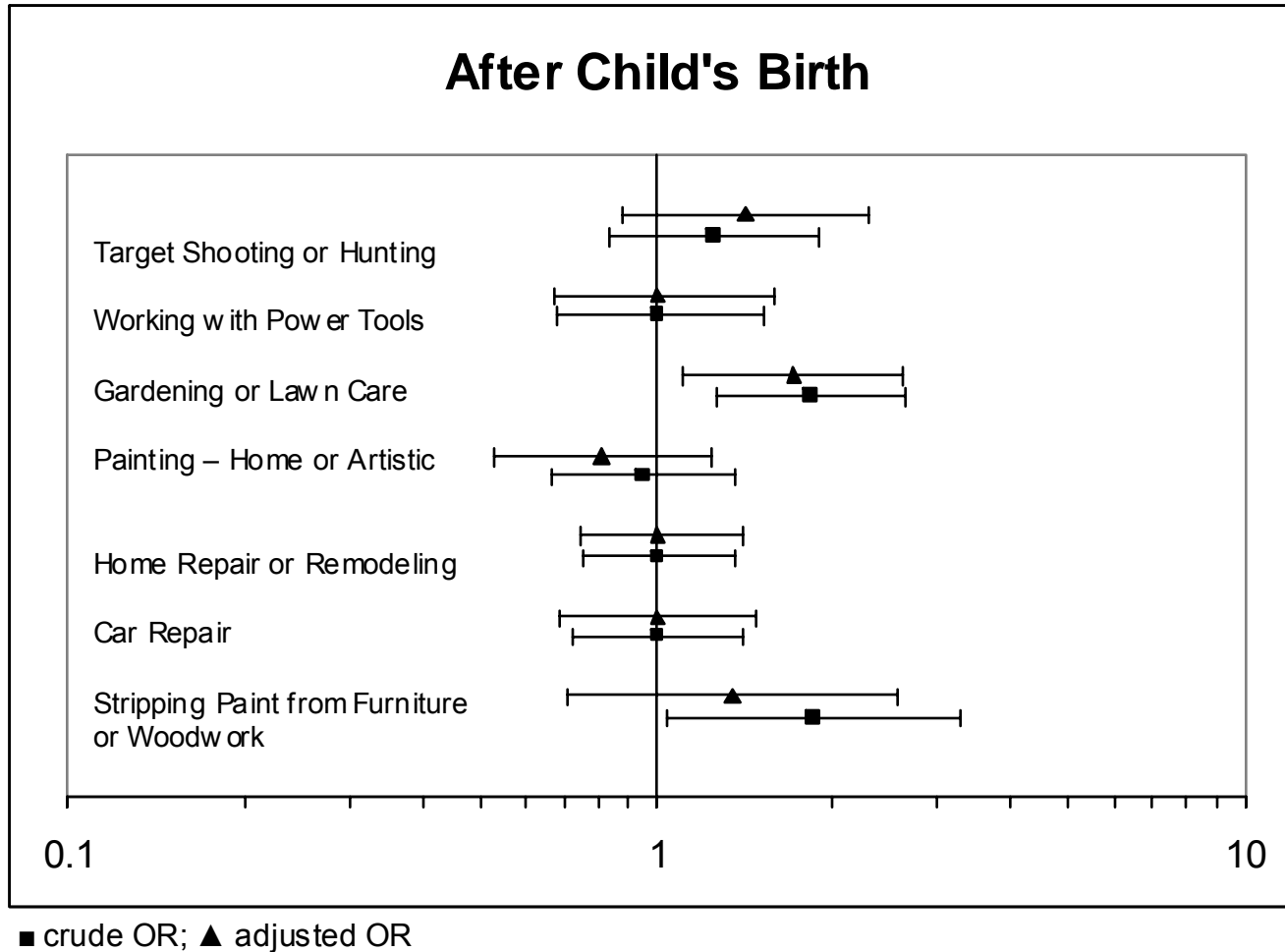
| Hobby | During Pregnancy | | After Birth | |
|-----------------|------------------|----------|-------------|----------|
| | OR* | 95% CI | OR* | 95% CI |
| Stripping paint | 1.4 | 0.8, 2.6 | 1.3 | 0.7, 2.6 |
| Car repair | 1.0 | 0.6, 1.4 | 0.9 | 0.6, 1.4 |
| Home repair | 0.8 | 0.5, 1.2 | 0.7 | 0.5, 1.1 |
| Painting | 1.2 | 0.8, 1.8 | 0.8 | 0.5, 1.2 |
| Lawn care | 1.6 | 1.0, 2.4 | 1.7 | 1.1, 2.6 |
| Power tools | 0.9 | 0.5, 1.5 | 0.8 | 0.4, 1.4 |
| Hunting | 1.3 | 0.8, 2.0 | 1.4 | 0.9, 2.3 |

*Adjusted for father's race, geographic location, date of father's interview, child's age at interview, whether a proxy interview was conducted, the child's gender, father's smoking status and the child's birth season.

Adjusted Analyses



Adjusted Analyses



Other Analyses

- No differences were seen by frequency of participation in hobby
- For many exposures, ORs were higher for children with an older reference age
- No large differences seen when least frequent participants excluded

Discussion

- Strongest associations for
 - lawn care with pesticides both during the pregnancy and after the child's birth.
- Modest associations for
 - stripping paint from furniture or woodwork during either time period

Discussion – Lawn Care

- Consistent with other studies
 - PNET, MB and other CNS tumor risk
 - Occupational and residential pesticide exposures
 - Lawn and household pesticides implicated
 - Positive associations on the order of 1.5-2.5

Discussion – Stripping Paint

- Organic solvent exposure of concern
- Mixed results from previous studies
 - Some have shown positive associations
 - Paternal exposure risk low - around 1.2
 - Others have shown no associations
 - Chromosomal aberrations have been shown
 - Other neurotoxic effects are known

Strengths

- Case-control design
 - Rare disease
 - Multiple exposures
- Assessed exposures from before conception until disease onset
- Many additional characteristics assessed

Limitations

- Potential for:
 - Recall bias
 - Non-differential underestimates
- Broad questions
 - No details on specific exposures or safety precautions

Recommendations

- For future studies:
 - Assess the exposures related to lawn care and stripping paint further; collect more detailed information pertaining to specific exposures, amount, timing, frequency and protective measures used.
 - Assess pesticide exposures beyond those encountered during gardening and lawn care, including those used on pets and for household pests.
 - Include a group of hospital controls – parents of children with illnesses other than the one of interest – in order to reduce the potential for recall bias.
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