Table 3: Associated occupational exposures among flight attendants with early miscarriage (gestational weeks 4-13) according to time period during pregnancy a

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variable b | Weeks 4-8 | | | |  | Weeks 9-13 | | | |  | Weeks 4-13 | | | |
| No.  Pregnancies | No.  Miscarriages | OR | (95% CI) | No.  Pregnancies | No.  Miscarriages | OR | (95% CI) | No.  Pregnancies | No.  Miscarriages | OR | (95% CI) |
| Any work flights c |  |  | Model 1 | |  |  |  | Model 2 | |  |  |  | Model 3 | |
| Yes d | 722 | 63 | 1.0 |  |  | 659 | 64 | 1.0 |  |  | 722 | 127 | 1.0 |  |
| No | 75 | 15 | 2.2 | (1.3-3.7) |  | 60 | 5 | 0.78 | (0.33-1.9) |  | 75 | 20 | 1.5 | (0.97-2.5) |
| Coworkers or passengers smoked in pregnancy |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| No  d | 651 | 55 | 1.0 |  |  | 596 | 51 | 1.0 |  |  | 651 | 106 | 1.0 |  |
| Yes | 146 | 23 | 1.7 | (1.0-2.9) |  | 123 | 18 | 1.8 | (1.0-3.0) |  | 146 | 41 | 1.8 | (1.2-2.6) |
|  |  |  |  | |  |  |  |  | |  |  |  |  | |
| Any work flights c |  |  | Model 4 | |  |  |  | Model 5 | |  |  |  | Model 6 | |
| Yes d | 722 | 63 | 1.0 |  |  | 659 | 64 | 1.0 |  |  | 722 | 127 | 1.0 |  |
| No | 75 | 15 | 2.4 | (1.4-4.1) |  | 60 | 5 | 0.90 | (0.37-2.2) |  | 75 | 20 | 1.7 | (1.1-2.8) |
| Physical job demands in pregnancy e |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Low d | 157 | 8 | 1.0 |  |  | 149 | 6 | 1.0 |  |  | 157 | 14 | 1.0 |  |
| High | 640 | 70 | 2.2 | (1.1-4.4) |  | 570 | 63 | 2.8 | (1.3-6.4) |  | 640 | 133 | 2.5 | (1.5-4.2) |
|  |  |  |  | |  |  |  |  | |  |  |  |  | |
| Cumulative absorbed dose (mGy) f |  |  | Model 7 | |  |  |  | Model 8 | |  |  |  | Model 9 | |
| No work flights c | 75 | 15 | 2.3 | (1.3-4.1) |  | 60 | 5 | 1.3 | (0.46-3.6) |  | 75 | 20 |  |  |
| <0.1 | **329** | 36 | 1.0 |  |  | 155 | 12 | 1.0 |  |  | 191 | 48 | NR | |
| 0.1+ | **393** | 27 | 0.95 | (0.55-1.6) |  | 504 | 52 | 1.7 | (0.95-3.2) |  | 531 | 79 |  |  |
|  |  |  |  | |  |  |  |  | |  |  |  |  | |
| Cumulative time zones crossed |  |  | Model 10 | |  |  |  | Model 11 | |  |  |  | Model 12 | |
| No work flights c | 75 | 15 | 2.3 | (1.3-4.1) |  | 60 | 5 | 0.92 | (0.35-2.4) |  | 75 | 20 | 1.7 | (1.0-2.9) |
| <30 d | **370** | 38 | 1.0 |  |  | 243 | 23 | 1.0 |  |  | 281 | 61 | 1.0 |  |
| 30+ | **352** | 25 | 0.90 | (0.54-1.5) |  | 416 | 41 | 1.2 | (0.70-2.0) |  | 441 | 66 | 1.1 | (0.75-1.6) |
|  |  |  |  | |  |  |  |  | |  |  |  |  | |
| Cumulative standard sleep interval travel (hours) |  |  | Model 13 | |  |  |  | Model 14 | |  |  |  | Model 15 | |
| No work flights c | 75 | 15 | 2.5 | (1.4-4.5) |  | 60 | 5 | 1.2 | (0.45-3.0) |  | 75 | 20 | 2.0 | (1.2-3.4) |
| <15 d | **452** | 39 | 1.0 |  |  | 303 | 24 | 1.0 |  |  | 342 | 63 | 1.0 |  |
| 15+ | **270** | 24 | 1.2 | (0.70-2.0) |  | 356 | 40 | 1.8 | (1.1-3.0) |  | 380 | 64 | 1.5 | (1.1-2.2) |
|  |  |  |  | |  |  |  |  | |  |  |  |  | |
| Absorbed dose and time zones crossed |  |  | Model 16 | |  |  |  | Model 17 | |  |  |  | Model 18 | |
| No work flights c | 75 | 15 | 2.3 | (1.2-4.2) |  | 60 | 5 | 1.2 | (0.42-3.4) |  | 75 | 20 | 1.9 | (1.1-3.3) |
| Low-Low (<0.1 mGy and <30 zones) d | **286** | 33 | 1.0 |  |  | 132 | 11 | 1.0 |  |  | 165 | 44 | 1.0 |  |
| Low-High (<0.1 mGy and ≥30 zones) | **43** | 3 | 0.91 | (0.36-2.3) |  | 23 | 1 | 0.55 | (0.07-4.2) |  | 26 | 4 | 0.84 | (0.36-2.0) |
| High-Low (≥0.1 mGy and <30 zones) | **84** | 5 | 1.1 | (0.41-2.9) |  | 111 | 12 | 1.7 | (0.79-3.9) |  | 116 | 17 | 1.4 | (0.79-2.5) |
| High-High (≥0.1 mGy and ≥30 zones) | **309** | 22 | 0.90 | (0.51-1.6) |  | 393 | 40 | 1.6 | (0.83-3.1) |  | 415 | 62 | 1.3 | (0.84-1.9) |
|  |  |  |  | |  |  |  |  | |  |  |  |  | |
| Absorbed dose and Standard Sleep Interval travel |  |  | Model 19 | |  |  |  | Model 20 | |  |  |  | Model 21 | |
| No work flights c | 75 | 15 | 2.6 | (1.4-4.8) |  | 60 | 5 | 1.5 | (0.51-4.4) |  | 75 | 20 | 2.2 | (1.2-3.9) |
| Low-Low( <0.1 mGy and <15 hours) d | **290** | 28 | 1.0 |  |  | 136 | 9 | 1.0 |  |  | 164 | 37 | 1.0 |  |
| Low-High (<0.1 mGy and ≥15 hours) | **39** | 8 | 1.8 | (0.86-3.9) |  | 19 | 3 | 2.5 | (0.65-9.4) |  | 27 | 11 | 2.0 | (1.0-3.9) |
| High-Low (≥0.1 mGy and <15 hours) | **162** | 11 | 1.1 | (0.55-2.4) |  | 167 | 15 | 1.6 | (0.71-3.5) |  | 178 | 26 | 1.3 | (0.78-2.2) |
| High-High (≥0.1 mGy and ≥15 hours) | **231** | 16 | 1.0 | (0.52-1.9) |  | 337 | 37 | 2.3 | (1.2-4.7) |  | 353 | 53 | 1.6 | (1.1-2.5) |
|  |  |  |  | |  |  |  |  | |  |  |  |  | |
| Time zones crossed and Standard Sleep Interval travel |  |  | Model 22 | |  |  |  | Model 23 | |  |  |  | Model 24 | |
| No work flights c | 75 | 15 | 2.6 | (1.4-4.8) |  | 60 | 5 | 1.0 | (0.38-2.8) |  | 75 | 20 | 1.9 | (1.1-3.4) |
| Low-Low (<30 zones and <15 hours) d | **311** | 30 | 1.0 |  |  | 191 | 17 | 1.0 |  |  | 221 | 47 | 1.0 |  |
| Low-High (<30 zones and ≥15 hours) | **59** | 8 | 2.0 | (0.97-4.3) |  | 52 | 6 | 1.6 | (0.61-4.1) |  | 60 | 14 | 1.8 | (1.0-3.4) |
| High-Low (≥30 zones and <15 hours) | **141** | 9 | 1.1 | (0.55-2.3) |  | 112 | 7 | 0.68 | (0.28-1.7) |  | 121 | 16 | 0.91 | (0.52-1.6) |
| High-High (≥30 zones and ≥15 hours) | **211** | 16 | 0.96 | (0.51-1.8) |  | 304 | 34 | 1.6 | (0.88-2.9) |  | 320 | 50 | 1.4 | (0.91-2.2) |

a Models of pregnancies in weeks 4-13 included 797 flight attendant study pregnancies (11 miscarriages in gestational weeks 1-3 and 32 pregnancies with one or more missing covariates were excluded).

b All models additionally adjusted for age at the last menstrual period and parity.

c Some employed flight attendants did not incur work flights during the first trimester.

d  Reference category

e High physical job demands defined as (1) being on your feet (including standing and walking) more than 8 hours/day or (2) two or more of the following: lifting or carrying objects that weigh at least 15 pounds more than 10 times a day, bending at the waist more than 25 times/day, and pushing or pulling heavy objects requiring at least 15 pounds of force or effort 20 or more times/day.

f Cumulative occupational exposure metrics were evaluated from the estimated date of last menstrual period through the cutoff week; cut points reflect the median exposure among cases.

NR, not reported since the likelihood ratio test of proportional odds was statistically significant (p=0.037).