NOTE

Childhood leukaemia incidence below the age of 5 years near French nuclear power plants

To cite this article: D Laurier et al 2008 J. Radiol. Prot. 28 401

View the article online for updates and enhancements.

Related content

- A German storm affecting Britain: childhood leukaemia and nuclear power plants
  Leo Kinlen

- The risk of childhood leukaemia following exposure to ionising radiation—a review
  Richard Wakeford

- The Krümmel (Germany) Childhood Leukaemia Cluster: a review and update
  B Grosche, P Kaatsch, B Heinzow et al.

Recent citations

- Comparative analyses of studies of childhood leukemia and magnetic fields, radon and gamma radiation
  Leeka Kheifets et al

- Cancer mortality around U.S. nuclear power plants
  Brant Ulsh and John F Hart

- Childhood leukemia and proximity to nuclear power plants: A systematic review and meta-analysis
  William Mueller and Clare Gilham
NOTE

Childhood leukaemia incidence below the age of 5 years near French nuclear power plants

D Laurier¹, D Hémon² and J Clavel²

¹ Institute for Radiation Protection and Nuclear Safety, IRSN/DRPH/SRBE, BP 17, 92262 Fontenay aux Roses cedex, France
² INSERM Unit 754, Villejuif, France

E-mail: Dominique.laurier@irsn.fr

Received 10 July 2008, accepted for publication 11 July 2008
Published 20 August 2008
Online at stacks.iop.org/JRP/28/401

Abstract
A recent study indicated an excess risk of leukaemia among children under the age of 5 years living in the vicinity of nuclear power plants in Germany. We present results relating to the incidence of childhood leukaemia in the vicinity of nuclear power plants in France for the same age range. These results do not indicate an excess risk of leukaemia in young children living near French nuclear power plants.

1. Introduction

Kaatsch and colleagues recently published the results of a case-control study of leukaemia incidence among children under the age of 5 years living in the vicinity of nuclear power plants (NPPs) in western Germany (Kaatsch et al 2008). The authors considered 593 leukaemia cases included in the German childhood cancer registry as living at diagnosis near one of the 16 NPPs in western Germany during the period 1980–2003. Their results showed a statistically significant increase in risk for all leukaemias (odds ratio, OR, of 2.19 with a lower 95% confidence limit, CL, of 1.51) and for acute lymphoblastic leukaemia (ALL) (OR of 1.98 with a lower 95% CL of 1.33) within 5 km of an NPP, and a statistically significant decrease in risk with increasing distance from an NPP. These results raised, once again, the question of childhood leukaemia risks around nuclear sites. Many results have already available since the mid-1980s, and a review of the epidemiological literature indicates, globally, no excess risk in the vicinity of nuclear facilities among children (age 0–14 years) or children and young adults (age 0–24 years) (IRSN 2008). Nevertheless, many fewer results are available specifically for the age range 0–4 years.

In the United Kingdom, a national study analysed the leukaemia risk near all nuclear facilities (COMARE 2005). It considered close to 3000 cases diagnosed below age 15 years within a distance of 25 km of 28 nuclear sites over the period 1969–93. It indicated no general excess. In addition, a specific analysis of myeloid leukaemia below age 5 years also indicated
no general excess. However, this study provided no direct comparison of results with those from the German study for the 0–4 year age group. An updated analysis, focusing on leukaemia incidence below the age of 5 years near British NPPs is under publication (Bithell 2008).

In France, we conducted a study of leukaemia risk near nuclear facilities in the framework of a collaborative project between the INSERM and the IRSN (White-Koning et al. 2004). This study considered all cases for ages less than 15 years, included in the national registry of childhood leukaemia as being diagnosed between 1990 and 1998 while resident within a distance of 20 km of 29 nuclear sites located all over France. Expected cases were calculated using national incidence rates as a reference. This study included a total of 670 observed cases. It showed no excess of childhood leukaemia generally near nuclear sites, and no decrease of risk with increasing distance from the sites. A similar conclusion was obtained for children below the age of 5 years. However, the published article provided no results that could be directly compared to those obtained by the German study of NPPs.

2. Additional French results

Results from intermediate analyses performed at the time of the French study of White-Koning et al. (2004), but not included in the final publication, allow a direct comparison with the results of the German study of Kaatsch et al. (2008). The analyses focus on leukaemia incidence among children aged 0–4 years living near one of the 19 NPPs in France between 1990 and 1998. Table 1 presents the distribution of risk according to the distance from the NPPs.

Overall, a total of 114 cases were observed within 20 km of a French NPP, against 108.1 cases expected. The results indicated no excess risk in any of the defined 5 km distance zones, or a decreasing trend of risk with increasing distance from the NPPs. In particular, the observed to expected case ratio for young children living within 5 km of a French NPP is 0.96 (95% confidence interval: 0.31–2.24).

3. Conclusion

These additional French results provide the basis for a direct comparison with those recently published from Germany. In contrast to what has been observed in Germany, the French results currently available provide no suggestion of an excess leukaemia risk near NPPs in the specific age range 0–4 years old. However, these findings are based on small numbers of cases, so the confidence intervals for observed to expected case ratios are wide. Nevertheless, these results effectively rule out an increased risk of leukaemia in young children living near French NPPs that is greater than two.

<table>
<thead>
<tr>
<th>Distance (radius) (km)</th>
<th>Observed cases</th>
<th>Expected cases</th>
<th>SIR</th>
<th>95% confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–5</td>
<td>5</td>
<td>5.2</td>
<td>0.96</td>
<td>[0.31–2.24]</td>
</tr>
<tr>
<td>5–10</td>
<td>20</td>
<td>15.4</td>
<td>1.30</td>
<td>[0.79–2.01]</td>
</tr>
<tr>
<td>10–15</td>
<td>18</td>
<td>18.3</td>
<td>0.99</td>
<td>[0.58–1.56]</td>
</tr>
<tr>
<td>15–20</td>
<td>71</td>
<td>69.3</td>
<td>1.03</td>
<td>[0.80–1.29]</td>
</tr>
<tr>
<td>Total</td>
<td>114</td>
<td>108.1</td>
<td>1.05</td>
<td>[0.87–1.27]</td>
</tr>
</tbody>
</table>
References

Bithell J 2008 Childhood leukemia near British nuclear installations: methodological issues and recent results


