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in brief...

# Chernobyl: the long-term health and economic consequences

Recent events in Fukushima have reawakened public anxiety about the consequences of a major accident at a nuclear power plant. **Hartmut Lehmann** and **Jonathan Wadsworth** assess the long-lasting effects of radiation exposure from the Chernobyl disaster on the health and labour market performance of the people of Ukraine.

On 26 April 1986, engineers at the Chernobyl nuclear power plant in Ukraine began a series of tests on one of the reactors, which led to the world's worst civil nuclear disaster. The amount of radiation released was far greater than from the Hiroshima or Nagasaki atomic bombs, hitherto the source of most of our knowledge about the effects of radiation fallout. As yet, the amount of radiation released and the areas affected by fallout from Fukushima are lower than at Chernobyl.

Much has been written about the medical and physical consequences of Chernobyl, but less attention has been given to the social and economic consequences of the disaster. Poor health and people's perceptions of their health can potentially influence their fertility, marriage behaviour or educational attainment, as well as the key labour market outcomes of wages, hours of work and employment.

Our research examines the relationship between people's exposure to radiation as a result of the Chernobyl accident and their subsequent health and economic performance 20 years later. We analyse the Ukrainian Longitudinal Monitor Survey, which in 2003, 2004 and 2007 collected self-reported health and socio-economic data from a representative sample of working age individuals.

The data set allows us to establish the place of residence of respondents at the time of the Chernobyl accident. This is important because there was widespread variation in the amount of radiation areas received. Some parts of Ukraine received little more radiation than normal background levels, while others received more than ten times the usual background level dosage.



The Chernobyl accident carries a long-lasting legacy for many residents of Ukraine

The first step of our analysis is to establish whether there is a link between local radiation levels and the list of illnesses reported in the survey. The second step is to see whether this radiation dose itself is correlated with other socio-economic outcomes over the next 20 years. Finally, we explore whether the radiation dose is an indicator of the effect of health on a range of labour market and income-generating outcomes that are important for daily life in Ukraine.

While the long latency period of many radiation-related illnesses means that it is important to take a long-run view of the consequences of the accident, equally Soviet secrecy about it and the lack of general awareness of the effects of radiation created a fertile ground for persistent fears and rumours attributing any health problem to Chernobyl. So perceptions may have changed as a result and perceptions can have a powerful influence on individual actions. As such, our research is an attempt to identify a causal effect of the accident on both health outcomes and health perceptions.

Our results suggest that the Chernobyl accident carries a long-lasting legacy for many residents of Ukraine, notably because of its effect on their perceptions of their health. To this day, more than half of the adult Ukrainian population appears to be still concerned over the consequences of this event. And one in six prime age Ukrainian adults report being in poor health, a much higher figure than comparable estimates from many western industrialised countries.

There is also a significant positive association between residence in radiation-affected areas at the time of the accident and self-assessed poor health. Adults living in areas considered to have received sufficiently high radiation fallout as to be continually monitored are up to 12 percentage points more likely to report being in poor health.

But there is a less obvious manifestation of such an effect on a variety of specific self-reported health conditions or measures associated with stress, such as drinking, smoking or weight problems, relative to others living in areas less affected by the radiation fallout. Only the Chernobyl liquidators (the volunteers and in some cases the conscripts brought in to try to contain and mop up the radiation leak in the immediate vicinity of the plant), who were much more exposed to radiation than other members of the population, appear to have experienced more long-term health problems.

So it seems that the main long-term health effect of Chernobyl for the majority of the current adult population may be working through perceptions of poor health. At the same time, there do appear to be significant associations with Chernobyl-related residence and subsequent labour market performance. Those more exposed to Chernobyl-induced radiation have

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significantly lower levels of employment and working hours 20 years on.

While there is also little evidence from the data that residence in a contaminated zone has influenced fertility, marriage behaviour or educational attainment, there is some evidence to suggest that mobility may be reduced among those living in areas that received higher doses of radiation in 1986. In this way, it may be harder to argue that poor health perceptions are the sole channel through which the legacy of Chernobyl manifests itself.

The lessons for Fukushima may be that while, as in Chernobyl, the area immediately surrounding the plant is likely to be isolated for years to come, individual perceptions are likely to be affected over a much wider area for a lengthy period of time – and this may have economic consequences.

This article summarises 'The Impact of Chernobyl on Health and Labour Market Performance' by Hartmut Lehmann and Jonathan Wadsworth, CEP Discussion Paper No. 1052 (<http://cep.lse.ac.uk/pubs/download/dp1052.pdf>).

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