

J-value results on evacuation, relocation and countermeasures after a big nuclear accident

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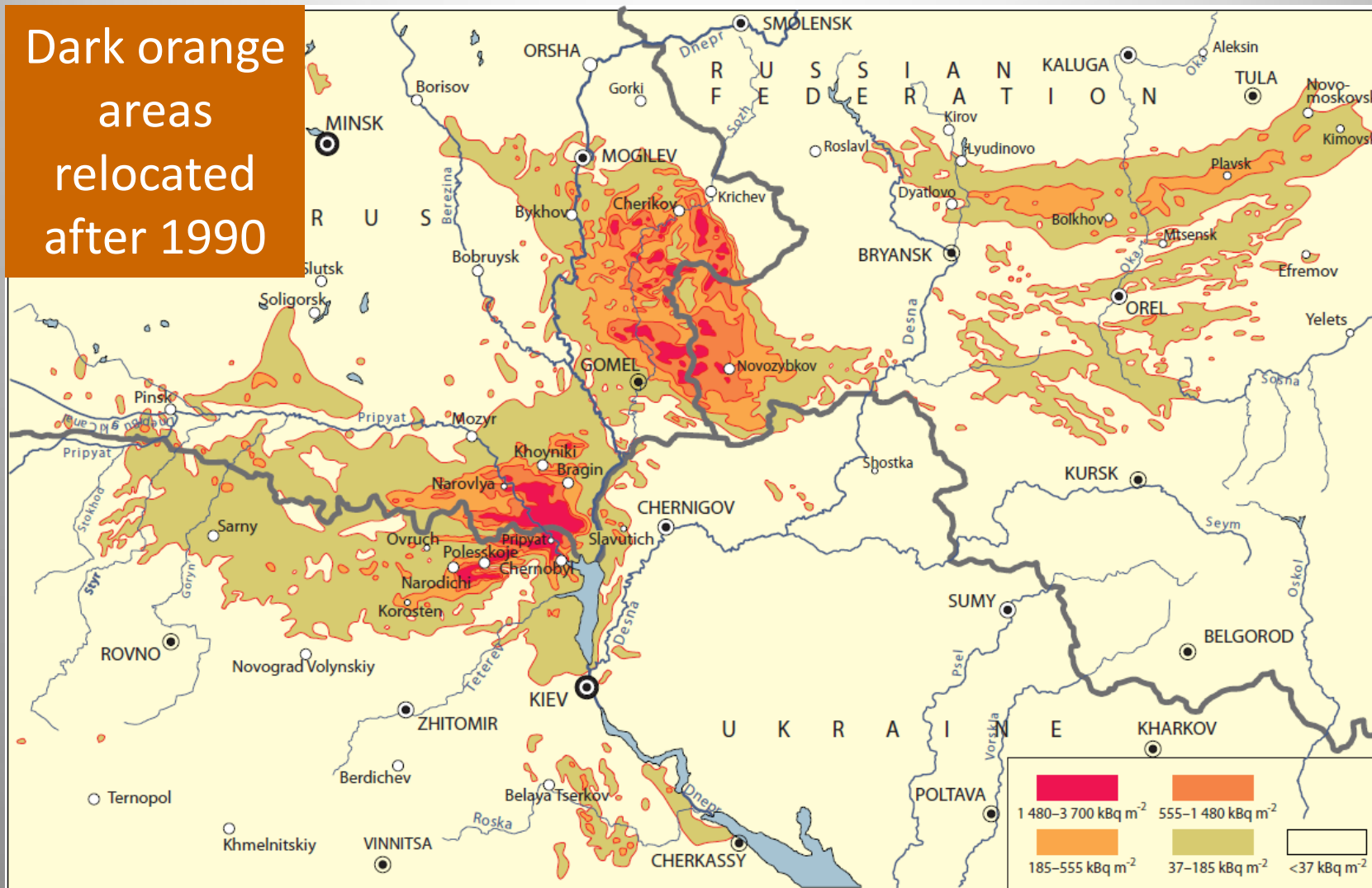
Chernobyl: first relocation in 1986

- **116,000** evacuated from 30-km zone by September 1986
- 7-month gain in life expectancy so J-value was 3 times too high
- Only **17,000** people should have been relocated ($J = 1$)



Chernobyl: second relocation in 1990

Dark orange areas
relocated
after 1990



~1000 km

Chernobyl: second relocation in 1990

- The State All-Union and Republican Programme: relocation of **220,000** people at a cost of 42,000 roubles per person
- Gain in life expectancy was just 21 days
- $J = 21$, so over 20 times too expensive
- **None** of these 220,000 people should have been relocated

Fukushima Daiichi: evacuation worse than radiation

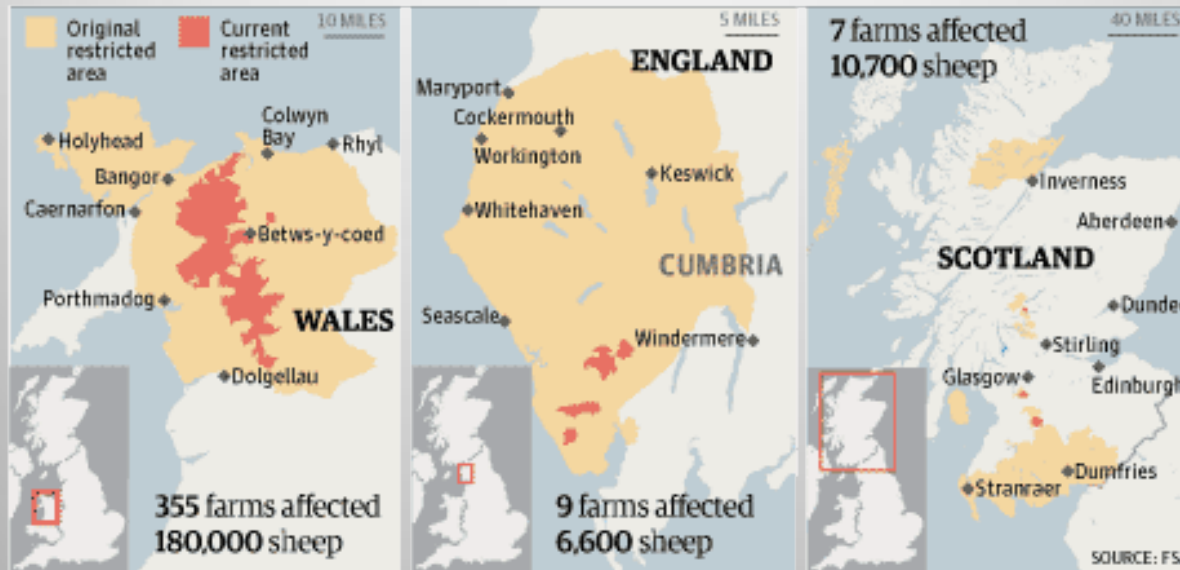
- **160,000** evacuees
- **1,121** deaths in the first 3 years from physical and mental exhaustion following evacuation (assumed to be the over 70s)
- Average loss of life expectancy was **27 days**
- Compare radiation dose averted by evacuation
- Average loss would have been **19 days**

Fukushima Daiichi: remedial measures: urban decontamination

- 110,000 houses in Fukushima City
- 7-fold dose reduction
- Loss of life expectancy averted: 35 days
- $J = 0.04$ so well worth doing



Post-Chernobyl sheep restrictions in UK



- Restrictions imposed on the movement, sale and slaughter of sheep on 9,700 farms in North Wales, Cumbria, Scotland and Northern Ireland

Removing the sheep restrictions in 2012

- Number of restricted farms had fallen to 300 by 2010, when the Food Standards Agency was asked to report on whether they could be lifted altogether
- The FSA calculated this was reasonable
- But should the restrictions have been lifted earlier?



Category	Number of people	Life extension (hh:mm:ss)	J-value
FSA report	2,150	1:34:00	230
Representative person (ICRP)	1,670,000	00:36	58

The UK sheep restrictions were such poor value for money by 2010 that it is clear that they should have been dropped much earlier