

Renoncement à l'énergie nucléaire en Europe Europaweiter Atomausstieg

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Risque résiduel des Centrales nucléaires en Europe - Tihange : Feu dans un transformateur



Risque résiduel persistant dans les centrales:

- **127 réacteurs** connectés au réseau dans 14 des 28 Etats Européens, (WNRISR – M. Schneider, 2016)
- Seulement 2 réacteurs connectés après 2000 (Temelin - Tschéchien, Cernavoda, Roumanie)
- En fait il y a moins de réacteurs connectés. Octobre 2016 Électricité de France (EDF) doit déconnecter **21 des 58 réacteurs français** pour des contrôles de sécurité
- On avait pris connaissance que l'acier des cuves à pression et du producteur de vapeur, **avait des fautes de construction** avec risque de fissures dans en tout 32 réacteurs atomiques sc.a.d 55% de toutes les centrales électriques françaises

Energie nucléaire

- **reste un risque de sécurité:** réacteurs en ,Allemagne, Belgique, France, ,Suisse, Tschéchie, Slovaquie, Ukraine u.a. montrent de grands déficits de sûreté
- **Est un risque pour la santé:** Outre **Tschernobyl et Fukushima** il y a des risques dans les mines à Uranium ,dans le traitement de l'Uranium, durant le fonctionnement normal d'une centrale

Energie nucléaire

Industrie nucléaire

L' utilisation de l'énergie nucléaire et la mise en action d'armes nucléaires causent des dégâts de santé épidéméologiquement prouvés



Travailleurs dans les mines d'Uranium

Exploitation d'Uranium

59.001 ex-exploteur de wismuth

2388 cancers des poumons

jusqu'à 1998

Relation entre la durée du travail et le
risque de maladie.

21% risque de cancer pro WLM
(working level month) à cause de
l'exposition au Radon (95% CI 18 - 24)

BJC
British Journal of Cancer

Lung cancer risk among German male uranium miners: a cohort
study, 1946–1998

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From 1946 to 1990 extensive uranium mining was conducted in the southern parts of the former German Democratic Republic. The overall workforce included several 100 000 individuals. A cohort of 59 001 former male employees of the Wismut Company was established, forming a large retrospective uranium miners' cohort for the time period 1946–1998. Mean duration of follow-up was 30.5 years with a total of 1 801 630 person-years. Loss to follow-up was low at 5.3%. Of the workers, 16 598 (28.1%) died during the study period. Based on 2388 lung cancer deaths, the radon-related lung cancer risk is evaluated. The excess relative risk (ERR) per working level month (WLM) was estimated as 0.21% (95% CI: 0.18–0.24). It was dependent on time since exposure and on attained age. The highest ERR/WLM was observed 15–24 years after exposure and in the youngest age group (<55 years of age). While a strong inverse exposure-rate effect was detected for high exposures, no significant association was detected at exposures below 100 WLM. Excess relative risk/WLM was not modified by duration of exposure. The results would indicate the need to re-estimate the effects of risk modifying factors in current risk models as duration of exposure did not modify the ERR/WLM and there was only a modest decline of ERR/WLM with increasing time since exposure.

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Keywords: epidemiology; cohort study; uranium miners; lung cancer; radon

From 1946 to 1990 there was extensive uranium mining in the southern parts of the former German Democratic Republic (GDR). It was conducted by the Soviet-German Incorporated Company Wismut. Some 231 000 metric tons of uranium ore were produced (Wismut, 1999) and incorporated into the former Soviet Union's nuclear programme. About 400 000 persons may have worked with the company, most of them underground or in uranium ore processing facilities (Otten and Schulz, 1998). Approximately 130 000 of the workers are known. Up to 1998, 7695 workers with radiation-induced lung cancers had been compensated (Schröder *et al.*, 2002). In 2006, the annual number of newly compensated cases was still almost 200 although with a decreasing trend (Koppich *et al.*, 2004).

et al., 2004; Kreishaier, 2006), yet further follow-up was only conducted for the Czech (Tomásek, 2002; Tomásek and Zarska, 2004) and the French cohort (Rogel *et al.*, 2002; Laurier *et al.*, 2004). Although the evidence of a radon-related lung cancer risk among miners is large, it is based upon various heterogeneous cohorts for which the cohort-specific risk estimates vary by more than an order of magnitude. The new German cohort is as big as all the 11 cohorts put together, but less heterogeneous in various aspects: same societal and geographical background, same way of follow-up, and one system for exposure estimation.

The aim of the present analysis was to evaluate the lung cancer risk associated with radon and its progeny due to cumulative radon exposure, exposure rate, duration of exposure, time since exposure, and attained age.

Travailleurs dans l'industrie nucléaire

154 localités
598.000 travailleurs
> 90% < 50 mSv

Tumeurs solides: 97% de risque plus élevé/Sv (95% CI 14 - 197)

leucémies: 193% risque plus élevé/ Sv (95% CI 0 - 847)

1-2% de tous les morts sont probablement dûs à l'irradiation

BMJ

Helping doctors make better decisions

2005

Risk of cancer after low doses of ionising radiation: retrospective cohort study in 15 countries

E Cardis, M Vrijheid, M Blettner, E Gilbert, M Hakama, C Hill, G Howe, J Kaldor, C R Muirhead, M Schubauer-Berigan, T Yoshimura, F Bermann, G Cowper, J Fix, C Hacker, B Heinmüller, M Marshall, I Thierry-Chef, D Utterback, Y-O Ahn, E Amoroso, P Ashmore, A Auvinen, J-M Bae, J Bernar Solano, A Biau, E Combalot, P Deboodt, A Díez Sacristán, M Eklof, H Engels, G Engholm, G Gulis, R Habib, K Holan, H Hyonen, A Kerekes, J Kurttinaitis, H Malke, M Martuzzi, A Mastauskas, A Monnet, M Moser, M S Pearce, D B Richardson, F Rodriguez-Artalejo, A Rogel, H Tardy, M Telle-Lamberton, I Turai, M Uzel, K Veress

Abstract

Objectives To provide direct estimates of risk of cancer after protracted low doses of ionising radiation and to strengthen the scientific basis of radiation protection standards for environmental, occupational, and medical diagnostic exposures.

Design Multinational retrospective cohort study of cancer mortality.

Setting Cohorts of workers in the nuclear industry in 15 countries.

Participants 407 501 workers individually monitored for external radiation with a total follow-up of 5.2 million person years.

Main outcome measures Estimates of excess relative risks per sievert (Sv) of radiation dose for mortality from cancers other than leukaemia and from leukaemia excluding chronic lymphocytic leukaemia, the main causes of death considered by radiation protection authorities.

Results The excess relative risk for cancers other than leukaemia was 0.97 per Sv (95% confidence interval 0.14 to 1.97). Analyses of causes of death related or unrelated to smoking indicate that, although confounding by smoking may be present, it is unlikely to explain all of this increased risk. The excess relative risk for leukaemia excluding chronic lymphocytic leukaemia was 1.93 per Sv (<0 to 8.47). On the basis of these estimates, 1-2% of deaths from cancer among workers in this cohort may be attributable to radiation.

Conclusions These estimates, from the largest study of nuclear workers ever conducted, are higher than, but statistically compatible with, the risk estimates used for current radiation protection standards. The results suggest that there is a small excess risk of cancer, even at the low doses and dose rates typically received by nuclear workers in this study.

by the public in the general environment, by patients through repeated diagnostic procedures,⁴ and by radiation workers.

The effects of low dose chronic exposure to external radiation have been directly estimated in several cohorts of workers in the nuclear industry,⁵ but the sample size has limited the precision of these estimates. Analyses of combined cohorts have improved precision.^{6,7} Estimates from these analyses, however, are compatible with a range of possibilities, from a reduction of risk at low doses to risks higher than those underlying current radiation protection recommendations.

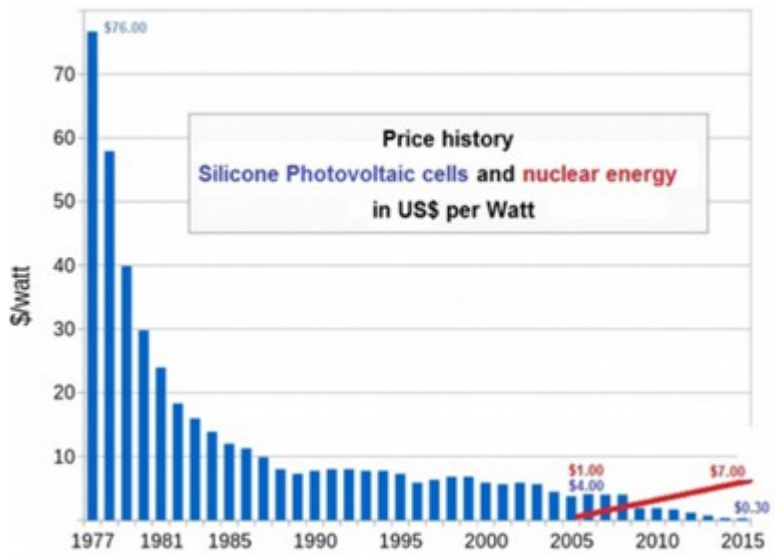
The 15 country study, an international collaborative study of cancer risk among radiation workers in the nuclear industry, was carried out to further improve the precision of direct estimates of risk after protracted low dose exposures and to strengthen the scientific basis of radiation protection.¹ We present risk estimates for mortality from all cancers, excluding leukaemia, and from leukaemia excluding chronic lymphocytic leukaemia and compare them with estimates derived from data on survivors of the A bomb. We have used the term nuclear industry to refer to facilities engaged in production of nuclear power, manufacture of nuclear weapons, enrichment and processing of nuclear fuel, production of radioisotopes, or reactor or weapons research. Uranium mining is not included.

Methods

This multinational retrospective cohort study used a common protocol in 15 countries and collected information on nearly 600 000 workers. Study cohorts were defined from employment or dosimetric records of participating facilities or, where available, from centralised national dose registries. The a priori eligibility criteria for inclusion of cohorts⁸ were essentially complete and non-selective follow-up for mortality;

en Europe ni au niveau mondial

- Comparaison
Photovoltaik - Nukleaire



Prix.

Photovoltaik:

1 Watt = 0,30 US-\$

Nukleaire

1 Watt = 7 US-\$

Hinckley Point C:

1 Watt = 11 US-\$

l'Énergie nucléaire ne protège pas le climat(not carbonfree)

Résultats d'études

- **Emission moyenne 66 gr. Co2/ Kwh.** The mean value of carbon dioxide emissions over the lifetime of a nuclear reactor is 66 grams per kilowatt-hour of electricity.
- **L'énergie nucléaire émet plus de Co2 /kwh que toutes les énergies renouvelables ensemble**
- Nuclear power emits more greenhouse gases per kilowatt hour than all renewables, including biomass (up to 41 grams per kilowatt hour), hydroelectric and solar (up to 13 grams per kilowatt hour), and wind (up to 10 grams per kilowatt hour).
- **L'énergie nucléaire émet moins de CO2 que les énergies fossiles.** Reactors produce significantly less carbon dioxide than all fossil fuels. The cleanest is natural gas (443 grams per kilowatt hour), while the most carbon dioxide is produced by coal (up to 1,050 grams per kilowatt hour).

• *Quelle: Sovacool BK. „Valuing the greenhouse gas emissions from nuclear power: A critical survey.“ Energy Policy 36 (2008):*

Prochain Devoir



Réaction en chaîne
Kettingreactie
Kettenreaktion
Chain reaction

TIHANGE

25. Juni 2017

← save the date!

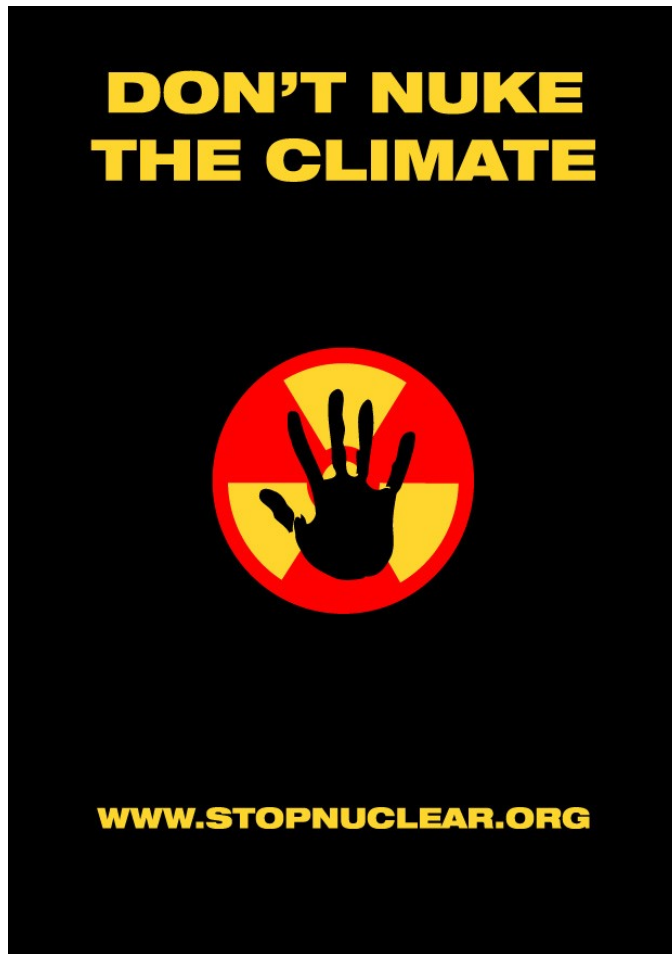


Chaîne Humaine | Mensenketting | Menschenkette | Human Chain
T I H A N G E — L I È G E — M A A S T R I C H T — A A C H E N

Climat et énergie nucléaire

- Bonn, Décembre 2017, Conférence sur le climat
- Opposition des mouvements antiatomiques et pour le climat contre les soi-disant-NGOs de l'industrie atomique comme „*Nuclear for climate*“ (ils ont déjà beaucoup d'influence auprès de l'UE) et „*Energy for Humanity*“ (Organisation suisse pro-nucléaire, qui veut collecter des subventions pour l'industrie atomique)
- Campagne: „**Don't nuke the climate**“

A new campaign



- For a nuclear free and carbonfree energy future
- In Europe and all over the world