

Concerns about alarmist portrayal of CT scans

We read with interest the Article by Michael Hauptmann and colleagues¹ and the linked Comment by Nobuyuki Hamada and Lydia B Zablotska² related to the study of brain cancer after childhood CT and would like to raise the following concerns.

First, we consider the title of the Comment “*New evidence for brain cancer risk after a single paediatric CT scan*” to be unnecessarily alarming. Even though Hauptmann and colleagues provide additional evidence to the existing literature, the epidemiological methods used by the authors are fundamentally statistical in nature; they establish association but do not prove causality. Hauptmann and colleagues find no direct evidence of any single child getting a brain tumour from a single CT scan. Rather, on aggregate, the authors report an excess absolute risk of 1.1 per head CT per 100 000 person-years. That is, after 10 years the authors would expect one additional cancer per 10 000 children receiving a head CT compared with what would otherwise be expected. This level of risk is not dissimilar to that found in previous work^{3,4} and hence the topic has not taken any dramatic new turn, as the title might imply.

Second, we are concerned that these two publications in *The Lancet Oncology* might lead to media coverage that emphasises the very small potential risk but neglects the well-established large benefit of head CT. As a result, some parents who are asked to allow a head CT to be done for their child might decline to do so, to the detriment of the child's health. For example, after use of the Pediatric Emergency Care Applied Research Network paediatric head CT rule⁵ to minimise unnecessary head CTs, clinically important traumatic brain injury was found in 4.4% of patients younger than 2 years and 4.3% of patients age 2 years and older. Hence, the number of children who

benefited from a medically appropriate head CT (430–440 per 10 000) is significantly larger than the one per 10 000 cancer potentially caused by the radiation.

Physicians, patients, and parents should be aware that the radiology and medical physics community are required to maintain close watch over the radiation doses used in medical imaging, optimising the doses for the specific patient and diagnostic task. At the low doses of radiation used in medical imaging, the benefit of a medically appropriate CT exam will far exceed the small potential risk of cancer.

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- 1 Hauptmann M, Byrnes G, Cardis E, et al. Brain cancer after radiation exposure from CT examinations of children and young adults: results from the EPI-CT cohort study. *Lancet Oncol* 2023; **24**: 45–53.
- 2 Hamada N, Zablotska LB. New evidence for brain cancer risk after a single paediatric CT scan. *Lancet Oncol* 2023; **24**: 2–3.
- 3 Pearce MS, Salotti JA, Little MP, et al. Radiation exposure from CT scans in childhood and subsequent risk of leukaemia and brain tumours: a retrospective cohort study. *Lancet* 2012; **380**: 499–505.
- 4 National Research Council. Health risks from exposure to low levels of ionizing radiation: BEIR VII phase 2. Washington, DC: The National Academies Press, 2006.
- 5 Kuppermann N, Holmes JF, Dayan PS, et al. Identification of children at very low risk of clinically-important brain injuries after head trauma: a prospective cohort study. *Lancet* 2009; **374**: 1160–70.