Long-term strategies for thyroid health monitoring after nuclear accidents

International Agency for Research on Cancer
Lyon, France

Kayo Togawa, MPH, PhD
togawak@iarc.fr

On behalf of the IARC Expert Group on Thyroid Health Monitoring after Nuclear Accidents

Background

- A nuclear power plant accident may result in a release of radionuclides including radioiodine.
- Exposure to radioiodine can cause various adverse health effects, including thyroid cancer.
- Important to consider how best to protect the thyroid health of the affected populations, as part of preparedness and response to any future nuclear accident
- IARC recognized the need for guidelines on how and whether to implement thyroid health monitoring after nuclear accidents involving release of radioiodine.

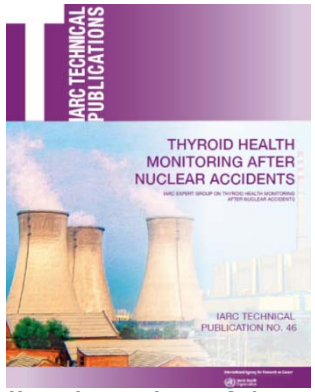
TM-NUC Project

Primary aim

- To develop recommendations on thyroid health monitoring after a nuclear accident

Approach

- Convened an international, multidisciplinary Expert Group (http://tmnuc.iarc.fr)
- The Expert Group reviewed the scientific evidence as well as the experience from past nuclear accidents in order to develop the recommendations.



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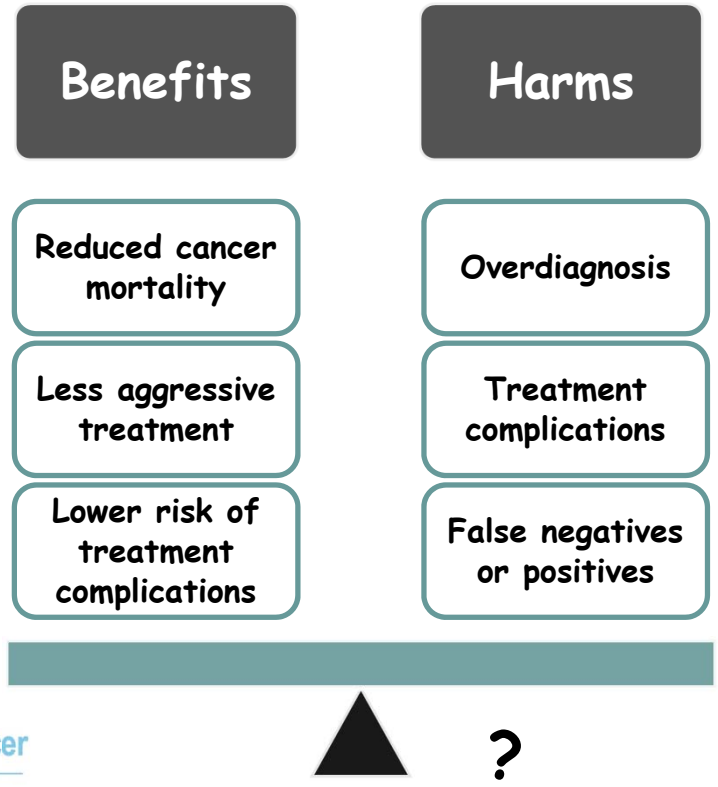
Cancer Screening

Cancer screening is the application of a screening test in an asymptomatic population to identify individuals with an abnormality suggestive of cancer, with the intent of reducing mortality and morbidity.



Thyroid Cancer in Adults

- Rare disease with a generally excellent prognosis
- Most common types: Papillary and follicular
- The expected 10-year disease-specific survival

  98–100% for localized or regional disease, 85–95% for distant metastases (ages < 55 years)
- Screening identifies both benign thyroid nodules and thyroid cancers that will remain indolent, as well as those that will become clinically significant.
- Leads to an apparent rise in thyroid cancer incidence without proportionate mortality reduction

Screening an asymptomatic adult population for thyroid cancer is NOT recommended, because the harms outweigh the benefits.

Bibbins-Domingo et al., 2017

Thyroid Cancer in Children and Adolescents

- Thyroid cancer is less common in children and adolescents than in adults.
- Papillary thyroid cancer-specific 30-year survival is approximately 99–100% irrespective of sex or presence of regional lymph node metastasis at presentation, with a minimal decrease in survival (to 97%) for patients with distant metastasis.
- For children and adolescents exposed to Chernobyl fallout, thyroid cancer-specific survival was 98–99%.

Screening populations of children and adolescents regardless of risk levels is expected to also result in issues related to overdiagnosis without clear public health benefits.

Expert Group Recommendation No. 1

The Expert Group recommends *against* population thyroid screening* after a nuclear accident.

The Expert Group defines “population thyroid screening” as actively recruiting all residents of a defined area to participate in thyroid examinations and subsequent diagnostic or follow-up tests as indicated.

Potential Benefits and Harms in High-Risk Groups

- Elevated risk in those exposed to radiation during childhood or adolescence
- Limited evidence on benefits of early detection in high-risk children and adolescents
- After the Chernobyl accident – favourable prognosis
- May have required less extensive treatment if the thyroid cancer had been detected earlier
- Not possible to predict with certainty which cancers will progress to an advanced state
- Risk of undergoing treatment without potential clinical benefit for cancers that may have remained indolent

Expert Group Recommendation No. 2

The Expert Group recommends that consideration be given to offering a long-term thyroid monitoring programme for higher-risk individuals* after a nuclear accident.

* The Expert Group defines “higher-risk individuals” as individuals exposed in utero or during childhood or adolescence (younger than 19 years) with a thyroid dose of 100–500 mGy or more.

Thyroid Monitoring Programme

- Thyroid monitoring programme includes:
  - education to improve health literacy
  - registration of participants
  - centralized data collection from thyroid examinations and clinical management
- Should be extended through adulthood
- An elective activity – the decision about whether to participate or to stop is individual preference-sensitive.
- Has to include a shared decision-making process to enable decision-making that is consistent with the person's values, preferences, and context

Remarks

- The practical definition of a thyroid dose of 100–500 mGy as an actionable level for offering inclusion in the long-term thyroid monitoring programme should not be confused with radiation protection limits.
- This does not mean that nothing should be offered to an individual with a thyroid dose below the actionable level.
- Further research is needed, and the optimal actionable level may need to be revised as new evidence emerges.

Considerations

1. Monitoring infrastructure to assess the likely health consequences of release of radioactive substances
2. Dosimetric monitoring
3. Oral administration of potassium iodide (thyroid blocking)
4. Education/risk communication to the population living in the vicinity of a nuclear power plant

Other considerations may also be important, such as socioeconomic implications, health-care resources, and social values. The final decision should be made jointly by the government, the relevant authorities, and the society affected by the nuclear accident.

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Sergey Shinkarev
Geraldine Thomas
Mykola Tronko
Salvatore Vaccarella

Specialists

Zhanat Carr
André Ilbawi
Hiroki Shimura

Advisers

Enora Clero
Silvia Franceschi
Maria Perez
Catherine Sauvaget

Project secretary

Catherine Chassin

Production team

Jennifer Brandt
Sylvia Lesage
Karen Müller

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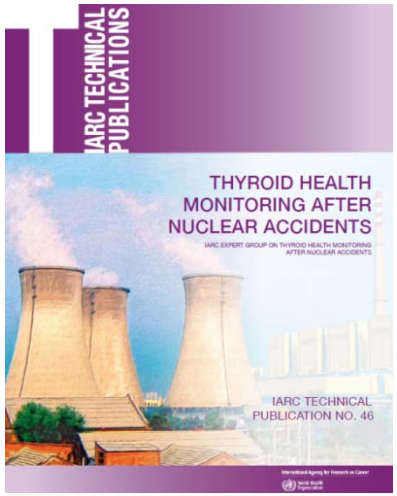

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