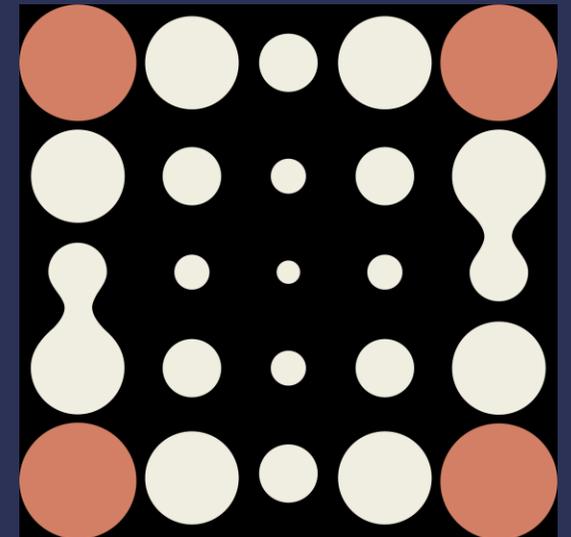


The evolving topic of tattoos in cancer epidemiology and why studies should be prospective.

Dr. Milena Foerster
Environment and Lifestyle Epidemiology Branch

foersterm@iarc.fr

International Agency
for Research on Cancer



Overview

1. What is known so far
2. Tattoos in (cancer) epidemiology
4. Cross-sectional vs prospective design
5. Outlook

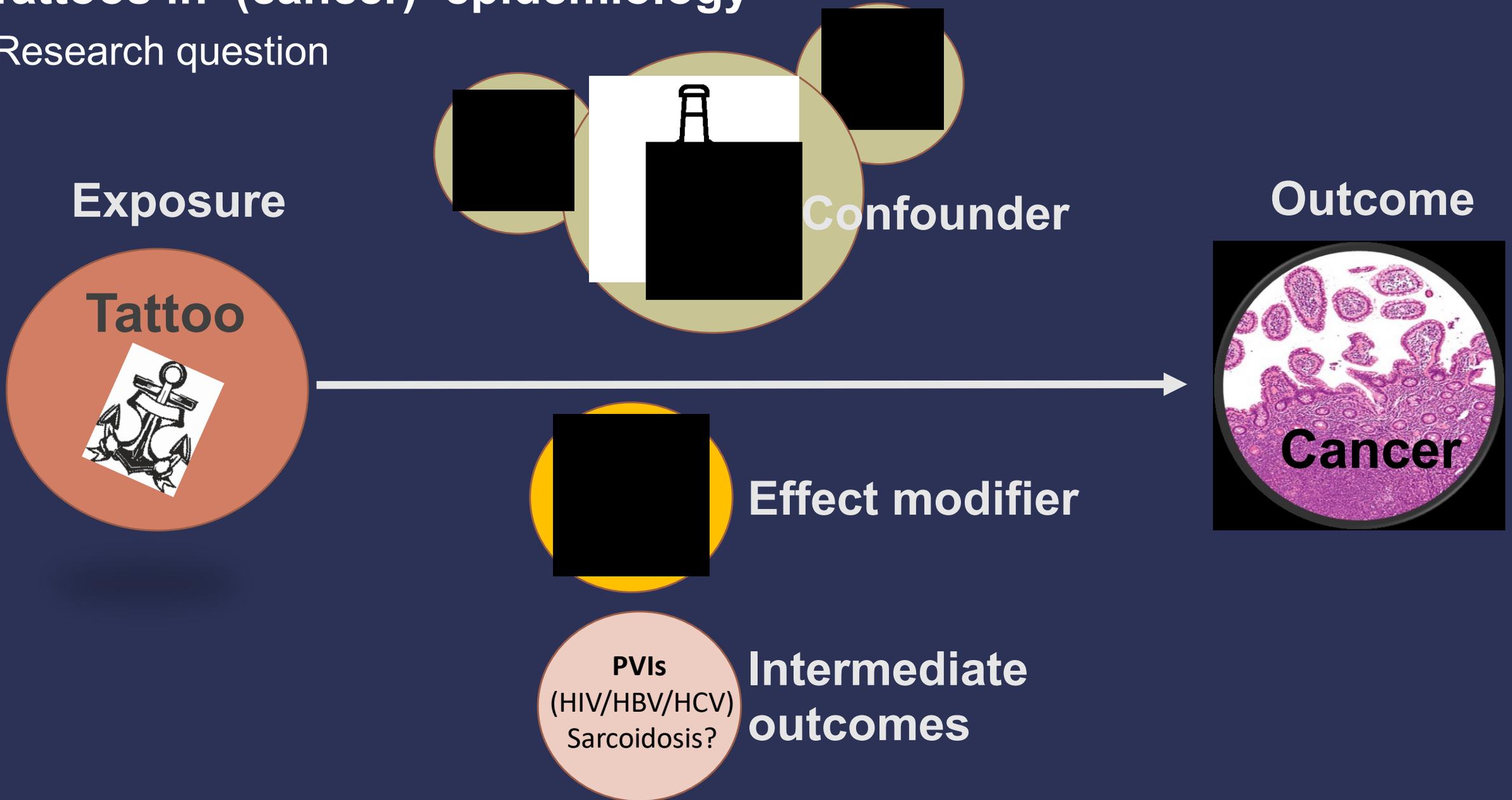
What is known so far

- Carcinogens found in tattoo inks (pigments or contaminants)
- Classification of these substances related (mostly) to respiratory or oral exposure
- Most tattoo pigments do not stay in the skin
- Cancer sites of interest : Lymphatic (NHLs) and skin
- Multiple possible “exposure routes” to cancer formation
- High relevance of the research question

- -> Need for well-designed epidemiological studies to assess potential health risks
 - Two small case control studies on tattoos and skin and lymphatic cancer published ambiguous results (Barton et al. (2020), Warner et al. (2020))
 - Larger case-control study ongoing (Lund University, Sweden)

Tattoos in (cancer) epidemiology

Research question



Tattoos in (cancer) epidemiology

Data sources

1. Population cohorts:

- Large samples representative of the general population and typically followed-up during xx years/lifetime
- Collect and update vast sociodemographic, lifestyle, and medical data
- Consists of exposed and non-exposed individuals
- Open to external research upon reasonable request

2. Independent data collection via questionnaire / online

- Useful for specific questions e.g. tattoos, COVID
- Risky if used as only data source

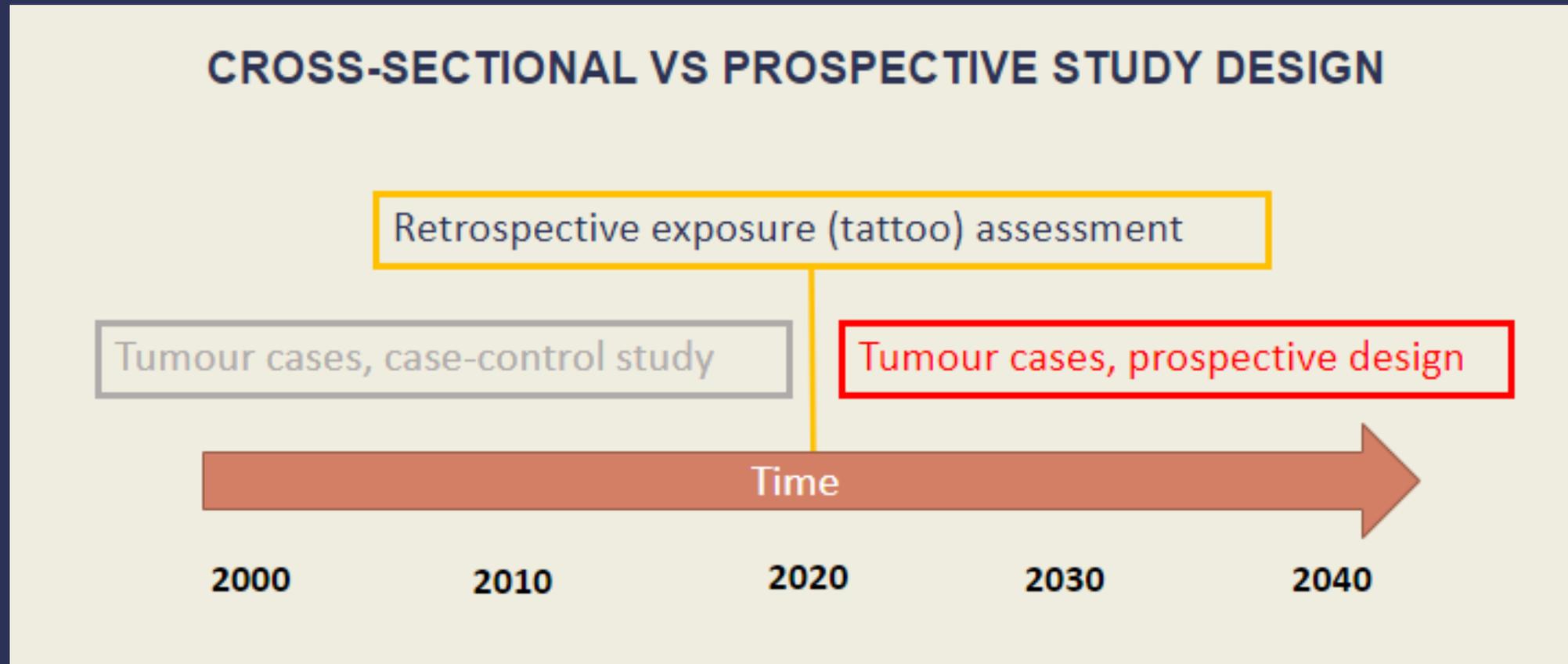
3. "Objective" data sources / registry data:

- To retrieve medical history and mortality data
- Open to external research upon reasonable request



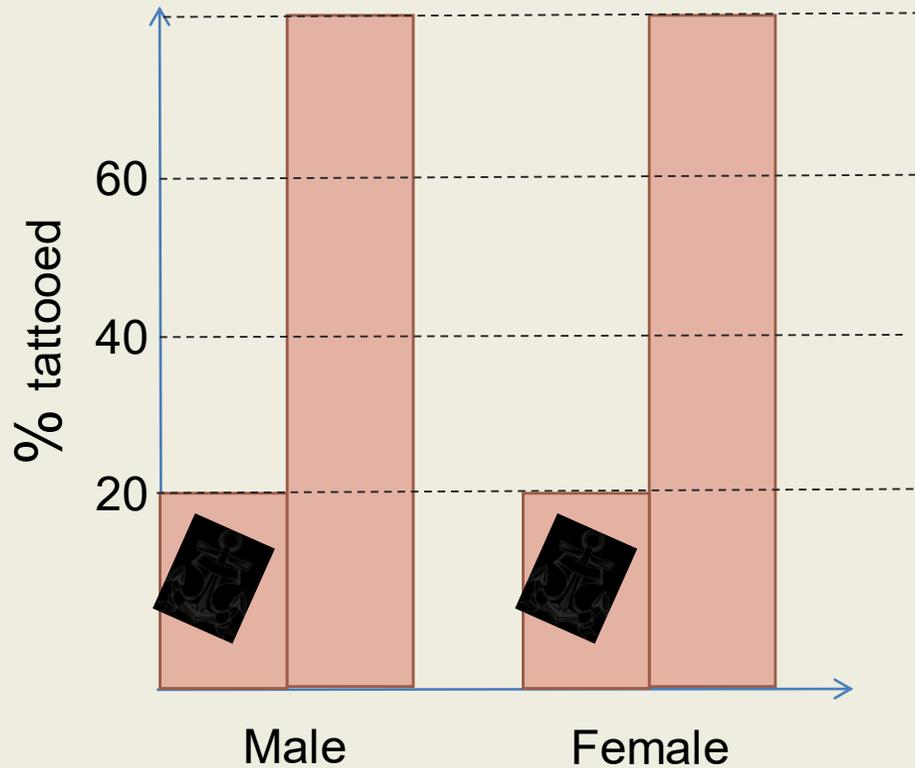
Tattoos in (cancer) epidemiology

Study designs



Tattoos in (cancer) epidemiology

Exposure: Tattoos

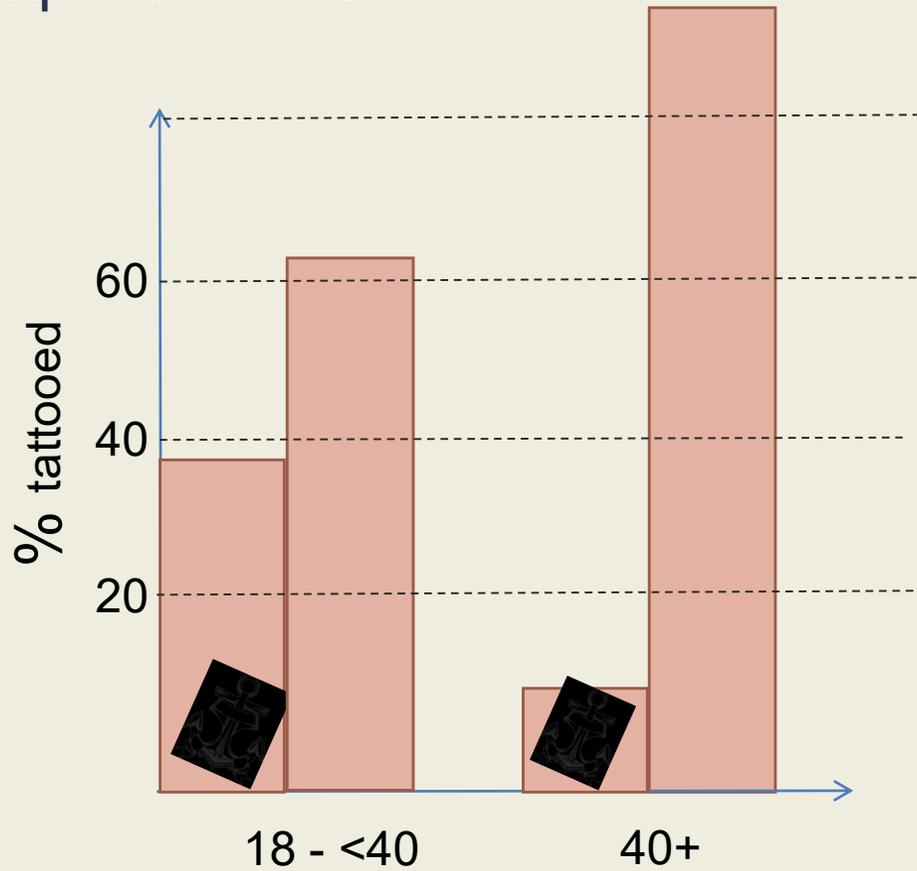


Relevant factors:

Population prevalence

Tattoos in (cancer) epidemiology

Exposure: Tattoos

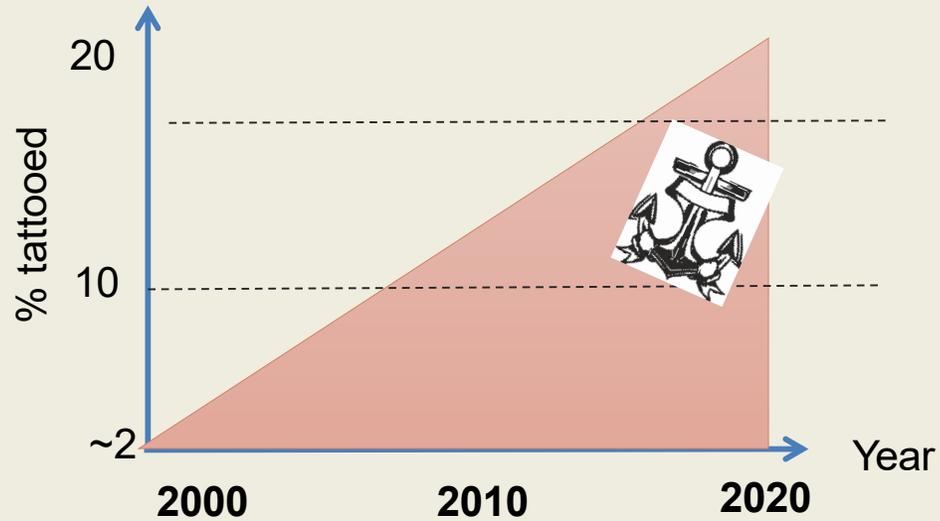


Relevant factors:

Population prevalence

Tattoos in (cancer) epidemiology

Exposure: Tattoos



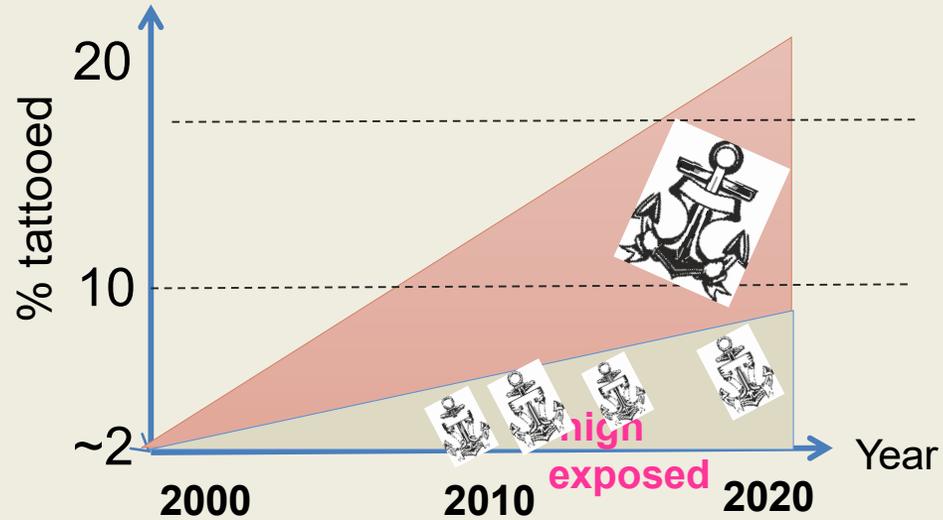
Relevant factors:

Population prevalence

Exposure change over time

Tattoos in (cancer) epidemiology

Exposure: Tattoos



Relevant factors:

Population prevalence

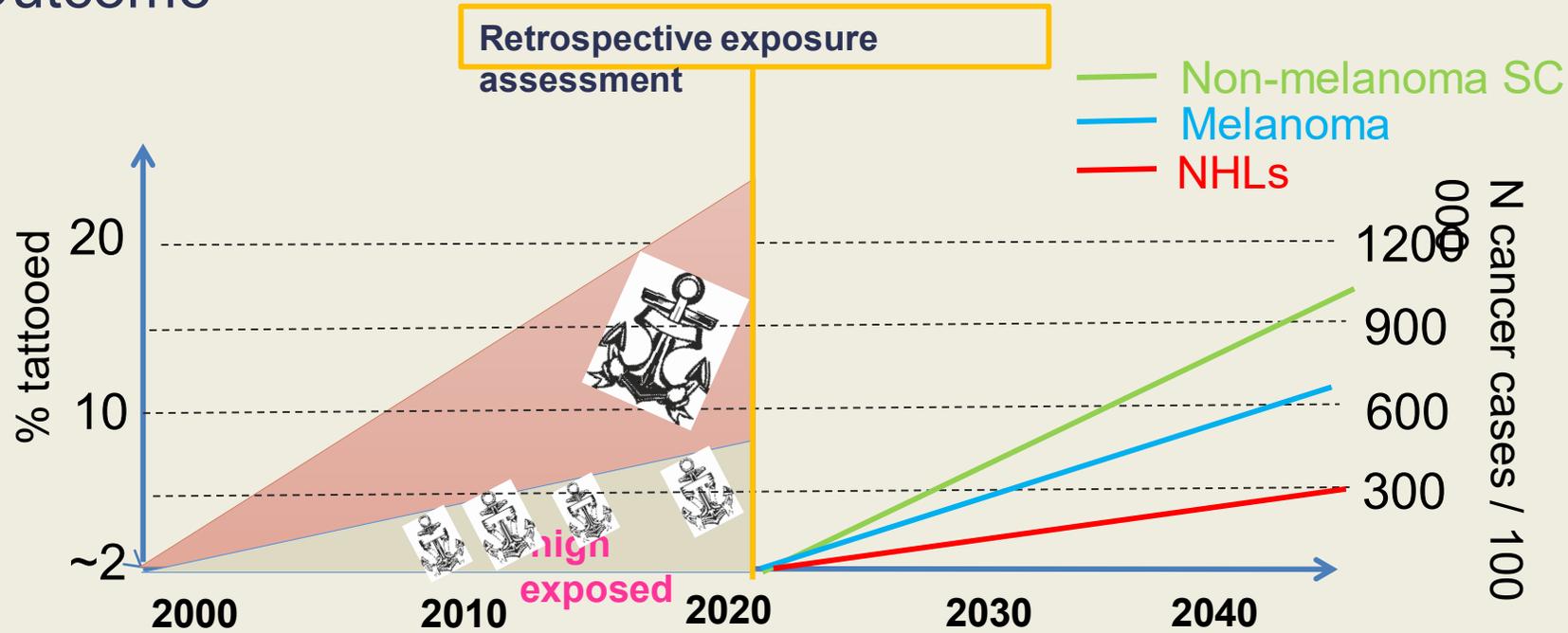
Exposure change over time

Exposure-response relationship

- High/low exposed populations
- Life-time vs one-time exposure
- Cumulative vs threshold exposure

Tattoos in (cancer) epidemiology

Outcome

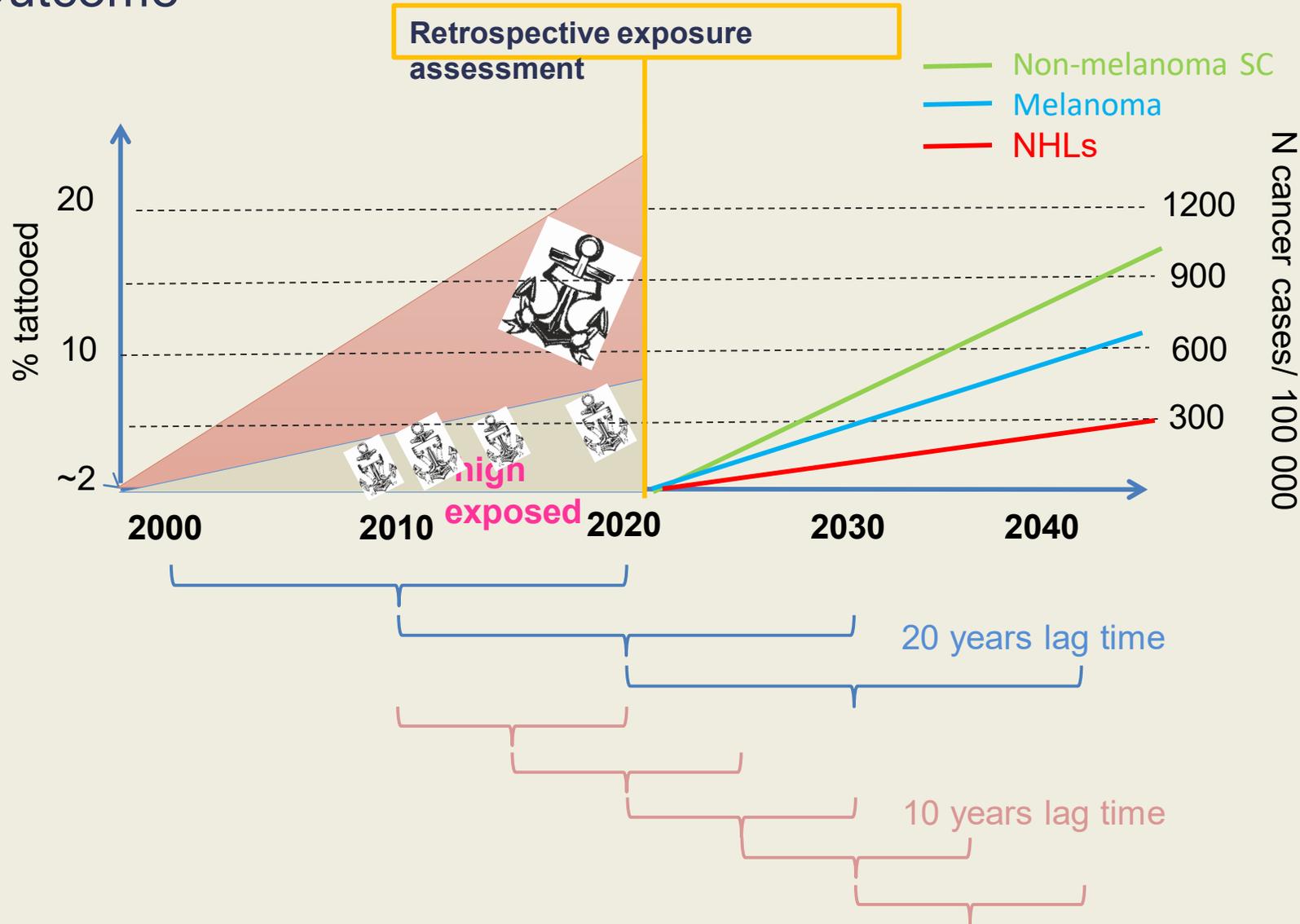


Relevant factors:

Incidence

Tattoos in (cancer) epidemiology

Outcome



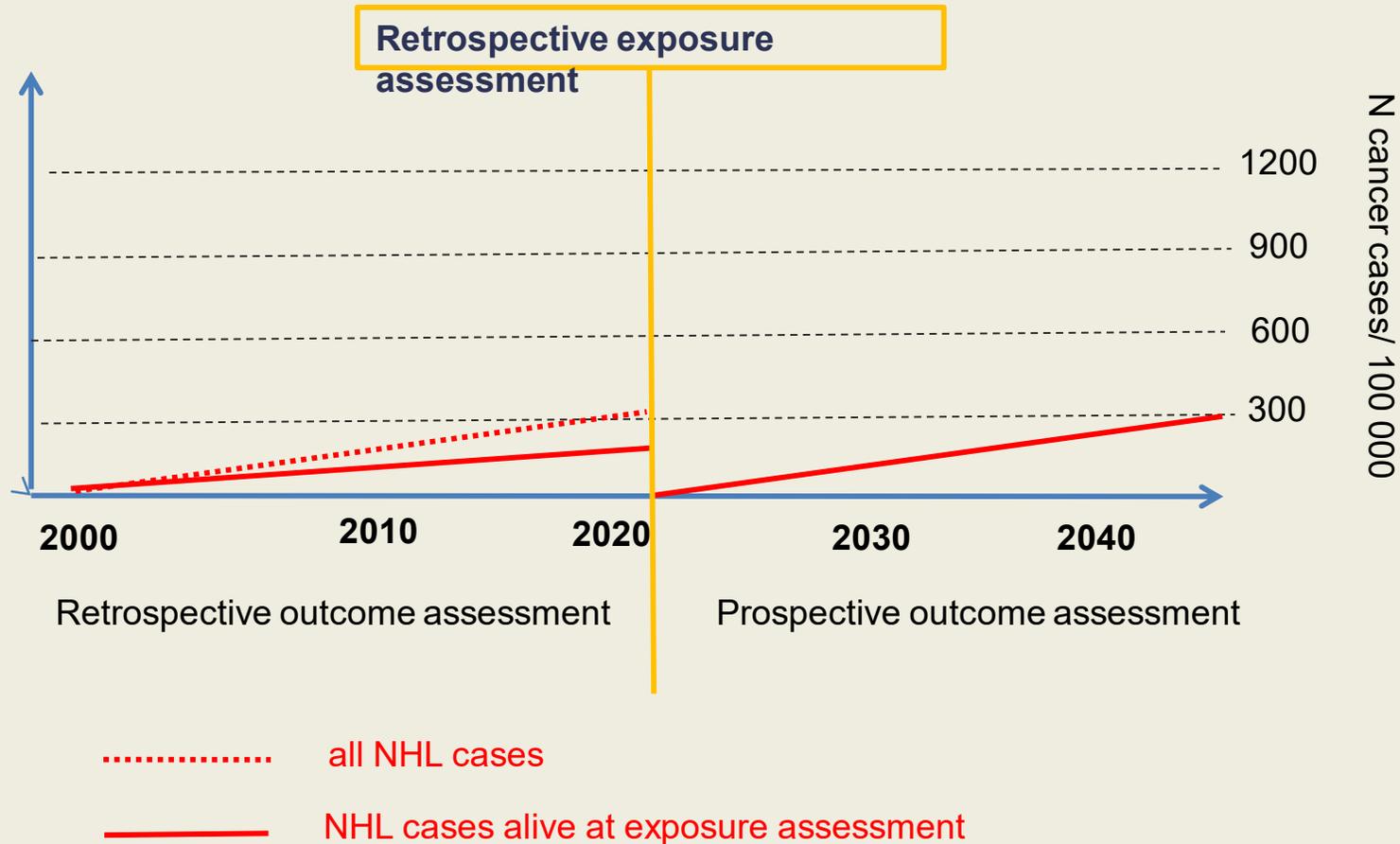
Relevant factors:

Incidence

Lagtime

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Outcome



Relevant factors:

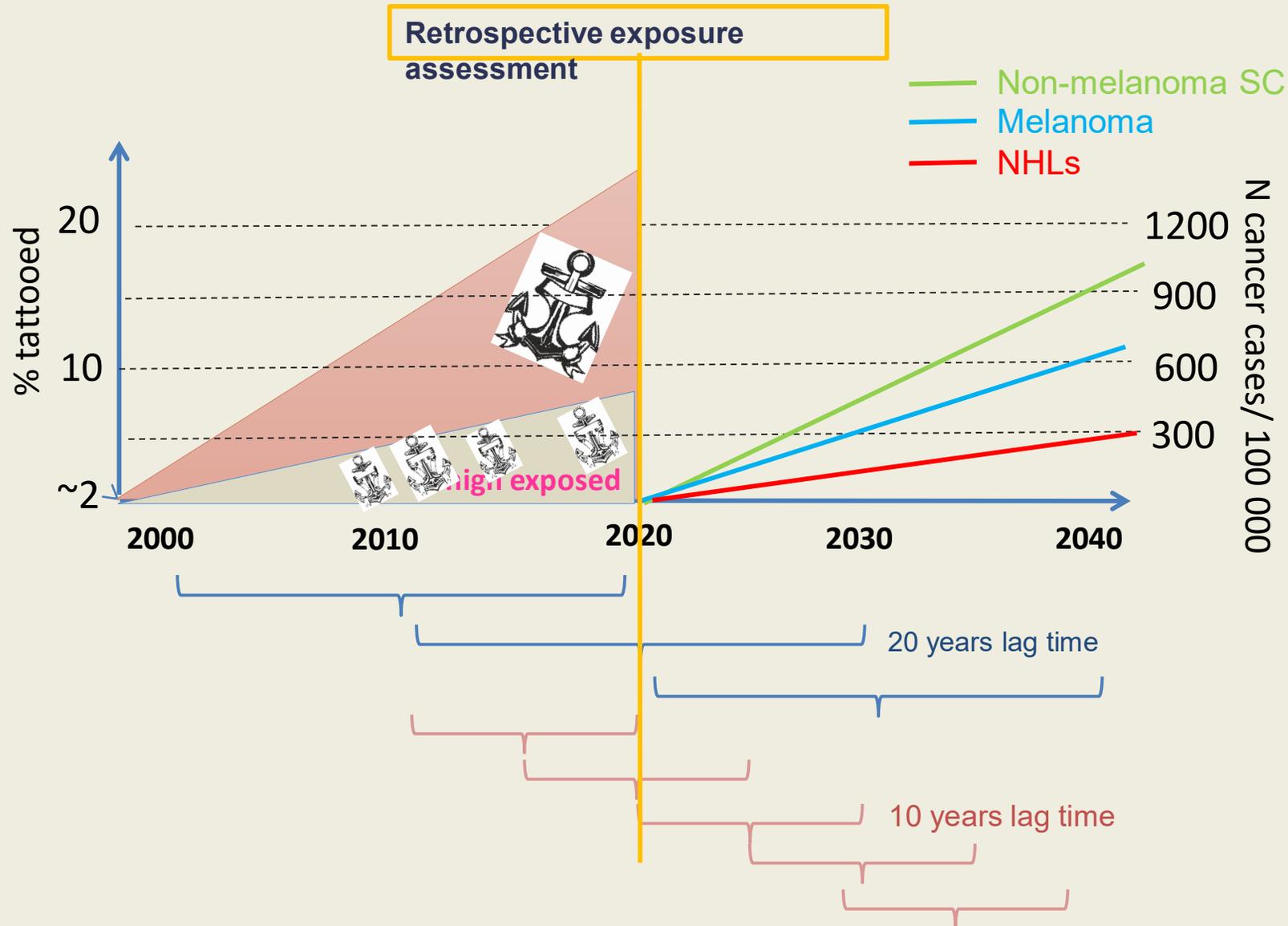
Incidence

Lagtime

Mortality

Tattoos in (cancer) epidemiology

Outcome



Relevant factors:

Incidence

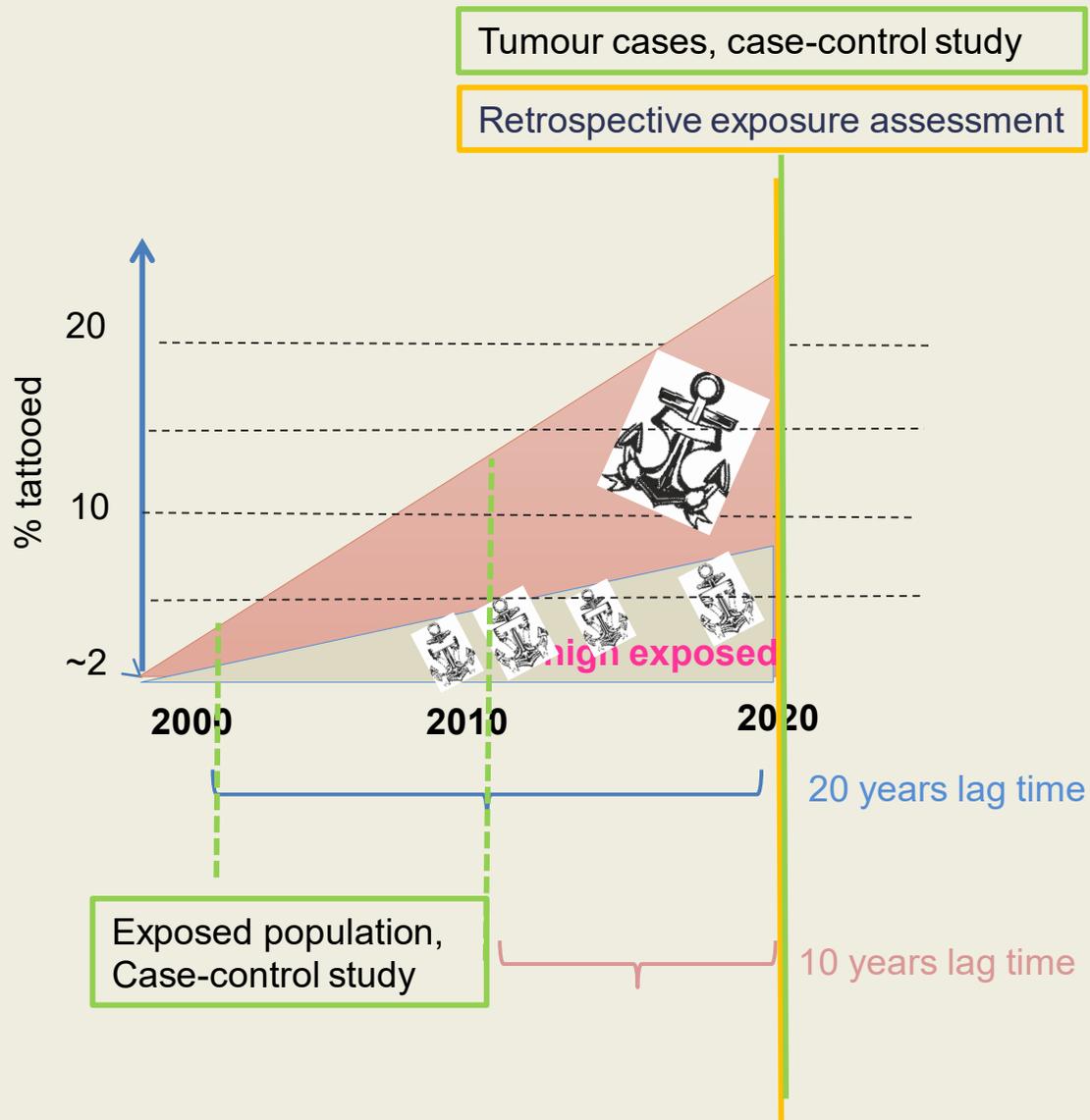
Lagtime

Mortality

Other factors:

Patient age

Confounders



CASE CONTROL STUDY

Outcome and exposure assessed cross-sectional or retrospectively

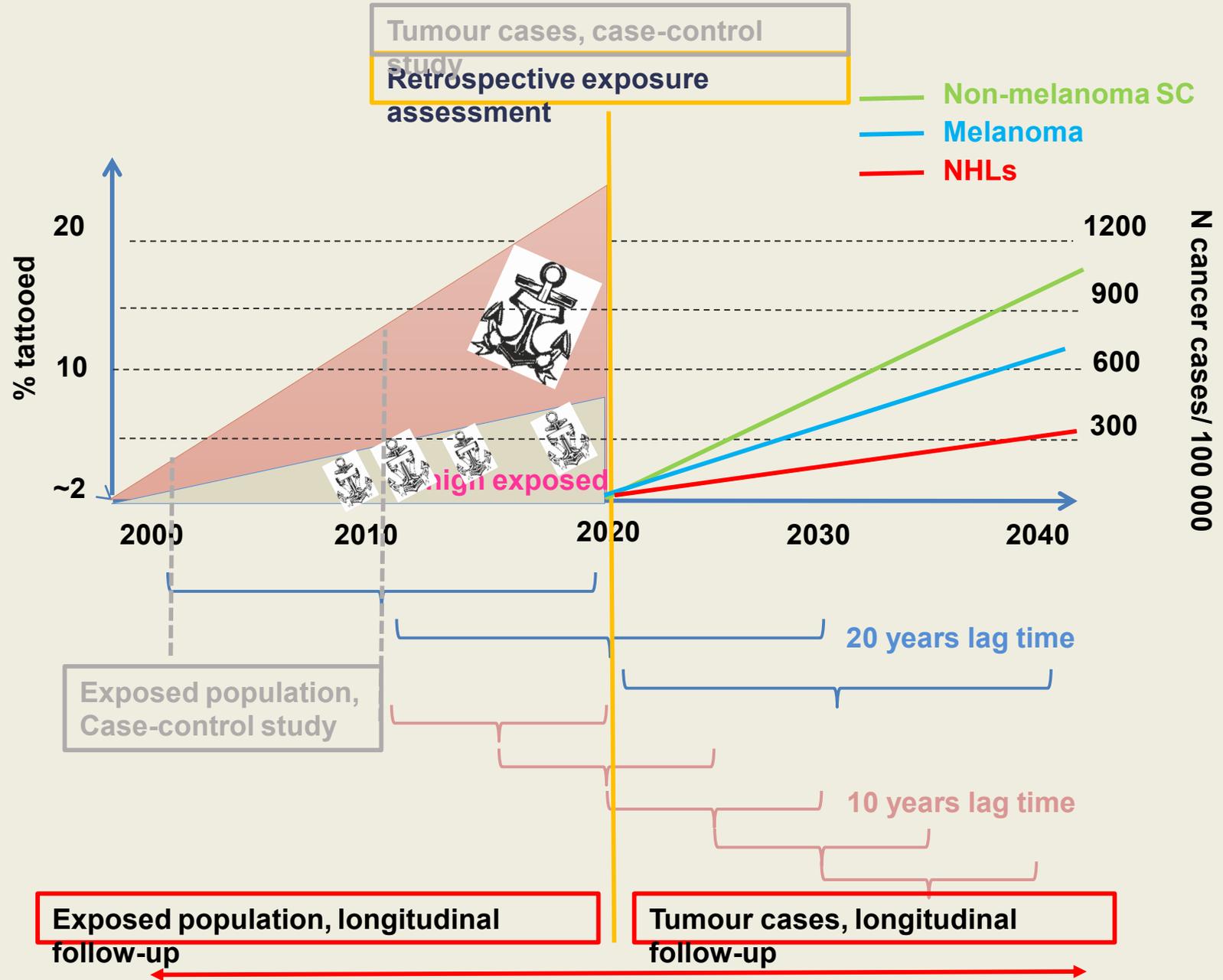
+ Allows for rapid data analysis

- Exposure assessed today cannot account for low population exposure >10 years ago (lagtime cannot be taken into account)
- Outcome assessed today cannot account for high mortality of cancer cases
- Cases recruited today unrepresentative (co-exposed, too old)

In most instances case control studies can give a first idea about a given association.

In the case of tattoos this is not necessarily the case

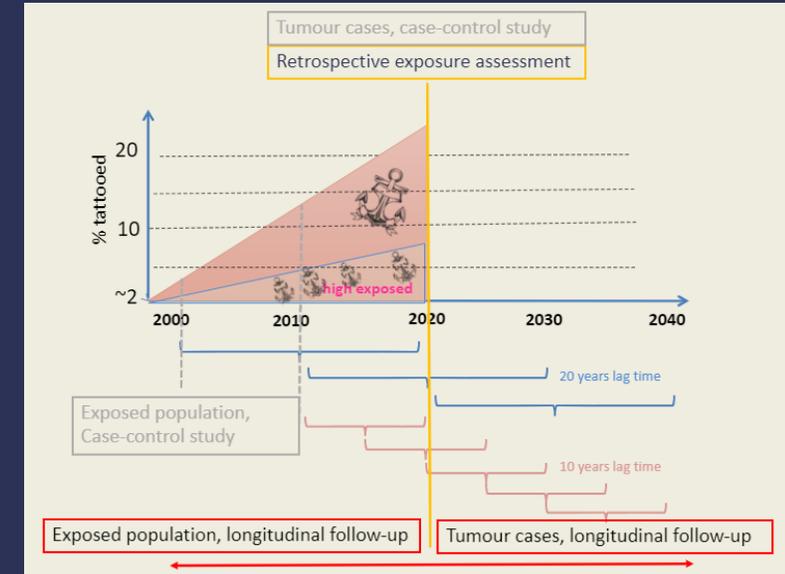
PROSPECTIVE STUDY



PROSPECTIVE STUDY

Cases recruited prospectively from T0, exposure assessed at T0 (and if possible at T0+X)

- + Assures information on outcome and exposure for ALL potential cases (no mortality bias)
 - + Accounts for the rising population exposure
 - + Different lagtimes can be assumed and tested
- Exposure assessed only once today cannot account for tattoos tomorrow
- Needs a sufficient large N for each outcome: long waiting time for results



Outlook

- + Prospective assessment of tattoo exposure in the French and German national cohorts Constances and NAKO
- + data on relevant sociodemographic factors & confounder data etc available, annual follow-up
- + cases and controls in one cohort

Protocol

1. Send out a tattoo exposure questionnaire (EpiTAT) to all tattooed cohort members in 2022 (approx. 14,000 tattooed people in France & 15,000 in Germany)
2. Prospective recruitment of cancer cases via national health insurance data (France) and cancer registries (Germany)

Ongoing

- + Validation study of EpiTAT in ~100 tattooed individuals



Thank you !

ENV Branch at IARC: Joachim Schüz, Lucas Dufour, Isabelle Deltour, Monika Moissoinier, Valerie McCormack, Liacine Bouaoun

The ESTP, and in particular Ines and Wolfgang

Constances: Prof. Marie Zins, Prof. Marcel Goldberg

Universite Paris-Est Creteil: Prof. Khaled Ezzedine

DKFZ: Dr. Lena Koch-Gallenkamp, Prof. Hermann Brenner

Saarland cancer registry: Dr. Holleczeck

All participating NAKO study centres

Contact:
foersterm@iarc.
fr

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