

THE REPRESENTATIVE INDIVIDUAL

Terms of reference

“To develop principles that assist in **defining the individual** to be used as the basis for determining exposures in the ICRP system of protection. Examples of areas to be covered include how the individual is defined in the context of exposures in **retrospective** and **prospective** situations as well as avoidable and unavoidable situations. **Demonstration of compliance** will also be addressed. Issues related to the critical group and concepts of uncertainty as related to individual will also be considered”.

TG Members:

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TG ON INDIVIDUAL

□ Introduction

Background
Principles and concepts

□ General aspects of dose assessment

Purpose
Types
Process
Uncertainties

□ Identification of Individual characteristics

Definition

Characteristics

Age specific dose coefficients

Time and space
Monitoring and modelling
Stakeholder

TG PROPOSAL

“The representative individual is a logical extension of the critical group concept recommended by the Commission starting with Publication 7 and continuing through Publications 43 and 60”.

IN SELECTING CHARACTERISTICS FOR THE REPRESENTATIVE INDIVIDUAL

reasonableness,

sustainability,

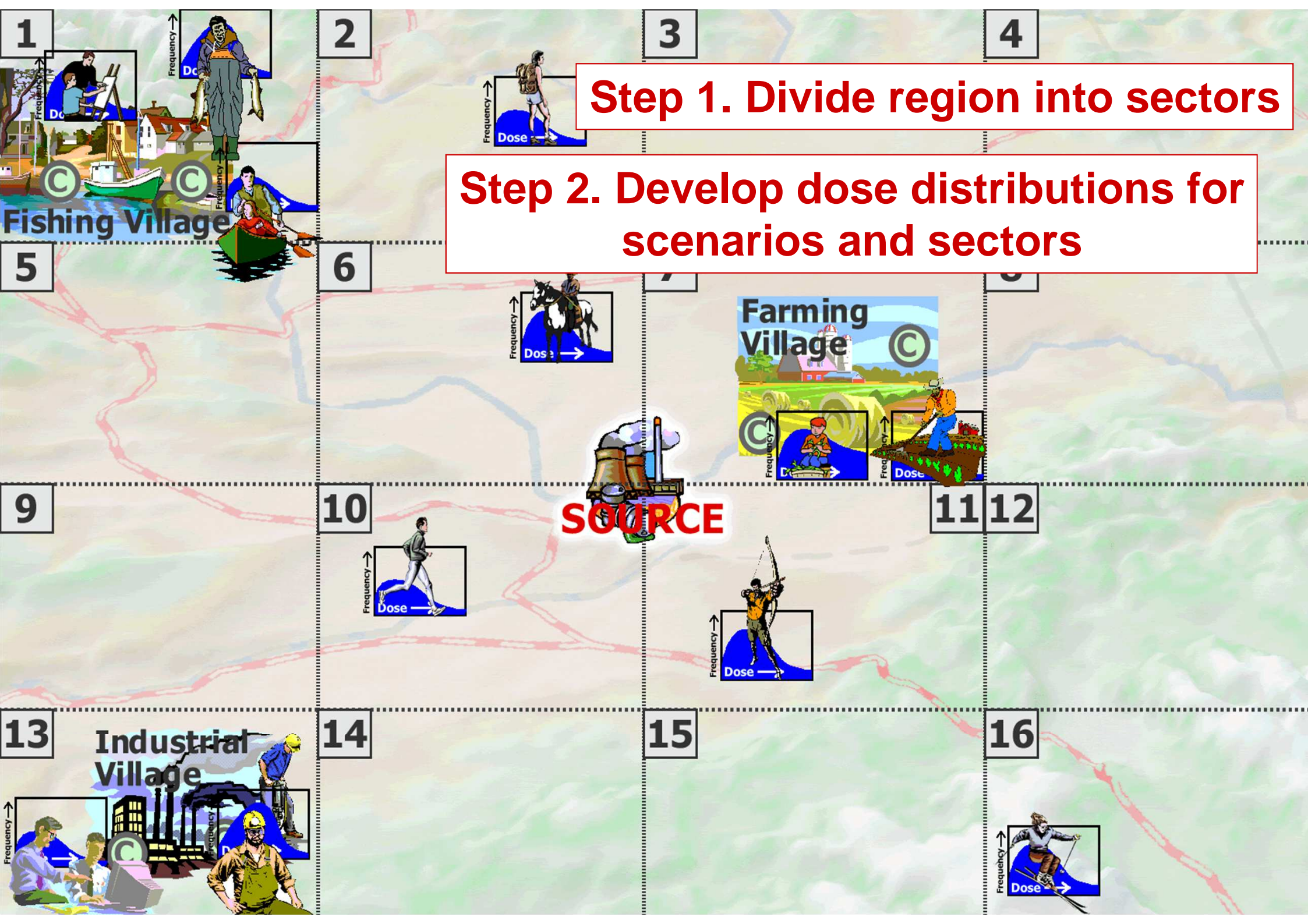
homogeneity.....

must be maintained.

CALCULATION OF ANUAL DOSE TO THE REPRESENTATIVE INDIVIDUAL

	Calculation method	
	Probabilistic	Deterministic
Environmental concentration data	Distribution of estimated or measured concentration	Simple “best estimate”
Physiological or habit data	Distribution of physiological parameters or habit data	Average value for the critical group <u>or</u> 95 th percentile of national or regional data
Dose coefficient	Fixed value based on age	Fixed value based on age
Dose for comparison to limit or constraint	Merge distributions Identify the representative individual?	Product of above values

Issue: How



Step 1. Divide region into sectors

Step 2. Develop dose distributions for scenarios and sectors

SOURCE

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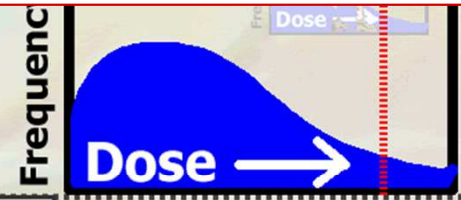
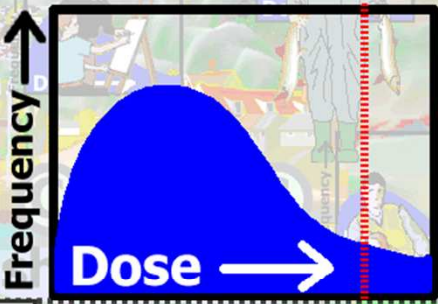
Fishing Village

Farming Village

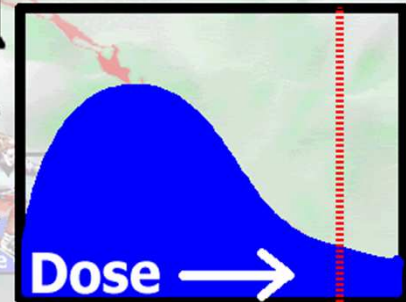
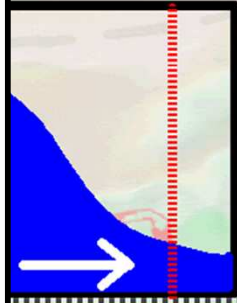
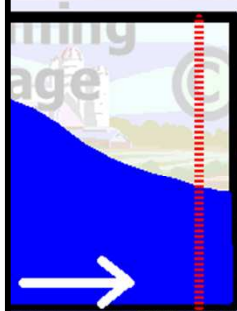
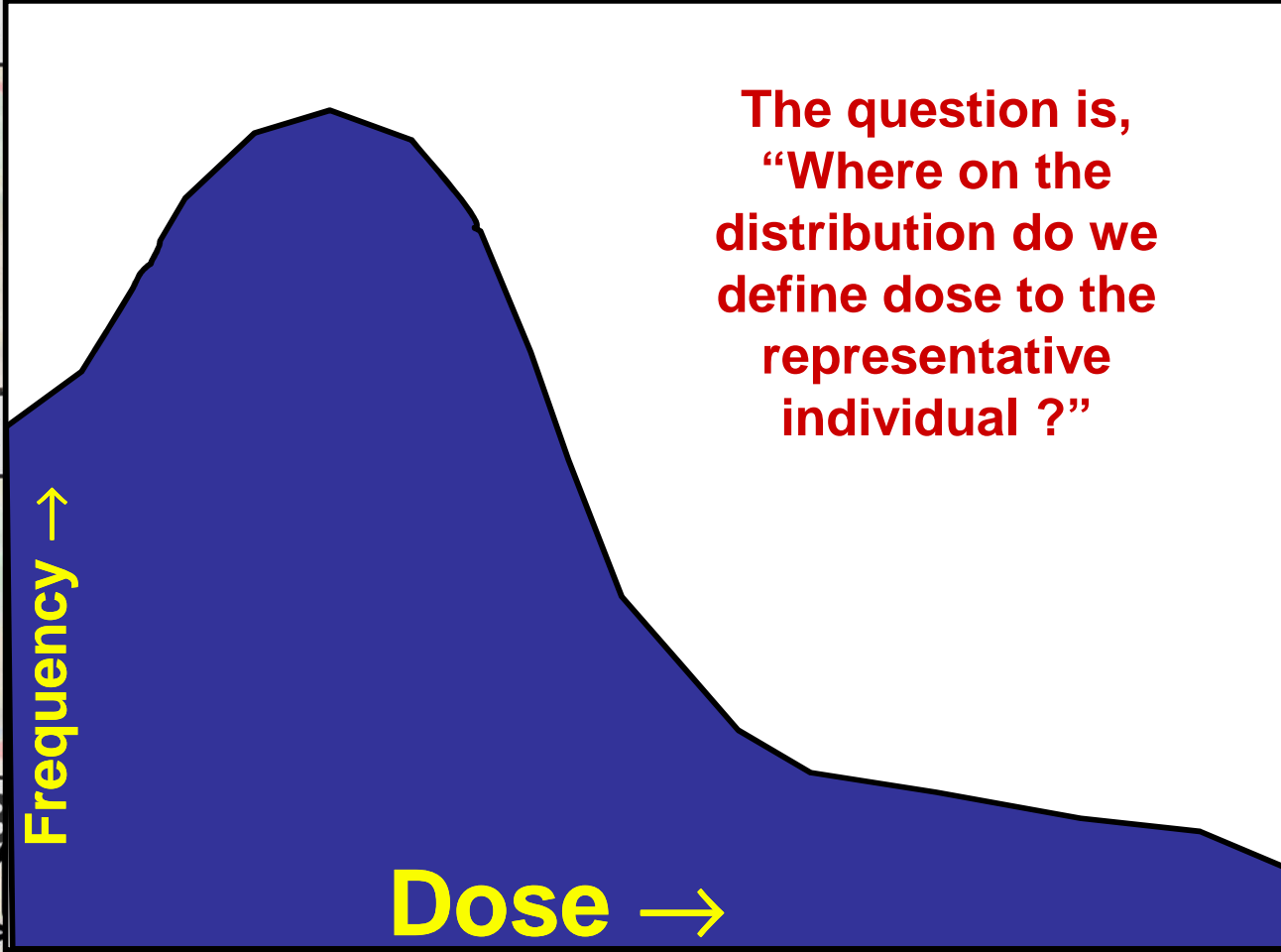
Industrial Village

Step 3. Combine dose distributions for sectors

Step 4. Merge distributions



The question is, "Where on the distribution do we define dose to the representative individual?"



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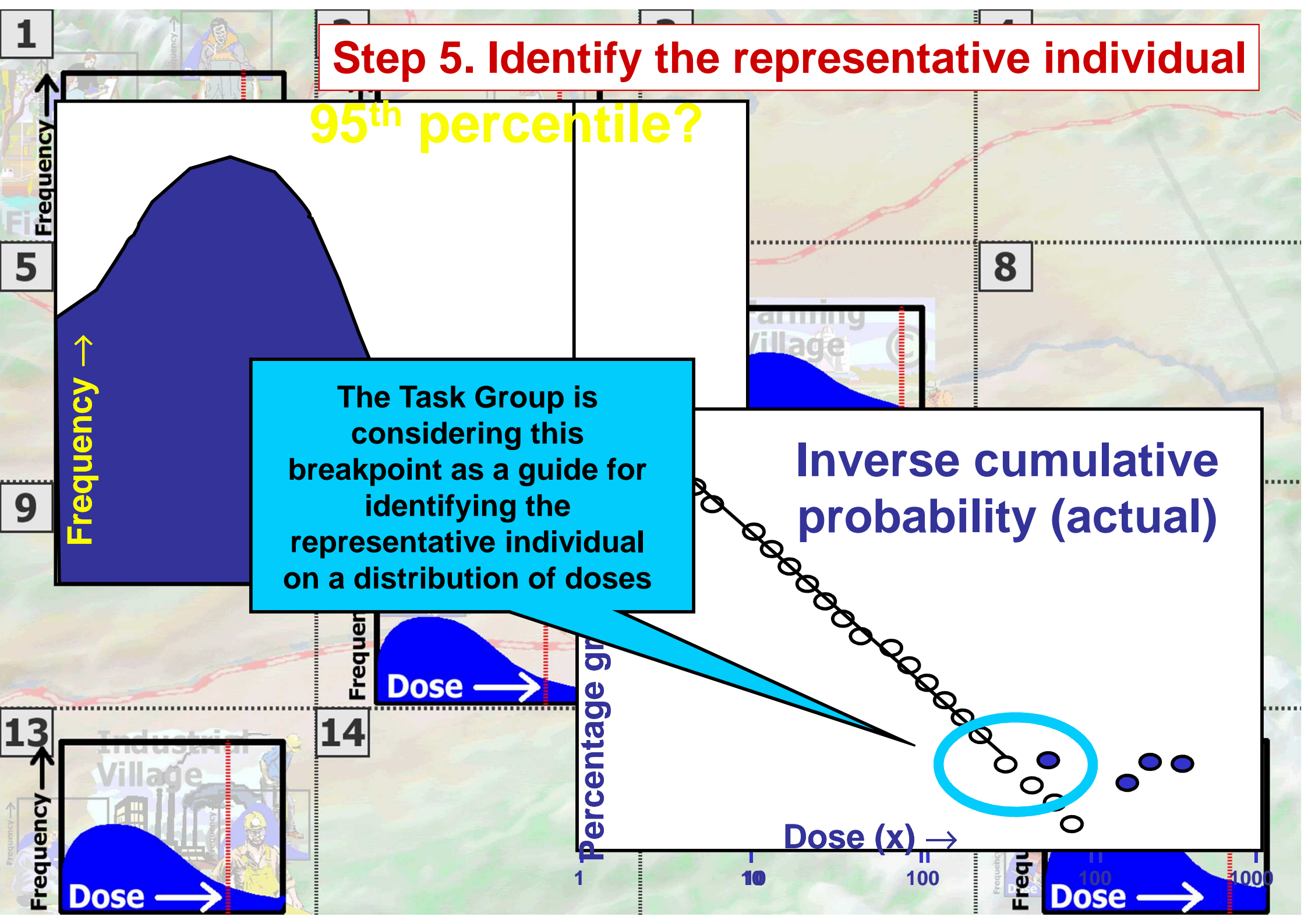
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Step 5. Identify the representative individual

95th percentile?

The Task Group is considering this breakpoint as a guide for identifying the representative individual on a distribution of doses

Inverse cumulative probability (actual)

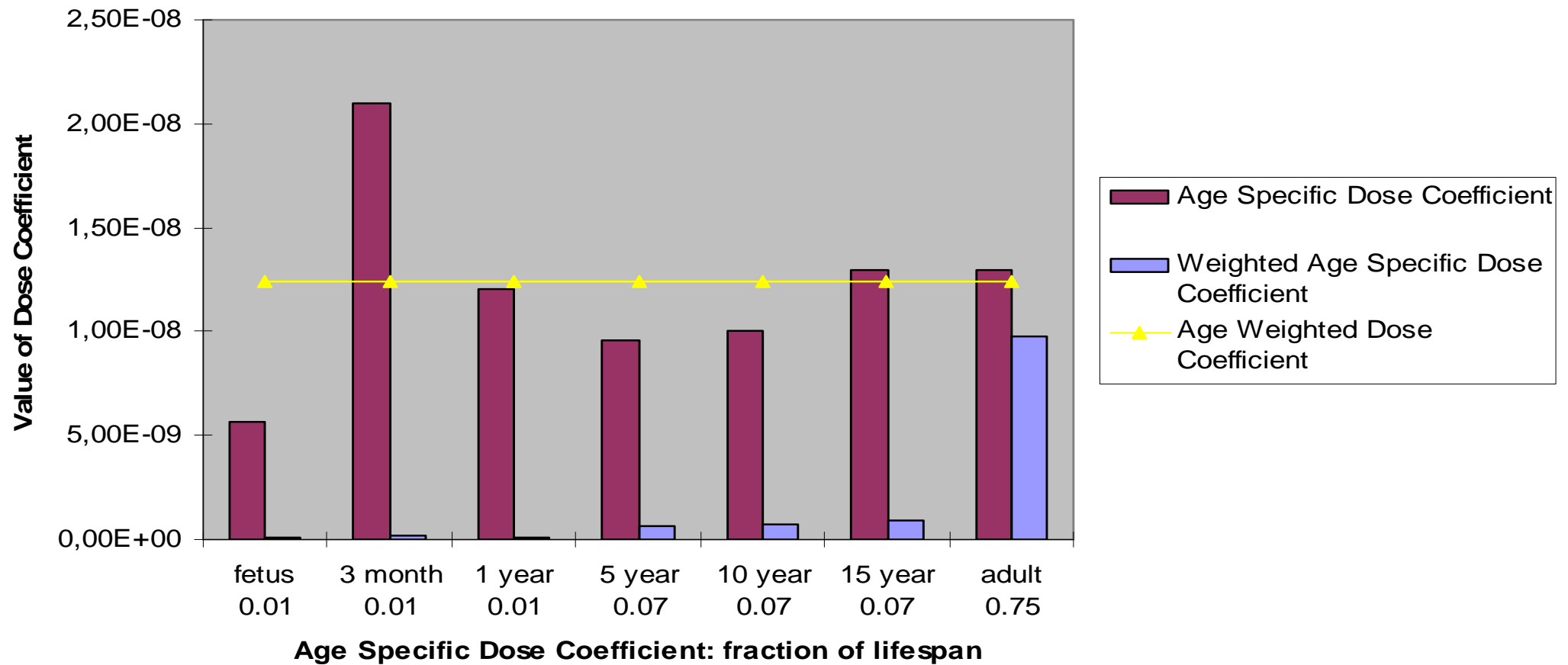


ICRP'S GOAL

- ❑ The Commission aims to provide a consistent level of protection by ensuring that the vast majority of the public are below the dose criteria.
- ❑ This goal takes into account the inherent variability in measured or estimated annual dose to the public, and the transient nature of many extreme situations related to dose among members of the public.
- ❑ It is acknowledged that a limited number of individuals within an exposed population could exceed dose criteria set by the Commission.

INDENTIFICATION OF INDIVIDUAL CHARACTERISTICS

Age Weighted Dose Coefficient: Cs-137 Example



AGE SPECIFIC DOSE COEFFICIENTS

❑ Seven age ranges

From foetus to age 70

Issue: Simplification

❑ For the purpose of compliance with dose criteria

Continuing exposure

Calculate annual dose

Consider three age ranges

- *infant (0-5 year) use 1y habits*

- *child (6-15 year) use 10 y habits*

- *adult (16-70 year) use adult habits*

❑ What about foetus or breast-fed infant?



European Commission

Radiation protection 129

Guidance on the realistic assessment of radiation doses to members of the public due to the operation of nuclear installations under normal conditions.

The report recommends that it is sufficient to consider three age groups; 1 year olds, 10 year olds and adult. Foetal doses should be born in mind if significant amounts of radioactive isotopes of calcium and phosphorus, which are used by the foetus for skeletal growth, are discharged.