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Ethical components in radiological protection communication: first feedbacks from Switzerland

1st European Workshop on the Ethical Dimensions of the Radiological Protection System

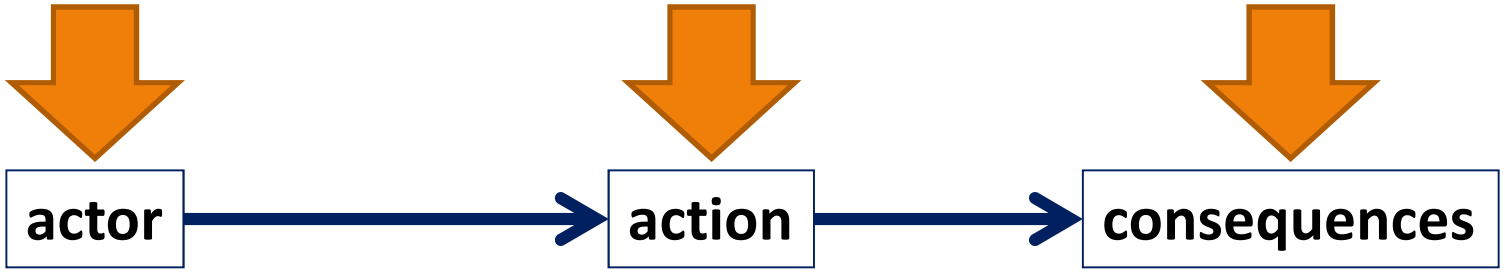
Milano 16-18 December 2013

Moral philosophy

deontology
duty coming from "above"
categorical imperative, god, etc.

virtue
the actors can be judged from their actions

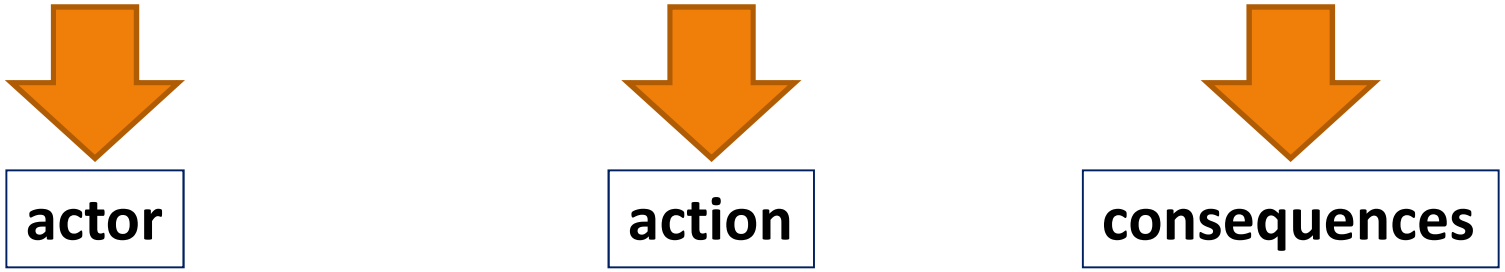
utilitarianism
the actions are judged by their consequences



Moral philosophy

deontology **virtue** **utilitarianism**

no approach is intrinsically superior to another
these are **useful resources** for specific reasoning **depending on the context**

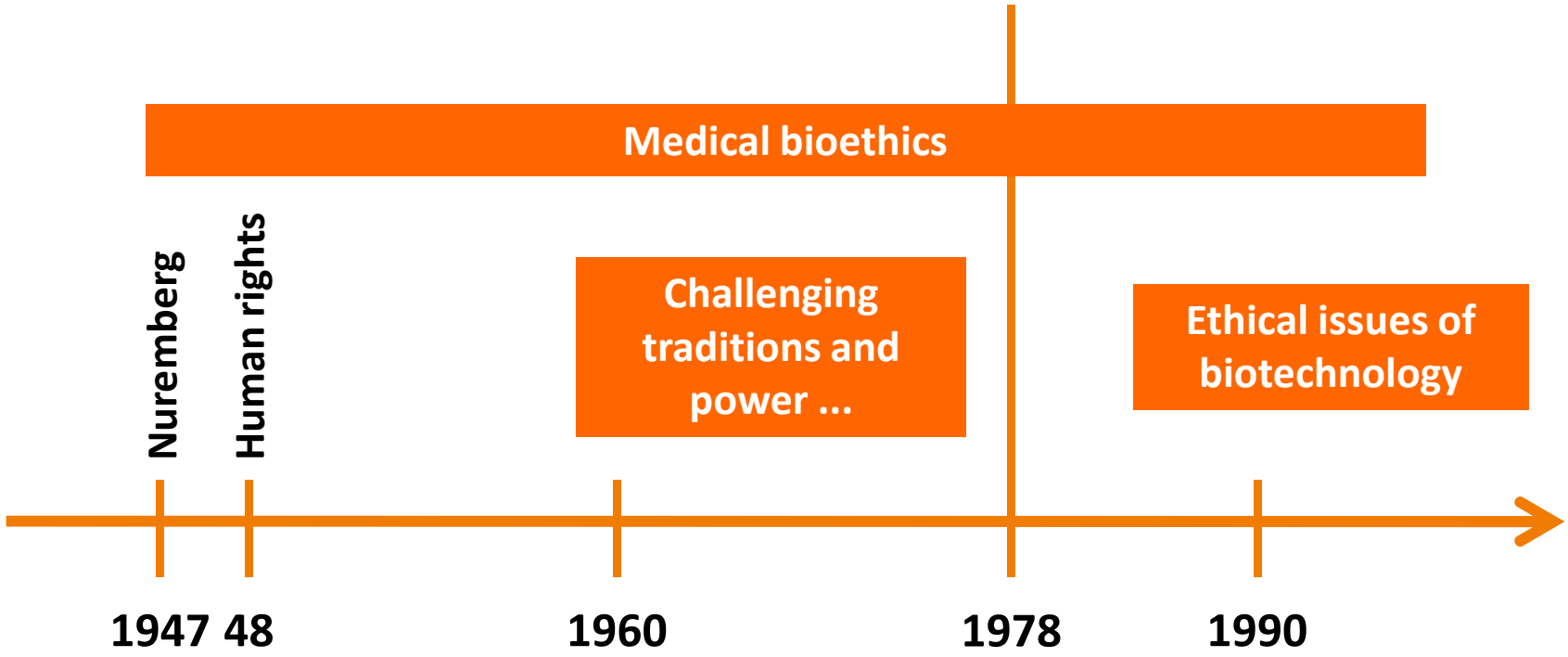


Ethics history in medicine

international law document
Voluntary **consent** of research subjects
Freedom to withdraw for the subjects
Proficiency **requirement** of the researcher

Ethics history in medicine

Belmont Report (1978)
Definition of basic ethical principles
- **autonomy**
- **beneficence** (non-maleficence)
- **justice**



3 principles of bioethics

autonomy

deontology

beneficence
(non-maleficence)

utilitarianism

justice

deontology

autonomy

deontology

Basis of **free and informed consent**

Prerequisite: **ability to discern**

All necessary **information** should be **available** in order to build an **opinion** in **accessible and understandable terms**

beneficence (non-maleficence)

utilitarianism

Also:
Confidentiality
Duty of truthfulness
Medical confidentiality

justice

deontology

End of paternalism
"Technical skills do not guarantee moral skills"

autonomy

deontology

beneficence
(non-maleficence)

utilitarianism

justice

deontology

Overall **good** for both
the **individual and society**

Maximization of **profit** versus risks

Suppressing evil and relieve suffering
Promote the well-being and sustain life
Preserve health and prevent disease

autonomy

deontology

beneficence
(non-maleficence)

utilitarianism

justice

deontology

Allocate resources **equitably**

Distribute fairly benefits and risks

No discrimination based on
ethnic criteria, racial, religious,
ideological, political, age, cost, etc..

Primacy of **autonomy**
… in Western medicine
… for a given patient

autonomy

deontology

beneficence
(non-maleficence)

utilitarianism

Primacy of **justice**
… for a population

justice

deontology

Acceptable mixing of the principles comes from

virtue

…and depends on the context

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3 principles of radiation protection

Justification

deontology / utilitarianism

Optimization

utilitarianism

Limitation

deontology

ICRP 103

Justification

deontology / utilitarianism

RADIATION DIAGNOSTIC

utilitarianism

Level 1: justification of **X-ray in medicine**

Level 2: justification of the **procedure** for a **group of patients**

deontology

Level 3: diagnostic and therapeutic objectives of **this patient** require the procedure

ICRP 105

Optimization

utilitarianism

MORE GENERALLY

utilitarianism

the Commission only recommends that **justification** require that the **net benefit be positive**

ICRP 103

Limitation

deontology

virtue

Justification concerns acting with the **right reasons and motives**
(Hansson, J. Rad Prot 2007)

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Justification

deontology / utilitarianism

utilitarianism

Maximize good versus harm

RADIATION DIAGNOSTIC

Lowest dose compatible with the diagnostic and therapeutic objectives **(ALARA)**

optimization is **subordinated to** the **justification** principle

Optimization

utilitarianism

Image quality

level 1. technical efficacy
level 2. diagnostic accuracy
level 3. diagnostic thinking
level 4. therapeutic efficacy
level 5. patient outcome
level 6. societal efficacy

optimization can be performed at different levels

Limitation

deontology

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Justification

deontology / utilitarianism

Optimization

utilitarianism

Limitation

deontology

Justification and **Optimization** are **not always sufficient**

No individual should be abused to excess
A certain **level of harm** is **unacceptable**

Primacy of **Justification** … in ICRP 103

Justification

deontology / utilitarianism

Optimization

utilitarianism

Primacy of **Limitation** for some actions

Limitation

deontology

Acceptable mixing of the principles comes from

virtue

…and depends on the context

Practical exercise to see what this means

1. Small **question** with moral or ethical component

… poll

2. Rephrasing of the question in **ethical perspective**

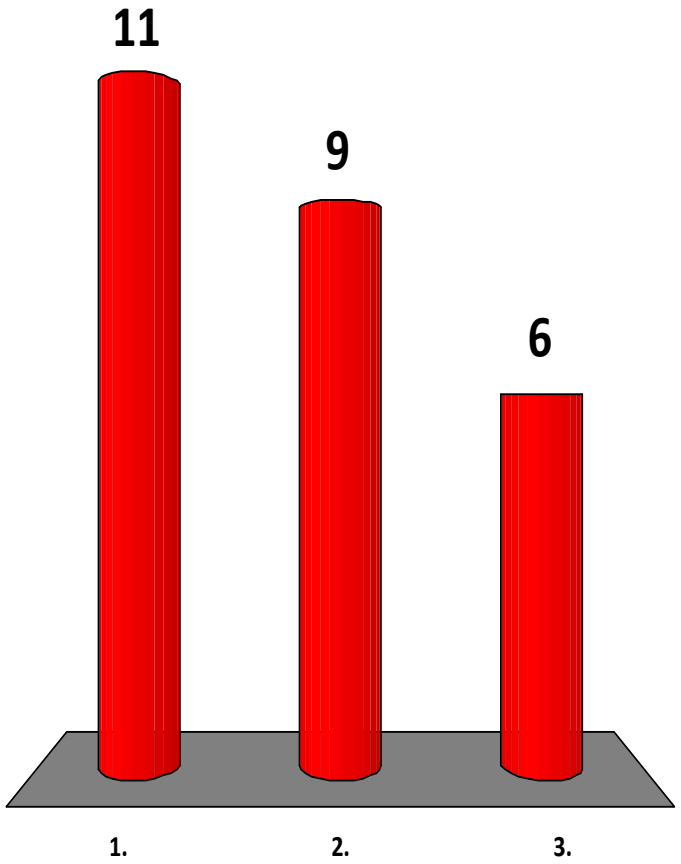
3. Same **question again**

… poll

Is it acceptable to perform radiological images of plane passengers before boarding
(with x-ray backscattering systems)?

Is it acceptable to perform radiological images of plane passengers before boarding (with x-ray backscattering systems)?

1. yes
2. no
3. I don't know



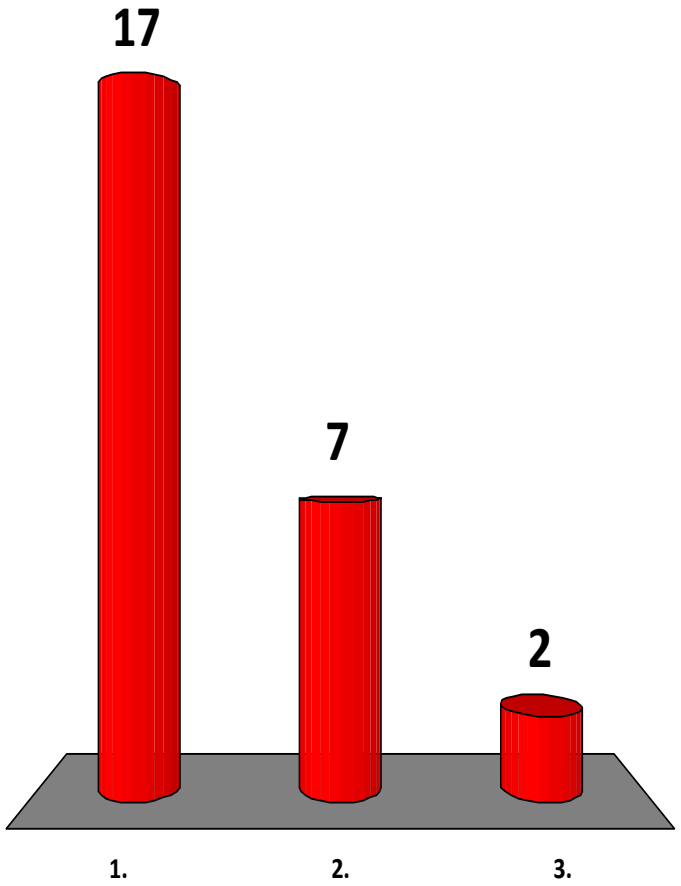
x-ray backscattering systems

- **Deontological** arguments
  - The passenger receives a supplementary dose that was not asked
  - The passenger can ask for manual search
  - Safe for security officer
    - no contact, less infection risk
  - same situation for all passengers
- **Utilitarian** arguments
  - Security increase for all passengers
  - Doses are very low (~0.050 uSv/scan)
    - Milano-Los Angeles ~140 uSv
    - 12 s flight (according to AAPM)

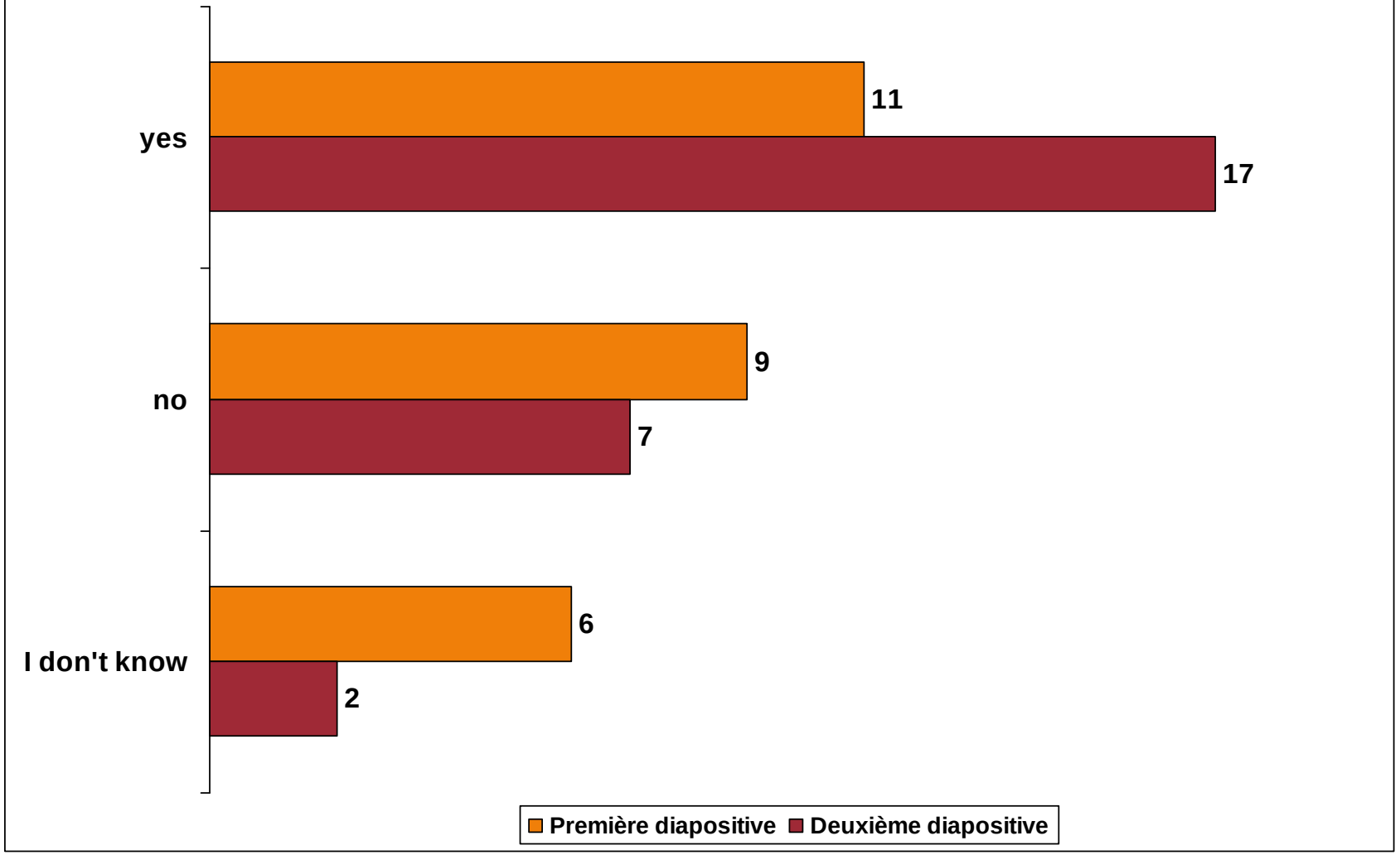
Same question

Is it acceptable to perform radiological images of plane passengers before boarding?

1. yes
2. no
3. I don't know



Is it acceptable to perform radiological images of plane passengers before boarding?



*Same question asked to a **general public** in November 2012, after a presentation of what we know about risk*

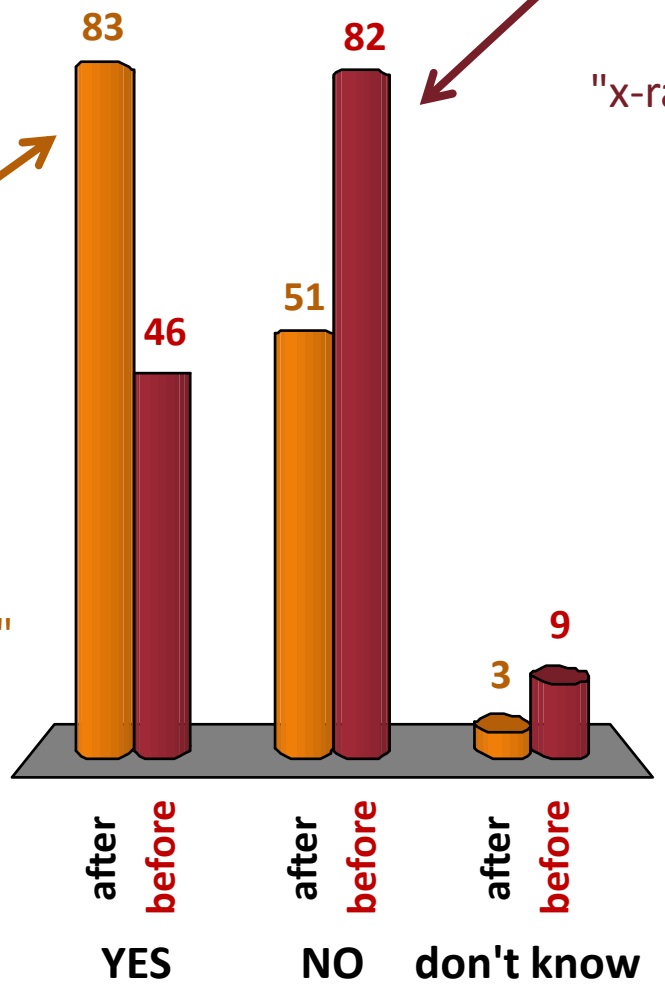
with no information, **deontological** principles seem to dominate:

"**no x-rays** for new application!"

"x-rays are **dangerous**!"

with some information, **utilitarian** principles can overturn the original opinion:

"with such **low doses**, ok"

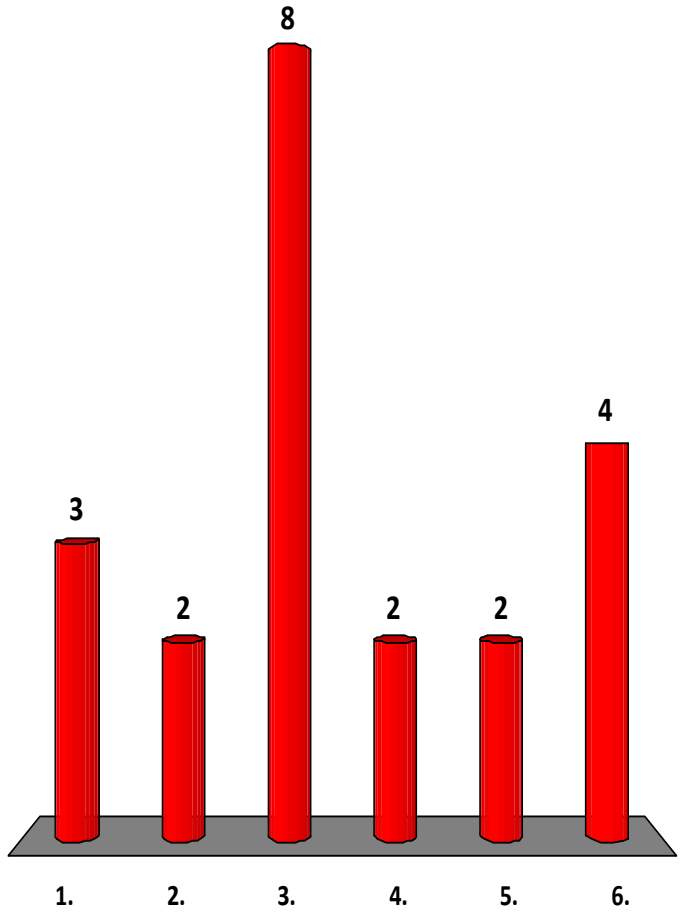


The Swiss federal commission for radiation protection recommends to ban such devices with other **utilitarian arguments**...

"trivializing back-scatter x-rays would increase the collective dose and disseminate further radiation use"

Imagine that your house is close to nuclear power plant after an incident similar to what happened in Fukushima.
A which **annual effective dose** would you **leave your house**?

1. 1 mSv/year
2. 5 mSv/year
3. 20 mSv/year
4. 50 mSv/year
5. 100 mSv/year
6. more than 100



Same question

At which **annual effective dose** would you **leave your house**?

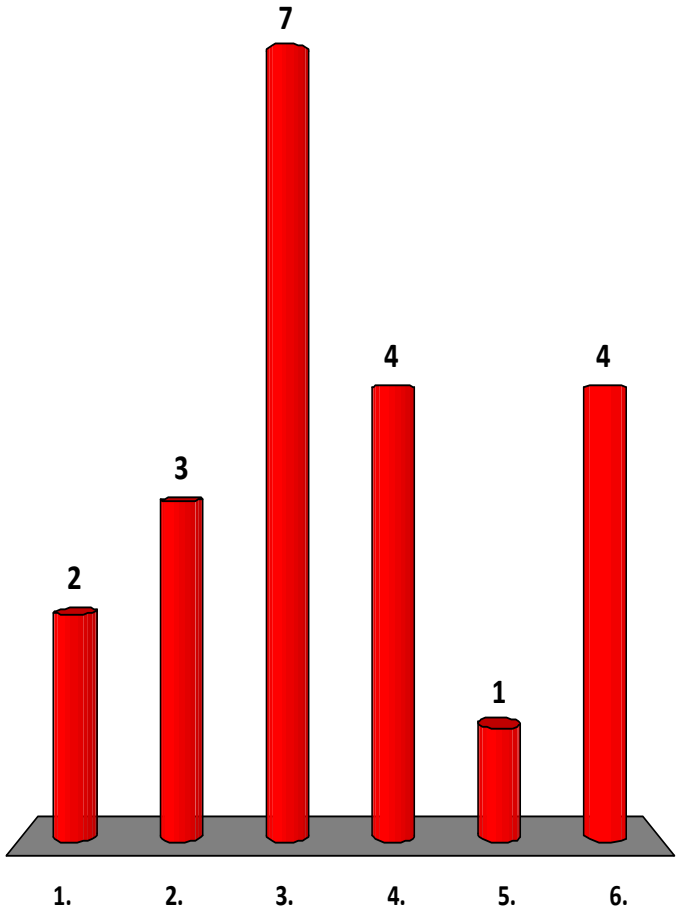
annual limit **population**

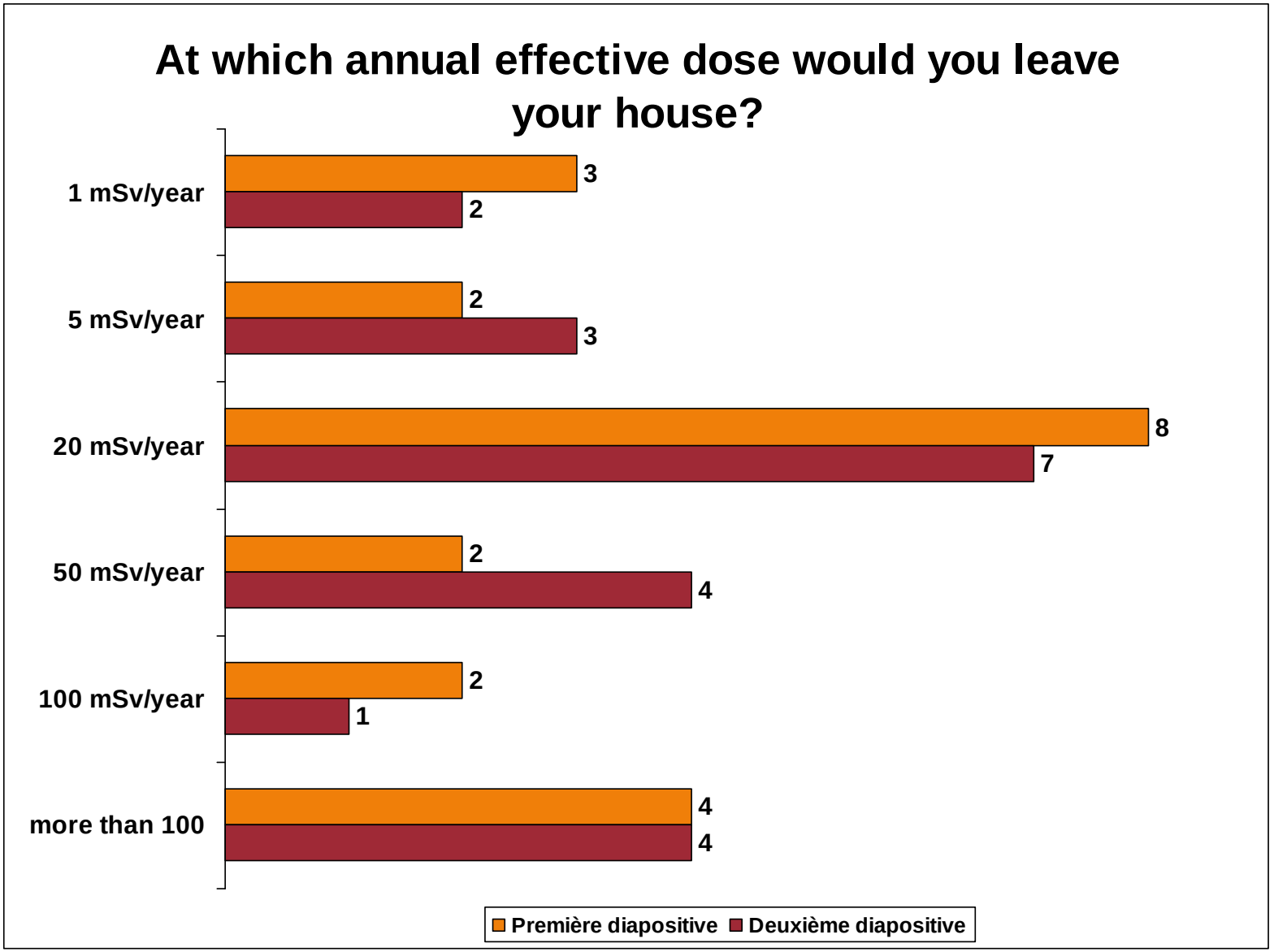
we get **each year**

annual limit **professional**

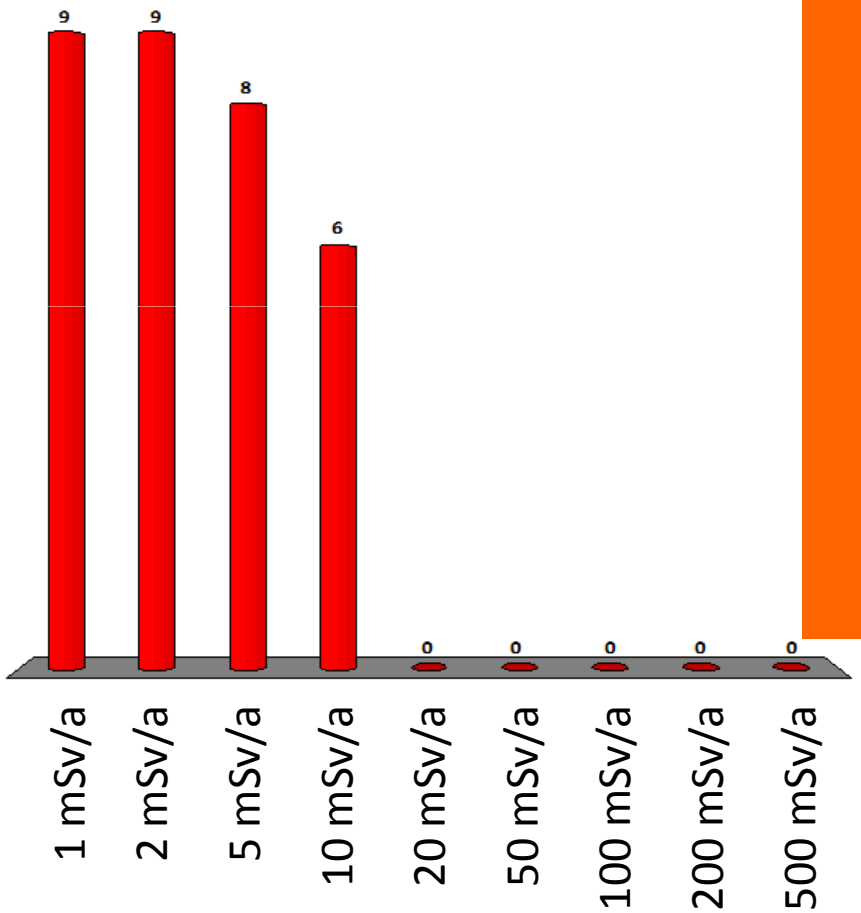
we get **in 20 years**

1. 1 mSv/year
2. 5 mSv/year
3. 20 mSv/year
4. 50 mSv/year
5. 100 mSv/year
6. more than 100




At which annual effective dose would you leave your house?
1 mSv/year
3
2
5 mSv/year
2
3
20 mSv/year
8
7
50 mSv/year
2
4
100 mSv/year
2
1
more than 100
4
4
Première diapositive
Deuxième diapositive

Same question asked to **radiation oncologists** in June 2011,



In their profession life,
radiation oncologists

- are ready to accept only **slightly optimized** medical images
- commonly consider as **negligible overdosages** of 500 mGy of organ at risk

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Same question asked to a **general public** in November 2012, after a presentation of what we know about risk

limite annuelle **population** → 1. **1** mSv/an

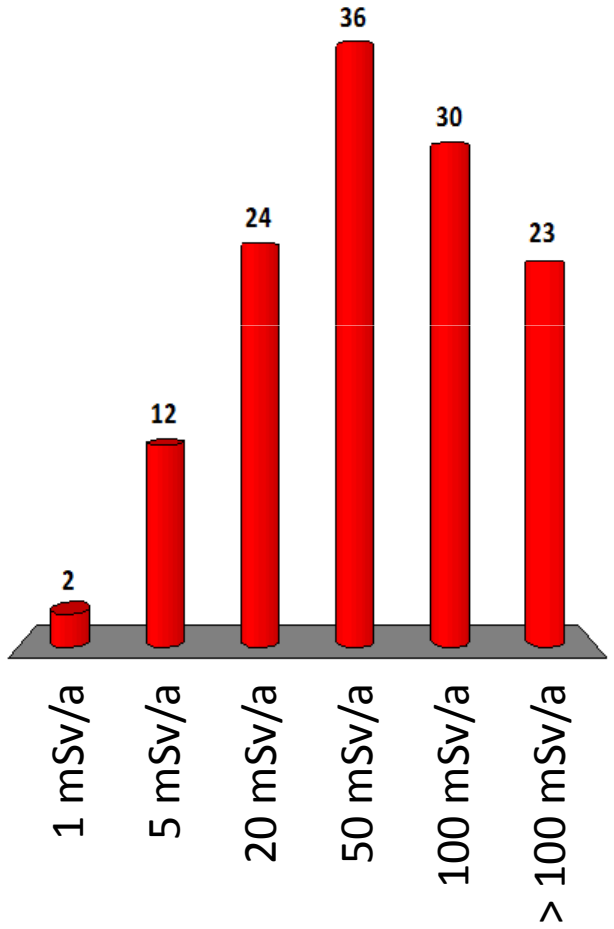
ce qu'on reçoit **chaque année** → 2. **5** mSv/an

limite annuelle **professionnels** → 3. **20** mSv/an

4. **50** mSv/an

ce qu'on reçoit **en 20 ans** → 5. **100** mSv/an

6. plus que **100**



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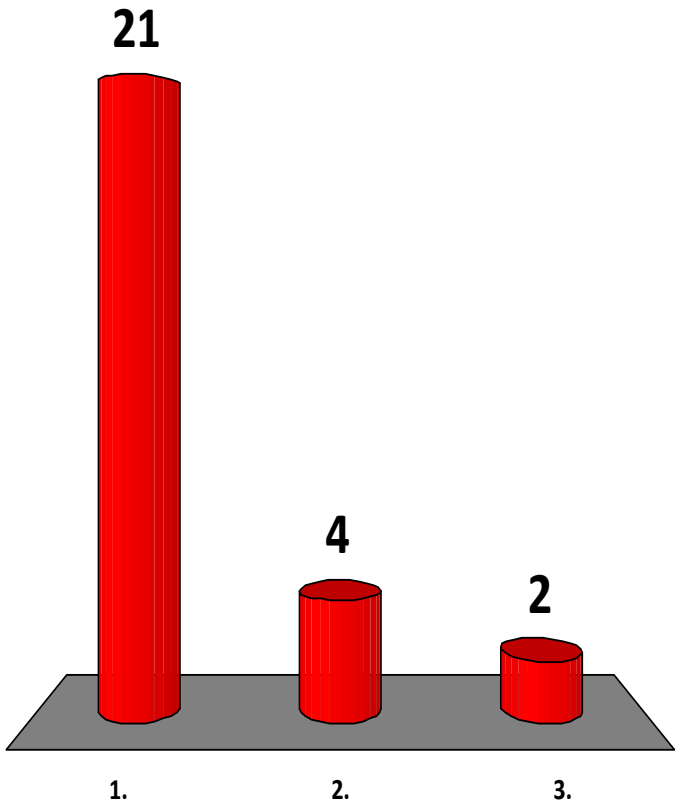
As a person working with radiations, would you like to know if **you** are **genetically more radiosensitive**?

1. yes
2. no
3. I don't know



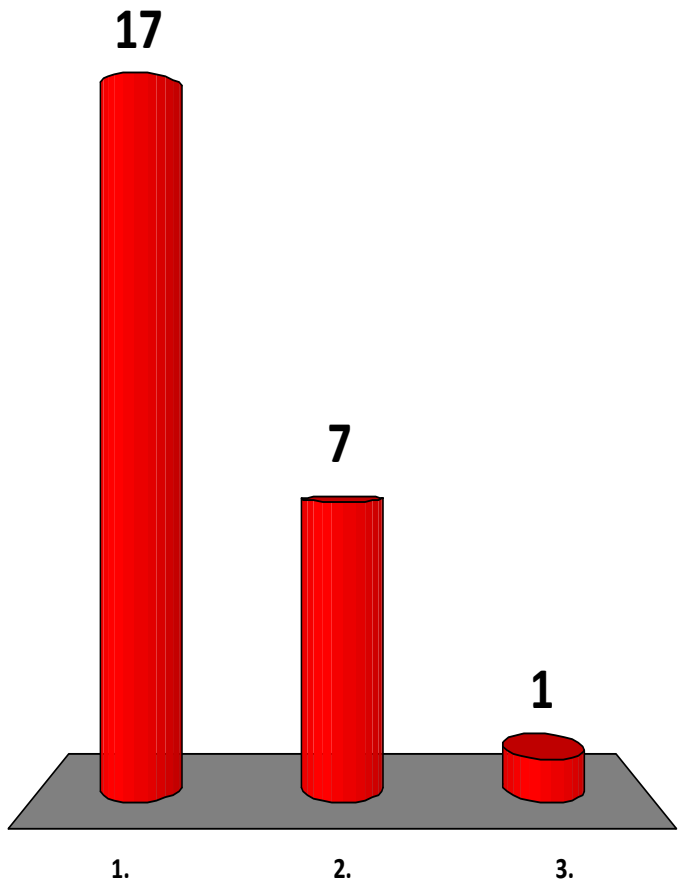
I want to know for **myself** if I am more **radiosensitive**

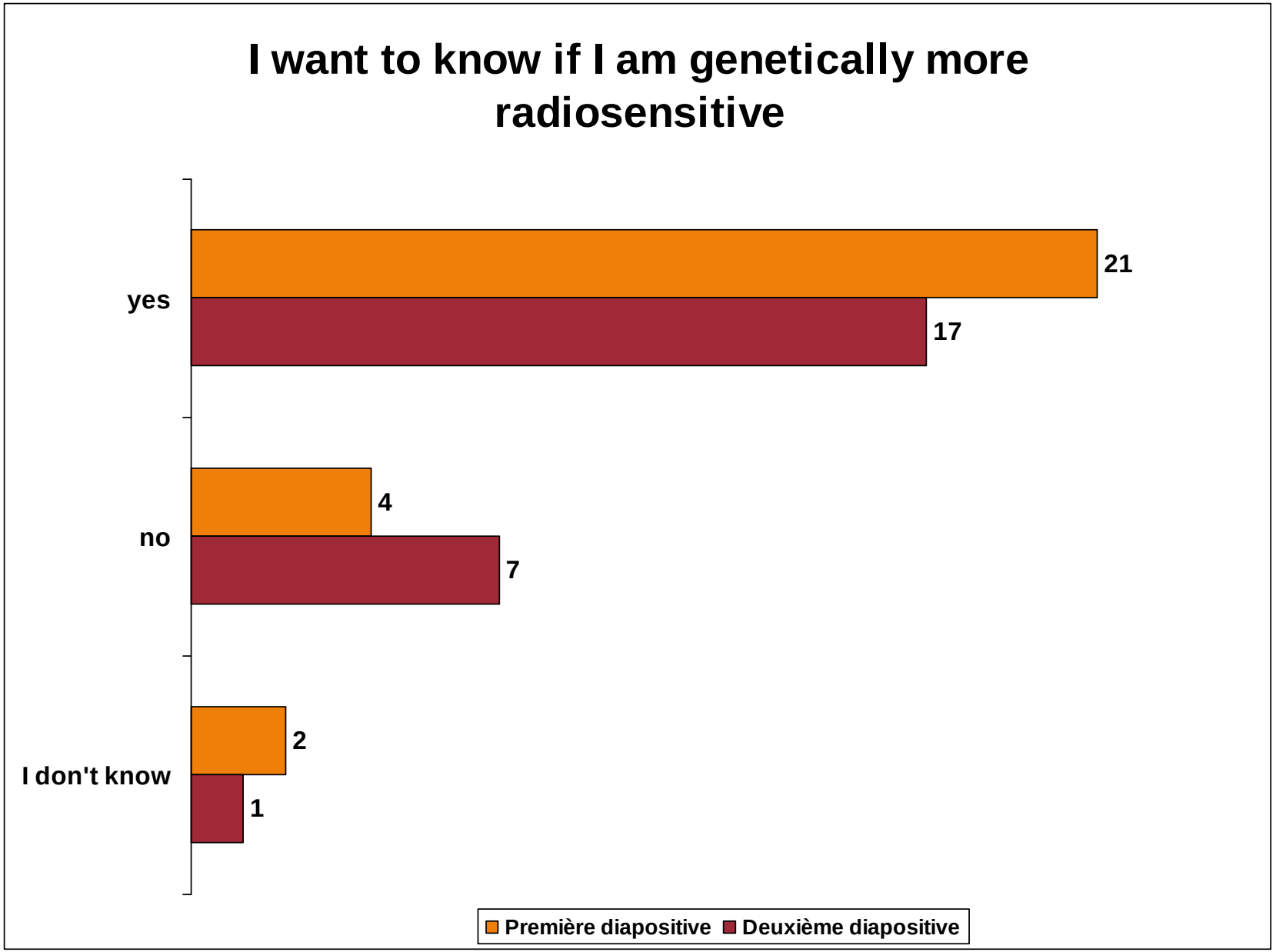
- **Deontological** arguments
  - Everybody has the right to know
  - Accepting a risk can only be done with informed knowledge
- **Utilitarian** arguments
  - These genetic tests just give a probability
    - this would help you balance the pro and con
  - Once you know, you start worrying
    - anti-placebo effect

Same question

I want to know if I am genetically more radiosensitive

1. yes
2. no
3. I don't know

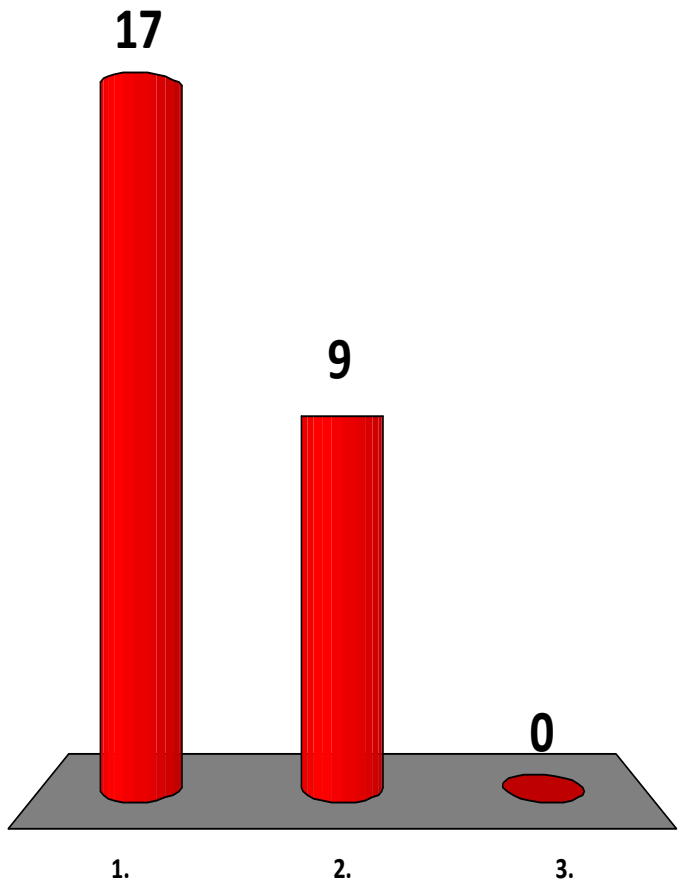



I want to know if I am genetically more radiosensitive
yes
21
17
no
4
7
I don't know
2
1
Première diapositive
Deuxième diapositive

Slightly different question

I want to know if **my employees** are more radiosensitive

1. yes
2. no
3. I don't know



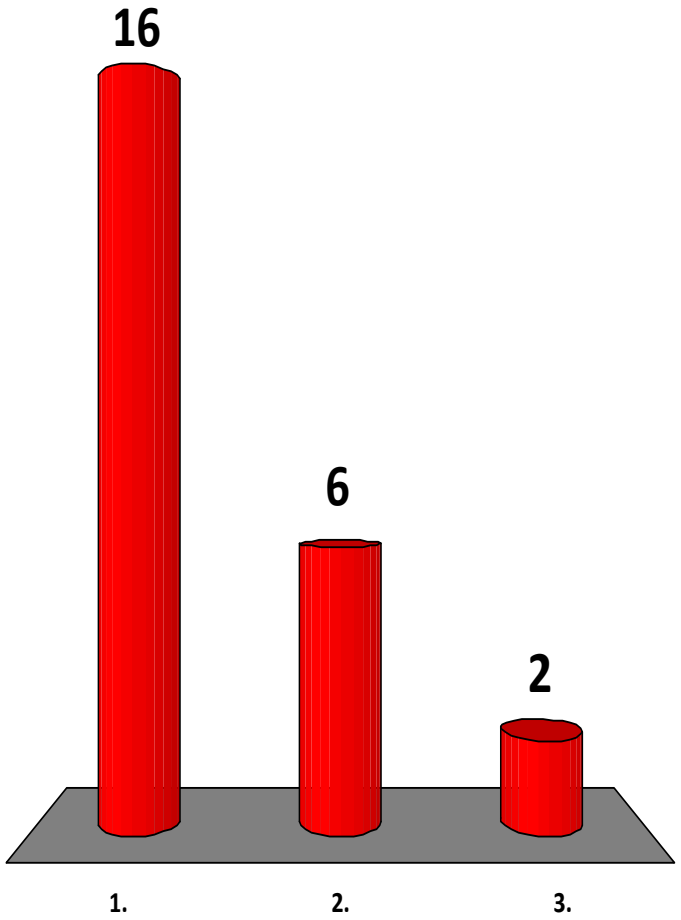
I want to know if my employees are more **radiosensitive**

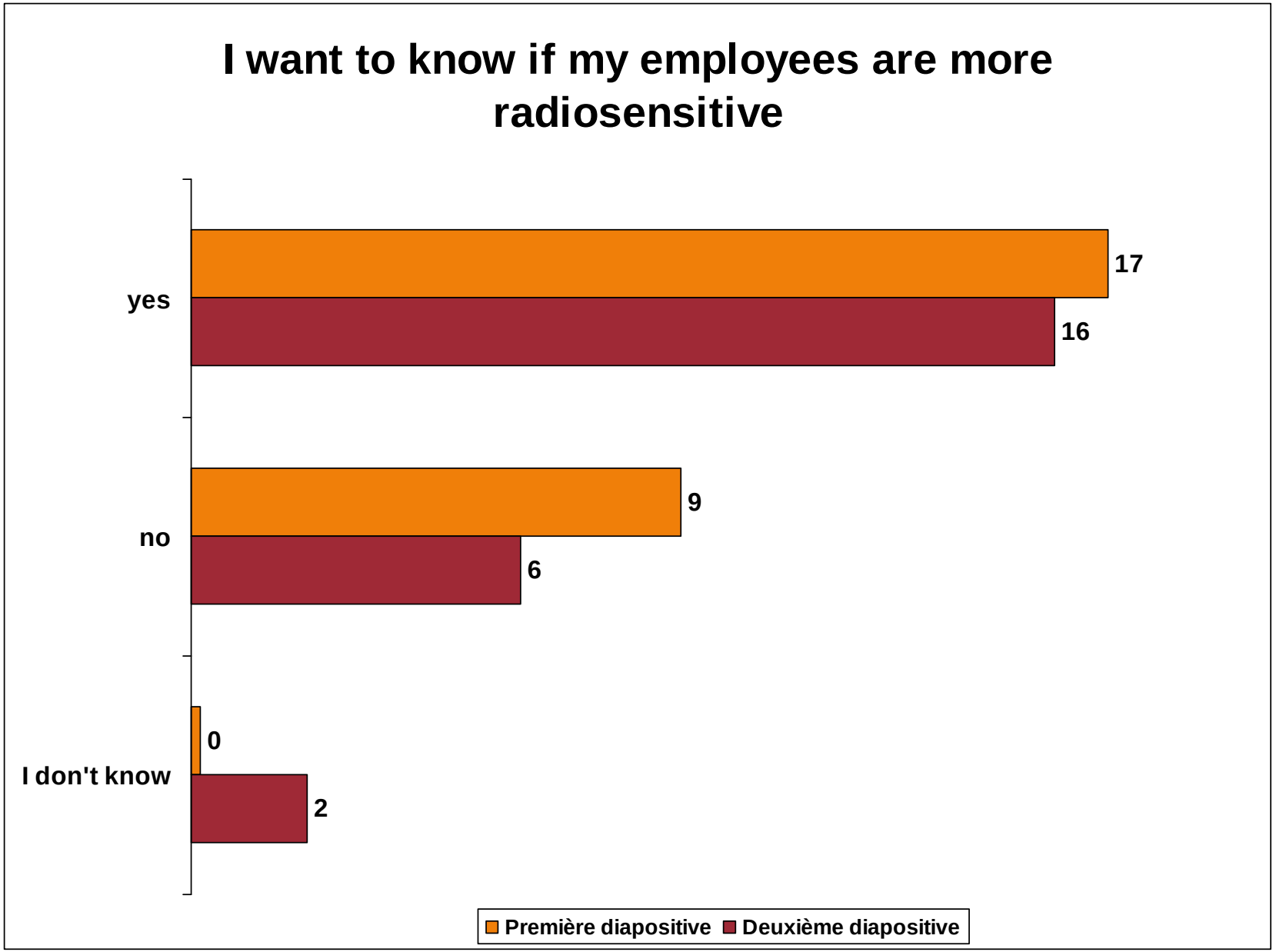
- **Deontological** arguments
  - I need to be able to **protect** my employees
  - I cannot **discriminate** between people when I choose a new employee
- **Utilitarian** arguments
  - It is better to submit the **most resistant** people to a **given risk**
  - It is accepted to act this way with **pilots** and **firefighters** who should have good **eyesight** and **physical shape**

Same question

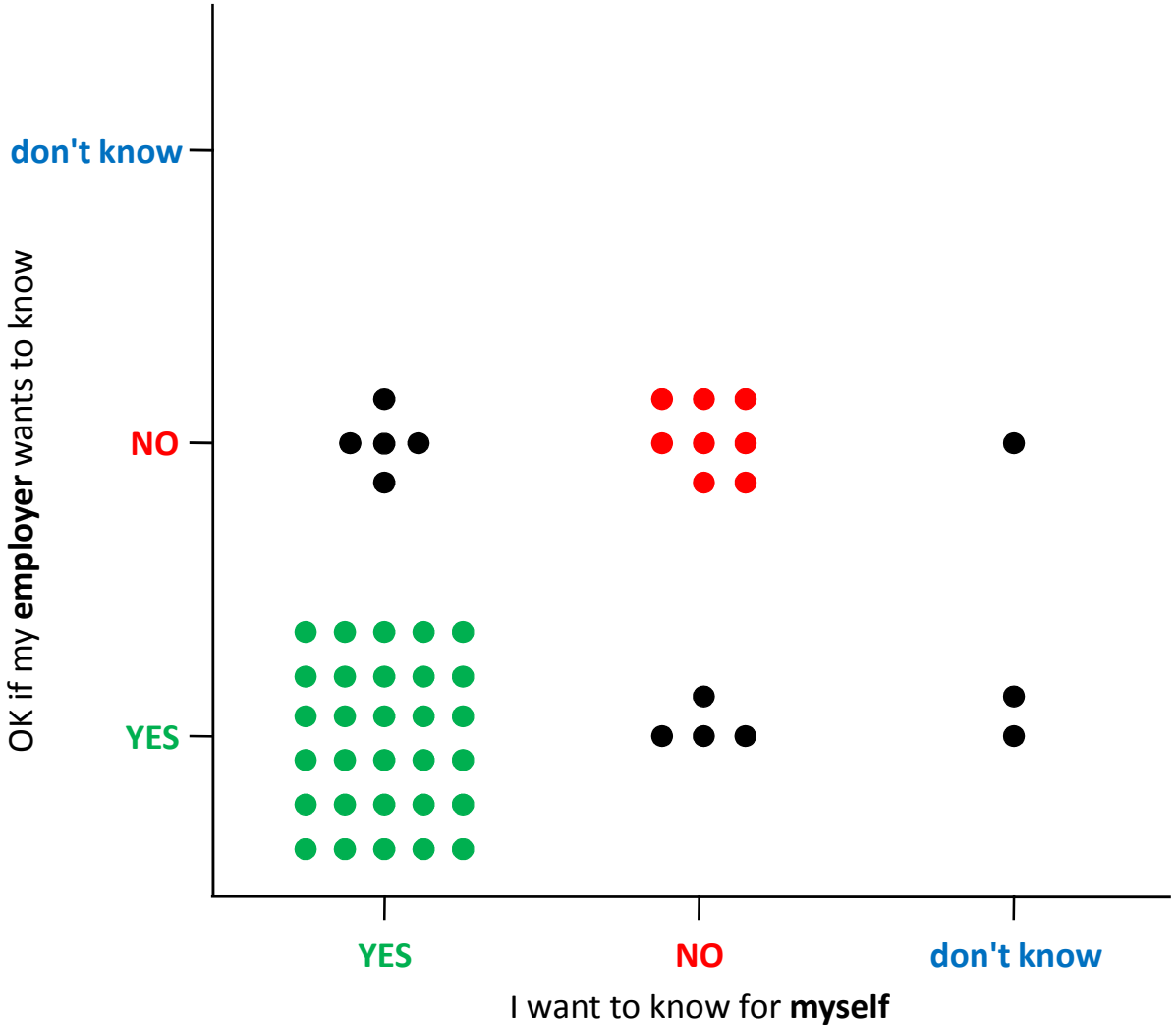
I want to know if **my employees** are more radiosensitive

1. yes
2. no
3. I don't know




I want to know if my employees are more radiosensitive
yes
17
16
no
9
6
I don't know
0
2
Première diapositive
Deuxième diapositive

Coherence between the two opinions: whether I or my employer wants to know, I agree or I don't
(about 50 RP experts in Switzerland in December 2013)



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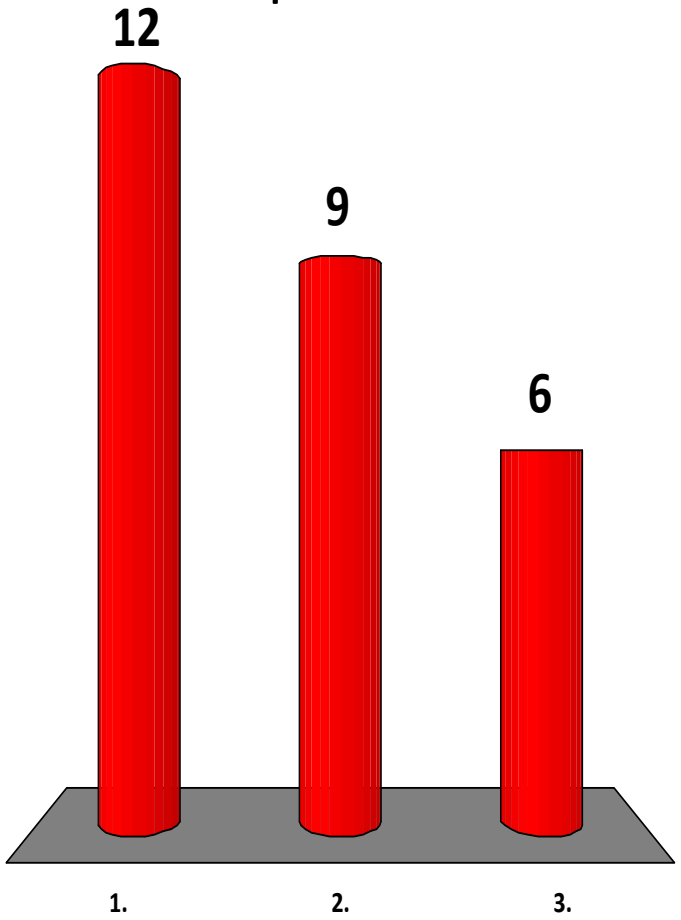
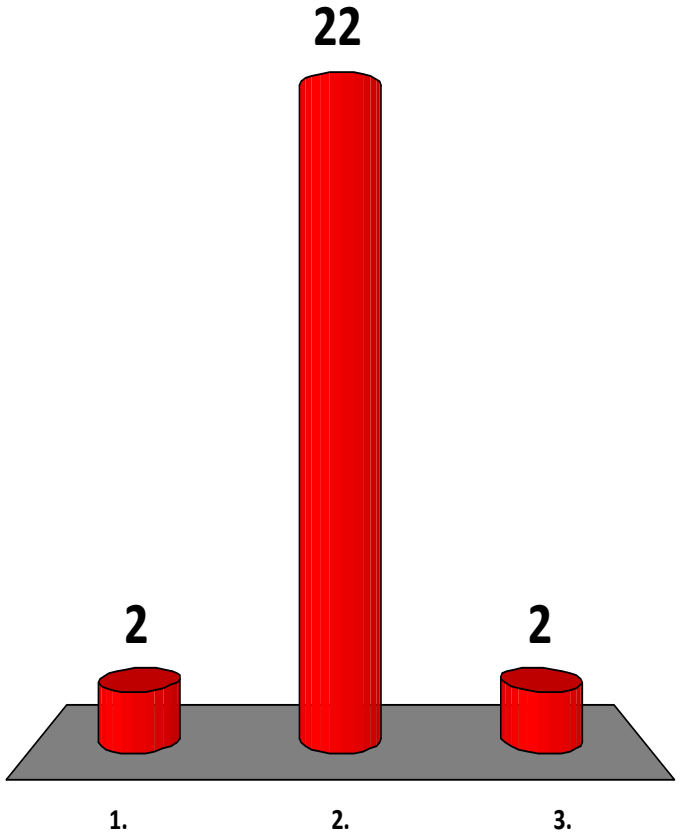
There are some hints that a particular gene increases the **risk of leukemia** by a **factor 25**.
If this were confirmed, do you think that **people with this gene should be excluded** from occupational exposure?

1. yes
2. no
3. I don't know



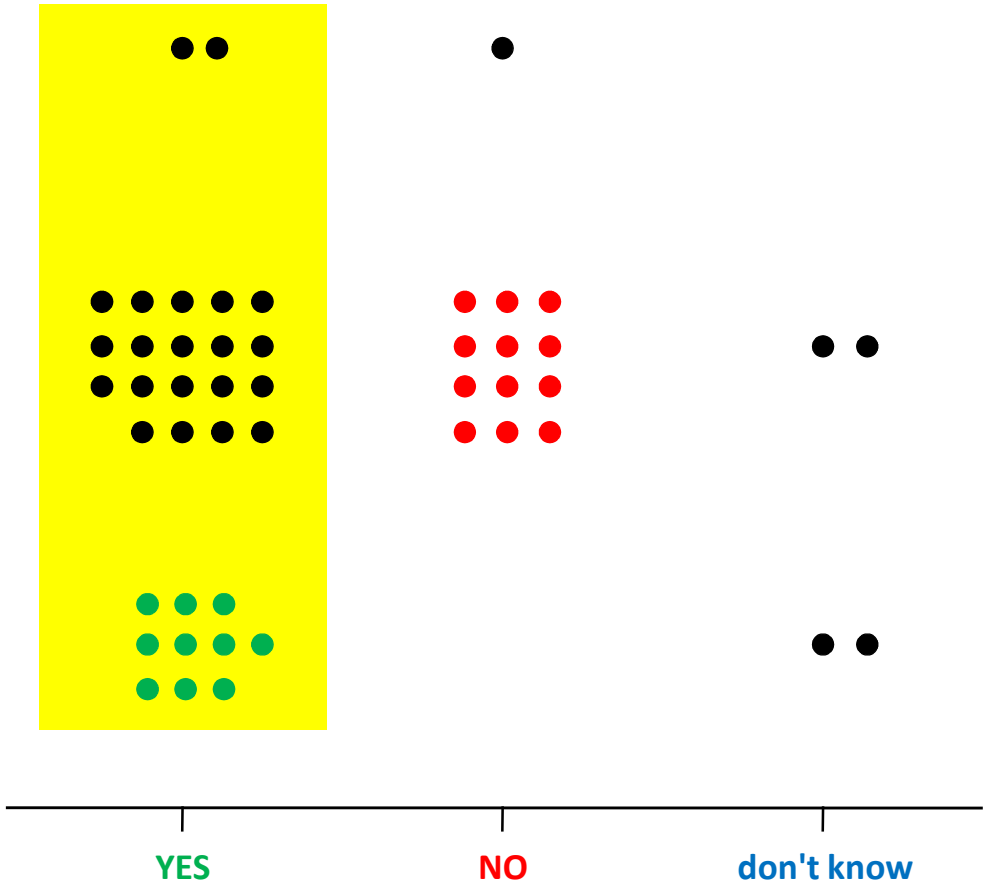
It is proven that personal behavior, like tobacco, has a direct effect on radiosensitivity.
Do you think that **tobacco smokers should be excluded** from occupational exposure?

1. yes
2. no
3. I don't know



(opinions of about 50 RP experts in Switzerland collected in December 2013)

Utilitarian approach typical for genetic risk and medical treatment in general:
"one **cannot do much** against this; let's act with precaution"
"**weak** or **frail** people need **special protection**"



Exclude if **leukemia** risk is 25 times higher

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(opinions of about 50 RP experts in Switzerland collected in December 2013)

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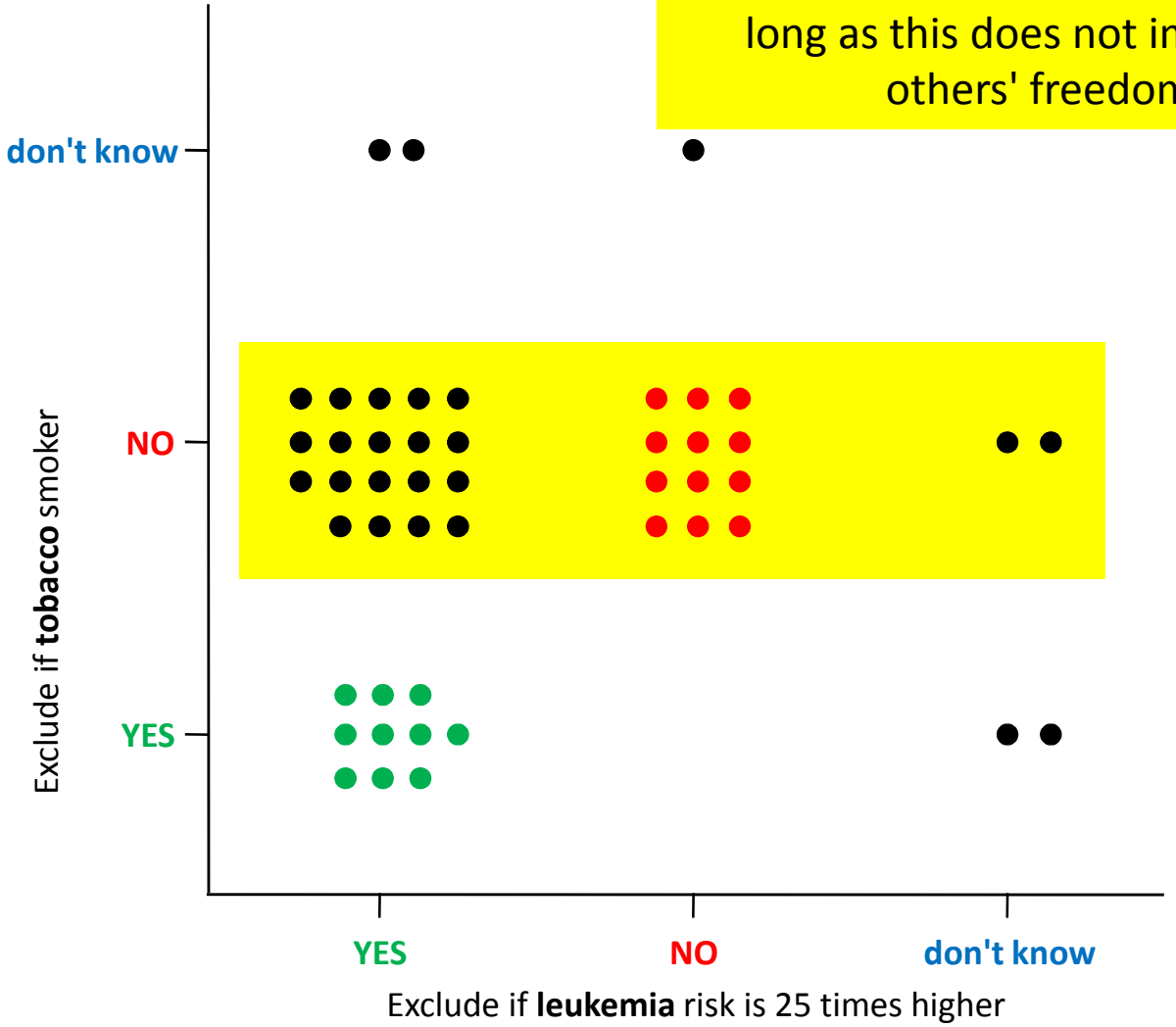
(opinions of about 50 RP experts in Switzerland collected in December 2013)

Deontological approach typical for risk linked to behavior:
"**everybody has the right** to behave as long as this does not impede on others' freedom"



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Conclusion

- **Ethical principles** are **enshrined in radiation protection** and in medicine
  - autonomy, benevolence, justice [*bioethics*]
  - justification, optimization, limitation [*radiation protection*]

- Ethical decisions need to be taken with the help of **different schools of moral philosophy**
  - First **define what we want**
    - **Virtue** helps to define **priorities** according to the **context** (e.g. protect an individual or a population ; now or future ; etc.)
  - Then mix deontology and utilitarianism
    - **Deontology** appears to have **some primacy**
      - Autonomy in Western medicine
      - Justification in radiation protection
    - Some dose of **utilitarianism** is always used in practice

- Ethics and radiation protection are **dynamic**
  - What is tolerable **now** may well be different than what it was in **1950**
  - What is tolerable **here** may well be different than what it is **there**