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

actor

action

consequences
Moral philosophy

- **deontology**
- **virtue**
- **utilitarianism**

No approach is intrinsically superior to another. These are useful resources for specific reasoning depending on the context.

- actor
- action
- consequences
Ethics history in medicine

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

Medical bioethics

Nuremberg  Human rights

1947 48
Ethics history in medicine

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

1947 48
1960
1978
1990

Medical bioethics
Challenging traditions and power ...
Ethical issues of biotechnology

Nuremberg
Human rights
3 principles of bioethics

- autonomy
  - deontology

- beneficence
  - (non-maleficence)
  - utilitarianism

- justice
  - 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

Also:
Confidentiality
Duty of truthfulness
Medical confidentiality

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

deontology

benificence
(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

Beneficence (non-maleficence)

Justice

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

Acceptable mixing of the principles comes from
**virtue**
... and depends on the context

**autonomy**
deontology

**beneficence**
(non-maleficence)
utilitarianism
deontology

**justice**
deontology

Primacy of **justice**
... for a population
3 principles of radiation protection

- Justification
  - deontology / utilitarianism

- Optimization
  - utilitarianism

- Limitation
  - deontology

ICRP 103
**Justification**

Deontology / Utilitarianism

**Optimization**

Utilitarianism

**Limitation**

Deontology

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**RADIATION DIAGNOSTIC**

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

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

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

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**ICRP 105**

More generally, the Commission only recommends that justification require that the net benefit be positive

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**ICRP 103**

Justification concerns acting with the right reasons and motives

*(Hansson, J. Rad Prot 2007)*
**RADIATION DIAGNOSTIC**

Maximize good versus harm

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

Optimization is subordinated to the justification principle

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

- 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
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 (~0.05 uSv/scan)
    - Milano-Los Angeles ~140 uSv
    - 12 s flight (according to AAPM)
Is it acceptable to perform radiological images of plane passengers before boarding?

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

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

- Yes: 11 (1st slide), 17 (2nd slide)
- No: 9 (1st slide), 7 (2nd slide)
- I don't know: 6 (1st slide), 2 (2nd slide)
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
At 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 mSv/year
At which annual effective dose would you leave your house?

- 1 mSv/year: 3 (Première diapositive), 2 (Deuxième diapositive)
- 5 mSv/year: 2 (Première diapositive), 3 (Deuxième diapositive)
- 20 mSv/year: 8 (Première diapositive), 7 (Deuxième diapositive)
- 50 mSv/year: 2 (Première diapositive), 4 (Deuxième diapositive)
- 100 mSv/year: 1 (Première diapositive), 2 (Deuxième diapositive)
- More than 100 mSv/year: 4 (Première diapositive), 4 (Deuxième diapositive)
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
Same question asked to a **general public** in November 2012, after a presentation of what we know about risk

1. 1 mSv/an
2. 5 mSv/an
3. 20 mSv/an
4. 50 mSv/an
5. 100 mSv/an
6. plus que 100
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

21
4
2
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
I want to know if I am genetically more radiosensitive

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

Same question

1. 17
2. 7
3. 1
I want to know if I am genetically more radiosensitive

- **Yes**: 21 (Première diapositive), 17 (Deuxième diapositive)
- **No**: 4 (Première diapositive), 7 (Deuxième diapositive)
- **I don't know**: 2 (Première diapositive), 1 (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**
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)
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
Utility 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"

Excluding if leukemia risk is 25 times higher.
(opinions of about 50 RP experts in Switzerland collected in December 2013)

Those who said no for a genetic reason continued to say no for a behavioral reason.
Deontological approach typical for risk linked to behavior: "everybody has the right to behave as long as this does not impede on others' freedom"

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