

# Ethical considerations of antibiotic treatment

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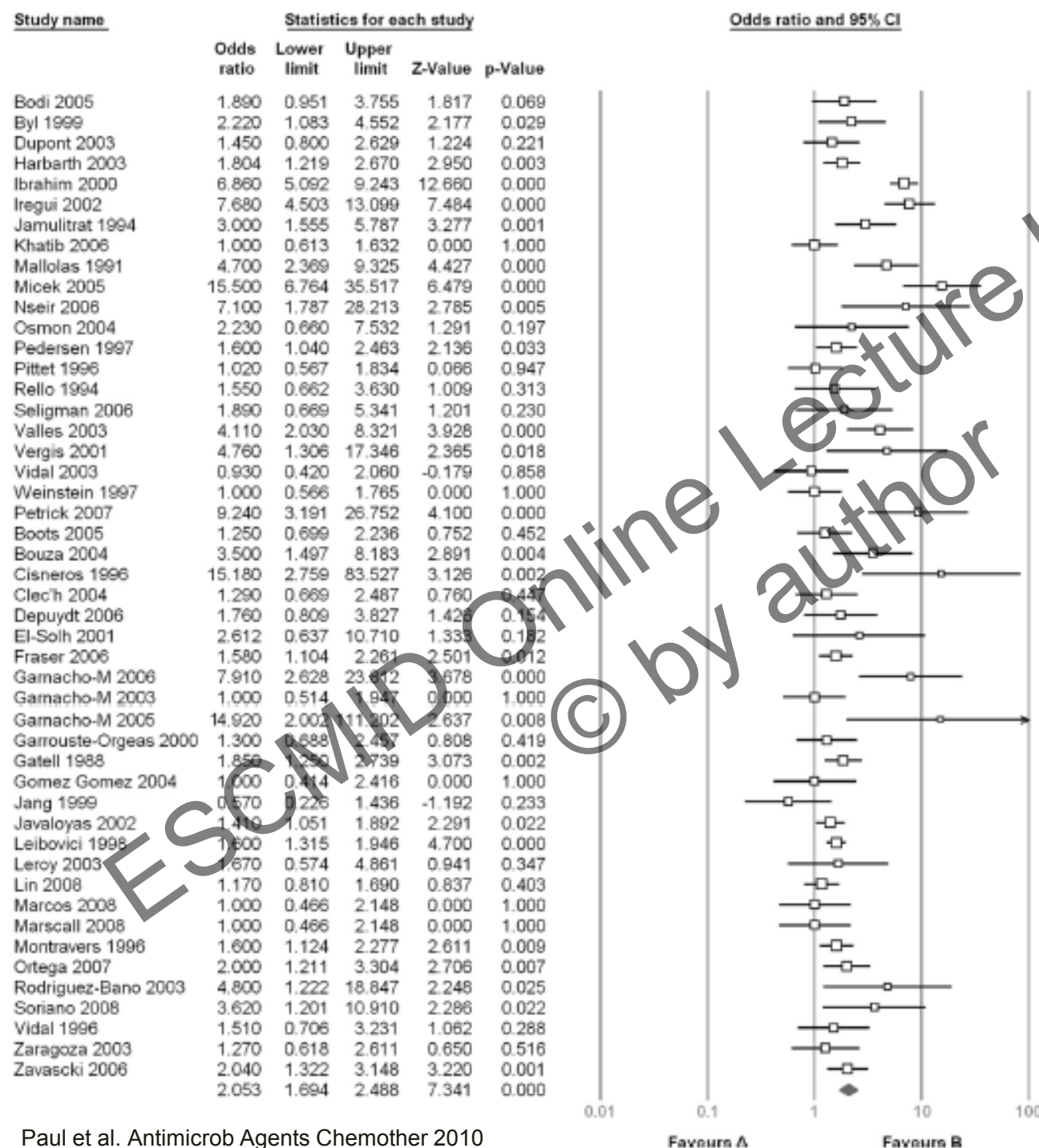
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# Three examples (1)

- A 56-years old woman is admitted to an Israeli hospital because of high fever, flank pain, low systolic blood pressure, and leucocyturia. She is treated according to the hospital guidelines with amikacin.
- A 64-years old man with severe pneumonia acquired in the Nottingham University Hospital is treated with amoxicillin/clavulanic acid and gentamicin according to local guidelines.
- A 64-years old man with severe pneumonia acquired in the Johns Hopkins Hospital is treated with ceftriaxone according to local guidelines.

## Three examples (2)

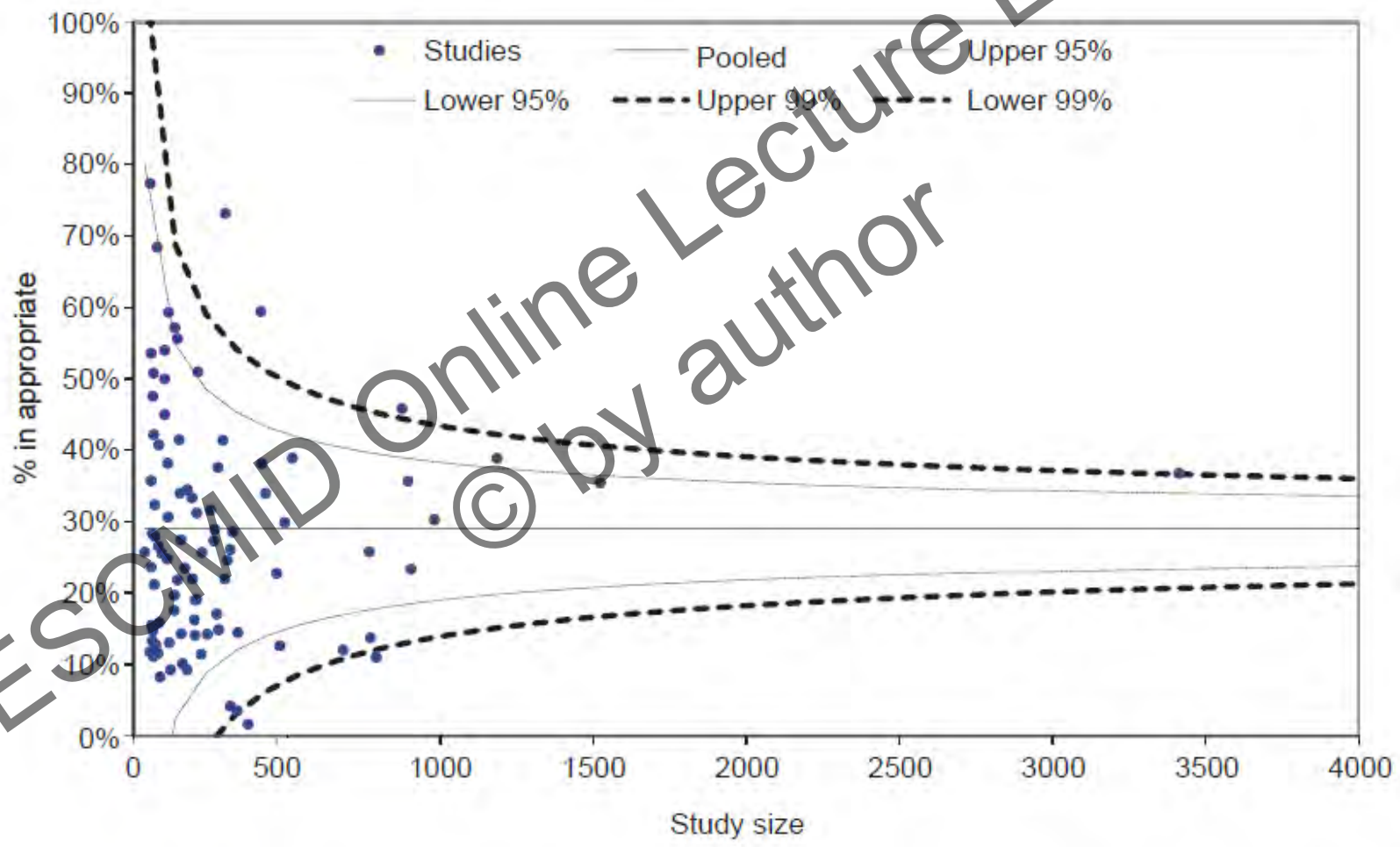
- In all 3 examples the coverage achieved by the guidelines treatment is 75%-90%.
- Treatment with meropenem would have achieved a coverage rate of about 95% in all 3 patients.
- Covering empirical antibiotic treatment in severe infections translates into a benefit in survival.



**Association of appropriate empirical antibiotic treatment and all-cause mortality**

OR of inappropriate empirical treatment for mortality 2.05 (95% CI 1.69-2.49)

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# The ethical dilemmas

- The only valid reason to prescribe less than maximum treatment for infections is to preserve antibiotics for future patients.
- It raises 2 ethical dilemmas:
  - The present patient is exposed to a real, small danger in order to benefit future patients.
  - We do not ask the patient for his or her consent to this.

Why patient's participation in decisions is so important

Isaiah Berlin on the right to autonomy:

'I wish my life and decisions to depend on myself, not on external forces of whatever kind. I wish to be the instrument of my own, not other men's act of will. I wish to be a subject, not an object; to be moved by reasons, by conscious purposes which are my own, not by causes which affect me, as it were, from outside.'

Whether and how to balance benefit to future, unknown patients with the harm to the present patient?

- The Georgetown mantra of bioethics: beneficence, non-maleficence, autonomy, and justice.
- ‘Justice between generations’ (Rawls J. *A Theory of Justice*. Cambridge, MA, USA: Belknap Press of Harvard University Press, 1971.)
- ‘...when a person takes something from nature and makes it his own property, one is allowed to do so only where there is enough, and as good left in common for others’ (John Locke’s *Second Treatise of Government*)
- Medical professionalism: The fair distribution of healthcare resources is one of the principles of professionalism, and commitment to just distribution of finite resources as one of its commitments. (ABIM Foundation, ACP-ASIM Foundation, European Federation of Internal Medicine. *Medical professionalism in the new millennium: a physician charter*. *Ann Intern Med* 2002; 136: 243–6.)

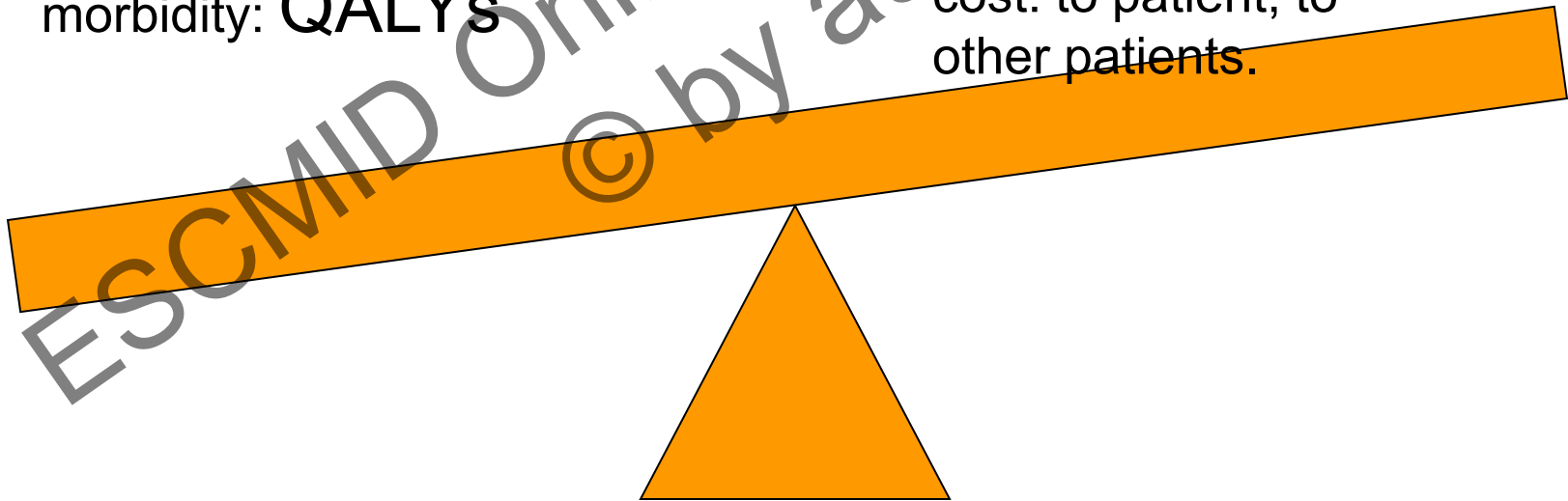


How to balance benefit to future, unknown patients with the harm to the present patient?

- Utilitarian theories: Cost-effectiveness or cost-utility or cost benefit analysis.

Benefits: better survival; less morbidity: **QALYs**

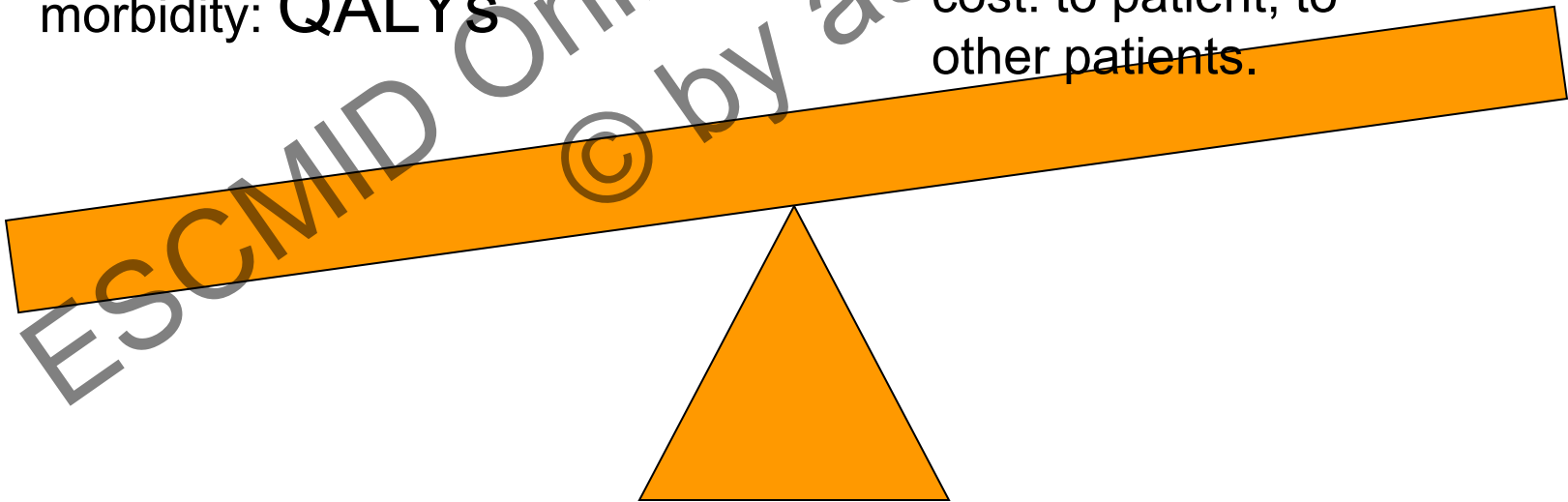
Costs: direct, side-effects, ecological cost: to patient, to other patients.



42 years old patient with severe infection

Benefits: better survival; less morbidity: **QALYs**

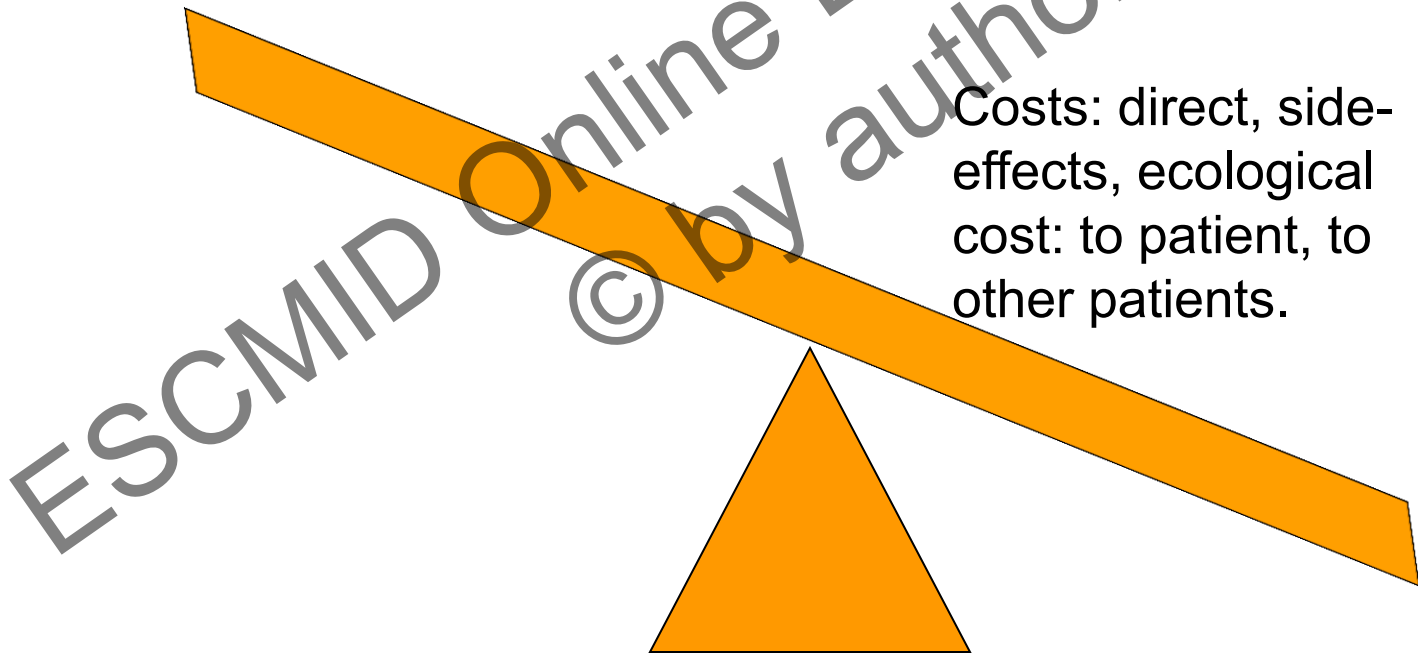
Costs: direct, side-effects, ecological cost: to patient, to other patients.



80 years old healthy patient with severe infection:

Few QALYs

Costs: direct, side-effects, ecological cost: to patient, to other patients.



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80 years patient with severe dementia for years, pressure sores, urinary catheter and severe contractures, severe infection :

No QALYs

Costs: direct, side-effects, ecological cost: to patient, to other patients.

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80 years patient with refractory AML: severe infection

No QALYs

Costs: direct, side-effects, ecological  
cost: to patient, to other patients.

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Immanuel Kant:

“Act in such a way that you treat humanity, whether in your own person or in the person of any other, never merely as a means to an end, but always at the same time as an end.”

# Decision points:

- Collective decisions: decisions made beforehand, in the form of guidelines or decision support systems.
- Individual decisions: Made for the present, individual patient.
- Decisions on the collective are easier.
- Decision support systems: TREAT example

# Why I'm talking to you about that?

- TREAT is a decision support system for antibiotic treatment.
- It uses a causal probabilistic network to predict with a high precision the probabilities of site of infection, pathogen distribution and susceptibilities to antibiotics.
- It then uses a cost benefit model to advise on the antibiotic drug/s with the best cost benefit difference.



# Cost-benefit model

- **Benefit**

- Appropriate antibiotic reduces mortality risk by ~1.6
- Reduces hospital stay by ~2 days

- **Cost**

- Direct costs, administration and monitoring costs
- Adverse events costs
- Costs of future resistance

## Costs of future resistance.

- Costs to the individual model the patient's next infection
- Costs to future patients assume a policy of using the specific antibiotic for all similar patients.
- Rise in the use of this antibiotic will cause a rise in resistance to the same and other antibiotics.
- This translates into a higher chance for inappropriate treatment for future patients, and a higher chance for death or disability

## Driving the model and problems:

- The model balances a benefit to a present patient vs harm to future patients.
- Is this ethically acceptable?
- Is this a 1:1 ratio?
- How do we compare a young person to an old one? A healthy one to one with almost no chances of survival because of a severe underlying disease? Dementia?

## A special consideration:

- The very sick (eg septic shock) present , identified, looking us in the eye patient merits special consideration.
- (The society is ready to invest millions into saving one trapped miner: we feel this is justified).

# To sum up

- The major decision in antibiotic treatment and antibiotic policy is the balance between the present patient and future ones: this is an ethical dilemma.
- There are factual solutions that might help and should be encouraged.
- We have no way to respect the autonomy of patients.
- Decisions on the collective are easier.
- The only model of ethics that allows a quantitative balance is the utilitarian model.
- Detailed decisions on the collective (manly decision support systems) are part of the solution.

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