

ICRP Workshop – The Future of Radiological Protection
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The need to review low-dose decision-making in radiation protection



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The broad context

But its not just the 'system of protection' itself – its also **how we implement it!**

- As RP professionals
- As regulators

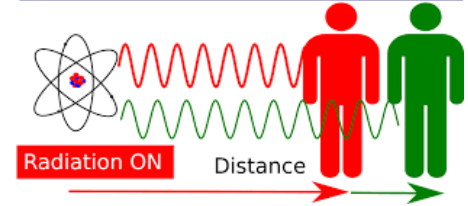
As a profession we are perhaps too cautious – and we are certainly very conservative in our general approaches.

Are we fixated on 'ever lower doses' and forever chasing μSvs ?



gg119298873 GoGraph.com

More Distance => Less Radiation Dose





Low Dose Decisions

Around 'a few mSv' and lower

The Basic Issue

Why do we allocate significant societal resources to reduce some relatively low exposure levels to even lower levels?

- Such exposures are often well within the variability of natural background, including the consequences of individual day to day decisions
- They make no real difference to the total exposure of any individual
- We are contributing to poor utilisation of societal resources, and risk bringing our profession into disrepute.
- This is at variance with the common-sense way we all live in a radiation environment

An Illustrative Example

Compare and contrast two types of exposure:

Exposure from the clearance system

versus

Exposure from a holiday



The classic example

Clearance – the 10 $\mu\text{Sv/a}$ criterion

Actually its nearer 0.1 $\mu\text{Sv/a}$ because of conservatism!

Doses to a very few individuals!

- up from 2 mSv/a to 2.0001 mSv/a

It costs many tens/hundreds £M



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Cornwall holiday in the UK

Tens of thousands of holidaymakers each year

Each person gets several tenths mSv additional dose

No-one is remotely concerned or interested



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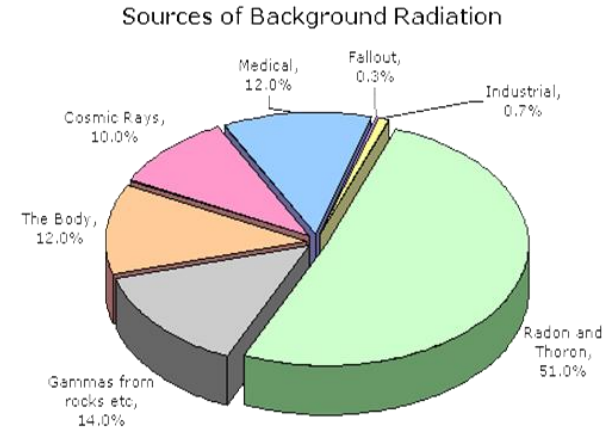
Is this giving value for money (best use of resources) to society?

Does it align with Common Sense?

The context of natural background exposure

- Every person receives at least 2mSv/a :
 - This is the basic minimum (and many receive significantly higher doses)
 - Everything else is an addition to this
- Personal lifestyle decisions add a 'Delta' to this:
 - Whether to change house
 - Where to holiday
 - Whether to fly
 - What to eat (..... etc)

This Delta could easily be ± 0.5 mSv or more



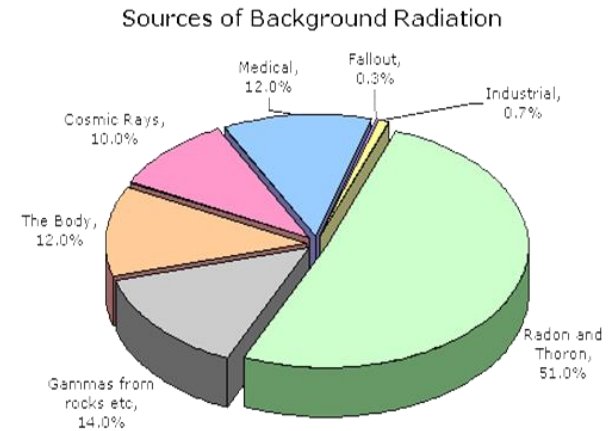
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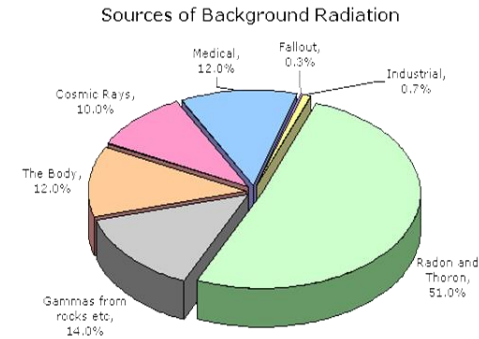
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- Such decisions are made daily, with no concern or interest (and usually no knowledge) of radiation risk.
Rightly so, but



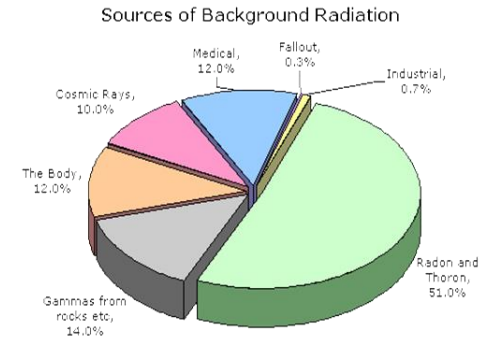
The context of natural background exposure

- Natural background exposure at the basic level is classed as 'existing exposure' and usually regarded as uncontrollable
- But these 'Delta' exposures of individual choice are *in principle* controllable:
 - Property safety laws: [move house, or holiday accommodation]
 - Risk information laws: [warning on airline tickets]
 - Food safety laws: [restrict higher dose foods]

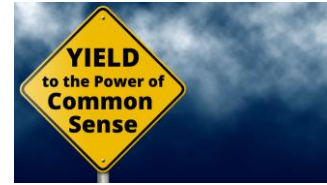


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- But these ‘Delta’ exposures of individual choice are *in principle* controllable:
 - Property safety laws
 - Risk information laws
 - Food safety laws
- OK – most of us would agree that it would be disproportionate to control these exposures, but they are controllable!
- Our system of protection has decided to allow them – they are ‘deemed acceptable’.



Common sense again



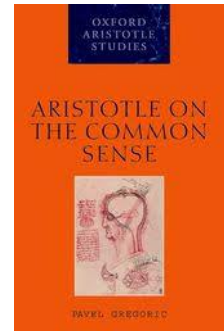
..... Why is it acceptable to automatically allow controllable exposures at levels of significant fractions of a mSv?

..... Whilst requiring some exposures to a very few persons to be reduced to μSv levels and lower?

- This places unnecessary burdens on society
- It is almost impossible to explain to peers
- It has the potential to call our profession into disrepute



VectorStock





Decisions at low dose

- the context of natural background



- **How to take decisions at ‘a few mSv/a and lower’**
 - when we don’t really know the risk, other than ‘if there is a risk, its very small’.
- LNT in principle provides a prudent basis for the system of protection,
 - but it needs a sense of proportionality in applying this prudence at these very low doses.
 - It must not be the only input to decision-making.
- We need to develop a more pragmatic framework:
 - which acknowledges the uncertainties,
 - recognises the wider framework of our radiation world,
 - and takes account of ‘common sense’



How to make decisions at very low dose



This is a challenging proposition

- it links to tolerability of risk and public perception

- the classical ToR approach relies on comparisons to other generally accepted risks
- but it does not take account of radiation risk uncertainty at low dose (it compares very real risks with hypothetical/inferred risk): prudence is OK, but it needs some balance
- it also ignores the wider picture of our 'radiation world': the universal natural background gives a different dimension to radiation risk



Public 'Concern'



We should make use of the context of natural background, and its variability, in our public interactions

And we should beware reacting to 'perceived public concern' by imposing very low dose decisions:

- Does driving to low doses really ease public concern?
- Or does it make them think: 'if it needs to be that low, this man-made radiation must be really dangerous'
- Hence it actually feeds 'radiation phobia'

And remember that someone has to pay. Usually its all of us!

The System of Protection itself, and how we implement it, should not try to anticipate any perceived public concern by reinforcing low dose expectations



Conclusions and Recommendations



How to build a better, stronger and more relatable approach:

- Give greater emphasis to natural background exposure and its variability, both in general decision-making and in public interactions
- Review the basis for assessing tolerability of risk, taking account of broader inputs such as the context of natural background
- Further reinforce that optimisation is not minimisation
- Continue to prioritise public engagement on radiation risk, but avoid an 'auto-response' of seeking 'ever lower doses'
- Ensure that decisions are based on realistic dose estimates rather than overly-conservative assessments

And recognize the value of Common Sense

