Public Health England

Protecting and improving the nation's health

Explaining radiation risk in a risky world

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Radiation workers and others are:

- Subject to the legal requirement to restrict exposure
- Required to understand the risk

But they:

- Are not necessarily scientific
- Come from a range of workplaces
- Have various attitudes to risk


NHS
SCOTLAND


CALIBRATION

Basic numbers

Scenario	Dose (mSv)	Risk of fatal cancer
Typical annual dose	1	0.004% or 1 in 25,000
Annual effective dose limit	20	0.08% or 1 in 1,250
Lifetime worker dose	50	0.2% or 1 in 500
High lifetime worker dose	250	1% or 1 in 100
Annual dose limit for 50 years	1000	4% or 1 in 25

Training outcome

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An audience that understands the consequences of exposure

- Are motivated to minimise exposure
- Does not take disproportionate risks in order to avoid trivial radiation exposure
- Realise that not all cancer is radiation-induced

These statements are all ‘true’

1. A whole body dose of 1 mSv is 20 times less than the annual dose limit

2. A dose of 1 mSv is 1000 times more likely to give you cancer than a dose of 1 μSv

3. If you receive a radiation dose of 1 mSv and then go on the develop fatal cancer, it is 99.8% likely that you would have developed the cancer anyway

4. The risk of fatal cancer in the UK is about 1 in 4. A dose of 1 mSv will increase this risk by 0.02%

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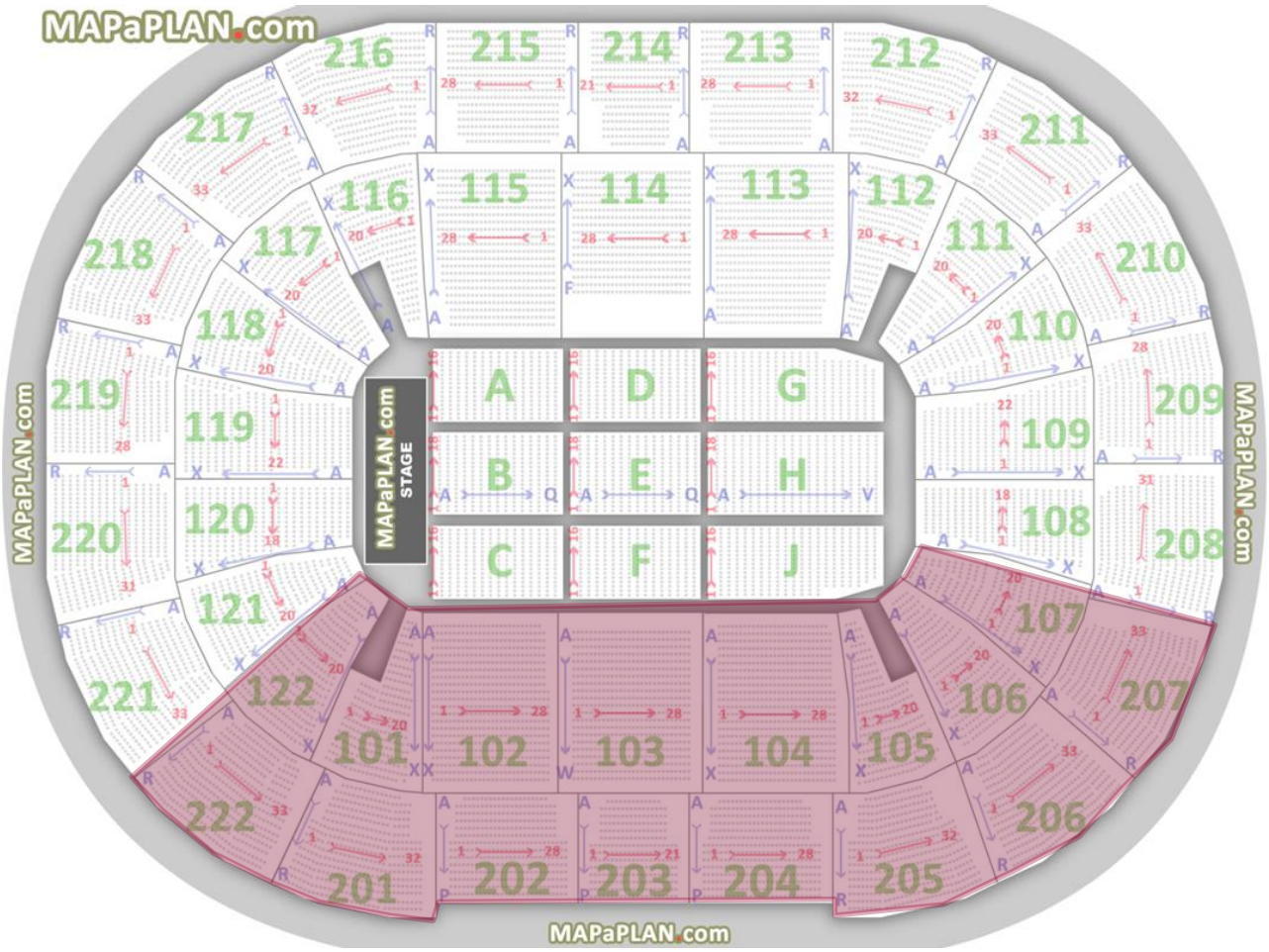
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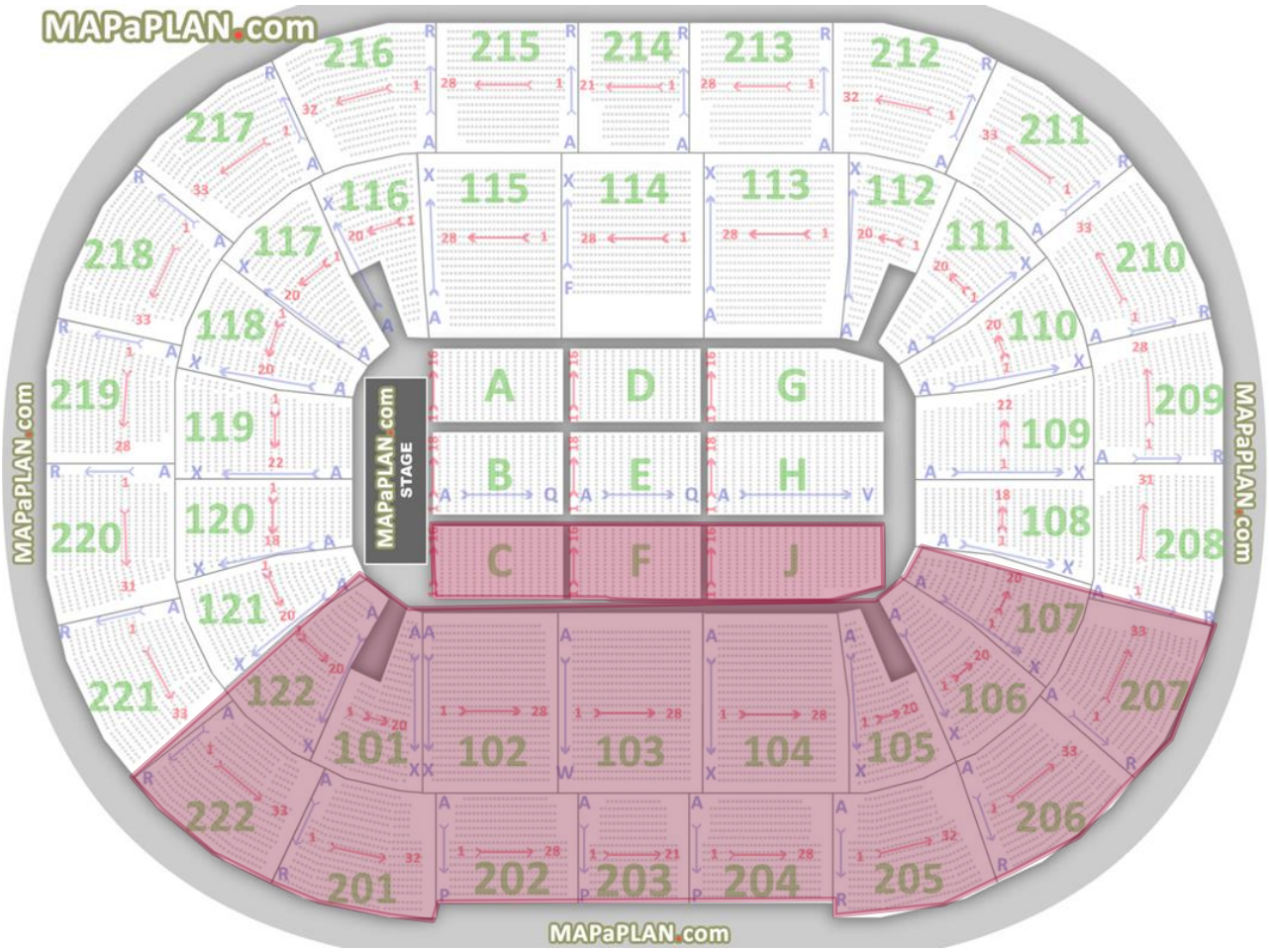
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Risk of Death

Immediate:

Natural causes (40 years old)	1 in 500
Accidents on the road	1 in 5 000
Accidents in the home	1 in 10 000
Accidents at work	1 in 20 000

Late onset:

Smoking 10 cigarettes per day	1 in 200
Single radiation exposure of 1 mSv	1 in 25 000

Can we refine this model further?

+ Graphic / visual
+ Accurately represents the statistics against background cancer deaths
+ Audience can relate to the numbers
+ No bias towards risk-averse / risk takers: not overly ‘persuasive’ one way or another

- Focusses on the group not the individual
- Implies ‘me or you’

Spiegelhalter et al

www.understandinguncertainty.org

“It’s like a lottery where the tickets you buy each day remain valid for ever - and so your chances of winning increase every day. Except that, in this case, you really don’t want to”

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