Fukushima nuclear power plant and your health

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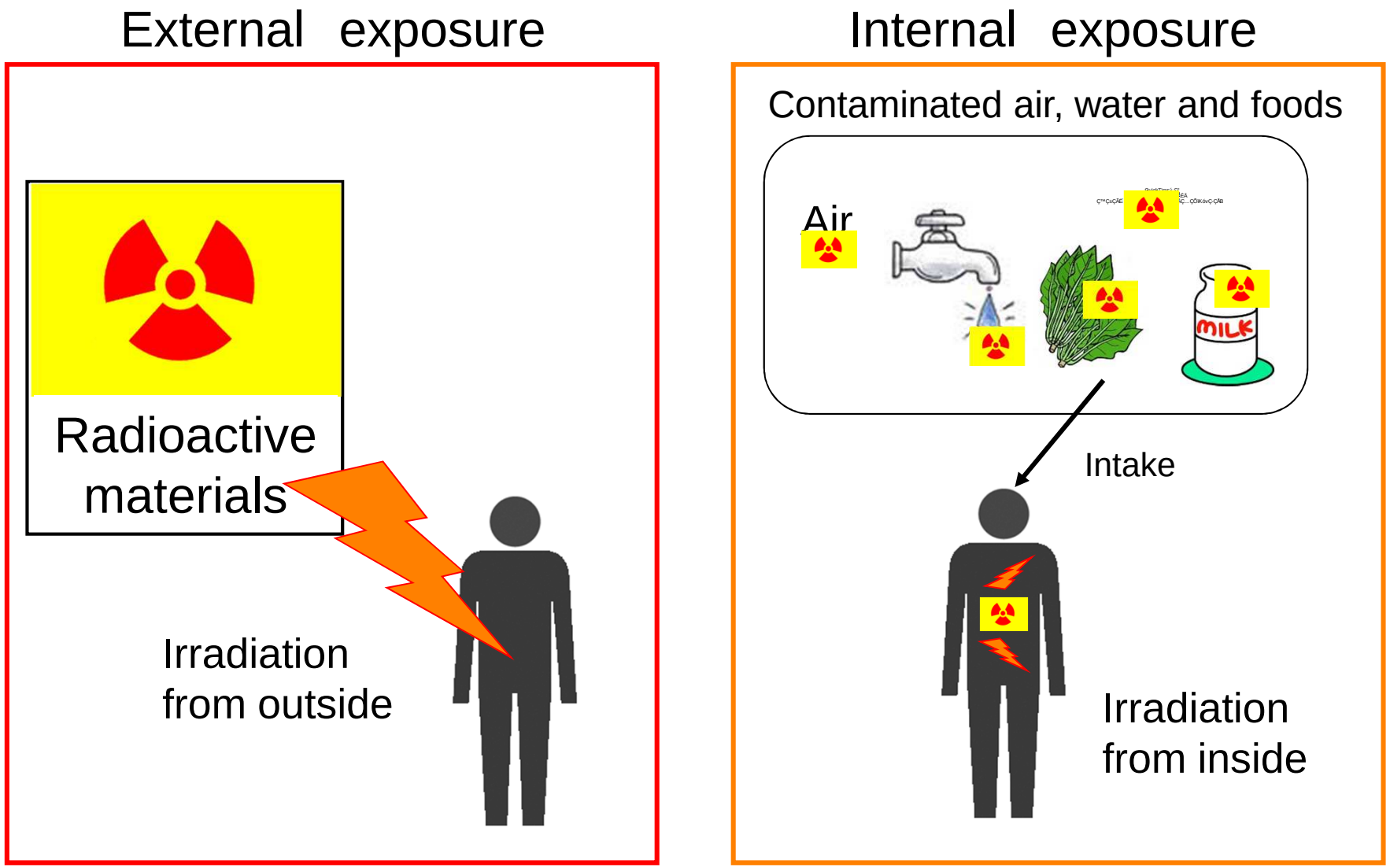
There are only two episodes in human history :

Hundreds of thousands of people exposed biologically significant dose
(= meaningful amount) of radiation

1. Hiroshima & Nagasaki, atomic bomb in 1945
2. Chernobyl, nuclear plant accident in 1986

To tell the conclusion first,
‘Fukushima’ *unlikely* becomes the third episode.

How people are exposed to radiation?



How radiation harms your health

Discriminate these two clearly

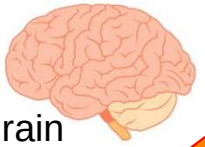
Immediate damage within *weeks*

Very high dose (=amount)
by mainly external exposure

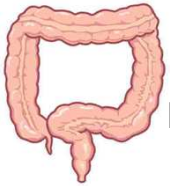
Hair loss

Burn

Serious damage

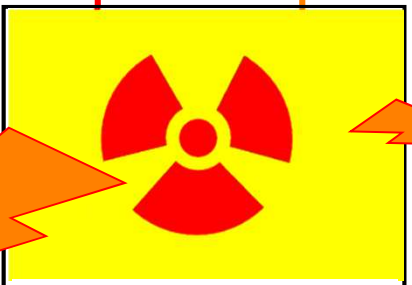


Brain



Intestine/Colon

Blood-producing system

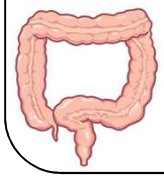


Radioactive materials

Cancer may develop *years* later

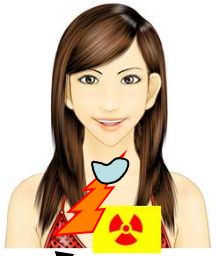
Relatively low dose
by external & internal exposure

Breast



Lung

Thyroid gland



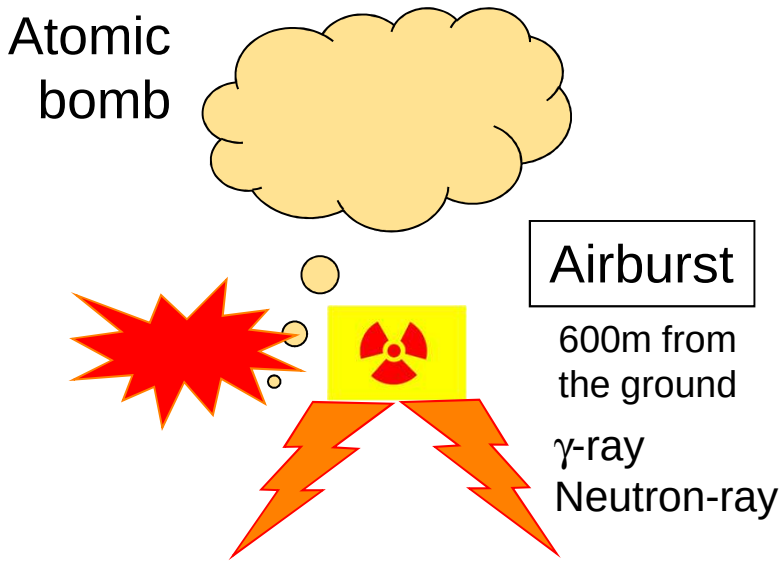
Air

(It will *never* happen to you)

(It *might* concern you)

External exposure
(Irradiation from outside)

Hiroshima & Nagasaki



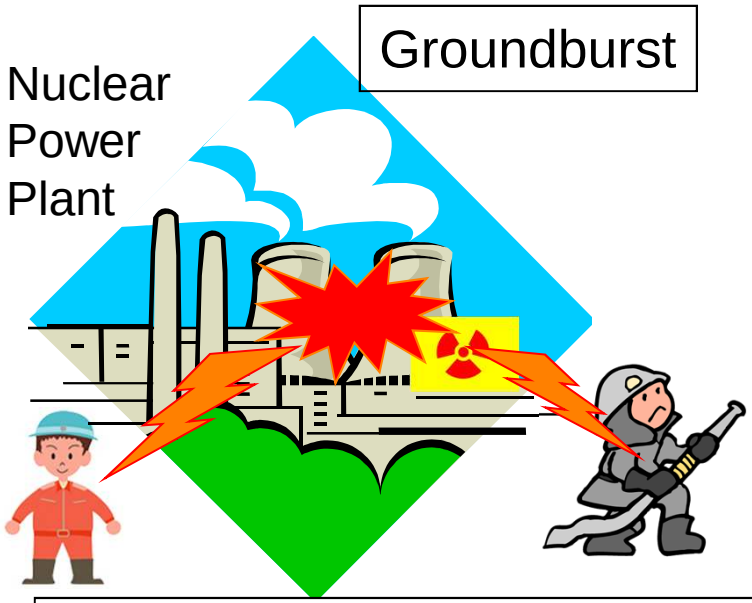
Hundreds of thousands of citizens

>100 mSv
(Many many > 1 Sv)

Died ~140,000 within 1 month

Leukemia ↑
Other cancers↑

Chernobyl



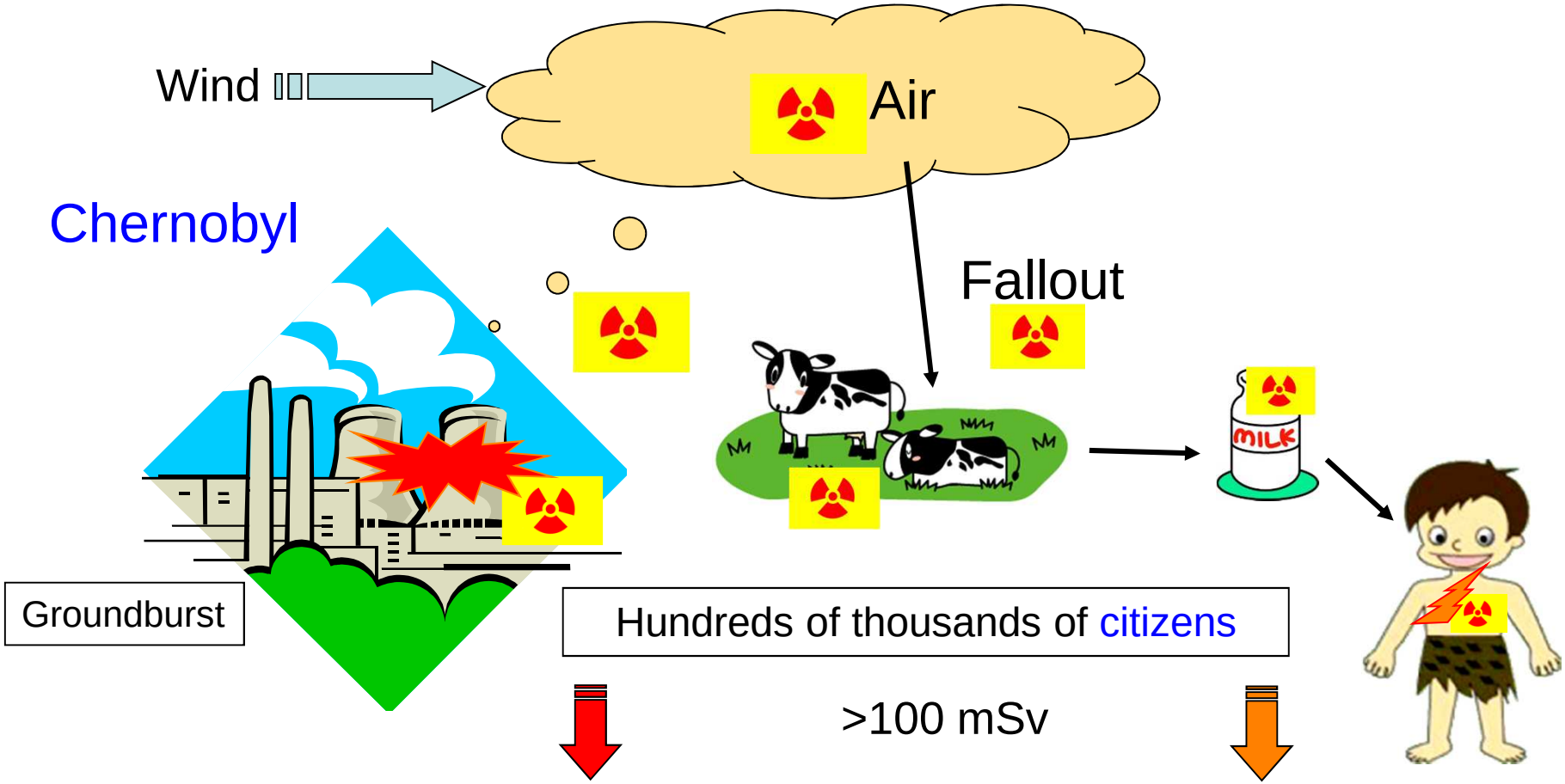
Thousands of workers and firemen

>100 mSv
(Hundreds > 1 Sv)

Died ~30
Seriously injured ~200

No significant increase of cancer, so far

Internal exposure
(Irradiation from inside)



Died within 1 month
0

~4000 thyroid cancer, mainly children
Other cancers did not increase significantly

Why thyroid cancer ?

Chernobyl

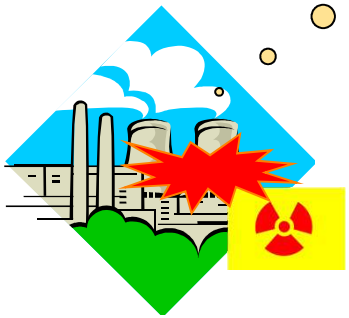
Wind

Air

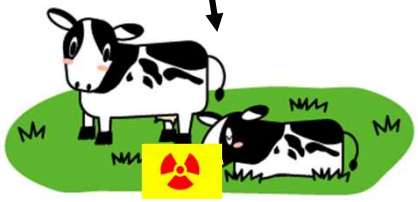
Xenon-133 (^{133}Xe)

Cecium-137 (^{137}Ce)

Iodine-131 (^{131}I)



Fallout



^{131}I

Concentrated in thyroid gland

↓

Irradiates thyroid gland

↓

Thyroid cancer

(Probably) *No* problem

^{133}Xe

Can't enter body

^{137}Ce

Distributes in whole body, and diluted

What’s going on in Fukushima

Fukushima : External exposure

Chernobyl

Groundburst

Thousands of workers and firemen

>100 mSv
(Hundreds >1 Sv)

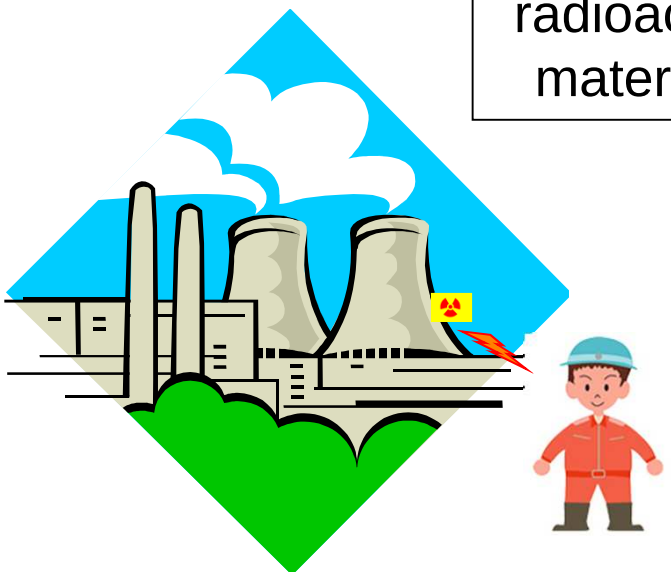
Died ~30

Seriously injured ~200

No significant increase of cancer, so far

Fukushima

Release of radioactive materials



~30 workers

100 ~250 mSv

Died 0

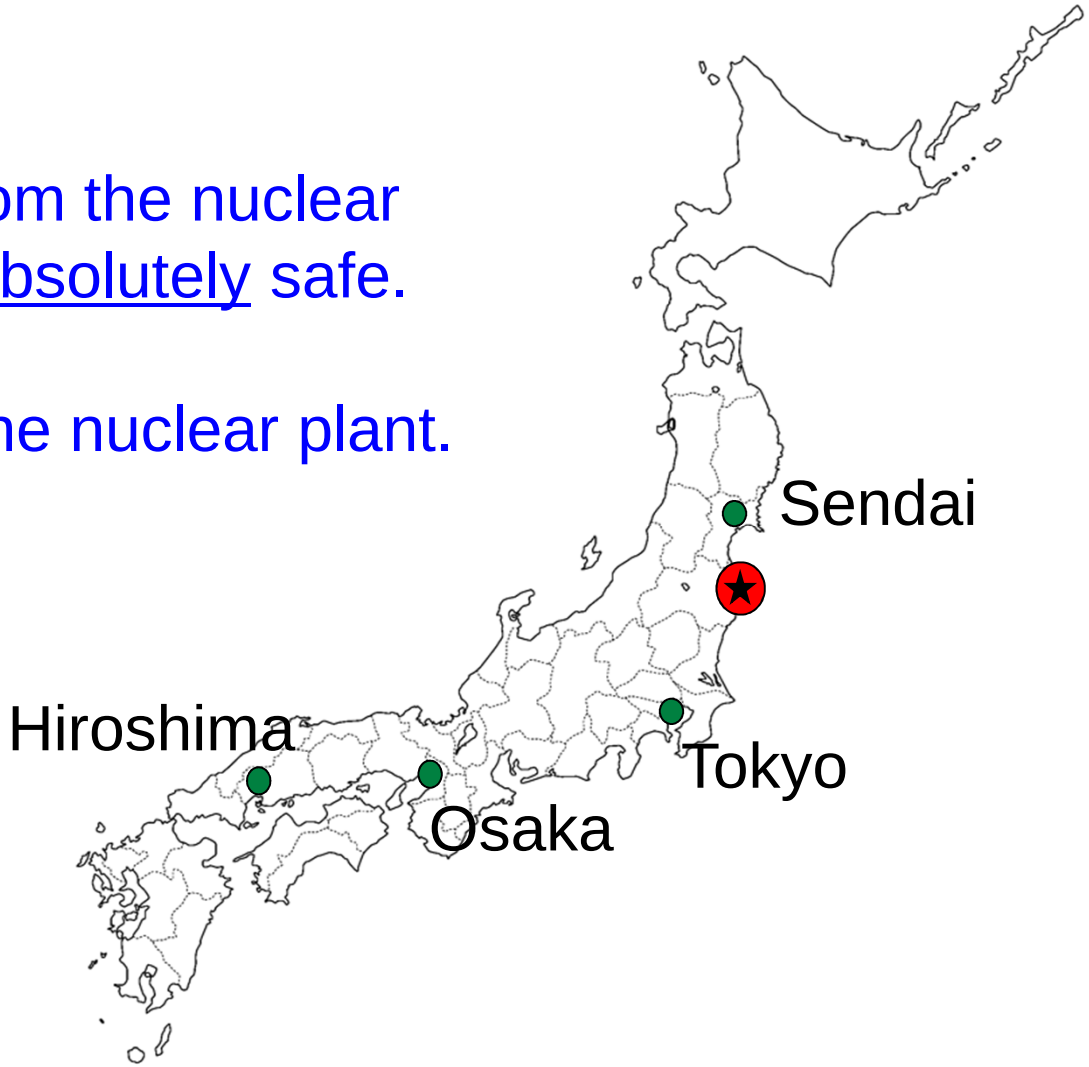
Seriously injured 0

No significant increase of cancer, *most likely*

Fukushima : To avoid external exposure
what you should do?

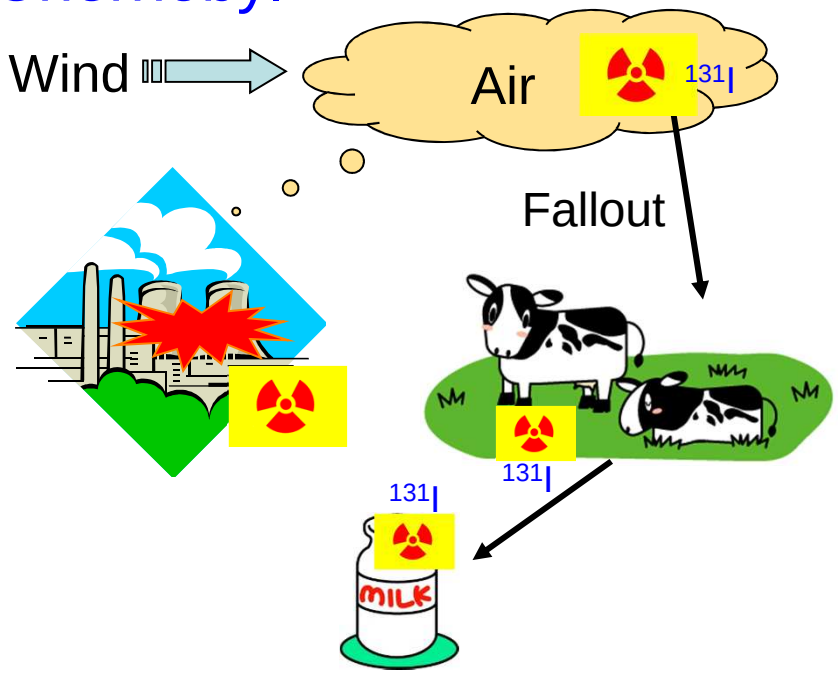
Stay 20 km away from the nuclear plant, and you are absolutely safe.

Do not try to enter the nuclear plant.



Fukushima : Internal exposure

Chernobyl



Hundreds of thousands of citizens

Probably >100 mSv

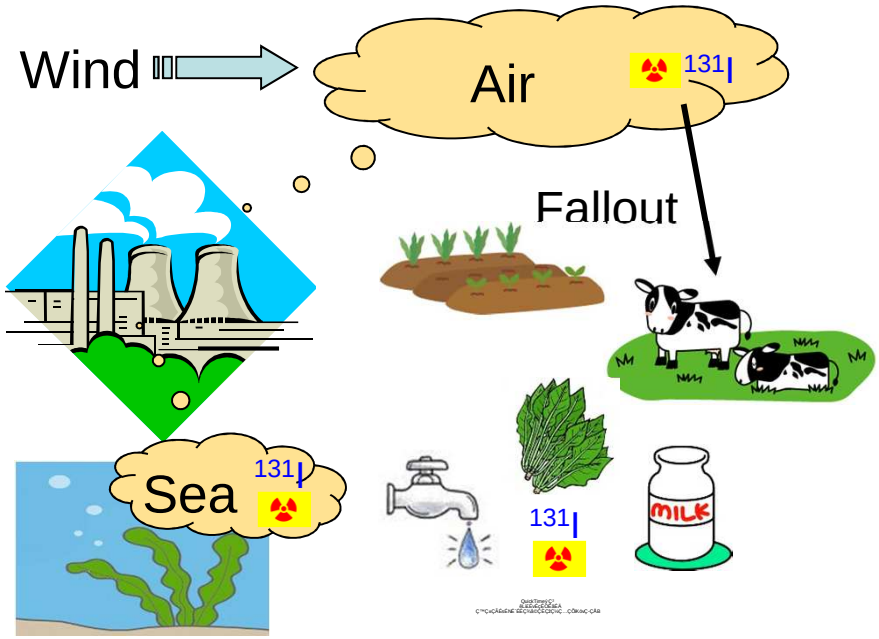
Died 0

Seriously injured 0

Thyroid cancer ~4000

No significant increase of other cancer, so far

Fukushima



0, so far

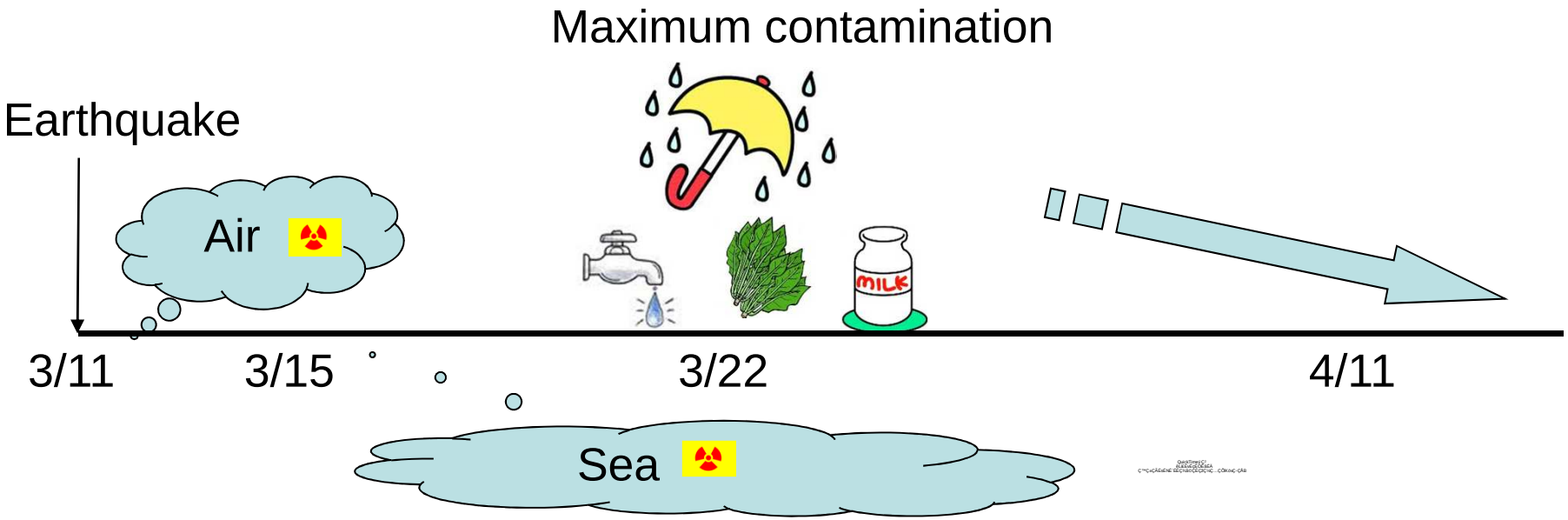
>10 mSv

Died 0

Seriously injured 0

No significant increase of cancer, most likely

Fukushima : Time course of release of radioactive materials



Contamination levels are very low even at maximum levels
Contamination levels are improving

If you take in these contaminated water more than 1Kg for 1 year,
you may get slightly increased risk for cancer.....

2. Inhalation of contaminated air (by breathing)

Once air in this area
was contaminated
with radioactive materials
at very low levels.

Currently radioactivity of air in Tokyo
is less than half of that in Moscow

3. Tapwater

Once tapwater in this area was contaminated with radioactive materials at very low levels.

At that time, if you drink >10 L of tapwater every day for years, you might get slight increase of cancer risk.

4. Food

Vegetable, milk, and fish in this area might contaminated with radioactive materials at very low levels.

If you have such food more than 1 Kg every day for years, you might get slight increase of cancer risk.

Contaminated food won't be shipped to market.

Possible question

Q: I have heard that Fukushima is now rated ‘Level 7’, the same as Chernobyl. If there is a big difference between Fukushima and Chernobyl, why the same level?

A: Many experts in United Nations, USA, France, Russia, and other countries think that this rating system is not good for evaluating big accident. I expect that the rating system will be changed in the future to avoid confusion. I think that if Fukushima is ‘7’, Chernobyl should be ‘8’ or even ‘9’. Many experts will agree.

Do not worry too much

External exposure : you are absolutely safe as long as you stay 20 Km away from the plant.

Internal exposure : Air, tapwater, vegetable, milk, and fish near the nuclear power plant are once contaminated with radioactive materials at very low levels.
Overall, radioactivity is decreasing to normal levels.

If you take in (maximum) contaminated water/food more than 1 Kg every day for 1 year, you might get slightly increased cancer risk.

Research Institute for Radiation Biology & Medicine will inform you immediately if the situation worsens.