



Public Health  
England

# ADMLC uncertainty workshop

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Impact of uncertainties on early health protection decisions in radiation emergencies and applicability to other fields



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## This presentation outlines...

- Outlines uncertainty in early dose assessments in a nuclear or radiological emergency
- Implications of this uncertainty for public health advice and presenting uncertain information
- Some problems - which may relate to other situations

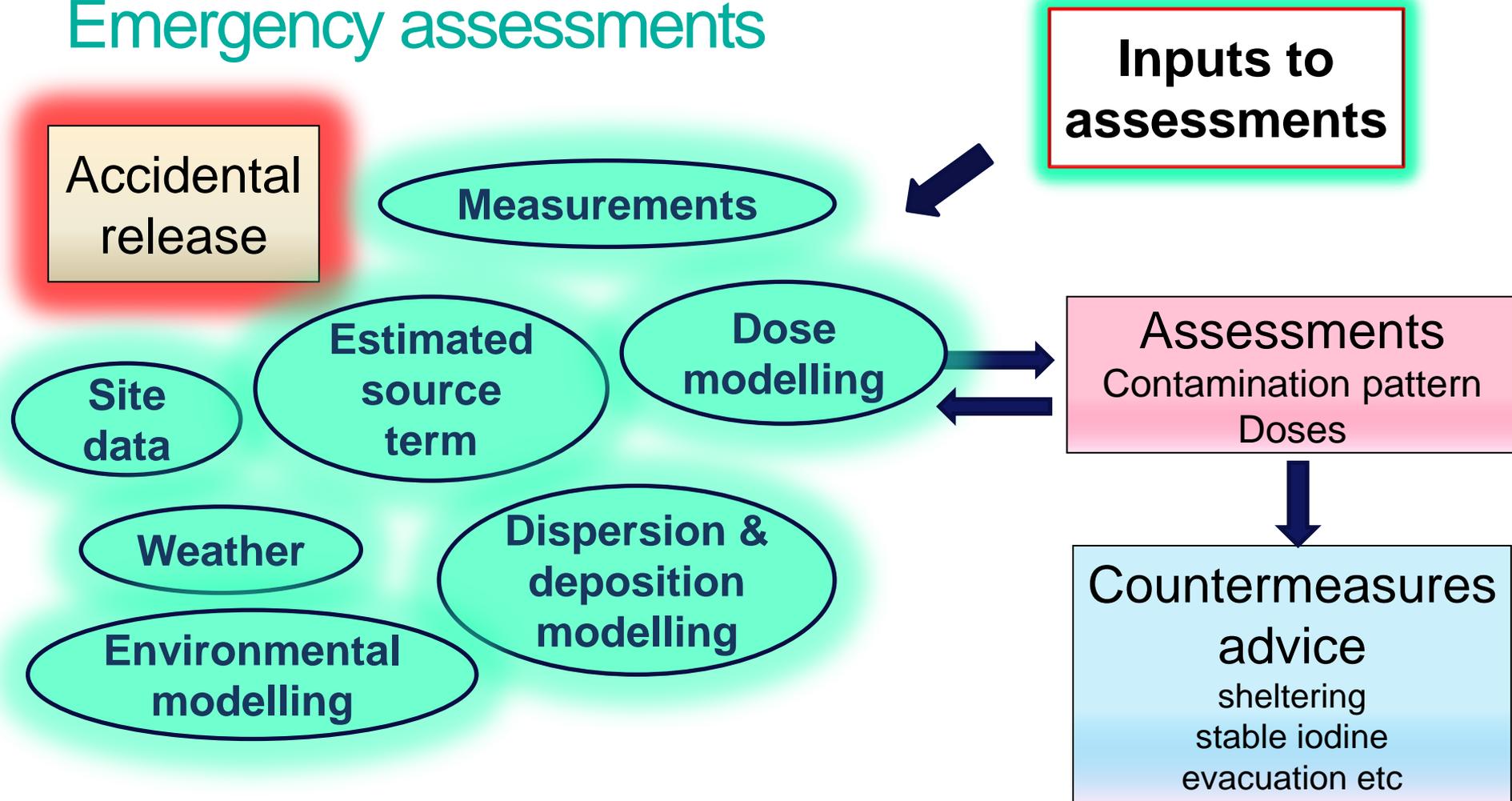


## Early emergency assessments

- Need rapid decisions on health protection
- What potentially significant information is not yet known?
- Hazards of unneeded countermeasures (eg risks of unnecessary evacuation)
- Hence need to be able to explain the uncertainty in dose estimates to decision-makers



# Emergency assessments





# Emergency assessments

**All components  
contain uncertainties,  
and calculations  
are approximations**

Accidental  
release

Measurements

Site  
data

Estimated  
source  
term

Dose  
modelling

Assessments  
Contamination pattern  
Doses

Weather

Dispersion &  
deposition  
modelling

Environmental  
modelling

Countermeasures  
advice  
sheltering  
stable iodine  
evacuation etc



## Uncertainties in assessments include ...

- what has been released (amounts and radionuclides)
- what the time distribution of the release is likely to be
- features of the release (eg particle size and release energy)
- what influence the weather has had so far
- future weather – may be several/many alternative predictions
- monitoring data – how reliable, is it being interpreted correctly?
- combinations of uncertainty – eg increase in amount released coinciding with change in weather such as onset of rain



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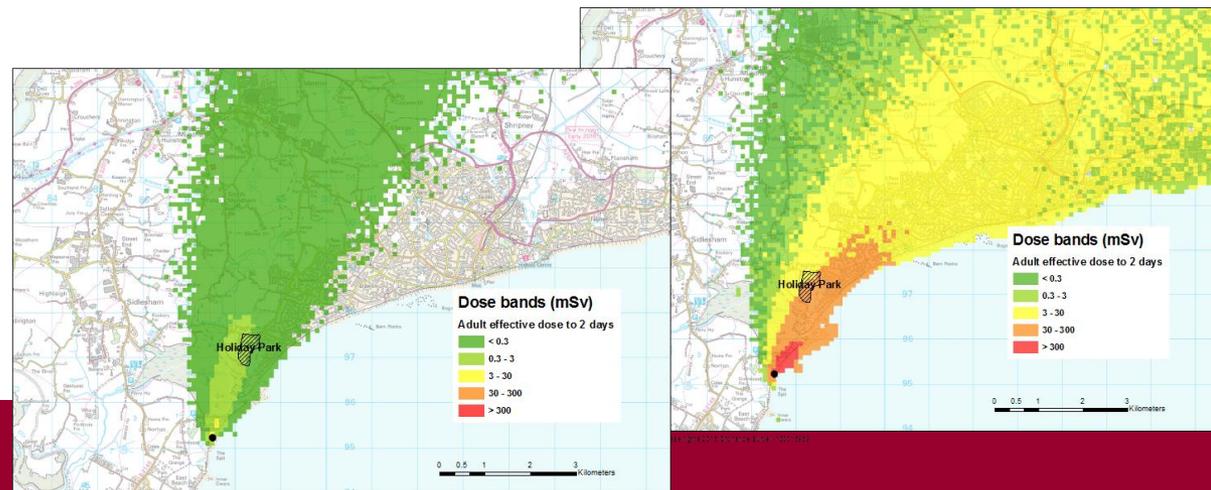
*How to deal with these in assessments?*

*How to present the results to decision-makers?*



## Presenting uncertain information

- Work in the UK (Warwick University, UK Met Office, PHE) – funded by ADMLC - described later
- Developing techniques for presenting uncertainty to decision-makers, focusing on radiological emergencies
- Workshops of UK government experts and agencies have explored how uncertainty is understood and what is needed in presentation





## Some conclusions (1)

- Predicting consequences of radiation accidents in early hours long recognised to have many uncertainties
- Many decision support systems developed in the last 20 years – few do uncertainty and none do it comprehensively
- Where done, the emphasis is on weather permutations
- Source term uncertainty seldom if ever included



## Some conclusions (2)

- The assumptions on which the analyses are built are often pessimistic ...
- ... and concentrate on worst case doses, not other outcomes (eg agricultural effects or economic impact)
- Interactions between uncertainties eg release duration and weather ignored
- A more comprehensive treatment of the key uncertainties is needed for providing advice to decision makers



## Additional thought for discussion

Does the view of uncertainty vary depending on who you are?  
eg scientists, government decision-makers, public,  
media

Is uncertainty likely to be well-received by decision-makers in an emergency?

- is it likely to be appreciated as offering greater insight?
- or will it be seen as an unwelcome complication?

How can it be made to be the expected format?



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# Any questions?

