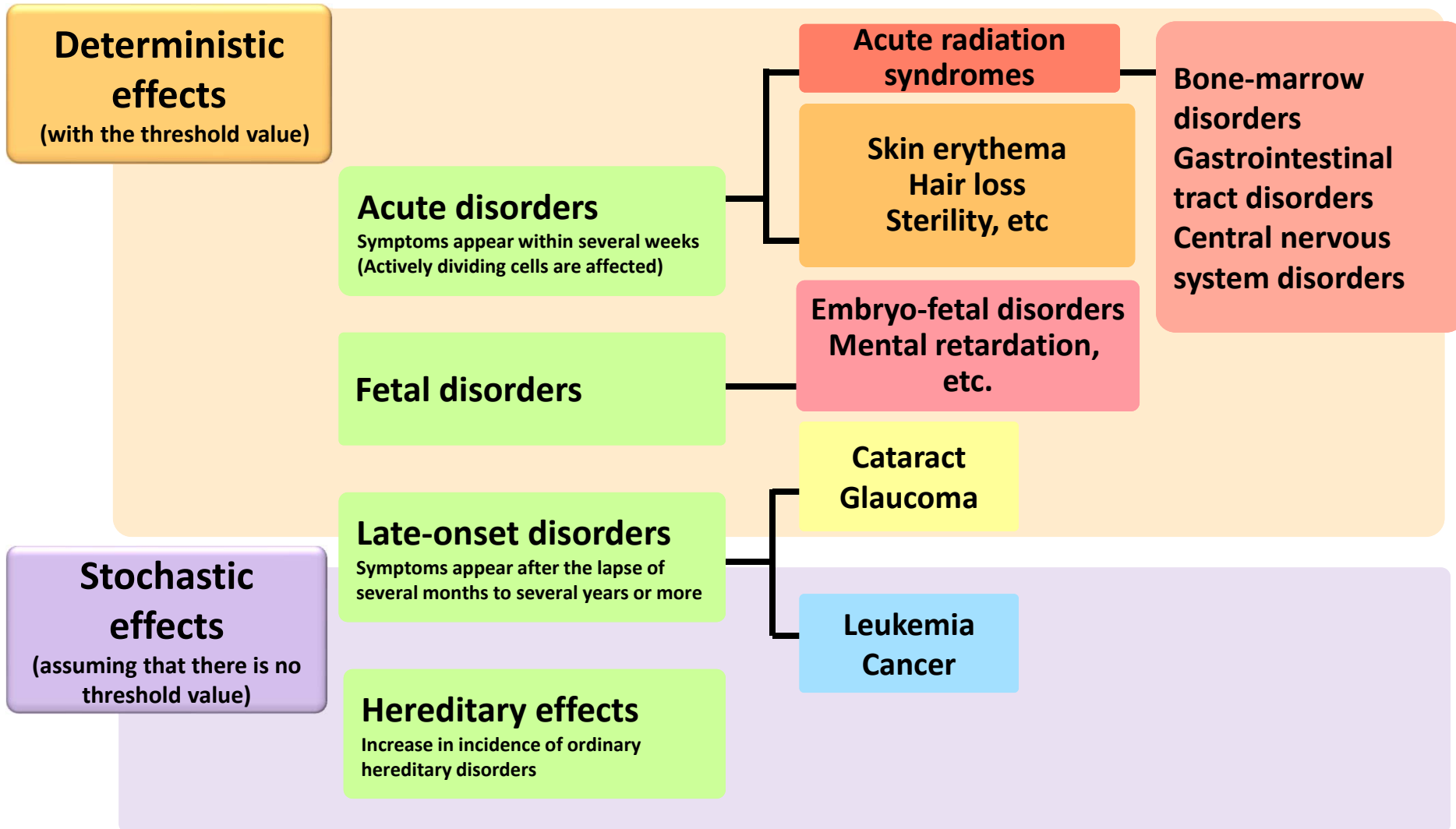


# Types of Effects

► Consideration is to be given to whether any health effects arise after radiation exposure and what effects, if any, the amount of radiation, parts exposed to radiation (whole-body exposure or local exposure), and exposure modes (acute, chronic or fractionated exposure).



# Exposure Modes and Effects

## High-dose exposure

(Exposed to a large amount of radiation)

## Low-dose exposure

(Exposed to a small amount of radiation)

## Acute exposure

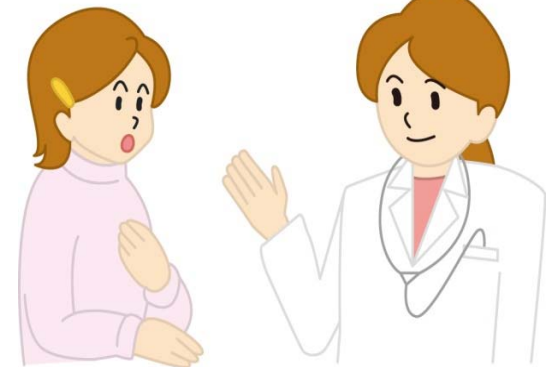
(Exposed to a large amount of radiation in a short time)

## Chronic exposure


(Exposed to a small amount of radiation over a long period of time)

Skin injury,  
nausea, hair  
loss?

Acute disorders  
appear when having  
been exposed to a  
large amount of  
radiation in a short  
time.



# Classification of Radiation Effects

		Incubation period	e.g.	Mechanism of how radiation effects appear
Categories of effects	Physical effects	Within several weeks = Acute effects (early effects)	Acute radiation syndromes* <sup>1</sup> Acute skin disease	Deterministic effects caused by cell deaths or cell degeneration* <sup>2</sup> 
		After the lapse of several months = Late effects	Abnormal fetal development (malformation)	
			Opacity of the lens	
	Hereditary effects	Cancer and leukemia		
			Hereditary disorders	

\*1: Major symptoms are vomiting within several hours after exposure, diarrhea continuing for several days to several weeks, decrease of the number of blood cells, bleeding, hair loss, transient male sterility, etc.

\*2: Deterministic effects do not appear unless having been exposed to radiation exceeding a certain dose level.

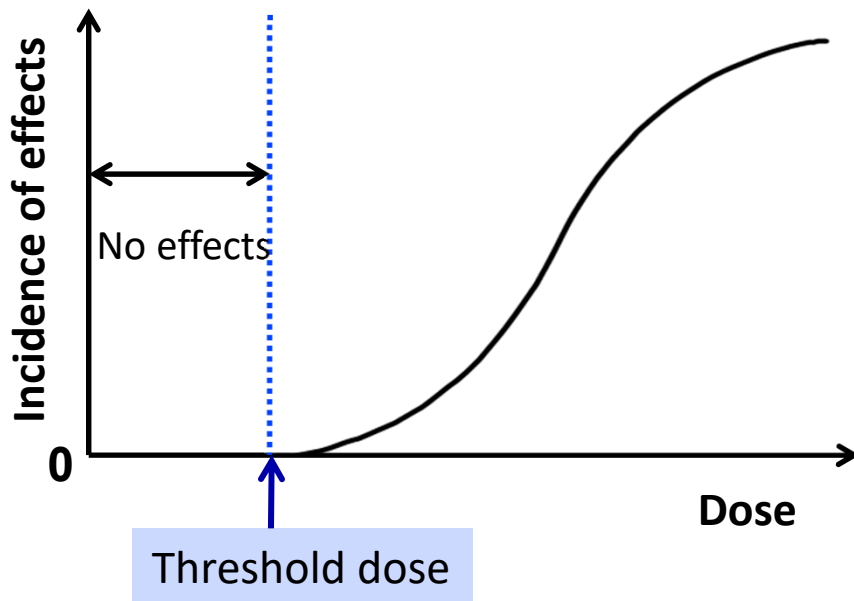
# Deterministic Effects and Stochastic Effects

## Deterministic effects

(Hair loss, cataract, skin injury, etc.)

When a number of people were exposed to the same dose of radiation and certain symptoms appear in 1% of them, said dose is considered to be the threshold dose.

(2007 Recommendations of the International Commission on Radiological Protection (ICRP))



## Stochastic effects

(Cancer, leukemia, hereditary effects, etc.)

Effects of radiation exposure under certain doses are not clear because effects of other cancer-promoting factors such as smoking and drinking habits are too large. However, the ICRP specifies the standards for radiological protection for such low-dose exposures, assuming that they may have some effects as well.

