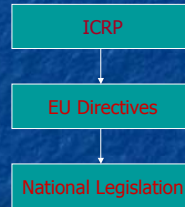


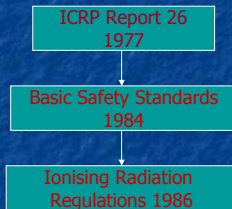
# The Legislative Framework Within The European Union

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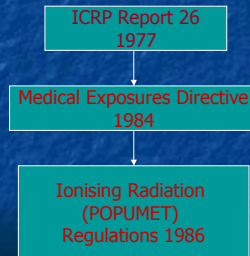
## Legislative Process In Radiation Protection



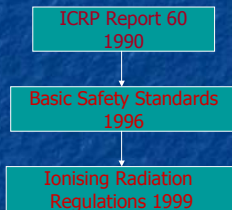
## Legislative Process In Radiation Protection



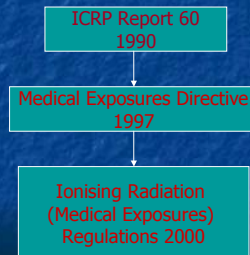
## Legislative Process In Radiation Protection



## Legislative Process In Radiation Protection



## Legislative Process In Radiation Protection



## Basic Safety Standards 96/29/EURATOM

- Applies to risks from ionising radiation
- Covers artificial and natural sources
- Work activities
- Public exposure
- Radiation emergencies
- Does not apply to radon exposure

## Basic Safety Standards 96/29/EURATOM

- Report Practices
- Authorisation of practices
- Authorisation of clearance/disposal and recycling

## Dose Limits Workers

Effective Dose	100mSv in 5 years
Effective Dose	50mSv in 1 year
Eye Lens	150mSv/year
Skin/Extremities	500mSv/year

## Dose Limits Public

Effective Dose	1 mSv/ year
Eye Lens	15mSv
Skin	50mSv

## Pregnant Workers

- Protection should be equivalent to that of a member of public
- 1mSv during pregnancy, once pregnancy has been declared

## Classification Of Workplaces

- Controlled areas
- Supervised areas
- Determined by a qualified expert

## Categoryisation Of Workers Category A

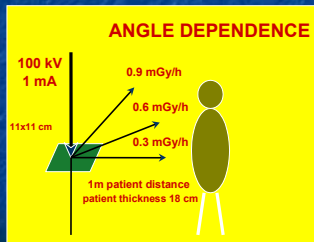
Effective Dose	6mSv/year
Eye Lens	3/10ths of a dose limit
Skin/Extremities	3/10ths of a dose limit

## FACTORS AFFECTING STAFF DOSES

- The main source of radiation for the staff in a fluoroscopy room is the patient (scattered radiation).
- The scattered radiation is not uniform around the patient.
- The level of dose rate around the patient is a complex function of a great number of factors.

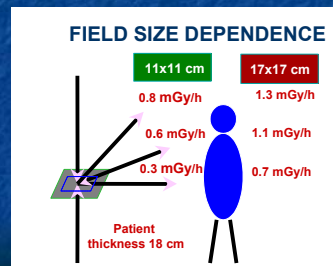


## FACTORS AFFECTING STAFF DOSES



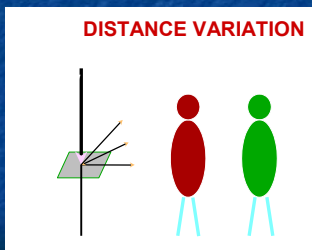
Scattered dose rate is higher near the area into which the X-ray beam enters the patient

## FACTORS AFFECTING STAFF DOSES



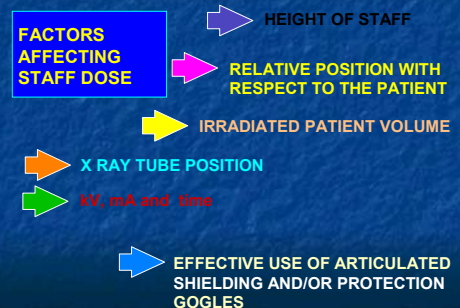
Scattered dose rate is higher when field size increases

## FACTORS AFFECTING STAFF DOSES



Scattered dose rate is lower when distance to the patient increases

## FACTORS AFFECTING STAFF DOSES



## Staff Dosimetry

- Whole body dose
- Eye dose
- Hand dose

## Staff Dosimetry Whole body dose

- Above the Apron overestimates
- Under apron underestimates
- Combine over/under apron doses gives best estimate of effective dose

## INDIVIDUAL MONITORING when a lead apron is used

- When expected doses are high 2 dosimeters are required:
  - 1 under the apron at waist level
  - 1 over the apron at collar level
- The effective dose is given by
$$E = 0.05 (D_{\text{over}} - D_{\text{under}}) + D_{\text{under}}$$
- The presence of thyroid shielding can reduce of 50% the E
- The dosimeter worn over the apron at collar level gives also an estimation of thyroid and eye lens doses

## Medical Exposures Directive 1997

- Exposure of patients as part of their own medical diagnosis or treatment
- Occupational health surveillance
- Health screening
- Research
- Medico-legal

## Medical Exposures Directive 1997 Justification

- New practices involving medical exposures should be justified in advance
- Existing practices should be reviewed when new evidence about their efficacy is obtained
- Individual medical exposures should be justified in advance

## Medical Exposures Directive 1997 Justification

- Exposure shall show a sufficient net benefit taking into account the direct health benefits and the radiation risks

## Medical Exposures Directive 1997 Justification

- Medical exposures for research purposes shall be examined by an ethics committee
- Special attention should be paid to the justification of medical exposures where there is no direct health benefit (e.g. health screening or medico-legal exposures)

## Medical Exposures Directive 1997 Optimisation

- Doses from medical exposures should be kept as low as reasonably achievable consistent with obtaining the required diagnostic information, taking into account economic and social factors

## Medical Exposures Directive 1997 Optimisation

- Member states shall promote the establishment of diagnostic reference levels

## Diagnostic Reference Levels ICRP 73

- The commission recommends the use of diagnostic reference levels for patients. These levels, which are a form of investigation level apply to an easily measured quantity, usually the absorbed dose in air or in a tissue equivalent material at the surface of a standard phantom or representative patient

## Diagnostic Reference Levels Medical Exposures Directive

- In principle diagnostic reference levels are applicable for standard procedures in all areas of diagnostic radiology
- Particularly mammography, pediatrics and interventional radiology
- Important where a reduction in dose means a relatively high reduction in risk

## UK Approach

- National patient dosimetry protocol
- Entrance surface dose
- Dose-area product

## Equipment

- All equipment should be kept under strict surveillance
- Inventory
- QA/QC procedures
- Acceptance testing/ regular performance testing