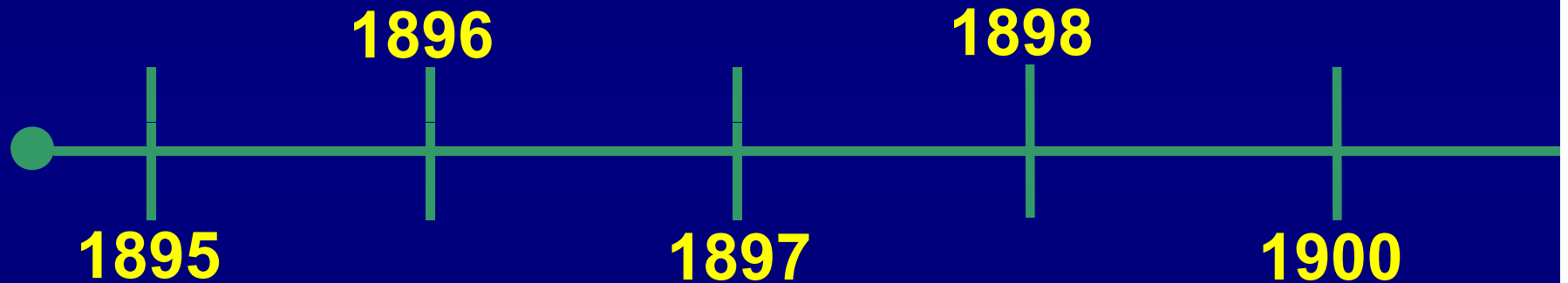


Chapter 1

The History of Health Physics

**Wilhelm Conrad
Roentgen discovers
X-rays**

**JJ Thomson discovers
electrons**



**Henri Becquerel
discovers radiation
(uranium fogs film)**

**M. Curie
discovers
Radium and
Polonium**



X-rays are used in medicine. Curies work with polonium-210 and radium-226

1903

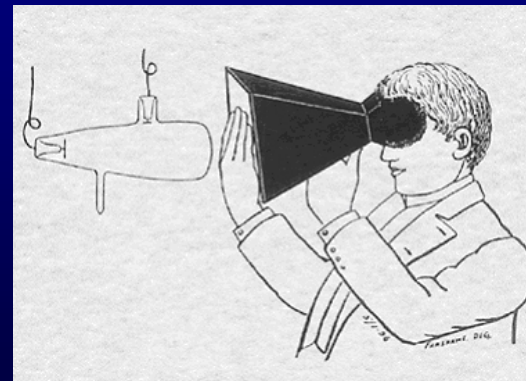
**EDISON FEARS
HIDDEN PERILS
OF THE X-RAYS.**

1911

**Early
1900's**

**Becquerel and
Marie & Pierre Curie
share Nobel Prize**

1904



**Almost 100
cases of skin
cancer
attributed to
radiation**

Ingestion of Ra-226
by women in radium
dial factories is
attributed to serious
illness and death

1921

1925

1925

Albert Einstein
receives Nobel
Prize for
photoelectric effect



Concept of
erythema dose
limit

**AMA condemns
use of X-rays to
remove body hair**

1927

**International
Commission for
Radiation Units and
Measurements
(ICRU) defines the
Roentgen**

**Chadwick
discovers
neutron**

1934

1926

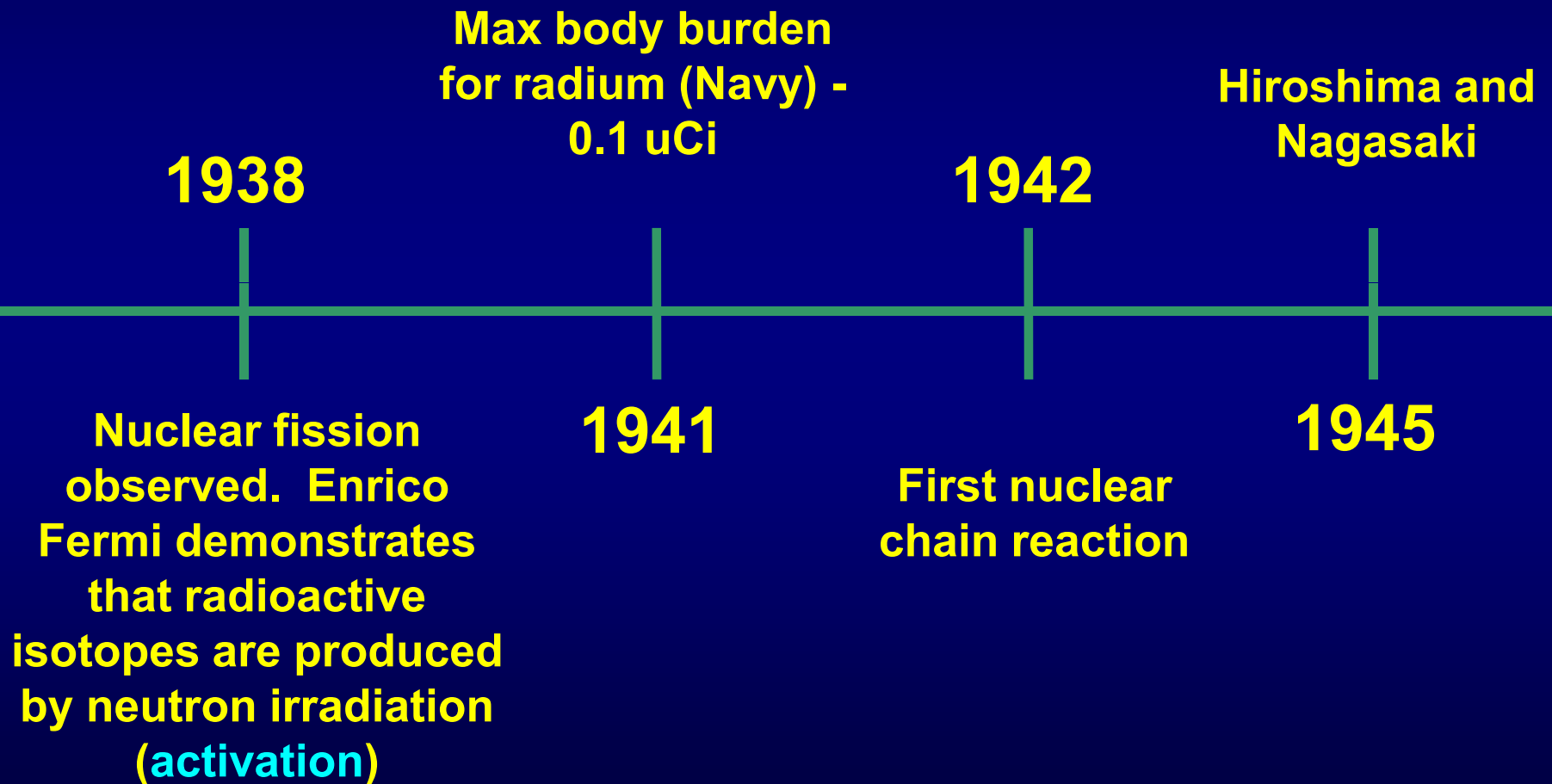
**H. J. Muller shows
reproductive cells
are sensitive to
radiation and
mutations can be
inherited.**

1928

1932



**Concept of
Tolerance Dose
(25 R/yr)**



**Harry Truman
signs Atomic
Energy Act
establishing AEC**

1946

**Concern with fallout
from weapons tests.
AEC considers
limiting public's
dose.**

1946

**Permissible Dose
replaces Tolerance
Dose. NCRP
recommends limit of
0.3 rem/week to
gonads and blood-
forming organs**

1948

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**International
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Radiological
Protection (ICRP)
recommends public
limit of 1.5 rem/yr**

1949

1953

**ICRU introduces
concept of
absorbed dose**

**US Military detonates a
hydrogen bomb at the
Bikini Atoll (Bravo Shot).
The test shot spread
unprecedented amounts
of fallout and caused
international concern.**

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1955

**UN Scientific
Committee on
the Effects of
Atomic Radiation
(UNSCEAR)
established**

**AEC requests NAS to
study effects of low-
level radiation**

1955

1956

**ICRP concerned
that 0.3 rem/wk is
too large;
recommends 5
rem/yr and 3
rem/quarter**



**President Eisenhower
establishes Federal Radiation
Council to issue Radiation
Protection Guides (RPGs) for
members of the public.**

1957

1959

**IAEA created, 10
CFR 20 published
(all 6 pages). It
limited workers to
0.9 rem per week,
3 rem/13 weeks**

1959

**FRC establishes
guidance for radon
exposure to workers
and members of the
public.**

ACCIDENTALLY ABSORBING A FANTASTIC AMOUNT OF RADIOACTIVITY, THE DYING INSECT, IN SUDDEN SHOCK, BITES THE NEAREST LIVING THING, AT THE SPLIT SECOND BEFORE LIFE EBBS FROM ITS RADIOACTIVE BODY!



Radioactivity makes its way into popular culture in 1962 when the story of Spider Man is introduced in a Marvel Comic titled “Amazing Fantasy.”



**FRC duties
transferred to
EPA; EPA sets
standards, AEC
enforces**

1968

1972

**FDA regulates
dose from TV's**

1970

**BEIR committee
issues report based
on Japanese
atomic bomb
survivors; LNT
theory established**

**President
Nixon
splits AEC
into ERDA
and NRC**

1974

1975

**NCRP 53 provides a
monthly dose limit for
embryo/fetus**

**President Carter
creates DOE in
response to
energy crisis**

1977

ICRP 26 published – defined acceptable risks, EDE concept, cancer as a stochastic effect and adopted the linear no-threshold hypothesis. It stated that hereditary biological effects from radiation were no longer a principle concern for dose limits

1977

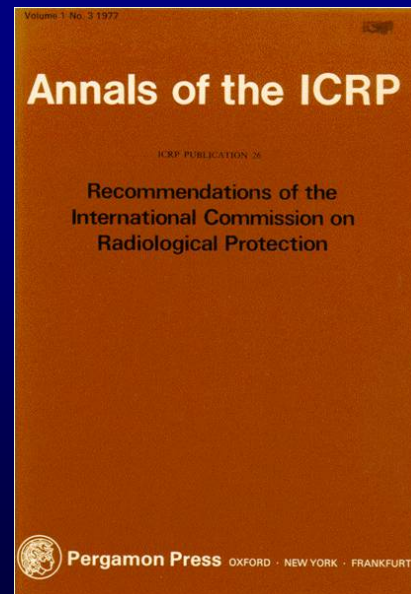
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BEIR III Report: LNT model probably overestimates risk

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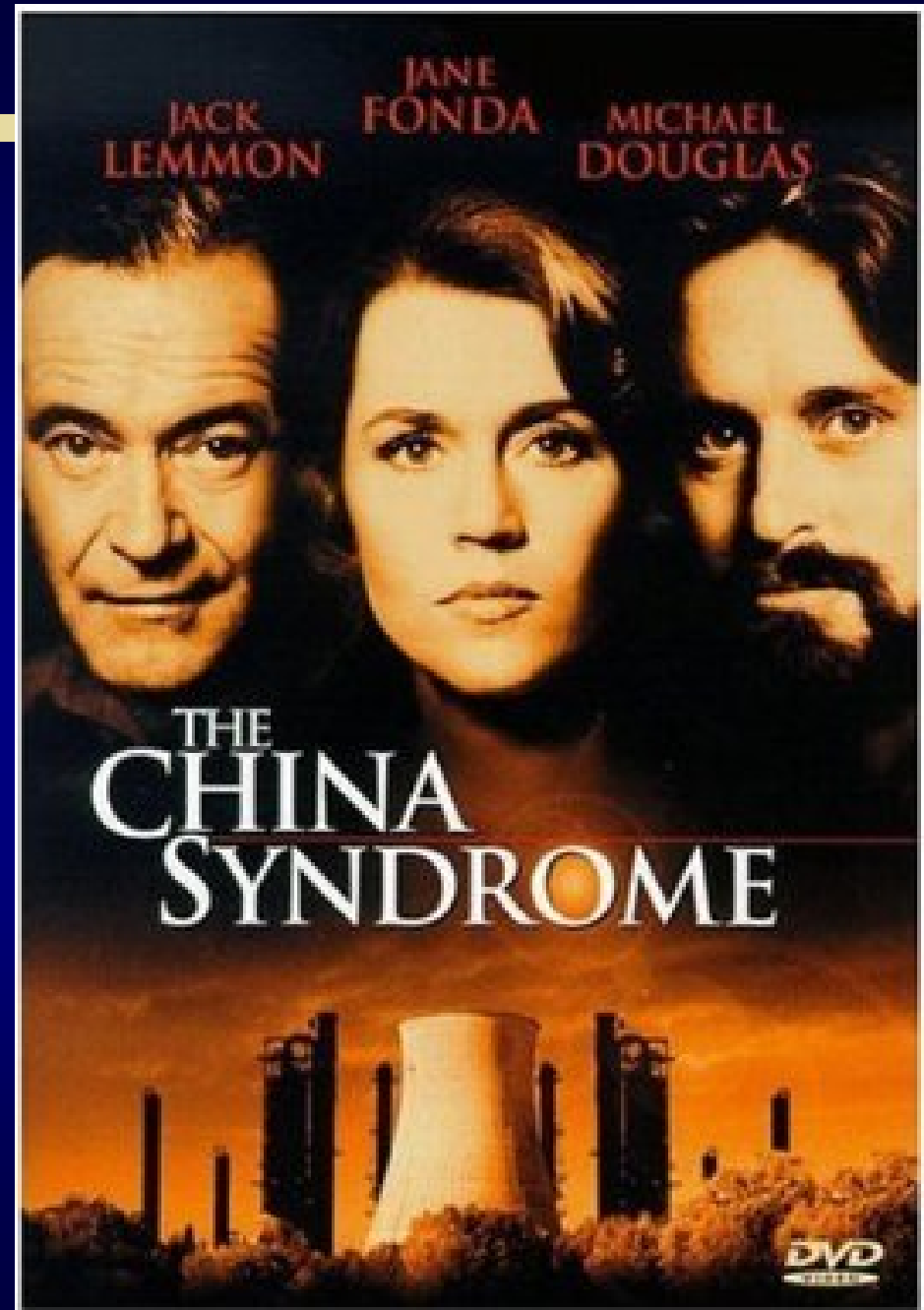
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In 1979, “The China Syndrome” is released.

12 days after its release, the real-world events at Three Mile Island occurred. 



NCRP Report 91: 5 rem stochastic limit, 50 rem nonstochastic, “Negligible Individual Risk Level” of 1 mrem per year

1987

1991

ICRP 60 recommends 10 rem in 5 years, not to exceed 5 rem in a year using BEIR IV, BEIR V, and revised UNSCEAR data; increases risk factor by 3 based on atomic bomb survivor study. NRC publishes revised Part 20

**DOE publishes
10 CFR 835**

1993

2005

**BEIR VII Report concludes
that current scientific
evidence is consistent with
LNT theory for development
of cancer in humans.**

**In a lifetime, 42 of 100 people
will be diagnosed with cancer.
If 100 people receive a dose of
0.1 Sv in a year, calculations in
BEIR VII suggest that there
would be one additional
cancer.**

**ORISE Cytogenetic
Biodosimetry Laboratory
reopens after being
closed for almost 20
years**

2007

2008

● Today

**ICRP 103 published
with revised
recommendations and
updated biological
models for internal
dosimetry calculations**

2007

**Average annual dose
to nuclear power plant
workers in the US is
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QUESTIONS?

**END OF
THE HISTORY OF
HEALTH PHYSICS**