II. Risk Coefficients

At the time the [Bikini?] book was prepared no agency of the U.S. Government had accepted the risk coefficients in BEIR. Thus we were constrained to use risk coefficients from BEIR-I. While not included in the printed book, risk estimates on BEIR-III were calculated for comparison purposes. The following gives the origin of the risk coefficients used.

A. BEIR-I
1. Cancer (Tables 3-3 and 3-4)

409862

	Cancer Deaths/year in U.S. from 0.1 rem/year (pop=197,863,000)		Derived Cancer Deaths/10⁶ person re	
	Absolute	Relative	Absolute	Relative
Leukemia	516	738	26	37
Other Cancers				
30 year elevated risk	1,210	2,436	61	123
lifetime elevated risk	1,485	8,340	75	421
Range	1,726-2,001	3,174-9,078	87-101	160-458

(Note: "Derived Cancer Deaths/10^6 person re" — heading appears cut off)

From the above the minimum estimate of cancer risk would be given by a risk coefficient of $87/10^6$ person re. and the maximum by $458/10^6$ person rem. Thus, these two risk coefficients were used to define a range of estimated cancer deaths.

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FOLDER Calculations

defects per year (3.6 million births/year):

or 3 times this amount at equilibrium. The

1800 cases represent an increase of 0.05% incidence

per year first generation & 0.25% at equilibrium

there would be
In addition, a few chromosomal defects
and recessive diseases and a few
congenital defects due to single gene
defects and chromosome aberrations

The Total incidence *at equilibrium* is 1100 to 27,000/year. *Then*
at equilibrium ~~0.75% at equilibrium~~ *the*
maximum would be 0.75% or 0.15% in the first generation).

These are equivalent to 0.15% per rem at equilibrium
0.03%/rem in the first generation.

b. Based on Overall ill health.

Overall ill health: 5% - 50% of ill
health is proportional to ᵛmutation
rate
the
Using 20% and doubling dose of 20 rem,
5 rem per generation → 5% increase
in ill health. *would eventually lead to a*

Thus ~~at equilibrium~~ *the rate of overall ill health*

is 1%/rem at equilibrium or 0.2%/rem in first

generation.

rem in first generation, ~~[struck through handwriting]~~

~~[struck through handwriting]~~

~~[struck through handwriting]~~

recognizing that it even probably very conservative

B. BEIR-III
1. Cancer (Table V-4)

Lifetime Risk of Cancer Death
$$(\text{deaths}/10^6/\text{rad})$$

Model	Single exposure to 10 rad		Continuous Exposure to 1 rad/yr	
	Absolute	Relative	Absolute	Relative
L-Q, $\overline{\text{LQ-L}}$	77	226	67	182
L-L, $\overline{\text{L-L}}$	167	501	158	430
Q-L, $\overline{\text{Q-L}}$	10	28	----	----

2. Birth Defects--pages 166-169
   (mean parental age = 30 years)

1 rem per generation (1 rem parental exposure) per 10^6 live
    offspring ⟶ 5 to 75 birth defects, this is 0.0005
    --0.0075%--First generation

Since th

given as   for the U.S population)

Spontaneous rate is *∧* 10.7%, *∧* ~~thus~~ 1 rem will increase the rate
    from 10.7% to 10.7005--10.7075%

In terms of percent increase of the spontaneous rate the 1 rem per generation since

$$0.\frac{.0005}{10.7} = 0.000047 = 0.0047\% \text{ increase and}$$

$$0.\frac{.0075}{10.7} = 0.0007 = 0.07\% \text{ increase}$$