

Aug 6, 1980 B

Bikini Book

410045

Cancer & Birth Defects Risk Calculations

R

For Enantak the following coefficients were used from BEIR I

Cancer: 2% inc./5rem or 0.0004% / mrem inc.

Birth Defects: 9% inc./5rem at equil.

1st year - 1% / 5rem or 0.0002% / mrem

For cancer the bone marrow dose was used

For birth defects the whole body dose was used.

For Bikini:

		Relations	
		Cancer	Birth Defects
BEIR I		0.0004% / mrem	0.0002% / mrem
BEIR III	linear linear quadratic	(0.00014% / mrem ? 0.00005% / mrem)	

Assume spontaneous incidence rates of

15% for cancer

10% for birth defects

BEIR III - 10.7% of all live births)

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W. S. ...

1 run/yr (15% Ca rate)

$$1.95 \times .15 = .2925, 15.2925$$

$$14.35 \times .15 = 2.1525, 17.1525$$

$$\underline{3 \text{ runs/yr for } 30 \text{ yr}} = \frac{90}{70} = 1.286 \text{ run/yr}$$

$$1.95 \times 1.286 = 2.51\% \times .15 = .38 + 15\% = \underline{15.38\%}$$

$$14.35 \times 1.286 = 18.45\% \times .15 = 2.77 + 15 = \underline{17.77}$$

$$\underline{0.6 \text{ runs/yr for } 30 \text{ yr}} = \frac{18}{70} = 0.257 \text{ run/yr}$$

$$1.95 \times 0.257 = .50\% \times .15 = .075 + 15 = \underline{15.075}$$

$$14.35 \times 0.257 = 3.69\% \times .15 = .55 + 15\% = \underline{15.55}$$

Emerg - 100%

30 year dose - 3000 man-rem

pop - 550

Total Man-rem = 1,650,000 man-rem = 1650 person-rem

Risk Coefficients	Relation	Absolutes
BEIR - I	$\sqrt{310/10^6}$ person-rem	95/10 ⁶ person-rem
BEIR - I (from BEIR II)	568	115
BEIR - III	182	67

Cancer Deaths

BEIR I	$\frac{310 \times 1650}{10^6} = \frac{511,500}{10^6} = 0.5$	$\frac{95 \times 1650}{10^6} = \frac{156,750}{10^6}$
	$\frac{160 \times 1650}{10^6} = \frac{264,000}{10^6} = 0.26$	0.16
	$\frac{458 \times 1650}{10^6} = \frac{755,700}{10^6} = 0.76$	

a. Band on 15%
Cancer incidence
(3 rem - 30%)

$$83 \times 0.004 \times 3 = 0.996$$

b. Band on 10%
Cancer incidence

$$55 \times 0.004 \times 3 = 0.66$$

BEIR I (from BEIR III)	$\frac{568 \times 1650}{10^6} = 0.937200$	$\frac{115 \times 1650}{10^6} = 0.189750$
BEIR III	$\frac{182 \times 1650}{10^6} = 0.300300$	$\frac{67 \times 1650}{10^6} = 0.110550$

for their life time

15.79%

17.15%

Cancer deaths in persons who
receive 3 cigs each year for
30 years

Risk increases from
national of 15% to
15.4%

Risk increases from
national of 15%
to 18%

Cancer deaths in persons who
receive 6 cigs each year
for 30 years

Risk increases from
national of 15% to
15.1%

Risk increases from
national of 15%
to 15.8%

REPOSITORY PNNL
COLLECTION Marshall Islands
BOX No. 5684
FOLDER Untitled

DOCUMENT DOES NOT CONTAIN ECI
Reviewed by J. Schmitt Date 4/30/97