

IONIZING RADIATION DECREASES HUMAN CANCER MORTALITY RATES

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XA9745598

ABSTRACT

Information from nine studies with exposed nuclear workers and military observers of atmospheric bomb explosions confirms the results from animal studies which showed that low doses of ionizing radiation are beneficial. The usual "healthy worker effect" was eliminated by using carefully selected control populations. The results from 13 million person-years show the cancer mortality rate of exposed persons is only 65.6% that of carefully selected unexposed controls. This overwhelming evidence makes it politically untenable and morally wrong to withhold public health benefits of low dose irradiation. Safe supplementation of ionizing radiation should become a public health service.

INTRODUCTION

Conservative radiation protection practice assumes a "linear no threshold" dose response to keep exposures to ionizing radiation "as low as reasonable achievable". Extensive compelling results from biology and epidemiology contradict the linear no threshold hypothesis [1-6].* High and low doses of ionizing radiation elicit opposite effects. Low doses stimulate physiologic functions in humans and experimental animals. The epidemiologic evidence reviewed here shows reduced total cancer mortality rates in exposed nuclear workers and other populations. The cumulative knowledge indicates exposures to the general population should be raised to a minimum yearly recommended allowance (MYRA) of about 1 cGy/y [2]. A public health evaluation should be undertaken to establish the bases and methods of providing radiation supplementaation as a public health service.

DATA REVIEW

Available data are summarized in Table 1. The first three studies show exposed workers in shipbuilding and energy producton have lower cancer death rates than controls in the same plants [7-9]. This result was confirmed in workers exposed in weapons plants [10-12]. Data from military observes of atmospheric atomic bomb blasts supports the same conclusion [13-15]. Seven of the studies were statistically significant.

* More information is available from a non-profit group:
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TABLE 1

CANCER MORTALITY RATES IN CONTROL AND EXPOSED PERSONNEL

REF ^a	YR ^b	mSv ^c	CONTROL/EXPOSED		% ^f	p<	PERSON YEARS
			PERSONS ^d	DEAD ^e			
7	34	27	33.4/28.5	13.4/9.8	73.1	0.001	1,592,000
8	20	7	21/4	22.0/2.0	9.1	0.01	500,000
9	29	20	4.7/3.3	23.7/20.3	85.7	0.01	112,000
10	33	90	58.9/36.3	9.9/2.8	28.2	0.001	3,237,000
11	38	66	20.6/15.3	34.8/20.8	59.8	0.001	2,132,000
12	47	25	11.4/2.9	20.5/17.7	86.3	0.01	457,000
13	33	4	11.1/21.0	26.5/21.0	79.2	0.001	1,479,000
14	28	12	1.9/1.0	38.1/33.4	87.7	NS	74,000
15	46	6	35.0/38.7	68.6/67.8	98.8	NS	3,500,000
AVERAGE & TOTAL					65.6		13,085,000

a. Reference. b. Years of observation. c. Estimated lifetime dose per exposed person (1 mSv = 0.1 Rem). d. In thousands. e. Number dead per 1,000 workers. f. Exposed/control X 100.

The above results are supported by information from a variety of exposed populations. Although exposed to 2-6 Gy from a rain of fallout for four hours from a hydrogen bomb explosion in 1954 at Bikini Island, none of the 23 Japanese fishermen died from cancer within 25 years [16]. Of the 10,000 Ural Mountain villagers evacuated following the 1957 nuclear waste explosion, those exposed to about 12 cSv had only 61% the cancer death rate of controls in the nearby area [17]. None of the workers at the Chernobyl explosion who received less than 2 Gy died with cancer within 10 years [18]. Increased leukemia has not been found in the exposed population within these 10 years. Finally, eight "terminally ill" patients lived 5-44 years after injection of plutonium; none died from cancer [19].

DISCUSSION

Low dose irradiation is a negative risk! Overwhelming evidence shows that low doses of ionizing radiation reduce premature cancer mortality 34%. The principle mechanism appears to be increased immune competence [2-6]. Statistically significant data negate the linear no threshold hypothesis. No deaths are attributed to whole body exposure to low dose irradiation. Exposure limits for both workers and the general population should be raised. Safe radiation supplementation should be a public health service.

Two examples demonstrate the urgent need for safe radiation supplementation. The results from 13 million person-years (Table 1) indicate that safe supplementation of the 61 million white male workers in the USA would prevent 75,000 premature cancer

deaths each year. When extrapolated to the 500,000 cancer deaths in the USA annually, low dose irradiation would prevent 150,000 premature cancer deaths each year. Obviously, present regulations and constraints on public health applications are politically irresponsible and morally abhorrent.

A minimum yearly recommended allowance (MYRA) of 1 cGy/y should be considered for the general population. This MYRA is about four times the average background in the United States. Much of the radiation received by workers (Table 1) would be dissipated within one year. Populations throughout the world live with ≥ 1 cGy/y: Kerala (India), Espirito, Guarapari, Meaip, Gerais, Araxi (Brazil) and Ramasar (Iran) [2]. The threshold for ionizing radiation was estimated to be about 1000 cGy/y [2]. This provides a substantial safety factor.

The evidence is strong enough to over-ride the moral indiscretions of governments which offer no opportunity to decrease cancer mortality rates with low dose irradiation.

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