

Vitamin D food fortification in European countries:

The underused potential to prevent cancer deaths

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GERMAN
CANCER RESEARCH CENTER
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Research for a Life without Cancer

Background & Aim

- Meta-analyses of randomized controlled trials have shown that vitamin D supplementation reduces cancer mortality by 13%.
- Vitamin D fortification of foods may increase vitamin D levels in a similar manner as vitamin D supplementation and could achieve similar reductions in cancer mortality.
- Only a minority of European countries already implemented widespread fortification of foods with vitamin D.
- We estimated the reduction in cancer mortality presumably already achieved by current fortification policies in 2017 and the potential for further reductions if all countries had effective fortification

Methods

- Status of current vitamin D food fortification policies in 34 European countries obtained from literature search, publicly available information, and health authorities
- Cancer death statistics and life expectancies from Globocan and Eurostat
- Effects of supplementation and fortification on serum 25(OH)D levels from published literature
- Estimation of cancer deaths already achieved with current policies and potentially further achievable preventable deaths
- Estimation of potentially preventable years of life lost

Numbers of cancer deaths in 2017 by age group and sex in Europe and in the European Union according to Eurostat.

Age	Men	Women	Total
Europe			
50-54	26,677	23,432	58,006
55-59	58,103	40,518	95,977
60-64	88,045	55,865	143,006
65-69	115,234	72,338	186,114
70-74	118,721	77,664	201,641
75-79	132,024	93,660	223,778
80-84	121,166	97,664	218,687
85-89	85,163	83,154	169,457
90-94	34,177	45,080	80,262
≥95	6,720	12,499	21,061
Sum	791,543	605,299	1,397,989
European Union (excluding United Kingdom)			
50-54	24,007	20,514	45,547
55-59	46,329	32,252	78,581
60-64	69,990	44,758	114,748
65-69	91,351	57,168	148,519
70-74	93,904	60,802	154,706
75-79	106,756	75,058	181,814
80-84	97,488	79,403	176,891
85-89	69,110	68,238	137,348
90-94	27,022	37,229	64,251
≥95	5,191	10,079	15,270
Sum	631,889	485,786	1,117,675

Estimates of currently prevented and further preventable cancer deaths and of preventable years of life lost in Europe and in the European Union in the population aged 50 years and older in 2017

Country	Fortification policy	Annual cancer deaths baseline	Probably currently prevented cancer deaths	Further potentially preventable cancer deaths	Preventable YLL
European Union					
Austria	--	19,663	0	2,163	20,579
Belgium	-	25,641	523	2,355	21,259
Bulgaria	--	16,216	0	1,784	12,750
Croatia	-	13,231	270	1,215	9,853
Cyprus	--	1,345	0	148	1,557
Czech Republic	--	26,290	0	2,892	24,980
Denmark	-	15,139	309	1,390	11,884
Finland	++	12,205	1,207	268	2,409
France	-	156,972	3,204	14,416	141,958
Germany	--	220,462	0	24,251	208,692
Greece	--	28,664	0	3,153	27,468
Hungary	--	31,206	0	3,433	28,145
Italy	--	164,340	0	18,077	164,262
The Netherlands	-	43,323	884	3,979	37,933
Poland	--	95,266	0	10,479	91,314
Portugal	-	26,039	531	2,391	22,367
Romania	--	47,787	0	5,257	41,440
Slovakia	--	13,067	0	1,437	11,821
Spain	-	104,179	2,126	9,567	98,019
Sweden	+	22,211	1,293	1,293	10,670
Non-EU countries					
Norway	+	10,516	612	612	5,604
Serbia	--	20,387	0	2,243	17,828
Switzerland	--	16,915	0	1,861	18,533
Turkey	--	71,658	0	7,882	80,866
United Kingdom	++	161,025	15,926	3,539	29,652
Europe ¹ , Main	NA	1,397,898	27,353	129,433	1,166,303
Weaker effect (-10%)		-	Preventable: 116,490		1,049,673
EU ² , Main	NA	1,116,916	10,782	113,263	1,013,513
Weaker effect (-10%)		-	Preventable: 101,937		912,162

YLL=years of life lost. *Only shown for countries with >10,000 cancer deaths in 2017

++: mandatory fortification with adequate amounts covering adequate range of products; +: wide-spread voluntary fortification but with insufficient amounts or adequate mandatory fortification but with too few products; o: insufficient mandatory fortification plus some voluntary fortification, -: no mandatory fortification but commonly some voluntary fortification of foods; --: no mandatory fortification and in practice also almost no voluntary fortification of foods.

Discussion

- ~27,000 cancer deaths prevented by established fortification policies in 2017; potential to prevent an additional 129,000 cancer deaths and >1 million years of life lost annually by implementing vitamin D fortification to the optimal degree in all European countries
- Foods suitable for fortification: range of widely consumed foods, e.g. milk, yoghurt, cheese, bread, orange juice, cereals, fat spreads
- Hypervitaminosis D is only expected with additional supplementation, but surveillance is recommended
- Further positive health effects of adequate vitamin D status: lower risk of fall and fractures (with calcium), increased muscle strength, fewer and less severe migraine, etc.

Conclusions:

- More widespread vitamin D food fortification policies in European countries might make a major contribution to lowering the burden of cancer deaths in Europe (by approximately 9%).
- Additional positive health effects can be expected from improved vitamin D status resulting from fortification.