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Report on population plasma unmetabolised folic acid concentrations before mandatory folic acid fortification in the Republic of Ireland

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It had been expected that mandatory folic acid fortification of most breads would be fully implemented in Ireland by July 2008, but the process is still in the preparatory stage. If mandatory fortification proceeds it is likely to lead to the appearance of the unmetabolised vitamin in the circulation^(1,2), which may have safety implications, principally masking of pernicious anaemia in the elderly population^(3,4) but also the acceleration of colo-rectal cancer has now become a concern⁽⁵⁾. The aim of the present study was to examine the levels of circulatory unmetabolised folic acid in Irish adults and newborn infants pre-mandatory folic acid fortification.

Population 1 comprised adults attending for routine blood donation sessions conducted by the Irish Blood Transfusion Service. Whole-blood samples were collected from blood donors (*n* 50; representing the general population; age range 20–60 years). Population 2 comprised mothers and infants in Coombe Laying-In Woman's Hospital, Dublin. Whole-blood samples were collected by venepuncture from mothers (*n* 20; age range 20–40 years) and from their infants' umbilical cords (*n* 20) immediately after Caesarian section. All women had been fasted for at least 8 h before surgery. A questionnaire on habitual and recent dietary intakes of folic acid was administered by an interviewer to all adult subjects. The data collection period was February–April 2006. Serum samples were analysed for total plasma folate, circulatory unmetabolised folic acid and erythrocyte folate.

Table 1. Mean erythrocyte folate, plasma folate and unmetabolised folic acid concentrations in the population 2 (fasted group) comprising mothers (*n* 20) and cord-blood (*n* 20)

Mothers	Erythrocyte folate (µg/l)	Plasma total folate (µg/l)	Plasma unmetabolised folic acid (µg/l)	Average FA intake (µg/d)	Cord-sample	Plasma unmetabolised folic acid (µg/l)
Mean	636	13.2	0.39	404	Mean	0.27
sd	841	8.64	0.33	311	sd	0.15
Median	425	9.46	0.29	298	Median	0.28
Minimum	123	2.90	0.00	82.0	Minimum	0.00
Maximum	4100	31.0	1.34	1321	Maximum	0.60

Table 2. Mean erythrocyte folate, plasma folate and unmetabolised folic acid concentrations in population 1 (unfasted group) comprising blood donors (*n* 50)

	Erythrocyte folate (µg/l)	Plasma total folate (µg/l)	Plasma unmetabolised folic acid (µg/l)	Average habitual FA intake (µg/d)	FA intake in past 24 h (µg/l)
Mean	457	14.1	0.72	197	123
sd	154	7.62	0.90	209	192
Median	474	13.2	0.55	124	68.0
Minimum	157	2.27	0.08	0.00	0.00
Maximum	785	32.1	6.10	962	1150

Circulatory unmetabolised folic acid is currently detectable at low levels in the majority of the population, even in babies *in utero*. Mandatory folic acid fortification will undoubtedly augment these levels. The long-term effects of this increase are unknown, but the potentially-harmful effects provide justification for on-going surveillance of the levels post fortification, if it goes ahead.

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