The Case for Folic Acid Fortification

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Spina bifida is a neural tube defect that is one of the most common severe birth defects in the world. The main cause is a lack of folate vitamin in the diet, and in 1991, the UK's Medical Research Council halted a trial of folic acid supplementation early because it was obvious that the supplement was preventing a large number of cases. At the time, the trial's authors concluded: "public health measures should be taken to ensure that the diet of all women who may bear children contains an adequate amount of folic acid."

The United states was relatively quick to act, mandating flour be fortified with folic acid in 1998, followed by around 80 countries worldwide. Countries with mandatory fortification have seen neural tube defects drop by between one third and one half. But not in the European Union nor, until recently, the United Kingdom. Finally, the UK has put forward proposals to fortify white flour, but many doctors say they could do much more. Europe is still to act.

I wanted to understand what was happening, and why, starting with what folic acid is.

Joan: Well, it's a water soluble B vitamin that has a great property — that it helps prevent neural tube defects occurring during pregnancy.

Jeremy: Joan Morris is professor of medical statistics at Saint George's, University of London, and an expert on what causes congenital anomalies. One of the most common of those anomalies is neural tube defects. The term groups several problems of development which may affect the brain and spinal cord. The best known is probably spina bifida, in which the spinal cord is exposed and which is associated with severe physical disabilities. Now, the neural tube is a structure that develops in the very early embryo, around two to four weeks of age. A streak of cells folds up to form a

tube, which will eventually turn into the brain and spinal cord. But if the tube doesn't close up properly, the result is a neural tube defect.

Lots of factors can influence the growth of the neural tube, but one of the most important is folate, or vitamin B9. A large trial funded by the UK's Medical Research Council was stopped early in 1991 when it became absolutely clear that a supplement of folic acid, which is converted to folate in the body, can prevent a large proportion of neural tube defects. There's just one problem.

Joan: The minute you know you're pregnant, it's too late. The important thing is to start taking it before you become pregnant. So to raise the levels of it in your blood before you're pregnant.

Jeremy: And that's why these days many women are advised to take folic acid supplements if they're planning to get pregnant. But there's just one problem with that, too.

Helena: For folic acid specifically in the US, you're mainly told take a prenatal vitamin, right? And you are told you should take it before you get pregnant. But a lot of pregnancies, maybe even most pregnancies, probably at least half are unplanned in the US.

Jeremy: And just about everywhere else. That was Helena Bottemiller Evich, a journalist who covers food issues in her newsletter Food Fix.

The word folate comes from foliage, leafy greens, and a lot of us probably don't get enough folate in the diet. That's especially important for women with an unplanned pregnancy. Joan Morris.

Joan: But it's not only the unplanned pregnancies, but it's also even reaching women who are planning a pregnancy. A lot of people feel like, you know, it's tempting fate, maybe. Or they don't believe they'll get pregnant quite so quickly. I mean, there's lots of other reasons why women don't take folic acid before they get pregnant, but really, the way forward is to put it in a common foodstuff so that women are automatically at a high level when they get pregnant.

Jeremy: And that's what they did in the US. Although it took a bit of a fight, by 1998, just seven years after the evidence came in, the Food and Drug Administration made folic acid fortification of white flour mandatory — and with good effect.

Helena: According to CDC [Centers for Disease Control] the overall rate for neural tube defects has dropped by about 35%. They estimate that 1300 neural tube defects cases do not happen every year because of this policy.

Jeremy: A lot of other countries were quite quick to follow America's lead on folic acid fortification, and at the moment something like 80 countries worldwide fortify food with folic acid. And countries with mandatory fortification have seen drops of between a third and a half of spina bifida babies. Right now, though, the UK and Europe are not doing fortification with folic acid, with predictable impacts on neural tube defects.

Joan: Well, we have quite a high rate in the UK compared to the rest of Europe. In the UK, there's probably between 800 to 900 pregnancies every year that will be affected with it. Yeah, pretty high actually, compared to the world.

Jeremy: The UK is finally considering folic acid fortification, which is why I'm making this episode. But what took them so long? For answers, I turned to Mun-Keat Looi, international features editor at the British Medical Journal. So why the delay?

Mun-Keat: I mean, it's hard to say. I'm not sure there is a definitive reasoning other than the usual confluence of factors of bureaucracy and the politics of government. I think also the kind of caution there is sometimes with taking that first step. I mean, one of the reasons why I think the recent studies have been able to push a bit further and the recommendations are thinking now to push a bit further is because there are so many other countries. There's something like 80 other countries in the world that now do folic acid supplementation, uh, fortification, sorry. And as a result of that, I think they are more confident in some ways of doing it rather than being the first to go for it, because you at the end of the day, you are putting things into people's food without their choice. And certainly in the West there is a lot more caution around, and we've seen it around adding fluoride to water, for example. People are a lot more cautious about doing anything that's Nanny State or Big Brother.

Jeremy: It's funny to think of the US as a nanny state, but never mind. In any case, about 30 years after the first compelling evidence came to light, the UK announced a consultation on mandatory folic acid fortification and the result was a recommendation that white

flour be fortified with 250 micrograms per 100g of flour. That's lower than some countries, higher than others. We're still waiting for a final decision on the level of fortification, but there are a few reasons why not everyone is happy. For a start, the level of fortification may be too low. Joan Morris.

Joan: There's a lot of evidence out there that the more you fortify, the greater the reductions will be. Even the government that's proposed it has accepted that it will prevent between 12 and 20% of all pregnancies. So that's not all pregnancies. And so we're just saying it's too low a level. It's great that it's something. But we could put more in safely and prevent more babies being affected.

Jeremy: Even Sir Nicholas Wald, lead author on the original 1991 study, has argued that increasing fortification to one milligram — 1000 micrograms, four times higher — would prevent many more cases with no risk. But then there's the question of which foods are going to be fortified. At the moment, it's only white wheat flour, which ignores women who don't eat white bread in the UK. Neural tube defects are one and a half times more common among women of Indian descent, and two and a half times more common for Bangladeshi mothers.

Mun-Keat: That was one of the most interesting things I found in my reporting, the way that the doctors told me about it, exacerbating inequalities. And inequalities, obviously, something that's that's a very big issue. They acknowledged that actually the current recommendation only affects bread and only white bread at that. Quite a lot of neural tube defects take place in minority communities of whom their main carbohydrate source is not bread, certainly not white bread. So I think it is a a major thing that's not been considered even in this current, this new recommendation.

Jeremy: Again. Maybe the UK could look to the US where they fortify wheat, rice and maize.

Helena: Yeah. So it's mostly refined grains. So you'll see it most often listed next to a product that contains an enriched flour that has thiamine, niacin, iron, riboflavin. And then it will also have folic acid. So it's mostly refined grains and also rice. And then we more recently started also fortifying tortillas to really target the Latino population in the US and make sure that we're not leaving any subpopulation behind.

Jeremy: So higher levels in more foods. But there's another constituency that wants to avoid mandatory fortification and for very good reasons.

Jonathan: My name is Jonathan Cook. I am the miller of Foster's Mill, which is in Swaffham Prior, which is close to Cambridge in the UK. I have been involved with the traditional Cornmillers Guild since 1998, and I'm currently the chairman of the Guild.

Jeremy: The Cornmillers Guild represents small mills that use exclusively wind or water power to drive their millstones.

Jonathan: We cannot comment on whether it's the right or the wrong thing to fortify flour. That is not our area of competence. As traditional millers, we have a specific concern, which is about our capacity and ability to be able to add very small scale micronutrients such as this into our production system.

As a miller, to be able to fortify flour, we are looking to dose the flour with very small amounts of micronutrients such as folic acid. But the simple reality is that to do that, you have to have a constant flow of flour and be literally regularly dosing that flour with very small amounts, which then is mixed in in the latter stages of the process, so that there is consistency. That has been an activity which traditional mills have always struggled with. Because if you're milling using horizontal mill stones, especially if you're using wind power, the speed at which those stones are turning — therefore, the volume of flour produced every second — constantly changes. So anything which tries to dose in a uniform way is going to present a fundamental challenge. Require equipment which would then start to change the look and the feel, if indeed there is actually space in the mill in the first place. A mill like mine, which is a small tower mill, there ain't much space to can swing a proverbial cat. So as a result this is not something which can be achieved in in any way, shape or form.

Jeremy: Jonathan Cook and the Cornmillers Guild have been campaigning for an exemption from mandatory fortification since the idea was first mooted by the UK government, and they've got their wish. Any mill that produces less than 500 tonnes of white flour each year will not have to fortify at all, which may also be good news for the farm and bakery mills that are springing up. But what about the health risk to their customers?

Jonathan: We are minnows and we've never compared, never tried to suggest anything otherwise when compared to the production of our roller milling colleagues in the UK. So in 2018, our guild's total annual production was estimated at no more than 2000 tonnes. At that point, the UK was producing around 4 million tonnes of flour. Our production was 0.049% of the total UK production, if I got my maths right. We are therefore insignificant in terms of the nation's health. However, we produce a product which is sought after. We have a loyal following which is enabling a significant number of historic buildings to remain in good condition and doing the job for which they were originally built.

Jeremy: So that's a win for Jonathan Cook and the small millers. And I may be exposing my prejudices, but I feel that people who get their flour from small, traditional millers are probably eating a diet that's pretty rich in folate. I certainly hope so.

So where does that leave us? The UK is now considering mandatory folic acid fortification. A lot of people would prefer the level of fortification to be much higher, and a lot of people would like other foods besides white wheat flour to be fortified. But it is a start. So why has it taken so long? And where's Europe in all this?

Mun-Keat: I think it's a combination of inertia and also just precaution. People don't want to upset the apple cart. People don't want to do anything that may cause harm, even on the off chance necessarily, and certainly in the current kind of environment. But I think it's partly that it just hasn't really been a high enough priority, perhaps.

Joan: Part of the reason that this is a sort of not at people's forefront is that basically women have terminations. Now that you have prenatal diagnosis, you see there's something wrong with the foetus and you have a termination. I think over 80% are terminations.

Jeremy: Out of sight, out of mind? That seems harsh, but possibly fair.

I did try and speak to some European experts about folic acid, but nobody wanted to go on the record. One person said that there was "limited political interest toward birth defects, and their primary prevention". Now certainly there does seem to be an excess of caution. I was told about potential harmful effects, but those have

already been conclusively disproved. And worries about excess folic acid masking other problems have also been discounted. There is, of course, support for healthy nutrition and supplements before conception, but we know those don't work too well. One expert said he had "nothing against fortification in principle, but a proper risk to benefit assessment must be performed by the European Food Safety Agency in order to support fortification in the EU". And that suggests to me that the EU thinks it has nothing to learn from the United States and all the other countries that have successfully mandated folic acid fortification. The UK hasn't yet made a final decision. Before they do, Joan Morris would like them to reconsider the amount.

Joan: I would certainly at least double the level, if not more, I think. I think we need to be a bit cautious, but I would certainly double it and and monitor it because there's no evidence of harm.

Jeremy: And Mun-Keat Looi of the British Medical Journal says most doctors agree.

Mun-Keat: The doctors at the moment are calling for actually the government to go a bit further. You know, if they're going to take this step of increasing the amount of fortification in wheat, why not go to one milligram rather than 0.25? Why not add a little bit more into wheat as well as maize as well as rice in order to prevent further further births with neural tube defects? And if you're going to take the one step, why not take a slightly larger step, especially one that all the evidence seems to say is safe.

Weighing up the caution, the risk and the political appetite with the possibility of preventing even 200 more births with neural tube defect, preventing 200 more births would be 200 lives that were possibly much higher quality of life than before. And certainly prevent someone having to make the terrible decision of having to terminate or not their pregnancy.

Jeremy: Obviously any folic acid fortification is better than none. But I asked Joan Morris why she thought it had taken so long for the UK to get on board.

Joan: Well, I ... obviously lots of issues. I think America went straight out and started fortifying in 1988, which is fantastic. And a lot of the world has followed, slowly. But the big exception is Europe. I think that. ... I mean, you know, I don't know why we haven't decided to do

it, but Europe is the only continent that's not fortifying. And I think a lot of the European countries are really quite interested in — after Brexit — the fact that we're now starting to fortify flour. Maybe it's one of the positive positive results of Brexit, but um ...

Yeah, I think the belief was that women who are about to become pregnant can take folic acid supplements, but it doesn't work. And I think the other issue that perhaps would be important to say is that even if we do fortify flour, or when we fortify flour, it's still really important for women planning to be pregnant, to become pregnant, to take the supplements. It doesn't mean it's an alternative to supplementation. It's an addition to supplementation. And obviously folic acid fortification is really one of our strongest public health measures that we can take.