



# Folic Acid Modelling

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# Food Standards Scotland

**Established by the Food (Scotland) Act 2015, as the public food body for Scotland**

We are a non-ministerial office within the Scottish Administration

## **Scottish Ministerial Request to FSS, March 2016:**

To develop an implementation plan for fortification of flour/bread with folic acid in Scotland:

- based on up-to-date science and evidence
- taking account of the burden on industry

# Science and evidence-based approach

**Risk  
assessment**



**FSS request to  
SACN for advice**

**Risk  
management**



**FSS commissioned  
dietary modelling**

# Risk assessment: SACN



## Update on folic acid

July 2017

# Updated advice from SACN

- Fortification of flour with folic acid should go ahead
- Should only be introduced alongside restrictions on voluntary fortification (e.g. breakfast cereals, spreads) and clear guidance on the use of supplements
- This is to ensure no increase in people with intakes above the **Upper Level** of **1 mg/day (1000 ug)**.

**sacn**

Scientific Advisory Committee on Nutrition

**Update on folic acid**

July 2017

## 1000 ug/day (1 mg) upper level (UL)

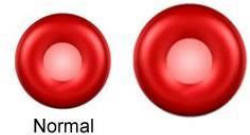
- Previously established by UK, US and EU regulatory authorities
- Concern that high doses of folic acid may mask B<sub>12</sub> deficiency in older people
- Folic acid UL currently under review by the Committee on Toxicology (COT)

# Masking B<sub>12</sub> deficiency in older people

- Lack of either vitamin B<sub>12</sub> or folic acid causes **macrocytic anaemia**
- High doses of folic acid alleviates both folate and B<sub>12</sub> anaemia- blood cells restored to normal

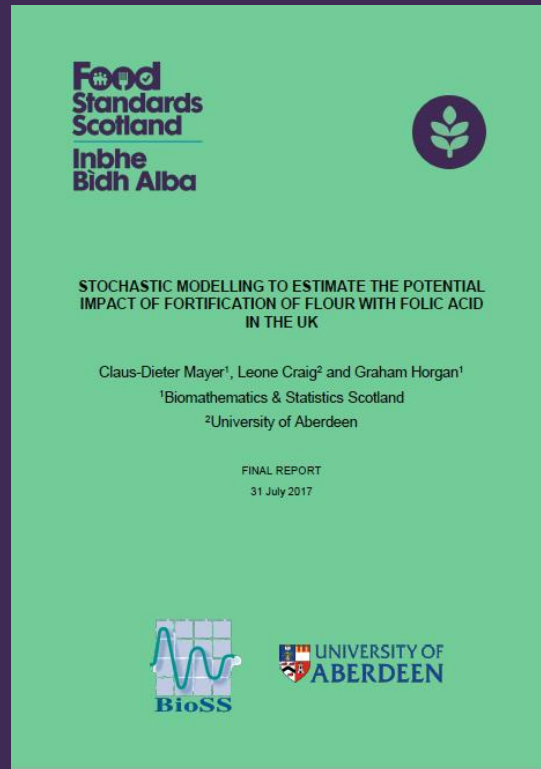
## However:

- Folic acid does not treat the other rare but more serious aspects of B<sub>12</sub> deficiency such as neurological changes
- Masking diagnosis may lead to irreversible neurological damage



Normal

# Risk management: UK dietary modelling



[https://www.foodstandards.gov.scot/downloads/STOCHASTIC MODELLING TO ESTIMATE THE POTENTIAL IMPACT OF FORTIFICATION OF FLOUR WITH FOLIC ACID IN THE UK - FINAL REPORT - July 31 2017.pdf](https://www.foodstandards.gov.scot/downloads/STOCHASTIC%20MODELLING%20TO%20ESTIMATE%20THE%20POTENTIAL%20IMPACT%20OF%20FORTIFICATION%20OF%20FLOUR%20WITH%20FOLIC%20ACID%20IN%20THE%20UK%20-%20FINAL%20REPORT%20-%20July%2031%202017.pdf)



# Why choose mandatory fortification of wheat flour?

Only around 30% of women take folic acid **before** pregnancy



Most women eat bread

# Why choose mandatory fortification of wheat flour?

- Consumed regularly (mostly in bread) and in similar quantities across the population
- Helps increase intakes in those who currently have the lowest intakes
- Non-wholemeal wheat flour milled in the UK is already required to be fortified with calcium, iron, thiamine and niacin
- Wheat flour as vehicle for fortification has been used successfully elsewhere



# Identifying the best options for folic acid fortification

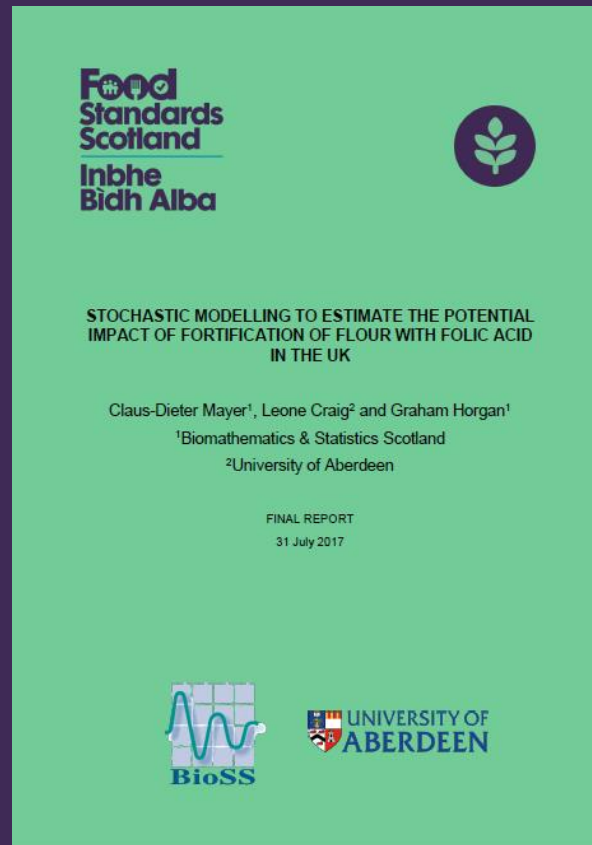
## Many dietary scenarios explored:

- All (non wholemeal) flour or just bread flour?
- How much folic acid to add?
- Fortification with and without limits on voluntary fortification?

## Impact on UK population:

- How many Neural Tube Defects would be prevented?
- How many people would consume more than UL?

# Examples of scenarios adding folic acid to all non-wholemeal flour



## Fortification of all flour assuming no change to voluntary fortification: impact on whole population

Fortification level (µg/100g)	Mean folic acid (ug/day)	% with intakes above UL
0 (status quo)	79	0.42
100	118	0.48
200	157	0.55
250	176	0.64
300	196	0.83
350	215	1.11
450	254	1.80

# Fortification of flour plus reductions in folic acid in breakfast cereals, spreads and supplements: impact on whole population

Fortification level (µg/100g)	Mean folic acid (ug/day)	% with intakes above UL
0 (status quo)	79	0.42
100	67	0.03
200	106	0.06
250	125	0.07
300	145	0.10
350	164	0.20
450	203	0.54

## Reductions in NTD affected pregnancies with no increase over UL

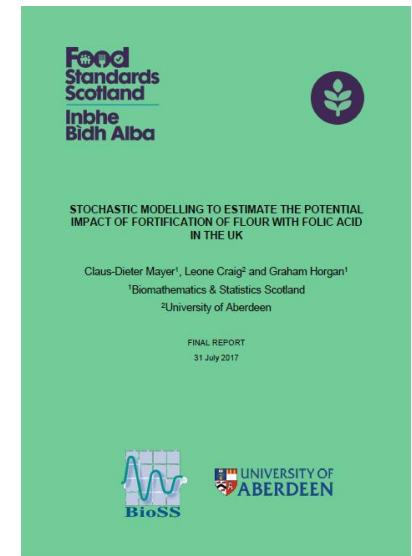
Scenario	Level in flour	Increase in folic acid (ug/day)	UK NTDs prevented
Cap on breakfast cereals, spreads and supplements	350 ug	85 ug	186-270 (16-23% reduction)
Cap on breakfast cereals and spreads only	200 ug	43 ug	103-154 (9-13% reduction)
Cap on supplements only	300 ug	101 ug	205-297 (17-25% reduction)

# Summary results of the dietary modelling

There are a number of scenarios which both reduce:

- (a) the number of people with low intakes of folic acid, and
- (b) the number of people with intakes above the UL

An average **increase** in folic acid intake of around **100ug/day** could **reduce NTD affected pregnancies by 25%**





# Conclusions

- Mandatory fortification of flour with folic acid should go ahead
- The up-to-date FSS dietary modelling provides a wide range of scenarios including those which are estimated to reduce NTDs by up to 25%, without exceeding the UL
- This reduction in NTD affected pregnancies appears broadly in line with reductions achieved in the USA following mandatory folic acid fortification.

