Consumption of fruits and vegetables in the UK and the potential impact of Brexit on nutrition

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Outline

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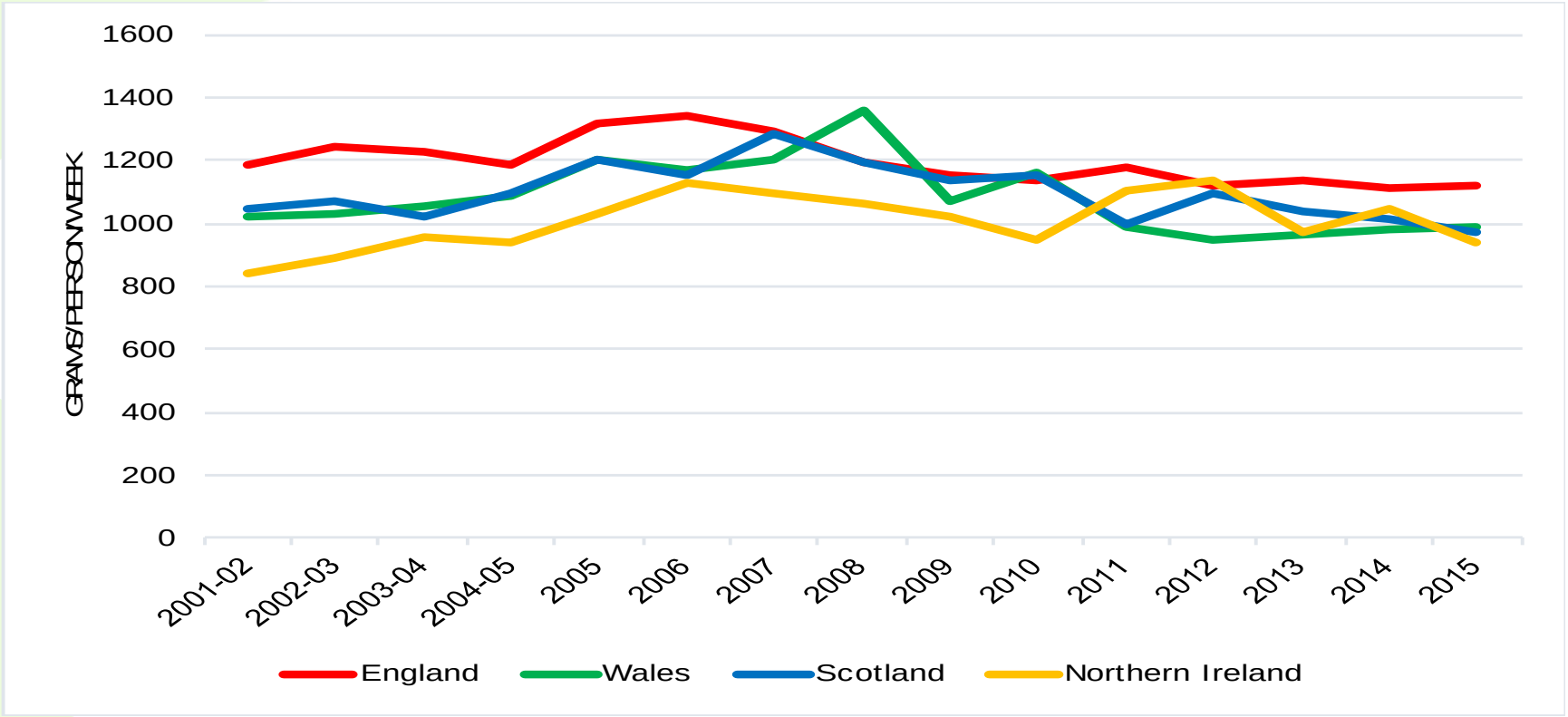
Background and Motivation

- June 2016 – UK voted to leave the EU
  - Generated some discussion around UK food
  - Trade, labour and currency
  - Little focus on nutrition

- Potential effects of ‘trading down’
  - Cheaper can result in lower quality
  - 2017: 26% of adults classified obese in England, 26% of adults consumed 5 or more portions of fruit and vegetables per day
  - Estimated cost of overweight and obesity on NHS = £6 billion per year (Scarborough *et al.,* 2011; Butland, 2007)

Consumption of Fruits in the UK

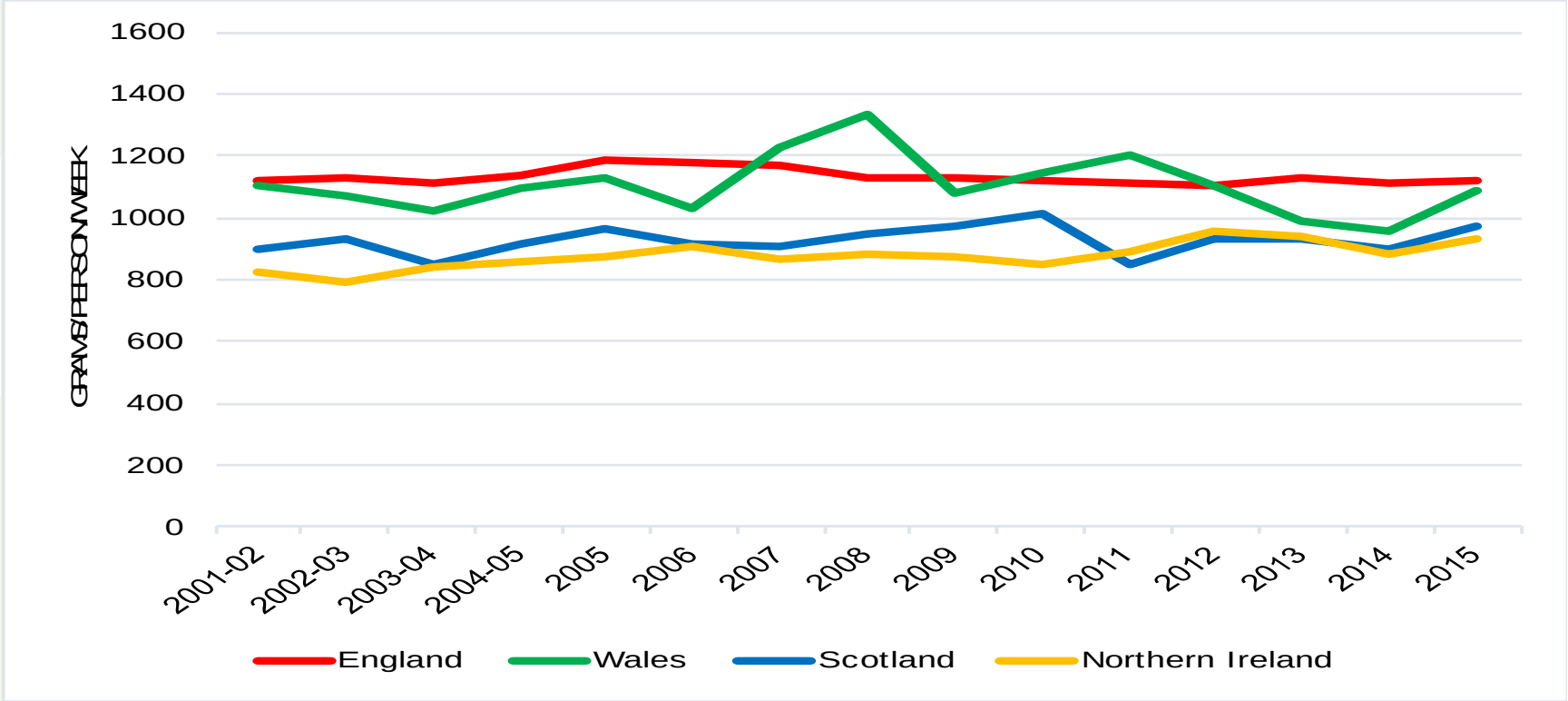
Average weekly per capita fruit (fresh and processed) purchased by UK country



Source: Defra (2017b)

Consumption of Vegetables in the UK

Average weekly per capita vegetables (fresh and processed) purchased by UK country



Source: Defra (2017b)

Questions

- What impact could Brexit have on prices for fruit, vegetables and potatoes in the UK?
  - Short term vs. long term
  - Impact on currency i.e. devaluation of sterling
  - Potential changes to movement of trade and labour

- What impact could change in price have on consumption of fruits and vegetables and nutrition in the UK?
  - Influence of household income on consumption
  - Potential changes to nutrient intake

Brexit Scenarios

- **Scenario 1: Devaluation of Sterling**
  - 2.9 per cent rise in price
  - (Johnson, Levell & Waters, 2016)
- **Scenario 2: Changes to Trade**
  - 8 per rise in price
  - attributed to possible changes in trade practices – defaulting to WTO tariffs (Smit, van Merrienboer and de Jong, 2017)
- **Scenario 3: Access to Labour**
  - 37 per cent rise in price (?)
  - Only applied to those foods domestically produced

Data

The analysis was based on:

1. Information from “Family Food” survey for each of the four nations comprising the UK (weekly per capita expenditures and purchases)
2. Retail price indices for the studied groups (base 1987=100)
3. Nutritional information per food category was from disaggregated data underpinning “Family Food” that can be found in the UK Data Archive as part of the Living Costs and Food Surveys

- Additional information from Agriculture and Horticulture Development Board (AHDB)

Data (cont.)

- Estimated nutrient intakes are calculated using nutrient composition data supplied by Public Health England (PHE)
- The majority of the data are from PHE's nutrient analysis programme, supplemented by values from manufacturers and retailers
- The five nutrients assessed were energy (kcal), vitamin C, vitamin A (retinol equivalent), magnesium (Mg) and iron (Fe)

Methods

The method consisted in:

1. Using the annual data from Family Food and a multistage demand system (6 stages) unconditional elasticities for the 260 products considered in family food were estimated
2. The exercise of computing the elasticities was carried out by the UK and each one of the UK countries
3. In order to ensure that the initial would be able to reproduce the 2015 data. The estimated elasticities were used to calibrate a demand system using Beghin et al. (2004)
4. The quantities purchased were transformed to nutrients using the conversion factors from Family Food
5. The calibrated demand system was implemented using Excel VBA
6. The simulations (changes in prices were carried out)

Results

Fruits - Bananas

Impact of Scenarios 1 and 2 on per capita per week consumption of fresh bananas in the UK

Source: Own calculation based on Defra (2017)

Fruits – Bananas (cont.)

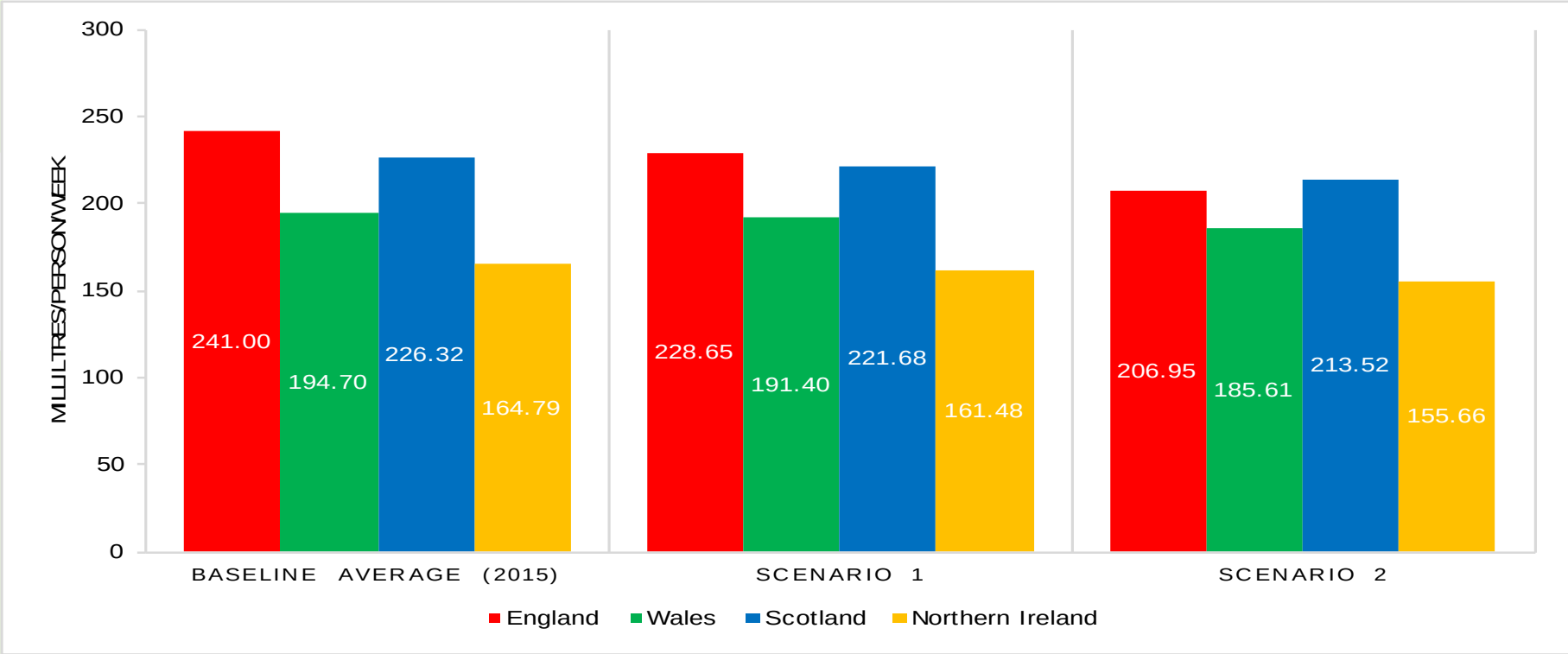
Scenario 2 - average change in intake of selected nutrients from fresh bananas in the UK

Country	Baseline Average Q_1 (2015) (grams)	Scenario 2 ΔQ (grams)	Energy ΔQ (kcal)	Vitamin C ΔQ (mg)	Vitamin A ΔQ (µg)	Mg ΔQ (mg)	Fe ΔQ (mg)
England	219.44	-3.44	-0.25	-0.03	-0.01	-0.08	0.00
Wales	194.74	-6.64	-0.48	-0.05	-0.02	-0.16	0.00
Scotland	204.27	-4.90	-0.36	-0.04	-0.02	-0.12	0.00
Northern Ireland	189.27	-3.49	-0.25	-0.03	-0.01	-0.08	0.00

Source: Own calculation based on Defra (2017)

Fruits – Pure Fruit juices

Impact of Scenarios 1 and 2 on per capita per week consumption of pure fruit juices in the UK



Source: Own calculation based on Defra (2017b)

Fruits – Pure Fruit juices (cont.)

Scenario 1 - average change in intake of selected nutrients from pure fruit juices in the UK

Country	Baseline Average Q_1 (2015) (ml)	Scenario 1 ΔQ (ml)	Energy ΔQ (kcal)	Vitamin C ΔQ (mg)	Vitamin A ΔQ (µg)	Mg ΔQ (mg)	Fe ΔQ (mg)
England	241.00	-12.34	-0.66	-0.59	-0.10	-0.18	0.00
Wales	194.70	-3.29	-0.18	-0.16	-0.03	-0.05	0.00
Scotland	226.32	-4.64	-0.25	-0.22	-0.04	-0.07	0.00
Northern Ireland	164.79	-3.31	-0.18	-0.16	-0.03	-0.05	0.00

Source: Own calculation based on Defra (2017)

Fruits – Pure Fruit juices (cont.)

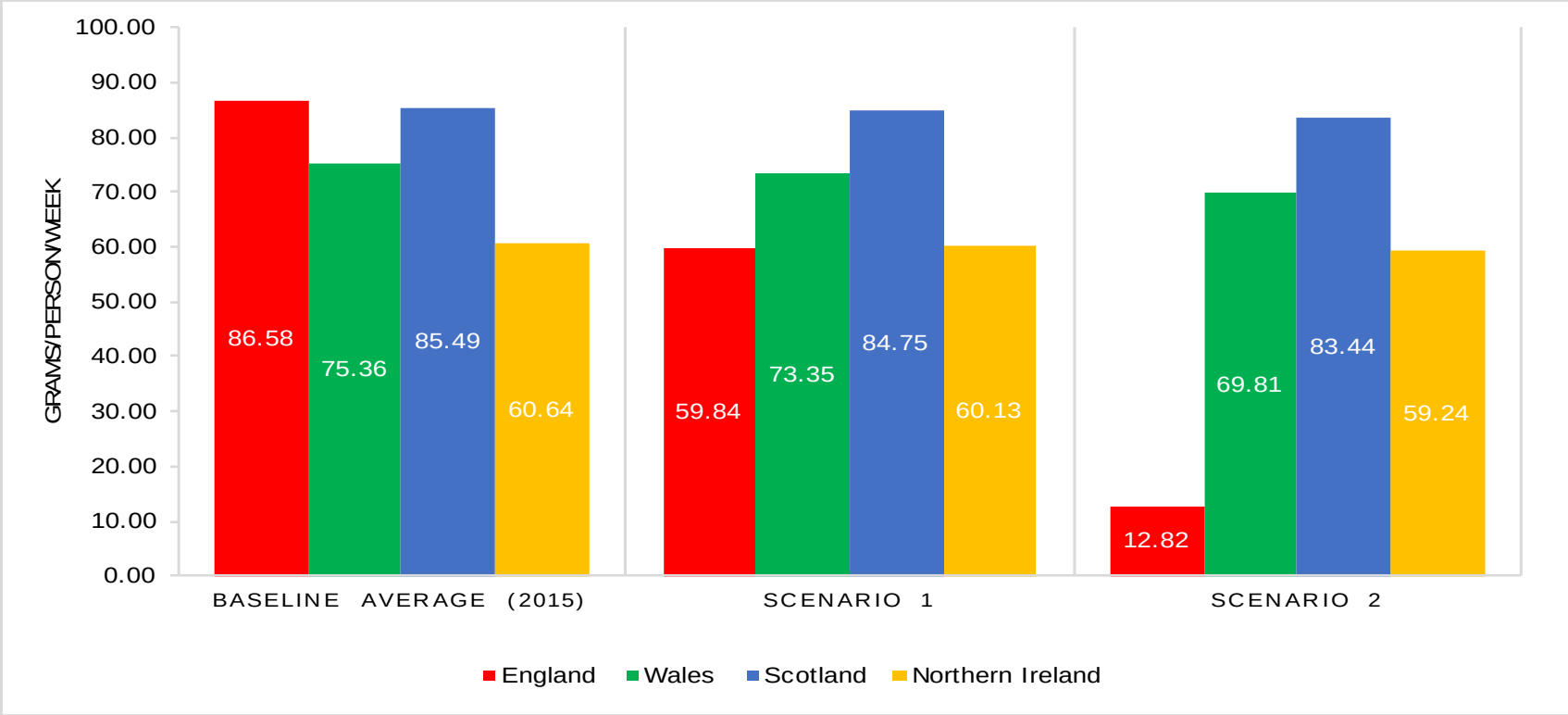
Scenario 2 - average change in intake of selected nutrients from pure fruit juices in the UK

Country	Baseline Average Q_1 (2015) (ml)	Scenario 2 ΔQ (ml)	Energy ΔQ (kcal)	Vitamin C ΔQ (mg)	Vitamin A ΔQ (µg)	Mg ΔQ (mg)	Fe ΔQ (mg)
England	241.00	-34.05	-1.82	-6.95	-0.28	-0.49	-0.01
Wales	194.70	-9.09	-0.49	-1.85	-0.07	-0.13	0.00
Scotland	226.32	-12.80	-0.68	-2.61	-0.10	-0.18	0.00
Northern Ireland	164.79	-9.13	-0.49	-1.86	-0.07	-0.13	0.00

Source: Own calculation based on Defra (2017)

Vegetables - Tomatoes

Impact of Scenarios 1 and 2 on average per capita per week consumption of fresh tomatoes in the UK



Source: Own calculation based on Defra (2017)

Vegetables – Tomatoes (cont.)

Scenario 1 - average change in consumption of fresh tomatoes in the UK and impact on intake of vitamin A

Country	Baseline Average Q_1(2015) (grams)	Scenario 1 ΔQ (grams)	Energy ΔQ (kcal)	Vitamin C ΔQ (mg)	Vitamin A ΔQ (µg)	Mg ΔQ (mg)	Fe ΔQ (mg)
England	86.58	-26.74	-0.58	-0.83	-2.30	-0.33	-0.01
Wales	75.36	-2.01	-0.04	-0.06	-0.17	-0.02	0.00
Scotland	85.49	-0.74	-0.02	-0.02	-0.06	-0.01	0.00
Northern Ireland	60.64	-0.51	-0.01	-0.02	-0.04	-0.04	0.00

Source: Own calculation based on Defra (2017)

Vegetables – Tomatoes (cont.)

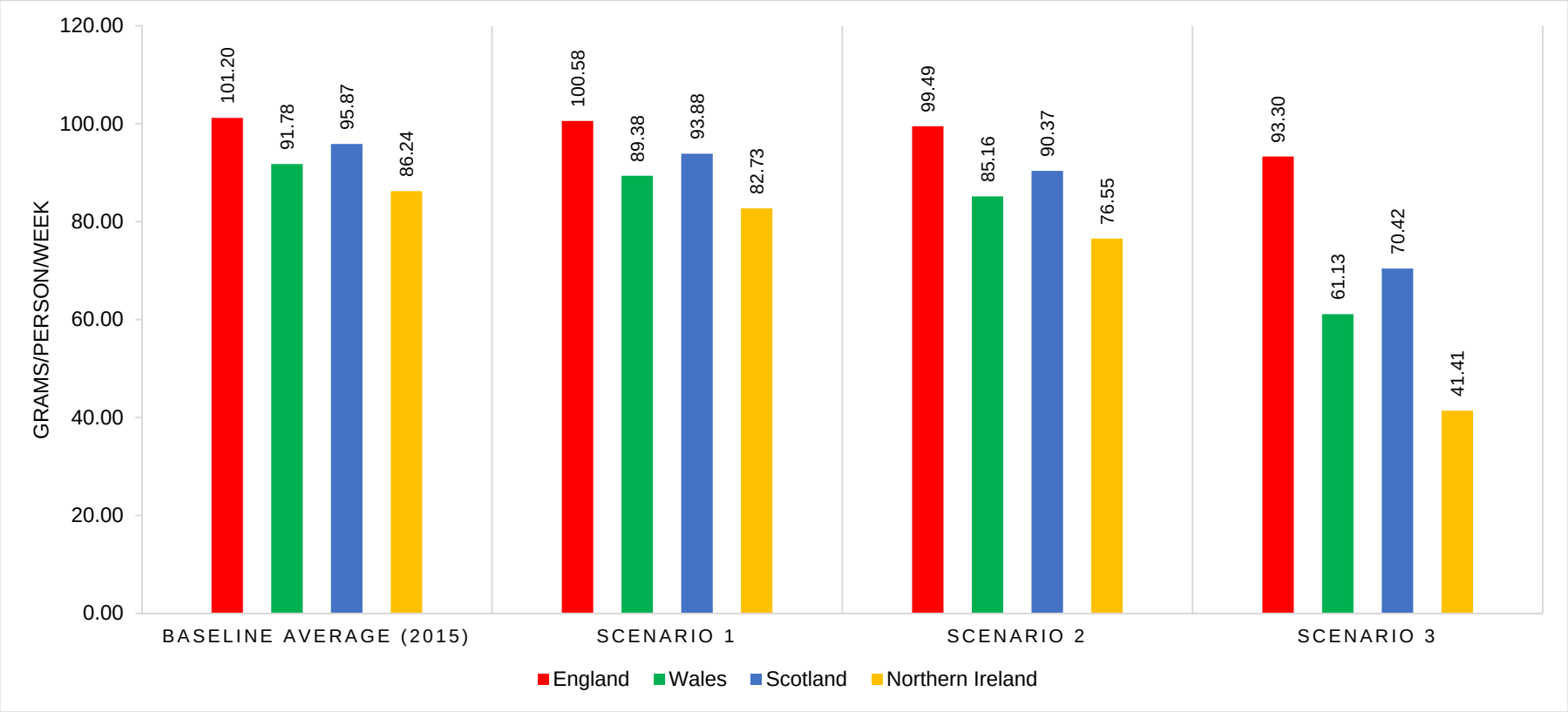
Scenario 2 - average change in consumption of fresh tomatoes in the UK and impact on intake of vitamin A

Country	Baseline Average Q_1(2015) (grams)	Scenario 2 ΔQ (grams)	Energy ΔQ (kcal)	Vitamin C ΔQ (mg)	Vitamin A ΔQ (μg)	Mg ΔQ (mg)	Fe ΔQ (mg)
England	86.58	-73.76	-1.60	-2.28	-6.35	-0.90	-0.03
Wales	75.36	-5.56	-0.12	-0.17	-0.48	-0.07	0.00
Scotland	85.49	-2.05	-0.04	-0.06	-0.18	-0.02	0.00
Northern Ireland	60.64	-1.41	-0.03	-0.04	-0.12	-0.02	0.00

Source: Own calculation based on Defra (2017)

Vegetables - Carrots

Impact of Brexit scenarios on average per capita per week consumption of fresh carrots in the UK



Source: Own calculation based on Defra (2017)

Vegetables – Carrots (cont.)

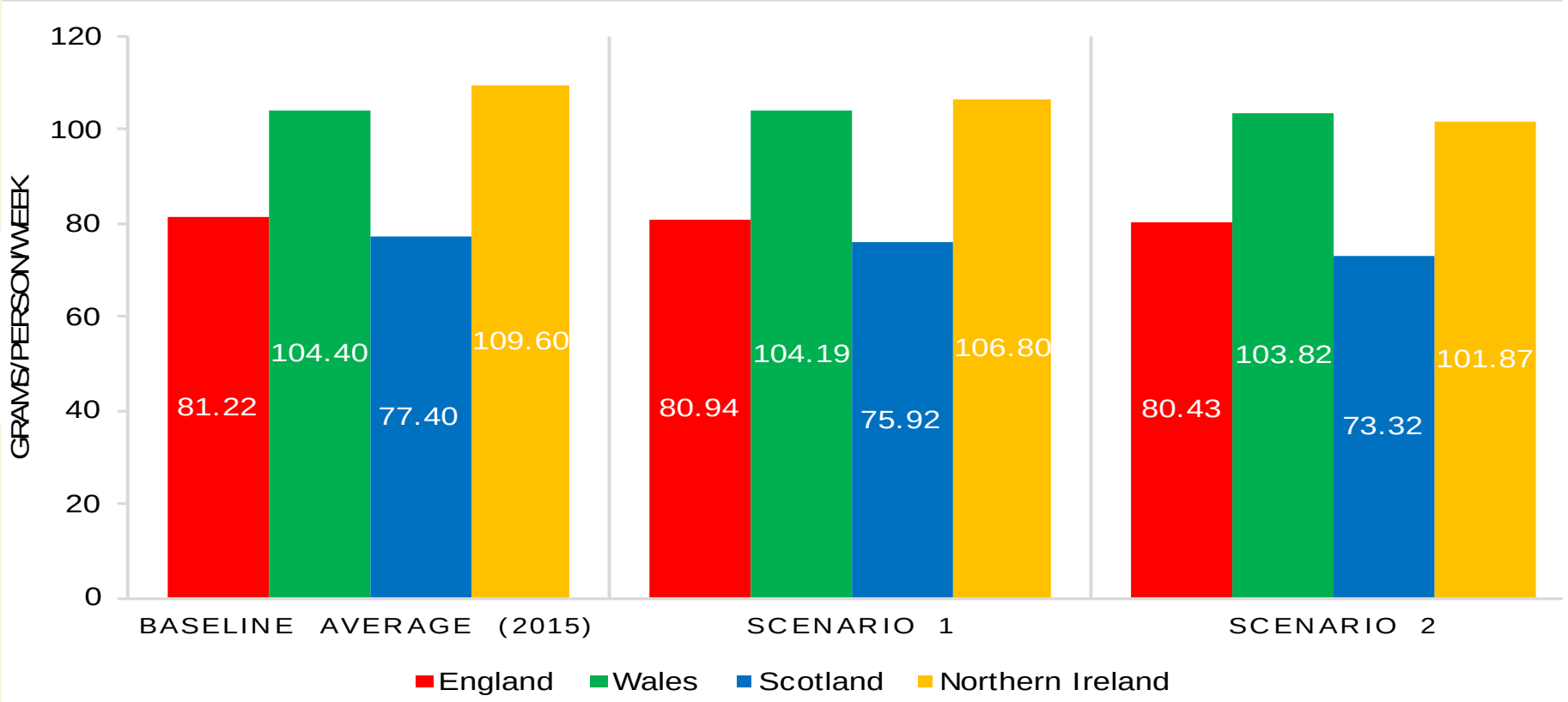
Impact of simulation scenarios on per capita per week consumption of fresh carrots in the UK in relation to vitamin A intake

Country	Baseline Average Q_1 (2015) (grams)	Scenario 1 ΔQ (grams)	Vitamin A intake ΔQ (µg)	Scenario 2 ΔQ (grams)	Vitamin A intake ΔQ (µg)	Scenario 3 ΔQ (grams)	Vitamin A intake ΔQ (µg)
England	101.20	-0.62	-2.46	-1.71	-6.78	-7.90	-31.32
Wales	91.78	-2.40	-9.52	-6.63	-26.28	-30.66	-121.52
Scotland	95.87	-2.00	-7.90	-5.50	-21.82	-25.45	-100.89
Northern Ireland	86.24	-3.51	-13.94	-9.69	-38.42	-44.83	-177.72

Own calculation based on Defra (2017)

Vegetables – Baked beans

Impact of Scenarios 1 and 2 on average per capita per week consumption of baked beans in sauce in the UK



Own calculation based on Defra (2017)

Vegetables – Baked beans (cont.)

Scenario 2 - average change in consumption of baked beans in sauce in the UK and impact on selected nutrient intakes

Country	Baseline Average Q_1 (2015) (grams)	Scenario 2 ΔQ (grams)	Energy ΔQ (kcal)	Vitamin C ΔQ (mg)	Vitamin A ΔQ (µg)	Mg ΔQ (mg)	Fe ΔQ (mg)
England	81.22	-1.78	-0.09	0.00	0.00	-0.08	0.00
Wales	104.40	-1.30	-0.07	0.00	0.00	-0.06	0.00
Scotland	77.40	-9.17	-0.47	0.00	-0.02	-0.40	-0.01
Northern Ireland	109.60	-17.40	-0.89	0.00	-0.04	-0.75	-0.02

Own calculation based on Defra (2017)

Conclusions

- Decreased consumption of fruit and vegetables following a 2.9 per cent rise in price - nutrient intakes in the UK were impacted only moderately for the average UK consumer and did not present any great threat to overall nutrient intakes

- For the most part, the average UK consumer was likely to tolerate a small rise in price affecting fruit and vegetables post-exit

Thank you for your attention!

Acknowledgements

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Additional material