Appendix S Supplementary 24-urine analytes

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S.1 Introduction

The NDNS RP collected 24-hour urine collections from those aged four years and over. However, due to small cell sizes for those aged 4 to 10 years and 65 years and over, urinary potassium, urea, creatinine and nitrogen results in this appendix are restricted to participants aged 11 to 18 years and 19 to 64 years, split by sex. Results for sodium excretion and estimated salt intake in Northern Ireland are presented in Chapter 7 and Tables 7.1-7.4.

Details of the urine protocols and methodologies, results used in the data analysis, response rates achieved, analytical procedures, quality control and other related information are included in other chapters and appendices (see Chapters 2 and 7; Appendices T, U and V).

Full details of the procedures used to establish completeness and the criteria applied to categorise the collections are given in Appendix T of this report.

Sodium, potassium, urea and creatinine results from complete collections were converted to mmol/24hr based on the weight of the full collection in kg and the assumption of a specific gravity of 1.0 kg/litre.[1] Nitrogen results were similarly converted to g/24hr.[2]

Data for the urine analytes in Table S.1 have been weighted to account for differential non-response to providing a 24-hour urine collection, in order to adjust for any bias arising from refusals and/or failures to provide a complete 24-hour urine collection. Details of the methodology used to weight the data are provided in Chapter 2 and Appendix B of this report.

S.2 Urinary potassium

A variety of food groups such as fruit and vegetables, meat, drinks, cereals and milk products contribute to potassium intake. Plasma potassium is subject to very tight

homeostatic control and the great majority of ingested potassium from the diet is rapidly excreted in the urine.

Urinary potassium measurement has been suggested to be useful for validating dietary intake information on a population basis.[3]

(Table S.1)

S.3 Urinary nitrogen

Nitrogen is an essential component of protein. For individuals in nitrogen balance, nitrogen excreted in the urine is a useful indicator of protein intake. However this is not the case if there is either an accumulation of total body nitrogen (e.g. growth, repair of lost muscle tissue) in which case urinary nitrogen underestimates protein intake, or loss of muscle mass due to starvation, dieting, injury or in old age, which would result in overestimation of protein intake.

(Table S.1)

S.4 Creatinine

Creatinine is the waste product derived from muscle creatine and is released into the blood and excreted in the urine at a relatively constant rate which depends on body muscle mass and meat intake. Creatinine is present in the ultra-filtrate of plasma which is formed by the glomerulus of the kidney, and is largely unaffected by passage through the kidney tubule. Therefore the daily creatinine excretion in urine reflects muscle mass, meat intake and renal glomerular function and although it is reasonably constant day-to-day for each individual it varies considerably between individuals and during the life course.

(Table S.1)

S.5 Urinary urea

Urea is the main detoxification and excretory product of the ammonia derived from the de-amination of amino acids. Urea is therefore the most common nitrogen-containing end product of protein catabolism. It is synthesised in the liver and excreted by the kidneys. Urea production is increased when excess protein is ingested or when body protein is catabolised, regardless of cause. In most people

the rate of production and 24-hour urinary excretion is a reflection of protein intake and the rate of degradation of tissue proteins.

(Table S.1)

[1] 24-hour potassium, urea or creatinine excretion in mmol/24hr = concentration in mmol/L X weight of the total urine collection in kg.

[2] 24-hour nitrogen excretion in g/24hr = concentration in g/L X weight of the total urine collection in kg.

[3] Tasevska, N., Runswick, S A., Bingham, S.A., (2006). Urinary potassium is as reliable as urinary nitrogen for use as a recovery biomarker in dietary studies of free living individuals. Journal of Nutrition, 136 (5), 1334-1340.