The accuracy of Canadian Nutrient File data for reporting phosphorus, potassium, sodium, and protein in selected meat, poultry, and fish products

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Dear Editor,

The Canadian Nutrient File (CNF) is a comprehensive food composition database containing composite values of the nutrient content of chemically analyzed foods (Health Canada 2015). Health care professionals often use the CNF as a reference for assessing dietary intake and monitoring population-wide nutrition programs, public health decision-making, and menu planning for vulnerable groups, such as people with chronic kidney disease (CKD) (Health Canada 2015). Because the CNF is largely based on the US Department of Agriculture (USDA) nutrient database and is infrequently updated to reflect differences specific to the Canadian food supply, the CNF nutrient values may not reflect foods sold in the Canadian marketplace (Csizmadia et al. 2007). We therefore examined whether the nutrient content obtained from chemical

analyses of selected meat, poultry, and fish products (MPF) was comparable to the nutrient data in the 2015 CNF.

Methods

From a recent patient survey, we identified unbreaded chicken, ground beef, steak, beef burgers, white fish, shrimp, deli ham, and bacon as the most commonly consumed MPF food categories in patients ($n = 67$) receiving dialysis in Toronto, Canada (Sharma Parpia 2015). MPF ($n = 91$) samples were then purchased from the top three grocery store chains in Canada and cooked (Mintel International 2009). Protein, sodium, phosphorus, and potassium contents were analyzed

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using official methods of AOAC International, as previously described (Sharma Parpia et al. 2018). Significant discrepancies were defined as CNF values that differed by more than two standard deviations from the mean analyzed value.

Results

The CNF had no food code for unbreaded chicken strips and frozen chicken breast, resulting in missing information for 20 MPF. Overall, 30% of the analyzed food categories found in the CNF ($n = 71$) had significant discrepancies in sodium, 40% in potassium, 20% in phosphorus, and 40% in protein (Table 1). It should be noted that 60% of the CNF values were based on food analysis conducted prior to 2000, dating as far back as 1983. All CNF values except for the nutrient content of steak and deli ham originated from the USDA nutrient database. While the CNF contains sources of foods from across Canada, our results on analyzed foods were limited to foods purchased in Toronto.

Discussion and Conclusion

Importantly, a reasonable level of accuracy in CNF values is needed for nutrients such as potassium and phosphorus, which may not appear on the Nutrition Facts table (Health Canada 2017). Our results demonstrate significant discrepancies between chemically analyzed and CNF values. For example, the CNF value for fresh skinless chicken breast significantly underestimated the chemically analyzed potassium content by almost half (256 vs 438 mg/100 g), which misrepresents this food as being a low potassium food (< 200 mg/75 g portion). These findings impact people who require a dietary potassium restriction, such as those with kidney disease, and others with impaired urinary potassium excretion (Sanghavi et al. 2013; Institute of Medicine 2005).

In conclusion, we found significant discrepancies in the sodium, potassium, phosphorus, and protein content listed in the CNF versus the chemically analyzed nutrient content of MPF commonly consumed by patients with CKD. Our results

Table 1 Comparison of the nutrient content by chemical analysis versus data for comparable foods from Canadian Nutrient File (CNF)

Food categories	Data source	Year	<i>N</i>	Na, mg/100 g	K, mg/100 g	P, mg/100 g	Pro, g/100 g
Chicken breast, fresh, skinless	Analyzed	2014/15	8	55 (10)	438 (36)	255 (21)	28 (1)
	CNF no. 842	1996	16	74	256*	228	31*
Chicken, rotisserie	Analyzed	2015	5	306 (90)	360 (26)	200 (12)	27 (1)
	CNF no. 6648	2009	12	381	245*	248*	18*
Lean ground beef, fresh	Analyzed	2015	6	70 (9)	383 (39)	213 (20)	23 (2)
	CNF no. 2687	1988	36	72	318	198	26†
Beef burger, frozen	Analyzed	2015	7	464 (73)	296 (50)	183 (29)	18 (4)
	CNF no. 2704	1988	2	77*	305	174	23
Top sirloin steak, Fresh	Analyzed	2015	6	65 (8)	458 (23)	263 (8)	30 (2)
	CNF no. 6144	2006	6	58	351*	219*	29
Tilapia	Analyzed	2015	6	58 (37)	390 (51)	205 (14)	20 (2)
	CNF no. 5967	2006	2	56	380	204	26*
Sole	Analyzed	2015	7	301 (113)	158 (70)	280 (108)	17 (2)
	CNF no. 3007	1989	n/a	363	197	309	15
Shrimp	Analyzed	2015	7	510 (127)	58 (50)	199 (62)	15 (3)
	CNF no. 3212	1989	n/a	947*	170*	306	23*
Deli ham	Analyzed	2014/15	11	993 (58)	551 (317)	251 (37)	16 (3)
	CNF no. 1148	1983	3	1249*	240	251	15
Bacon	Analyzed	2014/15	8	1625 (658)	355 (133)	301 (115)	31 (11)
	CNF no. 5406	2004	18	1783	525	389	39

Values for analyzed and reference foods are expressed as mean (SD)

CNF Canadian Nutrient File, Na sodium, K potassium, P phosphorus, Pro protein; n/a not available

*Indicates that the mean chemically analyzed value differed significantly from the CNF value by more than two standard deviations

† $n = 72$

$n = 9$

highlight the need for further study to extend these analyses to more foods in order for the CNF to more accurately reflect the nutritional composition of the current food supply in Canada. This initiative would enhance the quality of nutritional monitoring and surveillance and also enable clinicians to help patients make better informed food choices.

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