Project no: **022936**
Project acronym: **Beneris**
Project title: **Benefit-risk assessment for food: an iterative value-of-information approach**

Instrument: STP – Specific Targeted Project

D27 Intakes based on patterns: adults in Finland

Due date of deliverable: **1 December, 2007**
Actual submission date: **2 July, 2008**

Dissemination level: **PU**

Start date of project: **April, 1st 2006**
Duration: **3,5 years**

Organisation name of the lead contractor for this deliverable:
National Public Health Institute – KTL

Aim

The aim was to find out how the intake of those nutrients that are crucial in benefit/risk-analysis of fish differed between those with low vs. high scores of food consumption patterns.

Methods

The food consumption data consisted of 48-h recall and food records of Findiet 2002 study participants (n=247). The food consumption patterns were formed using principal component analysis (Table 1., see details: D14). Classes are based on factor scores, which are ranked to 4 equal sized classes (quartiles).

Results

Among men, those with high score of traditional pattern had higher intake of energy, fat, n-3 fatty acids, selenium, folate, vitamin D, and sodium than men with lower score (Table 2.). Men with high score of modern urban pattern had higher intake of vitamin C, but lower intake of fat, n-f fatty acids, and vitamin D than men with lower score (Table 3.). Men with high score of meat-fish pattern score had higher intake of energy, fat, n-3 fatty acids, selenium, vitamin C, and sodium than men with lower score (Table 4.). Men with high egg-soup score had higher intake of vitamin D, but lower intake of fat, selenium, and sodium than men with lower score (Table 5.).

Among women, those with high score of traditional rural pattern had higher intake of energy, fat, n-3 fatty acids, selenium, vitamin D, and sodium, but lower intake of vitamin C than those with lower score (Table 6.). Women with high score of modern-vegetarian pattern had higher intake of energy, fat, n-3 fatty acids, vitamin D, and vitamin C than those with lower score (Table 7.). Women with high score of traditional urban pattern had higher intake of energy, fat, selenium, and sodium than those with lower score (Table 8.).

Women with high score of modern urban pattern had higher intake of selenium, vitamin D, sodium and vitamin C than those with lower score (Table 9.).

Table 1. Principal component analysis of food groups: loads of patterns

		Traditional	Modern urban	Meat-fish	Egg-soup	not included	not included
Men	Potatoes and other tubers	0,416113					-0,48329
	Vegetables		0,718367				
	Legumes			0,713779			
	Fruits		0,407338			-0,38625	
	Dairy products	0,383762	-0,43866				0,383509
	Cereals and cereal products	0,519528					
	Meat and meat products			0,408196	-0,45504	0,330179	
	Fish and shellfish			0,583353		-0,49178	
	Eggs and egg products				0,723999		
	Fat	0,682352					
	Sugar and confectionary	0,719677					
	Cakes	0,602864					
	Non alcoholic beverages	0,406528	0,470146				0,342494
	Alcoholic beverages	-0,34211				0,641954	
	Condiments and sauces				0,362265		0,562178
	Soups, bouillon		0,599343		0,405644	0,31124	
	Miscellaneous			-0,35295			0,40695
		Traditional rural	Modern-vegetarian	Traditional urban	Modern urban	not included	not included
Women	Potatoes and other tubers	0,488284	-0,40294				0,375275
	Vegetables	-0,31403	0,423742	0,427723			0,431714
	Legumes		0,445652		-0,31166		
	Fruits		0,38849			0,587361	0,332565
	Dairy products	0,328813	-0,34663				0,447184
	Cereals and cereal products		0,381829	0,558439			
	Meat and meat products	0,372162	-0,30016	0,466592			
	Fish and shellfish		0,338874		0,691809		
	Eggs and egg products	0,437701				0,311286	
	Fat	0,652744		0,364845			
	Sugar and confectionary	0,453688	0,315604		-0,4193		-0,39103
	Cakes	0,612786		-0,31817			
	Non alcoholic beverages					-0,48204	
	Alcoholic beverages			0,360633	0,301228		-0,31631
	Condiments and sauces			0,305642		0,554861	
	Soups, bouillon	-0,44372		0,395993			
	Miscellaneous		0,622757		0,426821		

Nutrient intake by patterns among males

Table 2. Factor1: traditional pattern

class	nutrient	Mean	Sd	5th	25th	50th	75th	95th
0	ENERGY, KJ	7328	1594	4956	6425	7330	8145	9546
	TOTAL FATS, G	68	25	29	53	62	79	109
	FAPUN3	1.9	1.0	0.7	1.4	1.7	2.4	4.0
	F22D6N3	257	289	21	58	108	399	800
	F20D5N3	118	149	10	32	62	176	388
	SE	68	29	34	54	62	77	111
	FOL	244	65	161	196	229	302	339
	VITD	4.8	3.6	1.4	2.4	3.4	7.0	9.5
	NACL	8095	3361	4626	6223	7699	9041	10829
	VITC	89	51	29	42	80	147	175
1	ENERGY, KJ	8565	1650	5958	7785	8296	9726	10891
	TOTAL FATS, G	78	19	46	65	77	94	112
	FAPUN3	2.3	0.8	1.3	1.7	2.3	2.8	3.4
	F22D6N3	409	347	60	124	298	542	1093
	F20D5N3	159	120	27	64	125	211	387
	SE	74	17	48	65	72	82	108
	FOL	266	51	206	228	268	299	360
	VITD	6.6	3.2	2.4	4.4	5.3	8.8	12.4
	NACL	9577	2124	6794	7604	9391	11068	13019
	VITC	88	32	45	64	86	107	159
2	ENERGY, KJ	9020	1141	7435	8175	8870	9694	10599
	TOTAL FATS, G	85	17	60	71	82	98	118
	FAPUN3	2.3	1.0	1.4	1.6	2.0	2.7	4.3
	F22D6N3	322	372	35	87	193	362	963
	F20D5N3	137	143	13	46	79	166	492
	SE	78	23	53	63	71	97	114
	FOL	300	59	226	253	273	340	411
	VITD	6.7	6.7	2.1	3.7	5.0	6.5	12.3
	NACL	10363	2597	6615	8788	9989	11878	14401
	VITC	84	44	35	57	68	102	165
3	ENERGY, KJ	10782	1365	9165	9728	10288	11805	13245
	TOTAL FATS, G	101	17	75	86	101	110	131
	FAPUN3	2.8	1.1	1.5	2.0	2.8	3.4	4.0
	F22D6N3	350	439	23	91	187	413	1338
	F20D5N3	153	229	15	38	85	159	449
	SE	88	15	66	79	83	97	108
	FOL	345	62	238	296	333	400	438
	VITD	6.8	5.5	1.9	3.7	5.8	7.6	15.1
	NACL	11260	1785	8594	10284	11282	12493	13403
	VITC	98	49	46	58	89	119	166

Table 3. Factor1: modern urban pattern

factor2

class	nutrient	Mean	Sd	5th	25th	50th	75th	95th
0	ENERGY, KJ	9548	1870	6784	8170	9426	10599	12396
	TOTAL FATS, G	94	19	61	82	96	107	119
	FAPUN3	2.6	1.0	1.4	2.0	2.4	3.4	4.8
	F22D6N3	404	357	49	103	320	529	1133
	F20D5N3	165	132	29	49	131	222	425
	SE	85	25	53	70	81	107	133
	FOL	284	71	181	247	277	316	390
	VITD	7.6	6.9	1.5	3.8	6.0	9.0	14.0
	NACL	10360	2561	7488	8655	10599	11390	14663
	VITC	63	22	29	48	62	75	102
1	ENERGY, KJ	8704	1866	5654	7258	9006	9728	11877
	TOTAL FATS, G	84	24	47	60	87	102	116
	FAPUN3	2.5	1.1	1.4	1.7	2.2	3.0	4.2
	F22D6N3	360	478	35	82	168	424	1699
	F20D5N3	155	242	12	38	72	176	585
	SE	73	19	44	62	73	81	104
	FOL	275	63	196	226	269	324	383
	VITD	6.1	5.4	2.0	3.4	4.4	6.5	12.3
	NACL	10050	2410	6223	8173	10159	11266	13016
	VITC	76	36	35	47	72	95	143
2	ENERGY, KJ	8770	1687	5667	7804	9448	10104	11016
	TOTAL FATS, G	82	23	46	68	79	98	118
	FAPUN3	2.4	0.9	1.3	1.7	2.1	3.0	3.7
	F22D6N3	360	341	30	114	255	407	998
	F20D5N3	158	153	17	64	119	211	449
	SE	79	27	42	61	79	93	112
	FOL	290	60	207	235	294	329	381
	VITD	6.6	3.6	1.8	3.9	6.0	8.8	15.1
	NACL	9466	3178	6259	7066	9124	10969	13176
	VITC	113	42	55	71	113	157	166
3	ENERGY, KJ	8683	2094	5879	7515	8275	10196	11570
	TOTAL FATS, G	74	22	36	63	73	79	107
	FAPUN3	1.9	0.8	0.7	1.5	1.7	2.3	3.2
	F22D6N3	213	235	21	64	127	288	820
	F20D5N3	89	86	4	30	63	115	288
	SE	72	17	43	63	68	80	104
	FOL	306	82	182	252	296	384	438
	VITD	4.5	2.7	1.7	2.5	3.7	5.4	9.3
	NACL	9453	2852	4626	7614	9343	11619	13403
	VITC	106	53	38	77	96	127	221

Table 4. Factor 3: Meat-fish pattern

		Mean	Sd	5th	25th	50th	75th	95th
0	ENERGY, KJ	7980	2150	4956	6590	7858	9330	11877
	TOTAL FATS, G	69	22	29	57	64	82	107
	FAPUN3	1.8	0.7	0.9	1.4	1.6	2.0	3.4
	F22D6N3	139	122	17	54	87	233	351
	F20D5N3	57	46	4	24	43	98	130
	SE	64	19	34	48	64	75	93
	FOL	262	80	164	210	244	309	401
	VITD	4.3	2.4	1.5	2.4	3.8	5.1	10.0
	NACL	8395	2538	4626	6800	8257	10047	12355
	VITC	74	34	35	55	64	90	147
1	ENERGY, KJ	8818	1603	6430	7962	8575	9611	12110
	TOTAL FATS, G	86	23	53	70	81	105	118
	FAPUN3	2.1	0.7	1.3	1.6	2.0	2.6	3.2
	F22D6N3	234	176	41	88	170	362	534
	F20D5N3	99	65	25	39	76	142	222
	SE	73	16	43	61	73	82	98
	FOL	288	54	210	252	274	323	381
	VITD	4.7	1.9	1.9	3.1	5.0	6.5	7.2
	NACL	9358	1813	6387	7669	9509	10829	11679
	VITC	78	30	29	54	76	102	126
2	ENERGY, KJ	8962	1444	5838	7940	9084	9930	10891
	TOTAL FATS, G	82	17	53	71	79	101	107
	FAPUN3	2.5	0.8	1.4	1.9	2.4	2.8	4.2
	F22D6N3	408	421	35	116	226	542	1168
	F20D5N3	160	142	17	64	114	211	425
	SE	79	16	60	67	77	82	114
	FOL	286	54	206	249	290	315	373
	VITD	6.1	3.3	2.4	3.7	5.2	9.3	12.3
	NACL	9704	1850	6794	7727	10072	11266	12814
	VITC	95	43	41	59	88	133	166
3	ENERGY, KJ	9938	1870	7452	8182	9978	11018	12396
	TOTAL FATS, G	96	20	63	82	97	111	130
	FAPUN3	3.1	1.2	1.5	2.2	2.9	3.6	5.1
	F22D6N3	553	466	23	164	386	960	1338
	F20D5N3	250	249	17	82	162	363	678
	SE	92	28	55	74	86	105	149
	FOL	320	77	204	283	324	357	445
	VITD	9.8	8.0	2.5	5.0	7.7	11.1	29.3
	NACL	11863	3415	7529	9954	11904	13176	18405
	VITC	113	56	42	68	110	149	221

Table 5. Factor 3: Egg-soup pattern

factor 4

class	nutrient	Mean	Sd	5th	25th	50th	75th	95th
0	ENERGY, KJ	9483	1654	7435	8175	9578	9930	12110
	TOTAL FATS, G	89	21	53	76	87	104	127
	FAPUN3	2.5	1.0	1.4	1.7	2.5	3.0	4.3
	F22D6N3	300	285	41	95	205	399	960
	F20D5N3	139	147	25	39	89	166	375
	SE	87	25	60	67	82	104	116
	FOL	303	72	196	240	308	349	438
	VITD	5.5	3.3	2.1	3.4	4.5	7.0	11.5
	NACL	11198	2848	8788	10047	10775	12409	14401
	VITC	91	59	29	51	73	113	221
1	ENERGY, KJ	9242	1619	7401	8191	9324	10243	12251
	TOTAL FATS, G	88	20	63	75	85	106	118
	FAPUN3	2.2	0.6	1.5	1.7	2.1	2.4	3.6
	F22D6N3	265	244	35	87	206	325	819
	F20D5N3	112	89	17	60	86	132	304
	SE	78	17	55	67	78	87	108
	FOL	281	55	196	235	284	330	347
	VITD	5.6	3.1	2.1	3.5	4.9	7.2	11.2
	NACL	9660	2088	6615	7730	9733	11310	12971
	VITC	85	35	41	57	82	107	156
2	ENERGY, KJ	8563	1804	5958	6784	8730	10095	12229
	TOTAL FATS, G	80	23	44	61	76	96	116
	FAPUN3	2.4	1.1	1.0	1.6	2.1	3.2	4.2
	F22D6N3	353	414	17	88	195	413	1133
	F20D5N3	143	153	13	33	108	155	492
	SE	74	25	43	59	70	86	114
	FOL	277	67	181	228	273	315	411
	VITD	6.6	6.8	1.5	2.9	5.3	7.1	12.3
	NACL	9245	2695	6198	7488	8885	10603	13019
	VITC	88	40	29	61	83	111	165
3	ENERGY, KJ	8425	2301	4956	6590	8043	10302	11877
	TOTAL FATS, G	77	25	29	59	75	99	111
	FAPUN3	2.2	1.2	0.9	1.5	2.0	2.6	4.8
	F22D6N3	418	469	21	91	302	534	1338
	F20D5N3	173	236	4	42	115	186	449
	SE	70	21	34	61	70	80	97
	FOL	295	82	173	231	293	326	408
	VITD	7.1	5.7	1.7	3.4	5.4	9.5	14.0
	NACL	9235	2984	5643	6800	9603	11327	12810
	VITC	96	41	45	59	91	127	157

Nutrient intake by patterns among females

Table 6. Factor 1:traditional rural pattern

factor 1

class	nutrient	Mean	Sd	5th	25th	50th	75th	95th
0	ENERGY, KJ	5577	1302	3609	4739	5535	6458	7861
	TOTAL FATS, G	45	13	28	35	43	54	70
	FAPUN3	1.3	0.6	0.6	0.8	1.2	1.6	2.4
	F22D6N3	186	205	2	54	86	239	612
	F20D5N3	72	72	0	21	43	106	214
	SE	49	12	29	40	49	58	68
	FOL	222	64	133	179	220	254	363
	VITD	3.4	2.6	0.5	1.5	2.3	4.5	9.0
	NACL	6438	1558	3948	5358	6062	7817	9023
	VITC	101	51	18	54	104	142	186
1	ENERGY, KJ	6319	1231	4410	5321	6500	7198	8421
	TOTAL FATS, G	55	13	35	45	57	66	72
	FAPUN3	1.7	0.7	0.8	1.2	1.6	2.1	2.9
	F22D6N3	249	257	16	59	109	392	917
	F20D5N3	94	91	6	26	58	130	314
	SE	54	12	39	45	57	62	74
	FOL	242	64	146	195	229	283	382
	VITD	4.0	2.1	1.2	2.2	3.5	4.9	8.3
	NACL	6750	1587	4672	5588	6355	7835	9397
	VITC	108	41	53	77	104	143	178
2	ENERGY, KJ	6661	1122	5161	5955	6733	7300	8546
	TOTAL FATS, G	61	11	35	53	62	68	75
	FAPUN3	1.7	0.7	0.9	1.2	1.5	2.1	3.6
	F22D6N3	208	244	30	52	106	301	760
	F20D5N3	85	99	13	22	46	117	305
	SE	55	11	37	48	53	61	73
	FOL	253	78	156	196	229	313	411
	VITD	4.4	3.1	1.6	2.5	3.4	5.0	12.6
	NACL	7228	1777	4971	5888	7002	8145	10167
	VITC	97	36	37	74	97	118	156
3	ENERGY, KJ	7963	902	6558	7221	7903	8663	9611
	TOTAL FATS, G	78	16	54	66	76	92	107
	FAPUN3	2.2	0.9	1.1	1.8	2.1	2.5	3.0
	F22D6N3	270	507	16	75	167	266	675
	F20D5N3	106	177	6	45	61	109	331
	SE	67	15	42	58	69	74	95
	FOL	267	65	189	220	253	290	403
	VITD	5.0	3.5	1.9	3.2	4.3	5.7	10.6
	NACL	8461	1531	6234	7222	8109	9363	11360
	VITC	84	31	31	55	83	105	136

Table 7. Factor 2: modern-vegetarian pattern

class	nutrient	Mean	Sd	5th	25th	50th	75th	95th
0	ENERGY, KJ	6233	1438	4027	5251	5851	7221	8955
	TOTAL FATS, G	55	16	31	42	56	66	77
	FAPUN3	1.4	0.5	0.7	0.9	1.2	1.7	2.4
	F22D6N3	148	167	13	40	85	179	609
	F20D5N3	60	59	7	21	39	75	214
	SE	55	14	27	45	55	63	83
	FOL	235	81	133	179	215	275	403
	VITD	3.0	1.4	1.2	1.8	2.8	4.3	5.4
	NACL	6941	1758	3702	5810	7038	8333	10035
	VITC	74	32	25	49	70	99	139
1	ENERGY, KJ	5979	1513	3609	4888	6005	7060	8544
	TOTAL FATS, G	55	19	28	38	53	63	98
	FAPUN3	1.5	0.6	0.6	1.0	1.3	2.0	2.7
	F22D6N3	167	149	23	57	116	247	440
	F20D5N3	66	59	11	21	54	97	161
	SE	54	12	37	42	54	65	73
	FOL	229	67	141	181	220	259	388
	VITD	3.7	2.3	0.5	1.9	3.1	5.2	8.6
	NACL	6827	1869	4390	5517	6203	7946	11083
	VITC	87	39	18	70	80	112	173
2	ENERGY, KJ	7224	1401	4739	6476	7346	8003	9611
	TOTAL FATS, G	66	19	42	52	64	74	107
	FAPUN3	1.9	0.7	0.9	1.4	1.8	2.4	3.3
	F22D6N3	221	189	16	78	169	297	662
	F20D5N3	90	78	6	40	62	115	285
	SE	59	13	35	51	59	69	79
	FOL	261	65	171	220	251	293	411
	VITD	4.8	2.7	1.9	2.7	4.3	6.3	11.6
	NACL	7960	1826	4936	6798	7883	9230	10590
	VITC	105	42	47	80	96	132	191
3	ENERGY, KJ	7079	896	5816	6476	7116	7709	8726
	TOTAL FATS, G	64	13	39	55	63	74	88
	FAPUN3	2.1	1.0	0.9	1.5	2.0	2.4	3.6
	F22D6N3	380	558	2	53	155	573	1134
	F20D5N3	142	195	0	27	61	223	430
	SE	57	16	37	45	56	66	84
	FOL	260	59	186	215	248	305	371
	VITD	5.3	4.1	0.7	2.6	4.0	7.8	14.8
	NACL	7126	1452	5243	5942	6953	7948	9609
	VITC	123	33	64	103	123	147	178

Table 8. Factor 3: traditional urban pattern

class	nutrient	Mean	Sd	5th	25th	50th	75th	95th
0	ENERGY, KJ	6008	1307	4027	4978	6171	6903	8432
	TOTAL FATS, G	53	15	31	42	55	62	79
	FAPUN3	1.6	0.8	0.7	1.0	1.3	2.0	3.6
	F22D6N3	253	292	2	46	118	375	922
	F20D5N3	93	105	0	21	52	122	323
	SE	49	13	27	41	46	57	73
	FOL	214	56	133	169	214	248	317
	VITD	4.1	3.4	0.7	1.8	2.7	5.1	11.6
	NACL	6116	1390	3702	5395	5965	6871	8636
	VITC	97	36	24	77	97	120	159
1	ENERGY, KJ	6202	1298	4028	5321	6217	6923	8511
	TOTAL FATS, G	56	16	28	44	55	66	88
	FAPUN3	1.8	1.1	0.7	1.1	1.7	2.2	3.1
	F22D6N3	311	517	23	48	145	399	917
	F20D5N3	121	185	10	23	56	159	331
	SE	56	15	34	45	57	64	75
	FOL	230	51	163	196	221	244	338
	VITD	4.8	3.9	0.9	2.3	3.7	6.9	12.6
	NACL	6944	1612	4345	5718	7082	7826	9432
	VITC	89	35	25	64	88	115	150
2	ENERGY, KJ	6791	1329	4225	5919	7085	7524	9055
	TOTAL FATS, G	61	16	31	53	62	69	92
	FAPUN3	1.7	0.5	0.8	1.3	1.6	2.1	2.6
	F22D6N3	154	143	17	57	85	197	462
	F20D5N3	65	60	6	26	45	92	193
	SE	59	13	40	47	59	68	79
	FOL	254	78	143	210	247	291	411
	VITD	3.9	2.0	1.6	2.3	3.3	4.4	8.3
	NACL	7102	1482	5089	5863	6956	7919	10035
	VITC	106	48	31	67	94	146	186
3	ENERGY, KJ	7519	1321	4964	6679	7688	8544	9263
	TOTAL FATS, G	69	20	33	53	67	75	101
	FAPUN3	1.9	0.6	0.7	1.4	1.9	2.3	2.9
	F22D6N3	195	190	13	72	123	251	612
	F20D5N3	77	64	10	44	58	94	221
	SE	62	11	43	55	60	70	83
	FOL	287	69	194	239	275	334	418
	VITD	4.0	1.8	1.2	2.9	3.5	4.8	9.2
	NACL	8714	1596	5415	7422	8614	9609	11688
	VITC	97	43	37	55	100	123	184

Table 9. Factor 4: modern urban pattern

class	nutrient	Mean	Sd	5th	25th	50th	75th	95th
0	ENERGY, KJ	6893	1562	3786	5935	7116	7861	9127
	TOTAL FATS, G	62	20	34	47	61	75	100
	FAPUN3	1.5	0.6	0.6	1.1	1.4	2.0	2.6
	F22D6N3	81	70	2	38	60	104	192
	F20D5N3	32	26	0	13	26	47	91
	SE	53	13	34	44	53	59	76
	FOL	237	67	141	194	224	275	371
	VITD	2.7	1.3	0.5	1.9	2.9	3.7	4.8
	NACL	6813	1678	4345	5455	6745	7886	10554
	VITC	93	48	18	60	91	120	180
1	ENERGY, KJ	6544	1477	4028	5487	6921	7563	9143
	TOTAL FATS, G	59	19	31	46	58	68	98
	FAPUN3	1.6	0.7	0.7	1.1	1.6	2.0	3.0
	F22D6N3	140	139	15	55	106	172	497
	F20D5N3	57	50	7	22	46	77	182
	SE	53	14	27	42	50	65	73
	FOL	245	69	145	196	236	281	375
	VITD	3.2	1.9	1.2	1.9	2.6	4.6	7.3
	NACL	6802	1643	4224	5488	6983	7933	9397
	VITC	96	35	42	73	95	119	163
2	ENERGY, KJ	6390	1464	4139	5224	6431	7286	9139
	TOTAL FATS, G	58	18	31	44	59	67	100
	FAPUN3	1.6	0.6	0.8	1.1	1.4	2.1	2.7
	F22D6N3	185	145	20	64	145	279	462
	F20D5N3	72	51	10	30	60	109	193
	SE	57	12	37	48	56	65	78
	FOL	244	76	146	189	222	267	401
	VITD	3.8	2.0	1.7	2.4	3.5	4.5	9.0
	NACL	7469	1991	4735	5957	7008	8656	11688
	VITC	93	38	35	67	86	121	154
3	ENERGY, KJ	6695	1183	4520	6172	6704	7254	8546
	TOTAL FATS, G	60	14	28	53	62	70	82
	FAPUN3	2.2	1.0	0.7	1.6	2.2	2.5	3.6
	F22D6N3	511	521	45	207	424	653	1134
	F20D5N3	197	182	23	66	157	275	430
	SE	63	15	43	54	62	70	85
	FOL	258	67	167	216	248	283	411
	VITD	7.0	3.8	2.6	4.7	6.5	8.3	14.8
	NACL	7785	1623	5602	6579	7706	9210	10167
	VITC	107	42	47	81	105	129	186