

From evidence to policy – fruit in schools – is there an impact?
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agenda

- Fruit and vegetable intake in Europe over time
- Parental education and fruit and veg
- Important constituents of fruit and veg
- School availability of certain foods and BMI
- Conclusions



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Assessment of intake data and health data

The difficulty of comparing data

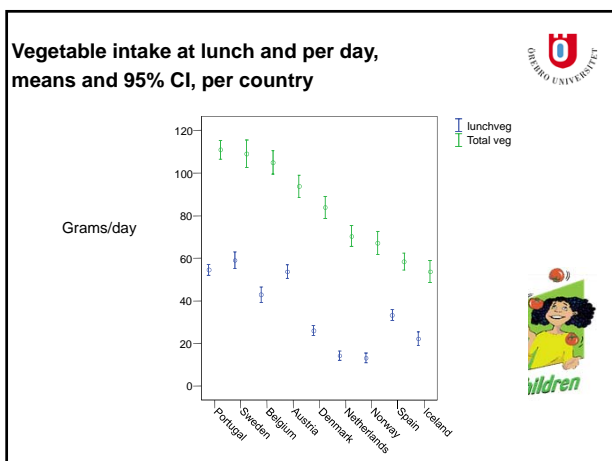
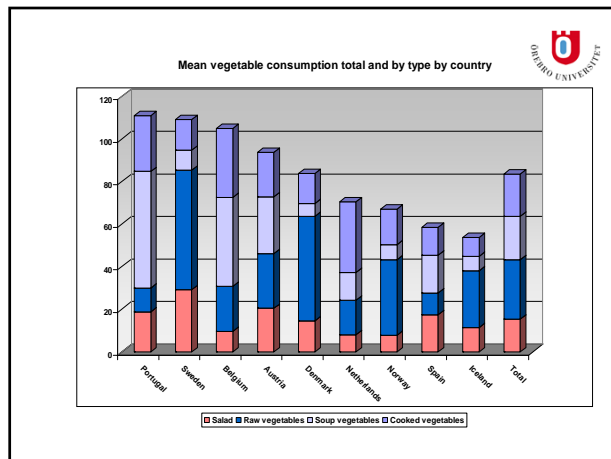
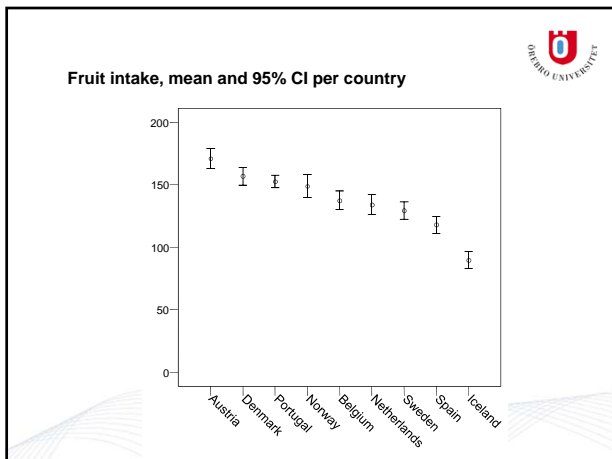
- Different ages reported
- Different cut-offs used
- Measured or self-reported
- Collected different years
- Non-representative data

 =  ?

To notice any change there is a need to assess the situation!



Fruit and veg intake among children – Pro Children, EU DG RESEARCH




Fruit preferences – fruit available

Most preferred fruits were small citrus

Most available fruit was apples

Predictors of intake



European Journal of Clinical Nutrition (2008) 62, 834–841
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www.nature.com/ejcn


ORIGINAL ARTICLE

Personal, social and environmental predictors of daily fruit and vegetable intake in 11-year-old children in nine European countries

I De Bourdeaudhuij¹, S te Velde², J Brug², P Due³, M Wind⁴, C Sandvik⁵, L Maes⁶, A Wolf⁷, C Perez Rodrigo⁸, A Yngve⁹, I Thorsdottir¹⁰, M Rasmussen¹, I Elmadfa¹, B Franchini¹¹ and K-I Klepp¹²

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Personal and social factors in combination



In conclusion, this study showed that especially a combination of personal and social factors is related to daily fruit and vegetable intake in schoolchildren. This shows that a comprehensive multilevel intervention strategy based upon a series of individual and social correlates will be most promising in the promotion of daily fruit and vegetable intake in children. Further research is needed to look into the potential effect of school-level factors as intervention studies showed promising results.

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2008 PRO GREENS




Public Health Nutrition: 17(11), 2436–2444 doi:10.1017/S1368980014001347

Fruit and vegetable consumption in a sample of 11-year-old children in ten European countries – the PRO GREENS cross-sectional survey

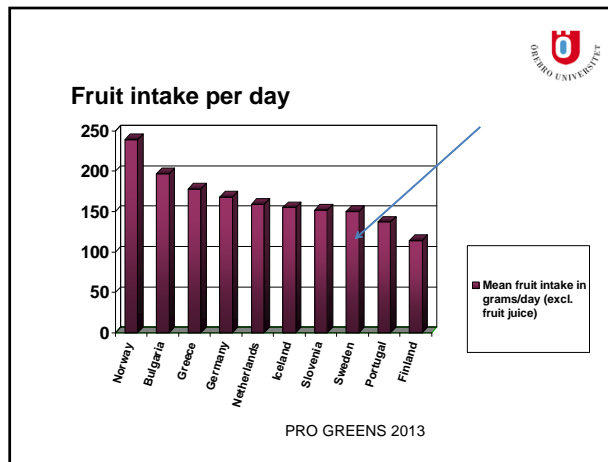
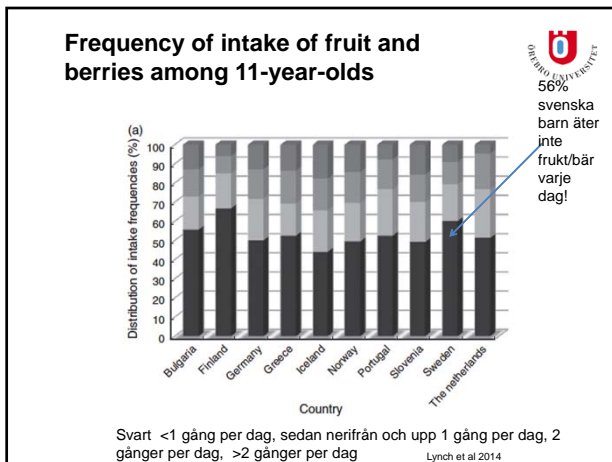
Christel Lynch^{1,*}, Asa Gudrun Kristjansdottir², Saskia J te Velde³, Nanna Lien⁴, Eva Roos^{5,6}, Inga Thorsdottir², Michael Krawinkel⁷, Maria Daniel Vaz de Almeida⁸, Angeliki Papadaki^{9,10}, Cirila Hlavan Ribic¹¹, Stefka Petrova¹², Bettina Ehrenblad¹, Thorhallur I Halldorsson², Eric Poortvliet¹ and Agneta Yngve^{1,13}

Table 3 Percentage with total fruit and vegetable (F&V) intake ≥ 400 g/d by gender and country among 11-year-old children (n 8158) from 236 schools across ten European countries participating in the PRO GREENS project, April–October 2009



Country	Total F&V intake ≥ 400 g/d		Girls	Boys
	%	Pair-wise comparisons*		
Bulgaria	31.7	a,b	33.7	29.3
Finland	13.8	d	14.4	13.2
Germany	23.9	c	23.6	24.2
Greece	26.0	c	23.3	28.8
Iceland	19.5	c,d	22.2	16.7
Norway	37.0	a	38.2	35.6
Portugal	21.0	c	22.3	19.7
Slovenia	16.8	d	17.9	15.7
Sweden	26.0	b,c	31.0	21.1
The Netherlands	19.1	c,d	21.0	17.0
TOTAL	23.5		24.8	22.1

*Pair-wise comparisons with Bonferroni correction. Countries for which percentages meeting the recommendation are significantly different are denoted with different letters a–e (e.g. percentage meeting the recommendation in Bulgaria differs from that in Finland, but not from that in Norway and Sweden).



What about SES differences?

Public Health Nutrition: 18(1), 89-99

doi:10.1017/S136898001300339X

Mediation of parental educational level on fruit and vegetable intake among schoolchildren in ten European countries

Elviira Lehto^{1,2,*}, Carola Ray¹, Saskia J te Velde³, Stefka Petrova⁴, Vesselka Duleva⁴, Michael Krawinkel⁵, Isabel Behrendt^{5,6}, Angeliki Papadaki^{7,8}, Asa Kristjansdottir⁹, Inga Thorsdottir⁹, Agneta Yngve^{10,11}, Nanna Lien¹², Christel Lynch¹¹, Bettina Ehrenblad¹¹, Maria Daniel Vaz de Almeida¹³, Cirila Hlavan Ribic¹⁴, Irena Simcic¹⁵ and Eva Roos^{1,2}

Conclusions: Parental educational level correlated positively with children's daily F&V intake in most countries and the pattern of mediation varied among the participating countries. Future intervention studies that endeavour to decrease the educational-level differences in F&V intake should take into account country-specific features in the relevant determinants of F&V intake.

Family vs school lunch?

Public Health Nutrition: 16(6), 1109-1117


doi:10.1017/S1368980012004181

Role of free school lunch in the associations between family-environmental factors and children's fruit and vegetable intake in four European countries

Carola Ray^{1,2,*}, Eva Roos^{1,2}, Johannes Brug³, Isabel Behrendt⁴, Bettina Ehrenblad⁵, Agneta Yngve⁶ and Saskia J te Velde³

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Family vs school lunch

Family-environmental factors important for fruit and vegetable intake, but more so in countries NOT providing a school lunch.

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Important constituents of fruit and vegetables

Polyamines

Folate

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Original Article COACTION

Polyamines in foods: development of a food database

Mohamed Atiya Ali^{1,3*}, Eric Poortvliet¹, Roger Strömberg² and Agneta Yngve^{1,3}

¹Group for Public Health Nutrition, Department of Biosciences and Nutrition, Karolinska Institutet, Huddinge, Sweden; ²Department of Biosciences and Nutrition, NOVUM, Karolinska Institutet, Huddinge, Sweden; ³Faculty of Health, Nutrition and Management, Akerhus University College, Lillestrøm, Norway

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Original Article COACTION

Polyamines: total daily intake in adolescents compared to the intake estimated from the Swedish Nutrition Recommendations Objectified (SNO)

Mohamed Atiya Ali^{1,3*}, Eric Poortvliet¹, Roger Strömberg² and Agneta Yngve^{1,3}

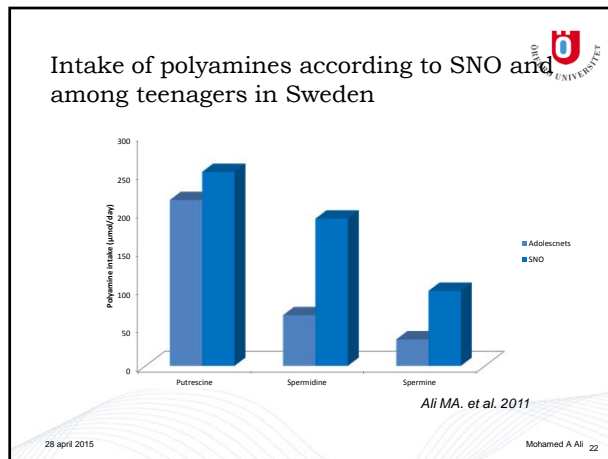
¹Unit for Public Health Nutrition, Department of Biosciences and Nutrition, NOVUM, Karolinska Institutet, Sweden; ²Department of Biosciences and Nutrition, NOVUM, Karolinska Institutet, Sweden; ³Faculty of Health, Nutrition and Management, Akerhus University College, Lillestrøm, Norway

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Rich sources

Rich sources of polyamines:

- Oranges and Sauerkraut → (putrescine)
- Green tomatoes & Cheese → (spermidine)
- Peas and Salmon → (spermine)



Folate and academic achievement

High Folate Intake Is Related to Better Academic Achievement in Swedish Adolescents

WHAT'S KNOWN ON THIS SUBJECT: Fetal neurocognitive development can be compromised by insufficient intake of folate and other nutrients, but it is not known whether folate intake during adolescence affects cognitive development and academic achievements of adolescents.

WHAT THIS STUDY ADDS: Results of this study reveal a positive link between folate intake and academic achievement, independent of socioeconomic status and income of parents. Optimizing folate intake of adolescents is a public health concern across the socioeconomic status spectrum.

AUTHORS: Torbjörn K. Nilsson, MD, PhD,^{1,2} Agneta Yngre, PhD,^{1,2} Anna K. Böttiger, PhD,^{1,2} Anja Hurig Wenckel, PhD,³ and Michael Spisic, MD, PhD⁴

DEPARTMENTS: ¹Department of Laboratory Medicine, Clinical Chemistry, Örebro University Hospital, Örebro, Sweden; ²School of Health and Medical Sciences, Örebro University, Örebro, Sweden; ³Unit for Public Health and ⁴Unit of Preventive Nutrition, Department of Biomedicine and Nutrition, Karolinska Institute, Huddinge Hospital, Stockholm, Sweden; and ⁵Faculty of Health, Education, and Management, Aarhus University College, Århus, Denmark

KEY WORDS: homocysteine, folate intake, dietary requirement, boys, girls, adolescents, health, socioeconomic status, nutrition, lifestyle

Pediatrics 2011

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Folate intake children Sweden (EYHS) mcg/day

	girls	boys	EAR*
9-year-olds	208	207	250
15-year-olds	228	285	330

*Estimated Average Requirement, US Food and Nutrition Board, Institute of Medicine and WHO Expert Group

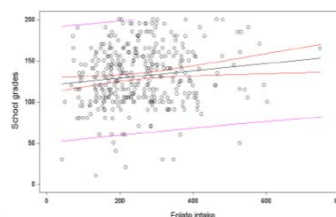


**Main folate sources
(% of daily intake)**

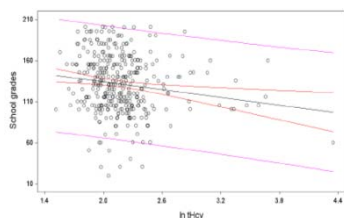
	girls	boys
Milk and yoghurt	18-22	22-25
Bread	15	17-18
Vegetables	8-15	7-9
Fruit juice	6-8	5-6
Fruit	6-7	4-5
Meat	5-6	8-9
Potatoes	6-9	7



Relationship folate intake – school performance




Homocysteine – school performance



Conclusions folate in youth

- Folate intake low in relation to US recommendations
- Main folate source yoghurt due to low intake of F&V
- Striking findings regarding school grades and folate intake need to be further studied



School nutrition environment and BMI

Int. J. Environ. Res. Public Health **2014**, *11*, 11261–11285; doi:10.3390/ijerph111111261

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International Journal of
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Public Health
ISSN 1660-4601
www.mdpi.com/journal/ijerph

Article

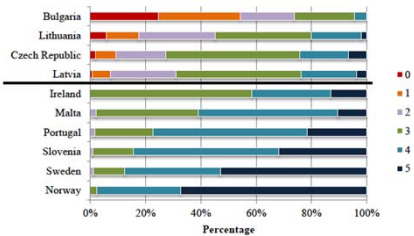
WHO European Childhood Obesity Surveillance Initiative: School Nutrition Environment and Body Mass Index in Primary Schools

Trudy M.A. Wijnhoven ^{1,*}, Joop M.A. van Raaij ^{2,3}, Agneta Sjöberg ⁴, Nazih Eldin ^{5,6}, Agneta Yngve ⁷, Marie Kunešová ⁸, Gregor Starc ⁹, Ana L. Rito ¹⁰, Vesselka Duleva ¹¹, Maria Hassapidou ¹², Éva Martos ¹³, Iveta Pudule ¹⁴, Austra Petrauskienė ¹⁵, Victoria Farrugia Sant'Angelo ¹⁶, Ragnhild Hovengen ¹⁷ and João Breda ¹

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Acceptance of five elements in school nutrition policies



Country	0 (Fresh fruit and milk)	1 (Sweet drinks)	2 (Sweet snacks)	3 (Salted snacks)	4 (Cannot be obtained)	5 (Cannot be obtained)
Bulgaria	10%	10%	10%	10%	10%	50%
Lithuania	10%	10%	10%	10%	10%	50%
Czech Republic	10%	10%	10%	10%	10%	50%
Latvia	10%	10%	10%	10%	10%	50%
Ireland	10%	10%	10%	10%	10%	50%
Malta	10%	10%	10%	10%	10%	50%
Portugal	10%	10%	10%	10%	10%	50%
Slovenia	10%	10%	10%	10%	10%	50%
Sweden	10%	10%	10%	10%	10%	50%
Norway	10%	10%	10%	10%	10%	50%

The five: Fresh fruit and milk can be obtained on school premises, sweet drinks, sweet snacks and salted snacks cannot be obtained on school premises.

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5 categories vs BMI/A Z-scores

Linear regression analysis showed only two countries with significant association:

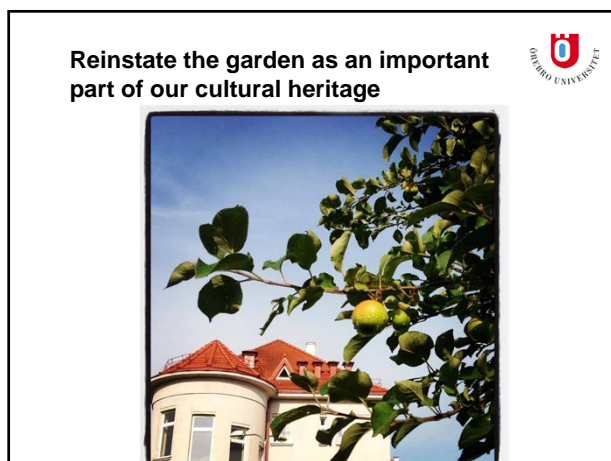
- Sweden – negative association
- Norway – positive association

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Berries, fruit and veggies – important cultural heritage in gardening







Support commercial growing of fruit, vegetables and berries in all countries



Use the forests – also a cultural heritage for our children



Conclusions

More fruit available does not automatically mean more fruit consumed

More fruit available does not automatically mean lower BMI



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