



The Swiss Salt Survey: Data on overweight and obesity in the Swiss General Population

Adam Ogna
CHUV - Lausanne



Background

- The latest data on prevalence of overweight and obesity in the general Swiss resident population rely on the Swiss Health Survey (SHS), a telephonic interview performed in 2007.

Body Mass Index 1) (BMI) nach Sprachgebiet und Geschlecht

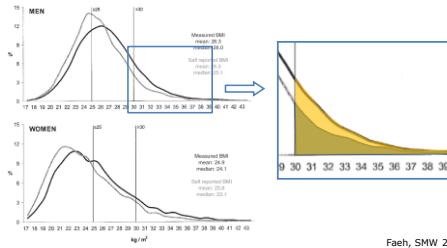
2007, in % der Wohnbevölkerung ab 15 Jahren

Sprachgebiet	Übergewichtig		Stark übergewichtig		Total Stichprobe		Gesambev.
	n	% Pop.	n	% Pop.	n	% Pop.	
Total							
Total	5 489	28.1	1 603	8.2	18 473	100	6 186 711
Deutsche Schweiz	3 378	29.2	957	8.2	11 310	100	4 450 369
Französische Schweiz	1 679	28.6	511	8.3	5 947	100	1 454 291
Italienische Schweiz	432	29.0	135	8.7	1 516	100	292 141
Männer							
Total	3 233	37.6	761	8.7	8 339	100	3 021 948
Frauen							
Total	2 256	20.8	842	7.8	10 134	100	3 164 763



Background

- Body mass index (BMI) is underestimated when self-reported, leading to a misclassification of up to 60% of obese subjects.



Faeh, SMW 2008



Background

- The last survey with measured BMI performed in the 3 linguistic regions of Switzerland dates back to 1977.

Gutzwiller, Prev.Med 1985



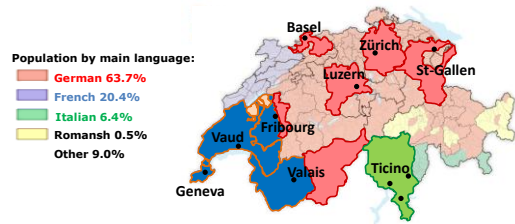
The Swiss Survey on Salt

- Cross-sectional population-based survey
- Mandated by the Federal Office of Public Health, as a part of the national « Salt Strategy 2008-2012 »
- Target population: permanent residents in CH aged ≥ 15 y
- Main objectives : to estimate
 - dietary salt intake
 - hypertension prevalence
 - knowledge about salt-related health problems



The Swiss Survey on Salt

- Study population: 1624 subjects (729 men, 777 women) from 3 linguistic regions (11 centers)
- Recruitment: from 01.2010 to 11.2011





Sampling strategy: two levels (1)

Same strategy as for the Swiss Health interview Surveys.

1) Random selection of households:

- By Federal Statistical Office
- Out of the Swisscom fixed lines phone directory



We contacted these households by:

- Information letter
- Phone call(s)
 - ⇒ definition of household composition (all individuals aged ≥ 15 years)



Sampling strategy: two levels (2)

2) Random selection of individuals:

- One individual per household
- Computer-generated random selection
- Objective: equal number of subjects included in each of the 8 predefined strata:



	15-29	30-44	45-59	≥60
Men	N	N	N	N
Women	N	N	N	N



The Swiss Survey on Salt

Method



- ✓ Demographic data
- ✓ Anthropometric data: **measured height and weight**
- ✓ Blood pressure (5x)



- ✓ 24-hour urine collection: **dietary sodium-, potassium- and protein-intake.**



- ✓ Blood pressure (5 x)
- ✓ Medical history and **lifestyle questionnaire**
- ✓ Optional blood sampling



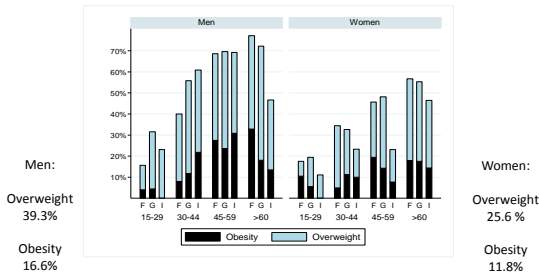
The study population

		All	French	German	Italian	
N		1506	463	828	215	
Age (years)	means±SD	47±18	47±19	48±18	46±19	p=0.16
15-29 years	%	23.8	23.1	24.1	24.6	
30-44 years	%	22.4	24.0	21.0	24.2	
45-60 years	%	24.4	23.3	25.1	24.2	
≥ 60 years	%	29.4	29.6	29.8	27.0	p=0.86
Sex						
Men	%	48.4	48.0	48.6	48.8	p=0.97
Country of birth						
Switzerland	%	78.6	74.8	79.0	85.0	p=0.01
Educational level						
Primary	%	11.2	13.0	9.1	15.8	
Secondary	%	44.0	43.2	43.1	48.8	
Tertiary	%	39.4	38.6	42.1	30.7	
Other	%	5.4	5.2	5.7	4.7	p=0.01



Prevalence of overweight and obesity

were **32.2 %** and **14.2%**, respectively, with significant differences between sexes and age categories



67.7% of participants reported to pay attention to alimentation

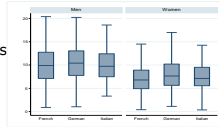
	OR [95% CI]	p		OR [95% CI]	p
Sex			Education level		
Men	1 (ref.)		Primary	1 (ref.)	
Women	2.16 [1.70-2.73]	<0.001	Secondary	1.01 [0.69-1.48]	0.98
Linguistic region			Tertiary	1.28 [0.86-1.90]	0.23
French	1 (ref.)		Other	1.13 [0.60-2.10]	0.71
German	2.85 [2.22-3.65]	<0.001	Country of birth		
Italian	4.32 [2.91-6.40]	<0.001	Switzerland	1 (ref.)	
Age group			Other	0.94 [0.71-1.25]	0.68
15-29 years	1 (ref.)		BMI category		
30-44 years	1.29 [0.92-1.83]	0.14	Lean	1 (ref.)	
45-59 years	1.27 [0.91-1.78]	0.16	Overweight	1.07 [0.81-1.40]	0.63
≥ 60 years	1.82 [1.30-2.54]	<0.001	Obese	0.85 [0.60-1.20]	0.35

Odds Ratio ± 95%CI by multiple logistic regression

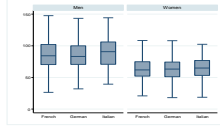


Salt- and protein-intake

Urinary salt excretion (mean ± sd) was 7.8 ± 3.4 g/24h in women and 10.6 ± 4.1 g/24h in men.



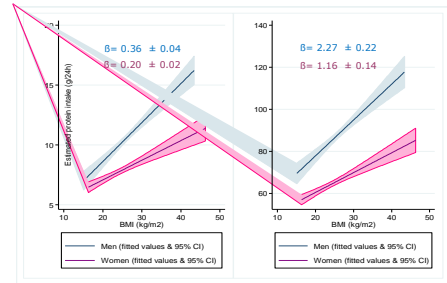
Protein intake* (mean ± sd) was 64.6 ± 18.4 g/24h in women and 88.2 ± 25.7 g/24h in men, corresponding to 1.0 ± 0.3 g/kg/24h in both sexes.



* calculated from the 24-hours urea nitrogen (Maroni et al, Kidney Int. 1985)



Salt- and protein-intake correlate with BMI, after adjustment for age and linguistic region



Urinary Na-to-K ratio a marker of alimentation quality

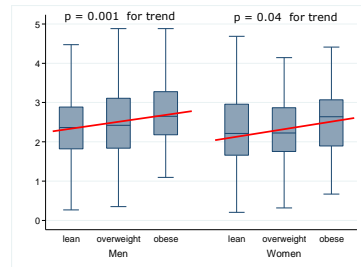
Sodium
processed food
confectioneries
bread
cheese



Potassium
fruits
vegetables



Urinary Na-to-K ratio increases across BMI-categories



Conclusions

- Overweight and obesity affect nearly half of the Swiss population aged >15 years. Age and sex are associated with BMI.
- Salt and protein intake correlate with BMI. This could express an augmented food consumption with increasing BMI.
- The urinary sodium-to-potassium ratio shows a less favorable dietary profile in obese than in lean subjects.
- Public health interventions addressing modifiable behavioral factors to reduce overweight and obesity in Switzerland can be expected to have substantial benefits.

Acknowledgements

Coordinating center	Investigators	Coordinators	Collaborators
Lausanne (CHUV)	M. Burnier, M. Bochud, F. Paccaud	A. Chappuis, N. Glatz	D. Bardy, S. Estoppey Younes, F. Jacquier, A. Pingoud, P. Vuistiner, R. Vulliamy
Recruitment centers	Investigators	Collaborators	
Basel	D. Conen	T. Schön, J. Blum, S. Tschan, G. Völlmin	
Fribourg	D. Hayoz	C. Morin, G. Aeby, A. Folly, L. Hayoz	
Geneva	A. Péchère-Bertschi, I. Guessous	M. Latapie, P. Dutilleul	
Luzern	P. Erne	Y. Odermatt, B. Mehmänn, D. Erne, S. Erne, V. Krummenacher, S. Rehefeldt, J. Rössly, N. Urbanek	
St-Gallen	I. Binet, P. Greminger	M. Alder, K. Hübel, M. Hartmann, P. Hartmann, U. Zürcher	
Ticino	F. Muggli, L. Gabutti, A. Gallino	V. Forni, A. Ogna, R. Bernasconi, M. Betello, N. Bianda, M. Boutefah, C. Esu, G. Forni, M. Forni, M. Forni-De Gottardi, P. Mondini, L. Pestalacci, L. Sala	
Valais	P. Meier	R. Meier-Bonfils, R. Hayoz	
Vaud	M. Burnier, M. Bochud	N. Glatz, P. Carruzzo, L. Glatz, D. Tinguely	
Zürich	P. Suter, E. Battegay, A. von Eckardstein	H. Stettler, D. Illiakis	

This study was funded by the Federal Office of Public Health (Contract No: 09.0041.03/04/0101/-2 and 09.005791/14.14.0000/-74). The survey was also supported by the Nephrology Division and by the Institute of Social and Preventive Medicine, CHUV, Lausanne, Switzerland. We thank the participants to the survey for their time and contributions.