Making the socioeconomic impact measurable

Ingrid Wilbacher[1)], Sabrina Winkler[2)], Gottfried Endel[1)]
1) Main Association of Austrian Social Insurance Institutions, 2) Research fellow University of Vienna
ingrid.wilbacher@hvb.sozvers.at

BACKGROUND / OBJECTIVES

-The influence of social factors on health is well known, discussed and evaluated.
-The detection of the socioeconomic status (SES) is much more difficult, differs by culture (nation) and is usually measured by questionnaire or by using age, gender and income. This includes the bias of currency, while the SES is always influenced by the whole CV.
-The legal framework of the Austrian social insurance system distinguishes 566 **entitlement conditions**, which are determined by current occupation or living conditions. All entitlements of a all persons are stored in a central database (for pension calculation). These entitlement conditions are standardized and were **put into an index** to detect the SES.
We want to determinate the social epidemiology in Austria. This is the report of the process of developing and validating.

METHODS

- We ranked these 566 entitlement conditions **according to the WHO social determinants of health** (including social gradient, stress, social exclusion, work and unemployment, and added the estimated income level for Austria as a surrogate for the social support domain) and
- developed an index-value (1-4) for each entitlement condition to calculate a socioeconomic index value, which is the **weighted mean** of all entitlements a person has gained **in the last 30 years**.

The calculation into the past:

$$\frac{SES_{359}*a_{359}+SES_{358}*a_{358}+\ldots+SES_1*a_1}{a_{359}+a_{358}+\ldots a_1} = \text{weighted mean over 359 months}$$

a = weight
SES = Index value for social determinants of health
Footnote = month from 30 years up to 1 month ago.
End = 359. Month No. 360 = current month.

Quality checks:
- **ranking** in a qualitative way **by one person, checked by a second**
- **results** were **checked according to the Austrian social insurance law** as basic for the entitlement
- critical **peer discussion** by random selections
- check for **nomenclature correlation**, by clustering similar results
- evaluate **1000 test data** from real (anonymized) persons

Examples of generating the SES are shown in Table 1.

Personalized data were only used in de-identification.

Validation checks:
- We clustered SES results by districts (of the City of Vienna) and compared them with official "social" data (Fig. 1 and 2)
- and with hospital admission data due to ICD 10 diagnosis (Fig. 3)

Table 1

entitlement condition	Legal basic	social stress	social exclusion	work and unemployment	social gradient	estimated income	Mean	social stress	social exclusion	work and unemployment	social gradient (occupation)	estimated income level for Austria
old age pension	ASVG, neutrale Zeit, PVA (Ang)	4	2	1	2	3	**2,4**	pension (age)	low social exclusion due to pension (occupational peer lost)	stable income	middle status	in Austria usually in the lower middle
obligatory pension insured in ASVG (employee)	ASVG, Beitragszeit/Pflicht, PVA(Ang)	1	1	1	2	2	**1,4**	no sign for social stress	no sign for social exclusion	stable income	middle status, skilled non manual work	in Austria usually in the upper middle
contributory record for exemplary damages	ASVG, Beitragszeit/Pflicht, PVA(Ang)	4	4	1	4	4	**3,4**	poverty risk	prison (stigma)	stable income (existence secured)	low status	in Austria usually low charged, or no income
repurchase for university time	ASVG, GSVG, BSVG; Teilpflichtversicherungszeit, PVA(Arb), PVA(Ang), VA Berg (Ang), VA Berg (Arb), VA Eisenb., SVGW (FSVG), SVGW (GSVG), SVB	1	1	1	1	1	**1**	no sign for social stress	no sign for social exclusion	stable income (repurchase possible)	high status, expert, management, technical expert, education, hoher Status (=university level)	in Austria usually good charged (=academic)
maternity protection	ASVG, Teilpflichtversicherungszeit, PVA(Arb), PVA(Ang), VA Berg (Ang), VA Berg (Arb), VA Eisenb.	2	2	1	2	3	**2**	ev social stress (dependency)	ev. social exclusion, reduced social contacts	stable income	middle status	in Austria usually in the lower middle
sickness benefit	ASVG, Teilpflichtversicherungszeit, PVA(Arb), PVA(Ang), VA Berg (Ang), VA Berg (Arb), VA Eisenb.	4	3	1	2	3	**2,6**	dependency, illness	social insecureness (longterm illness)	stable income	middle status	in Austria usually in the lower middle
unemployment benefit	ASVG, Teilpflichtversicherungszeit, PVA(Arb), PVA(Ang), VA Berg (Ang), VA Berg (Arb), VA Eisenb.	3	3	4	2	3	**3**	social stress	social insecureness	no work	middle status, skilled non manual work	in Austria usually in the lower middle
repurchase of insurance time (ASVG)	ASVG, Beitragszeit/Freiwillig, PV(Ang)	2	1	1	2	2	**1,6**	ev social stress, pension near	no sign for social exclusion	stable income (repurchase possible)	middle status, skilled non manual work	in Austria usually in the upper middle
full insurance coverage due to several precary work contracts - worker	ASVG, Beitragszeit/Pflicht, PVA(Ang), VA Berg. (ANG), VA Berg. (ARB)	3	3	2	3	3	**2,8**	social stress, precary work situation	social unstableness due to precary work	precary work	low status, skilled or partly skilled manual work	in Austria usually in the lower middle
unemployment assistance	ASVG, Teilpflichtversicherungszeit, PVA(Arb), PVA(Ang), VA Berg (Ang), VA Berg (Arb), VA Eisenb.	4	4	4	4	4	**4**	dependency, poverty risk	need for social support	no work	low status, unskilled work	in Austria usually low charged, or no income
early retirement due to longterm insurance	GSVG, neutrale Zeit, SVGW (FSVG), SVGW (GSVG)	4	2	1	2	2	**2,2**	pension (age)	low social exclusion due to pension (occupational peer lost)	stable income	middle status, skilled non manual work	in Austria usually in the upper middle
self insurance § 16a	ASVG, Beitragszeit/Freiwillig, PV(Ang)	2	2	2	2	2	**2**	ev social stress (change in life)	ev social exclusion (change in life)	precary work (need for self insurance)	middle status, skilled non manual work	in Austria usually in the good middle (FSVG, GSVG)
bereavement pension	Sonstige Zeit	2	2	1	2	3	**2**	ev socialer stress (orphan)	ev social exclusion (change in life)	stable income	middle status	in Austria usually in the lower middle
obbligatory health insurance (ASVG) - asylum seeker or refugee	ASVG, Sonstige Zeit	4	4	4	4	4	**4**	dependency, poverty risk	need for social support	no work	low status	in Austria usually low charged, or no income
health insurance as a relative	ASVG, Sonstige Zeit	3	3	4	3	4	**3,4**	dependency	social unstableness due to dependency	no work	low status (i.e. as housewife)	in Austria usually low charged, or no income
family hospice leave	ASVG, BSVG, Beitragszeit/Pflicht, PVA(Arb), PVA(Ang), VA Berg (Ang), VA Berg (Arb), VA Eisenb.	4	3	2	3	4	**3,2**	dependency, poverty risk, confrontation with loss of relatives	social unstableness, exclusion due to defined time consume	precary work (lenght unclear)	low status (nursing)	in Austria usually low charged, or no income
credits according to § 13 Bundesbezügegesetz (federal recipient law)	ASVG, Beitragszeit/Pflicht, VA Berg (Ang), VA Berg (Arb)	2	1	2	2	1	**1,6**	ev social stress change into pension, partly received pension (for governmental part time work, no employment)	no sign for social exclusion	precary work (only chargings for part time)	middle status, skilled non manual work (additional job)	in Austria usually good charged

RESULTS

Persons living in Viennese districts with lower social burden of diseases (lower SES index value, higher social status) suffer more often from *Injury, poisoning and certain other consequences of external causes , Neoplasms, Diseases of the eye and adnexa and Diseases of the skin and subcutaneous tissue.*

Persons living in Viennese districts with higher social burden of diseases (higher SES index value, lower social status) suffer more often from *Diseases of the respiratory system, Pregnancy, childbirth and the puerperium, Certain conditions originating in the perinatal period, Endocrine, nutritional and metabolic diseases and Diseases of the genitourinary system.* This fits mainly to the literature.

The SES values defined by our index and the social variables extracted from official data (income, educational level) corrleated by district. (Fig. 1 and Fig. 2)
The burden of special diseases (ICD 10 coded) correlated with our SES fit to results from the literature. (Fig. 3)

Figure 1

SES values for inhabitants of the City of Vienna by districts and education levels from official statistical data wien.gv.at

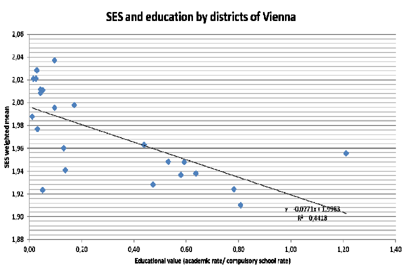

Figure 2

SES values for inhabitants of the City of Vienna by districts an income level from official statistical data wien.gv.at

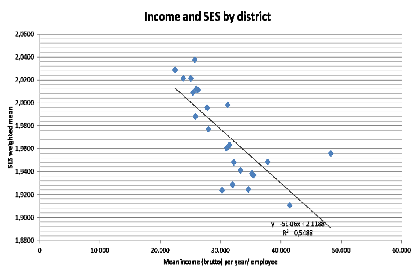

Figure 3

Correlation between SES by inhabitants of the City of Vienna by districts and hospital admission diagnoses by ICD 10

ICD 10	Titel	R2 (districts of Vienna)	Correlation hospital stay and SES
A00-B99	Certain infectious and parasitic diseases	3,47	pos
C00-D48	Neoplasms	6,38	neg
D50-D90	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	1,39	pos
E00-E90	Endocrine, nutritional and metabolic diseases	5,84	pos
F00-F99	Mental and behavioural disorders	0,01	0,00
G00-G99	Diseases of the nervous system	3,30	neg
H00-H59	Diseases of the eye and adnexa	5,18	neg
H60-H95	Diseases of the ear and mastoid process	0,15	0,00
I00-I99	Diseases of the circulatory system	0,42	0,00
J00-J99	Diseases of the respiratory system	20,30	pos
K00-K93	Diseases of the digestive system	1,85	neg
L00-L99	Diseases of the skin and subcutaneous tissue	9,60	neg
M00-M99	Diseases of the musculoskeletal system and connective tissue	4,31	neg
N00-N99	Diseases of the genitourinary system	[illegible]	pos
O00-O99	Pregnancy, childbirth and the puerperium	51,57	pos
P00-P96	Certain conditions originating in the perinatal period	20,12	pos
Q00-Q99	Congenital malformations, deformations and chromosomal abnormalities	2,13	pos
R00-R99	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	1,05	neg
S00-T98	Injury, poisoning and certain other consequences of external causes	32,92	neg
Z00-Z99	Factors influencing health status and contact with health services	0,00	0,00

CONCLUSIONS

We have a valid SES index that can be connected to health care utilization data for planning issues. Innovative is the inclusion of a persons' past.

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