Inequalities in Health and Health Care in Serbia: An Inverse Health Care Law; but also Inverse SMR!

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BACKGROUND OF HEALTH AND HEALTH CARE

Serbia

- Recently emerged from Soviet Empire and form break up of Yugoslavia
- One third off land in Central Belgrade owned / covered by hospitals
- Population about 7.8 million excluding Kosovo
- Life Expectancy 66 males,71 females; infant mortality 9.5 per thousand

Health in Serbia

- In 2007, 60% of population assessed their health as good and 19% as bad (Graph 1). For people 15+, 56% good, and 22% as bad.
- 32% of those in bottom quintile, and 12% of richest quintile reported health as bad.
- Proportion of population that assesses their health status as good increases with economic prosperity whereas the percentage of inhabitants, who assess their health as bad, decreases (Graph 2)

Chronic Illness

- Nearly one third of the population in Serbia (32 percent) reported that they suffered from a longlasting disease or a health problem. Women reported it more frequently than men (36 percent and 28 percent respectively), and it was particularly high in those aged over 60 (73 percent).
- The frequency of this finding was also higher among poorer respondents who fell into the first and second quintile (30 percent and 29 percent).

Current Use of Health Care

- In 2007, 35% of population used outpatient health services in the previous month, and hospital treatment in the previous 12 months.
- Females more likely to use services than males, as well as those aged 45+ years, particularly those aged 65+ (58%.
- Urban residents were more likely to use health services (37% compared to 32% elsewhere).
- Less usage by poor and socially vulnerable (24% of those below poverty line, 26% of uninsured, 22% of unemployed, 25% of Roma.

Use of Health Care by Chronically and Acutely Ill

- 67 percent of chronically and acutely ill used health services.
- Significantly less use of services by ill population below the poverty line (52% compared to 68% above the line), and the uninsured (56% compared to 68% of the insured; and by refugees and by IDPs

Non-Use of Health Care Services

- No need ot use health care services: 56% of ill people.
- Minor health problems could be solved with self-care (26%).
- Not enough money for health care services: 9% of non urban areas 4% or urban areas; t
- Three times more likely among those below the poverty line; 13% of poorest and 1% of richest quintiles.
- In Roma population, 33% did not use health care services for these reasons, 6x more than overall.

ORGANISATION AND STAFFING OF PRIMARY HEALTH CARE

Organisation of Health Care

- Primary Health Care organised through local authorities, 136 Dom Zdravija's
- Regulated programmes of care for pre-school, Children and Women and for specific conditions
- Each group has specific staffing norms per a specific number of the corresponding age group in the population for Doctors, Consultants, Nurses, Laboratory Diagnostics, Radiology, Non-medical staff (administration and technical).

Sector	Doctors	Nur-ses	Popula-tion Base	Annual Workload norms
Salary Units	22.55	12.6 -14.4		
General and Occ.Med.	1	1.1	1600 > 18	7,200 exams
Pre-school Children	1 spec pedi'n	1.5	850 aged 0 to 6	6000 exams
School children	I doctor	1.1	1500 aged 7-18	6,000 exams
Women	1 spec obs&gyn	1.33		

Step 2 Staff Required

- Step 2: Using population estimates based on 2001 Census, these ratios have then been used to calculate for ‘team’ and then each DZ, the number of staff of each type
- Employment law (a) does not allow for part time working, so whole numbers of each specialty grouping; and, (b) fractions of a person are always rounded up.

Steps 3 and 4

- Step 3: Current relative salary rates for each of the different staff inputs multiplied by the number of employees of each type give the cost of each team, and then DZ.
- Step 4: Given service activity levels, these amounts can be translated into prices for each service and a fixed percentage is then added on for drugs and materials.

CURRENT BUDGET ALLOCATIONS, AND RELATION TO NEED VARIABLES

Budget Allocations and Need

- Rural areas over-staffed and large metropolitan areas relatively under staffed.
- Large inefficiencies in the provision of health care
- These variations (inequalities) are largely unrelated to income or mortality, generating an *Inverse Health Care Law*.
- Correlation between income per capita and actual budget is 0.118; and with proposed budget is -0.039

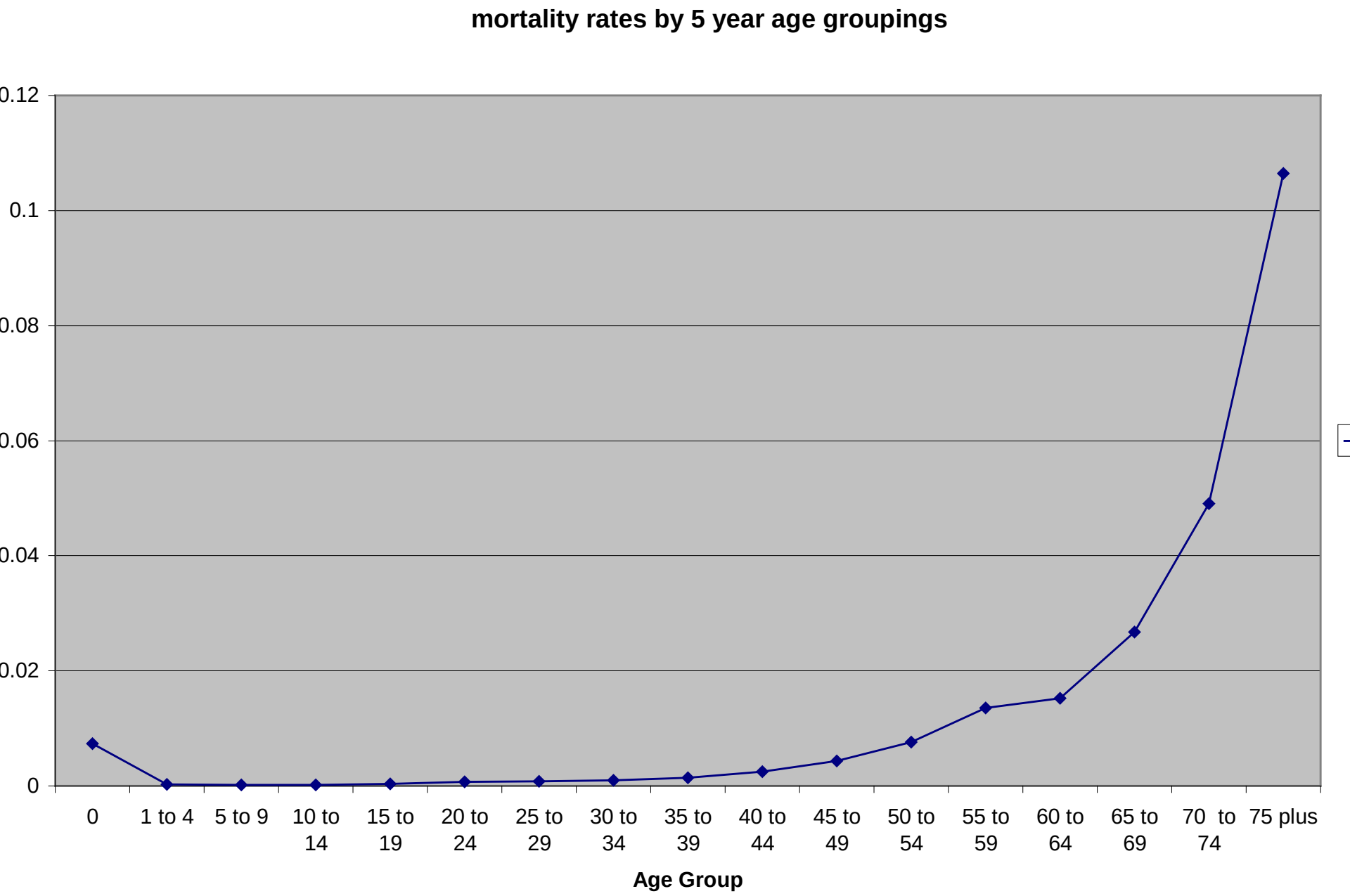
Correlations between income per capita, Life Expectancy and Budgets

		Existing 2007 Budget pc	Hypothetical 2007 budget pc	Winners (+) and Losers (-)
	N	105.4	117.6	105.4
Income per Capita	Corr.	0.118	0.039	-0.070
	Sig.	0.228	0.674	0.475
Life Expectancy	Corr.	0.049	0.019	0.000
	Sig.	0.620	0.837	0.997

DEVELOPING A MORE APPROPRIATE ALLOCATION FORMULA

More Appropriate Allocation

- In principle, a capitation formula includes adjustments for age, for needs and for costs of providing services: so weighting for any unit is
- Weighting = (1 + a)*(1 + n)*(1 + c).
- Age weighting often based on level of (costed) utlisation of services by different age groups. Above procedure effectively provides an age weighting because input staff norms based on assumptions about levels of service that could and should be provided for age group.
- Age Distribution of Mortality is Typical


mortality rates by 5 year age groupings
0.12
0.1
0.08
0.06
0.04
0.02
0
0
1 to 4
5 to 9
10 to 14
15 to 19
20 to 24
25 to 29
30 to 34
35 to 39
40 to 44
45 to 49
50 to 54
55 to 59
60 to 64
65 to 69
70 to 74
75 plus
Age Group

Difficulty of calculating Age Adjustment

- Extensive data available from National Statistics Office, Public Health Institute and Health Insurance Fund, BUT:
- No age breakdown of (costed) utilisation
- Alternatives: manipulate age distribution of mortality? or import from elsewhere? BUT
- Found extensive patient satisfaction data carried out for a thesis.

Using Patient Satisfaction Data

- Mean of patient visits calculated separately for the adult (18+, N = 98,947) general practice dataset, the pediatric dataset (0-18 year olds, N = 50,728) and the gynaecological dataset (females 15+, N = 9,004).
- N of patient visits recorded as 1 (1-2 visits), 2 (3-5 visits), 3 (6+ visits), 9 (not known). To partly compensate for fact that sample based on those who were visiting doctors, these categories have been recoded as 1 = 1 visit (rather than 1.5 visits), 2 = 3 visits (rather than 4 visits) and 3 = 8 visits (rather than 9 or 10 which would be a more natural estimate of those with 6 or more visits).

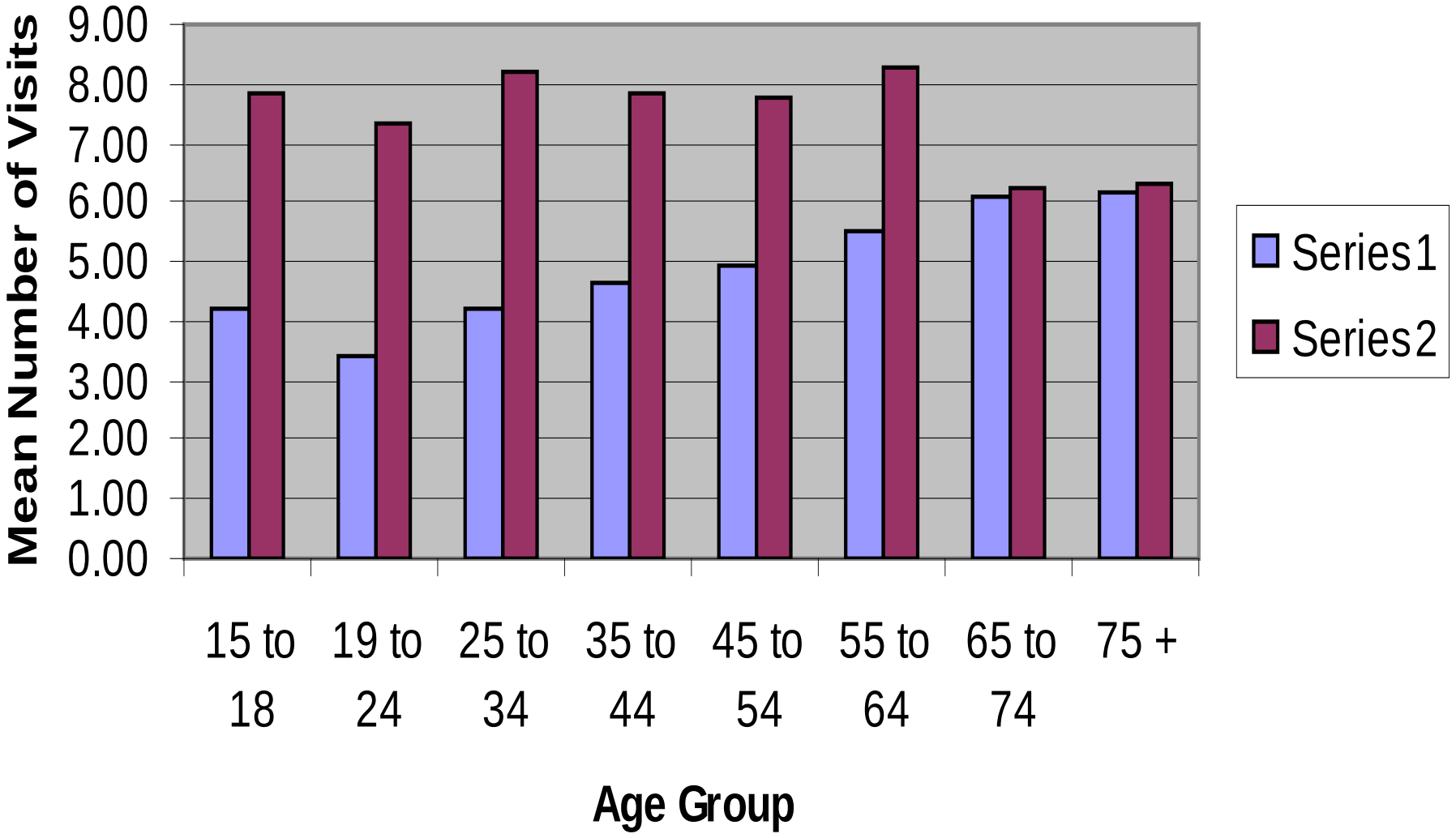
Age Distribution in Samples

- Age recorded in all three data sets as follows:
- 1 = 0 to 2 year old; 2 = 3 to 6 year olds; 3 = 7 to 10 year olds; 4 = 11 to 14 year olds; 5 = 15 to 18 year olds; 6 = 19 to 24 year olds; 7 = 25 to 34 year olds; 8 = 35 to 44 year olds; 9 = 45 to 54 year olds; 10 = 55 to 64 year olds; 11 = 65 yo 74 year olds; 12 = 75+ year olds
- The expected number of visits in each DZ was then calculated; and the expected number of visits per capita – relative to the overall national mean of 5.8873 –taken as the age adjustment.

Estimated Number of Vists in each Age-Sex group

Age	Both	Males	Females
0 to 2	4.62		
3 to 6	4.57		
7 to 10	3.88		
11 to 14	3.57		
15 to 18		4.25	7.86
19 to 24		3.41	7.36
25 to 34		4.22	8.19
35 to 44		4.61	7.83
45 to 54		4.91	7.79
55 to 64		5.49	8.26
65 to 74		6.07	6.25
75 +		6.17	6.34

Age Sex Utilisation 15+



Data for Need Factor: available reliable, cannot be manipulated

Looked for indicators of, e.g.

- Employment/unemployment levels;
- Housing conditions;
- Income Levels
- Proportions of population being cared for at home by a relative.

Nomenclature in next Table

- A = Salary per Employee;
- B = Life Expectancy at Birth Males;
- C = Life Expectancy at Birth Females;
- D = Unemployment Rate;
- E = Standardised Mortality Ratio (All Ages);
- F = Person Power Salary Units pc (age weighted);
- G = Person Power Salary Units pc (age weighted) Full Time

		LE birth males	LE birth females	Deaths per 1000	Infant Deaths per 1000	SMR all age groups
Unemployment per 1000	Corr.	-0.191	-0.370	-0.079	-0.054	0.413
	Sig.	0.026	0.000	0.357	0.579	0.000
Proportion years of education less than 4 years all	Corr.	0.300	0.147	0.273	0.270	-0.090
	Sig..	0.000	0.086	0.001	0.005	0.300
	N	137	137	137	106	136
Cars per Household	Corr.	-0.151	0.079	-0.374	-0.268	-0.129
	Sig..	0.079	0.364	0.000	0.006	0.135
Road density	Corr.	0.212	0.243	-0.081	-0.060	-0.050
	Sig..	0.013	0.004	0.346	0.544	0.565
National Income per 1000	Corr.	-0.001	-0.127	-0.253	-0.232	-0.062
	Sig..	0.987	0.149	0.000	0.019	0.488

Correlations between Need and Health Variables

- Neither the number of new dwellings per 100, nor the value of new constructions, nor floor space (square metres) per 1000 are correlated with any of the ‘health’ variables.
- Proportion of the population with educational attainment less than 4 years is correlated positively with Life Expectancy at birth but also positively with deaths per 1000 and infant deaths per 1000
- Unemployment per 1000 is correlated negatively with Life Expectancy at birth for all and for females but not with deaths per 1000 or infant deaths per 1000; but road density is correlated positively with Life Expectancy at birth, but not with death variables.
- Cars per household are negatively correlated per household with deaths per 1000 and infant deaths per 1000
- National Income per capita is not correlated with Life Expectancy at birth, but is highly negatively correlated with deaths per thousand and infant deaths per 1000.

Inverse relation with SMR

- Standardised Mortality Rate 61 to 136 ;
- Strong correlation with unemployment (0.413)
- but correlated -0.062 with income per capita
- Same results with death rates as with SMR: deaths per 1000 and infant deaths per 1000 are correlated -0.253, -0.232 with income per capita

- Inequalities in death rates unrelated to inequalities in income at national level
- In order to generate formula a more precise, need to understand how this anomalous situation has arisen

Is Belgrade different?

- Analyses carried out separately for 16 DZs in Belgrade and other 120 DZs
- Correlation of national income per capita with SMR (all ages) higher (0.317) in Belgrade but not significant; although
- Correlation of low educational attainment significantly positive in Belgrade and significantly negative outside Belgrade
- Correlation of cars per household negative in Belgrade; positive outside Belgrade

Distinctive Patterns in Belgrade

- Understaffing because people (including staff) fled Belgrade during war,
- Positive correlations with income related variables because relatively wealthy people living outside Belgrade come to Belgrade when they are seriously ill (because there are better hospitals)

Other Interpretations of Anomalies

- Alcohol, for Eastern Europe country, is relatively expensive so more available to the wealthier. UNLIKELY
- Cross border migration and internal displacement of people: break up of former Yugoslavia; and / or tight bureaucratic control. POSSIBLE
- Most poverty measures based on information / records about those employed in the formal sector, a poor proxy for actual level of poverty; LIKELY