

WP 5: Methods for evaluating service use and costs in an integrated social and healthcare system

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Objectives (IMPRO/WP5)

- **WP5 develops and demonstrates methods for assessing the cost-effectiveness of integrated social and healthcare services**
 - In value-based decision-making, costing data must be linked to outcomes that are meaningful to the patients
 - A specific focus on housing arrangements (social care) that indicate individuals' ability to function as well as the cost of social care
- **WP5's specific task:**
 - Investigates *patient grouping* and *cost calculation methods* that contain all services relevant in integrated care
 - Demonstrates how cost and outcomes of care can be analysed using actual service data from different regions and for different patient groups
 - Using the costing and other ETL procedures to finalize the research data warehouse, provides support and enriched data to all other WPs

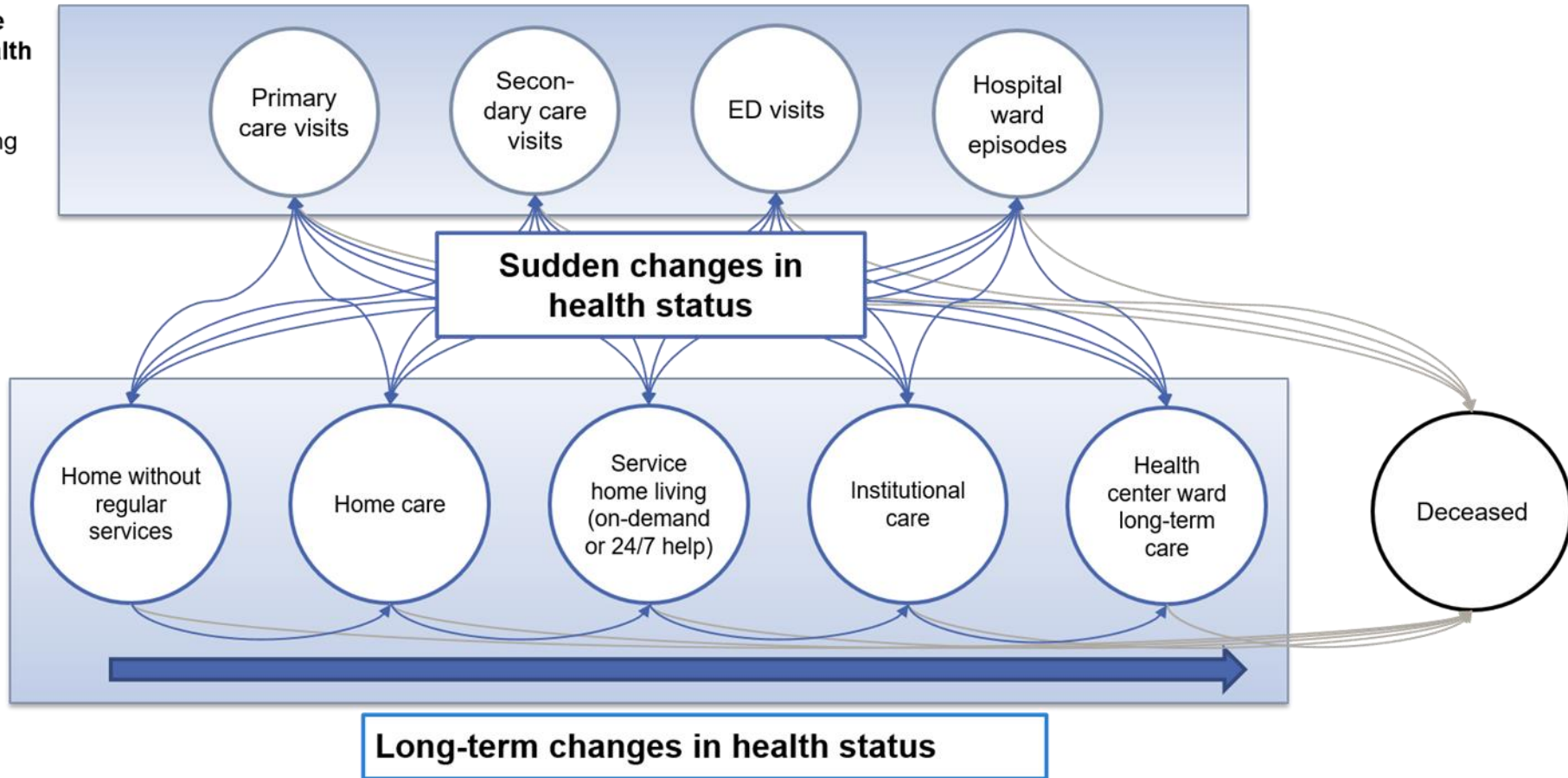
State-transition model of health and social care system

Resource-based use in hospitals and health centers:

- Temporary
- Health-conserving or reactive

Long-term states of the elderly:

- Continuous
- Everyday supportive care



Research data base – contents and supplementary information

- **Service use contains primary outpatient and inpatient care, hospital care as well as social care including home care, sheltered and nursing home services and other institutional care for all patient groups**
 - T2D, T1D, AF, AUD, CHD, control group
 - 57 673 patients, 5y follow-up 2014-2018, 12.9 million contacts
- **Service use data contains e.g.:**
 - diagnoses (ICD10, ICPC2)
 - procedures (NCSP)
 - contact type (visit, admission, phone call,..., emergency, scheduled)
 - date of the contact
 - care provider organization and profession

Costing methodology

- **Hospital costs based on Siun sote's cost accounting**
 - hospital outpatient visits
 - hospital discharges
- **Primary care outpatient costs**
 - contact level grouping using simplified APR/pDRG grouping system and related cost weights (standard costing)
- **Primary care inpatient (terveyskeskus vos)**
 - standard price list costs for acute and long-term care
- **Social care, long-term and home care visits**
 - standard price list per diem and per visits costs

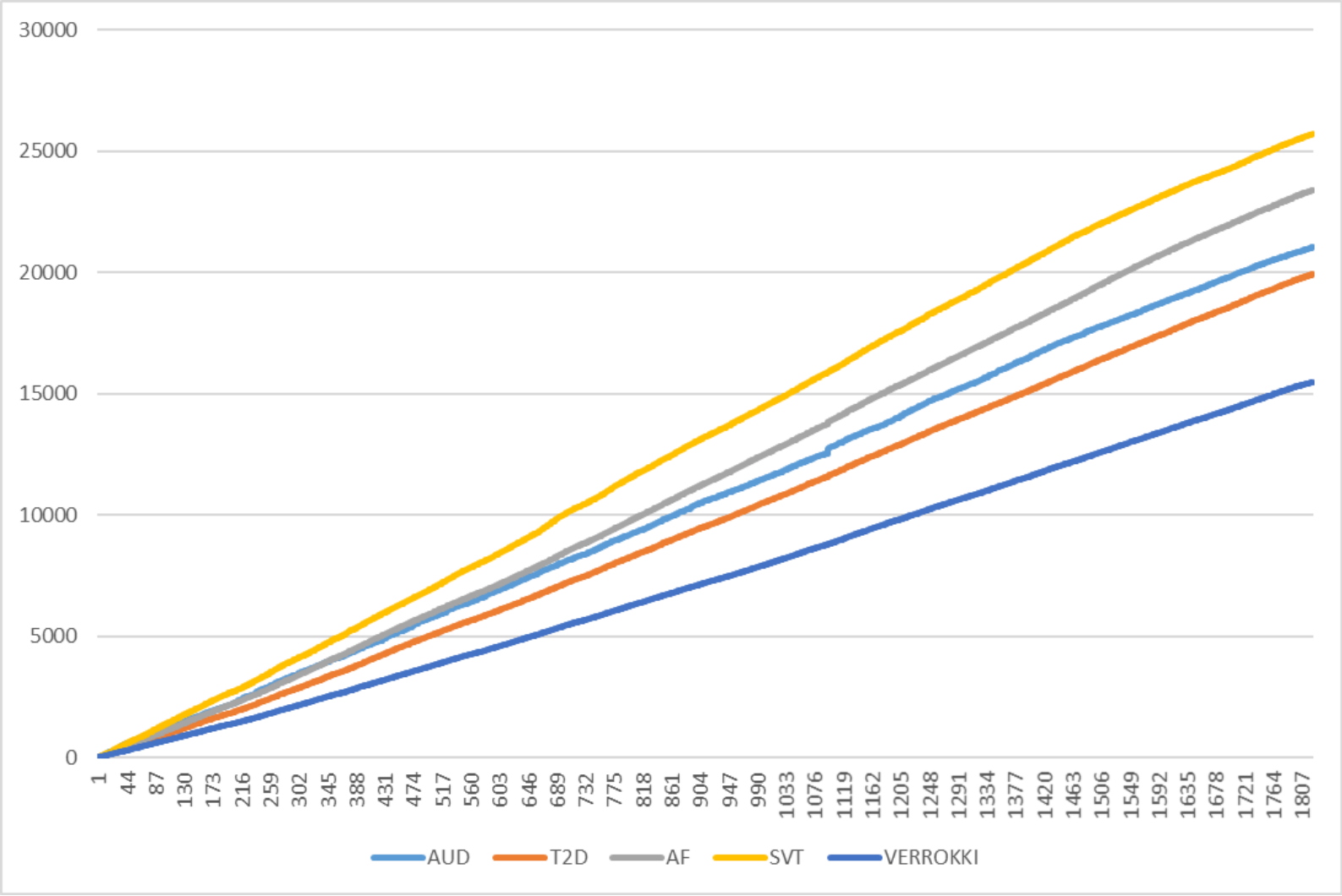
Some additional end-points calculated and included in the IMPRO research database

- **Multimorbidity – the number of days between 1.1.2014 and the date when becoming multimorbid**
- **Costly patient – the number of days between 1.1.2014 and the date when exceeding the 90% cost limit**
- **Death - overall survival**
- **Housing state transition - the number of days between 1.1.2014 and the transfer day to service home, long-term care or home care services**
- **Clinical end-points and events: AMI, Stroke, ICH, GI-bleed, dementia onset....**

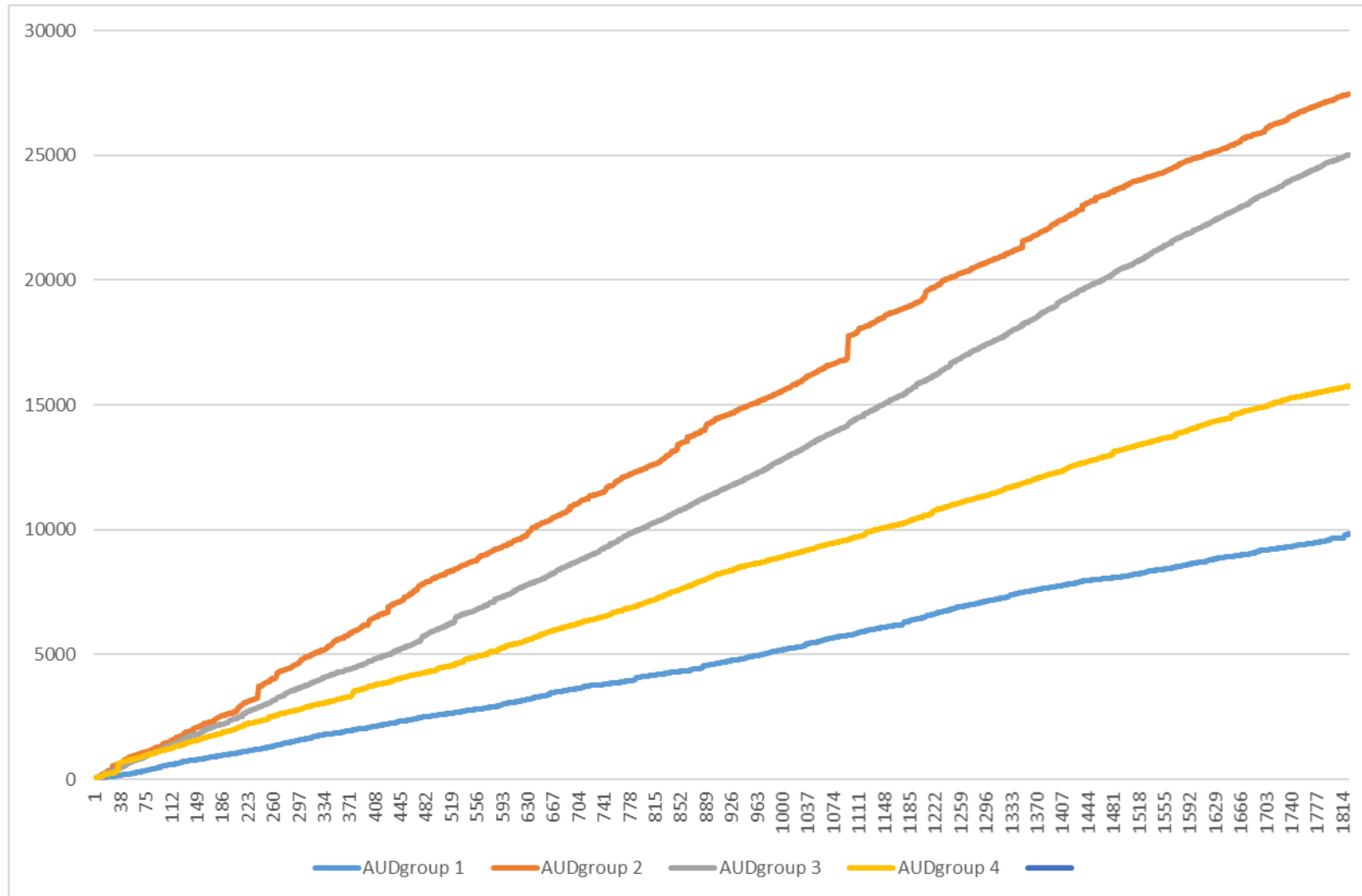
Some additional end-points calculated and included in the IMPRO research database

- **Postal code for each individual**
- **Small-area socio-economic and environmental indicators based on postal codes**
- **Travel time to the primary care center in the catchment area**

Example 1: daily cumulative (sote) costs per patient



Example 2: daily cumulative (sote) costs per patient, AUD sub-groups

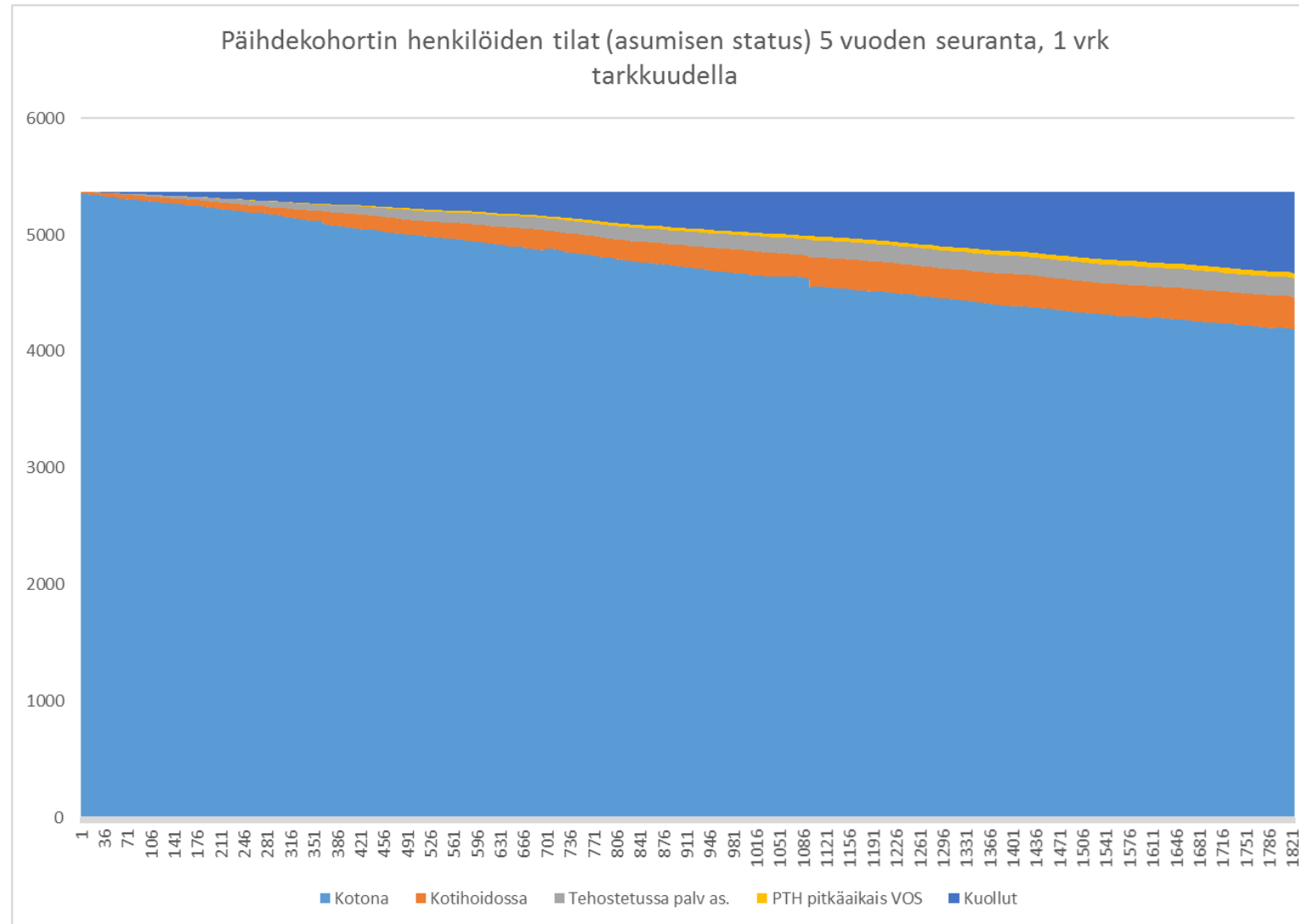


Explaining cost differences by modelling

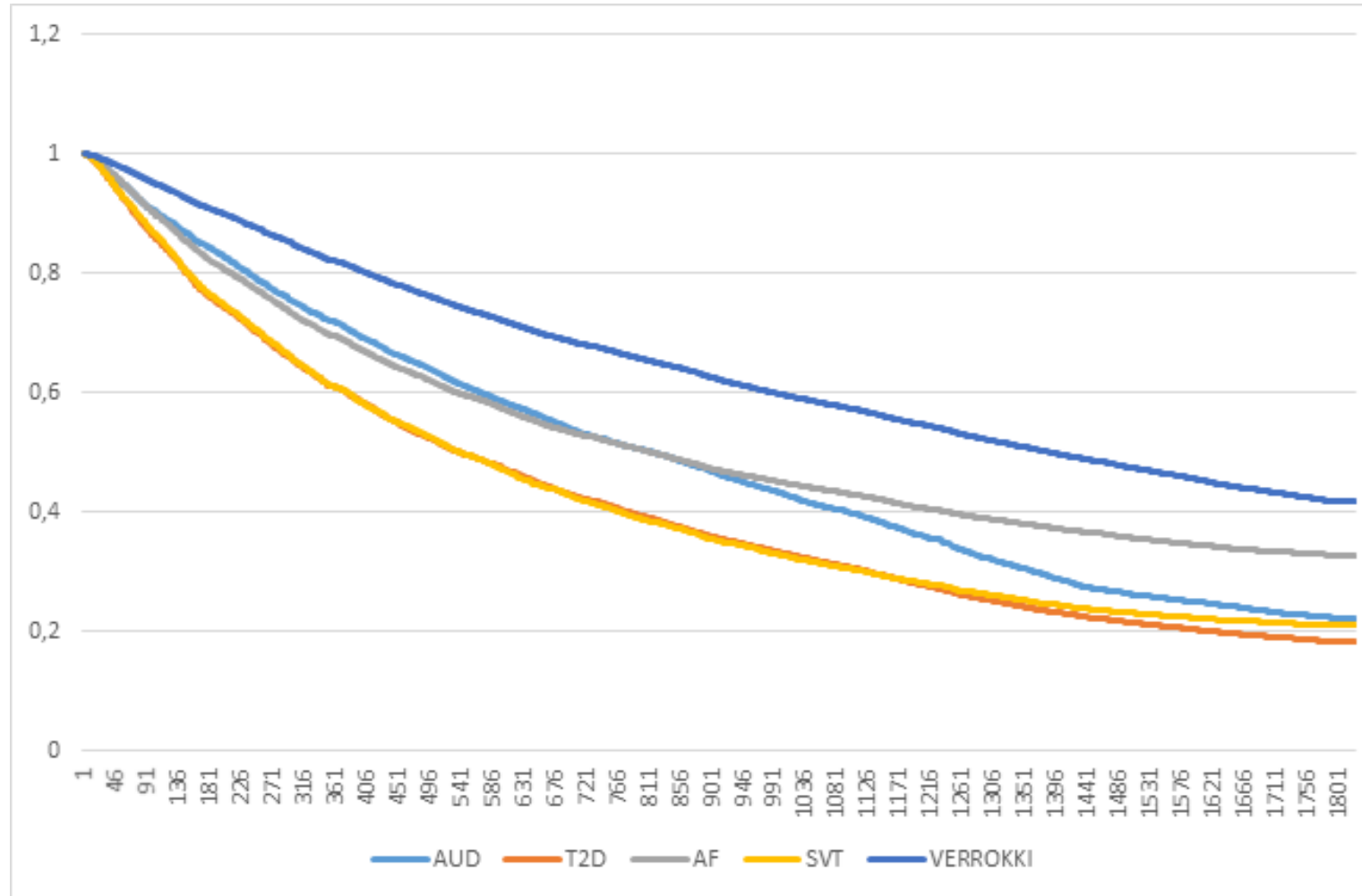
Source	SS	df	MS	Number of obs	=	5,216
Model	1.7251e+12	20	8.6257e+10	F(20, 5195)	=	52.55
Residual	8.5274e+12	5,195	1.6415e+09	Prob > F	=	0.0000
Total	1.0253e+13	5,215	1.9660e+09	R-squared	=	0.1683
				Adj R-squared	=	0.1651
				Root MSE	=	40515

kust5v	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
sp	-1583.007	1251.744	-1.26	0.206	-4036.952	870.9375
ika018	-7150.474	3170.874	-2.26	0.024	-13366.72	-934.2256
ika1945	-2721.923	1341.465	-2.03	0.043	-5351.759	-92.08783
ika6675	11118.86	1939.494	5.73	0.000	7316.632	14921.08
ika7685	21615.5	3345.915	6.46	0.000	15056.1	28174.9
ikayli85	8435.923	8963.605	0.94	0.347	-9136.514	26008.36
multimorbid	11215.05	1467.175	7.64	0.000	8338.765	14091.33
perusastepros	-248.4133	129.1017	-1.92	0.054	-501.507	4.680316
tyotpros	-892.8858	302.2034	-2.95	0.003	-1485.332	-300.4399
mediaanitulo	-1.990308	.4456328	-4.47	0.000	-2.863936	-1.116681
omistuspros	-14.04474	67.37637	-0.21	0.835	-146.1308	118.0413
alkutuopros	-90.94825	55.01503	-1.65	0.098	-198.8009	16.90436
maaseutu	2749.611	1990.943	1.38	0.167	-1153.474	6652.696
taajama	-174.87	1816.636	-0.10	0.923	-3736.241	3386.501
matka_aika	.1042791	1.334684	0.08	0.938	-2.512262	2.72082
kothoiasiak	36267.08	2071.913	17.50	0.000	32205.26	40328.9
tehpalvasiak	18667.65	1991.651	9.37	0.000	14763.17	22572.12
audgroup1	-7314.356	1953.29	-3.74	0.000	-11143.63	-3485.086
audgroup2	6993.141	1646.134	4.25	0.000	3766.025	10220.26
audgroup3	4825.159	1576	3.06	0.002	1735.535	7914.783
_cons	60456.82	8697.952	6.95	0.000	43405.17	77508.46

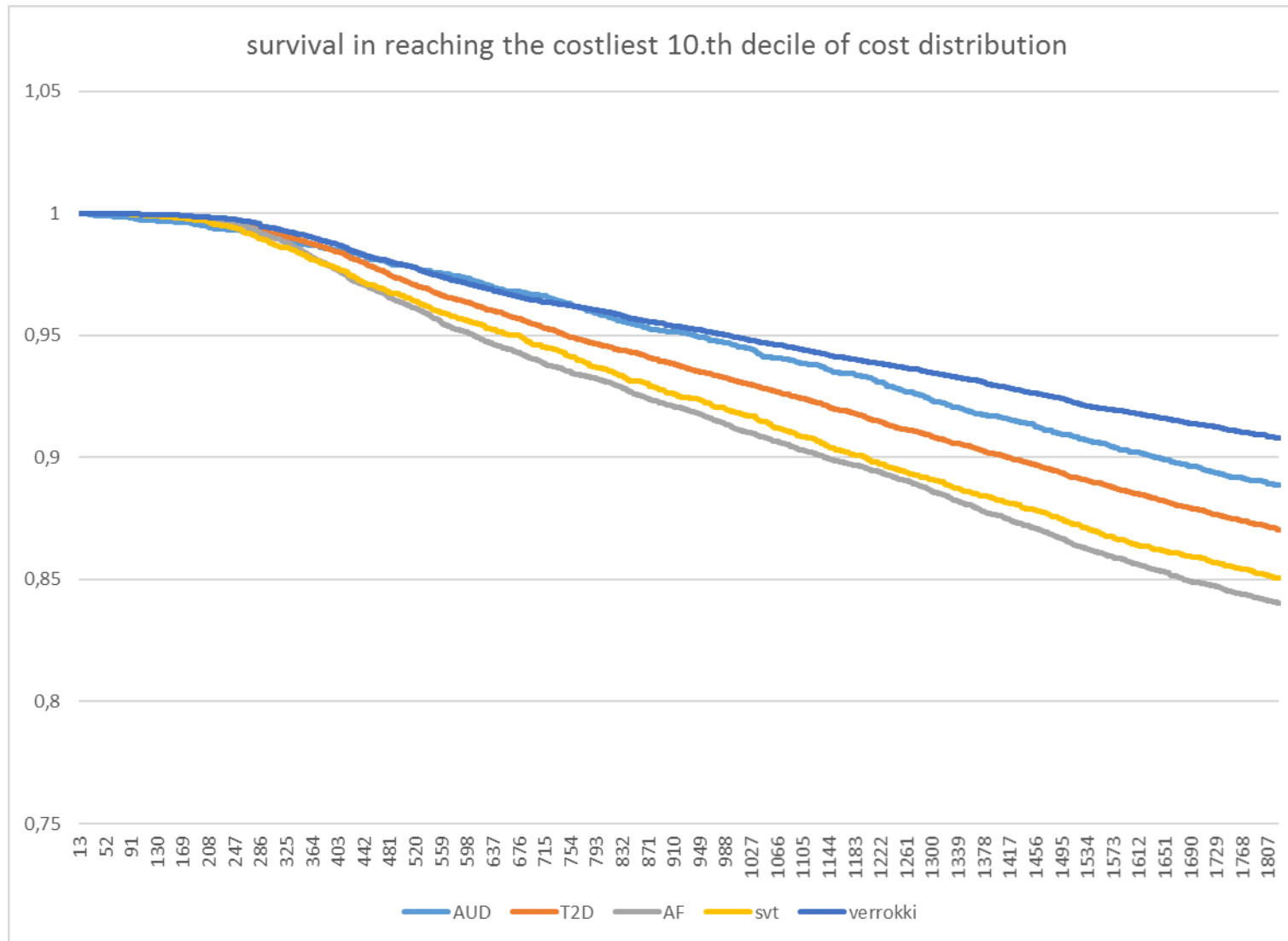
Example 3: Complete daily follow-up of housing status (AUD)



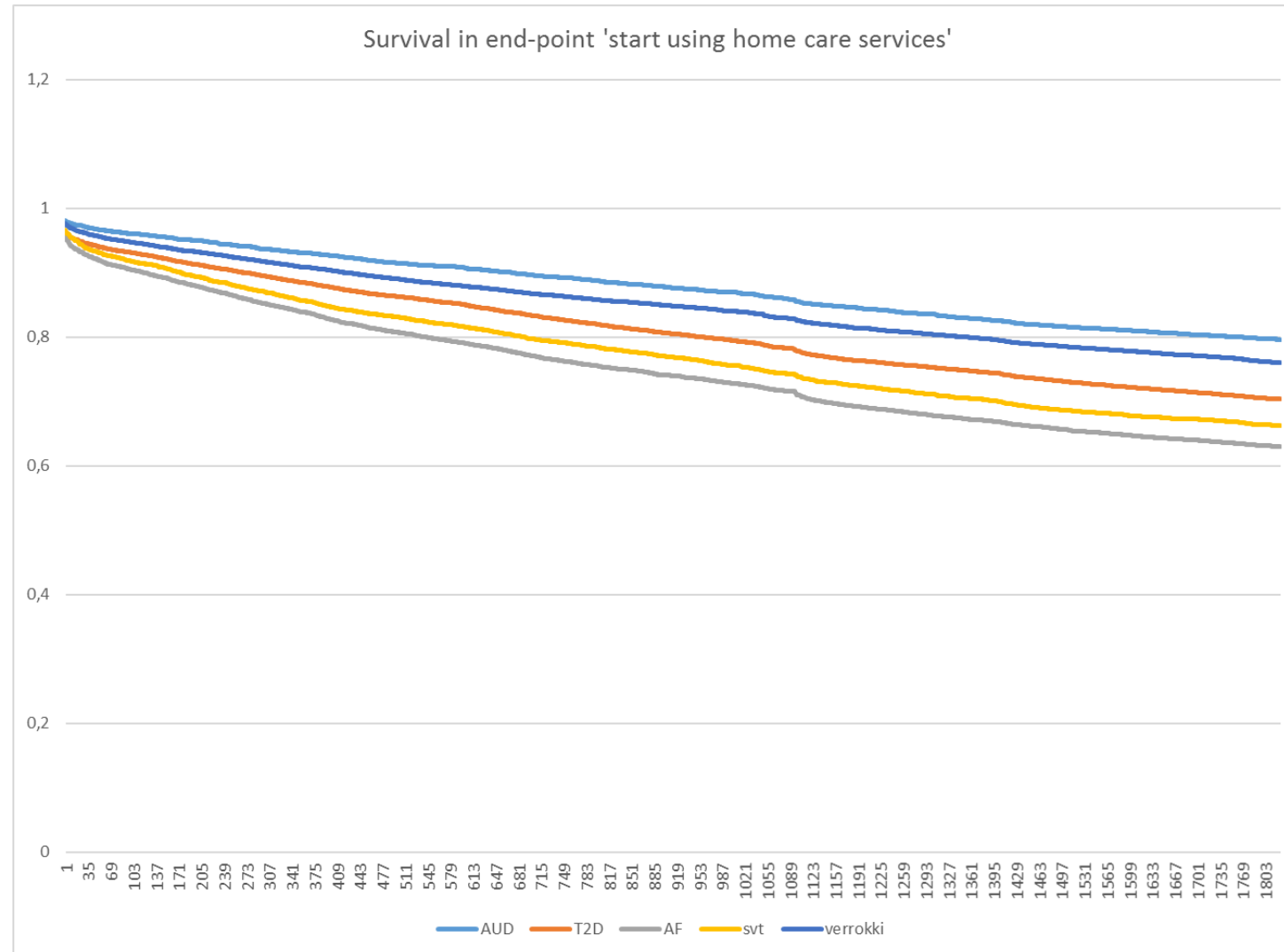
Example 4: survival in avoiding multimorbidity



Example 5: avoiding the 'kalliit potilaat' -category



Example 6: exploring the state transition to home care



Next steps – what is still missing?

- **Laboratory and other individual level measurements**
- **Medication data**
- **Distance/travel time data to care providers -> traveling costs**