

Quality-of-Care Indicators and Mortality in Patients with Stroke

A Nationwide Long-term Follow-up Study

DSKS 13.01.23

Aim

- To evaluate the association between fulfillment of quality indicators of acute stroke care included in the Danish Stroke Registry, and long-term mortality



- Admission to a stroke unit
- CT_MR
- Treatment with antiplatelet
- Treatment with anticoagulant
- Assessment by physiotherapist
- Assessment for nutritional risk
- Assessment occupational therapist
- Treatment with ultrasound (neck)
- Mobilisation
- Indirect dysphagia screening

Methods

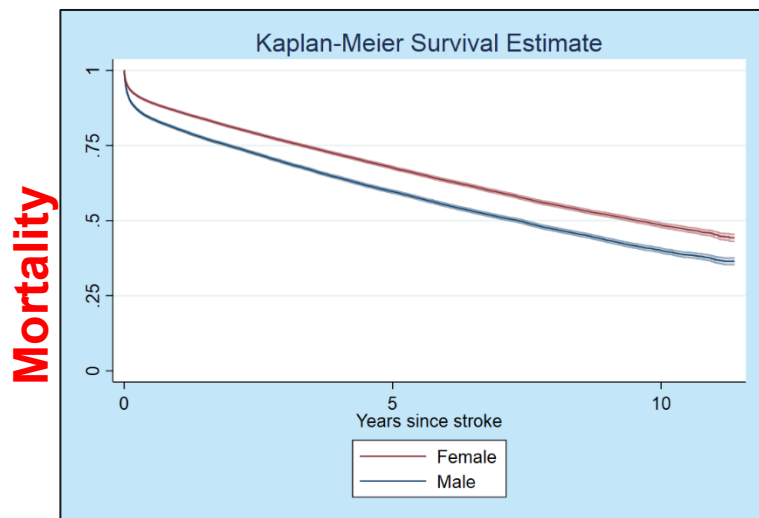
Resources

- Danish Stroke Registry (N=238.134)
- Danish National Patient Registry
- Danish Civil Registration System
- Ten individual quality-of-care indicators
- Cox proportional hazards regression to examine mortality
- Poisson regression to estimate relative risk
- Standardized relative survival

Sample

- January 2008 to December 2018
- Alive 4 days after admission
- I61, I63, I64
- First admission in Danish Stroke Registry
- No priori stroke
- Information on vital status
- Min 3 relevant indicators for everyone
- **N=93.749, (46% women), age 72 [62-81]**

Survival estimates and cox proportional hazards

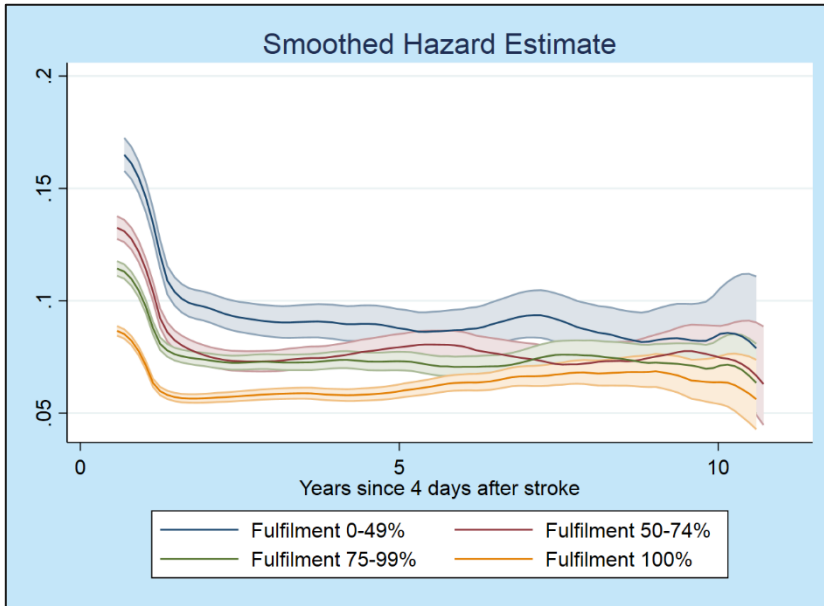


HR for Mortality			
Quality-of-Care Indicators	Unadjusted	Adjusted for Sex and Age	Fully Adjusted
Admission to a stroke unit	0.73 (0.68 : 0.78)	0.80 (0.76 : 0.85)	0.82 (0.77 : 0.87)
Examination with CT/MRI	0.89 (0.85 : 0.93)	0.99 (0.96 : 1.02)	0.86 (0.83 : 0.90)
Mobilization	0.56 (0.52 : 0.59)	0.66 (0.63 : 0.70)	0.85 (0.82 : 0.89)
Indirect dysphagia screening	0.76 (0.73 : 0.80)	0.84 (0.80 : 0.89)	0.89 (0.85 : 0.93)
Assessment by physiotherapist	0.85 (0.80 : 0.90)	0.85 (0.81 : 0.88)	0.89 (0.85 : 0.94)
Assessment by occupational therapist	0.84 (0.80 : 0.89)	0.85 (0.81 : 0.89)	0.88 (0.83 : 0.94)
Assessment for nutritional risk	0.65 (0.61 : 0.70)	0.76 (0.72 : 0.80)	0.86 (0.83 : 0.90)
Treatment with antiplatelet	0.54 (0.51 : 0.58)	0.65 (0.61 : 0.69)	0.73 (0.69 : 0.78)
Carotid vessel imaging with ultrasound	0.94 (0.87 : 1.01)	0.94 (0.88 : 0.99)	0.96 (0.90 : 1.03)
Treatment with anticoagulant	0.65 (0.58 : 0.73)	0.71 (0.64 : 0.78)	0.86 (0.77 : 0.96)

Fully Adjusted: Sex, age, marital status, housing, stroke type, SSS, myocardial infarct, atrial fibrillation, hypertension, diabetes, smoking, and department/hospital

Dosis-response hazards and relative risks

Dosis Response



RR for Dosis Response with 0-49% Fulfilment as Base Level			
Time from Admission	Fulfilment 50-74%	Fulfilment 75-99%	Fulfilment 100%
30-days	0.83 (0.75 : 0.92)	0.76 (0.68 : 0.83)	0.74 (0.67 : 0.82)
90-days	0.82 (0.77 : 0.88)	0.72 (0.68 : 0.77)	0.71 (0.66 : 0.75)
365-days	0.84 (0.80 : 0.89)	0.76 (0.71 : 0.81)	0.70 (0.66 : 0.74)
3-years	0.87 (0.84 : 0.91)	0.81 (0.78 : 0.84)	0.74 (0.71 : 0.77)
5-years	0.90 (0.87 : 0.92)	0.85 (0.82 : 0.88)	0.78 (0.75 : 0.80)
6-years	0.91 (0.88 : 0.94)	0.86 (0.83 : 0.90)	0.80 (0.77 : 0.83)
7-years	0.92 (0.90 : 0.95)	0.87 (0.84 : 0.91)	0.82 (0.80 : 0.85)
8-years	0.92 (0.90 : 0.94)	0.89 (0.85 : 0.92)	0.84 (0.82 : 0.87)
9-years	0.92 (0.89 : 0.94)	0.89 (0.86 : 0.92)	0.86 (0.83 : 0.89)
10-years	0.92 (0.90 : 0.95)	0.89 (0.86 : 0.92)	0.88 (0.85 : 0.91)

Fully Adjusted: Sex, age, marital status, housing, stroke type, SSS, myocardial infarct, atrial fibrillation, hypertension, diabetes, smoking, and department/hospital

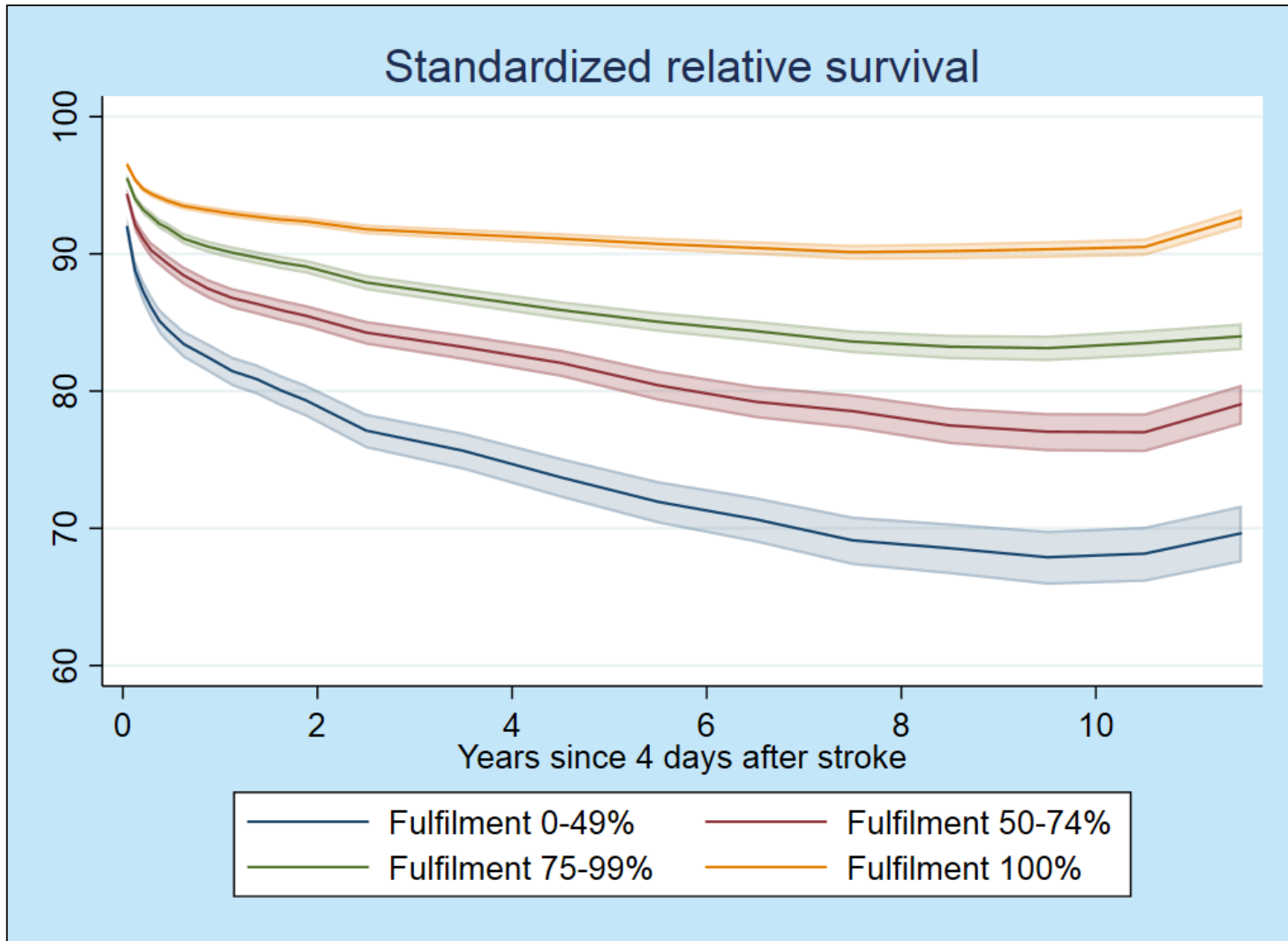
Standardized relative survival

Survival relative to background population, standardized by sex and age.

Time	Fulfilment 0-49%			Fulfilment 50-74%			Fulfilment 75-99%			Fulfilment 100%		
	RelS	Re_lo	Re_up	RelS	Re_lo	Re_up	RelS	Re_lo	Re_up	RelS	Re_lo	Re_up
	92.04	91.33	92.70	94.38	93.91	94.82	95.54	95.24	95.81	96.55	96.35	96.74
30-days	88.81	87.97	89.59	92.14	91.58	92.66	94.03	93.69	94.35	95.41	95.18	95.64
60-days	87.27	86.38	88.10	91.09	90.49	91.65	93.23	92.86	93.58	94.73	94.48	94.97
90-days	86.11	85.17	86.98	90.27	89.64	90.86	92.73	92.34	93.10	94.38	94.12	94.63
121-days	85.13	84.16	86.04	89.79	89.14	90.40	92.20	91.80	92.59	94.12	93.85	94.38
152-days	84.52	83.53	85.46	89.31	88.64	89.94	91.90	91.49	92.30	93.88	93.60	94.14
182-days	83.44	82.40	84.42	88.44	87.73	89.11	91.12	90.67	91.54	93.49	93.20	93.78
273-days	82.47	81.40	83.49	87.47	86.73	88.18	90.53	90.07	90.98	93.20	92.89	93.50
365-days	81.46	80.34	82.52	86.79	86.02	87.52	90.10	89.61	90.56	92.93	92.61	93.23
456-days	80.88	79.74	81.97	86.37	85.58	87.12	89.74	89.24	90.21	92.71	92.38	93.03
547-days	80.06	78.88	81.18	85.91	85.10	86.68	89.37	88.86	89.86	92.51	92.17	92.83
638-days	79.35	78.15	80.50	85.51	84.68	86.30	89.10	88.57	89.60	92.38	92.04	92.71
2-years	77.13	75.83	78.37	84.27	83.38	85.13	87.92	87.35	88.47	91.80	91.42	92.16
3-years	75.65	74.26	76.98	83.22	82.25	84.13	86.90	86.27	87.50	91.44	91.04	91.83
4-years	73.72	72.23	75.15	82.07	81.03	83.05	85.91	85.23	86.57	91.11	90.67	91.53
5-years	71.94	70.35	73.46	80.43	79.30	81.51	85.06	84.32	85.76	90.74	90.26	91.19
6-years	70.67	68.97	72.29	79.23	78.02	80.39	84.38	83.59	85.14	90.44	89.92	90.93
7-years	69.13	67.31	70.87	78.54	77.26	79.77	83.61	82.75	84.44	90.13	89.56	90.67
8-years	68.55	66.65	70.37	77.50	76.13	78.81	83.24	82.32	84.12	90.21	89.60	90.78
9-years	67.90	65.88	69.82	77.05	75.60	78.41	83.14	82.17	84.05	90.34	89.71	90.93
10-years	68.16	66.09	70.13	77.01	75.55	78.39	83.52	82.52	84.46	90.51	89.85	91.13

Standardized relative survival

Survival relative to background population, standardized by sex and age.



Conclusion

- Reduced long-term mortality
- Found a dose-response relationship
- Low-cost interventions
- Stroke EU plan

