ADDITIONAL DATA - Content

A) Representativeness

	Study cohort	Reference population
Gender	52% (f); 48% (m)	≥ 80 yrs. (2023)*: 59% (f); 41% (m)
Marital status	Single: 6% Married / registered partner: 50% Widowed: 39% Separated/ divorced: 5%	≥ 80 yrs. (2023)* Single: 4% Married: 40% Widowed: 45% Separated / divorced: 10%
Religion	Christian: 78% Other religion: 1% No religion: 21%	membership / total population (2023)* Christian: 71% Other religion: 6% No religion: 23%
Educational level	Primary school: 20% Secondary school: 15% Vocational training / - college: 25% University: 39%	≥ 67 yrs. (2021)* Primary school: 24.8% Secondary school: 47.6% Vocational school: 2.5 % University: 25.2%
Healthcare professionals	17% (female 90%)	55-66 yrs. (2021)*: 18% (female 85%)
Comorbidities	Reported conditions: Diabetes 12% Cancer 25%	Prevalence ≥ 80 yrs. (2019)* Diabetes 11% Cancer (cumulative risk + survival): 30%
EQ VAS	72.0 ± 18.1 SD	67.7 ± 22.0 (n = 170)†

Supplement 4 - table 1: Representativeness of the study cohort compared to the target population
* Statistics Norway, www.ssb.no, accessed 30.03.2023
† Andersen FH, Flaatten H, Klepstad P, et al (2015) Long-term survival and quality of life after intensive care for patients 80 years of age or older. Ann Intensive Care 5:53. https://doi.org/10.1186/s13613-015-0053-0 A (n= 179, ≥ 80 yrs., Western Norway)

B) Factors affecting the odds of the older respondents opting for ICU admission

	First scenario complete case analysis			First scenario with multiple imputation			Second scenario complete case analysis			Third scenario complete case analysis			All scenarios complete case analysis		
	OR	**95% CI**	***P*-value**	**OR**	**95% CI**	***P*-value**	**OR**	**95% CI**	***P*-value**	**OR**	**95% CI**	***P*-value**	**OR**	**95% CI**	***P*-value**
Experimental: Vignette framing															
Outcome															
Mortality	–	–		–	–		–	–		–	–		–	–	
Survival	1.76	0.82, 3.81	0.15	1.42	0.75, 2.71	0.28	1.93	0.88, 4.22	0.1	1.59	0.74, 3.43	0.24	4.82□	0.92, 25.4	0.06
Vignette gender															
Female	–	–		–	–		–	–		–	–		–	–	
Male	0.66	0.31, 1.43	0.30	1.06	0.55, 2.02	0.86	1.17	0.54, 2.53	0.69	1.43	0.64, 3.22	0.38	0.8	0.39, 1.64	0.55
Observed: Very old respondents' characteristics															
Age (years)															
	0.96	0.86, 1.06	0.41	0.94	0.86, 1.03	0.20	0.89	0.79, 0.99	0.04*	0.86	0.76, 0.96	0.008*	0.79	0.63, 0.99	0.04*
Respondent gender															
Female	–	–		–	–		–	–		–	–		–	–	
Male	2.29	0.96, 5.5	0.06	2.27	1.08, 4.78	0.03*	4.74	1.9, 11.8	<0.001*	4.51	1.76, 11.6	0.002*	26.3□	3.32, 209	0.002*
Marital status – living together with someone															
No	–	–		–	–		–	–		–	–		–	–	
Yes	0.79	0.33, 1.89	0.59	0.98	0.47, 2.02	0.95	1.38	0.6, 3.18	0.45	1.02	0.43, 2.44	0.96	1.16	0.2, 6.82	0.87
Being religious															
No	–	–		–	–		–	–		–	–		–	–	
Yes	2.39	0.89, 6.39	0.08	2.13	0.87, 5.20	0.10	2.56	0.96, 6.85	0.06	2.63	0.98, 7.04	0.06	9.71□	1.26, 75.1	0.03*
Health care professional background															
No	–	–		–	–		–	–		–	–		–	–	
Yes	0.69	0.21, 2.26	0.54	0.72	0.27, 1.95	0.52	1.04	0.31, 3.48	0.95	1.76	0.8, 3.86	0.96	0.88	0.09, 8.74	0.91
Comorbidity-polypharmacy score															
	1.01	0.9, 1.13	0.89	1.01	0.92, 1.11	0.79	1.08	0.96, 1.21	0.22	1.03	0.92, 1.16	0.63	1.13	0.88, 1.45	0.35
Clinical frailty scale															
	1.13	0.75, 1.71	0.56	1.17	0.82, 1.67	0.39	0.78	0.51, 1.21	0.27	1.39	0.9, 2.13	0.13	1.2	0.51, 2.82	0.68
Health realted quality of life (EuroQol-5D VAS)															
	1.00	0.97, 1.03	0.88	1.00	0.97, 1.02	0.72	0.99	0.96, 1.02	0.62	1.03	1.0, 1.07	0.07	1.02	0.96, 1.09	0.47
ICU experience – as patient or relative															
No	–	–		–	–		–	–		–	–		–	–	
Yes	2.71	1.23, 5.98	0.01*	2.15	1.08, 4.27	0.03*	1.76	0.80, 3.88	0.16	1.76	0.8, 3.86	0.16	8.39□	1.39, 50.8	0.02*

Supplement 4 – table 2: Mixed-effects logistic regression model for the two vignette-framing effects and very old respondents' characteristics on the odds of wanting ICU admission ('yes' vs. 'no'/'don't know') for the three scenarios separately, and across all scenarios. Missing values are handled by complete case analysis or multiple imputation.
CI = Confidence Interval, * significance level $p < 0.05$.
□ See supplemental material 3 for an explanation of the unrealistic high effects of age, gender, religion and ICU experience when including all three scenario answers in the analysis.

C) Additional data on respondent dyads' agreement

1. Response counts - cross tabulations

a. Very old respondent – next-of-kin proxy statement (proxy accuracy)

	The next-of-kin respondents' proxy statement			Total
The very old respondents' actual preference	*Opting for ICU admission*	*Opting against ICU admission*	*Not wishing to decide*	
Opting for ICU admission	110 (52%)	30 (23%)	14 (23%)	154
Opting against ICU admission	64 (30%)	79 60%)	26 (43%)	169
Not wishing to decide	39 (18%)	24 (18%)	21 (34%)	84
Total	213 (100%)	133 (100%)	61 (100%)	407

Supplement 4 – table 3: Next-of-kins' proxy statement vs. very old respondents' preference, ● = agreement, ● = the next of kin opts for higher treatment intensity, ● = the next of kin opts for lower treatment intensity

b. Next-of-kin proxy statement - next-of-kin own preference

	The next-of-kin respondents' proxy statement			Total
The next-of-kin respondents' own preference	*Opting for ICU admission*	*Opting against ICU admission*	*Not wishing to decide*	
Opting for ICU admission	188 (82%)	6 (4%)	20 (30%)	214
Opting against ICU admission	23 (10%)	132 (87%)	12 (18%)	167
Not wishing to decide	18 (8%)	14 (9%)	34 (52%)	66
Total	**229 (100%)**	**152 (100%)**	**66 (100%)**	**447**

Supplement 4 – table 4: Next of kin proxy statement vs. next of kins' own preference, ● = agreement

c. Conversation between the very old respondent and the next of kin on the topic in question prior to survey participation

"Have you had a conversation regarding treatment preferences in an event of critical illness, permanent dependency and / or the end of life?"		The next-of-kin's responses		
		No	Yes	Sum
The very old patients' responses	No	**56**	26	82
	Yes	17	**28**	45
Sum		73	54	127

Supplement 4 – table 5: Respondent dyads agreement on, whether they have had had a conversation regarding treatment preferences in an event of critical illness, permanent dependency and / or the end of life

2. Agreement with 95% CIs, stratified by respondent preferences

a. Very old respondent – next-of-kin proxy statement (proxy accuracy)

	% agreement			
	Estimate	**95% CI**		
The very old respondents' actual preference				
Opting for ICU admission	71%	60%	to	80%
Opting against ICU admission	45%	36%	to	55%
Not wishing to decide	21%	12%	to	36%
The next-of-kin respondents' proxy statement				
Opting for ICU admission	48%	39%	to	57%
Opting against ICU admission	60%	48%	to	70%
Not wishing to decide	25%	14%	to	40%

Supplement 4 – table 6: percentage agreement between very old respondents ICU admission preference and next-of-kins' proxy statement, stratified by the very old respondents' actual ICU admission preference and the next of kins' proxy statement. CI: Confidence Interval

b. Next-of-kin proxy statement - next-of-kin own preference (assumed similarity)

	% agreement			
	Estimate	**95% CI**		
The very old respondents' actual preference				
Opting for ICU admission	80%	70%	to	87%
Opting against ICU admission	78%	70%	to	84%
Not wishing to decide	85%	73%	to	92%
The next-of-kin respondents' proxy statement				
Opting for ICU admission	81%	72%	to	87%
Opting against ICU admission	84%	75%	to	91%
Not wishing to decide	47%	32%	to	62%
The next-of-kin respondents' own preference				
Opting for ICU admission	85%	77%	to	91%
Opting against ICU admission	78%	68%	to	85%
Not wishing to decide	51%	35%	to	66%

Supplement 4 – table 7: percentage agreement between the next of kins' own ICU admission preference and the next-of-kins' proxy statement, stratified by the very old respondents' actual ICU admission preference, the next of kins' proxy statement, and the next of kins' own ICU admission preference. CI: Confidence Interval

3. Factors affecting proxy accuracy

Variables		OR	95% CI	*P*-value
Very old respondent's ICU admission preferences				
	Yes	-	-	
	No	**0.14**	**0.04, 0.45**	**0.001***
Very old respondents' age		**0.81**	**0.67, 0.98**	**0.03***
Next-of-kin respondent's age		**1.03**	**0.94, 1.12**	**0.54**
Very old respondent's gender				
	Female	**-**	**-**	
	Male	**0.39**	**0.10, 1.59**	**0.19**
Next-of-kin respondent's gender				
	Female	**-**	**-**	
	Male	**0.54**	**0.12, 2.47**	**0.42**
Next of kin respondent's religion				
	Not religious	**-**	**-**	
	Religious	**1.06**	**0.26, 4.36**	**0.93**
Next-of-kin respondent's ICU experience				
	No	**-**	**-**	
	Yes	**2.40**	**0.63, 9.10**	**0.20**
"Have you [the next-of-kin-respondent] had a conversation with your very old family member regarding his / her treatment preferences in an event of severe illness, permanent dependency or at the end of life?				
	No	**-**	**-**	
	Yes	**0.96**	**0.27, 3.42**	**0.95**
Relationship within the respondent dyad				
	Married, registered partner	**-**	**-**	
	Parent - child	**3.34**	**0.23, 47.6**	**0.37**
	Other	**1.53**	**0.06, 41.0**	**0.80**
"How certain are you [the next-of-kin-respondent] that you state your very old family member's ICU admission preference correctly?"				**0.003***
	Very certain	**-**	**-**	
	Somewhat certain	**0.53**	**0.16, 1.74**	**0.29**
	Neither certain nor uncertain	**0.04**	**0.02, 0.25**	**< 0.001***
	Somewhat uncertain	**0.03**	**0.00, 0.26**	**0.002***
	Very uncertain	**0.00**	**0.00, –**	**1**

Supplement 4 – table 8: Mixed-effects logistic regression model for respondents' characteristics on the odds of predicting correct. CI: Confidence Interval, * significance level $p < 0.05$.

Comments:

It is challenging to create a regression model for factors affecting proxy accuracy. Fictional example:

- 90% of the very old respondents want to be admitted to ICU
- 70% of the next-of-kin respondents think the very old respondent want to be admitted, but there is *no* real association with the very old respondent's actual preference

If we estimate the probability of agreement between proxy statements and the very old respondents' true preferences based on various explanatory variables, all variables associated with the probability of wanting admission will *seem* to be associated with the probability of *agreement*.

For example, if men are more likely than women predict 'opting for ICU admission', it will look like gender is a predictor of agreement. So, gender might look like a predictor of agreement even if men and women are equally good at predicting their very old family member's preference. And this spurious association will hold *even* if we were to pair the very old respondent's questionnaire with a *random* (i.e., not their own) proxy statement.

One solution could be to stratify by the very old respondents' responses resulting in small numbers (too few observations to conduct regression analyses). Alternatively, we can include, as done above, their responses as a covariate in the model (but this has stricter assumptions, namely that effect of the predictors is the same for all the very old respondents' answers).

Since we found a large effect of the next-of-kins' certainty in their proxy statement on the odds of predicting correct, we attempted to present this result in a simpler way. We calculated the agreement stratified by certainty and by the very old respondents' preference / the next of kins' proxy statement:

	Next-of-kin's certainty about the very old respondent's ICU admission preference	*n*	Agreement between next-of-kin's proxy statement and the very old respondent's true ICU admission preference Estimate**	95% CI		
Very old respondents' actual preference*						
Opting <u>for</u> ICU admission	Very certain	51	89%	71%	to	96%
	Somewhat certain	75	76%	61%	to	86%
	Neither certain nor uncertain	22	42%	22%	to	66%
	Somewhat uncertain	5	22%	3%	to	73%
	Very uncertain	3	0%	0%	to	0%
Opting <u>against</u> ICU admission	Very certain	42	48%	30%	to	67%
	Somewhat certain	100	45%	33%	to	57%
	Neither certain nor uncertain	20	41%	26%	to	59%
	Somewhat uncertain	14	26%	8%	to	58%
	Very uncertain	0	–	–	to	–
Next of kin's respndents' proxy statement*						
Opting <u>for</u> ICU admission	Very certain	62	70%	54%	to	82%
	Somewhat certain	93	56%	44%	to	68%
	Neither certain nor uncertain	18	49%	27%	to	72%
	Somewhat uncertain	6	25%	3%	to	78%
	Very uncertain	0	–	–	to	–
Opting <u>against</u> ICU admission	Very certain	29	85%	57%	to	96%
	Somewhat certain	62	78%	62%	to	88%
	Neither certain nor uncertain	15	54%	28%	to	77%
	Somewhat uncertain	7	50%	17%	to	83%
	Very uncertain	0	–	–		–

Supplement 4 – table 9: Proxy accuracy and next-of-kin respondent's certainty stratified by the very old respondents' ICU admission preferences and by the next-of-kin respondents' proxy statements. *n*: number of responses**; CI: confidence interval.

* Based only on scenarios where the patient expressed an opinion (admit / not admit).
** Each respondent had a response for 1–3 scenarios, and the estimate and CI listed is based on a GEE model that takes into account the dependence between multiple responses for the same respondent. This is the reason that the percentage agreement estimate is not necessarily a multiple of 1/*n*.

D) Confidence levels stratified by ICU admission choice