Intensive care of the very old: What do they wish for themselves?

Questionnaire Development and Testing

For the purpose of this study, "old" was defined as age ≥ 67 years (retirement age in Norway) and "very old" was defined as age ≥ 80 years.

Item generation - mapping review (January – September 2019)

Publications addressing very old patients' treatment preferences were manually identified.

Additionally, we conducted the following literature search on proxy accuracy:

	Narrative	Search terms
P – Patient, **Problem or Population**	Surrogate statements	**proxy**, informant, **surrogate**, statement, prediction
I – Intervention	Family conference Structured discussion Advanced directives	
C – **Comparison, control or comparator**	Patients' preferences regarding treatment intensity and end-of-life care Subgroup: old, very old, incapacitated patients	**patient**, incapacitated, elderly, old, very old **preferences**, decision, intensive care, life-sustaining therapy, end-of-life
O – Outcome(s)	Accuracy Confidence Projections	accuracy, concordance

Table 1: PICO process

Study selection:

Search results (June 9, 2019): PubMed 64, Embase 440, Cochrane 0, Cinahl 0

– duplicates (22)
– excluded screening title (11)
– conference abstracts (7)
– excluded screening abstract (49)
+ added cross-references (13)
– excluded after full text
    review articles (3)
    reporting same cohort (3)
    not reporting data on accuracy (3)

Included studies: 19

First author Year Country	N (pairs)	Age (subject/ proxy)	Setting	Study design	Domain of preferences	Accuracy	Other findings
Uhlmann 1998 USA [1]	90/ 105	74/69 74/42	Old outpatients ≥ 1 chronic disease	Multi centre Cross-sectional cohort (spouse / physician)	CPR / CPR + MV (hypothetical scenarios)	Mostly no better than chance alone In "current heath" scenario 82% (physicians)	Under-treatment error (physicians) Over-treatment error (spouses) High confidence
Seckler 1991 USA [2]	70	78/-	Old outpatients	Single centre Cross-sectional cohort (spouse / physician)	CPR (current health and severe cognitive impairment scenario)	No better than chance (physicians) Poor (self-designated proxy)	Under-treatment error (physicians) Over-treatment error (spouses) High confidence
Fagerlin (1) 1992 USA [3]	60	47/20	Healthy volunteers	Single centre Longitudinal cohort + intervention	Treatment intensity End-of-life decisions (hypothetical scenarios)	Modest No effect of intervention	Over-treatment error Strong evidence of assumed similarity
Fagerlin (2) 1992 USA [3]	361	73/62	Outpatients			Modest No effect of intervention	Over-treatment error Strong evidence of assumed similarity
Hare 1992 USA [4]	50	44/41	Outpatients	Cross-sectional cohort	Treatment intensity End-of-life decisions (hypothetical scenarios)	No better than chance	High confidence Over-treatment error
Layde 1995 USA [5]	1226	-/-	Seriously ill inpatients, est. 50% 6-month survival	Multi centre Cross-sectional cohort (SUPPORT)	CPR / DNR	Crude agreement 74%	Over-treatment error, improving towards the end of life No factors associated with concordance identified
Libbus 1995 USA [6]	30	58/52	Outpatients ≥ 1 chronic disease	Single centre Cross- sectional cohort	Treatment intensity End-of-life decisions (1 scenario, old patient PVS)	Crude agreement 60-77%	Over-treatment error Intermediate confidence Prior experience without effect
Matheis-Kraft 1997 USA [7]	60	79/-	Old women, inpatients and care facilities	Multi centre RCT	Treatment intensity End-of-life decisions (hypothetical scenarios)	No to poor agreement beyond chance, slightly better in study group, but not significant	Not reported
Mattimore 1997 USA [8]	2418	62/-	Est. 50% 6-month survival	Cross-sectional cohort	Permanent nursing home residency	Poor (both for surrogates and physicians)	Under-treatment error
Marbella 1998 USA [9]	717	64/-	Est. 50% 6-month survival	Multi centre Longitudinal cohort + intervention	Treatment intensity End-of-life decisions (hypothetical scenarios)	Modest to good, improving over time, but not by intervention	Agreement inversely correlated age
Sulmasy 1998 USA [10]	300	60/55	Est. 50% 2-years survival	Multi centre Cross-sectional cohort	Treatment intensity End-of-life decisions (hypothetical scenarios)	Poor to fair Association with various patient / proxy factors (ie. having discussed)	Over-treatment error, No corr. with age
Principe-Rodriguez 1999 Puerto Rico [11]	12	60/-	Inpatients, limited life expectancy	Single centre Cross- sectional cohort	CPR, organ support, End-of-life decisions	poor	Under-treatment error (not significant, small sample size)

Ditto 2001 USA [12]	401	73/63	Old outpatients	Multi Centre RCT	Treatment intensity End-of-life decisions (hypothetical scenarios)	High in current health scenario Moderate in all illness scenarios, no effect of interventions (2 types of AD +/- semi-structured discussion)	High mutual confidence Intervention improved perceived AD benefits and comfort Overtreatment-/ undertreatment ratio 2:1 -3:1
Briggs 2001 USA [13]	27	69/50	Inpatients, chronic single organ failure, limited life expectancy	Single centre Longitudinal cohort, intervention	Treatment intensity End-of-life decisions (hypothetical scenarios)	moderate	Moderate similarity High level of assumed similarity
Engelberg 2005 USA [14]	96	71/57	Hospice, mixed in-/outpatients, est. survival > 2 weeks	Multi centre Cross-sectional cohort	Preferences regarding dying and death	Variable agreement Good for 8/30 items Association with having discussed and higher income	Higher agreement on functional status and symptom burden No corr. with age
Volandes 2009 USA [15]	14	83/68	Geriatric outpatients, ≥ 65 years	Multi centre RCT (narrative +/- video)	CPR, organ support, End-of-life decisions In dementia scenario	33% increasing to 100% after intervention	
Song 2001 USA [16]	17	53/46	Outpatients, end-stage CKD, dialysis	Sigle centre RCT (ACP interview)	CPR, organ support, End-of-life decisions	Moderate congruence, improving to good after intervention	Over-treatment error
Bryant 2013 USA [17]	200	46/47	ED, ≥18 years, normal mental status, stable vitals	Single centre, cross-sectional cohort	Preferences regarding acute stroke treatment and clinical trial consent	Poor agreement, clinical treatment preference shows better agreement than consent to trial	High confidence
McDade-Montez 2013 USA [18]	197	32	Newlywed couples	Population sample Cross-sectional cohort	Treatment intensity End-of-life decisions (hypothetical scenarios)	Moderate agreement	High impact of personal preferences on proxy ratings (=assumed similarity)
Liu 2017 Taiwan [19]	1049 1901	60/48 60/50	Inpatients, advanced cancer	Single centre, 2 separate cross-sectional cohorts	CPR, organ support, End-of-life decisions	Poor to fair, significantly lower 10 years later	Over-treatment error

Table 2: PICO search results. CPR=cardiopulmonary resuscitation, MV=mechanical ventilation, PVS=persistent vegetative state, RCT=randomized controlled trial, AD=advance directive, CKD=chronic kidney disease, ACP=advance care planning, ED=emergency department

Existing evidence - summarized findings:

- Very old patient's life sustaining treatment (LST) preferences:

Research regarding LST preferences conducted on patient populations with very limited life expectancy due to cancer or other chronic illness, show large variations across countries, cultures, populations, and individuals [20]. Little evidence exists regarding very old people with stable health who have limited life expectancy merely because they approach the final chapter of their lives. Two recent studies from France have explored this issue, showing that at least a moderate proportion (30-60%) of independent individuals above the age of 80 would refuse life-sustaining treatment interventions in case of acute life-threatening illness when being asked in a hypothetical situation [21]. A smaller, but still relevant proportion (14%) of very old patients who are asked about their preferences in the emergency room chose to refrain from ICU admission [22]. Whether this difference is due to a reference shift of values and expectations under the experience of acute illness, or a matter of chance due to small numbers, is unknown. Very little research has been conducted into the stability of patients' preferences regarding LST, and consequently estimates remain controversial [23, 24].

- Family members' accuracy to predict patients' LST preferences:

Numerous studies have aimed to quantify the accuracy of proxy statements regarding LST. Most studies were conducted in the USA 15-20 years ago, and showed poor to modest accuracy [25, 26]. Overtreatment errors (i.e. the proxy would choose LST, while the patient would refuse) and errors due to assumed similarity (i.e. the proxy is more likely to decide based on his / her own preferences rather than on true knowledge of the patient's preferences) appear to be frequent [3, 13, 18]. There is probably higher agreement when assessing observable, behavioural domains like functional status, or quality of life than in actual decision-making [27]. Some studies show high confidence in proxy decisions, both on the patients' and on the proxies' side, despite low proxy accuracy [1, 4, 12, 17]. Factors influencing proxy accuracy (i.e. age, timing, proxy-patient relationship, expected burden of treatment, likely outcome) and interventions to enhance proxy accuracy (i.e. advanced directives, family conferences, structured educational interviews) have been studied with conflicting results [9, 12, 25].

The validity of the existing evidence regarding very old patients' LST preferences and related proxy accuracy is limited by several factors:

- Most studies have used hypothetical scenarios to explore preferences regarding LST. In these studies, comprehension of the scenarios posed, and the consequences of the choices made are important and likely impact decision-making. Moreover, both patient preferences and proxy accuracy may change over time or with exposure to critical health-related events. We did not find any studies exploring the stability of proxy accuracy over time.

- None of the published scenarios address ICU admission in advanced age.

- Most studies have been conducted in the US, where uncertainty is dealt with in a different way than in Northern Europe. In the US, if a patient does not refuse treatment either personally or by a designated surrogate, the clinical default option is to provide treatment. This clinical default has affected the interpretation of the findings of several studies regarding proxy accuracy. For example, when dichotomizing Likert scales the "don't know" answers have been analysed together with the "do want treatment" answers in studies emanating from the US. Since it is not possible to predict individuals' preferences, where uncertainty exists regarding his / her own preference, these answers should have been reported and analysed separately [28].

- There are several ethical concerns with regard to the substituted judgement standard [29–31]. Even though statements by family members may have limited value as a "decision tool", ICU family conferences in process of decision-making may not be reduced to surrogate evidence alone.

Notwithstanding the normative value of ICU family conferences in a Norwegian context has not been elaborated yet.

- Large cultural and healthcare context differences (i.e. financing of health care provision, level of trust, medico-legal precautions, frequency of advanced directives, substituted judgment standards, place of death, ICU involvement at the time of death, frequency of LST limitations before ICU death) between the USA and Norway may limit the external validity of the existing evidence both regarding very old patients LST preferences and proxy accuracy.

Based on the findings of the literature review and discussions within the study group we constructed pairs of questionnaires addressing ICU admission preference in hypothetical events of acute critical illness in advanced age. Table 3 summarizes the four predefined questionnaire development steps.

	Focus Group Interviews	**Pre-Test**	**Pilot-Test Respondent Group Sessions**	**Sensibility Test**
Timeframe	January 2020	February – March 2020	May – June 2021	August – September 2021
N (sample)	9 professionals 13 laymen	20 pairs (convenience)	20 pairs (non-probability)	20 pairs (non-probability)
Response rate		45%	70%	65%
Purpose / Questions addressed	Item generation Face validity Ethical issues	Feasibility Data dispersion Ethical issues	Comprehension Flow Salience Acceptability Administrative ease Time to complete	Completeness Appropriateness Suitability
Instrument version	1	1	2	3

Table 3: Questionnaire development - milestones

Face / Content validity (January 2020)*:*

The first draft of the questionnaires was evaluated by focus groups consisting of 9 health care professionals (4 senior ICU consultants, 2 junior anaesthetists, 2 ICU nurse specialists, 1 research nurse, 2 geriatricians, 1 public health specialist) and 6 laymen (2 very old adults, 4 possible proxy decision makers, of those 2 with higher education, but no health care professionals).

Pre-testing: (February/March 2020):

We pre-tested a preliminary version of the questionnaire containing only one vignette and no questions regarding demographic or health-related information among 20 grandparent/parent pairs of medical students. Completed questionnaires were returned anonymously by mail. The response rate was 45% with eight complete pairs.

We assessed whether the case vignette was feasible, and produced responses with sufficient data dispersion to assess proxy accuracy and factors that might affect the choices made.

Very old adult's preference	N	Son's / daughter's prediction			
		Wants ICU admission	Does not want ICU admission	Wants the doctor to decide	Unsure about the very old participant's preference
Wants ICU admission	3	1	1	1	
Does not want ICU admission	1		1		
The doctor should decide	4	1		2	1
Unsure	0				

Table 4: Pre-test results

We reduced and adjusted the "uncertain" and "the doctor should decide" response categories to "wishing to not engage in the decision" after the pre-test in order to more precisely match the Norwegian regulations, where patient preferences are an important information to the medical decision process, but the ultimate decisional authority remains with the medical team.

Additional space for free-text comments was provided, and the respondents were asked to elaborate the reason for their preference. Moreover, we abstracted confidence into the choices made as an independent item and asked the participant to indicate for each scenario how certain they feel about their answer regarding treatment preference on a five-point Likert-like scale.

The pre-test also revealed cases of assumed similarity, where the son/daughter apparently decided according to his/her own preferences, which were different from the preferences of their very old mother / father. None of the respondents commented on unpleasant feelings when confronted with questions regarding life-threatening illness, but several both very old persons and their adult children volunteered that they perceived the topic as relevant, important, and not sufficiently addressed yet.

An interesting observation from the pre-test was that respondents who opted for their physician to decide had less or no free text comments, compared to respondents who made a clear choice.

Pilot testing (May - June 2021): We assessed the penultimate versions of the questionnaires (one for the very old person, and one for the potential proxy) for face and content validity once again, and conducted a pilot study with regards to relevance, flow, arrangement and time to complete. The Regional Committee for Medical Research Ethics Western Norway, REK Vest, assessed this pilot project, and waived approval (Project ID 276403, date 25.05.2021). We recruited 18 pairs of very old people and their next-of-kin (the most likely proxy in case of an acute health related event) through user representatives, senior interest organizations, the volunteer service and the retired employee association at Haukeland University Hospital and through advertisements in public spaces and social media. We aimed for balance regarding gender, educational and cultural background. Potential participants were informed about the project by phone, and upon verbal consent, they received the questionnaire test package by mail. The package contained an information letter, the respective questionnaire (very old person / next-of-kin, version 2), and an evaluation sheet addressing understanding and processing of the questionnaire as well as an invitation to participate in a group interview. Fourteen very old and thirteen next-of-kin participants returned the completed questionnaires, and nine very old and four next-of-kin respondents participated in group interviews.

	Very old pilot participants	Next-of-kin pilot participants
N (total)	14	13 (5 spouses, 5 daughters, 2 sons, 1 friend)
N (male / female)	5 / 9	3 / 10
Age (median, SD, range) [yrs.]	84.5 / 4 / 80-94	63 / 14 / 52-88
Higher education	6	9
Born outside Norway	1 (Denmark)	1 (Sweden)

Table 5: Demographics of the pilot population

All interview participants provided signed informed consent. They were asked to complete the questionnaire and the evaluation sheet before the interview. The participants could keep the questionnaire and the evaluation sheet as an aid memoire during the interview but were encouraged to not change their written answers. The evaluation forms did not contain any personal identifiable data and were collected after the interview.

The interviews took place at Haukeland University Hospital and followed a standardized template. They were not audiotaped due to data protection considerations. Two investigators met 3-6 participants. The group interviews were chaired by the principal investigator (GLS), assisted by a co-investigator (BÅS), who also wrote minutes. None of the interview participants expressed emotional distress or required comfort, and no further ethical concerns were revealed during pilot testing and group interviews.

Time to complete the questionnaire varied substantially, with a mean time of 60 minutes (SD 40 minutes, range 13-150 minutes). None of the pilot participants found the questionnaire too long, but several expressed, that the length was in keeping with the complexity and seriousness of the topic addressed. Most respondents did not identify any difficult questions (22/25) and no respondents were disturbed or upset by any of the questions or the topic in itself. Seven answers were missing, and six ambiguous answers were given. The missing and ambiguous answers were equally distributed among very old and nest-of-kin respondents and across the whole questionnaire. 20 of 25 returned questionnaires were answered completely and unambiguously. 21 of 25 respondents provided free-text comments, among them 15 were rated as informative and elaborate.

Statement	Response mean	Response range	Other observations
The information about intensive care was useful	4.0	3-5	
The number of scenarios was appropriate	2.7	1-4	Marked difference between respondents: respondents with a clear preference fed back on too many and too similar scenarios, while respondents with varying preference found them appropriate
There were too many similar scenarios	3.2	1-5	

Table 6: Results of the pilot testing (5 point Likert-like scale, 1=strongly disagree, 5=strongly agree)

The content, wording and layout of the questionnaire and cover letter was revised according to the data from the evaluation sheets and a synthesis of the group interviews. The number of scenarios was reduced to three, and more detailed instructions where provided after each question.

Clinical sensibility testing (August – September 2021): The Regional Committee for Medical Research Ethics Western Norway, REK Vest, also waived approval for sensibility testing of the survey tool (Project ID 276403, date 25.05.2021).

We performed clinical sensibility testing of the penultimate versions of the questionnaires with an adaptation of the template published by Burns et al., 2008 [32] on a similar group of both very old and proxy volunteers (N=23).

Statement	Response median	Response range
Many questions are unsuitable or inappropriate	2.0	1-3
The questions address important aspects regarding intensive care of vey old people	4.2	3-5
Important questions regarding intensive care of very old people are missing	3.2*	1-4
The survey is suitable to elicit old people's values and wishes regarding intensive care	4.1	3-5

Table 7: Results of the clinical sensibility testing (5 point Likert-like scale, 1=strongly disagree, 5=strongly agree)

* None of the respondents made any specific suggestion regarding further questions to be addressed.

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