Study of Advice and Decision-making on prognosis using the Judge-advisor System within multi-disciplinary Teams (ADJUST)

– Statistical Analysis Plan (version 1.0 26.03.2021)

1 Study Summary

For full details see the study protocol (version 1.0 01.09.2020).

Title	Study of Advice and Decision-making on prognosis using the Judge-advisor System within multi-disciplinary Teams (ADJUST)
Short title	ADJUST: A study on MDT prognostication
Lead Investigators	Prof Paddy Stone and Andrea Bruun
Statistician	Dr Victoria Vickerstaff
Design	Online psychological experiment
Objectives	To understand how clinicians form intuitive judgements about the prognoses of palliative care patients after receiving advice perceived as coming from either a team member or an algorithm. *Primary objective:* To assess the level to which clinicians incorporate advice received from other clinicians or an algorithm into their estimates of the prognosis of palliative care patients. *Secondary objective:* To investigate the extent to which clinicians' integration of advice is influenced by the characteristics of the judge, the advisor or the advice itself.
Population	100-300 palliative care clinicians
Registration	Clinicaltrials.gov NCT04568629 (29/09/2020). Prospectively registered

2 Introduction

2.1 Purpose and scope of the statistical analysis plan

This document describes the main statistical analyses to be applied to the data from the ADJUST study. This Statistical Analysis Plan was written by Andrea Bruun in collaboration with Dr Victoria Vickerstaff, Dr Nicola White, and Dr Linda Oostendorp.

2.2 Timing of Analysis

The analysis will be performed after all the data have been checked and locked and the analysis plan has been finalised. When checking the data we will remove participants who have violated the protocol (e.g. putting the same answer for every vignette).

3 Data collection

3.1 Participant characteristics

The following demographic data will be collected from all participants recruited into the study:

1. Profession
2. Age
3. Gender
4. Work environment (hospice, hospital, community service)
5. Country of employment
6. Professional level
7. Years of experience
8. Years of palliative care experience

3.2 Outcome data

Each participant will be asked to complete five vignettes. The primary and secondary outcomes will be provided for all vignettes.

3.2.1 Primary outcome measures

The primary outcome will be clinicians' continuous estimates of the probability of a patient surviving for two weeks (measured from 0% 'certain to die' to 100% 'certain survival'). Participants provide an initial and a final estimate of the probability of survival.

3.2.2 Secondary outcome measures

The secondary outcome will be clinicians' estimates of the probability of a patient surviving for two weeks and the characteristics of the participants (profession, gender, age, work environment etc.).

4 Statistical analysis plan

Data analysis will be mainly descriptive and focused on addressing the overall objective "To understand how clinicians form intuitive judgements about the prognoses of palliative care patients after receiving advice perceived as coming from either a team member or an algorithm".

4.1 Analysis of participant demographics

Summary measures for the characteristics of participants will be presented using means (with standard deviations), medians (with interquartile ranges), counts and proportions, as appropriate. The number of missing observations for each characteristic will be reported.

4.2 Missing data

Participants who do not complete the five vignettes will be removed from the analysis.

We will report the number of vignettes each participant completed. Potential bias due to missing data will be investigated by comparing characteristics of those who completed sufficient vignettes with those who did not complete sufficient vignettes.

4.3 Analysis of the primary objective

In order to assess the level to which participants incorporate the advice into their final estimates of the probability of survival, the WOA is calculated for each participant for each vignette(s). This is done by comparing their final estimate against the initial estimate and the advice provided. The final

estimate of probability of surviving two weeks can be represented as a weighted combination of the participant's initial estimate and the advice received, with the weights being proportional to the extent of the shift towards (away from) the advice. WOA will be defined as $= |f - i|/|a - i|$, where 'i', 'f', and 'a' stand for initial, final, and advice, respectively.

If a participant decides to adhere completely to his or her initial estimate (100% discounting of the advice), the weight of the advice will be 0. If the participant decides to shift completely to the advice then the weight of advice will be 1.0 (0% discounting). Intermediate weights indicate that positive weights were assigned to the initial estimate and the advice (partial discounting).

We will then use multilevel regression analysis accounting for multiple vignettes completed by each participant, to compare the means of the WOA scores for the two arms, the algorithm arm and the clinicians' arm.

4.4 Analysis of the secondary objective

We will perform regression analyses to explore any associations between participants' weighting policies and characteristics of the participants (profession, gender, age, work environment etc.).

We want to explore any associations between participants' weighting policies and the advice itself (e.g. the strength of the advice) as well. Participants will receive five pieces of advice from the PiPS data. They will receive advice given with high confidence (i.e. the patient has 90% probability of surviving the next 14 days), with lower confidence (i.e. 75% probability of survival) and one where the advice is equivocal (i.e. 50% probability of survival).

Multilevel regression analyses will be used to take into account multiple vignettes are completed by each participant.

5 General statistical considerations

All the statistical summaries and analysis will be performed using Stata version 15 (or above).