E6. Please summarise the research approach and methods in more detail and outline how the selected research instruments will be used.

Methodology
The aim of this study is to compare the efficacy of 200ml and 400ml bottles used in nasal saline irrigation by conducting a randomised controlled trial in post-Functional Endoscopic Sinus Surgery (FESS) patients. Patients will perform nasal saline irrigation on their own after the method is explained in detail by the chief investigator to ensure that the correct technique is used. Nasal saline irrigation is a necessary treatment, providing an adjunctive function in the management of chronic rhinosinusitis. It is also the basis of the postoperative care of patients after FESS. However, although used extensively, there are significant variations in the technique used for nasal saline irrigation. For this study, patients will use a standardised method of nasal saline irrigation. The solution to be used will be an isotonic saline solution with the addition of a sachet, and a head down-and-forward position will be used.

Participants will be randomised into two groups, each group using either a 200ml or 400ml bottle. Randomisation will be via sealed envelope methodology.

For tracking data collection purposes, each participant will be assigned a patient code.
The effectiveness of the nasal saline irrigation will be evaluated every 2 weeks over the course of 2 months to elucidate differences between the two methods.

The SNOT-22 Score will be used, allowing patients to grade any problems they are experiencing from 0 (no problem) to 5 (problem as bad as it can be). The patients will be required to fill out this score every 2 weeks to evaluate the efficacy of each treatment. If a patient gives a score of 5 for a period of 2 weeks, routine post-operative care will continue to be provided as many patients have severe disease and 5 is not uncommon.

The Lund Kennedy Endoscopic Score will also be used and graded every 2 weeks by Prof. Simon Carney. This score is defined by the characteristics of nasal polyps, discharge, oedema, scarring and crusting within the patient's nasal cavity.

The presence of any Eustachian Tube Dysfunction (ETD) will be detected by Type B or Type C tympanometry at each visit. Tympanometry is a non-invasive method of assessing for any ETD. A small rubber-tipped probe is placed into the external auditory meatus of each ear and a tracing is made of the compliance of the tyrannic membrane in response to acoustic stimuli and minor pressure change. It is routinely performed on both adult and paediatric patients suspected of having middle ear disease and/or Eustachian Tube problems. It is safe and not associated with any recognised complications. Type B Tympanometry suggests middle ear involvement from fluid (middle ear effusion). Type C Tympanometry suggests Eustachian Tube Dysfunction (often just before or after effusion.

Standard post-operative care for FESS surgery mandates regular check-ups every two weeks for up to two months. All FESS patients, whether in the study or not, will have these follow-up appointments. The LUND evaluation, assessing mucosal appearances, is not typically included in routine assessments, but SNOT-22 scores are part of the standard care protocol required by the Australian Society of Otolaryngology Head and Neck Surgery (ANOHS) for post-operative sinus surgery. However, in this study, we will include both LUND and SNOT-22 assessments in the regular check-ups for participants. Importantly, these evaluations will not affect the usual patient care and management and not take any more time than if not participating.

Outcome Measures.

Primary outcome measures:
Problems after surgery: measured by SNOT-22 score with 22 subheadings for 2 months post-FESS.

Secondary outcome measure:
Visual pathological states within the nasal cavity: measured by Lund-Kennedy score for 2 months post-FESS.
Type C or Type B tympanometry.

Participants' selection and activities
Number of participants: 40
Identification: Possible participants are identified as those requiring nasal saline irrigation post-FESS surgery by the clinician.
Recruitment method: Participants will be recruited from the Southern ENT rooms exclusive to Adelaide Specialist Group: Eligible participants will be initially approached by their treating physician and be provided with more detailed information about the study during the consultation. Participants will also be provided with information sheets regarding the study and any further questions will be answered by the co-investigators. Participants will be given sufficient time to reflect on their decision to participate. Following this, to minimise coercion, final consent will be discussed only with the co-investigators (Hailey Kim and Timothy Lin).

Inclusion and Exclusion Criteria:
Inclusion: Nasal Saline Irrigation indication following Post-FESS surgery.
Exclusion: Patients with a history of frequent or active epistaxis, high risk of aspiration and incompletely healed facial trauma. Patient with significant craniofacial abnormalities.

Data Collection
Clinicians (Prof. Simon Carney) will have access to the patient records as part of the routine clinical practice and will be the same if the study is not taking place. Students (Hailey Do Hee Kim and Timothy Lin) and others affiliated (Tracey) will have access to patient records for purposes of data processing, only if it is necessary for the purposes of data processing and synthesis. Tracy is the Practice Manager and has experience in ethics and code conflict. Bottle storage, data sheet collection from patients and keeping patient code will be handled by Tracey.

Data Storage
Questionnaire data will be collected in paper format (questionnaires will contain patient initials and study numbers - which will be assigned at the time of randomisation).
This will be transferred to a password-protected Microsoft Excel spreadsheet. Hard copies will then be stored securely before being destroyed after the specified amount of time. All other data collected during the study will be stored electronically on a password-protected computer and backed up daily to a secure password-protected USB drive.
With regard to the training of the research team on maintaining the integrity and security of the data, Professor Simon Carney has past experience in data security for sponsored and investigator-driven trials.
Access to the data storage will only be available to the researchers in this study. It will not be granted to others other than Flinders University or other official bodies for ethical or legal compliance etc.
All data secured in storage will be destroyed following the required data storage period of 15 years, according to university protocols.

Matching and sampling strategies
Simple random sampling via randomly assigned bottles by the clinician during the consultation.
For potential bias, confounding factors and missing information, there are none anticipated.
Sample size and statistical or power issues
(as per SNOT-22 questionnaire)

Mean postoperative issues
- Power: 80%
- Significance level: 0.05
- Standard deviation: 9
- Estimated Mean of group 1: 49
- Estimated Mean of group 2: 40
- Required sample size: 32

Therefore, allowing for dropout, 40 participants will be selected to fulfil both primary outcome measures.
Note: Sample size calculations were created using standard deviation values that were deemed to be the smallest difference that would be clinically important to detect (as opposed to the differences expected to be seen). Hence, it was deemed that a minimum difference of 9 in the SNOT-22 score would be the smallest clinically important difference to detect.

Data Analysis
An analysis of normality will be performed. All data sets exhibit an ordinal independent variable (bottle size) and a continuous dependent variable. Thus, for the datasets determined to be parametric the independent t-test will be used. For the datasets determined to be non-parametric, the Mann-Whitney U test will be used. $P<0.05$ will be regarded as significant.

All data sets exhibit a nominal independent variable (bottle size) and 2 continuous dependent variables (SNOT-22 score and Lund-Kennedy score). Thus, for the datasets determined to be parametric, the one-way MANOVA will be used. For the datasets determined to be non-parametric, the multivariate Kruskal–Wallis (MKW) test will be used. $P<0.05$ will be regarded as significant.