

**Aims:**

To investigate which surgeon-centric factors play a role in determining safety in eye surgery

**Introduction:**

Not much consideration has gone into factors that affect surgery beyond obvious factors such as visual acuity. We considered that along with stereo-acuity, colour-blindness, and handedness. A 2004 report highlighted the lack of consideration towards left-handed surgeons where it was found that only 13% had appropriate surgical equipment<sup>1</sup>.

We feel colour-blindness is an important factor to consider. Another study highlighted a potential risk as it was found that a consultant failed to correctly identify kerato-conjunctivitis as they saw a patch of blue when it should clearly be redness<sup>2</sup>.

We had also found a study whereby stereopsis was studied by conducting a 'pea-on-peg' test between a stereo-normal and a stereo-poor group to find that the stereo-normal groups outperformed the stereo-poor group<sup>3</sup>.

We looked to gather opinions as a starting point before launching in-depth testing for these factors. By collecting opinion from our survey, we were able to assess how surgeons felt towards the necessity of left-handed equipment and we looked to present evidence to show the potential risks associated with poor stereopsis and colour-blindness.

We had also found a study whereby stereopsis was studied by conducting a 'pea-on-peg' test between a stereo-normal and a stereo-poor group to find that the stereo-normal groups outperformed the stereo-poor group<sup>3</sup>.

**Method:**

A survey comprising of 22 questions was designed using Survey Monkey to be shared to members of the UKEGS & Midlands Ophthalmic Society (MOS). The questionnaire was designed to gather subjective opinions of the surgeons on factors such as visual acuity, colour blindness, stereoacuity, and handedness. We also tried to gather information on some external factors that may affect safety of eye surgery.

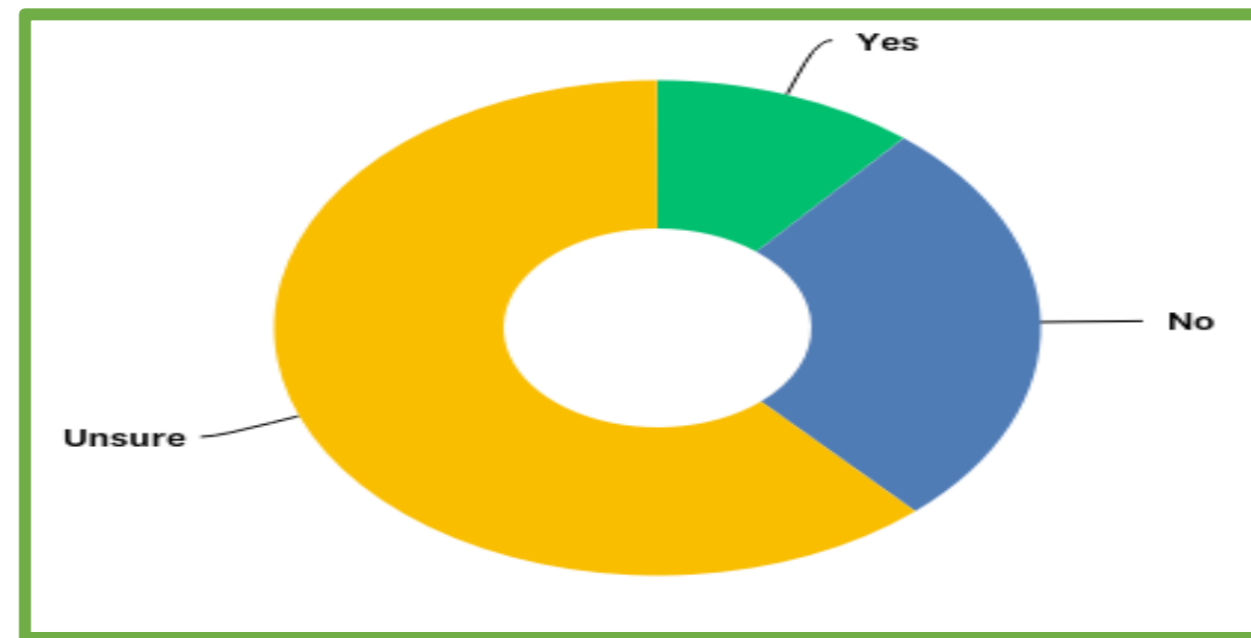


Fig 3. Is there appropriate provision for left-handed surgeons?

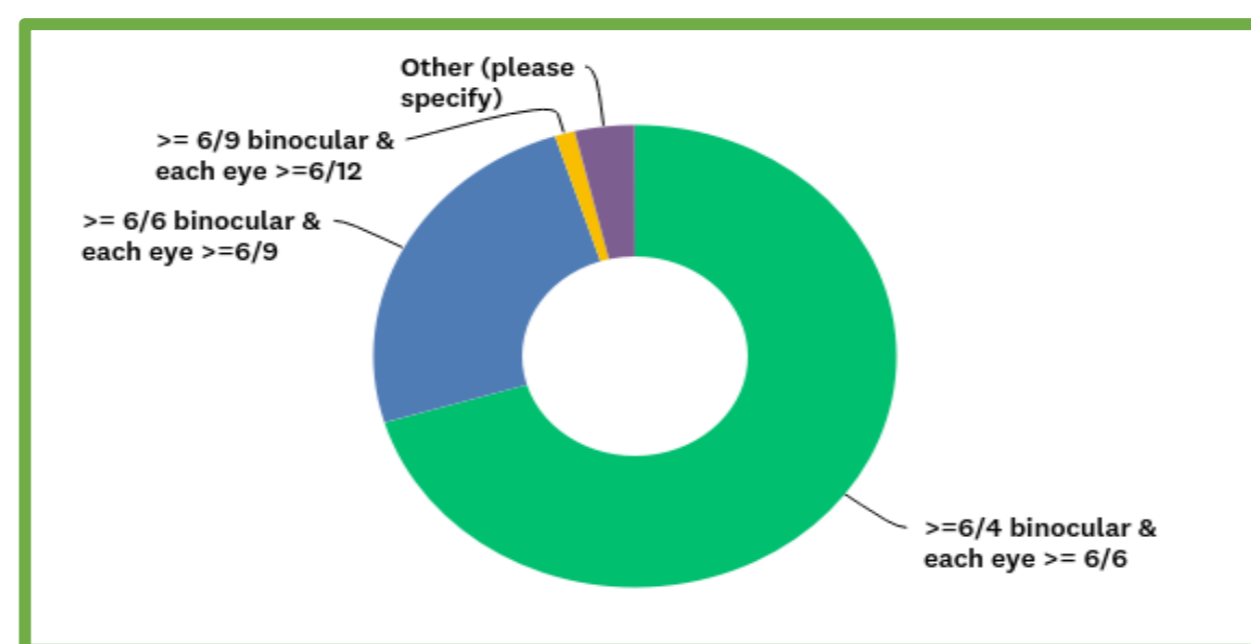


Fig 4. Snellen visual acuity scores of the participants

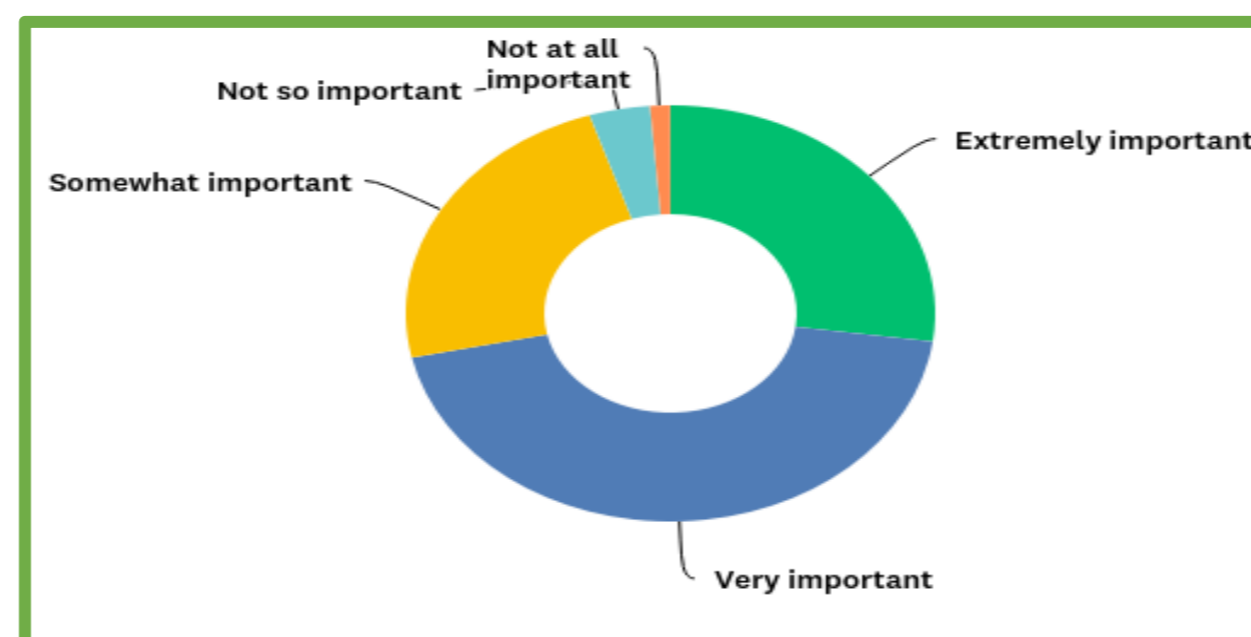


Fig 5. How important is it to be stereo-normal as a surgeon?

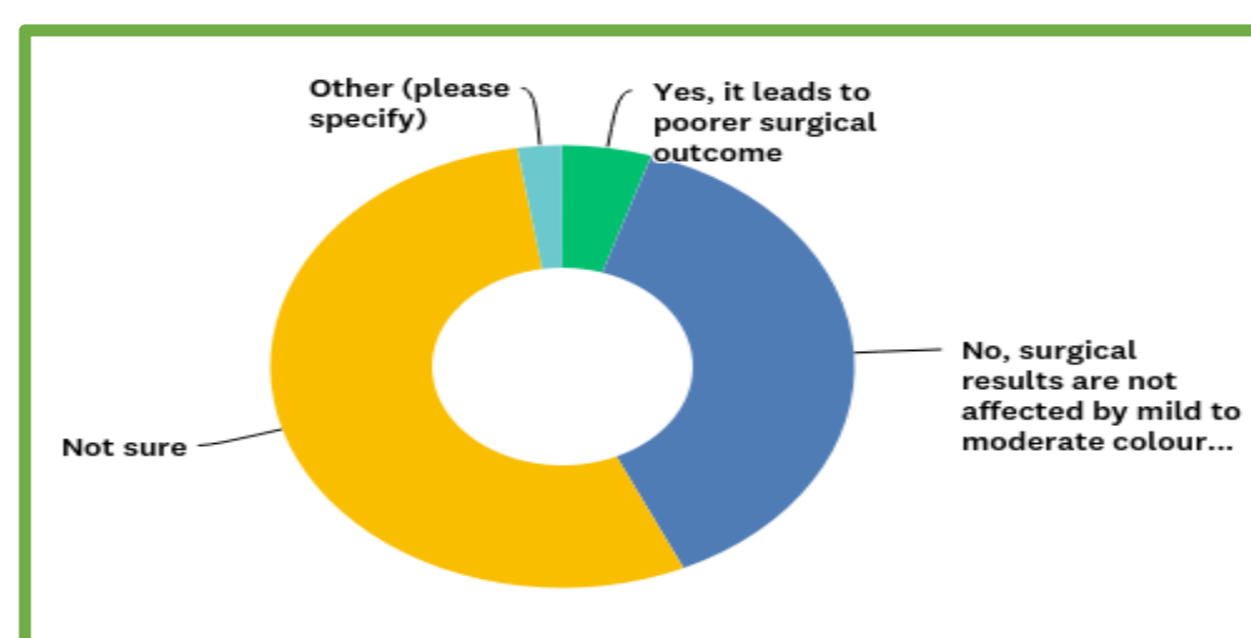


Fig 6. Can colour-blindness lead to poor surgical outcomes?

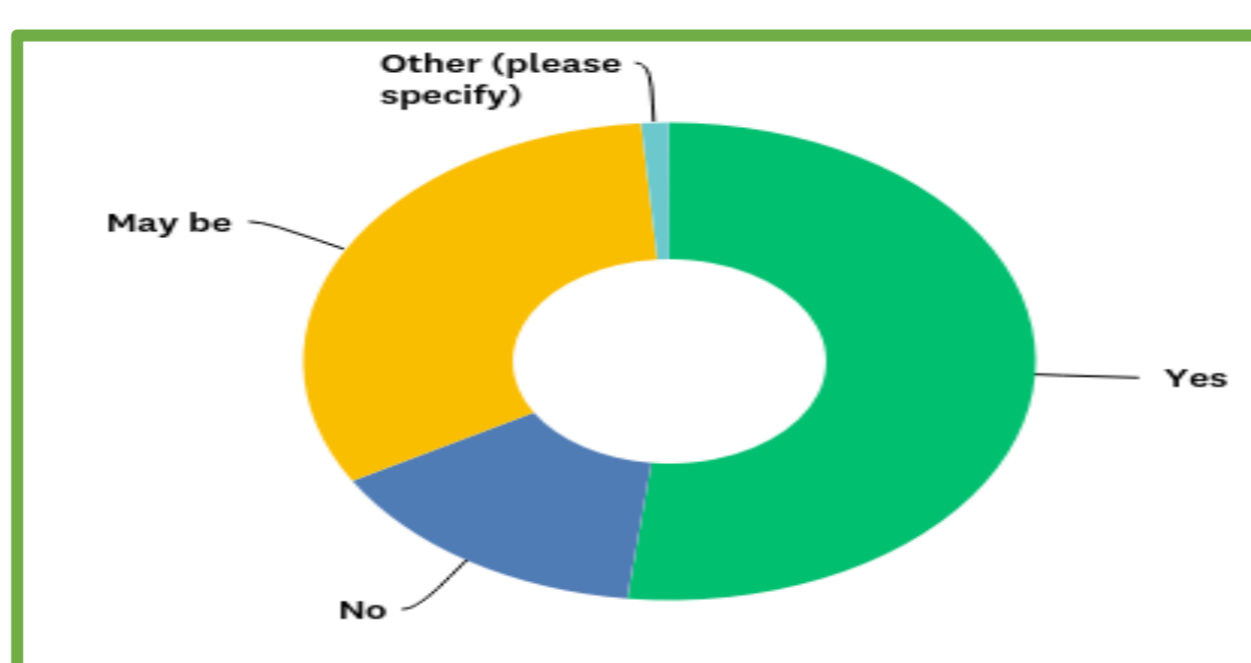


Fig 7. Should there be regular testing for these factors?

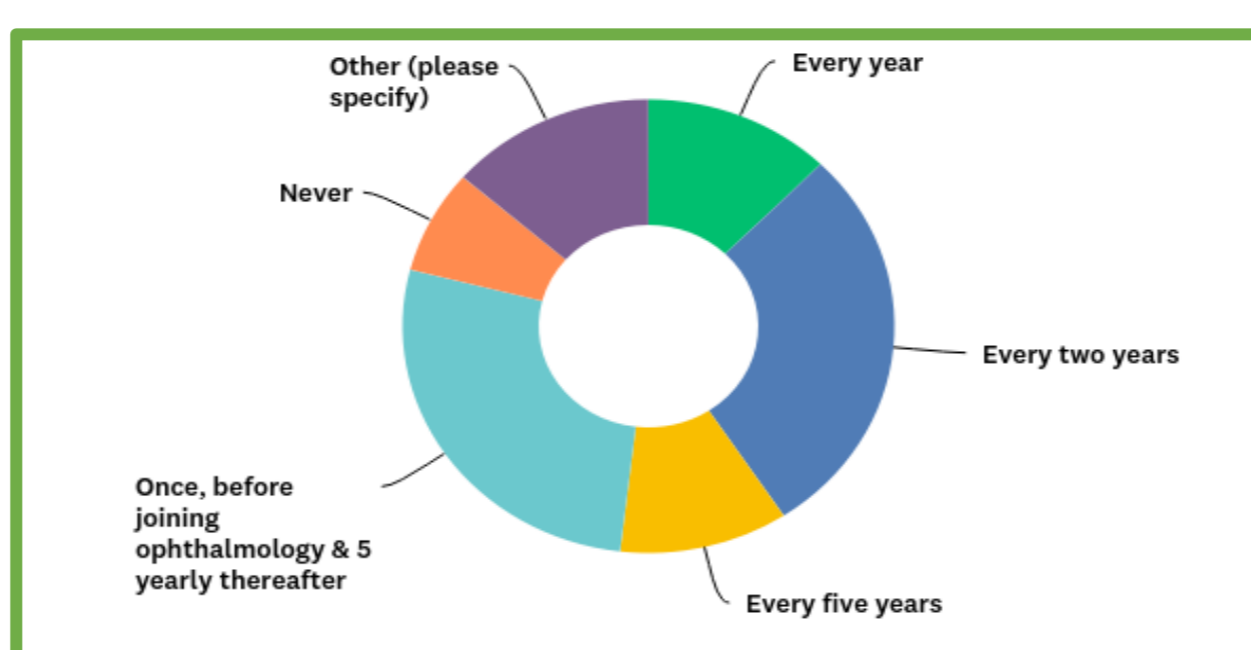


Fig 8. How regularly should these factors be tested for?

**Results:**

We received 83 responses where 73.17% of the responses came from consultant ophthalmologists. We considered which age range would have the safest surgical outcomes. Our survey showed that surgeons aged between 45-54 are considered as the safest with 82.28% of clinicians agreeing (Fig 2). We looked at the handedness of the clinicians to find that 88.89% of participants were right-handed, 7.32% were left-handed, and 3.66% were ambidextrous (Fig 1). 30.99% participants felt that there wasn't suitable surgical equipment for left-handed surgeons and trainees (Fig 3). When considering if colour-blindness would impair a surgeon's ability to operate, 39.44% felt that this was not the case with 52.11% feeling that there was no significant evidence to suggest that colour-blindness would impact surgical results (Fig 6).

We concluded with stereo-acuity and found that 70.37% of clinicians had 20/20 vision (Fig 4) and 90.12% of participants felt that visual acuity is an important trait in surgeons (Fig 5). When it suggesting a system where there was regular testing the clinicians were more divided on this issue. 53.52% of participants agreed (Fig 7) on regular testing for these factors but there was some division with regards to the frequency of testing with 12.35% saying yearly, and 26.76% saying that an ophthalmology trainee should be tested once before joining the speciality then every five years thereafter (Fig 8). We even posed the idea of having a screening process at university but 35.80% of participants disagreeing with this idea (Fig 8).

**Conclusion and discussion:**

Visual acuity and stereo-acuity appear to have the greatest impact on the safety of eye surgery. Evidence also suggests that colour-blindness may present a risk to the safety of eye surgery. Inadequate surgical equipment for left-handed surgeons then may lead to challenges to training and performing safe surgeries. Screening is a contentious issue as it appears discriminatory but would have long term benefits for patient safety. We hope our survey would inspire research to look at these factors more objectively and their effects on surgery in greater detail.

**References:**

1. Dobson, R. (2004). The loneliness of the left-handed surgeon. *BMJ*, 330(7481), pp.10.7.
2. Spalding, J. (1999). Medical students and congenital colour vision deficiency: Unnoticed problems and the case for screening. *Occupational Medicine*, 49(4), pp.247-252.
3. Bloch, E., Uddin, N., Gannon, L., Rantell, K. and Jain, S. (2014). The effects of absence of stereopsis on performance of a simulated surgical task in two-dimensional and three-dimensional viewing conditions. *British Journal of Ophthalmology*, 99(2), pp.240-245.

**Affiliations:**

1. Oxford Brookes University
2. Russells Hall Hospital, Dudley

**Acknowledgements:**

Altomed Ltd, UK.

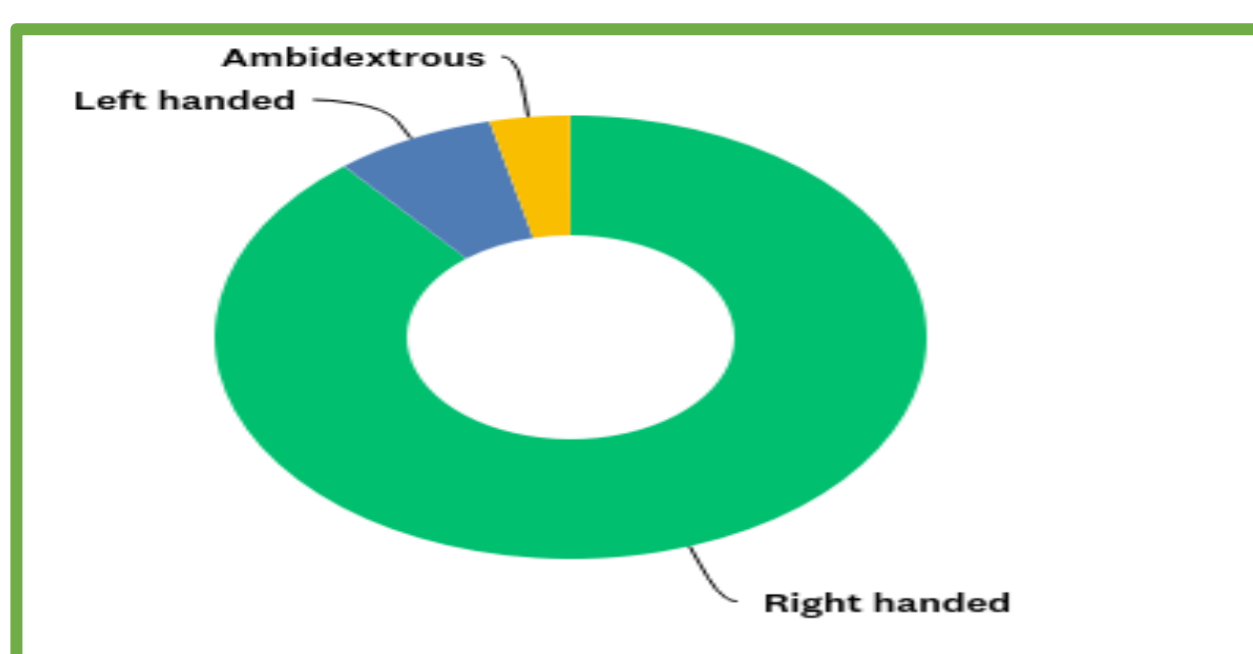


Fig 1. Proportion of left, right-handed and ambidextrous surgeons

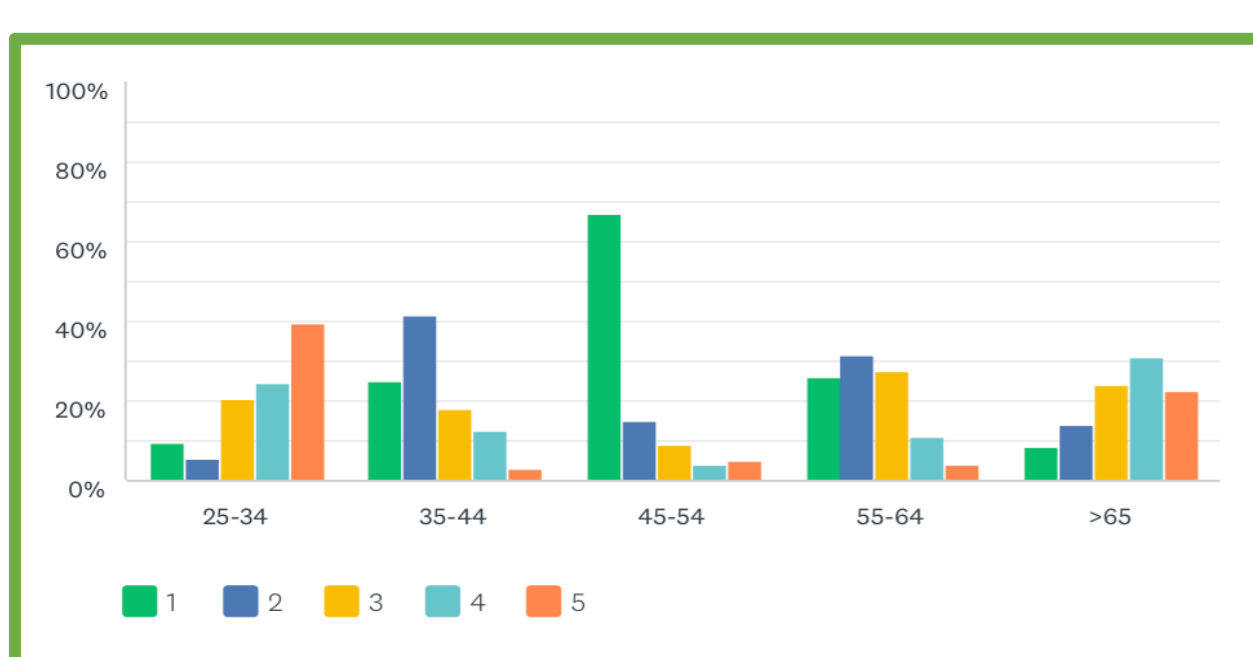


Fig 2. Age group of surgeons considered the safest: 1= safest, 5= least safe