

Title: Structure of multidisciplinary heart teams, a survey based heart team study.

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Abstract

Objective

Multidisciplinary approach is well established in various disciplines, with evidence highlighting improved patient outcomes. The objective of this survey was to determine the real world practice of heart teams across Europe.

Methods

The survey was drafted after a consensus opinion from the authors. The survey was sent to cardiac surgeons and cardiologist identified through electronic search. The survey link and the information sheet were sent through email followed by survey completion reminders. The survey responses were cumulated and analysed.

Results

Among 2188 invited clinicians, 220 clinicians from 26 countries took part in the survey (response rate 10%). The completion rate for the survey questions was 85%. 140 (64%) were cardiac surgeons and 80 (36%) were cardiologists. The heart team meeting frequency was weekly according to 104 (55%) respondents. This was conducted face to face according to 139 (73%) of the responses. Eighty seven (56%) of the respondents reported 10% – 20% of patients undergoing percutaneous coronary intervention (PCI) were discussed at the heart team meeting. Seventy nine (47%) respondents had ad hoc PCI institutional guidelines. Fifty four (32%) respondents reported an audit process for the heart team decisions.

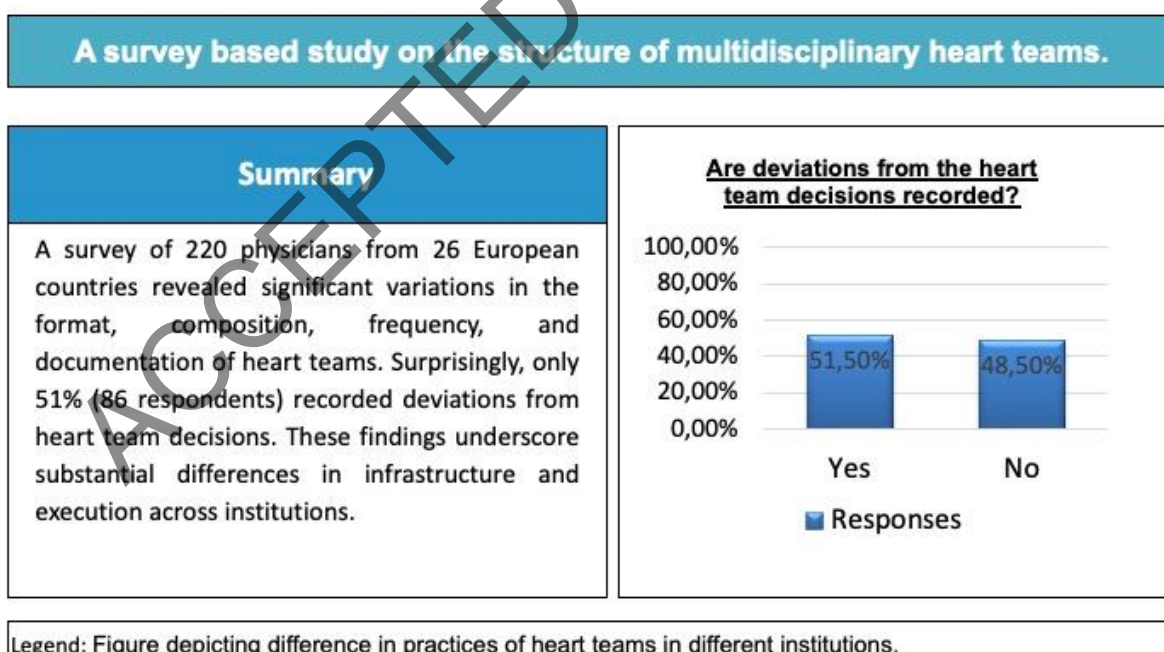
55 Conclusion

56 This survey suggests that there is marked variability in the infra-structure and
57 execution of heart teams in different institutions. The results of the survey suggest a
58 need to formulate guidelines on composition and execution of heart teams which may
59 result in an increase in transparency of decision-making within different institutions in
60 reporting and comparing outcomes.

62 Keywords

63 Multi-disciplinary team, heart team, cardiovascular disease.

66 Graphical Abstract



Introduction

The concept of multidisciplinary teams is well established (1, 2). With increasing complexity of patient with heart disease and a variety of interventions available, a multidisciplinary approach is paramount for optimizing the patient outcomes (3). Although the concept of the heart team is a class I indication in both European and US guidelines, the level of evidence is C (4). The centres that have integrated these guidelines perform as a highly functioning team with evidence of improvement in patient outcomes (5). However, the current practice regarding the ideal definition, the ideal composition, the desired goals, the means of implementation, metrics of success and unintended consequences of an optimally functioning heart team are still lacking. The aims of the heart team survey were to determine whether the heart team approach is being applied in the different institutions across Europe and to determine the real life practices of patient management in each institution (graphical abstract).

Main Text

Methods

The study represents a pilot survey of contemporary opinion-based routines at different institutions. The survey was drafted after a consensus from the authors. Approval was obtained from medical ethics committee at the Maastricht university medical centre (METC 2021-3013). Consent was obtained from participants to take part in the online survey and use of data for publication. The cardiologists and cardiac surgeons in Europe were identified through member database on cardiology and surgical societies according to the country of work, emails were then obtained by

searching publications of the identified clinicians using PubMed.. Invitation emails were sent with the survey link to individuals along with an information leaflet about the survey. Reminder emails were also sent to individuals who had not completed the survey. Survey Monkey was used to facilitate the completion of the survey. The survey responses were anonymous. The participants were allowed to pick multiple answers for each question. Responses to the multiple-choice questions were tabulated and presented as bar graphs, while open-ended answers were summarized in tables. The percentage in the results section refers to the respondents who have answered the question. These clinicians were contacted to answer a list of 47 questions (appendix 1) focusing on the composition of heart team in different institutions, execution of the heart team, institutional guidelines for ad hoc interventions, documentations of heart team decisions, understand the decision making progress of the heart teams and the audit of heart team decisions (appendix 1).

Results

1. Participant demographics

Among 2188 invited clinicians, 220 from 26 countries (from 105 different cities) (figure 1a/1b) took part in the survey (response rate 10%, the survey response does not take into consideration problems with recipient email servers or emails filtered into the junk folder). The completion rate for the survey questions was 85%. One hundred and forty (64%) were cardiac surgeons and 80 (36%) were cardiologists (figure 1c). The sub-speciality interest is shown in figure 1d. Seventy percent of the responders were > 40 years of age (figure 1e). One hundred and forty one (64%) were working in university hospitals (supplemental figure 1).

2. Composition of heart team

Two hundred and one respondents (91%) had a heart team in their hospitals (figure 2a). Over 50% of the respondents reported the heart team should comprise a cardiac surgeon, general cardiologist, interventional cardiologist, imaging cardiologist and/or

anaesthetist (figure 2b). One-hundred and nine (109, 54%) respondents reported there should be a minimum quorum required for heart team meeting to take place (figure 2c). Over 50% of the respondents agreed at least one of the following attendees are mandatory for the heart team meeting; general cardiologist, imaging cardiologist, interventional cardiologist, cardiac surgeon and heart team co-ordinator (figure 2d). Eighty-two (41%) respondents reported the presence of a meeting chair (figure supplemental figure 2a). When the respondents were asked who chairs the meeting the answer was very variable ranging from head of department, cardiac surgeon, cardiologist or on a rotational basis (supplemental figure 2b).

3. Conduct of the heart team

One hundred and four (55%) respondents had weekly heart team meetings (figure 3a). One hundred and twenty nine (66%) respondents reported the heart team meeting lasted for an hour (figure 3b) and 139 (73%) respondents had in person meetings (figure 3c). One hundred and forty five (77%) respondents reported a lack of cut off time for patients to be added to the heart team meetings (figure 3d). One hundred and six (56%) respondents circulated a patient list in advance of the heart team meetings (supplemental figure 3a). Fifty eight (54%) of the respondents acknowledged the patient list was prepared by the heart team co-ordinator (supplemental figure 3b). Ninety five (50%) of the heart teams had a regional referral system (supplemental figure 3c).

4. Type of patients discussed

One hundred fifty five (90%) of the respondents acknowledged that most patients undergoing percutaneous coronary intervention (PCI) were not discussed in the heart team meeting (figure 4a). Eighty seven (56%) of the respondent considered 10-20% of the patients undergoing PCI were discussed (figure 4b). Eighty two (49%) respondents reported a lack of institutional guidelines for adhoc PCI or other ad hoc interventions

(figure 4c). The percentage of ad hoc PCI carried out in respondent's institution was quite variable (figure 4d).

5. Data presentation and documentation

Ninety eight (58%) respondents reported an electronic documentation process (figure 5a). Ninety six (57%) of the respondents used a patient template for clinical information at the heart team meetings(figure 5b). Sixty eight (40%) of the respondents had a video presentation of the patient during heart team discussions (figure 5c). One hundred and three (61%) respondents reported all investigations had to be completed prior to discussion in the heart team meeting (figure 5d). One hundred and forty (88%) respondents reported, patients were re-discussed if further investigations were required (supplemental figure 5a). Euroscore was the most common risk stratification scoring system used (supplemental figure 5b). According to one hundred and twelve (67%) of the respondents, SYNTAX score was not calculated for coronary artery disease patients (supplemental figure 5c). Frailty assessment tool was used by 75 (44%) respondents (supplemental figure 5d). Dementia screening was sparingly used (supplemental figure 5e). One hundred and forty seven (88%) of the respondents acknowledged heart team decisions were communicated to the general practioners (supplemental figure 5f).

6. Dedicated heart teams.

Majority of the respondents acknowledged the presence of dedicated heart teams including transcatheter aortic valve implantation (TAVI), surgical valve replacement or repair, infectious endocarditis, complex or high risk case and adult congenital (figure 6a). The frequency of dedicated heart teams was weekly as per 105 (62%) of the respondents (figure 6b). In the cases of dedicated heart team meetings majority of the respondents reported that the cases were done jointly by cardiologist and cardiac surgeons (figure 6c). In case of complex cases 70 (41%) of the respondents reported anaesthetist were the additional team members who were invited to the heart team meetings (figure 6d).

7. Decision making and auditing process for the heart team.

One hundred and thirty nine (83%) respondents reported the decision making process of the heart team was guideline directed (figure 7a). The respondents reported a combination of factors that would influence the treatment modality including; risk score, co-morbidities, clinical expertise, patient choice (figure 7b). One hundred and twenty nine (77%) acknowledged lack of re-imbursements for the heart team meetings (figure 7c). Respondents were asked about resolution process for lack of consensus for patient management, the answers ranged from majority opinion, opinion of the referring cardiologist, going back to the patient, decision of chair, etc (supplemental figure 7a). One hundred and thirteen (60%) respondents reported a lack of auditing process for heart team decisions (supplemental figure 7b). One hundred and twenty (70%) of the respondents reported lack of use of a quality indicator tool for heart team decision outcomes (supplemental figure 7c).

Discussion

The heart team concept stems from two landmark papers, the SYNTAX and the PARTNER studies where an interventional cardiologist and a cardiac surgeon determined the eligibility of the trial patients (6). Since these trials, both European and US guidelines have identified the requirements for a collaborative heart team approach as a class I indication in management of cardiovascular disease (4, 7). Multiple studies have highlighted the importance of the heart team approach in the management of increasingly complex patients with a wide variety of different treatment options in the armamentarium (3, 6, 8, 9). Despite the passage of over a decade since the inception of heart team for management of cardiovascular pathologies, the complete implementation is still lacking.

The current survey was carried out to establish the functionality of the heart team in different institutions. Over 201 (90%) respondents had a heart team in their hospitals. There was a wide variation in opinions of the conduct of the heart team in different institutions. Although the European guidelines highlighted the composition of the heart team to comprise of clinical cardiologist, interventional cardiologist, cardiac surgeon, imaging specialist and cardiovascular anaesthesiologist, only 50% of respondents related to it. Similarly, only 109 (54%) respondents reported the presence of a minimum quorum for heart team meeting to take place. Archbold et al have highlighted the importance of the meeting chair in the conduct of heart team meetings, particularly in complex cases and where difference of opinion existed (3). However, in the survey only 82 (41%) respondents reported the presence of a meeting chair at their heart teams. Fifty one (25%) respondents identified the presence of a heart team coordinator (figure 2a). The importance of the heart team coordinator cannot be over stressed as highlighted by Luckraz et al (9), in particular to ensure the smooth referral process, documentation and implementation of the heart team decisions (3). Similar to the recommendations of Luckraz et al, the survey found over 60% of the respondents had weekly heart team meetings that last for an hour (figure 3). There was marked variability in the documentation process, clinical information template used and the completeness of investigations to be available prior to patient discussion (figure 5) highlighting the need for consensus heart team guidelines.

Not all patients undergoing PCI were discussed in the heart team meeting (figure 4a). There was also a lack of institutional guidelines for adhoc PCI or other ad hoc interventions if a prior heart team discussion had not taken place as per 82 (49%) respondents (figure 4c). Archbold et al also highlighted consideration of a model for daily and mini heart team meetings in the context of urgent and emergency referrals (3).

With increasing patient complexities, advances and emergence of new therapies for cardiac pathologies, the importance of dedicated heart teams cannot be overstated. The rationale behind dedicated heart team is to bring clinicians on the table who are experts in same pathology but with different skill sets. The survey highlighted the presence of dedicated heart teams for different cardiac pathologies (figure 6). This allows a more patient centered approach and tailor the therapy to the requirement of the patient. Similarly, Sardari Nia et al highlighted and re-enforced the impact of a well-functioning dedicated mitral heart team on patient management with resultant improvement in patient survival (5).

The decision making process of the heart team was based on several factors including risk score, co-morbidities, patient choice and clinical expertise (figure 7b). Continuous evaluation of outcomes with quality review and/or local/external audit is a requirement of an ideal heart team. Most respondents reported a lack of auditing process or use of a quality indicator tool for the heart team decision outcomes (figure 6e/6f). This is important of 2021 ESC-EACTS valvular guidelines in which the heart team approach is mentioned over 60 times and many controversial decision-makings are referred to the heart team.

There are several limitations of the survey, the lack of a randomise control study including the low response rate of the survey. The responses may be individual viewpoints rather than departmental practices. There may be a lack of complete representation of heart team centres across Europe. Nevertheless, the survey highlights marked variability in the infra-structure, execution of the heart team meetings in different institutions which have been echoed in the literature. The survey identifies the need for Heart team guidelines to be formulated. These guidelines may help to reduce the marked variation seen in practices as seen in this survey. The ultimate goal is a patient

centred approach to management of cardiovascular pathology to improve both short term and long-term outcomes.

Funding

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Conflict of interest

None declare

Author contributions statement

All authors were involved in the concept, designing, drafting, critical revision, and approval of the article. UIA and PSN were involved also in execution of the survey.

Data Availability Statement

The survey data presented in this manuscript can be obtained by the journal upon request.

Figure legends:

Graphical abstract: Figure depicting difference in practices of heart teams in different institutions.

Figure 1: Selection of questions regarding participant demographics.

a: Map representing origin of respondents from different countries as depicted by different shades of green.

b: Pie chart representing origin of respondents from different countries.

c. position as subspeciality

d. the main practice area

Figure 2: Selection of questions regarding composition of the heart team.

Figure 3: Selection of questions regarding conduct of the heart team.

Figure 4: Selection of questions regarding types of patients discussed.

Figure 5: Selection of questions regarding data presentation and documentation.

Figure 6: Selection of questions regarding dedicated heart teams.

Figure 7: Selection of questions regarding decision making and auditing process of the heart teams,

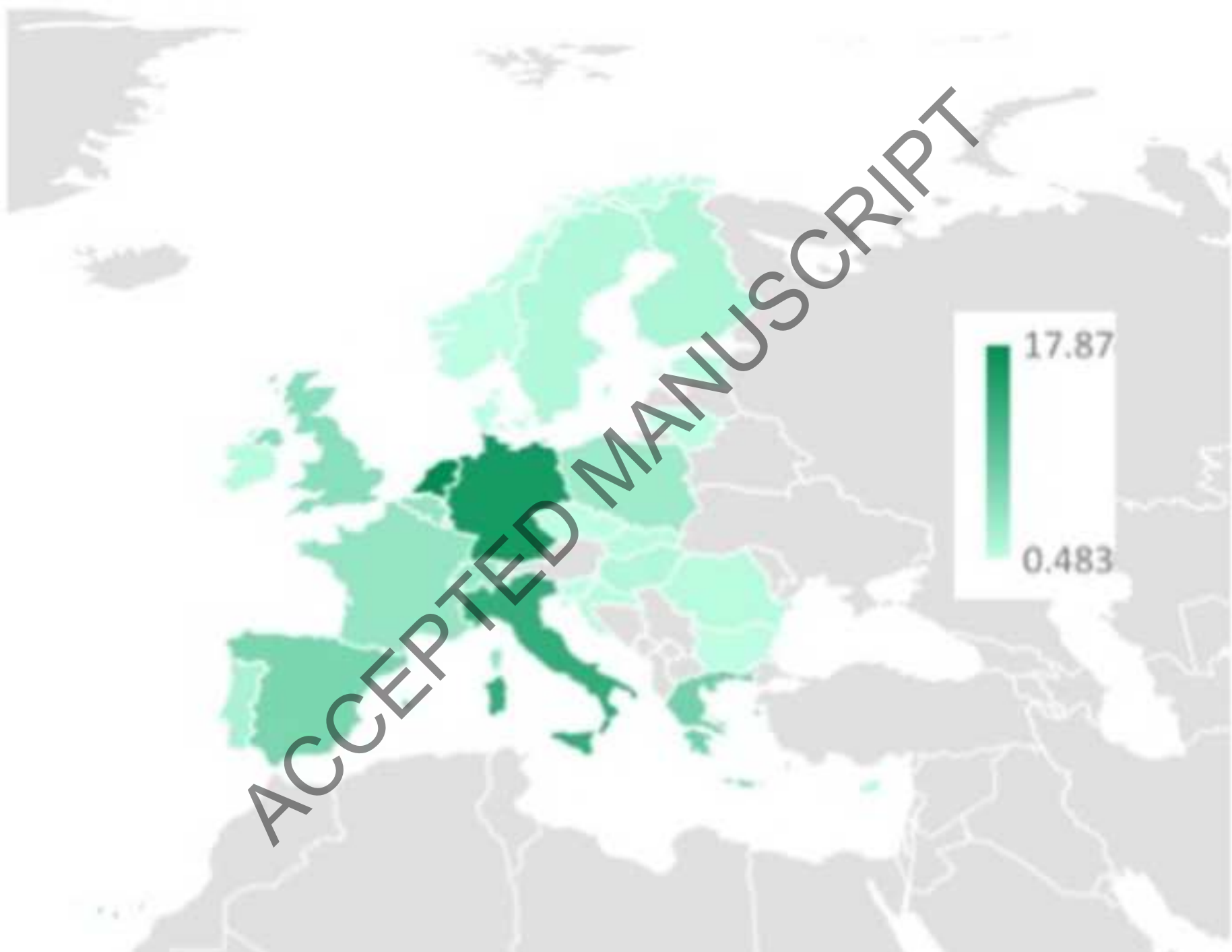
References

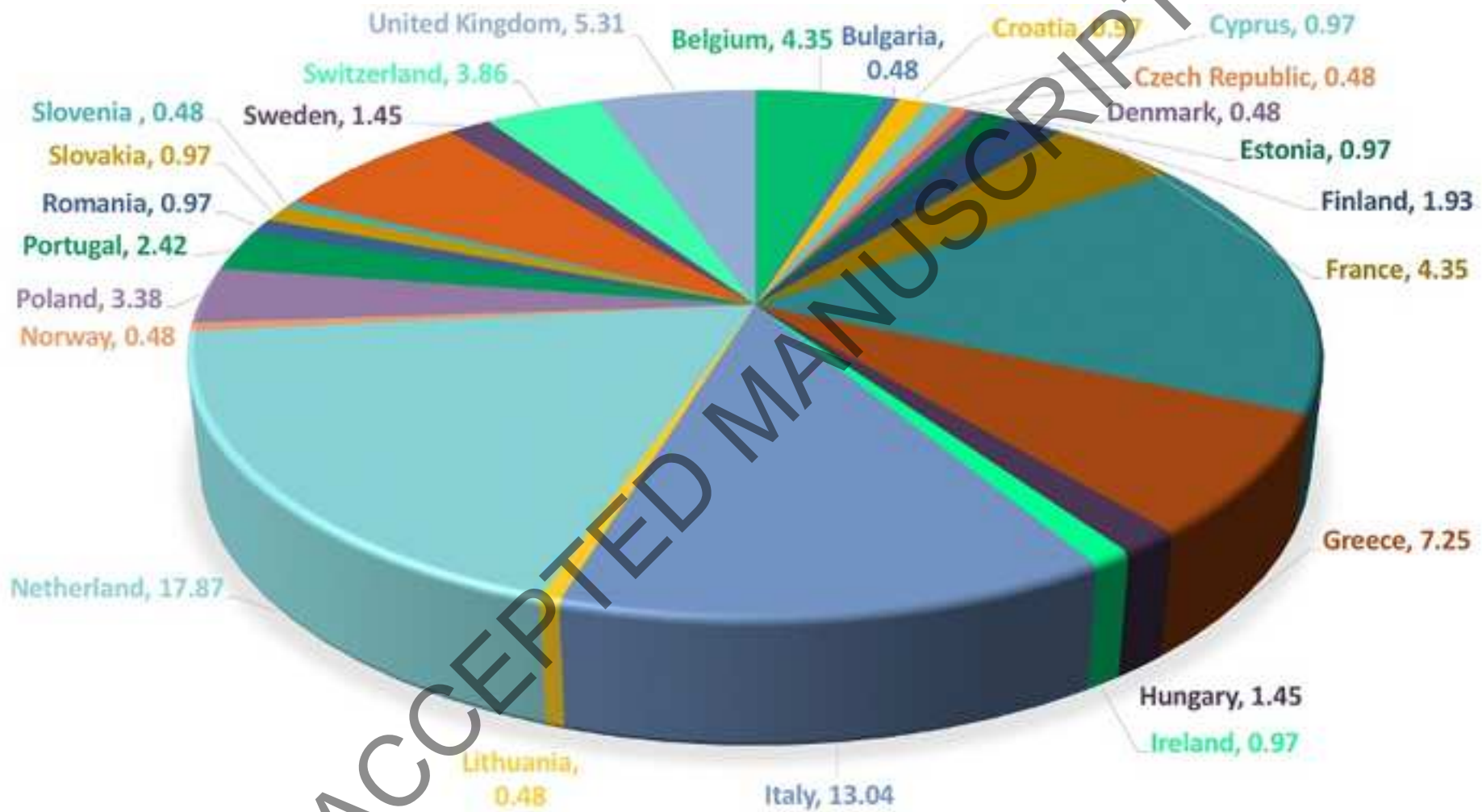
1. Forrest LM, McMillan DC, McArdle CS, Dunlop DJ. An evaluation of the impact of a multidisciplinary team, in a single centre, on treatment and survival in patients with inoperable non-small-cell lung cancer. *British journal of cancer*. 2005;93(9):977-8.
2. Kesson EM, Allardice GM, George WD, Burns HJ, Morrison DS. Effects of multidisciplinary team working on breast cancer survival: retrospective, comparative, interventional cohort study of 13 722 women. *Bmj*. 2012;344:e2718.
3. Archbold A, Akowuah E, Banning AP, Baumbach A, Braidley P, Cooper G, et al. Getting the best from the Heart Team: guidance for cardiac multidisciplinary meetings. *Heart*. 2022;108(11):e2.
4. Lawton JS, Tamis-Holland JE, Bangalore S, Bates ER, Beckie TM, Bischoff JM, et al. 2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularization: Executive Summary: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. *Circulation*. 2022;145(3):e4-e17.
5. Sardari Nia P, Olsthoorn JR, Heuts S, van Kuijk SMJ, Vainer J, Streukens S, et al. Effect of a dedicated mitral heart team compared to a general heart team on survival:

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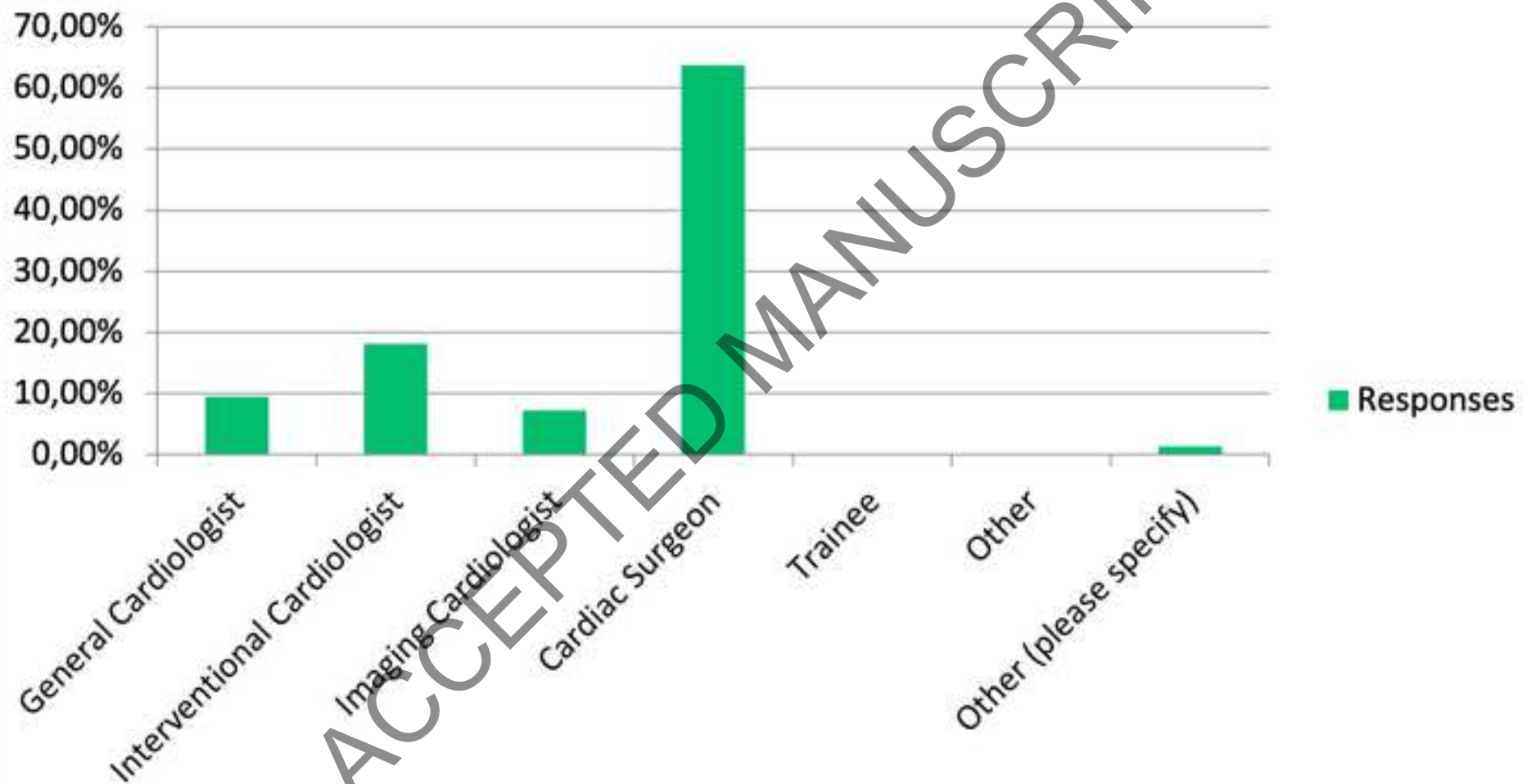
- a retrospective, comparative, non-randomized interventional cohort study based on prospectively registered data. *Eur J Cardiothorac Surg.* 2021;60(2):263-73.
6. Coylewright M, Mack MJ, Holmes DR, Jr., O'Gara PT. A call for an evidence-based approach to the Heart Team for patients with severe aortic stenosis. *J Am Coll Cardiol.* 2015;65(14):1472-80.
7. Vahanian A, Beyersdorf F, Praz F, Milojevic M, Baldus S, Bauersachs J, et al. 2021 ESC/EACTS Guidelines for the management of valvular heart disease. *Eur Heart J.* 2022;43(7):561-632.
8. Starck CT, Bracke F, Delnoy PP, Freedman RA, Kutarski A, Gallagher M, et al. ILEEM-survey on the Heart Team approach and team training for lead extraction procedures. *Cardiol J.* 2022;29(3):481-8.
9. Luckraz H, Norell M, Buch M, James R, Cooper G. Structure and functioning of a multidisciplinary 'Heart Team' for patients with coronary artery disease: rationale and recommendations from a joint BCS/BCIS/SCTS working group. *Eur J Cardiothorac Surg.* 2015;48(4):524-9.

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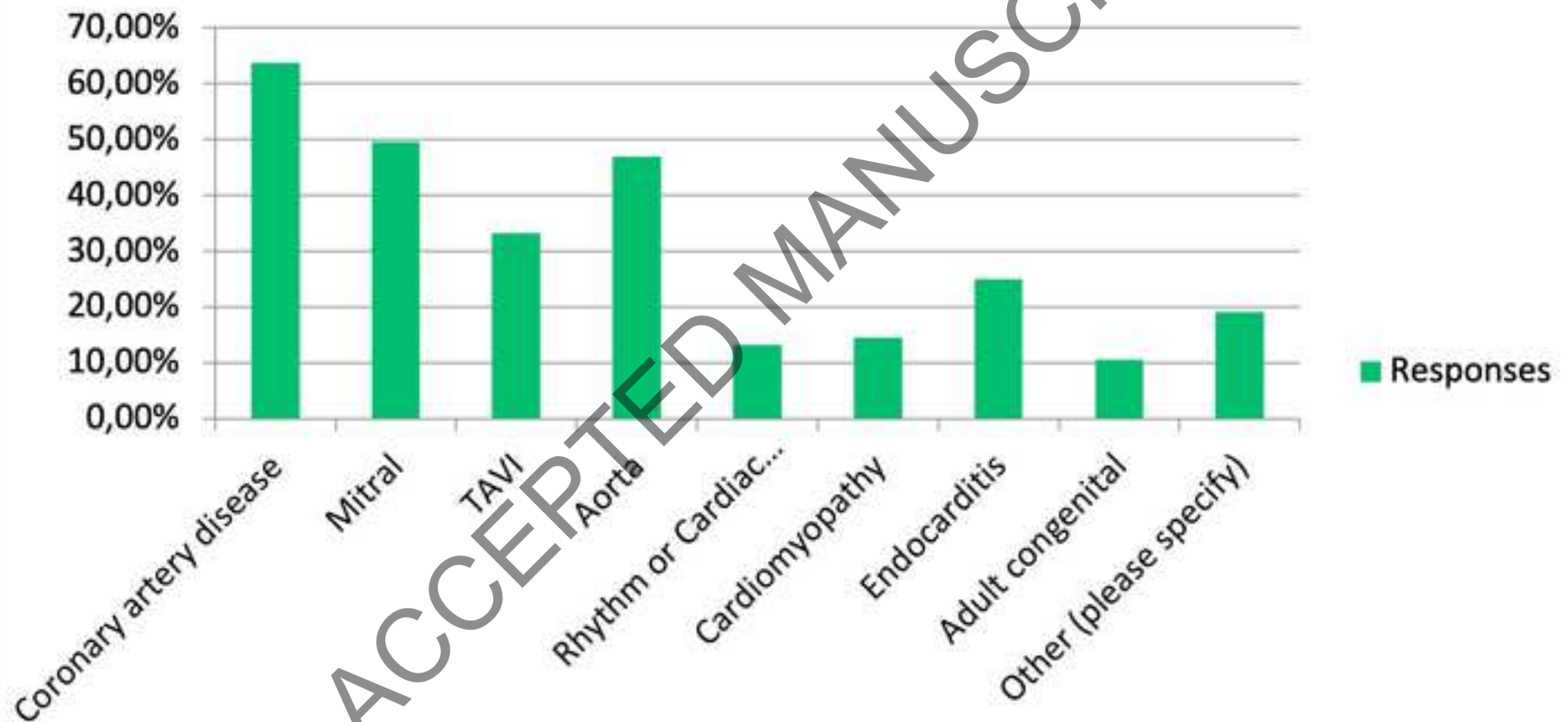




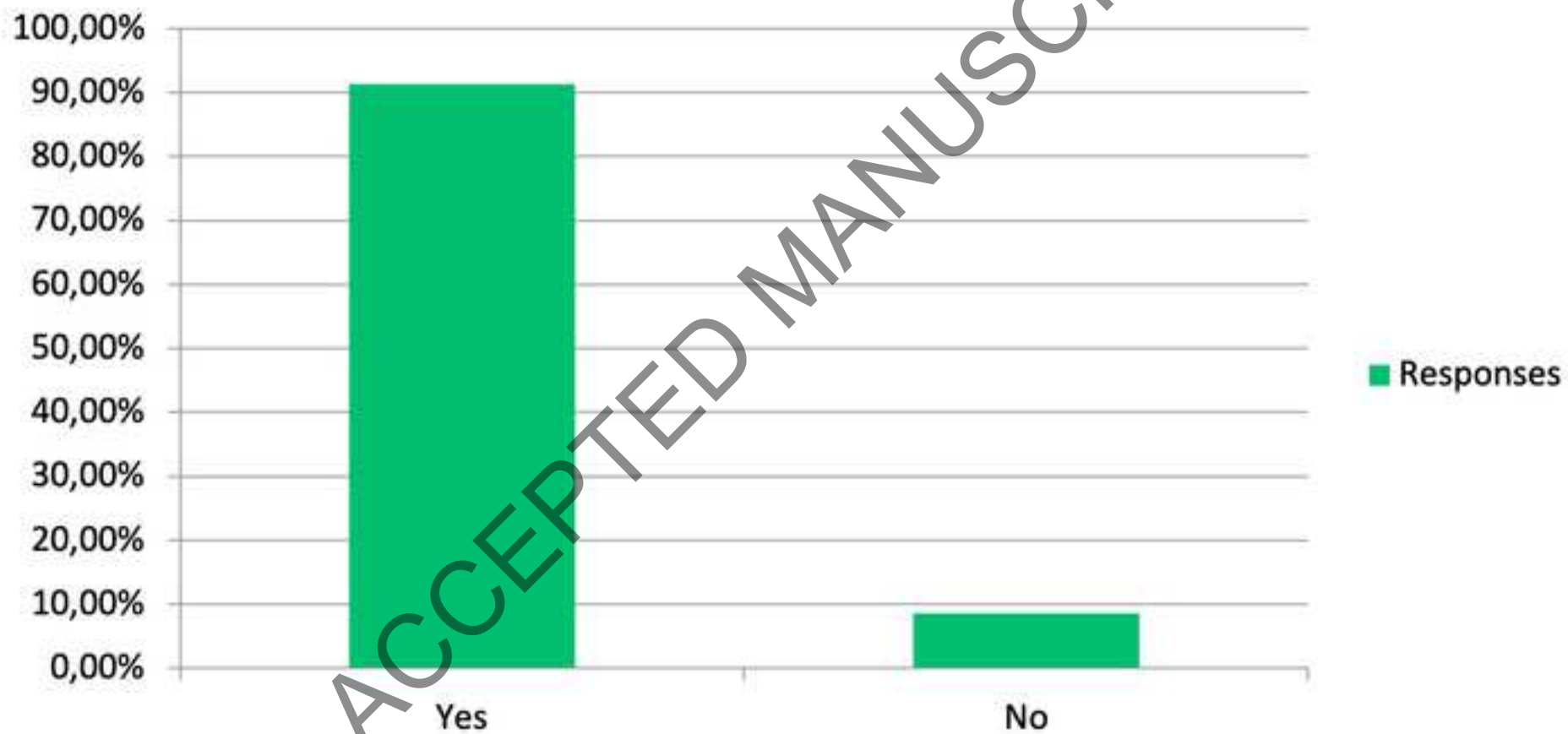
What is your current position?



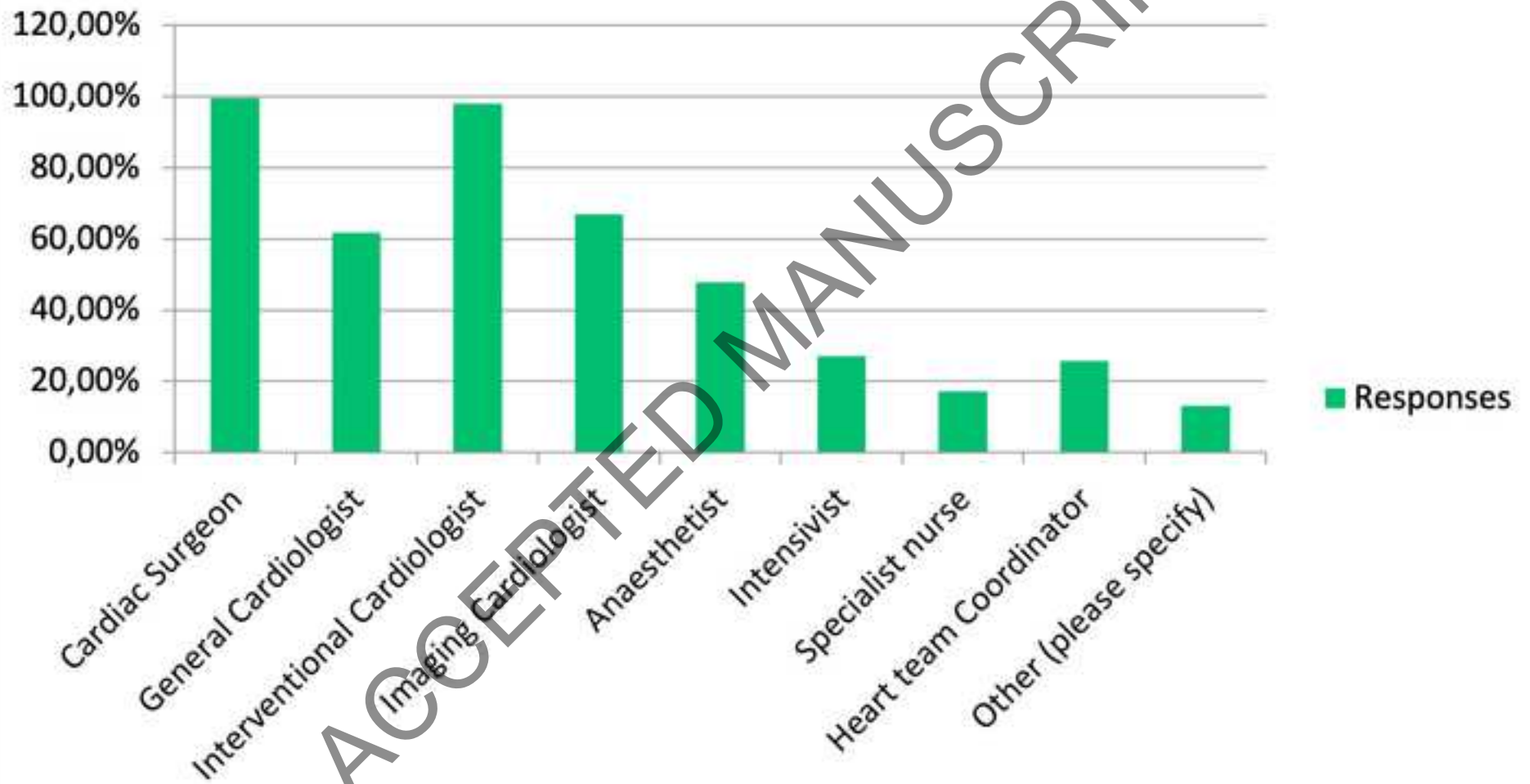
What subspecialty interest best describes your practice?



Do you have a heart team at your hospital?



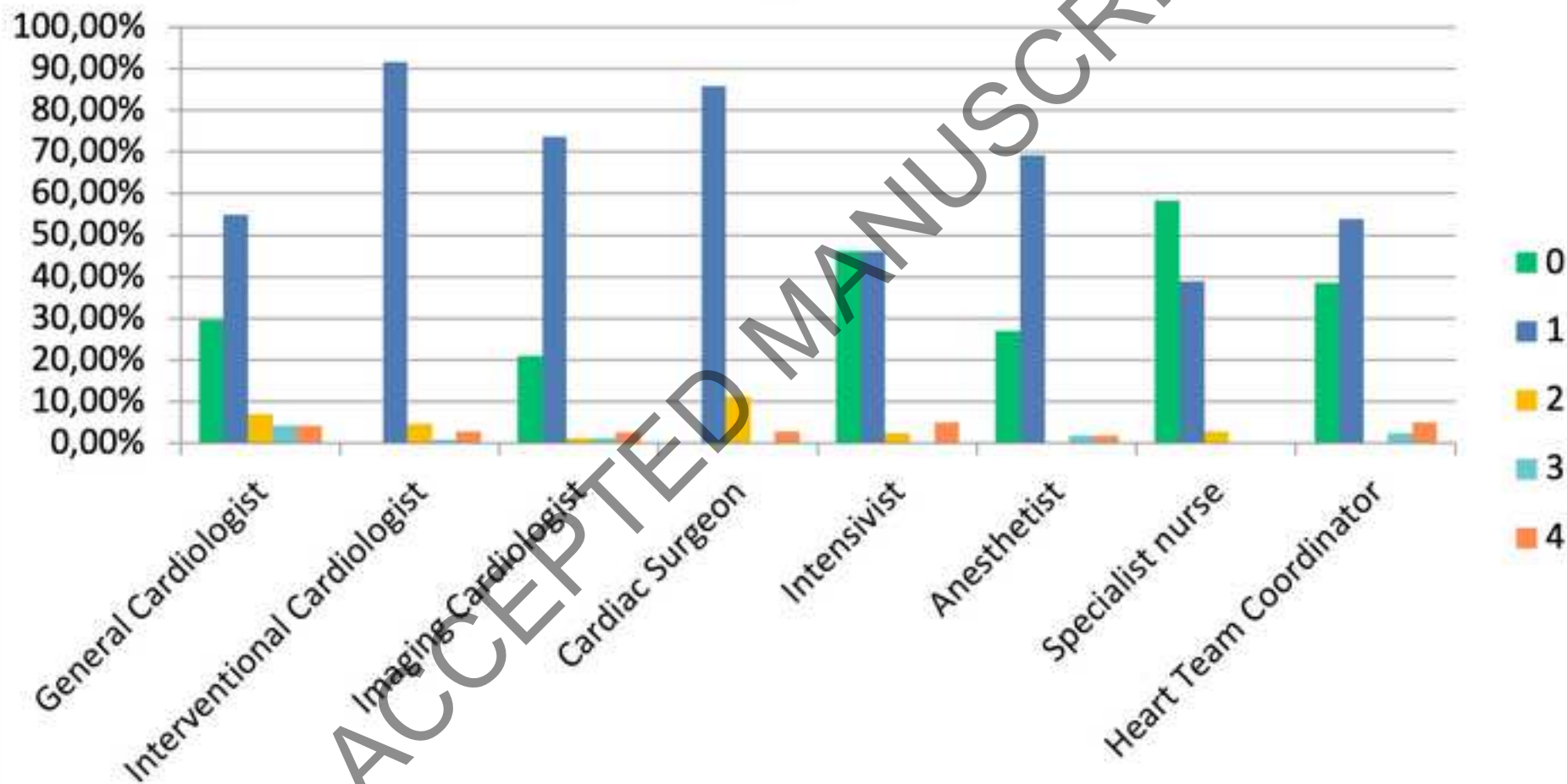
Composition of the heart team?



Is there a minimum requirement of attendees for the heart meeting to convene?



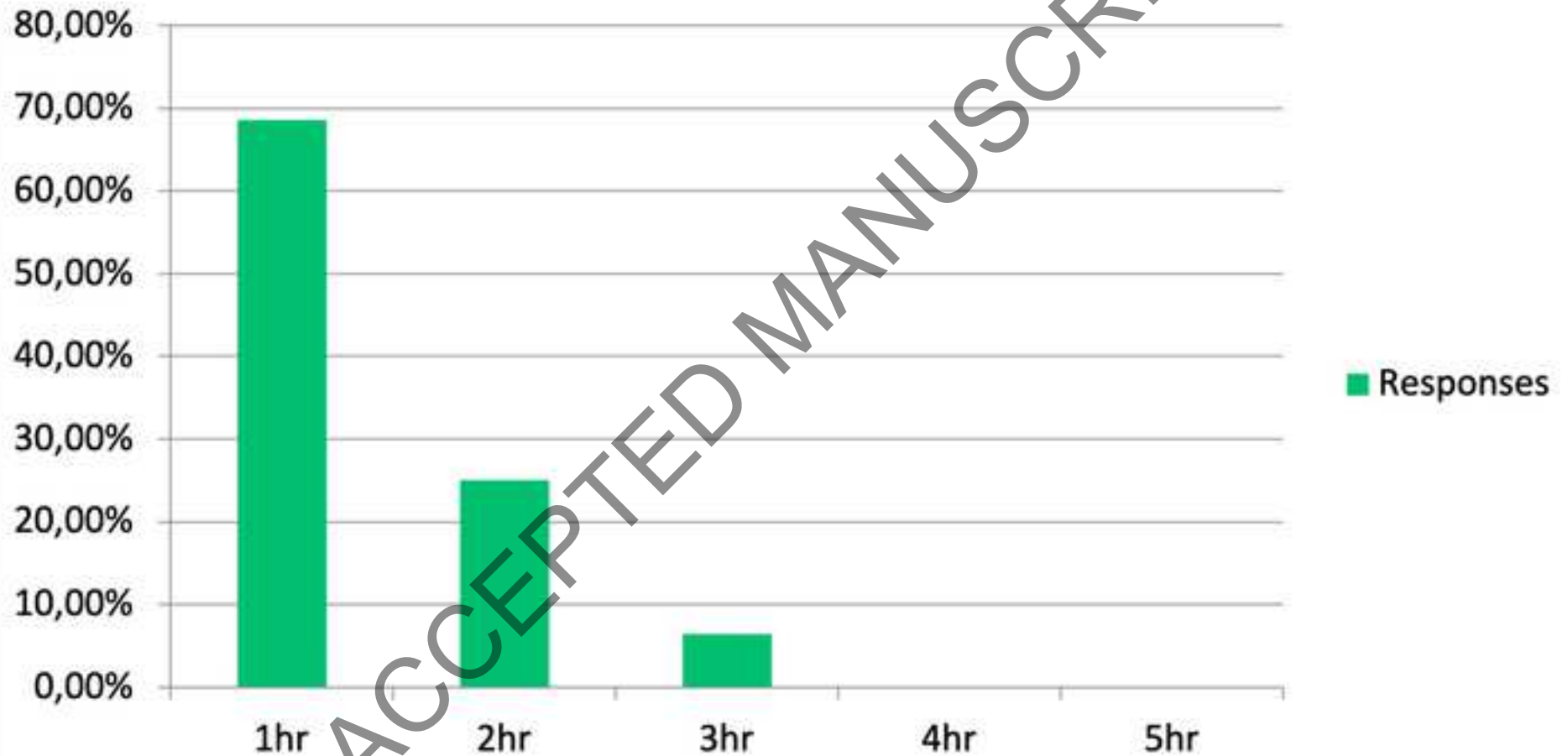
If yes how many of the following attendees are mandatory for the meeting to convene?



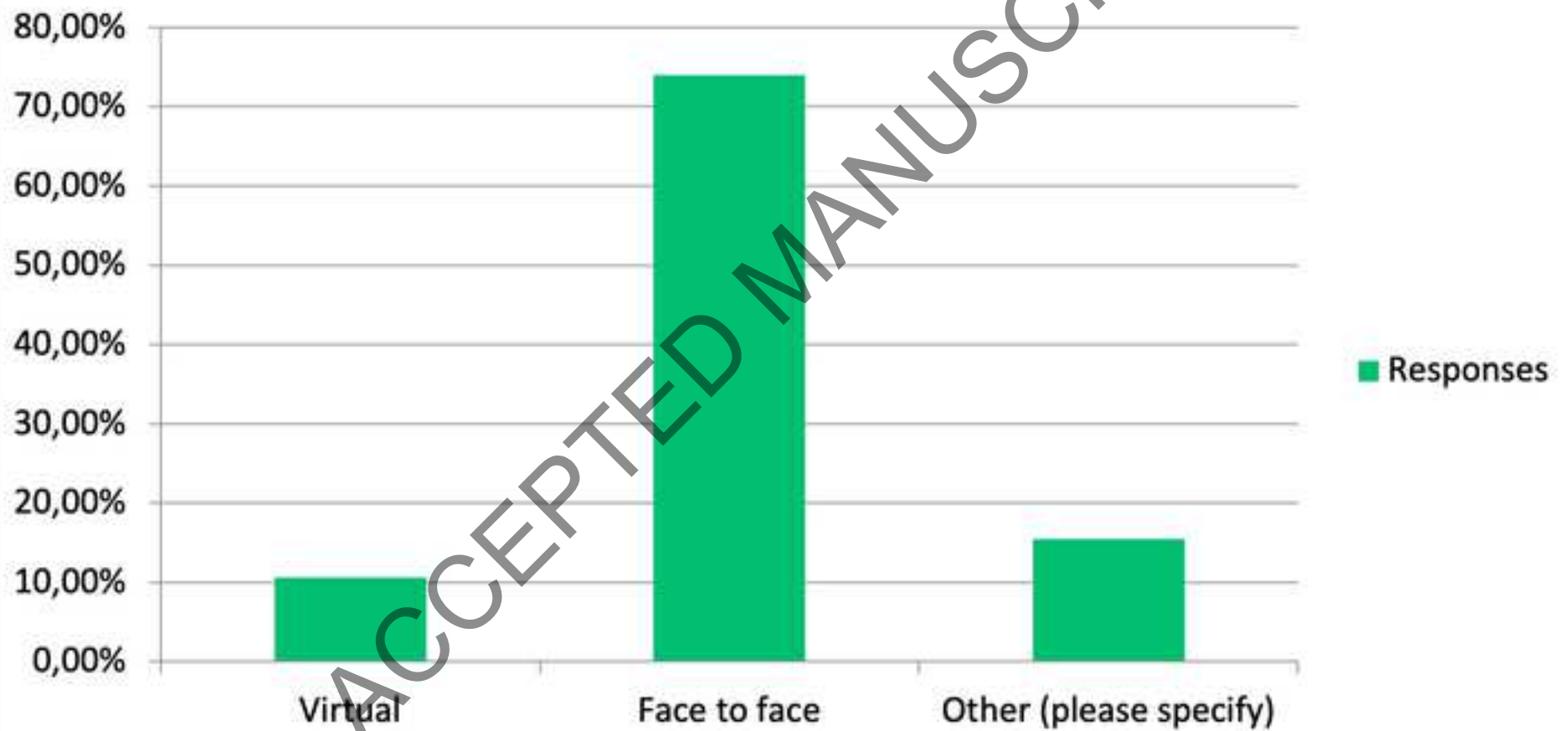
What is the frequency of the heart team meeting?



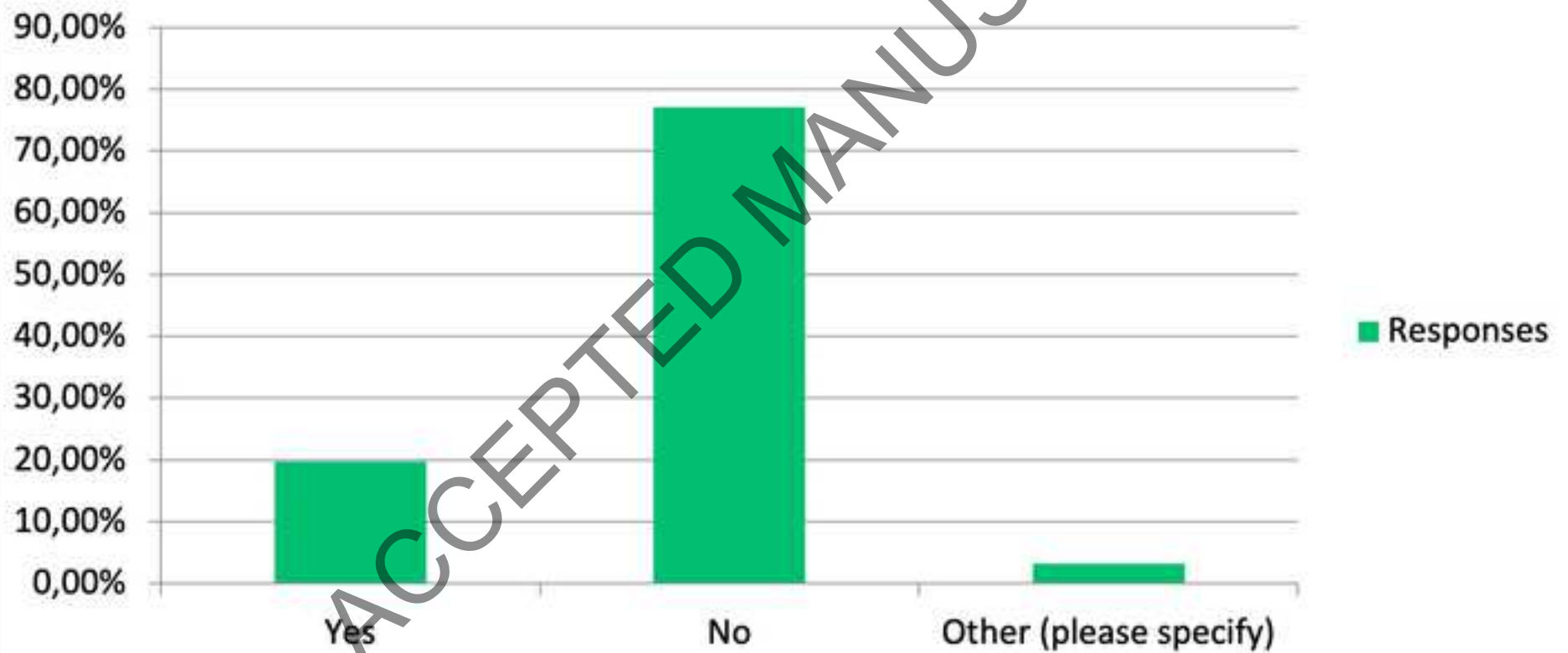
Duration of the heart team meeting?



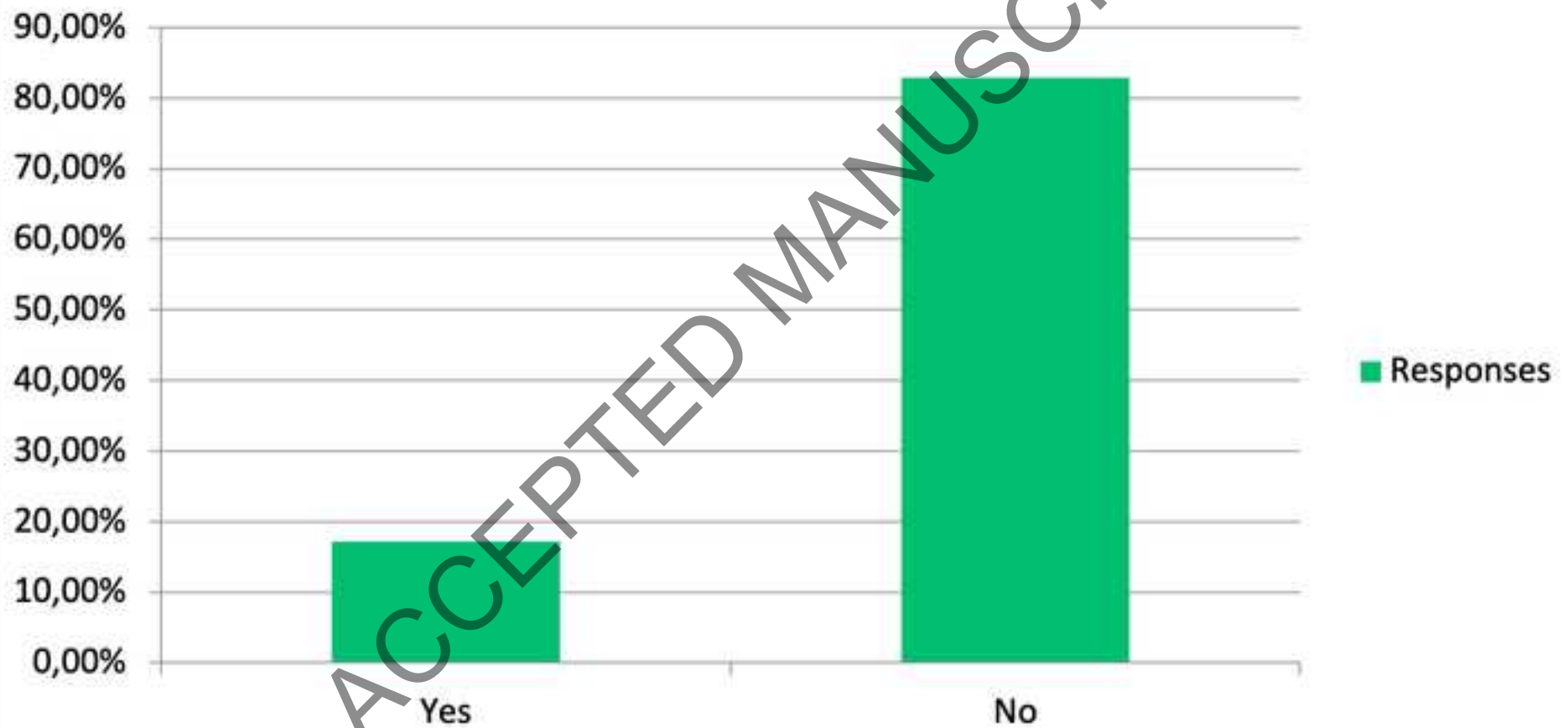
How is the heart team meeting conducted?



Is there a cut off time after which further patients cannot be added to the heart team meeting?



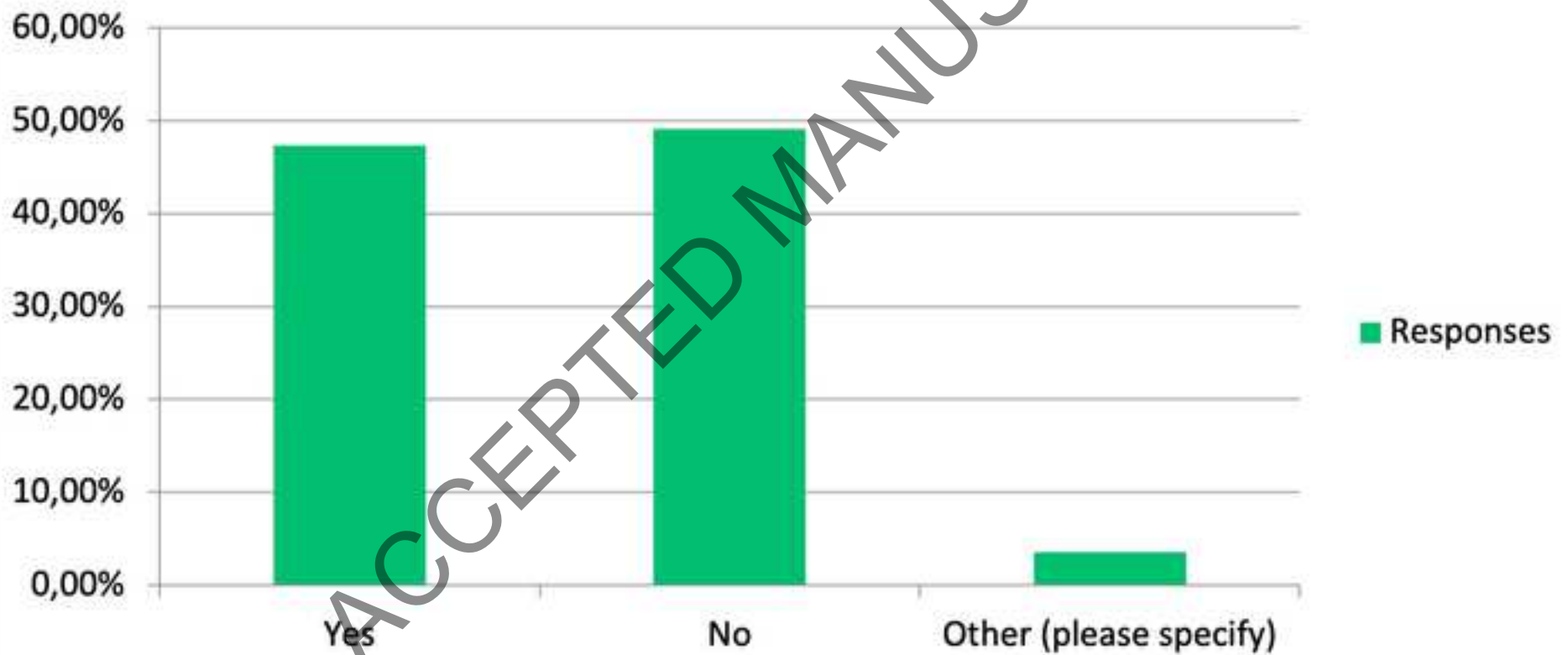
Are all patients undergoing PCI discussed in the heart team meeting?



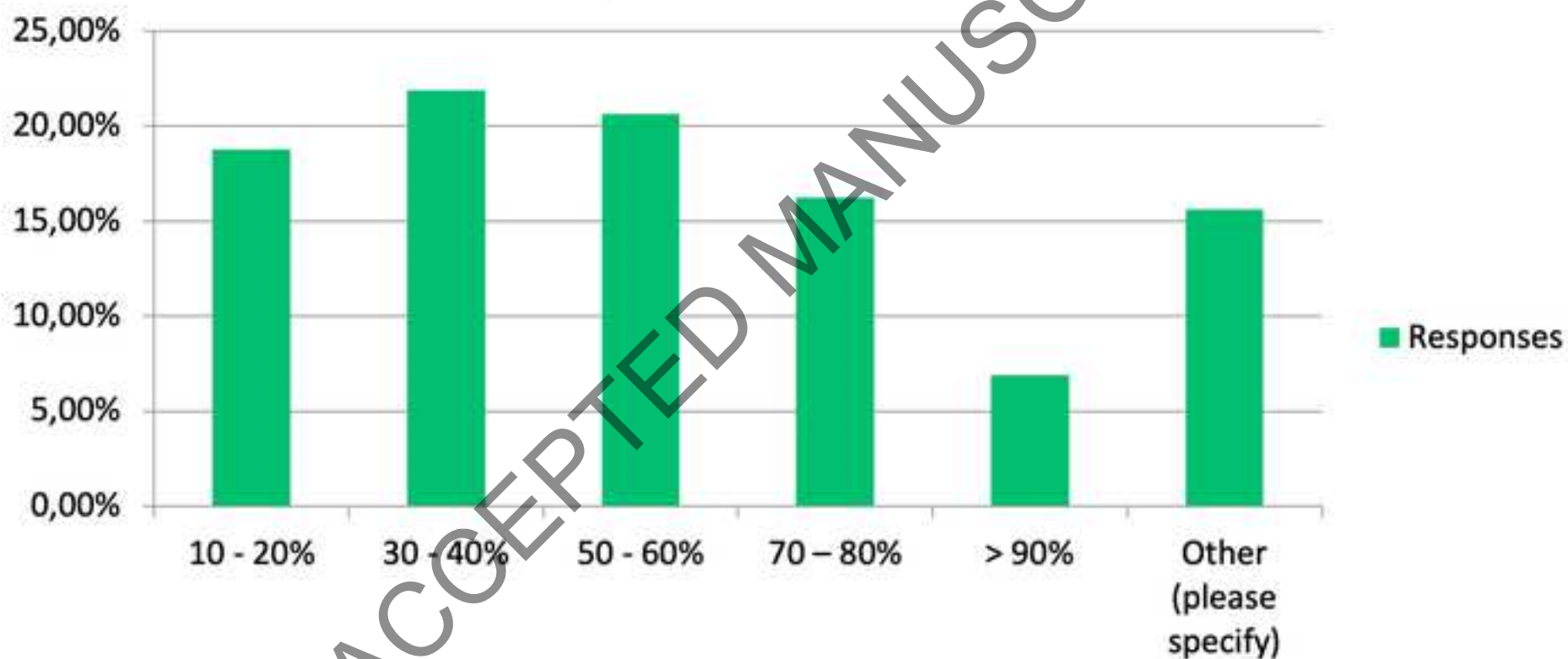
If no what percentage of patients undergoing PCI are discussed at the heart team meeting?



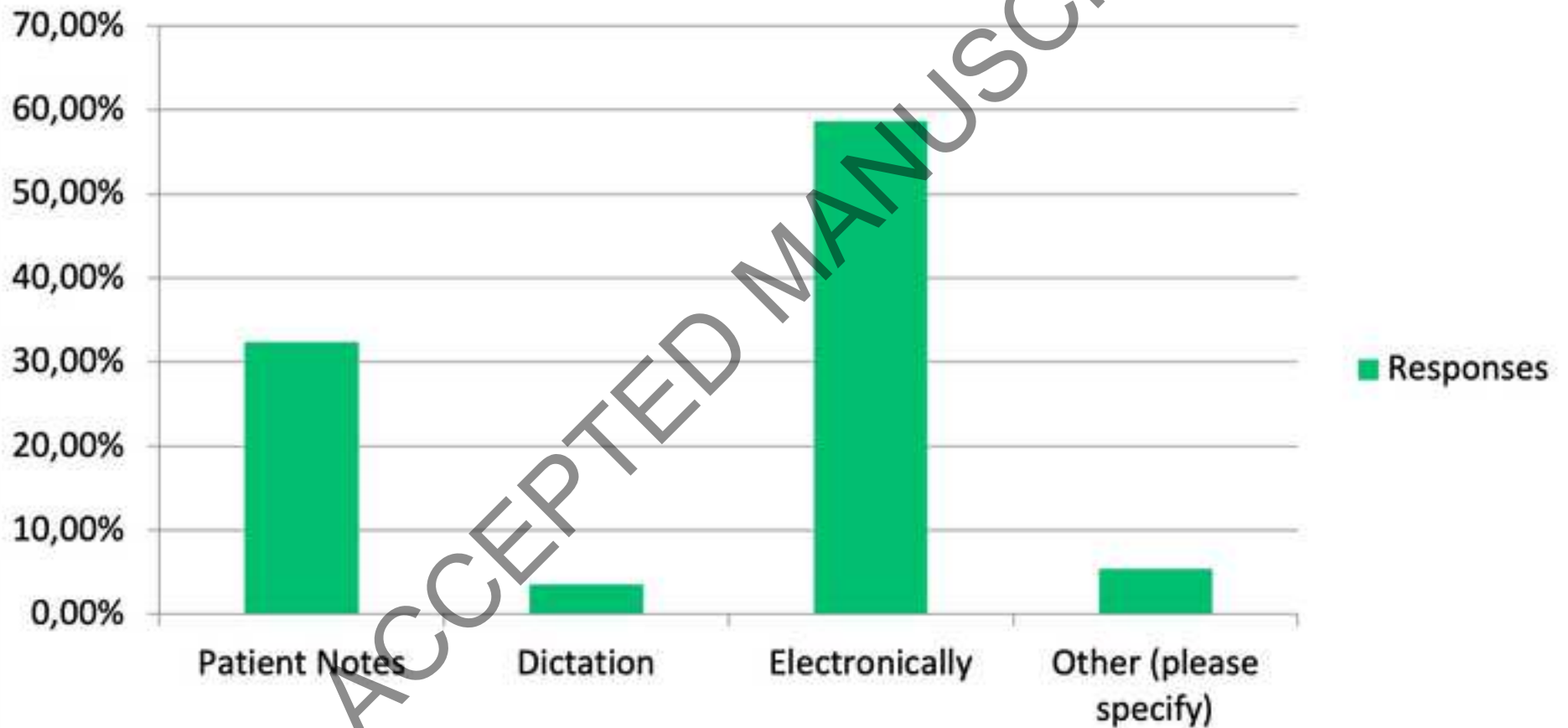
Are there institutional guidelines for ad hoc PCI or other interventions to be done without the consent of the Heart Team?



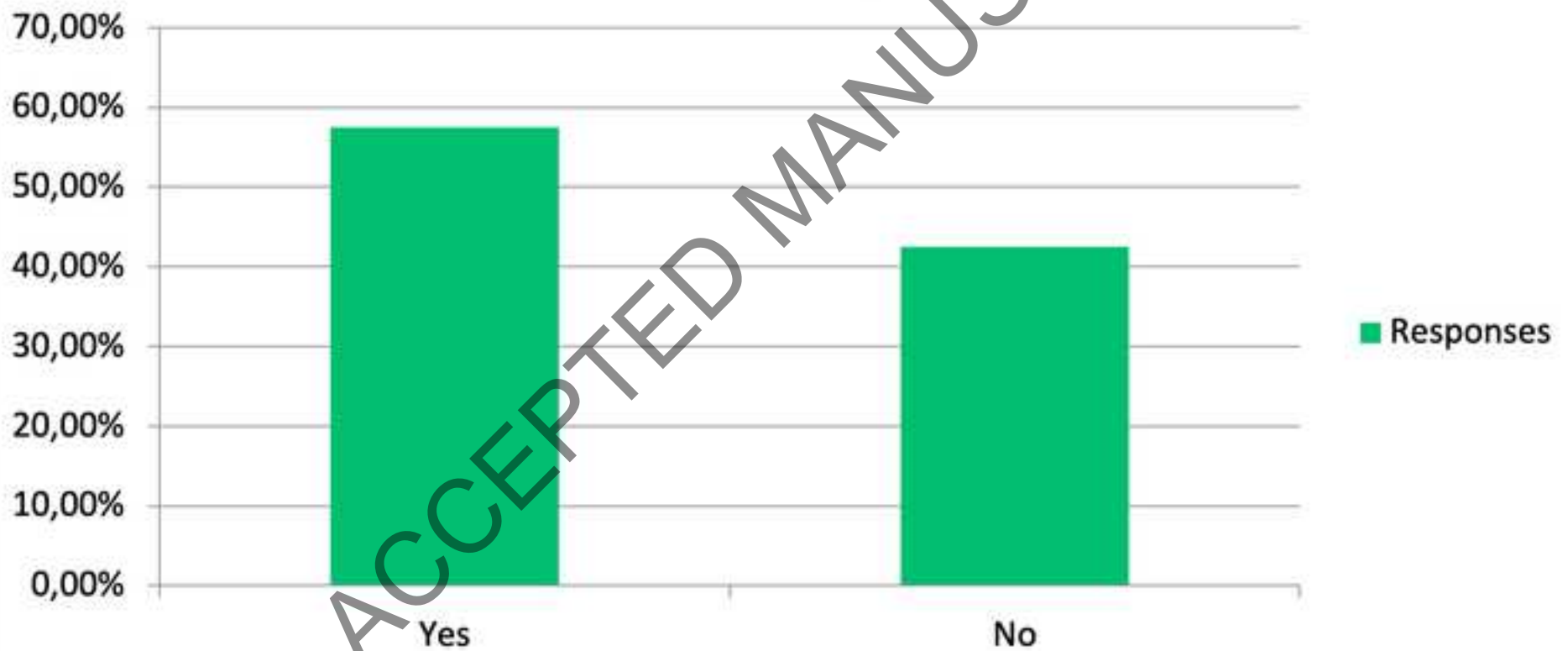
What percentage of ad hoc PCI are done at your institution?



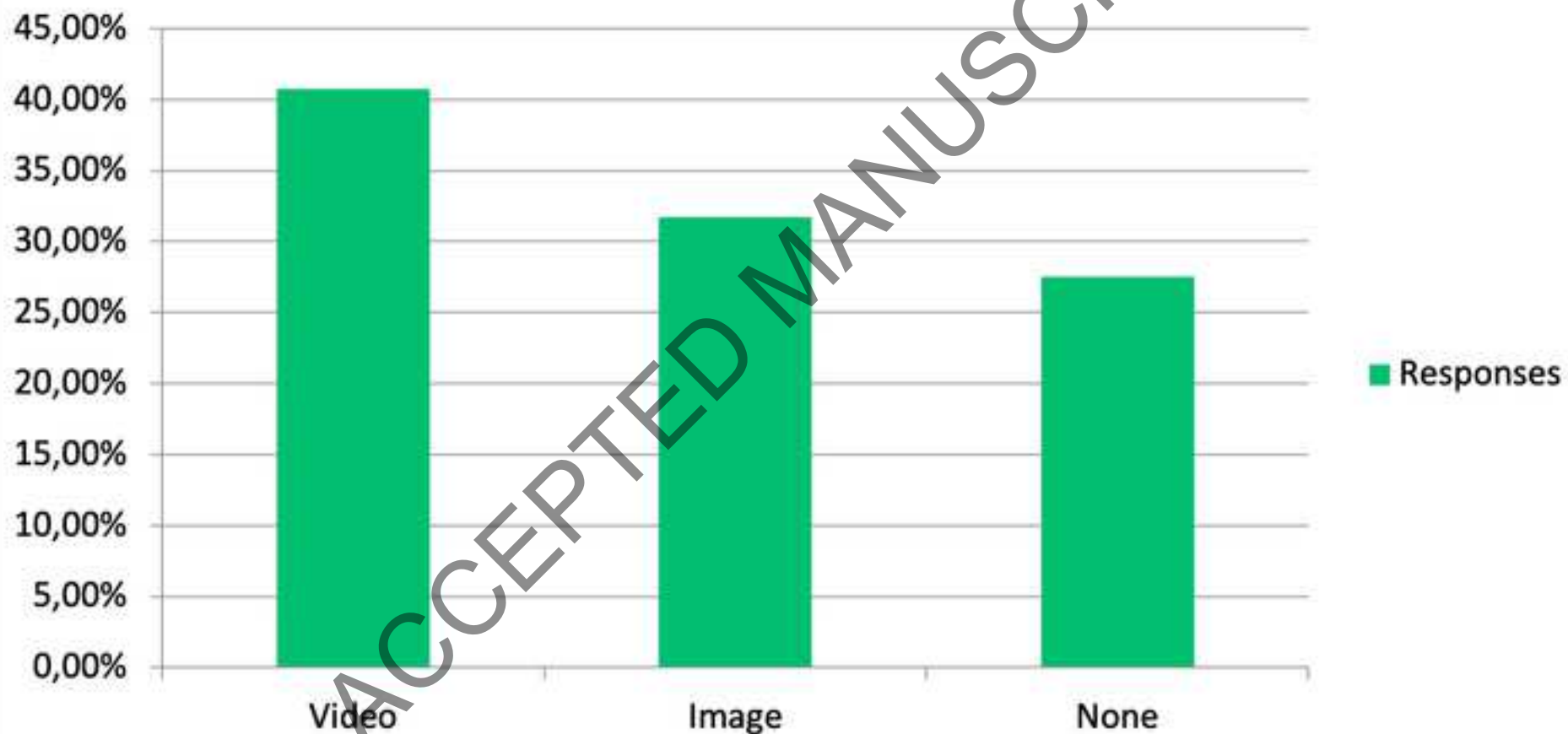
Where are the patient discussions documented?



Is there a template used for patient clinical information for discussion at the meeting?



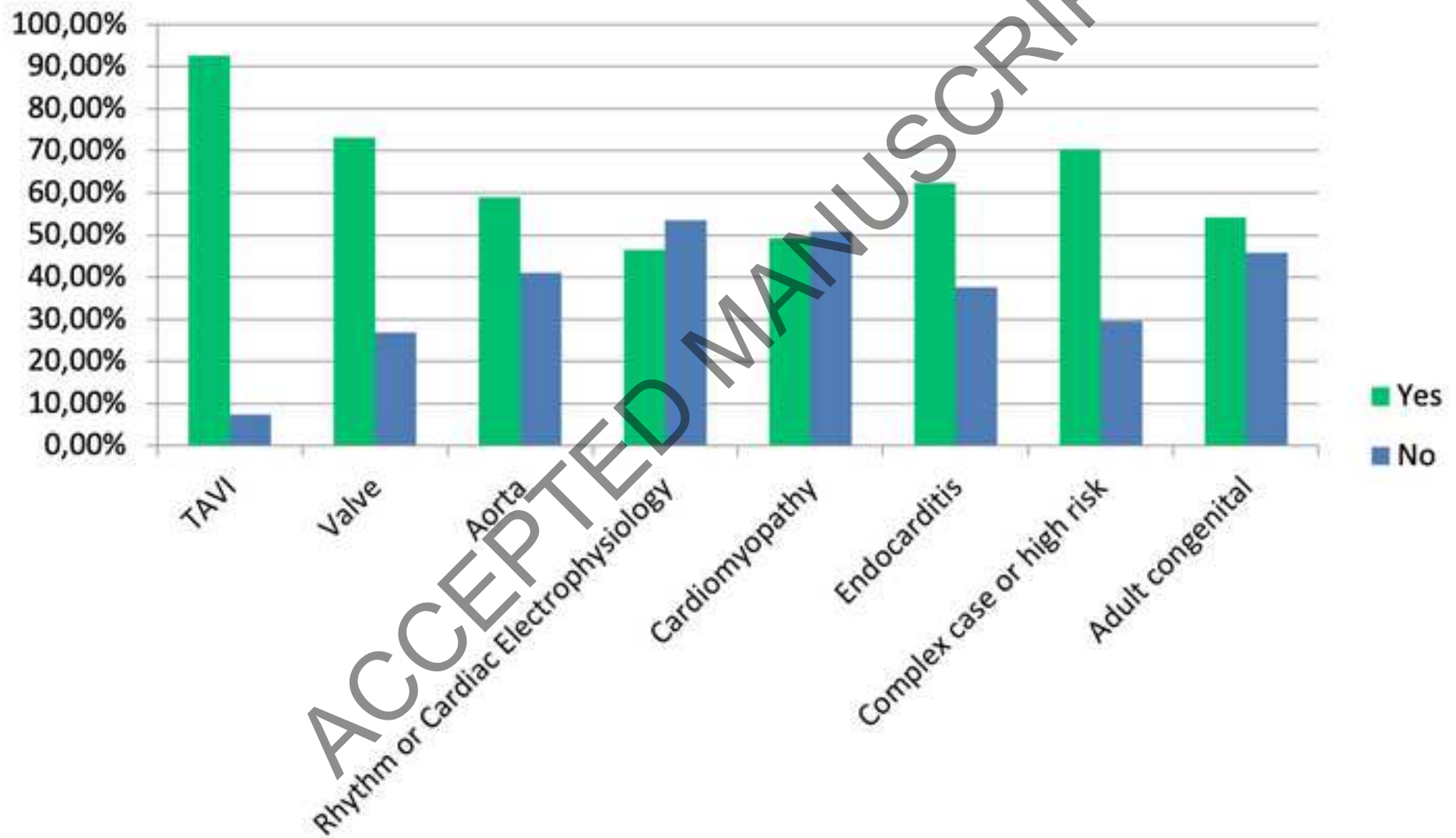
Is there a media presentation of the patient?



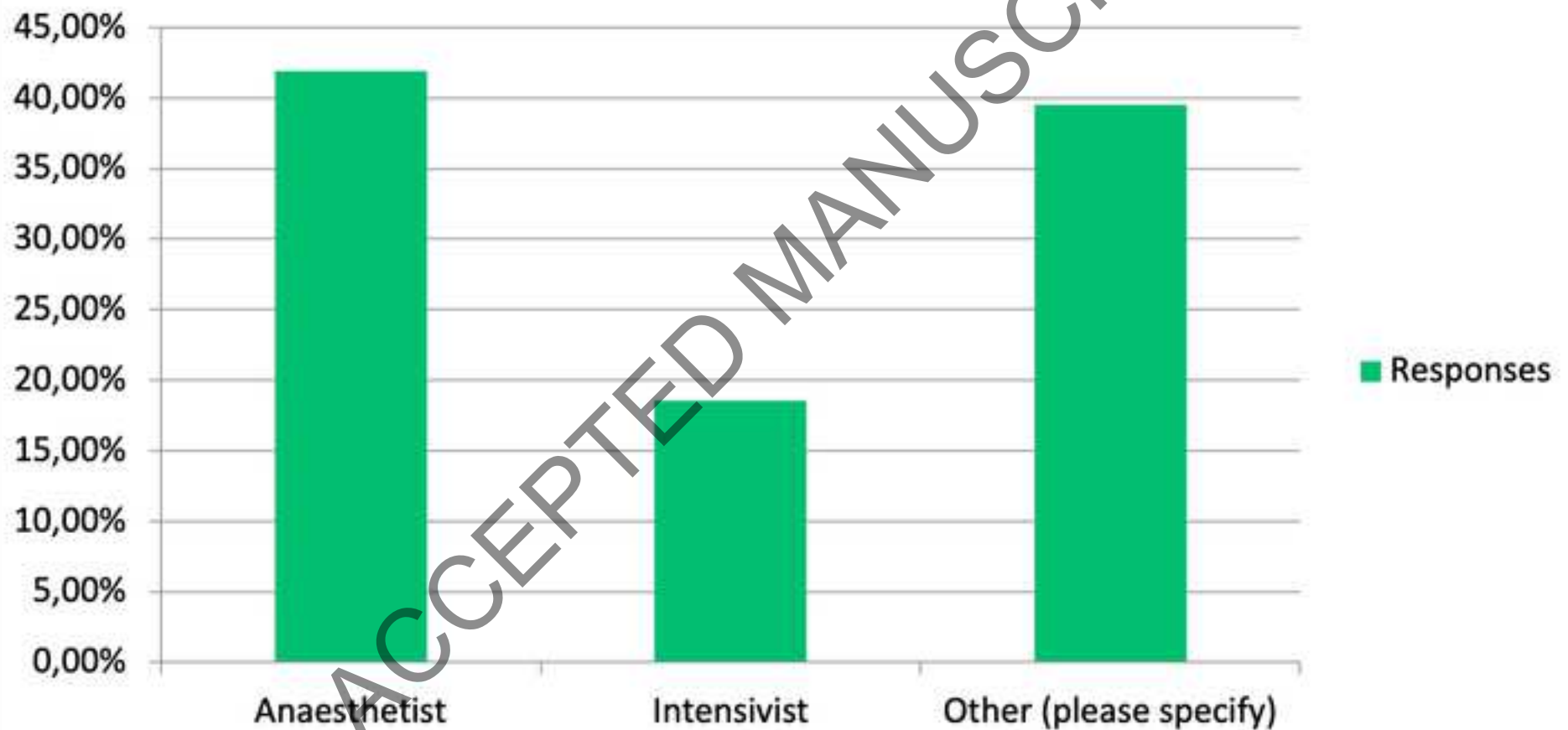
Is there a requirement of all investigations to be available prior to discussion?



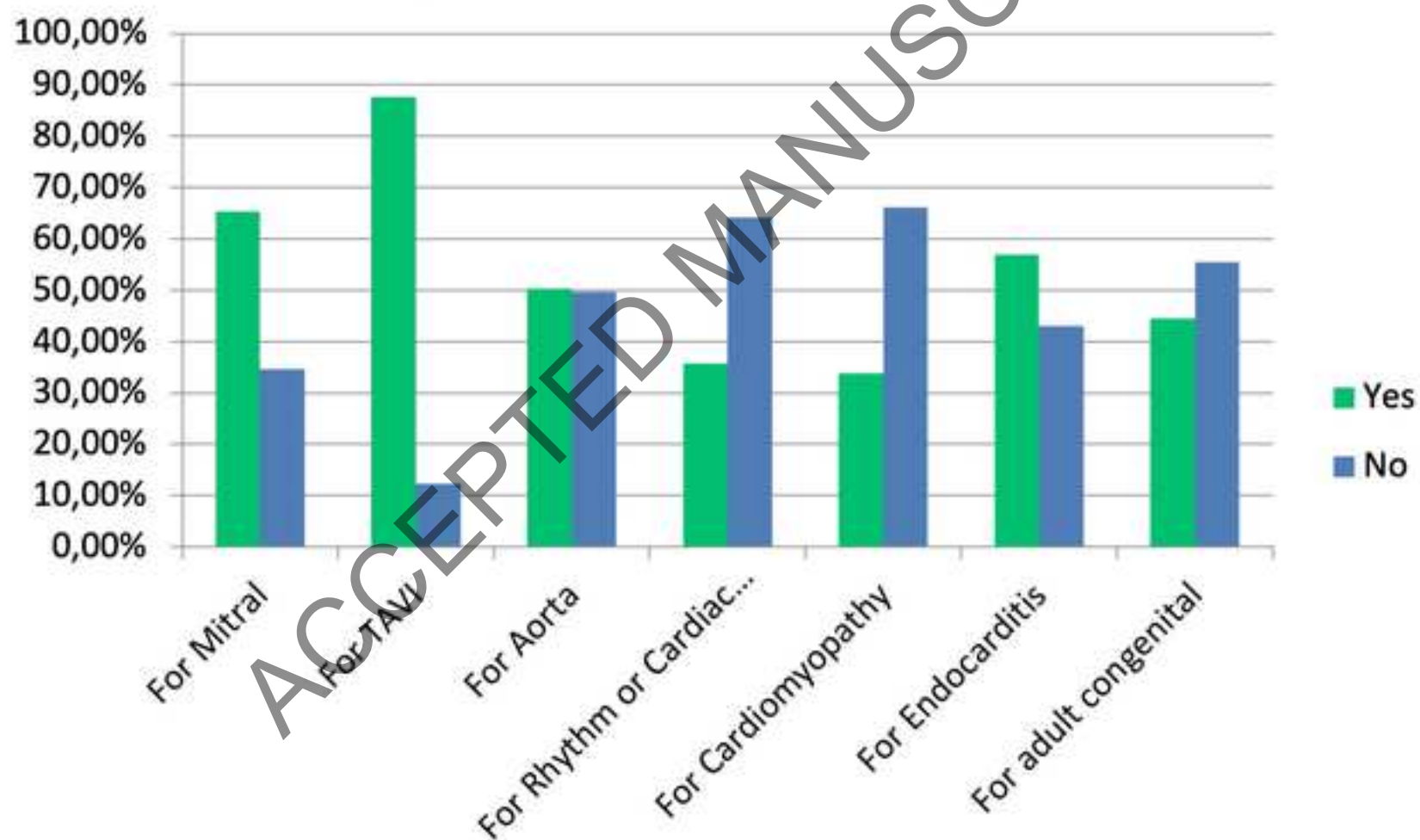
Are there dedicated heart teams for the following cardiac pathologies?



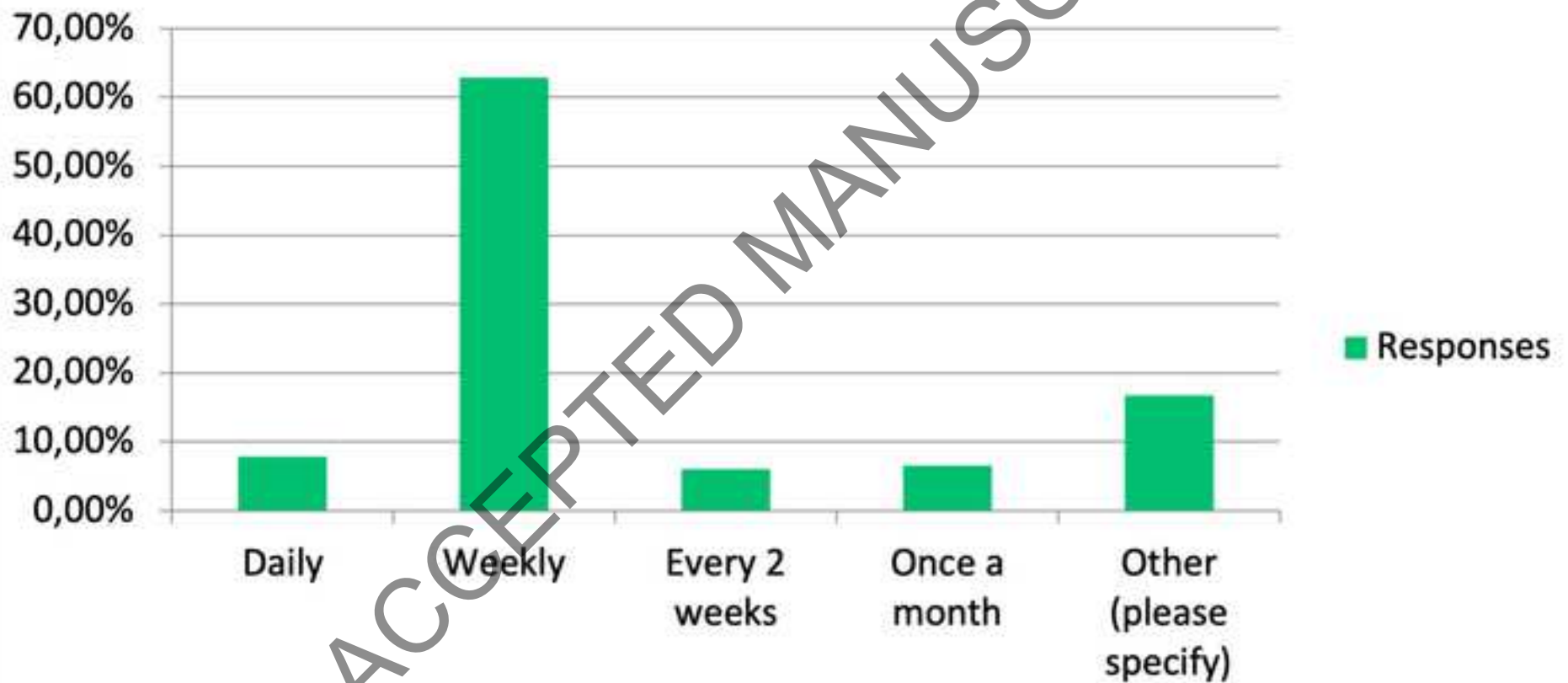
In the complex case heart team meetings are additional team members invited?



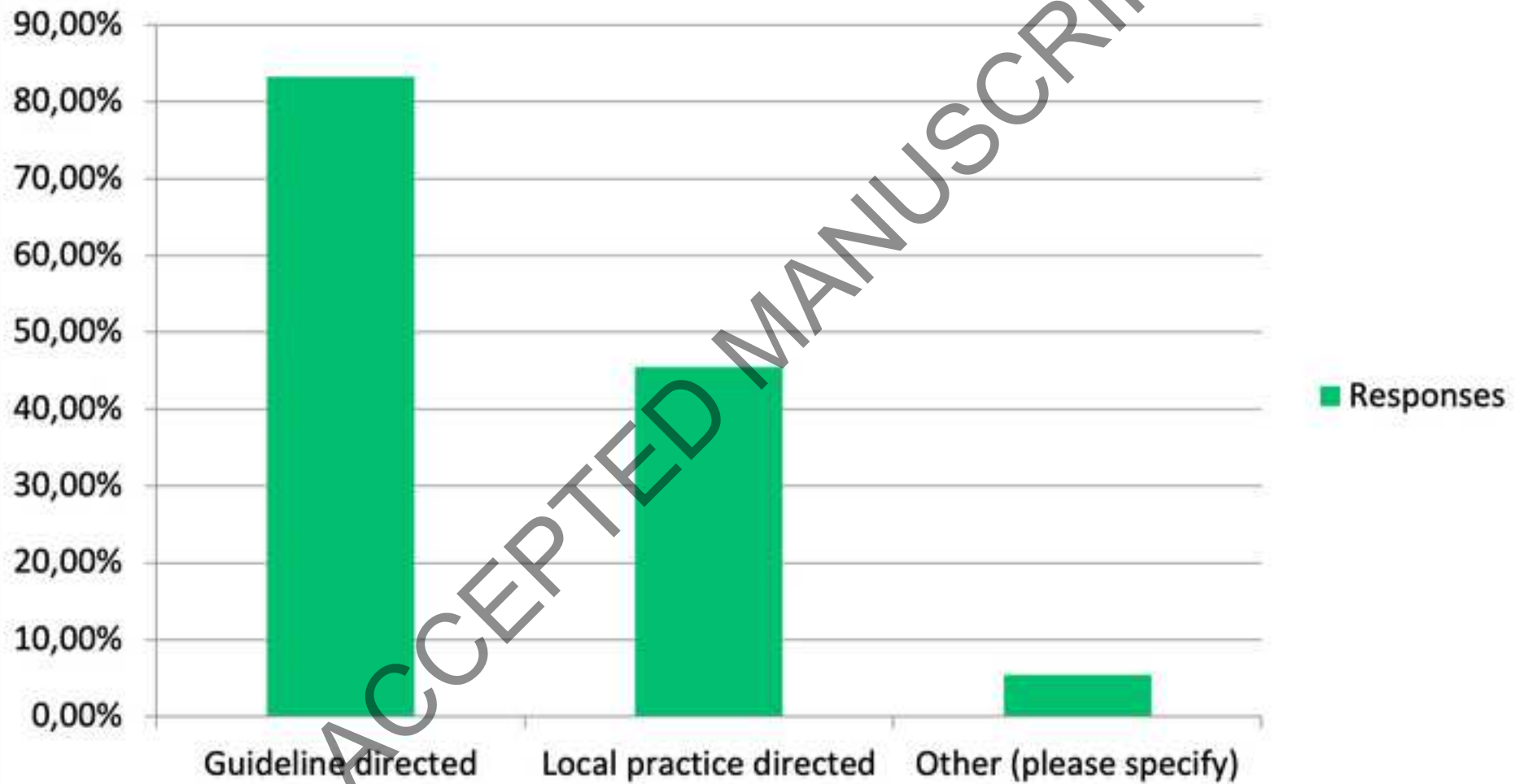
In the case of dedicated heart team meetings, are the cases treated (operation or intervention) jointly with surgeons and cardiologist?



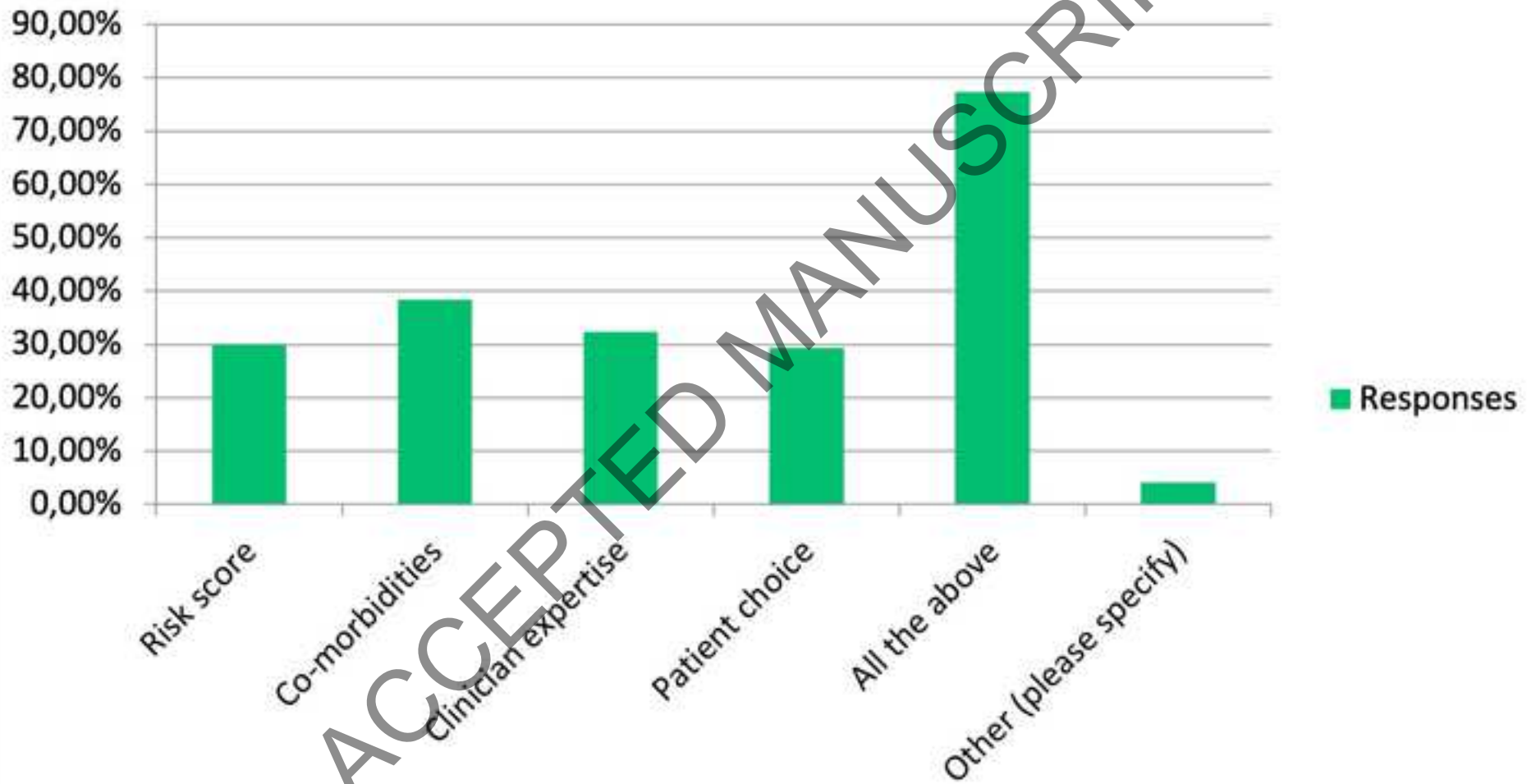
What is the frequency of the dedicated heart team meeting?



Are the decisions of the heart team?



What influences the treatment modality?



Is there re-imbursement for the heart team meetings?

