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## Brief Reports



### EMERGENCY PHYSICIANS' PERCEPTIONS AND DECISION-MAKING PROCESSES REGARDING PATIENTS PRESENTING WITH PALPITATIONS

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**Abstract—Background:** Palpitations are a common emergency department (ED) complaint, yet relatively little research exists on this topic from an emergency care perspective. **Objectives:** We sought to describe the perceptions and clinical decision-making processes of emergency physicians (EP) surrounding patients with palpitations. **Methods:** We conducted 21 semistructured interviews with a convenience sample of EPs. We recruited participants from academic and community practice settings from four regions of the United States. The transcribed interviews were analyzed using a combination of structural coding and grounded theory approaches with ATLAS.ti, a qualitative data analysis software program (version 7; Atlas.ti Scientific Software Development GmbH, Berlin, Germany). **Results:** EPs perceive palpitations to be a common but generally benign chief complaint. EPs' clinical approach to palpitations, with regards to testing, treatment, and ED management, can be classified as relating to one or more of the following themes: 1) risk stratification, 2) diagnostic categorization, 3) algorithmic management, and 4) case-specific gestalt. With regard to disposition decisions, four main themes emerged: 1) presence of a serious diagnosis, 2) perceived need for further cardiac testing/monitoring, 3) presence of key associated symptoms, 4) request of other physician or patient desire. The interrater reliability exercise yielded a Fleiss' kappa measure of 0.69, indicating substantial agreement between coders. **Conclusion:** EPs

perceive palpitations to be a common but generally benign chief complaint. EPs rely on one or more of four main clinical approaches to manage these patients. These findings could help guide future efforts at developing risk-stratification tools and clinical algorithms for patients with palpitations. © 2015 Elsevier Inc.

**Keywords—**palpitations; emergency medicine; clinical decision-making; interviews

### INTRODUCTION

The complaint of palpitations is somewhat common in the emergency department (ED), comprising over 0.5% of all ED visits, yet relatively little research exists on this topic from an emergency care perspective (1–3). As a result, there is substantial variability in the rates of ED testing and admission for patients presenting with palpitations, as well as significant resource utilization of questionable benefit to patients (1,4–8). Admission rates for this cohort range from 14% to 31% in various regions of the United States (1). It is difficult to develop and implement clinical guidelines or algorithms to improve management of these patients without understanding the clinical decision-making processes of the

emergency physicians (EPs) who care for them. Although there is a review article that extrapolates from other clinical settings, there have not been, to our knowledge, any studies examining EPs' approach to this complaint (3).

Given that the literature is so scarce, we performed a qualitative study designed to generate a valid basic foundation for further research. This approach has been used for other chief complaints, including chest pain, palliative care, and other salient topics in emergency medicine (9–11). In this study we sought to describe EPs' perceptions and decision-making processes in assessing ED patients with a chief complaint of palpitations; our results can be used to generate hypotheses for subsequent quantitative studies, and inform the design of future interventions.

## MATERIALS AND METHODS

### *Study Design*

We conducted a semistructured interview with 21 EPs across the United States. All interviews were conducted in a private office or by telephone during a 4-month period in the summer of 2013. All interviews were conducted by the principal investigator (PI), a male EP with masters-level training in health services research and qualitative methodology. All participants provided verbal informed consent and understood the purpose of the study. Interviews continued until all topics were covered and the participant had no further comments; they lasted 20–60 min. Interviews were then digitally recorded and transcribed by a research assistant and reviewed by the interviewer for accuracy. Subsequent interviews were conducted until full theme saturation had been achieved.

### *Study Setting and Population*

We recruited participants from four regions of the United States (Northeast, West, South, Midwest), and from both academic and community practice settings. We identified leaders in the field of clinical emergency medicine through referrals from key opinion leaders in the Department of Emergency Medicine of a large academic center. To be included in the study, participants were required to be currently working as full-time ED attending physicians. We employed snowball sampling to obtain a range of participants across regions and practice settings; we approached 27 EPs, of whom 21 agreed to participate.

### *Study Protocol*

The interview guide addressed the EP's clinical approach to ED patients with a chief complaint specifically of

palpitations; interviews included questions regarding key clinical factors, testing, treatment, disposition, and follow-up for these patients. Palpitations were defined as a sensation of irregular, rapid, slow, or forceful pulsation in the chest (12). We began interviews with a "grand tour" question about their last encounter with a patient presenting with palpitations. For example, we asked EPs, "Can you remember the last time you saw a patient in the ED with a chief complaint of palpitations? Can you walk me through the case?" Focused questioning addressed history of present illness, physical examination, ED testing, treatment, reasons for admission, reasons for discharge, and typical follow-up. We also asked each EP about his/her risk perception regarding these patients, his/her general clinical approach and how it was developed, as well as his/her perceptions of resource utilization surrounding this complaint. We asked unscripted follow-up questions as needed to probe emerging themes. The 30-item interview guide was pilot-tested with two EPs and modified for brevity and clarity (see [Appendix](#)). Our local Institutional Review Board approved all study procedures.

### *Data Analysis*

We conducted a thematic analysis using grounded theory, a methodology used in social sciences that involves the discovery of new hypotheses through the systematic analysis of qualitative data. This approach begins with data collection and does not involve the testing of an a priori hypothesis, but rather generates a new theory grounded in the data, using the constant comparative technique. The PI and co-investigator read through all the transcripts line by line to identify major themes and subthemes that emerged from the text. To identify themes, we first used a structural coding approach to assemble an a priori list of topic areas and themes based on the structure of the interview questions. We subsequently refined the coding scheme based on our review of the contents of the profiles, following the constant comparative method, identifying themes and subthemes that emerged from the interviews (13). We used ATLAS.ti (version 7; Atlas.ti Scientific Software Development GmbH, Berlin, Germany), a qualitative data analysis software program, to code and analyze the transcripts. Three of the authors worked to develop a consensus regarding the approach to coding, including application of particular codes and sub-codes to sections of text. Two of the authors then coded each interview. An interrater reliability assessment using the University of Pittsburgh Coding Analysis Tool, with two coders double-coding two exemplary interviews across the full set of codes, yielded a Fleiss' kappa of 0.69, indicating strong agreement between coders (14,15).

**Table 1. Characteristics of Emergency Physician Respondents (n = 21)**

Physician Characteristic (n = 21)	Mean	Range
Age in years	45.1	33–65
Years in practice	16.1	4–36
	n	Percent
Female	5	24%
Metropolitan status		
Urban	18	86%
Rural	3	14%
Region		
West	8	38%
Northeast	5	24%
South	4	19%
Midwest	4	19%
Practice setting		
Academic	13	62%
Community	8	38%

## RESULTS

Characteristics of the 21 EPs interviewed are presented in [Table 1](#). Eight practice in a community hospital and 13 in an academic medical center. We were unable to find any substantive difference between those EPs who participated as study subjects and the six EPs who declined to do so.

### *EP Perceptions Regarding Palpitations as a Chief Complaint*

The majority of EPs interviewed perceived a complaint of palpitations to be common or somewhat common in the ED. A majority perceived this complaint to be low risk or very low risk, and almost all interviewees feel it is lower risk than syncope, absent any other associated complaints. For example, a community EP noted (regarding the risk of adverse outcome), "... very low ... if all you

have is palpitations and it's an occasional skipped or missed beat or slight irregularity, I think the risk of something bad happening to the patient is pretty small." Another community EP stated, "palpitations are common but the likelihood of any patient population having significant disease that is life-threatening and presenting with chief complaint of palpitations, I believe, is really, really small." Nearly all EPs believed the etiology of the palpitations was uncovered "sometimes" or "rarely" during the ED visit.

### *Clinical Approach*

Four main overlapping themes emerged with regard to the clinical approach to palpitations: these can be expressed in terms of 1) risk-stratification, 2) diagnostic categorization, 3) algorithmic management, and 4) case-specific gestalt ([Table 2](#)). These approaches were, for many EPs, not mutually exclusive.

*Risk stratification.* A majority of EPs (19 of 21) reported using either explicit or implicit risk stratification to manage patients with palpitations. They primarily use age, history of present illness, past medical history, general appearance, vital signs, and certain key ED tests to risk stratify patients into two (high vs. low) or three (high, intermediate, low) distinct risk categories.

An academic EP stated, "I use the history, physical and ancillary tests to make a decision about the likelihood that the palpitations were either dangerous in and of themselves or caused by a dangerous condition. So I risk stratify the patient ... I admit or discharge based on the risk-stratification results." Risk stratification was reported to be an approach used by EPs across all regions and practice settings. A community EP explained, "it's risk stratifying them as to whether they fall into what probably becomes the most common category: that is,

**Table 2. Major Themes Regarding Emergency Physicians' Clinical Approach and Disposition Rationale for Emergency Department Patients with Palpitations**

Theme	Examples
Clinical approach	
1. Risk stratification	Patient is categorized as high, medium, or low risk based on key clinical factors.
2. Diagnostic categorization	Symptoms are categorized as organic vs. functional, cardiac vs. psychiatric.
3. Algorithmic management	Certain clinical variables dictate specific actions, e.g., associated chest pain triggers ischemic work-up.
4. Case-specific gestalt	Physicians use their intuitive judgment on an individual basis.
Disposition	
1. Presence of a serious diagnosis made in the ED	Ventricular dysrhythmia revealed on cardiac monitor.
2. Perceived need for further cardiac testing/monitoring	Patient requires in-patient provocative stress testing.
3. Presence of key associated symptoms	Patient has associated chest pain or syncope.
4. Request of other physician or patient desire	The patient, primary doctor or consultant request the patient be admitted.

ED = emergency department.

palpitations, no red flags for anything serious ... either by history, physical or electrocardiogram (EKG).” An academic EP described there being three general categories “... benign, pathologic and not necessarily life threatening, and then life-threatening.”

*Diagnostic categorization.* Other EPs (9 of 21) described an approach of diagnostic categorization. They said they attempt to determine whether the symptom of palpitations had an organic or functional etiology. More specifically, they sought to differentiate between psychiatric and cardiac causes. A community EP explained, “I look at their age and their circumstances and comorbidities, and at their symptoms and any associated symptoms and then I just kind of put them in a bucket, is this organic versus is this functional?” An academic EP said “the first is one based on putting them on the monitor, looking at their 12-lead EKG for signs of concerning palpitations – either an arrhythmia that’s present or their intervals are long ... or something that suggests they may have a bad, organic cause of palpitations.”

A community EP explained, “if they have substantial psycho-social stressors, maybe they don’t need anything beyond that, except maybe something to manage anxiety, if that’s the way they feel ... provided there are no concerning symptoms to steer us more [towards] an organic cause of the symptoms instead of a functional cause.”

*Algorithmic management.* A subset of EPs (14 of 21) also described a more conditional, algorithmic approach, in that certain key findings dictate the management of the patient. One community EP stated, “the renal failure patient is a special population ... I almost automatically get electrolytes on that patient.” An academic EP stated, “I start with ABCs. If they are stable, then it’s different. Then, if they have ongoing palpitations, and I’m able to observe them on a monitor in the ED while they are having palpitations, that’s a very different scenario than if the symptoms are not ongoing in the ED.” Another academic EP stated, “if they have had palpitations and syncope, they are coming in [to the hospital] ...”

*Case-specific gestalt.* Some EPs (11 of 21) indicated that their approach to palpitations is, at times, unique to the particular patient encounter, and that they use case-specific clinical gestalt to guide management. An academic EP said, “for now it’s just clinical gestalt ... I am in the habit of tailoring what I order to the clinical situation.”

“It kind of all depends ... Clinically – how do they look? What I find out by exam. All of it depends on gestalt ... and the history, really,” expressed another academic EP.

Over half the EPs indicated that their clinical approach was developed primarily from their own clinical experience, as opposed to published studies or guidelines. When asked how he developed his approach, one community EP replied, “I think it’s based on anecdotal experience ... there is more literature, from my perspective, on the work-up of syncope.” One academic EP replied, “based on my teaching ... residency. More commonly [based on] clinical encounters with people who have similar complaints.”

About half the EPs (10 of 21) felt there is insufficient evidence on this topic in the emergency medicine literature. “There are tons of articles on atrial fibrillation, but I can’t think of a single study that I’ve read on undifferentiated palpitations,” stated a community EP. Few EPs felt that evidence-based practices from the syncope or chest pain literature could be, in some ways, extrapolated to patients with palpitations. “What I do is I mirror the low-risk chest pain strategy that I use ... where patients under the age of 40 who have no history of coronary artery disease, complaining of chest pain, with a normal EKG have like 0.02% chance of actually having a myocardial infarction (MI) or needing PCI,” explained an academic EP.

#### *Key Clinical Factors*

EPs identified several key clinical factors in the evaluation of a patient presenting with palpitations. These included duration and frequency of symptoms, key associated symptoms including chest pain, dyspnea, and syncope/presyncope, history of cardiac dysrhythmias or structural heart disease, and use of stimulant medications or substances. Most EPs made an important distinction between isolated palpitations and those associated with other symptoms: “If it’s isolated palpitations and no associated signs or symptoms, I am getting really comfortable. The more advanced age, the more you are gonna be concerned about it ... Chest pain, shortness of breath, syncope and light headedness is in there [concerning associated symptoms] ...” expressed a community EP.

Components of the physical examination that were deemed as important included general appearance, vital signs, heart sounds, and palpation of the peripheral pulses. The electrocardiogram (ECG) and ED cardiac monitoring were felt to be the most useful tests, whereas blood, urine, and x-ray testing were felt to be generally “low-yield.”

#### *Disposition*

With regard to disposition decisions, four main themes emerged: 1) presence or absence of a serious diagnosis uncovered in the ED, for example, malignant dysrhythmia; 2) perceived need for further cardiac

testing/monitoring; 3) presence or absence of key associated symptoms, for example, syncope; 4) Request of other physician or patient desire (Table 2). About half the EPs (11 of 21) identified the presence of a serious diagnosis, or being at high risk for one, as a reason for admission. An academic EP explained, “obviously, if I see an episode of ventricular tachycardia in the ED, that’s not a challenging disposition. So I risk stratify the patient ... I admit or discharge based on the risk-stratification results.” When key associated symptoms are present with palpitations, many EPs will admit a patient. An academic EP stated, “an associated complaint of syncope would cause admission.”

About half of EPs (11 of 21) identified the need for further cardiac testing or monitoring as a reason for admission. “It would probably be the person who has risk factors for coronary disease, like diabetes, hypertension, smoking, and age ... I would think all of them get serial monitoring and probably some provocative testing or unprovocative testing ... like an echo looking for structural abnormality.” – Academic EP.

A few EPs stated that a patient’s wishes influence the disposition decision. “If they are afraid to go home, I would admit them to the hospital. But I would tell them ‘if I was you, I would go home. But if you are uncomfortable, I’ll put you in the hospital.’ I try to use a lot of shared decision-making with the patients.” – Academic EP.

Most EPs (16 of 21) recommended or arranged primary care follow-up for ED patients with palpitations. Many EPs (12 of 21) arranged follow-up with cardiology, when patient was already followed by a cardiologist or was believed to have a serious cardiac diagnosis. Holter monitoring was the most commonly cited outpatient diagnostic test. Over half the EPs felt that overutilization exists in the form of laboratory and x-ray testing, but not with respect to hospitalization. “The vast majority of patients with palpitations don’t need a complete metabolic panel, complete blood count, troponin, even chest x-ray. I would say it’s common place to order those labs in [certain] places,” explained an academic EP.

## DISCUSSION

Although palpitations are known to be a somewhat common presenting complaint, there is scant literature on this topic in the emergency medicine literature (1). There is only one clinical guideline pertaining to the management of palpitations, published by the European Heart Rhythm Association, which does not specifically discuss ED management (6). Weber and Kapoor, examining a mixed cohort of admitted, clinic, and ED patients found that the etiology of palpitations can often be diagnosed with a simple initial evaluation (2). After multivariate logistic regression, these authors found four independent predic-

tors of a cardiac etiology to the palpitations: male sex, description of an irregular heartbeat, history of heart disease, and event duration >5 min. All of these factors were mentioned as higher-risk attributes by at least some of our participants, except for male sex. The finding that history, physical examination, and ECG were the highest-yield components of the evaluation was consistent with the beliefs of our participants. Jamshed et al. published a review article exploring the ED management of palpitations in the elderly and put forth an algorithm to guide emergency clinicians (3). This method, however, does not seem to fully represent how EPs approach patients with palpitations, as is shown in our study. Specifically, their approach focused almost exclusively on ruling-in cardiac disease by using ECG, echocardiography, stress test, and electrophysiological studies in selected cases. It does not, however, discuss the multiple other potential etiologies that can be uncovered in the ED, such as anemia, thyroid disease, substance abuse, psychiatric illness, and so on. These other potential causes were often mentioned during our interviews. This review was consistent with the responses from our participants in other respects, namely, that most patients presenting with palpitations can be managed as outpatients and typically have a benign cause to their symptoms.

When existing literature is limited, qualitative methods, such as semistructured interviews with key informants, are well suited for initial research to generate hypotheses for further quantitative work (16). Understanding clinical decision-making for a particular clinical entity is important because it can help guide the development of clinical algorithms and guidelines to optimize management.

Some EPs described an algorithmic approach to the management of palpitations, whereby the presence or absence of certain factors triggered specific testing or disposition. For example, several EPs stated that all patients with associated chest pain would undergo cardiac enzyme and chest x-ray testing, whereas those with syncope would generally be admitted. An algorithmic approach to clinical decision-making has been previously described in emergency medicine in general (17,18).

Finally, a group of EPs described a more implicit, case-by-case approach to managing patients with palpitations. This “case-specific gestalt” approach is comparable to Klein’s recognition-primed decision model whereby physicians use an intuitive judgment process based on knowledge and experience, as has been described for the clinical management of chest pain (9).

The approach to decision-making suggested by the EPs who participated in our study is probably not unique to palpitations, and could well apply to many other cardiopulmonary complaints. For example, a clinical approach of risk-stratification or diagnostic



categorization could be used for the evaluation of syncope, chest pain, or dyspnea. One might argue that clinical risk stratification is conducted, to some extent, during all patient encounters in the ED. There also seems to be substantial variability in the management of patients with palpitations, and there does not seem to be a standard protocol or clinical pathway for this complaint. In contrast, the management of chest pain and syncope seem to be more standardized and, to a certain extent, protocolized (19–22).

Our sample of EPs described a variety of key clinical factors and diagnostic tests they use to guide their management of patients presenting with palpitations. EPs seem to focus on 1) intrinsic patient characteristics (age and past medical history), 2) certain components of the history of present illness (characterization of the palpitations and key associated symptoms), 3) certain parts of the physical examination (general appearance and vital signs), and 4) results of select ED tests (primarily ECG and cardiac monitor) when making clinical decisions pertaining to patients with palpitations.

Because palpitations are associated with substantial health care resource utilization, it may be fruitful to evaluate quantitatively whether these key factors described by EPs in our study actually portend serious adverse events in patients with palpitations (1). These results could help guide future research aimed at the development of clinical algorithms or objective risk-stratification methods to improve the clinical management of these patients and optimize resource utilization with regard to ED testing and hospital admission. For example, a prospective study evaluating the prevalence of newly diagnosed cardiac disease for patients admitted to the hospital after an ED visit for palpitations could quantify the diagnostic yield of such admissions. As well, a prospective, observational study with long-term follow-up of clinical outcomes recording the key clinical factors reported in our study (e.g., presence of syncope/presyncope, chest pain, dyspnea, history of structural heart disease) could elucidate if, and with what magnitude, these factors are associated with adverse outcomes.

### Limitations

Our qualitative study design can only generate hypotheses about the clinical approaches to palpitations used by a broad set of experienced EPs. The themes generated by our work should be further evaluated by subsequent research. The number of interviewed EPs was limited, and may not represent EPs at large, thus limiting the generalizability of our findings; however, the participating EPs included academic and community physicians from across the four regions of the country, offering a broader view of palpitations than could be described at

one hospital setting. Most of the EPs in the study practiced in a major urban area, and many held leadership positions within their organizations, so particular caution should be taken in generalizing our results to typical EPs practicing in a rural area.

## CONCLUSIONS

The emergency physicians in our survey study described four main overlapping clinical approaches they use when managing palpitations, a clinical complaint for which a strong evidence base is lacking. Our study provides insight in the real-world decision-making of EPs managing patients with palpitations, including key clinical factors that influence ED management. As with almost all other complaints in emergency medicine, EPs use their knowledge and clinical experience to risk stratify, diagnose, and determine disposition using their clinical gestalt and input from other stakeholders (other physicians and patients). Subsequent studies to confirm our findings and quantitatively assess the importance of these key clinical factors should be pursued to provide further evidence to guide the management of patients with palpitations.

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### ARTICLE SUMMARY

#### **1. Why is this topic important?**

Palpitations are a common complaint in the Emergency Department (ED), yet little is known about the clinical approach of emergency physicians for this complaint.

#### **2. What does this study attempt to show?**

We sought to describe the perceptions and clinical decision-making processes of emergency physicians surrounding patients with palpitations.

#### **3. What are the key findings?**

Four main, overlapping themes emerged to describe emergency physicians' clinical approach to patients with palpitations. Four main themes regarding reasons for admission for these patients were found.

#### **4. How is patient care impacted?**

This research will help guide the development of clinical algorithms and risk-stratification tools to optimize the clinical care of ED patients presenting with palpitations.

## APPENDIX

**INTERVIEW PROTOCOL FOR SEMI-STRUCTURED INTERVIEW WITH EMERGENCY  
PHYSICIANS REGARDING THEIR MANAGEMENT AND PERCEPTIONS OF PATIENTS  
PRESENTING WITH PALPITATIONS**

## A. About Your Practice and You

How many years have you been practicing emergency medicine?

Are you board-certified in EM? Yes No Academic/Community Region: Urban/Rural

## B. Approach to Palpitations

Next, I'd like to ask you a few questions about your management of patients who present to the ED with palpitations.

- 1) When was the last time (roughly) you remember seeing a patient with palpitations?
- 2) Can you recall any of the specifics of the case? Please explain.
- 3) How did you manage him/her? And why?
- 4) Was this typical of your general approach to hemodynamically (HD) stable palpitations in the ED? (Yes or No. If No, how did it differ?)
- 5) What is your general approach to hemodynamically (HD) stable palpitations in the ED? Please walk me through your approach to palpitations.
- 6) How do you think about these patients when managing them?
- 7) Are there exceptions to your general approach? Please explain.
- 8) How did you develop your approach? What is it based on?
- 9) Do you feel like there is currently sufficient evidence to guide your management of palpitations?
- 10) With regards to the history of present illness, are there any key questions you ask patients with palpitations? If so, what are these questions?
- 11) Are there any key physical examination findings you look for in patients with palpitations? If so, what are these?
- 12) Do you ask about any specific questions about past medical or surgical history? Which ones?
- 13) Do you look for or ask about any specific medications or substances?
- 14) Are there tests that you typically order for palpitations in the ED? Why?
- 15) How do you decide on which tests to order?
- 16) How often, if ever, do you request consultations for these patients?
- 17) What therapies, if any, do you give in the ED to patients with *undifferentiated* palpitations? Why?
- 18) How common do you feel palpitations are in the current ED in which you work?
  - a. Very common, common, somewhat common, rare, very rare, never.
- 19) How often do you find the etiology of the palpitations after ED work-up?
  - \_\_\_ Never
  - \_\_\_ Rarely
  - \_\_\_ Sometimes
  - \_\_\_ Usually
  - \_\_\_ Always
- 20) What are the most *common* diagnoses you consider?
- 21) What are the most *dangerous* potential diagnoses you consider?
- 22) In terms of morbidity and mortality risk, where do you feel palpitations falls on the spectrum from very low to very high risk?
  - a. Very Low Risk/Low Risk/Moderate Risk/High Risk/Very High Risk
- 23) What about compared to syncope as a chief complaint? Higher or lower?
- 24) Do you ever risk-stratify patients with palpitations? If so, how?
- 25) What would cause you to admit a patient with *undifferentiated* palpitations? Why?
- 26) How often do you feel you admit patients with *undifferentiated* palpitations? To what service?
  - \_\_\_ Never
  - \_\_\_ Rarely

\_\_\_ Sometimes

\_\_\_ Usually

\_\_\_ Always

- 27) What would make you feel comfortable discharging a patient with palpitations? Why?
- 28) What follow-up do you generally arrange or recommend?
- 29) Are there any outpatient tests that you arrange or recommend?
- 30) Do you perceive there to be overuse or misuse of resources in these patients? In what respect?

**We have covered a lot of information in our discussion today. Before we end, I would like to give you an opportunity to raise any questions or issues that we did not discuss already today.**

Is there anything else you would like to add that we haven't yet covered? Do you have any other comments/feedback about the interview?