

# BMJ Open Expanding the role of non-physician medical staff in primary care in Germany: protocol for a mixed-methods study exploring the perspectives of physicians in rural practices

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## ABSTRACT

**Introduction** Primary care faces substantial challenges worldwide through an increasing mismatch in supply and demand, particularly in rural areas. One option to address this mismatch might be increasing efficiency by delegation of tasks to non-physician medical staff. Possible influencing factors, motives and beliefs regarding delegation to non-physician medical staff and the potential of an expanded role, as perceived by primary care physicians, however, remain unclear. The aim of this study is to assess these factors to guide development of potential interventions for expanding the role of non-physician medical staff in delivering primary care services in rural Germany.

**Methods and analysis** This mixed-methods study based on the theoretical domains framework (TDF) consists of survey and interviews conducted sequentially. The survey, to be sent to all primary care physicians active in rural Baden-Wuerttemberg (estimated n=1250), includes 37 items: 15 assessing personal and practice characteristics, 15 matching TDF domains and 7 assessing opportunities for delegation. The interview, to be performed in a subsample (estimated n=12–20), will be informed by results of the survey. The initial interview guide consists of 11 questions covering additional TDF domains. Perspectives towards delegation will be maximised by comparing data emerging in either part of the study, seeking confirmation, disagreement or further details.

**Ethics and dissemination** The Ethics Committee of Heidelberg University approved this study (approval number: 2021–530). Written informed consent will be obtained before each interview; consent for participation in the survey will be assumed when the survey has been returned. Results will be disseminated via publications in peer-reviewed journals and talks at conferences. By combining quantitative and qualitative methods, our results will support future research for crafting potential interventions to expand the role of non-physician medical staff in rural primary care.

## INTRODUCTION

Primary care (PC) faces substantial challenges worldwide. It functions as the first access point to healthcare,<sup>1</sup> which, in

## Strengths and limitations of this study

- ⇒ This study will provide initial insights into potential areas of focus for future interventions that seek to expand the role of non-physician medical staff in rural primary care in Germany.
- ⇒ Use of mixed-methods and a theory-guided approach promises to generate rich data on a topic that has not previously been well characterised.
- ⇒ The exploratory design may help identify previously undiscovered themes and motives.
- ⇒ The current study will not explore the perspectives of patients or non-physician medical staff, even though their attitudes and beliefs may have significant bearing on decisions to delegate tasks differently in primary care practices.

turn, reflects high demand. This demand continues to increase as populations age and the prevalence of chronic diseases grows.<sup>2,3</sup> As demand for services to address some chronic diseases is increasingly provided by physicians in specialties and subspecialties, the need for PC physicians (PCPs) as coordinators of care assumes even greater importance.<sup>4</sup>

Delivering PC in rural areas faces additional challenges arising from a greater imbalance of supply and demand in PC and structural problems in service delivery. The proportion of older people in rural areas, for example, has increased to a greater extent than in urban areas,<sup>5</sup> leading to an even greater increase in the prevalence of chronic diseases and a higher demand for PC. The supply of PCPs in rural areas also appears increasingly limited given an ageing PCP workforce<sup>6–9</sup> and the low rate at which retiring PCPs are replaced.<sup>10</sup>

The reduced accessibility of PC practices in rural areas (eg, longer drives or fewer options for public transport)<sup>11</sup> and the legal obligation

of German PCPs to perform home visits when necessary result in additional challenges. Home visits in particular occupy a higher proportion of a PCP's typical workload in rural areas,<sup>12</sup> resulting in less time spent in practice and fewer patients receiving care per PCP. Importantly, rising demand and insufficient supply have the potential to lead to increased health disparities between rural and urban areas.<sup>13</sup>

As rising demand appears to be a given, increasing the supply of those delivering PC represents an evident focus. In contrast to other countries such as England or the Netherlands, however, options for augmenting or expanding roles within the PC workforce are currently limited in Germany given the relative underdevelopment of the public health infrastructure and the absence of health professionals trained to contribute to the delivery of PC.<sup>14</sup> Recently implemented policy measures to increase the number of PCPs, including quotas for medical schools for committing students to work in rural areas in the future, fail to offer a short-term solution. However, opportunities for creating greater practice efficiency through changes to practice structure and processes have yet to be explored.

PC in Germany is primarily delivered in PCP-owned solo practices that employ medical assistants (MA), the only other established health profession active in German PC.<sup>14</sup> MAs are responsible for practice organisation, administration and performing simple medical procedures including phlebotomy and vaccination. Currently, only two major training programmes for MAs are established in German PC to allow MAs to take additional responsibility for selected, more advanced tasks (see online supplemental appendix). Still, the role of MAs in patient care is less extensive compared with those of non-physician medical staff (NPMS) working in PC settings in other countries.<sup>14</sup> In contrast to German PC practices, NPMS elsewhere often consist of nurses, pharmacists, social workers or dietitians, resulting in a broader availability of services and a more team-based approach.<sup>14</sup>

International examples suggest that this team-based approach may also result in greater efficiency in PC.<sup>15 16</sup> Two recent systematic reviews, including one by the Cochrane Collaborative, further suggest that team-based PC improves care coordination<sup>17</sup> and that using NPMS as substitutes for PCPs might improve patient mortality and quality of life in some cases.<sup>18</sup> The generalisability of this evidence across healthcare systems, however, is limited as the conditions under which NPMS are included in patient care vary between *delegation*, in which PCPs remain responsible for any task performed by NPMS, and *substitution*, in which NPMS perform tasks autonomously without supervision of PCPs. The latter, as described by Laurant *et al.*,<sup>18</sup> is currently prohibited by law in Germany. Taken together, current organisational structure in German PC might neither be most effective nor most efficient in organising and delivering PC.<sup>15</sup> The extent, however, to which efficiency and effectiveness in German PC might be improved by expanded roles of

NPMS and the acceptability of promoting further delegation, implementing substitution or integrating further professions in PC is currently unclear.

Several factors may influence an expansion in the roles of NPMS in the delivery of PC in rural areas. Especially in solo practices, PCPs often act as primary decision-makers for practice organisation and operation, making their motives and beliefs regarding delegation particularly important. Previous studies in Germany exist in this area, yet offer conflicting results on factors influencing PCPs' motives and beliefs regarding delegation.<sup>19 20</sup> Even less is known about PCPs' specific motives and beliefs in rural Germany, where they might differ due to scarcer resources and a stronger focus on personal doctor-patient relationships.<sup>21</sup> To guide development of future interventions that advance practice efficiency by promoting an expanded role of NPMS in rural PC, a clearer appreciation of influencing factors on and PCPs' motives and beliefs regarding delegation of tasks to NPMS might be valuable.

The aim of this study, therefore, is to assess these factors to guide development of potential interventions for expanding the role of NPMS in delivering PC services in rural Germany. More specifically, the study question centres on which influencing factors, motives and beliefs of PCPs might affect the delegation of tasks to NPMS in PC in rural Germany.

## METHODS AND ANALYSIS

We implement a sequential mixed-methods design, often used in exploratory study designs, consisting of a survey complemented by semistructured interviews.<sup>22</sup> This approach will allow us to connect results from both methods to form a deeper understanding of influencing factors, motives and beliefs regarding delegation and to discover insights in an area that has been the focus of limited investigation in the past.<sup>23</sup>

### Patient and public involvement

There was no patient or public involvement in the study. Following completion of each interview, a copy of final study results will be offered and sent to interested participants at their request.

### Setting

As major parts of healthcare systems in Germany are organised and administered on the state level, it is natural to seek potential drivers of and starting points for interventions that often differ by state. The proposed study will be conducted in Baden-Wuerttemberg, one of the largest federal states in Germany (population 11 000 000) located in southwestern Germany with a physician density<sup>24</sup> and age distribution,<sup>25</sup> comparable to that of Germany as a whole. Baden-Wuerttemberg was specifically selected as opportunities for access to our target population, supported by long-standing institutional

connections with the state ministry of health and regional physician organisations, were strongest.

### Participants and recruitment

Publicly available geocoded data on practice location are not available in Germany. To identify PCPs active in rural areas, we started with two county-level definitions for rurality (population density per unit of area and population size reachable by a predefined amount of travel time)<sup>26</sup> provided by the Federal Office for Building and Regional Planning. Twelve of the 44 counties in Baden-Wuerttemberg met one or both definitions (approximate population size 2 000 000).

Physicians working in the German equivalent fields of general internal medicine or general medicine/general practice/family practice in a rural county are considered eligible. Although normally considered a PC specialty, we exclude paediatricians as they might be less impacted by the increase in long-term treatment and management of chronic diseases in general, and thus their motives and beliefs regarding delegation as a strategy for practice efficiency may be both quantitatively and qualitatively different. No further exclusion criteria will be applied. Data from the Associations of Statutory Health Insurance Physicians suggest the pool of potentially eligible respondents to be approximately 1250.

We will use a database provided by commercial marketing agencies targeting physicians to identify potentially eligible respondents in rural counties and obtain their practice address. To increase response rates and limit respondent burden, we use the total design method to design all study forms including a brief, participant-friendly survey (one page front and back) introduced by a personalised cover letter.<sup>27</sup> Study forms, sent by standard mail, include a description of study purpose, the printed survey, a response form, a return envelope and a second envelope without identifier to contain the completed survey to ensure respondent anonymity. The response form serves three specific purposes: to identify non-responders to whom a second mailing will be sent after 4 weeks; to assess four characteristics (gender, age, reason for non-participation and general attitude towards delegation) to be completed by those not willing to complete the entire survey; and to give consent for future contact for interviews.

Those agreeing to a possible interview or those identified from survey responses as colleagues with potentially differing views and who might be willing to participate will be contacted. Interviews will be conducted until theme saturation assessed a posteriori during data analysis (see below) is reached. We anticipate the need to recruit between 12<sup>28</sup> and 20 participants.<sup>29</sup>

### Theoretical framework

Implementing new routines in PC such as delegating tasks differently involves organisational and individual behaviour change. As the objective of this investigation is to identify factors relevant for future interventions,

it is natural to consider behavioural change theory. In previous work, existing theories were reviewed and sorted into 84 constructs and 14 domains comprising the theoretical domains framework (TDF).<sup>30</sup> Since its original development in 2005, the TDF has been widely used in health services research to explore factors that influence behaviour change.<sup>31</sup>

We applied the TDF<sup>30</sup> to ensure representation of all domains in either the survey, the interview or both (table 1) and as a strategy that might permit complementary insights. To this end, we developed an initial pool of items consisting of at least one item per domain for both the survey and interview guide.

### Survey

The final survey, consisting of 37 items in five subsections (table 2), is informed by previous work that describes 32 validated question stems representing various domains of the TDF. Item wording is modified to match the research question by inserting 'action', 'context', 'time' and 'target' of the intended behaviour into the question stem.<sup>32</sup> All items in the initial pool we created were then discussed on multiple occasions within the research group, with social scientists and independent PCPs, for clarity, consistency of content with the research objective and the extent to which survey items in the initial pool adequately represented specific domains. This review suggested that some domains were rather complex and could be misinterpreted or that previous work provided limited guidance in developing an item that clearly tapped a specific domain. In these instances, the domain was marked for exploration using qualitative methods instead. Finally, as not all items were directly applicable to our study objective and to limit participant burden, we focused on 15 items to represent nine TDF domains using a 5-point Likert scale (1='don't agree at all'; 5='completely agree').

Personal characteristics highlighted in previous work are included to assess potential influences on beliefs regarding delegation (items 1.1–1.6).<sup>19 20 33–38</sup> Practice characteristics are assessed using six items. These include self-perceived location of the practice to confirm congruence with our definition of rurality and practice organisation, an important factor in determining both reimbursement schemes and the amount of organisational influence a single physician has regarding opportunities for delegation to NPMS (items 2.1+2.2). As no public records on workload or workforce in PC practices in Germany exist, we use a common metric in the German healthcare system that reflects the number of individual patients treated per quarter year (item 2.3).<sup>19 20 33–37</sup> Enrolment in the 'GP-centred care plan', a form of healthcare delivery in Germany similar to preferred provider and health maintenance organisations elsewhere, will be assessed as this has potential influence on reimbursement and thus the potential for delegation of tasks to MAs with additional qualifications (item 2.4). Practice workforce size (2.5) and workforce composition (2.6) will be assessed by the number of employees working full

**Table 1** Domain definitions for the theoretical domains framework and their representation, by mode of data collection

Domain	Representing items	
<i>Knowledge</i> An awareness of the existence of something.	Survey	4.4
	Interview	1.1
<i>Skills</i> An ability or proficiency acquired through practice.	Interview	2.1
<i>Social/professional role and identity</i> A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting.	Survey	4.2, 4.15
	Interview	4.1
<i>Beliefs about capabilities</i> Acceptance of the truth, reality or validity about an ability, talent or facility that a person can put to constructive use.	Survey	4.3
<i>Optimism</i> The confidence that things will happen for the best or that desired goals will be attained.		
<i>Beliefs about consequences</i> Acceptance of the truth, reality or validity about outcomes of a behaviour in a given situation.	Survey	4.8, 4.9, 4.10, 4.11
	Interview	3.1
<i>Reinforcements</i> Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus.	Survey	4.12
<i>Intentions</i> A conscious decision to perform a behaviour or a resolve to act in a certain way.	Survey	4.7
<i>Goals</i> Mental representations of outcomes or end states that an individual wants to achieve.	Survey	4.6
<i>Memory, attention and decision process</i> The ability to retain information, focus selectively on aspects of the environment and choose between two or more alternatives.	Survey	4.5
	Interview	3.2
<i>Environmental context and resources</i> Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence and adaptive behaviour.	Survey	4.1, 4.13, 4.14
<i>Social influences</i> Those interpersonal processes that can cause individuals to change their thoughts, feelings or behaviours.	Interview	4.1
<i>Emotion</i> A complex reaction pattern, involving experiential, behavioural and physiological elements, by which the individual attempts to deal with a personally significant matter or event.		
<i>Behavioural regulation</i> Anything aimed at managing or changing objectively observed or measured actions.		

time or part-time<sup>20 34–37</sup> and as the number of employees with basic and additional professional training (items 2.5, 2.6). The latter is important given that practices with a larger number of employees with additional qualifications might have greater possibilities for implementing or facilitating delegation.

We assess the current activity profile using three items (items 3.1–3.3) to explore the extent to which delegation might be used in direct and indirect patient care and in non-patient-care-related work.

Section 5 assesses current and future potential for delegating tasks to NPMS. Although previous studies

mostly used task lists to evaluate delegation and potential expansion of skill mix,<sup>20 33 34 37 39 40</sup> this approach limits respondents' ability to represent ideas they feel relevant to the topic. To better explore this area, we use open-ended questions to assess tasks performed currently as well as tasks potentially performed in the future by MAs in general and those with additional training (items 5.1–5.4). Related to this, we will probe physicians' perceptions of possible areas of future training programmes for NPMS and for the integration of other professionals not yet working in PC (items 5.5+5.7).



**Table 2** Survey

No	Question text	Item structure/response options	References
<b>1</b>	<b>Personal characteristics</b>		
1.1	Gender	<i>Single answer</i> Male, female, non-binary	19 20 33–37
1.2	Age	<i>Numeric box</i> Age in years	19 20 33–36
1.3	Years as primary care physician	<i>Numeric box</i> Years	37
1.4	average working hours/week	<i>Numeric box</i> Full hours	36 37
1.5	Working as	<i>Single answer</i> Self-employed, employee	36 37
1.6	Specialist in	<i>Single answer</i> Family medicine, general internal medicine, general practitioner (no specialist training), other	19 33
<b>2</b>	<b>Practice characteristics</b>		
2.1	How would you describe the location of your practice?	<i>Single answer</i> Urban, suburban, rural	19 20 33–35 37
2.2	How is your practice organised?	<i>Single answer</i> Medical care centre, group practice, joint practice, solo practice	19 20 33–37
2.3	How many 'Scheine'* do you personally handle on average per quarter year?	<i>Numeric box</i> Number in full hundreds	19 20 33–37
2.4	Does your practice participate in the PCP-centred care programme?†	<i>Single answer</i> Yes, No	20 34 35
2.5	How many people are working in your practice?	<i>Numeric box</i> (Each for full time/part-time): physicians (including you), medical assistants, other	20 34–37
2.6	How many non-physician employees have completed additional training? (If a single person has multiple qualifications, please enter each.)	<i>Numeric box</i> Open text	20 34–37
<b>3</b>	<b>Current activity profile</b>		
What proportion of your time (in percentages) is currently spent in:			
3.1	Direct patient care at your work? (including nursing home/home visits and associated travel time)	<i>Numeric box</i> Percentages	20 34 35 37
3.2	Indirect patient care at your work? (eg, reviewing laboratory results)	<i>Numeric box</i> Percentages	20 34 35 37
3.3	Non-patient activity at your work? (eg, billing)	<i>Numeric box</i> Percentages	20 34 35 37
<b>4</b>	<b>Attitudes towards delegation of medical tasks to non-physician medical staff in your practice</b>		
Likert scale: Completely agree, Agree, Neither agree nor disagree, Disagree, Completely disagree			
4.1	I work in a region where there is currently a shortage in primary care supply.	<i>Primary domain</i> Environmental context and resources	
4.2	I am one of the first to implement new models in healthcare or practice organisation.	<i>Primary domain</i> Social/professional role and identity	
4.3	I am able to implement changes to the processes in my practice.	<i>Primary domain</i> Belief about the capabilities	32
4.4	I am well informed about the possibilities of delegation.	<i>Primary domain</i> Knowledge	20 32 34 35 37

Continued

Table 2 Continued

No	Question text	Item structure/response options	References
4.5	When I think about efficiency in my practice, the use of delegation plays a role.	<i>Primary domain</i> Memory, attention and decision process	
4.6	My goal for this practice is to achieve the highest efficiency possible.	<i>Primary domain</i> Goals	
4.7	I will delegate as many tasks as possible to my non-physician medical staff in the future.	<i>Primary domain</i> Intentions	20 32 34 35
I think that an increase in delegation of medical tasks to non-physician medical staff in my practice...			
4.8	...increases patient satisfaction.	<i>Primary domain</i> Beliefs about consequences	19 32 33
4.9	...impairs the treatment of my patients.	<i>Primary domain</i> Beliefs about consequences	19 32 33
4.10	...reduces my workload.	<i>Primary domain</i> Beliefs about consequences	19 32 33
4.11	...increases efficiency in my practice.	<i>Primary domain</i> Beliefs about consequences	32
4.12	...is financially worthwhile for my practice.	<i>Primary domain</i> Reinforcements	19 32 33
4.13	I am open to delegating additional medical activities to my practice personnel.	<i>Primary domain</i> Environmental context and resources	
4.14	I am open to delegating additional medical activities to my practice personnel, if they obtained additional training.	<i>Primary domain</i> Intentions	32
4.15	I am open to transferring medical tasks to my practice personnel in the sense of substitution.	<i>Primary domain</i> Social/professional role and identity	37
Substitution refers to the complete assumption of responsibility for tasks by non-physician medical staff. An example is the independent recall, treatment and control of patients with type 2 diabetes mellitus by non-physician medical staff. You would only be included in the treatment if there were problems beyond the skills of the staff.			
<b>5</b>	<b>Opportunities to delegate medical activities to non-physician medical staff in your practice</b>		
Please list (several if possible) examples of the most relevant tasks that...			
5.1	... medical assistants without additional training typically perform in your practice at present.	Open ended	
5.2	... medical assistants without additional training could perform in your practice in the future.	Open ended	
5.3	... medical assistants with additional training typically perform in your practice at present.	Open ended	
5.4	... medical assistants with additional training could perform in your practice in the future.	Open ended	
5.5	... non-physician medical staff could perform in your practice in the future, if further additional training were provided. (Please also consider training that is not yet available but might be in the future.)	Open ended	
5.6	What is the greatest factor influencing delegation of physician tasks in your practice? (a) Facilitating. (b) Hindering.	Open ended	
5.7	Are there other professionals with which you would like to work in your practice in the future? If so, what types?	Open ended	37

\*\*Scheine' or 'bills' reflects the number of individual patients treated per quarter year.

†A form of healthcare delivery in Germany similar to preferred provider and health maintenance organisations elsewhere.

A bilingual native English-speaking physician (DL) reviewed the German language survey alongside its proposed translations and made suggested revisions that were back translated into German by an independent party, discussed by the research team and either accepted or deleted by consensus. The final survey was pretested using cognitive interviews with two participants of the study sample to assess item clarity and interpretation.

### Interviews

An initial interview guide following a semistructured format and consisting of 11 questions (table 3) has been developed to cover TDF domains described above and those not addressed in the survey. Although the qualitative approach can be used to detect emerging themes potentially related to multiple domains, the elements of the interview guide were developed with the intention that each represented a single domain.

Section 1 addresses knowledge about delegation to NPMS in the practice and general motives and beliefs. In section 2, we explore the extent to which delegation is currently implemented, approaches to delegation and which factors play a facilitating or hindering role. In section 3, we explore the potential for delegation, potentially adding to insights arising from responses provided in section 5 of the survey. A fourth section explores perceived social influences, whether by patients or other physicians, while section 5 explores thoughts and ideas on future developments including both potential barriers and facilitators that might allow greater delegation to NPMS from the physician's perspective. The interview ends with a summary of responses documented by the interviewer and provides an opportunity for validation, clarification of misunderstandings and member checking. Three TDF domains, 'Optimism', 'Emotion' and 'Behavioural regulation', were considered too broad to be addressed in a specific question and were thought to be best analysed as part of the content analysis of the interview.

Each question of the preliminary interview guide was discussed within the research team to ensure a clear relation to the research objectives. Pretests have been performed with two PCPs representing the target sample to ensure the questions are clear and understandable and to estimate interview length. The final interview guide may be modified by results from the survey, to explore emerging themes, while being respectful of participants' busy schedules. Any modification will undergo a similar pretesting process.

### Data management

Survey responses will be scanned, text digitally converted and results uploaded into a database available only to the research team. If written responses are not legible, data will be censored. Surveys will be archived in paper-based and digital formats. Audio recordings of the interview will be transcribed and will only be available during the transcription process. Written transcripts will be validated against the audio files by the researcher conducting the

interview and deleted thereafter. The data set generated in the survey and the interviews will be available from the corresponding author on reasonable request. The audio transcript files will not be available to external researchers.

### Data analysis

Data analysis will proceed in three steps: separate analysis of survey and interview data followed by a comparative assessment of both seeking complementary or new insights.<sup>22</sup>

Incomplete survey data will be included in the analysis, although responses will be checked for plausibility (eg, identical responses across all items) and excluded on a case-by-case basis. Floor/ceiling effects will be assumed if more than 80% of participants' responses fall in either of the extreme response categories. These items will be excluded unless context can be identified during the later comparative assessment stage. Descriptive analysis will include comparison of participants' demographics with demographics of the sample group to check for over-representation and under-representation of subsamples. Analyses of survey data will use Stata Statistical Software: Release 16.<sup>41</sup>

As mentioned, insights arising from the analysis of survey data will inform decisions to refine the interview guide. Once conducted, interview data will be subjected to content analysis according to Mayring<sup>42</sup> using MAXQDA 2022 (VERBI Software, 2021). We will use both inductive and deductive practices to compare our findings to previous research, as well as to generate new insights and possible hypotheses for future follow-up studies. A template analysis based on the TDF will identify themes potentially relevant for supporting organisational behaviour change in the future around the theme of delegation. Theme saturation will be assumed, when both researchers conducting thematic analysis agree, that enough insights are generated to address the research objective.<sup>43</sup>

Finally, as neither the survey nor the interviews are designed to separately cover all domains of the TDF, we will attempt to connect insights arising from data from both to identify potential influencing factors, motives and beliefs regarding delegation of tasks to NPMS.<sup>22 23</sup>

This comparative analysis will be performed by identifying themes emerging from the analyses of either the quantitative or the qualitative part of the study and following it across to the other part, seeking confirmation, disagreement or further insights. This process will be repeated until no further insights on results of either part of the study can be generated.<sup>44 45</sup> The TDF will then be used as a guide to sort and summarise results.

### ETHICS AND DISSEMINATION

The study has been approved by the Ethics Committee II of Heidelberg University, Mannheim Medical Faculty in April 2021 (approval number: 2021-530). Written informed consent will be obtained from each participant

**Table 3** Elements of the interview guide and corresponding primary domain of the theoretical domains framework

No	Key question/follow-up questions	Primary domain
<b>1</b>	<b>Introduction</b>	
1.1	When did you first encounter the issue of delegation of medical tasks? a. What have you learnt about delegation since then? b. Is there anything you would like to know about delegation that you do not know so far?	Knowledge
1.2	Can you tell me about your perspective on the delegation of medical tasks to non-physician medical staff in your practice?	
<b>2</b>	<b>Current situation</b>	
2.1	How is it decided in your practice who takes on which tasks? a. Can you tell me more about this? b. Can you tell me about the expectations you currently have when delegating to your staff?	Skills
<b>3</b>	<b>Potential of delegation</b>	
3.1	Can you tell me about the potential of delegation of medical tasks to non-physician medical staff in your practice? a. Can you give me examples? b. What would have to happen to delegate these tasks? c. How would you describe your likelihood to delegate these tasks under these circumstances? d. How would you describe your expectation to your staff if you delegated these additional tasks? e. Can you imagine to transfer tasks to non-physician medical staff in the sense of substitution?	Beliefs about consequences
3.2	Can you tell me what comes to mind about efficiency in primary care practice? a. How does the issue of delegation play a role in considerations of efficiency in your practice?	Memory, attention and decision process
3.3	Can you tell me what comes to mind if I ask you about tasks that are solely the physicians' responsibility? a. What defines these tasks that makes you think they must be performed by a physician?	Social/professional role and identity
<b>4</b>	<b>Expectations of delegation</b>	
4.1	When you think of your patients, how do you think they would react to an increased delegation to non-physician medical staff? a. Can you give me examples? b. Can you imagine the opposite? c. Can you imagine why this might be the case?	Social influences
4.2	When you think of your medical colleagues, how do you think they would react to an increased delegation to non-physician medical staff? a. Can you give me examples? b. Can you imagine the opposite? c. Can you imagine why this might be the case? d. Can you tell me how you would think about this if we were talking about substitution?	Social/professional role and identity
<b>5</b>	<b>Future development</b>	
5.1	How do you think delegation of medical tasks will develop in the future?	
5.2	Can you think about anything else on this topic that is important to you?	
<b>6</b>	<b>Summary/member checking</b>	
6.1	If I have understood you correctly ... (summary Interviewer) a. Delegation in general. b. Current situation. c. Expectations and potential. d. Colleagues/patients.	

before each interview. Following consent, the interview will be audio recorded and transcribed to allow analysis. Consent for participation in the survey will be assumed when the survey has been returned. Financial incentives will not be offered for survey completion although

interviewees will receive an incentive of €40 as a small token of appreciation for their participation.

Insights emerging from this study will be shared with local and regional governmental agencies and key stakeholders in planning outpatient healthcare, especially



in Baden-Wuerttemberg. Results will be disseminated through publications in peer-reviewed journals, conference talks and poster presentations.

## DISCUSSION

Mismatch in supply and demand for German PC is increasing, especially in rural areas. Delegating greater responsibility for the performance of selected tasks to NPMS may address this mismatch by fostering greater practice efficiency. However, building potential interventions in PC practices should be preceded by efforts to understand structures and processes in PC.<sup>46</sup> Thus, we take a first step in better understanding PC by exploring influencing factors, motives and beliefs regarding delegation.

The proposed study is the first to use theory as an organisational foundation for specifically identifying potential influencing factors, motives and beliefs regarding delegation of tasks to NPMS and probing the potential of further integrating NPMS in German PC practices using both qualitative and quantitative methods. Previous German studies on this topic, in contrast, are largely atheoretical, rely heavily on a quantitative approach and offer conflicting results.<sup>19 20 37 47</sup> By using a theory-based approach combined with mixed-methods research techniques, the proposed study has the potential to contribute to a clearer, more comprehensive picture of potential barriers and facilitators to taking a more team-based approach in PC from the physician's perspective.

While the methods we will use in this study are largely descriptive and exploratory in nature, we view this as an important strength, especially in view of the currently limited knowledge base addressing motives and beliefs regarding delegation. Combining qualitative interviews with an open-ended approach and theory-guided survey allows for a broader and deeper exploration of prevailing motives, beliefs and potential influencing factors and promises to inform the focus of future interventions that seek to expand the role of NPMS. Especially as the interview opens opportunity to address any topic relevant to participants and as we specifically ask participants to name relevant factors in the survey, we anticipate an ability to uncover influencing factors not previously identified. Indeed, the added value of a qualitative approach and the data connection process is the opportunity to identify and explore factors not previously uncovered that are relevant and must be considered in the design of any future intervention.<sup>22 23</sup>

Responses to the future results of this study may take many forms. Interventions at the PCP levels or health systems levels, for example, may be required before designing and implementing interventions to expand team-based care, such as educational programmes for PCPs or adjustments in practice compensation. Additional research may be required to evaluate different practice styles and identify best practice examples for task delegation in PC practices.

This study promises to shed a broader light on tasks performed by NPMS at present and those that might be possible in the future. Previous studies provided task lists,<sup>20 33 34 37 39 40</sup> which might constrain answers on the most frequent tasks typically performed by MAs, even though the tasks performed in PC are broad and particularly diverse.<sup>48</sup> The potential for delegation in the future remains unclear in amount and area, as previous studies identify either the assumption of responsibility for home visits<sup>47</sup> or the performance organisational tasks as being most relevant to PCPs.<sup>20 37</sup>

Although our study has a narrow focus, the approach we describe may be applicable in other research settings, especially those involving organisational behaviour change. Combining the TDF as an organising framework in quantitative and qualitative research may yield unexpected and valuable insights for work in other fields.

Although the TDF provides a comprehensive framework for identifying potential influencing factors, motives and beliefs, previous experiences suggest that some factors on the 'systems level' (eg, those that address cultural influences) might not be represented adequately.<sup>49</sup> This represents a limitation of this study, although we believe these factors might still be identified in context of the interviews even if not addressed explicitly.

Surveys are subject to potential errors and resulting biases in data analysis, especially sampling, non-coverage, measurement and non-response error.<sup>50</sup> We address sampling and non-coverage bias by using a broad definition of 'rural' and by including all PCPs in rural areas in Baden-Wuerttemberg. To address sampling and non-coverage error in the interviews, we will specifically sample PCPs with differing views by asking participants for such and by aiming to achieve theme saturation.

Sampling error might arise from the address data to be obtained from commercial sources, as they might not accurately identify physicians of the target sample. In terms of potential selection bias, however, we are not aware of any reason that might make physicians more or less likely to be included in this database. Indeed, as a commercial data source, one would expect a strong incentive for ensuring inclusion of all actively practising physicians would exist. To mitigate selection bias, survey analysis will include comparison of participant demographics with demographics of the full sample.<sup>9</sup>

Our survey consists of some items, especially those pertaining to the TDF that have not been psychometrically tested, potentially resulting in measurement error. We attempt to address this, in part, by carefully reviewing previous work to identify validated items<sup>32</sup> and by performing multiple pilot tests with individuals' representative of the target population and discussions within the research group and with external experts. Additionally, we include items that assess potential acquiescence or social desirability effects and use survey procedures that assure anonymity of responses. Measurement error in the interviews will be addressed using member checking and having multiple researchers code the interviews.

Non-response error remains a major factor in any survey study.<sup>50</sup> We aim to maximise response rate by designing survey and the means of returning responses following the total design method. To reduce respondent burden, we limit the survey to two pages, maximise consistency in its design and use personalised cover letters, post-paid response letters and reminders after 4 weeks to all non-respondents.<sup>50</sup>

This study will focus solely on the PCPs' perspective as they currently have the greatest influence on operational decisions related to practice structure and processes. The perspectives of patients and NPMS, however, remain both important and largely unexplored. Although previous research in other settings suggests that delegation is generally well accepted by patients,<sup>51</sup> the patients' perspective as well as that of NPMS should be assessed in future research.

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