

Modernization of postgraduate medical training: competence-based curricula

How well do these curricula prepare for the profession of Medical specialist

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**rijksuniversiteit
groningen**

Groningen, maart 2010



Studentenbureau UMCG

Universitair Medisch Centrum Groningen

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Afstudeerscriptie in het kader van

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ISBN 978-90-8827-090-1
NUR 807 Personeel en organisatie
Trefw CanMEDS-Competencies, task, medical specialist, self-efficacy, consensus procedure

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Voorwoord

Voor u ligt het resultaat van mijn afstudeerstage binnen het Universitair Medisch Centrum Groningen. In het kader van mijn studie bedrijfskunde, specialisatie Human Resource Management, heb ik binnen het UMCG een onderzoek gedaan ter afsluiting van mijn studentenleven. Van te voren had ik niet gedacht binnen een ziekenhuis af te studeren, maar terugkijkend heb ik een hele leuke en, ook belangrijk, leerzame tijd gehad. Uiteraard had ik dit resultaat niet kunnen behalen zonder professionele begeleiding. Allereerst wil ik dan ook mijn begeleiders vanuit het UMCG, Jan Pols en Pine Remmelts, ontzettend bedanken voor hun steun en kritische blik op mijn onderzoek. Door jullie enthousiasme en ideeën kreeg ik de juiste 'vibe' te pakken die nodig was tijdens dit traject. Verder wil ik mijn afstudeerbegeleider vanuit de RUG, Bernard Nijstad, bedanken. Vooral op het gebied van statistiek en SPSS is Bernard onmisbaar geweest. Ook mijn familie en vrienden hebben een belangrijke rol gespeeld tijdens de periode van mijn afstuderen (die toch acht maanden duurde), heel erg bedankt allemaal! Als laatste wil ik de club studenten die tegelijk met mij afstudeerden binnen het UMCG bedanken voor de vele gezellige koffiemomenten en de support die we elkaar hebben gegeven!

Table of contents

1 INTRODUCTION	1
2 THEORETICAL FRAMEWORK	3
2.1 COMPETENCIES.....	3
2.2 SELF-EFFICACY.....	5
2.3 RELATIONSHIP BETWEEN COMPETENCIES, TASKS AND SELF-EFFICACY	5
3 RESEARCH METHODS	9
3.1 PARTICIPANTS	9
3.2 PROCEDURE.....	9
3.3 DATA ANALYSIS	10
4 RESULTS	13
4.1 CONSENSUS PROCEDURE	13
4.2 CORRELATION AND REGRESSION ANALYSES	14
5 DISCUSSION	17
5.1 MAIN FINDINGS	17
5.2 PRACTICAL AND THEORETICAL IMPLICATIONS.....	18
5.3 STRENGTHS, LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH	19
5.4 CONCLUSIONS	20
REFERENCES	21
APPENDIX A	23
APPENDIX B	24
APPENDIX C	26

1 Introduction

Vocational training is designed to most optimally prepare students for the practice of a particular occupation. When the connection between the elements of the educational program and the practice of the job is missing, students will be less well-prepared, and there is a chance that they will fail in performing some tasks of their profession. In case of a discrepancy in the connection between the educational program and the practice of the job, the curriculum needs to be adjusted. Such change in curricula is currently taking place in postgraduate medical training. Before, it was mainly focused on training medical experts, but due to societal developments and developments in health care, the training of medical specialists needs to be approached from a broader perspective. This is one of the reasons that the Central College of Medical Specialties (CCMS) decided to introduce competence-based programmes for specialist training. As Meininger and Bakker (2007) state: “Modern times call for modern doctors”.

In the past, doctors were people with high social status, with the result that parties outside the medical profession had almost no control over their educational system (Eve & Hodgkin, 1997). Nowadays, however, societal demands are leading to more transparency concerning the content and quality of postgraduate curricula. Continuous innovations of the medical education are necessary to deliver constant high quality care (Jones, Higgs, De Angelis & Prideaux, 2001). Several developments are responsible for the changing role of medical science in society. These developments are for instance: the increase in medical knowledge, patient emancipation, women’s participation in the study of medicines, changing education and practise of the profession, and legal limitation of working hours for doctors in specialist training (Bleker, 2008). These factors are responsible for the fact that healthcare does not only focus on the healing process of patients, but also focus on the stimulation of the health of society (Jones et al., 2001).

Following these developments, competence-based programmes for medical specialist training have been introduced. *Competence* is conceptualized in terms of the integration between knowledge, abilities, skills, and attitudes (Hager & Gonczy, 1996; Van Loo & Semeijn, 2004; Meininger & Bakker, 2007). An extended definition of

competence in the context of medical professions is: ‘the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community being served’ (Epstein & Hundert, 2002). Because of the shift in medical postgraduate training from focusing primarily on medical expertise to a broader context, major changes in postgraduate training programmes have occurred (Meininger & Bakker, 2007). Borleffs (2009) assumes that besides the main focus of being a medical expert, additional skills are required for being a good doctor. He describes a ‘good doctor’ as someone who is in the possession of skills that belong to the so-called ‘Medical Humanities’. Medical Humanities deal with training programmes that include the development of qualities that broaden students’ and residents’ view on the medical profession. In a number of countries, also in the Netherlands, the modernization of postgraduate medical training occurs by applying the Canadian Medical Education Directives for Specialists model (The CanMEDS-model, see Figure 1) (Scheele et al., 2008).

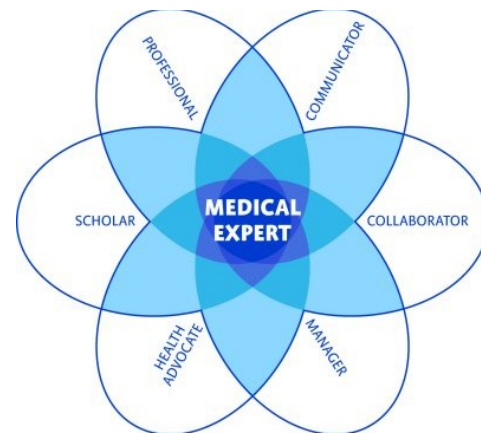


Figure 1 CanMEDS model

The CanMEDS framework consists of seven roles. The main role lies in the centre of the model, the *medical expert*. The other six roles are the *communicator*, the *collaborator*, the *manager*, the *health advocate*, the *scholar*, and the *professional*. In the Netherlands each role is treated as a domain of competencies; medical performance, communication, collaboration, knowledge & science, community performance, management, and professionalism (Rademakers, De Rooy, & Ten Cate, 2007). Besides being a medical specialist, it is required that a medical specialist can communicate with patients, collaborate with colleagues, has good management skills, acts in a socially required way, has good academic qualities, and professionalism (Meininger & Bakker, 2007).

After implementing the new competence-based curricula in postgraduate medical training programmes, it is expected that 'modern medical specialists' are better prepared for their tasks because their education is more congruent with developments and demands from society. To find out whether medical specialists who recently graduated (young medical specialists) feel better prepared by their education than before the curricula change, it is necessary to know how well-prepared young medical specialists felt before this modernization. The present study¹ can therefore be seen as a baseline measurement, as the participants of the research have graduated before the competence-based curricula were introduced.

Medical specialists do not perform isolated competencies when practising their profession, but they perform certain tasks. These tasks are related to certain competencies. However, how these tasks and competencies relate is still unclear. Previous work of Van den Bergs (2009) identified 73 general tasks that comprehensively describe the work of surgical and non-surgical disciplines. The present study focuses on these different tasks in relation to the seven competencies which comprise the CanMEDS-model.

The goal of the present study is to identify which competencies a medical specialist needs to possess to perform a

certain task properly, and to clarify for which tasks/competencies they feel less well-prepared by their medical training. Therefore, a first research question is: '*Which competencies of the CanMEDS-model are primarily needed to perform each of the 73 general medical tasks properly?*'. This research question investigates the relationship between the tasks and the competencies of the CanMEDS model and will be addressed in a qualitative study. In a second quantitative part of the study, feelings of self-efficacy of young medical specialists are investigated. *Self-efficacy* is defined as 'one's belief in one's capability to perform a specific task' (Gist, 1987). For a sample of 165 young medical specialists, ratings have been provided on self-efficacy for each of the 73 tasks identified by Van den Bergs (2009). These ratings of self-efficacy will be connected to the degree in which different CanMEDS competencies are required to perform the tasks. This second part of the study will answer the next research question: '*Can differences among tasks in average self-efficacy of young medical specialists be explained with the competencies needed to perform these tasks?*' This research question will identify differences in the level of self-efficacy for tasks in relation with the relevance of the different competencies associated with these tasks. Together, the quantitative and qualitative parts will provide insight into the level of preparedness felt by young medical specialists, and show which competencies need to be trained more to assure that young medical specialists master all competencies which are important for their day-to-day work.

To answer the research questions it is necessary to define the concepts of 'competence' and 'self-efficacy' based on scientific literature and to provide background information on the origins of the CanMEDS-model as well as the tasks of medical specialists. This is presented in the theory section. Furthermore, in the method section is outlined how this research has been conducted. Next, the results are presented in the results section. Eventually, conclusions and recommendations are formulated in the discussion section of this study. Additionally, the strengths and limitations of this research, and suggestions for further research have also been described in this section.

¹ This study was commissioned by the Wenckebach Institute, Postgraduate School of Medicine (PGSoM). This institute is part of the University Medical Centre Groningen (UMCG), and is involved in the development and training of all professionals in health care.

2 Theoretical framework

As mentioned in the introduction, the modernization of postgraduate medical training is in an advanced phase. This means that the transition from traditional training to competence-based training is in progress.

To provide a short overview of the background of the profession and education of medicine, we go back to the 4th century BC when Hippocrates, the father of the Western medicine, had his students take an oath committing themselves to maintain certain professional rules. Nowadays, medical students who graduate still take this oath, although the text is adjusted to modern times and it does not have a legal character anymore (Farnell, 2004). Until the late 20th century physicians had a social contract with society, which signified that physicians would serve the public with altruism, professional competency and integrity. In return, self regulation, professional autonomy, and status were given to medical specialists (Gadon & Glasser, 2006). The oath can be seen as a so-called 'social contract' with society. This social contract eroded because of changes in the health care environment. By the identification of these changes like patient consumerism, government regulatory encroachment, financial imperatives, the increase in medical information on the internet, litigation, technology, and the increase in medical knowledge, it became clear that there was a need to reform medical education and the standards of physician competence (Frank & Danoff, 2007). In the early 1990s, it became clear that change was necessary concerning the way in which young physicians were prepared for the evolving work environment, and the Royal College of Physicians and Surgeons of Canada (RCPSC) initiated the modernization of the specialist postgraduate medical education (Baerlocher & Asch, 2006). The RCPSC is the legal standard-setting body for specialist physicians in Canada, and is responsible for accrediting the specialist training programs at Canada's medical schools. The core task of the RCPSC became the CanMEDS 2000 project (Rourke & Frank, 2005). The overall goal of the Canadian Medical Education Directives for Specialists (CanMEDS) project was 'to identify the core competencies for specialist physicians, according to the needs of society, to identify the

most relevant medical training, and consequently, to provide the highest quality of care' (Baerlocher & Asch, 2006).

2.1 Competencies

In several countries, the modernization of medical science occurs by applying the CanMEDS-model (Scheele et al., 2008). In the Netherlands the roles of the CanMEDS-model have been translated into seven domains of competencies. Before going into detail on these specific competencies, different perspectives on the concept of competence will be given first. In the literature on competencies, many different definitions appear. Van Loo and Semijen (2004) divide the literature on competencies roughly into three perspectives on the meaning and the operationalisation of competence: the educational perspective, the labour market perspective, and the human resource perspective. From the educational perspective, competencies are seen as composites of knowledge, skills, and attitudes. This is also called the integrated approach to competence (Hager & Gonczi, 1996). In labour market research, the concept of competence is commonly equated with 'skill' or 'qualification'. Additionally, the human resources perspective on the concept of competence refers to the potential (behaviour) of people in their working environment. In recent HRM literature, the concept of competence is also defined as integrated knowledge, skills, and attitudes that can be used to perform at work, which means producing output that supports organizational goals (Dewulf, 1999). According to Meininger and Bakker (2007), when reviewing the concept of competence, it essentially comes down to a person possessing the personal skills to act adequately and to learn in different, mostly critical job situations.

Competence-based education. When associating the concept of competence with training or education, the term 'competence-based education' will come up. When an educational system moves from traditional training to competence-based training, the way in which students learn changes. Most people think competence-based train-

ing is new and thus a modern concept, but the approach was already used in the early 1970s in teacher education in the United States. Although standards of performance were defined in somewhat different ways, the approaches were similar in the way that all were concerned with the specification of standards of performance in the clearest possible terms (Melton, 1994). The differences between traditional and competence-based education are presented by Schlusmans, Slotman, Nagtegaal and Kinkhorst (1999), and Table 1 shows the main ones.

Wesselink, Lans, Mulder and Biemans (2003) define *competence-based education* as 'creating opportunities for students and workers, close to their world of experience in a meaningful learning environment (preferable the professional practice) wherein the learner can develop integrated, performance-oriented capabilities to handle the problems in practice'. This definition was derived from three different interpretations of the concept of competence. First, the behavioristic approach, which can be described by the discrete behaviors of a person associated with the completion of various tasks. This approach is not concerned with the connections between the tasks and the transformation

from one task to another. The second approach, on which the above definition of competence-based education is based, is the generic approach. This approach focuses on distinguishing between average and excellent workers. When judging the competencies of workers by following the ideas of the generic approach, the generic competencies or 'personal qualities' are central, for example critical thinking capacity and problem solving capabilities. The third approach, the holistic approach, is a combination of the first and the second approach. In this approach, competence is seen as a whole of knowledge, capabilities, skills, and attitudes displayed in a context with a suitable level of generality. An important characteristic of competence-based education is that it includes the education and training process in the evaluation of the worker, because it is not enough to focus just on the results at the end of a learning process. During the learning process evaluation can help the worker or student to become more competent (Wesselink et al., 2003).

Traditional education	Competence-based education
Knowledge holding and discipline focused skills are the basic principles	Competencies with matching tasks and real-life cases or problem situations are the basic principles
Students study in advance prescribed subject matters	Students execute study tasks, individually or in groups
All students follow the same curriculum	Depending on the level of knowledge/skills of the student during entrance a personal curriculum is composed
Especially knowledge and skills are being tested	Especially testing competencies
Teacher guided testing	Also self-assessment and peer-assessment
Separate/individual skills modules	General skills become integrated study tasks
Educational entities are derived from separate disciplines	Educational entities are mostly interdisciplinary

Table 1 Differences between traditional education and competence-based education

Competence-based education has two main goals. The first one is to make individuals more competent instead of solely emphasizing on their knowledge deficits. The second goal is to reduce the gap between the labor market and the training system, which is exactly the reason for the introduction of competence-based education in postgraduate medical training, the subject of this study.

CanMEDS roles. The guidelines for the modernization of all medical specialty training programmes in the Netherlands, presented by the Dutch Central College of Medical

Specialties, are based on the CanMEDS 2000 model. This Canadian model, which defines seven main roles for medical specialists, was adjusted to the Dutch situation to fit Dutch healthcare and training circumstances (Rademakers, et al., 2007). The seven CanMEDS roles, or competencies, have been determined and defined by The Royal College of Physicians and Surgeons of Canada. This framework shows the exact definitions and descriptions of the seven roles/competencies. The following definitions are cited from the CanMEDS 2005 Physician Competency Frame-

work edited by Frank (2005) (see appendix A for a broader description of the roles (competencies)).

- **Medical expert (medical performance).** As Medical Experts, physicians integrate all of the CanMEDS Roles, applying medical knowledge, clinical skills, and professional attitudes in their provision of patient-centred care. Medical Expert is the central physician Role in the CanMEDS framework.
- **Communicator (communication).** As Communicators, physicians effectively facilitate the doctor-patient relationship and the dynamic exchanges that occur before, during, and after the medical encounter.
- **Collaborator (collaboration).** As Collaborators, physicians effectively work within a healthcare team to achieve optimal patient care.
- **Manager (management).** As managers, physicians are integral participants in healthcare organizations, organizing sustainable practices, making decisions about allocating resources, and contributing to the effectiveness of the healthcare system.
- **Health Advocate (community performance).** As Health Advocates, physicians responsibly use their expertise and influence to advance the health and well-being of individual patients, communities, and populations.
- **Scholar (knowledge and science).** As Scholars, physicians demonstrate a lifelong commitment to reflective learning, as well as the creation, dissemination, application and translation of medical knowledge.
- **Professional (professionalism).** As Professionals, physicians are committed to the health and well-being of individuals and society through ethical practice, profession-led regulation, and high personal standards of behaviour.

2.2 Self-efficacy

The purpose of education is to prepare students for a particular profession. After graduating, students should be ready to perform the tasks associated with the job they want to practice. In case of a discrepancy between the contents of the educational program and the practice of the job, the level of self-efficacy of a person will be low. In the literature, *self-efficacy* is defined as ‘a personal judgment of

how well one can execute courses of action required to deal with prospective situations’ (Bandura, 1982). People who perceive themselves as highly efficacious are able to produce successful outcomes when making an effort, whereas people who perceive low self-efficacy are likely to cease their efforts prematurely and fail on the task (Bandura, 1977). Research has demonstrated that self-efficacy is related to a number of work-performance measures, such as organizational performance (Wood, Bandura, & Bailey, 1990), skill acquisition (Mitchell, Hopper, Daniels, Georgefalvy, & James, 1994), and newcomer adjustment to an organizational setting (Saks, 1995). Although there have been several studies investigating the relationship between self-efficacy and other organizational concepts, as far as this study reviewed the literature, little seems to be known about the relationship between self-efficacy on a certain task and the competencies needed to perform this task adequately.

2.3 Relationship between competencies, tasks and self-efficacy

The relationship between the three central subjects of this study (i.e. tasks, competencies, and self-efficacy) can be graphically presented as is shown in the conceptual model in Figure 2. The list of the 73 tasks medical specialists need to carry out during their work is developed by Van den Bergs (2009) through observations, interviews and judgments by experts. The participants in Van den Bergs’ research were asked to what extent they need to perform certain tasks when performing their profession. They could choose from the following answers: ‘daily’, ‘weekly’, ‘monthly’, ‘every six months’, ‘sporadic’, or ‘never’. After analyzing the results, a list of 73 tasks valid for all 27 registered non-surgical and surgical specialties remained. These 73 tasks of a medical specialist are in the present study linked to the seven CanMEDS competencies. To properly perform a certain task someone needs to possess certain competencies, so there is a mutual relationship between the 73 tasks and the CanMEDS competencies. As this study is investigating the level of self-efficacy of young medical specialists on the tasks and matching competencies, self-efficacy is linked in the conceptual model to both the tasks

and competencies. The level of self-efficacy was measured in a previous study by a questionnaire which asked the participants to react on the following statement for each of the 73 tasks: 'I am well prepared on ... (73 tasks) ... by my medical training'. The current study makes use of the average level of self-efficacy of the 165 participants on the 73 tasks to be able to assess whether differences in self-efficacy among tasks are due to the fact that different competencies are required to perform these tasks.

In the existing literature not much is known about the relationship between tasks and competencies and the level of self-efficacy. Many articles have been written about tasks and competencies in relation to medical professions (e.g., Hager & Gonczi, 1996; Pols, Yedema & Boendermaker, 2005; Graham et al., 2009; Batalden, Leach, Swing, Dreyfus & Dreyfus, 2002), but the relation with self-efficacy, the focus of this study, is new. When considering specific tasks, it is generally known that people differ in their level of self-efficacy; one person can be more confident about his capability than another person. However, not only persons differ at the individual level on self-efficacy; there are also differences in level of self-efficacy between tasks at the sample/population level. Previous research, that measured the level of self-efficacy on the 73 tasks of a medical specialist, shows a pattern of tasks with high- or low levels of self-efficacy for the whole sample. So there is not only a difference in level of self-efficacy between persons, but also between specific tasks. As shown in Figure 3, certain tasks have a high level of self-efficacy in the sample (left side/dark grey), and certain tasks have a low level of self-efficacy in the sample (right side/light grey).

Consequently, the previous research discovered a pattern which proves that tasks differ in their level of perceived self-efficacy by people. The numbers presented at each bar in Figure 3 correspond with the numbers of the 73 tasks in appendix B. Examples of tasks which score high on level of self-efficacy are 'taking medical history' (task 9), 'performing physical examination' (task 10), and 'keeping patients' records up to date' (task 27). Unlike the previously mentioned tasks, the following tasks are examples of tasks with low levels of perceived self-efficacy of young medical specialists: 'negotiating with hospital management' (task 57), 'preparing and handing in grant requests' (task 58), and 'attending training programmes in the field of organizational and/or management issues' (task 69). The present study

tries to explain the differences in level of self-efficacy of young medical specialists among the 73 tasks presented in figure 3.

This study assumes that the level of relevance of the seven CanMEDS competencies to perform a certain task affects the level of self-efficacy of young medical specialists on the different tasks. In the past, the competency of medical performance was trained more extensively than other competencies. For this study, we therefore assume that the medical specialists in our sample (who graduated before the change in the medical curriculum) score higher on the competency medical performance than on the other competencies. As a result, they should therefore feel better prepared for tasks for which the competence of medical performance is the most relevant competence.

This assumption thus resulted in the following hypothesis: 'young medical specialists feel better prepared by their training on tasks where the competence 'medical performance' is most relevant, than on tasks for which this competence is less relevant'.

According to Pajares (1996) people engage in tasks in which they feel competent and confident and avoid those tasks in which they do not. He also states that the higher the sense of efficacy, the greater the effort, persistence, and resilience. As a consequence, medical specialists who lack the competencies that are most relevant to perform certain tasks will avoid these tasks. However, these avoided tasks are also part of the job, so it is important that medical specialists are able to perform these tasks as well. The present study links the tasks with competencies and considers the level of self-efficacy. In the end, it will be known which competencies need more attention in medical education.

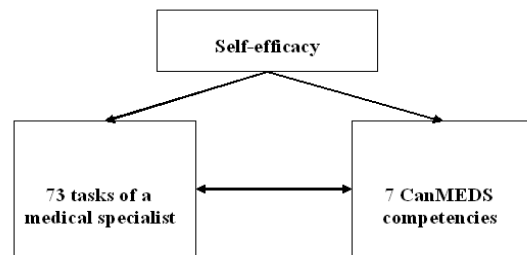


Figure 2 Conceptual model: relationship between tasks, competencies and level of self-efficacy

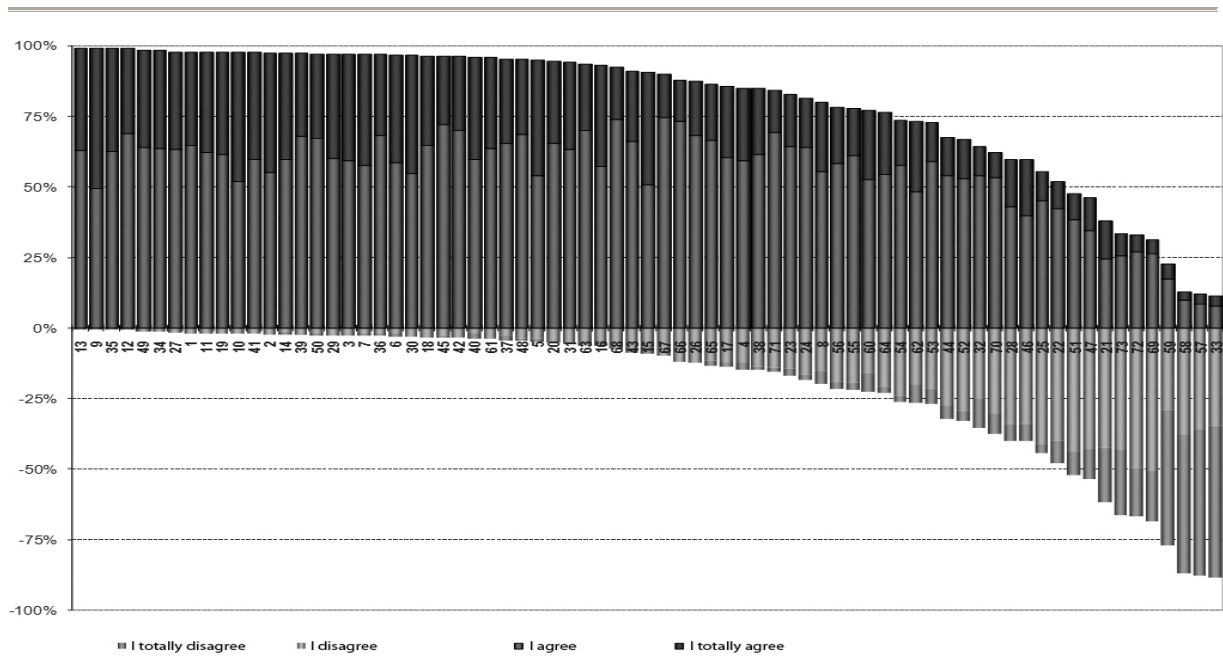


Figure 3 level on self-efficacy on 73 tasks

3 Research methods

The research question that belongs to the qualitative part of this study was formulated in the previous section as: '*Which competencies of the CanMEDS-model are primarily needed to perform each of the 73 general medical tasks properly?*'. This question will be answered by making use of a consensus procedure, called 'the Delphi procedure'. In this procedure, a panel of experts will establish which competencies are most relevant to perform a certain task properly. It is important to remember that all seven competencies are relevant for each of the 73 tasks, but one competence can be more relevant than another competence, that is why in this study the participants were asked to indicate *the most* relevant competence(s) per task. The consensus procedure needs to be repeated until the desired consensus is achieved (Jones & Hunter, 1995). In the current study the consensus procedure consisted of two rounds. In the first round, the participants were asked to identify the most relevant CanMEDS competencies to each of the 73 tasks. After the questionnaires of the first round have been analysed, the participants were asked to look at the results and reconsider their answers. After the second round it was known which competencies, according to the participants, were the most relevant to perform a certain task properly. The reason to choose for the consensus procedure is because of subjectivity. There is not one objective answer to the question which competencies are most relevant to perform a certain task. That is the reason why the question was submitted to experts, who were in this case people who were closely involved in the modernization of postgraduate medical training, so the outcome of the consensus procedure is reliable (i.e., intersubjective agreement).

3.1 Participants

For this study, sixteen people who were involved in the modernization of the medical training were approached to participate in the consensus procedure. To be included in the study, the participants had to comply with the criteria

that they were familiar with the CanMEDS competencies and tasks of medical specialists. All participants were active in the Northern and Eastern regional training body (in Dutch: OOR-NO²), which coordinates the innovation of specialist training in their area. The panel consisted of a set of highly qualified experts. The participants were either medical specialists who were competent in the theory of education, or the participants were didactics who were involved in postgraduate medical training. In more detail; three participants were head of department at the UMCG and two participants were as head of postgraduate medical training closely involved in the innovation of the curricula. In addition, several participants were member of the working group postgraduate medical education at NVMO³ (the Dutch association for medical education). Because the research was anonymous and confidential it is not possible to give more detailed information about the participants.

3.2 Procedure

The consensus procedure consisted of two rounds, and each round had a timeframe of approximately three weeks, including the analysis of the results. For each round, the participants received a package by mail including a cover letter, an instruction form, the questionnaire for that particular round, an appendix with the description of the CanMEDS competencies formulated by the Central College of Medical Specialties (CCMS) (see appendix A), and in the second round also the results of the first round. On the instruction form it was mentioned that the individual answers would be treated in an anonymous and confidential way, and that the individual answers in the evaluation could not be traced to recognizable respondents. At the end of each questionnaire the participants were asked to give their reaction on a number of evaluation questions.

² OOR-NO in Dutch: Onderwijs- en Opleidingsregio Noord- Oost-Nederland

³ NVMO in Dutch: Nederlandse Vereniging voor Medisch Onderwijs

These questions were asked to optimize a possible consensus procedure in the future.

In the first round of the consensus procedure the participants were asked to answer the following question: 'Which competence(s) is (are), in your opinion, (the) most relevant to perform a certain task?'. The participants were free to decide how many competencies they marked as most relevant for each task. In this first round the participants were asked to answer this question for 73 different tasks. They could choose each of the seven CanMEDS competencies as being relevant.

After analyzing the results of the first round of the procedure, the participants received a second questionnaire and they were asked to answer the following question: 'Given what is already known (see results round 1), do you think that the competence(s) where the participants agreed on are really the most relevant competencies to perform a certain task properly? If your answer is 'no', we ask you to mark the competencies which in your opinion are *also* most relevant to perform a certain task properly'. The questionnaire in the second round of the procedure consisted of fewer tasks compared to the first questionnaire, because the participants already agreed on certain task/competence combinations after the first round. The results from the first round were shown in the second questionnaire, the participants also received their own questionnaires of the first round, so they could see their own answers of the first round while filling out the second questionnaire.

After the consensus procedure it was established which competencies are most relevant to perform a certain task, according to the panel of experts. The level of self-efficacy was in a previous study already linked to the 73 tasks, which were linked to the competencies by the current study. This made it possible to predict the average level of self-efficacy of young medical specialists with the relevant scores of the seven CanMEDS competencies. The previous study which linked the level of self-efficacy to the 73 tasks asked young medical specialists to give their reaction on the following statement: 'I am well prepared on ... (73 tasks) ... by my medical training'. The participants answered this question by choosing the appropriate answer on a five-point Likert scale: 'I totally agree', 'I agree', 'I neither agree/disagree', 'I disagree' and, 'I totally disagree'. This questionnaire was filled out by 165 medical specialists ($N=165$) that in the five previous years graduated from their postgraduate medical

training. Of these 165 respondents, 55.2 percent was female and 43.6 percent was male (the other 1.2 percent were missing data). Almost two-third of the respondents (64.2 percent) was younger than 40 years old. Additionally, the participants responded from many different hospitals, but almost one-third (31.5 percent) was practicing the profession of medical specialist at the UMCG.

3.3 Data analysis

The first part of this study consisted of the consensus procedure. After having received the questionnaires of the first round, all task/competence combinations which were marked as relevant by 80 percent or more of the participants, and all task/competence combinations which were marked by less than 20 percent of the participants were considered as combinations on which the participants agreed on. These are the tasks and most relevant (matching) competencies and the competencies which were considered not most relevant for a certain task. All task/competence combinations which were marked by less than 80 percent and more than 20 percent of the participants as being relevant for performing a certain task were reconsidered in the second round of the consensus procedure. After having received the questionnaires of the second round, all task/competence combinations which were marked as relevant by 75 percent or more of the participants, and all task/competence combinations which were marked by less than 25 percent of the participants were considered as combinations on which consensus exists. Due to limited time, this study was only able to conduct two rounds of consensus, that is why the cut-off percentages in the second round were adjusted from 80 to 75 percent and from 20 to 25 percent, in order to increase the number of task/competence combinations. The results of the second round in combination with the task/competence combinations which the participants had already agreed on after the first round of the procedure, resulted in tasks with one or more competencies which were, according to the participants, the most relevant one's to perform a task properly.

The second part of this study, the quantitative part, investigated how the average level of self-efficacy in the sample

was related to the relevance of certain competencies for a certain task. In this analysis, 'task' was the unit of observation, 'the average level of self-efficacy' was the dependent variable and 'the relevance of each competence' was the independent variable. By performing regression analyses in SPSS and analyzing the correlation between the variables, it could be analyzed what the relationship between the 73 tasks, the most relevant competencies, and the level of self-efficacy was. The present study tried to explain why there are differences between the 73 tasks of a medical specialist in level of self-efficacy. Because this study assumes that the level of relevance of a competence influences the level of self-efficacy of young medical specialists on tasks, this was done by verifying to what extent certain competencies are needed to perform a certain task properly.

4 Results

4.1 Consensus procedure

First round. For this study, sixteen people were approached to participate in the consensus procedure. Fourteen participants did complete the questionnaire, thus the response rate was 87.5 percent. The average time the participants needed to fill out the questionnaire was 23 minutes. Because it was expected that the participants would have interesting suggestions for this study, their opinion was asked to optimize the procedure. On the question what the participants thought about this method of research to find out the link between tasks and competencies, most of the participants were positive and expressed that they were very interested in the final results. The participants also came up with ideas to optimize the investigation of the link between tasks and competencies. For example, one participant suggested taking a closer look at the tasks of medical specialists, because the tasks used in this study are the current situation and not the desired situation. Overall, the reactions to the evaluation questions were positive and people were looking forward to the continuation of this research.

During the first round of the consensus procedure, the participants could indicate seven competencies as being relevant in performing the 73 separately tasks. In total, the participants judged 511 task and competence combinations (73 tasks x 7 competencies = 511). After the first round of the consensus procedure, consensus (<20% and >80%) existed on 232 task/competence combinations. Of these 232 task/competence combinations, positive agreement (>80% mostly relevant) existed over 68 (29.3%) task/competence combinations and negative agreement (<20% less relevant) existed over 164 (70.7%) tasks in combination with certain competencies. Notable was the fact that after the first questionnaire, for only two tasks it was already clear which competencies were most relevant and which competencies were less relevant to perform that task properly. These two tasks were 'reflecting on your own action' (task 65) and 'independently identifying gaps in your own knowledge or skills' (task 67).

Second round. After analyzing the questionnaires of the first round, the fourteen people who filled out the first questionnaire were asked to fill out the second questionnaire as well to increase the consensus of the task/competence combinations on which no agreement existed yet. Again, the opinion of the participants was asked through evaluation questions. Overall the reactions were positive and again the participants were curious for the results. Moreover, it was suggested to extend the research to other groups besides young medical specialists, for example residents or hospital interns. The average time the participants needed to fill out the second questionnaire was 20 minutes.

In total, the participants could indicate 279 (511-232=279)⁴ task/competence combinations in the second round of the consensus procedure. After the second round of the consensus procedure, consensus (<25% and >75%) existed over 421 task/competence combinations. Of these 421 task/competence combinations, positive agreement (>75% mostly relevant) existed over 116 (27.6%) task/competence combinations and negative agreement (<25% less relevant) existed over 305 (72.4%) tasks in combination with certain competencies. Appendix C shows the final results of the consensus procedure.

After the consensus procedure it became clear for each task which competence is or which competencies are most relevant to perform a task properly and which competencies were less relevant to perform a task. For twenty-two tasks (30.1%) the participants linked all competencies as mostly relevant or less relevant to the task. For four tasks it is still unclear which competence is the most relevant and which competence is less relevant, because the participants did not reach consensus on these tasks. These tasks are 'writing and/or dictating letters' (task 30), 'negotiating with the management of the hospital' (task 57), 'preparing and handing in grant requests' (task 58), and 'attending training programmes in the field of organizational and/or manage-

⁴ 511 is the total number of task/competence combinations. After the first round the participants agreed on 232 task/competence combinations. 511 minus 232 is 279 task/competence combinations the participants needed to consider in the second round.

ment issues' (task 69). In addition, twenty-nine tasks were linked to just one most relevant competence, thirty-three tasks have two most relevant competencies, and the participants linked three competencies as being most relevant to seven tasks.

Because this study was restricted in time, the results after the second round of the consensus procedure were the final results. Table 2 shows for each competence the number of tasks for which the participants indicated that particular competence as one of the most relevant competencies to perform the task. The competence 'community performance' stands out, because the participants did not indicate one task where 'community performance' is one of the most important competencies in order to perform a certain task properly.

Most relevant competence	Number of tasks
Medical performance	15
Communication	35
Collaboration	19
Knowledge and Science	10
Community Performance	0
Management	17
Professionalism	20

Table 2 Most relevant competence – number of tasks

4.2 Correlation and regression analyses

The correlation between the dependent variable and the independent variables, means, and standard deviations are shown in Table 3. The predictors were the percentages of participants that indicated a particular competence as being one of the most relevant competencies to perform a certain task. The competence 'communication' has the highest mean score, which indicated that this competence is one of the most relevant competencies for the greater part of tasks. Furthermore, the high standard deviations show that there is a lot of variance among tasks in how many experts rated a particular competence as most relevant for a task. This variance was needed in this study to be able to predict variance in how well prepared young medical specialists are for different tasks. The correlation analysis shows that the

average level of self-efficacy of young medical specialists was significantly related to the competence 'medical performance' (0.472, $p < 0.01$) [positive], 'management' (-0.241, $p < 0.05$) [negative], and 'community performance' (-0.266, $p < 0.05$) [negative]. The positive relation between 'medical performance' and self-efficacy means that the more the competence 'medical performance' is relevant to perform a certain task, the higher the level of self efficacy of the medical specialist for that task. In contrast, the negative relationships between 'management' and self-efficacy and between 'community performance' and self-efficacy suggest that the more these competencies are relevant to perform a certain task, the lower the level of self efficacy of young medical specialists for that task.

To test the central hypothesis 'young medical specialists feel better prepared by their training on tasks where the competence 'medical performance' is most relevant, than on tasks for which this competence is less relevant' in this study, a linear regression analysis was conducted. For each of the 73 tasks of medical specialists ($N=73$) the percentages of participants that indicated a particular CanMEDS competence (i.e. medical performance, communication, collaboration, knowledge and science, community performance, management, and professionalism) as being one of the most relevant competencies to perform a certain task properly were included as predictor in a linear regression model to assess the independent impact of each variable upon self-efficacy (dependent variable). The linear regression analysis revealed two significant effects (see Table 4). There was a significant positive effect of the variable 'medical performance' on self-efficacy ($\beta=0.334$, $p < 0.01$). This means that the more the competence 'medical performance' is needed / is relevant to perform a certain task properly, the higher the average level of self-efficacy of young medical specialists is for that task. Furthermore, a negative effect was found of the variable 'management' on self-efficacy ($\beta=-0.370$, $p < 0.05$). This means that the more the competence 'management' is needed / is relevant to perform a certain task properly, the lower the average level of self-efficacy of young medical specialists for that task. The above regression analysis makes the assumption that a particular competence is more important than another competence when more participants indicated the competence as being most relevant. Furthermore, the regression analysis assumes that the data is normally distributed,

which is not the case when using the percentages as input for the regression analysis. Therefore, a second regression analysis was conducted, where these disadvantages were eliminated. This second regression analysis is different from the previous analysis because instead of the actual percentages, a distinction is made between the most relevant task/competence combinations (>75%) and the less relevant task/competence combinations (<75%). This is called a dichotomous regression analysis, where the data consisted of the figures one and zero. Also in this second regression analysis, the level of self-efficacy was the dependent variable. The dichotomous linear regression analysis revealed two significant effects (see Table 5). There was a significant positive effect of the variable 'medical performance' on self-efficacy ($\beta=0.481$, $p<0.01$). This effect was also found in the first regression analysis, but in this regression analysis the effect is stronger. In contrast with the results of the first regression analysis, a significant positive effect was found of the variable 'communication' on self-efficacy ($\beta=0.306$, $p<0.05$). This means that the more the competence 'communication' is needed / is relevant to perform a certain task properly, the higher the average level of self-efficacy of young medical specialists is for that task. The significant negative effect of the competence 'management' on the level of self-efficacy found in the first regression analysis was not significant in this dichotomous regression analysis. Moreover, the positive effect of the competence 'communication' on the level of self-efficacy found in this second analysis did not come up in the first regression analysis. The different results of the two regression analyses can be explained by the differences in coding the data. In the first regression analysis, the data existed of percentages that had a range from 0 percent to 100 percent. In the second regression analysis, the range decreased drastically, because the data only existed of the number zero and one. Overall, the results of the two regression analyses and the correlation analysis showed support for the central hypothesis in this study: *'Young medical specialists feel better prepared by their training on tasks where the competence 'medical performance' is most relevant, than on tasks for which this competence is less relevant'*. Consequently, when a young medical specialist needs to perform a task where the competence 'medical performance' is most relevant, the young medical specialist (on average) feels efficacious.

Variable	Mean	SD	1	2	3	4	5	6	7	8
1 Medical performance	32.40	35.522	-							
2 Communication	56.14	36.190	-0.029	-						
3 Collaboration	34.77	35.952	-0.141	0.266	-					
4 Knowledge and science	22.71	30.706	-0.069	-0.341**	-0.241*	-				
5 Community performance	9.56	10.399	-0.161	0.070	-0.156	0.065	-			
6 Management	35.08	35.469	-0.164	-0.544	0.062	-0.206	-0.042	-		
7 Professionalism	47.82	32.831	-0.143	0.497	0.018	-0.154	0.108	-0.548**	-	
8 Self-efficacy	2.3236	.65554	0.472**	0.032	-0.083	-0.029	-0.266*	-0.241	-0.075	-

* $p < 0.05$

** $p < 0.01$

Table 3 Mean, standard deviation, and correlations between variables

Independent variables	Self-efficacy	Independent variables	Self-efficacy
Medical performance	0.334**	Medical performance	0.481**
Communication	-0.088	Communication	0.306*
Collaboration	-0.051	Collaboration	0.015
Knowledge and science	-0.140	Knowledge and science	0.141
Community performance	-0.200	Community performance	-
Management	-0.370*	Management	0.119
Professionalism	-0.185	Professionalism	-0.035
R ²		R ²	0.231
Adjusted R ²	0.320	Adjusted R ²	0.161
Overall model F	0.246	Overall model F	3.306**
	4.363**		

* $p < 0.05$

** $p < 0.01$

Table 4 Regression analysis (input data: percentages)

* $p < 0.05$

** $p < 0.01$

Table 5 Regression analysis (dichotomous)

5 Discussion

The aim of this study was to identify which competencies a medical specialist needs to possess to perform a certain task properly, and to clarify for which tasks they feel under-prepared for by their medical training. Results of this study should lead to a better insight in the level of self-efficacy perceived by young medical specialists for tasks and matching competencies. So it will become clear which competencies need to be trained more to assure that young medical specialists master all competencies which are important for their daily work. Based on findings of previous research, this study focused on 73 tasks a medical specialist needs to perform, seven competencies (CanMEDS), and their relationship with the level of self-efficacy.

5.1 Main findings

In this study it was hypothesized that *'young medical specialists feel better prepared by their training on tasks where the competence 'medical performance' is most relevant, than on tasks for which this competence is less relevant'*. To find support for this hypothesis two research questions were formulated. The answer to the first research question needed to give insight in the link between the 73 tasks a medical specialist needs to perform and the seven CanMEDS competencies a medical specialist needs to possess in order to be able to perform the tasks properly. By conducting a consensus procedure experts indicated which competencies were the most relevant for each of the 73 tasks. Appendix C shows a list of tasks for each of the (for that task relevant) CanMEDS competencies. The table in appendix C also shows the ranking of the relevant competencies the participants made in the consensus procedure. The results of the consensus procedure showed that the competence 'communication' is one of the most relevant competencies for the greater part of the tasks, namely for 35 of the 73 tasks. In addition, the competence 'community performance' is not once indicated as being most relevant for any task by the participants of the consensus procedure. In this study this means that this competence was not once

indicated as most relevant by more than 75 percent of the participants.

There has not been a significant amount of research concerning the CanMEDS competencies, but Rademakers, De Rooy and Ten Cate (2007) investigated senior medical students' appraisal of the CanMEDS competencies. The results of that study can be placed in contrast with the results of the present study, because the students indicated the competencies 'communication' and 'professionalism' as being the most important competencies. Also, in the research of Rademakers et al. (2007), the competence 'community performance' scored relatively high in level of importance, while in this study the competence 'community performance' was not once indicated as being most relevant. By comparing the results of the two studies prudence is called for, because the present study ranked the competencies in level of relevance for certain tasks and the study of Rademakers et al. (2007) asked the participants to rank in level of importance. In both studies however, the competence 'communication' scored high in level of relevance and importance.

The second research question was designed to provide a better insight in the level of self-efficacy of young medical specialists on the 73 tasks. This study assumed that medical specialists feel more efficacious on the competence 'medical performance' than on the other six CanMEDS competencies, and based on this assumption it was predicted that young medical specialists would feel especially well-prepared for tasks in which the competency medical performance was relevant. The regression analyses conducted in this study both found support for the hypothesis. It is thus concluded that young medical specialists feel better prepared by their education on tasks where the competence 'medical performance' is most relevant than on tasks for which this competency is less relevant⁵.

⁵ This study assumed that young medical specialists feel more efficacious on the competence medical performance. However, although the results are consistent with this assumption, the direct link between the perceived level of efficacy of young medical specialists and the CanMEDS competencies is not made in this study, and no clear conclusion about this assumption is possible.

Furthermore, from the first regression analysis (where the predictors were the actual percentages) it is concluded that the relevance of the competence 'management' for a task has a negative influence on the level of self-efficacy of young medical specialists for that task. This means that when a task needs to be performed where the competence 'management' is most relevant, the young medical specialist on average does not feel highly efficacious. Moreover, from the second regression analysis (in which relevance of a competence was dichotomously coded) it is concluded that the competence 'communication' has a positive influence on the average level of self-efficacy of young medical specialists for tasks. This means that when a task needs to be performed where the competence 'communication' is most relevant, the young medical specialist on average feels efficacious. In contrast to the results on the competence 'medical performance', which in both regression analyses showed a positive effect on self-efficacy (stable result), the conclusions on the competencies 'management' and 'communication' were not confirmed in both regression analyses. Rather, this depended on the way the data was coded, which signifies that prudence is called for. However, although in this study these outcomes were not constant in both analyses, it gave rise to assume that differences among tasks in average self-efficacy of young specialists may sometimes be due to the relevance of competencies other than medical performance.

Finally, the results of the correlation analysis also showed a significant negative relation for the level of self-efficacy and tasks for which the competence 'community performance' is the most relevant competence, which means that when a task needs to be performed where the competence 'community performance' is most relevant, the medical specialist does not feel highly efficacious. However, this relation was not confirmed in the regression analysis, because this competence was not once indicated as being most relevant for any task by the participants of the consensus procedure.

5.2 Practical and theoretical implications

Practical implications. The results of the current study have important practical implications. They suggest that

there is a major difference in level of self-efficacy perceived by young medical specialists between tasks for which different competencies are most relevant. This means that some tasks and competencies need more attention during medical training to increase the level of self-efficacy of young medical specialists. Because this study made clear which competence is most relevant for different tasks, it is possible to pay extra attention during training to the tasks linked to competencies which are related to low self-efficacy under young medical specialists. In other words, this study showed which competencies need to be trained more to assure that young medical specialists feel sufficient prepared to all the tasks they will face in their day-to-day work. However, in this study, the sample consisted of medical specialists who recently graduated, so it would be unreasonable to expect that these people immediately master all tasks. After the postgraduate medical training, the training programmes are important to turn these people into great medical specialists.

Theoretical implications. Because the modernization of postgraduate medical training is still in progress, there is not much literature on this subject. This makes that the present study adds significant meaning to the literature on the subject of the CanMEDS competencies. Besides the main findings of this study, while conducting this research it became clear that the list of tasks of medical specialists was not complete and, as a consequence, need to be optimized before further research on these tasks can be performed. It is therefore recommended that, first of all, a list of general tasks needs to be created which is valid for all specialism. Secondly, it is recommended to create a list of tasks for each specialism separately, which includes specific tasks valid for a specific specialism.

Moreover, this study concluded that the competence 'community performance' was not most relevant for any task. The reason can be that of unclearness of the meaning of the competence, or that the tasks associated with this competence were not included in the list of tasks. The theory on the CanMEDS competencies is not yet extensive. Besides the definitions of the CCSM, not much research had been conducted on this subject. Because of the present study, next to the main findings, it became clear that there exists ambiguousness about the meaning of the competen-

cies. It is thus recommended to make clear what each competence represents for.

In addition, one study on the subject of CanMEDS competencies in relation to medical training concluded that senior medical students appraised the competence 'communication' as the most important competence for medical specialists (Rademakers et al., 2007). The present study concluded that the competence 'communication' was linked to the greater part of tasks. Thus, both studies imply that the competence communication is an important competence which medical specialists should possess in order to act in a desired way.

5.3 Strengths, limitations and suggestions for further research

Strengths. A strength of this study is the level of professionalism of the participants of the consensus procedure. All fourteen participants were closely related to the modernization of postgraduate medical training and some were closely involved in the development of the new competence-based curricula. In addition, a second strength of this study is the chosen method. A great advantage of the method of consensus over other methods is that the participants, with mostly tight agendas, did not need to meet at any one place at a given time. This decreased the time that would otherwise have been needed to set up a date to discuss the competencies for each particular task. Another strong point of the present study is the fact that it adds new insights to the limited existing literature concerning the subject of the modernization of postgraduate medical training, and in particular the relation with the tasks of medical specialists and the CanMEDS competencies. During the literature study only the publication of the research of Rademakers et al., (2007) appeared. The appraisal of CanMEDS competencies of differ groups (students, experts, medical specialists etc.) is therefore extended by this study.

Limitations and suggestions for further research. A limitation of this study is the fact that the definitions of the seven CanMEDS competencies were not unambiguous. One participant may have a completely different idea about the meaning of a competence than another person. Despite

the fact that the participants received a clear description of each of the competencies (see appendix A) it is questionable whether the participants defined the competencies in exactly the same way when linking the competencies to the tasks. An example of this ambiguity is the competence 'communication'. This competence is described by the CCMS as communication with patients, but the participants might have judged this competence as communication with colleagues. Consequently, it is recommended that in further research the meaning of all competencies is made clear and unambiguous to all participants of the research. Moreover, another limitation of this study is the fact that the consensus procedure only consisted of two rounds. The reason for this was the limited amount of time available to conduct this study. A perfect consensus procedure is finished when consensus is reached on all items, regardless of the number of rounds that is needed. This study consisted only of two rounds, fortunately the consensus results are relatively satisfying.

This study was seen as a pilot for further research. The consensus procedure will be extended by a third round in which the expert panel is asked to place the relevant competencies in order of relevance. After this has been conducted, it is known for each task which competence is the most relevant competence to perform that task properly. The tasks can be placed under the most relevant competence. The result will be seven groups of data (each competence with a number of tasks) for which, for example, it can be analyzed whether there exist differences in level of self-efficacy. In addition, it will be possible to conduct research on level of tasks, instead of, what this study mostly did, on level of competence.

To further optimize the procedure of the research it is useful to take into account the answers to the evaluation questions given by the experts after each round of the consensus procedure. According to some experts of the consensus procedure, the list of tasks used in this study is not entirely complete. Thus, to further optimize the consensus procedure, it is recommended that the list of tasks of medical specialists is reconsidered. In addition, to be completely accurate, the tasks should be grouped per specialism, next to a number of general tasks which are valid for all medical specialism. A last recommendation to optimize the consensus procedure is to include experts that are located in different locations, with different professions to

increase the variety in the group of participants. When making a distinction between the participants' specialism's of the consensus procedure it will be possible to verify whether there are differences in valuing the CanMEDS competencies to tasks between the different groups of participants.

5.4 Conclusions

This study concluded that young medical specialists feel better prepared by their education on tasks where the competence 'medical performance' is most relevant than on tasks where this competency is less relevant. This means that when a task needs to be performed where the competence 'medical performance' is most relevant, the young medical specialist feels efficacious. In contrast, some outcomes indicated that the relevance of the competencies 'management' and 'community performance' has a negative influence on the level of self-efficacy of young medical specialists for certain tasks. Consequently, when these competencies are mostly relevant in performing a task properly, the medical specialist feels less efficacious in performing that particular task. In addition, some outcomes indicated that the competence 'communication' has a positive influence on the level of self-efficacy of young medical specialists⁶ for certain tasks. Furthermore, the expert panel that linked the seven CanMEDS competencies to the 73 tasks agreed on the fact that the competence 'communication' is relevant to the greater part of tasks. In contrast, the competence 'community performance' was not linked to any task.

This study, first of all made clear which competencies are the most relevant ones to perform a task properly. Additionally, it became clear that young medical specialists feel highly efficacious when performing tasks where the competence 'medical performance' is the most relevant competence. Furthermore, although further research is needed, there are reasons to believe that medical specialists expe-

rience low self-efficacy when the competencies 'management' and 'community performance' are the most relevant competencies to perform a task. These two competencies, that possibly received too little attention during medical education, can be trained more by exercising the tasks for which these competencies are the most relevant.

⁶ Note that the effects of the competencies other than the competence 'medical performance' were not stable when comparing the two regression analyses, it depended on the way the analysis was conducted.

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Appendix A

Competency fields and key competencies of medical specialists formulated by the Central College of Medical Specialists (CCMS) (Rademakers, et al., 2007)

1 Medical expert (Medical Performance)

The medical specialist:

- had adequate knowledge and skills according to the profession's current standards
- adequately applies the diagnostic, therapeutic, and preventive possibilities of the discipline, in an evidence-based way wherever possible
- delivers effective and ethical patient care
- quickly finds necessary information and applies it adequately

2 Communicator (Communication)

The medical specialist:

- establishes adequate therapeutic relationships with patients
- listens carefully and obtains relevant patient information effectively
- adequately discusses medical information with patients and their families
- reports adequately on patient cases in oral and written ways

3 Collaborator (Collaboration)

The medical specialist:

- consults effectively with other doctors and health care providers
- refers adequately to other health care professionals
- delivers adequate collegial advice
- supports effective interdisciplinary collaboration and chain care

4 Scholar (Knowledge and Science)

The medical specialist:

- assesses medical information critically
- contributes to the development of professional, scientific knowledge

- develops and maintains a personal ongoing education plan
- contributes to the education of students, residents, colleagues, patients and other involved in health care

5 Health advocate (Community Performance)

The medical specialist:

- knows and identifies the determinants of illnesses
- contributes to the health of patients and community
- acts according to relevant legislation
- acts adequately in case of incidents in health care

6 Manager (Management)

The medical specialist:

- finds an adequate balance between professional patient care and personal development
- works effectively and efficiently in a health care organization
- allocates available health care resources wisely
- uses information technology to optimize patient care and lifelong learning

7 Professional (Professionalism)

The medical specialist:

- delivers high-quality patient care with integrity, honesty and compassion
- exhibits appropriate personal and interpersonal professional behavior
- is conscious of the limits of his or her personal knowledge and acts within these limits practices consistently with the ethical standards of the profession

Appendix B

List of tasks

1. Preparing appointments, consultation hours and/or visiting current patients
2. Meeting new patients during consultation hours.
3. Meeting patients for check-ups during consultation hours.
4. Meeting patients with protracted and/or chronic problems.
5. Meeting patients with acute problems.
6. Conducting paper visits in the department.
7. Conducting clinical visits in the department.
8. Conducting telephone consultations.
9. Taking medical history.
10. Performing physical examination.
11. Applying for additional research.
12. Interpreting results of additional research.
13. Formulating patient policies.
14. Availability and offering services (being present in the hospital or within reach by phone).
15. Performing minor invasive surgery (E.g lumbar or sternum punctures).
16. Preparing and carrying out surgery.
17. Conducting discussions with patients or their legal representatives to obtain permission (e.g., for special examination, donation, drugs or surgery).
18. Conducting discussions with family of the patients concerning the treatment.
19. Offering explanations, on patient level, about diagnosis, treatments, alternatives, etc.
20. Engaging in bad news discussions with patients.
21. Conducting discussions with patients about euthanasia.
22. Conducting discussions with patients and their families concerning medical errors.
23. Dealing with third parties present during contacts between the specialists and the patients.
24. Adapting the way of working to accommodate the personality of patients.
25. Handling inappropiate patient behaviour.
26. Clarifying what the patient may or may not expect from the medical specialist.
27. Keeping patients' records up to date.
28. Processing and storing patient information (electronically).
29. Filling out and/or signing application forms.
30. Writing and/or dictating letters.
31. Writing follow-up prescriptions.
32. Filling out DBC-forms.
33. Discussing treatment reimbursements with insurers.
34. Preparing patient transfers or preparing patient meetings.
35. Presenting a patient during a patient transfer or patient meeting.
36. Managing the transfer of a patient to another department.
37. Managing the transfer of a patient to another hospital.
38. Managing the transfer of a patient to another care institution (e.g. a nursing home).
39. Cooperating with fellow specialists in a team.
40. Cooperating in a multidisciplinary team.
41. Cooperating with nurses.
42. Cooperating with paramedics (e.g. dieticians, fysiotherapists).
43. Cooperating with people who offer patients psychosocial counseling (e.g. medical/social services).
44. Cooperating with people who offer patients spiritual support (e.g. priests, pastors, spiritual leaders).
45. Cooperating with support staff.
46. Leading a team.
47. Running a department or practice.
48. Consulting a colleague to share opinions.
49. Advising a colleague who requested your opinion.
50. Giving feedback on the actions of colleagues.
51. Dealing with feedback received from colleagues.
52. Planning activities and staying within the margins set.
53. Finishing activities within the available time.
54. Finetuning the planning of activities with colleagues.

55. Dealing with unexpected incidents which harm the planning.
56. Taking part in discussions concerning the financial situation of your specialty.
57. Negotiating with hospital management.
58. Preparing and handing in grant requests.
59. Discussing a patient with the general practitioner.
60. Performing scientific research.
61. Delivering a lecture/paper.
62. Writing an article.
63. Supervising interns.
64. Supervising physician assistants.
65. Reflecting on your own actions.
66. Keeping up to date concerning the medical literature and recent developments.
67. Independently identifying gaps in your own knowledge or skills.
68. Attending training programmes in medical content areas.
69. Attending training programmes in the field of organizational and/or management issues.
70. Attending training programmes in the area of education and training.
71. Teaching interns, nurses or medical specialists in training.
72. Offering quality improvements or organizational improvements.
73. Stimulating and contributing to educational innovations.

Appendix C

Results Consensus Procedure

The figures described behind the tasks stands for the number of people who choose that competency as most relevant. For example: Task 2: 12 people choose Medical performance as the most relevant competency and two people choose Communication as the number one competency for task 2.

Medical Performance (Mp)

5. Meeting patients with acute problems.
10. Performing physical examination.
11. Applying for additional research.
13. Formulating patient policies.
15. Performing minor invasive surgery (E.g lumbar or sternum punctures).
16. Preparing and carrying out surgery.
31. Writing follow-up prescriptions.
2. Meeting new patients during consultation hours. (MP: 12 / Cm: 2)
3. Meeting patients for check-ups during consultation hours. (MP: 9 / Cm: 5)
8. Conducting telephone consultations. (Cm: 8 / MP: 6)
9. Taking medical history. (MP: 13 / Cm: 1)
12. Interpreting results of additional research. (MP: 8 / KS: 6)
14. Availability and offering services (being present in the hospital or within reach by phone). (MP: 11 / Cl: 3)
4. Meeting patients with protracted and/or chronic problems. (Cm: 10 / MP: 4 / P:0)
7. Conducting clinical visits in the department. (Mp: 9 / Cm: 4 / S: 1)

Communication (Cm)

26. Clarifying what the patient may or may not expect from the medical specialist.
35. Presenting a patient during a patient transfer or patient meeting.
2. Meeting new patients during consultation hours. (Mp: 12 / Cm: 2)

3. Meeting patients for check-ups during consultation hours. (MP: 9 / Cm: 5)
8. Conducting telephone consultations. (Cm: 8 / Mp: 6)
9. Taking medical history. (Mp: 13 / Cm: 1)
17. Conducting discussions with patients or their legal representatives to obtain permission (e.g., for special examination, donation, drugs or surgery). (Cm: 13 / P: 1)
18. Conducting discussions with family of the patients concerning the treatment. (Cm: 14 / P:0)
19. Offering explanations, on patient level, about diagnosis, treatments, alternatives, etc. (Cm:14 / P: 0)
20. Engaging in bad news discussions with patients. Cm: 12 / P: 2)
21. Conducting discussions with patients about euthanasia. (Cm: 11 / P: 3)
22. Conducting discussions with patients and their families concerning medical errors. Cm:11 / P:3)
23. Dealing with third parties present during contacts between the specialists and the patients.(Cm: 10 / P: 4)
24. Adapting the way of working to accommodate the personality of patients. (Cm: 8 / P: 6)
25. Handling inappropriate patient behaviour. (P:8 / Cm: 6)
63. Supervising interns. (Cm: 8 / P: 6)
64. Supervising physician assistants. (Cm: 7 / P: 7)
36. Managing the transfer of a patient to another department. (Cl: 9 / Cm: 5)
39. Cooperating with fellow specialists in a team. (Cl: 13 / Cm: 1)
40. Cooperating in a multidisciplinary team. (Cl: 13 / Cm: 1)
41. Cooperating with nurses. (Cl: 11 / Cm: 3)
42. Cooperating with paramedics (e.g. dieticians, physiotherapists). (Cl: 11 / Cm: 3)
43. Cooperating with people who offer patients psychosocial counseling (e.g. medical/social services). (Cl: 10 / Cm: 4)
44. Cooperating with people who offer patients spiritual support (e.g. priests, pastors, spiritual leaders). (Cl: 10 / Cm: 4)
45. Cooperating with support staff. (Cl: 10 / Cm:4)

- 48. Consulting a colleague to share opinions. (Cl: 10 / Cm: 4)
- 59. Discussing a patient with the general practitioner. (Cl: 8 / Cm: 6)
- 50. Giving feedback on the actions of colleagues. (P: 8 / Cm: 6)
- 51. Dealing with feedback received from colleagues. (P: 13 / Cm: 1)
- 61. Delivering a lecture/paper. (Ks: 11 / Cm: 3)
- 4. Meeting patients with protracted and/or chronic problems. (Cm: 10 / Mp: 4 / P: 0)
- 7. Conducting clinical visits in the department. (Mp: 9 / Cm: 4 / Cl: 1)
- 37. Managing the transfer of a patient to another hospital. (Cl: 7 / M: 4 / Cm: 3)
- 38. Managing the transfer of a patient to another care institution (e.g. a nursing home). (Cl: 7 / M: 4 / Cm: 3)
- 49. Advising a colleague who requested your opinion. (Cm: 7 / Cl: 6 / P: 1)

Collaboration (Cl)

- 6. Conducting paper visits in the department.
- 14. Availability and offering services (being present in the hospital or within reach by phone). (Mp: 11 / Cl: 3)
- 36. Managing the transfer of a patient to another department. (Cl: 13 / Cm: 5)
- 39. Cooperating with fellow specialists in a team. (Cl: 13: Cm: 1)
- 40. Cooperating in a multidisciplinary team. (Cl: 13 / Cm: 1)
- 41. Cooperating with nurses. (Cl: 11 / Cm: 3)
- 42. Cooperating with paramedics (e.g. dieticians, physiotherapists). (Cl: 11 / Cm: 3)
- 43. Cooperating with people who offer patients psychosocial counseling (e.g. medical/social services). (Cl: 10 / Cm: 4)
- 44. Cooperating with people who offer patients spiritual support (e.g. priests, pastors, spiritual leaders). (Cl: 10 / Cm: 4)
- 45. Cooperating with support staff. Cl: 10 / Cm: 4)
- 48. Consulting a colleague to share opinions. (Cl: 10 / Cm: 4)
- 59. Discussing a patient with the general practitioner. (Cl: 8 / Cm: 6)

- 54. Finetuning the planning of activities with colleagues. (M: 8 / Cl: 6)
- 7. Conducting clinical visits in the department. (Mp: 9 / Cm: 4 / S: 1)
- 37. Managing the transfer of a patient to another hospital. (Cl: 7 / M: 4 / Cm: 3)
- 38. Managing the transfer of a patient to another care institution (e.g. a nursing home). (Cl: 7 / M: 4 / Cm: 3)
- 46. Leading a team. (Cl: 6 / P: 1 / M: 6)
- 47. Running a department or practice. (Cl: 7 / P: 1 / M: 6)
- 49. Advising a colleague who requested your opinion. (Cm: 7 / Cl: 6 / P: 1)

Management (M)

- 1. Preparing appointments, consultation hours and/or visiting current patients.
- 27. Keeping patients' records up to date.
- 28. Processing and storing patient information (electronically).
- 29. Filling out and/or signing application forms.
- 32. Filling out DBC-forms.
- 33. Discussing treatment reimbursements with insurers.
- 34. Preparing patient transfers or preparing patient meetings.
- 52. Planning activities and staying within the margins set.
- 53. Finishing activities within the available time.
- 55. Dealing with unexpected incidents which harm the planning.
- 56. Taking part in discussions concerning the financial situation of your specialty.
- 72. Offering quality improvements or organizational improvements.
- 54. Finetuning the planning of activities with colleagues. (M: 8 / Cl: 6)
- 37. Managing the transfer of a patient to another hospital. (Cl: 7 / M: 4 / Cm: 3)
- 38. Managing the transfer of a patient to another care institution (e.g. a nursing home). (Cl: 7 / M: 4 / Cm: 3)
- 46. Leading a team. (Cl: 6 / P: 5 / M: 3)
- 47. Running a department or practice. (Cl: 7 / P: 1 / M: 6)

Community Performance (Cp)

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Knowledge and Science (Ks)

- 60. Performing scientific research.
- 62. Writing an article.
- 66. Keeping up to date concerning the medical literature and recent developments.
- 68. Attending training programmes in medical content areas.
- 71. Teaching interns, nurses or medical specialists in training.
- 73. Stimulating and contributing to educational innovations.
- 12. Interpreting results of additional research. (Mp: 8 / Ks: 2)
- 61. Delivering a lecture/paper. (Ks: 11 / Cm: 3)
- 67. Independently identifying gaps in your own knowledge or skills. (P: 12 / Ks: 2)
- 70. Attending training programmes in the area of education and training. (P: 8 / Ks: 6)

Professionalism (P)

- 65. Reflecting on your own actions.
- 17. Conducting discussions with patients or their legal representatives to obtain permission (e.g., for special examination, donation, drugs or surgery). (Cm: 13 / P: 1)
- 18. Conducting discussions with family of the patients concerning the treatment. (Cm: 14 / P: 0)
- 19. Offering explanations, on patient level, about diagnosis, treatments, alternatives, etc. (Cm: 14 / P: 0)
- 20. Engaging in bad news discussions with patients. (Cm: 12 / P: 2)
- 21. Conducting discussions with patients about euthanasia. (Cm: 11 / P: 3)
- 22. Conducting discussions with patients and their families concerning medical errors. (Cm: 11 / P: 3)
- 23. Dealing with third parties present during contacts between the specialists and the patients. (Cm: 10 / P: 4)
- 24. Adapting the way of working to accommodate the personality of patients. (Cm: 8 / P: 6)
- 25. Handling inappropriate patient behaviour. (Cm: 8 / P: 6)
- 63. Supervising interns. (Cm: 8 / P: 6)
- 64. Supervising physician assistants. (Cm: 7 / P: 7)
- 50. Giving feedback on the actions of colleagues. (P: 8 / Cm: 6)

- 51. Dealing with feedback received from colleagues. (P: 13 / C: 1)
- 67. Independently identifying gaps in your own knowledge or skills. (P: 12 / Ks: 2)
- 70. Attending training programmes in the area of education and training. (P: 8 / Ks: 6)
- 4. Meeting patients with protracted and/or chronic problems. (Cm: 10 / Mp: 4 / P: 0)
- 46. Leading a team. (Cl: 6 / P: 5 / M: 6)
- 47. Running a department or practice. (Cl: 7 / P: 1 / M: 6)
- 49. Advising a colleague who requested your opinion. Cm: 7 / Cl: 6 / P: 1)