Assessment Report

Study Programme Groups of Sports and Medicine

PhD studies

University of Tartu

2018

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Introduction

Quality assessment of a study programme group involves the assessment of the conformity of study programmes and the studies and development activities that take place on their basis to legislation, national and international standards and developmental directions with the purpose of providing recommendations to improve the quality of studies.

The goal of quality assessment of a study programme group is supporting the internal evaluation and self-development of the institution of higher education. Quality assessment of study programme groups is not followed by sanctions: expert assessments should be considered recommendations.

Quality assessment of study programme groups at the level of doctoral studies takes place at least once every 7 years based on the regulation approved by EKKA Quality Assessment Council for Higher Education *Quality Assessment of Study Programme Groups at the Level of Doctoral Studies.*

The aim of the assessment team was the evaluation of the Study Programme Group (SPG) of Sports and the Study Programme Group of Medicine at the level of doctoral studies at the University of Tartu.

The following persons formed the assessment team:

André Nieoullon (*Chair of the panel)*	Emeritus Professor of Neuroscience, Institute of Developmental Biology, Aix-Marseille University; Scientific Advisor in charge of Life and Health Sciences at the French Ministry for Higher Education, Research and Innovation (France)
Heikki Kainulainen	Professor of exercise physiology, Department of Biology of Physical Activity, University of Jyväskylä (Finland)
Sigmund Loland	Professor of sport philosophy, The Norwegian School of Sport Sciences (Norway)
Jarkko Ketolainen	Professor of Pharmaceutical Technology, School of Pharmacy, Faculty of Health Sciences, University of Eastern Finland; member of Research Council for Health, Academy of Finland (Finland)
Joke Denekens	Emeritus Professor in General Practice and head of the department of General Practice at the University of Antwerp (Belgium)
Michael John Mulvany	Professor Emeritus, Department of Biomedicine, University of Aarhus (Denmark)
Riho Tapfer	Employer representative; Estonian Medicines Verification Organisation, Head of Supervisory Board; Association of Pharmaceutical Manufacturers in Estonia, Head of Executive Board (Estonia)

Melinda Barkhuizen	PhD student; joint programme of Translational Neuroscience, University of Maastricht & North-West University in South Africa (Holland)

The assessment process was coordinated by Tiia Bach (EKKA).

After the preparation phase, the work of the assessment team in Estonia started on Monday, 20 November 2017, with an introduction to the Higher Education System as well as the assessment procedure by EKKA, the Estonian Quality assurance organization for higher and vocational education. The members of the team agreed the overall questions and areas to discuss with each group at the university, who were parts of the assessment process. The distribution of tasks between the members of the assessment team was organized and the detailed schedule of the site visit agreed.

During the following days, meetings were held with the representatives of the University of Tartu from November 21th to November 23th. The schedule for discussion on site for each of the various study programmes only allowed for short time slots to be available for team members to exchange information, discuss conclusions and implications for further questions.

On Friday, November 24th, the team held an all-day meeting, during which both the structure of the final report was agreed and findings of team meetings were compiled in a first draft of the assessment report. This work was executed in a cooperative way and the members of the team intensively discussed their individual views on the relevant topics.

In the following sections, the assessment team summarizes their general findings, conclusions and recommendations which are relevant across the SPGs. In so doing, the team provides an external and objective perspective on the programmes and the contexts within which they are delivered. Ultimately, the intention is to provide constructive comment and critic which may form the basis upon which improvements in the quality of the programmes may be achieved. In formulating its recommendations, however, the assessment team has not evaluated the financial feasibility associated with their implementation.

General information and statistical data

According to the University of Tartu Act adopted on 16 February 1995, the University of Tartu is the national university of the Republic of Estonia. Its mission is to advance science and culture, provide the possibilities for the acquisition of higher education based on the development of science and technology on the three levels of higher education in the field of humanities, social, medical and natural sciences, and to provide public services based on teaching, research and other creative activities.

Study programmes to be assessed within the study programme groups of Medicine and Sports

Study programme group	Study programme	Level
Medicine	Medicine	PhD programme
	Neurosciences	PhD programme
	Pharmacy	PhD programme
Sports	Exercise and Sport Sciences	PhD programme

All four programmes belong to the Faculty of Medicine (which is one among the four Faculties at the University of Tartu) consisting of six institutes. The study programmes are administered at the faculty level in medical, pharmacy and neurosciences curricula, and at the institute level (Institute of Sport Sciences and Physiotherapy) in the field of exercise and sport sciences. All the institutes participate in conducting doctoral studies and the curricula are implemented in cooperation with the institutes, which takes place mainly in the form of joint-courses and supervision. Cooperation with other faculties of the university takes place mainly in the scope of university-level elective courses, less through joint supervision.

The Institute of Sport Sciences and Physiotherapy has recently merged with the Faculty of Medicine. Cooperation has mainly been conducted through joint supervision.

Faculties and the university as a whole regard the successful coordination of doctoral programmes as crucial for the development of the faculty, university, and society. The University of Tartu is the only university in Estonia providing doctoral level studies in medicine, pharmacy, neurosciences, and exercise and sport sciences.

The following tables from the auto-evaluation report for the doctoral studies provided to the evaluation committee by the university give information for the last six years on the number of students in the different programmes including international students, number of admissions, number of annual defended thesis per programme and finally information on drop-out (early-leavers).

Table 1 - Number of doctoral students in the study programme groups

Total number of doctoral students (including international students), including doctoral students with work placements at the university (including doctoral students on academic leave)

Curriculum	**2011/2012**		**2012/2013**		**2013/2014**		**2014/2015**		**2015/2016**		**2016/2017**	**2017/2018**
	Total	incl. those work-ing at UT	Total	incl. those work-ing	Total	incl. those work-ing a	Total	incl. those work-ing at UT	Total	incl. those work-ing at UT	Total	Total
Medicine	143	44	154	47	163	48	158	54	165	49	166	165
Pharmacy	4	1	5	2	6	3	8	3	7	1	7	6
Neurosciences	23	9	25	7	25	7	29	6	28	5	27	30
Total in study programme group of Medicine	**170**	54	**184**	56	**194**	58	**195**	63	**200**	55	**200**	**201**
Exercise and Sport Sciences	**38**	6	**34**	6	**31**	5	**29**	5	**28**	3	**25**	**22**
Total in UT	1,493	481	1,504	502	1,457	493	1,401	487	1,348	380	1258	1196

Source: SER p. 13, HaridusSilm, additional information submitted during the visit

Table 2 - Number of international students

Curriculum	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018
Medicine	4	5	8	9	9	11	11
Pharmacy	0	0	0	0	0	0	0
Neurosciences	0	1	3	4	3	4	4
Total in study programme Group of Medicine	**4**	**6**	**11**	**13**	**12**	**15**	15
Exercise and Sport Sciences	**2**	**3**	**2**	**1**	**1**	**0**	**0**
Total in UT	103	122	129	139	143	158	186

Source: SER p. 13, HaridusSilm, additional information submitted during the visit

Table 3 - Number of admissions

Number of admitted students (incl. number of students coming directly from the second stage of studies in the same university)

Curriculum	**2011/2012**		**2012/2013**		**2013/2014**		**2014/2015**		**2015/2016**		**2016/ 2017**	**2017/ 2018**
	Total	Incl. those continuing at UT	Total	Incl. those continuing at UT	Total	Incl. those continuing at UT	Total	Incl. those continuing at UT	Total	Incl. those continuing at UT	Total	Total
Medicine	29	27	23	21	26	19	19	16	22	21	22	22
Pharmacy	2	2	1	1	1	1	2	2	1	1	2	1
Neurosciences	4	4	6	5	3	1	6	4	4	3	3	4
Total in SPG of Medicine	**35**	**33**	**30**	**27**	**30**	**21**	**27**	**22**	**27**	**25**	**27**	**27**
Exercise and Sport Sciences	**7**	**6**	**3**	**2**	**3**	**3**	**3**	**3**	**4**	**4**	**3**	**3**

Total in UT	225	218	190	151	179	153	168	137	171	139	177	177

Source: SER p. 14, HaridusSilm, additional information submitted during the visit

Table 4 - Number of defended doctoral theses

Number of defended doctoral theses (incl. theses defended in nominal time + 2 years)

Curriculum	**2011/2012**		**2012/2013**		**2013/2014**		**2014/2015**		**2015/2016**		**2016/2017**	
	Total	Incl. nom. time + 2 yr	Total	Incl. nom. time + 2 yr	To-tal	Incl. nom. time + 2 yr	To-tal	Incl. nom. time + 2 yr	To-tal	Incl. nom. time + 2 yr	Total	Incl. nom. time + 2 yr
Medicine	10	4	13	5	15	9	9	3	8	3	12	6
Pharmacy	1	0	0	0	0	0	2	2	1	0	1	1
Neurosciences	1	1	3	1	2	1	2	1	2	0	1	0
Total in study programme group of Medicine	**12**	5	**16**	6	**17**	10	**13**	6	**11**	3	**14**	7
Exercise and Sport Sciences	**3**	3	**1**	0	**6**	4	**0**	0	**2**	1	**3**	2
Total in UT	95	68	114	57	117	62	107	45	120	75	138	65

Source: SER p. 14, HaridusSilm, additional information submitted by UT

Table 5 - Number of drop-outs

Curriculum	2011/2012		2012/2013		2013/2014		2014/2015		2015/2016		2016/2017
	Total	incl. pur-posely	Total	incl. pur-posely	Total	incl. pur-posely	Total	incl. pur-posely	Total	incl. pur-posely	Total
Medicine	7	3	5	1	11	4	11	3	14	2	0
Pharmacy	0	0	0	0	0	0	0	0	1	1	0
Neurosciences	0	0	4	1	0	0	3	0	2	0	0
Total in study programme group of Medicine	**7**	3	**9**	2	**11**	4	**14**	3	**17**	3	**0**
Exercise and Sport Sciences	**4**	3	**5**	2	**0**	0	**4**	0	**6**	0	**0**
Total in UT	119	45	148	55	128	42	154	40	171	48	

Source: SER p. 14, HaridusSilm, additional information submitted during the visit

Summary, strengths and general recommendations

Taking into account the objective of the onsite visit, the purpose of which is to assess the conformity of study programmes at the level of doctoral studies to national and international standards and provide recommendations for the improvement of the quality of studies, the Assessment Committee has met the main different stakeholders (Vice-Rector for research, delegates from the faculty of Medicine, delegates of supervisors, delegates of PhD candidates, delegates of alumni) involved in the PhD training in two major study programme groups of the Faculty of Medicine related to Medicine (doctoral programmes in Medicine, Pharmacy and Neurosciences) and Sports (programme in Exercise and Sport Sciences). The Committee greatly appreciated the very informative exchanges with all the members of the delegations that participated in the interviews in a very constructive and convivial atmosphere. Such interviews have allowed the Committee members to complete the information provided by the satisfactory self-evaluation report previously provided by the university but also from the university website. The Committee was also provided with the national and university acts regulating doctoral studies in Estonian universities and in the University of Tartu. Information about quality assurance evaluation process and the role of EKKA was accessible to the Committee. Finally, to achieve a more specialized analysis of each curriculum provided under the responsibility of the Faculty of Medicine, part of the visit was dedicated to separate analysis of the four study programmes by two selected members of the Committee for each programme. Thus, this final report contains general comments and recommendations on the doctoral studies at the Faculty of Medicine, University of Tartu, and specific recommendations for each programme separately where relevant.

The main conclusion is that the Committee finds that the organization of doctoral studies by the University of Tartu follows most of the international standards of good practices in doctoral studies. More specifically, the Committee can emphasize the compliance of the PhD training being provided with the Principles for Innovative Doctoral Training (European Commission, 2011) and general conformity with the Salzburg principles (2005) according to the Bologna Process. The Committee finds that doctoral training at the University of Tartu is based on research excellence in the field of biomedical research and that this research is associated with an attractive institutional environment for the doctoral candidates.

The University of Tartu has made considerable effort for a clear-cut structuration of the study programmes and to develop proper quality assurance policy for the PhD training. In this respect the PhD programmes are defined as corresponding to 240 ECTS of which studies amount is 60 ECTS, thus corresponding to a four year study programme. However, records show that the present mean duration of doctoral studies at the Faculty of Medicine is more close to six years than to four years. Data also show marked differences in the number of PhD candidates registered in each of the four programmes, the candidates of the Medicine programme making up more or less 75% of all candidates who are studying on these four programmes of the Faculty. So the question thus arises of the viability over time of the Pharmacy programme with low number of candidates/supervisors. Further recruitment of excellent international students should be a way to improve situation since the quality of research is good and training excellent. Increasing international visibility of

the university through further developing speciality networks and joint-programmes should be a way to promote PhD training in Tartu. The outcomes of doctoral studies estimated to the publication of three articles in international journals by the candidate in which he/she has to be at least first author in one/two of these publications is also in agreement with international requirements, although three publications in top level journals within four years can be considered as a too ambitious objective and lead numerous universities to reduce this requirement in order to be able to complete thesis in the formal duration of four years.

The University of Tartu emphasizes the concept that PhD training is training by research to become an independent researcher as stated by the European Commission. In this respect resources displayed by the university are in line with such an ambition and the Committee is pleased to note the quality of research and of the staff involved in training of candidates. All the research institutions involved in the training are equipped with up-to-date technologies and the number and qualifications of the teaching staff and supervisors of candidates is quite good.

Research funding seems for the moment rather adequate for PhD training but some questions arise for the future to sustain international competitiveness of the research. One of the general problems, however, is the support of doctoral candidates who need higher income and better social guarantees. For sure the increase of the stipends to around 660 euros per month coming soon is an excellent initiative, but more has to be made for improving the attractiveness of PhD studies in Estonia, contributing also to focus the daily work of candidates to research and thus improving in this way the duration of the thesis to better fit this formal duration. The panel was thus pleased to know that the University has made the principle decision that from September 2018 the income of the PhD students should be increased to the mean income level in Estonia.

Finally, regarding teaching and training through research of PhD students some improvements should be introduced in the curriculum to make admission procedures more transparent and supervision more efficient, and to reduce in some way the load of courses. It is also recommended that theses could be defended before formal publication of research articles through acceptance in the thesis of articles submitted for publication providing that these are scientifically evaluated by independent opponents in the jury.

Thus, taking into account feedback of PhD candidates and alumni as well as conformation with best practices developed in selected western universities (for example, through the network of the European Universities Association-doctoral programme or the ORPHEUS association network), the University of Tartu is encouraged to further promote continuous improvements of the curriculum, which could also be a way to increase international visibility of the doctoral training at the Faculty of Medicine.

More specific conclusions to be addressed separately to the different SPGs

The programmes in Medicine, Pharmacy and Neurosciences are associated to excellent research institutes and rather competitive clinical research. The level of research is, however, uneven between research groups and the Faculty of Medicine should work to promote international visibility and contribution to international networks of the research groups. The University of Tartu has also to take care of the long-term viability of the programme in Pharmacy due to insufficient number of PhD students. Moreover, for this programme e-learning has to be developed and senior scientists have to develop external funding.

The Exercise and Sport Sciences programme is good but still in the process of improving its research facilities. Staff and students appeared as sufficient and highly motivated. The ambition seems to cover the whole area of sport science. More clear and interdisciplinary research field could be developed indicating more clearly the expertise and the possibility of PhD projects.

General strengths of the Faculty of Medicine doctoral four programmes

- Strong research groups with quite competitive scientific international production.
- Excellent research facilities including top-level preclinical analytic equipment.
- Teaching and research staff of high level.
- Highly motivated PhD students.
- Strong support from the Rectorate.

General recommendations

- Present scholarships are inadequate and contribute to too large drop-out and to PhD studies extending over the formal duration (four years). Efforts should be made by the university to improve scholarships therefore reducing parallel working and contributing to increase the attractiveness of PhD studies.
- Efforts should be made to reduce the duration of doctoral training to formal duration by decreasing the load of the courses of such a wide curriculum from 60 ECTS to 40 or even 30. In such a way, specialty courses could be reduced without affecting the quality of the PhD training since some of them are very general and are more likely related to a master level rather than a PhD level.
- The requirement of three published articles in international journal with at least two as a first author is certainly too much and effort should be made to validate in part submitted articles through an adequate procedure involving external evaluation. Such a procedure will contribute, we believe, to reduce the duration of doctoral studies and the drop-out without affecting the quality of the theses.
- Supervision in general should be improved by reducing at least the number of PhD students supervised by the same supervisor and reducing the number of supervisors for each student.
- Develop a policy to improve international visibility of the research and PhD training.
- Generalize implementation of e-learning.
- Career development opportunities should be further developed.
- We recommend the development of a more informative website highlighting the main research direction, profiles of the research staff, recent publications and training opportunities to enhance the visibility of the SPGs.

Strengths and areas for improvement of the study programmes by assessment areas

Medicine; Pharmacy; Neurosciences; Exercise and Sport Sciences

Study programme

Standards

- ✓ The launch and development of the study programme are based on the Standard of Higher Education and other legislation, national strategies, university development plans, the effectiveness of research and development, various analyses (including labour market and feasibility analyses); striving for the best overall programme quality.
- ✓ Doctoral programmes contain at least 70% research, development or other creative work by doctoral students, making the results thereof public in international peer-reviewed research journals or in other ways that have international dimensions.
- ✓ Study programmes incorporate doctoral student participation in conferences and/or other professional activities, and are counted towards completion of the study programme.
- ✓ Doctoral programmes enable doctoral students to acquire leadership and teamwork skills, develop coaching and teaching skills as well as a proficiency in foreign languages at the level needed for successful participation in international working environments.
- ✓ Different components of a doctoral programme form a coherent whole supporting the personal development of each doctoral student.
- ✓ Study programme development takes into account feedback from doctoral students, supervisors, employers, alumni and other stakeholders.

General comments

The general organization of the PhD programmes as they have been presented to the Committee is in agreement with the regulations established by the University of Tartu and in close line with the national policy acts defining the organization of doctoral studies at university level. The Doctoral program volume is 240 ECTS, of which studies amount to 60 ECTS and research activity 180 ECTS (75% of total study volume).

The publication of at least 3 articles in international peer-reviewed journals is a prerequisite to defending a doctoral thesis (2 as first author). The doctoral thesis consists of a series of publications equipped with a summary. The thesis is defended in a public discussion.

Focusing on the four different programmes (Medicine, Pharmacy, Neurosciences, and Exercise and Sport Sciences), the Committee has the task to evaluate the activity and outcomes from the information given by the University. Current analysis of the reports showed that taken as a whole these programmes represent for the last five years about 14 to 18% of the total number of PhD candidates of the university (**Table 1**; about 220 out of

approximatively 1200 for the university in 2017), among them about 7% of the candidates being international students (**Table 2**). However it is worth noting that the number of newly admitted candidates during the last years in the programmes considered here increased from 15 to 20% of the total number of the PhD candidates admitted to the university (about 30 candidates out of approximately 150 every year), thus suggesting that the programmes at the faculty of Medicine are among the most attractive proposed to candidates by the university (**Table 3**).

One of the most critical features of the PhD training being provided is, however, that there are very large differences between the four PhD programmes regarding the number of PhD candidates (**Table 1**). The vast majority of PhD candidates is studying in the medicine programme (165 candidates, which is almost 75% of the total PhD candidates in the Medicine and Sports SPGs). The other programmes include fewer candidates (Pharmacy – 6 candidates in 2017; Neurosciences – 30; Exercise and Sport Sciences - 22). Such a great difference will impact the long term viability of the Pharmacy programme with very low number of candidates since it could be difficult for the university to sustain the programme over time. Furthermore, the administrative support that can be provided for such a small programme must be limited. Such differences between the four PhD programmes could be highly relevant for the future in the context where, unfortunately, the number of PhD candidates taken as a whole has decreased at the university during the last few years. However, in such a context it is pleased to notice that the SPG in medicine seems to resist to this trend better. But attention should be payed to the PhD programme in Exercise and Sport Sciences since the number of candidates as a tendency to decrease over time.

The number of defended doctoral theses in these SPGs during the last five years (**Table 4**) represented a mean of 17% of the total number of theses defended in the university (mean around 19 theses out of 110 for the university every year). However, the number of theses defended at the Faculty of Medicine every year (in Medicine – 9-15 thesis per year during the last 5 years; Pharmacy – 1-3 per year; Neurosciences – 1-3 per year; Exercise and Sports Sciences – 0-6 per year) is obviously very low in comparison with the total number of PhD students registered on these programmes. The ratio is indeed of 8% whereas is western universities similar ratio is generally around 20%.

Drop out of PhD candidates during doctoral studies (**Table 5**) is too large, extending over 15% during the last years. Such a large drop-out is over the range of what is observed in general in the domain of health sciences in western European universities (less than 10%). The situation, however, varies from one programme to another. In the Medicine programme, which represents the majority of the PhD candidates of the Faculty of Medicine, the relative drop-out is less than 10% whereas the programme of Exercise and Sport Sciences shows large number of students leaving during the training, reaching almost 20% during the last years.

Nevertheless, if the number of students leaving the doctoral training every year (**Table 5**) is compared as a whole to the annual admission of candidates (**Table 3**), the situation can be appreciated as non-acceptable since the ratio of drop-out is increasing year after year. Indeed, records show the drop-out represented a little bit more than 30% of the admitted students in the academic year 2013-14 to increase to 60% in the year 2014-15 and more than 70% of admissions in 2015-16. But the panel understands that a number of the present enrolled candidates entered in earlier years (until 2011) when it was possible to do so without financial support, and that these candidates are in part responsible for the high drop-out rate here mentioned.

The two SPGs have indicated that their programmes are based on the training lasting four years (240 ECTS). However, regarding the mean annual flow of admitted candidates in the SPGs relative to the number of defences from these programmes indicates that the mean

duration of the PhD studies greatly exceeds four years. Such a situation is attested by looking at the current number of students registered in different years of the programmes (1st year mean first registration in the programme; 2nd, 3rd and 4th as following registrations); (**Table 6**). The university was unable to give us neither the details of the registered PhD candidates following the 4th official year of the doctoral programmes, nor the extent of PhD programme interruptions. We thus understood that the last number of registrations in the 4th year (here 99 for the academic year 2017-18) represents the total number of students registered following the three first years and consequently this number largely exceed the number of students regularly registered in years 1st, 2nd and 3rd. Indeed, individual records provided by the auto-evaluation report show that the actual mean duration of doctoral studies at the Faculty of Medicine is of at least six years, with large differences ranging from three years (few cases) to more than ten years. Thus, while the net time spent on PhD training may be four years the actual duration is at least 50% over this official duration. The visiting committee strongly recommends to the University of Tartu to set up an information system able to identify the number of PhD students registered from the first year of admission to the last year corresponding to the defence of the thesis to clarify.

Table 6 – Number of PhD students registered in different years of the programmes for the academic year 2016-17, number of defences and early leavers.

Programme	**Number of candidates enrolled 2016/17**	**Number of candidates in each year as of 01.11.2017**				**Total**	**Number of defences 2016/17**	**Number of early leavers 2016/17**
		1.a	2.a	3.a	4.a+			
Medicine	22	30	22	42	71	165	8	14
Pharmacy	1	1	2	2	1	6	1	1
Exercise/Sports	4	3	3	5	11	22	2	6
Neurosciences	4	4	4	6	16	30	2	2
Total	31	38	31	55	99	223	11	23
Source	*Table 6 of self-assessment*	*Data provided during visit*					*Table 8 in self-assessment*	*Table 7 in self-assessment*

The majority of candidates completes in about six years. Although the initial data collection goes well, interviews with PhD candidates indicated that the delay appears to come in the writing process and the extended process to formalize publications where the students often appear to be employed fulltime and then do not have sufficient time to write. The recent change in admission procedures which prevents the admission of students without grants may improve the motivation of the candidates to graduate on time. There is a lack of structure motivating both candidates and supervisors to finish within the stipulated duration.

The University aims to enable doctoral students to acquire leadership and teamwork skills, develop coaching and teaching skills as well as a proficiency in foreign languages at the level needed for successful participation in international working environments and the level of English used throughout the programmes was very good.

We had challenges assessing whether the different components of the doctoral programmes indeed form a coherent whole supporting the personal development of each doctoral

student. Elective courses for transferable skills are available, but it is unclear how many candidates attend these courses and what the acquisition of skills after attending these courses were. The candidates regarded the flexibility in the choice of courses as positive, but since candidates can choose between several courses which are fragmented, this does not guarantee that candidates acquire all the prescribed learning outcomes during their PhD. Fewer courses with a more harmonized structure and improved quality can ensure candidates have the benefit of all learning outcomes.

Regarding the standard that the study programme development should take into account feedback from doctoral candidates, supervisors, employers, alumni and other stakeholders, we found that feedback from the doctoral candidates is regularly collected, but input from employees, stakeholders and the labour market should be collected in a more systematic manner to create additional career options for the PhD candidates.

Strengths

- The general curriculum is research driven and in accordance with international standards.
- Participation in international and national conferences is excellent for the candidates the Committee interviewed.
- The inclusion of an international opponent during the evaluation is an excellent practice.
- PhD candidates were positive about the flexibility of the courses and the availability of e-learning.
- As interaction between disciplines is important, we appreciate the endeavour to introduce a faculty-based integrated interdisciplinary curriculum, under which the secondary doctoral programs will operate with a central goal to increase transferable skills.

Areas of improvement and general recommendations

- We suggest procedures for regular review and updating of the structure, function and quality of the PhD programmes. We consider it essential to take into account the input from supervisors, candidates and stakeholders in the content of the programme on a regular basis. In the current challenging financial environment, setting specific goals and targets are especially important. Currently, this is done on an *ad hoc* basis but we recommend systematizing this with the help of a dedicated administrative office at faculty level.
- We suggest to enhance the internal and external visibility of the programmes by means of an improved website, social media, etc.
- Efforts should be made that employers and other stakeholders are aware of the acquired outcomes and competencies of the PhD graduates.
- Some courses are too general. We recommend that a better structure be implemented to evaluate the number, quality and ECTS points be harmonized and low ECTS courses be consolidated into larger courses to form a coherent whole in order to ensure that the relevant learning outcomes are met by the time of graduation. Moreover, since the title of the courses does not always adequately

reflect the content, better identification of course content has to be made in some cases to increase attractiveness of the courses.

- The teaching of "specialty courses" (assigned 36 ECTS) is not in accordance with international practice, since these are normally included in the master programmes. The Committee however notes that some of the "specialty courses" are in fact general courses concerned with research methodology and suggests that the title of these courses could be renamed. On the other hand, courses related to the acquisition of transferable skills (12 ECTS) may be increased to include courses like entrepreneurship, for example. The Committee recommends that total course assignments should not be more than 60 ECTS equivalents and that consideration should be given to reducing it.
- We strongly recommend that research ethics courses should be mandatory for all PhD candidates. Bioethics and other professional ethics are relevant for the specialities (medicine, sports, physiotherapy, neurosciences, pharmacy, etc.) and could be additional. The panel was pleased to know that when doctoral research includes animal models, in agreement with the EU Directive 2012, it is mandatory for PhD candidates to follow a special course on the use of animals in biomedical research before being authorized to perform experiments with animals.
- The number of joint-programmes should be increased to further develop international research networks and attract international students from western Europe universities. Possibilities of funding exist at the level of EU (e.g., Marie Sklodowska-Curie support) and have to be more solicited.
- The university should act to drastically reduce the length of the PhD studies particularly for non-MDs who have to work to support themselves. The norm should be that PhD studies are completed within the stipulated four years.
- We strongly recommend to the university to further develop an information system leading to a better follow-up of the registrations of the PhD candidates year by year, that is to provide an overview of the actual state from admission to defence of the thesis for each individual candidate, including interruptions.
- The four PhD programmes should interact more closely to further promote interdisciplinarity in PhD training.
- Finally, it is not clear to the Committee why the four programmes examined could not be re-organized as only one programme. This would provide volume and allow stronger support for the administration required for admission, monitoring of candidate progress, courses, assessment of theses, defence and awarding of a degree, etc. A clear definition of research areas would maintain the internal and external visibility of the current programmes within the combined organization.

Specific strengths and recommendations

Exercise and Sport Sciences

Strengths

- The programme reflects the general strengths of the medicine programmes as listed above. The Exercise and Sport Sciences programme is indeed ambitious with the view covering important fields of exercise and sport.

Recommendations

- PhD training holds a high quality but aims to cover an extensive field including biomedical and social perspectives and physiotherapy. With only 3-4 PhD candidates per year, a more clear strategy could be developed with priorities of certain fields together with strategies for inter-disciplinarity where possible. Topical fields could be the role of physical activity in enhancing public health, training and performance-enhancement in sports, and the role of sport and physical education in schools. Good work is being conducted in these areas already, this is a matter of systematizing and adding focus to existing activities.
- The conferences attended by the PhD students interviewed were mainly with neighbouring countries. If financially possible, we recommend extending this to exchanges and conferences further abroad.

Medicine

Strengths

- There appears to be a steady intake of MDs to the SPG in Medicine.
- The students who were interviewed appreciated the course programme as regards both its quality and flexibility.

Recommendations

- The Committee received the impression that many of the MDs do not complete, but instead go back to their clinical training after three years and do not write up the results of any research they have done. For MDs a clear programme should be drawn up at the start indicating how their PhD training is to be performed in parallel with their clinical training.
- This programme should allow candidates a full four years net for their PhD training and will likely involve the candidate having part-time residency of some of the programme.
- It is recommended that MDs should complete their PhD training within six years and that candidates should be actively followed throughout their training to ensure that this can be achieved. Ensuring such completion on time would be a major task for the supervisor.

Pharmacy

Strength

- Curriculum development is strongly research driven.

Recommendation

- Industry and other stakeholders need to be better integrated into curriculum development, i.e. establishing a stakeholder steering group for the programme.

Neurosciences

Strengths

- Very good international standing of neuroscience research.
- Some fields of neuroscience are particularly well developed in Tartu such as biological psychiatry, neuroendocrinology, behavioural studies but also cell and molecular neurobiology.

Recommendations

- Since some of the subjects in the SPG medicine are related to brain research, we propose that a brain-research umbrella could be formed that connects the PhD Neurosciences and PhD Medicine candidates working on the brain. This will strengthen the visibility of the brain-related research in the University of Tartu.
- Further, the SPG could consider setting up an Estonian Society of Neuroscience, which could join the Federation of European Neuroscience Societies to further increase international visibility of research and PhD training.
- We recommend to develop a course focussing on additional basic aspects of neuroscience like excitability and intercellular communication, for example.

Resources

Standards

✓ In conducting doctoral study programmes, an adequate number of teaching staff and researchers participate, who hold the appropriate qualifications required to carry out doctoral studies and supervise doctoral theses in a given study programme. ✓ Universities shall ensure that sufficient funds are available to conduct doctoral studies, to provide development activities associated with doctoral studies and research, and to support the professional development of teaching staff and researchers. ✓ Resources (teaching, learning and research environments; libraries; resources required for teaching, learning and research) support the achievement of objectives set out in study programmes as well as the actual teaching, learning and research at the level of doctoral studies. Resource development is sustainable. ✓ Trends in the numbers of current learners, admitted learners and graduates (by study programme) in doctoral studies under the study programme group during the last five years indicate sustainability.

General comments

The Committee understands that the sufficiency of resources (financial, personnel, infrastructure) is supposed to be guaranteed by the standards of opening curricula. For the

majority of PhD programmes, the teaching and laboratory work take place under modern conditions, i.e. at the Biomedicum, at the Institute of Technology, at the Chemicum, at the University of Tartu Hospital Foundation, at the Institute of Biomedicine and Translational Medicine Centre of Transitional Medicine of the University of Tartu. All these institutions are equipped with cutting-edge technology. For Exercise and Sport Sciences, the current equipment is adequate at the moment and up-to-date new facilities are under construction.

Both the equipment necessary for teaching and the scientific equipment have been continually renewed and improved and are currently considered as among the most modern in Europe. Doctoral candidates have also access to large-scale databases of scientific articles through the University of Tartu Library and the Centre of Medical Information of the Tartu University Hospital. However, work must be done to ensure the continued modernisation and sufficient maintenance of the equipment. Over the past ten years, the state has fortunately channelled EU supports toward improving science and learning infrastructure but now sufficient financial guarantee for the next five years is lacking.

The number and qualifications of the teaching staff and supervisors responsible for the curricula is excellent. Quality of research appreciated at least from publications associated to theses is generally high. All academic positions related to the curriculum are filled with colleagues with PhD degree, and considerable experience in research – often in an international context – is guaranteed. Interdisciplinarity is an important principle for PhD training and therefore additional positions are opened for interdisciplinary projects. In general, the ratio of teaching staff to candidates is satisfactory. However, in certain small speciality groups, there are not enough experienced supervisors. A more equal distribution of teaching staff and groups is recommended. The supervisory load and scientific qualifications of the staff is varied and should be systematized. The faculty has adequate resources to ensure high quality teaching and learning. The supporting infrastructure for conducting research is of high standard and laboratories for research work are of high grade.

Research funding in the Faculty of Medicine is sufficiently available to support PhD studies, but not for all research groups and not guaranteed for the future. In Exercise and Sport Sciences funding is insufficient. Neuroscience appeared to have sufficient funding. In the Pharmacy programme, only a few senior scientists apply for external funding. The competitiveness for research funding gives a lot of stress to research groups. Reduction of funds is a great threat for the future. More funding has to come from cooperation with other stakeholders such as companies, industry, etc.

One of the main general problems, however, is that doctoral candidates need a higher income and better social guarantees to pursue doctoral studies full-time and the options for part-time studies are limited. Additionally, the doctoral candidates have indicated that they would appreciate more involvement in the planning of research projects and in the completion of research applications. The funding of doctoral studies certainly needs significant improvement. Additional funding is required for both candidate salaries and doctoral research. Indeed, most of the candidates have to work parallel to their doctoral studies and support from the state is limited to the nominal duration of four years.

The question thus arises to better know how the doctoral candidates are supported following the four years initial period until the defence of the thesis. Currently, all doctoral candidates' research costs are being funded by the research resources of the institutes and possibly the research groups also contribute to support their fellows.

The distribution of PhD positions to PhD programmes is stable over time and could be reconsidered every second year, i.e. based on research output, external funding and

candidate number and quality. In some programmes, the number of admissions has been stable over the years and competition for places seems sufficient. However, in general the number of applicants is decreasing. The competition for positions in all programmes should be increased as the level of competition is in general quite low. For example, in the Neuroscience programme recent admissions show the application of more or less only two candidates for one position available.

In recent years, more applications have been received from international students certainly due to the excellent reputation of the research groups and university. However, the majority of these candidates are mainly from developing countries. This is good since in such a case the selection process will contribute to recruitment of candidates with higher background, but efforts should be increased to attract candidates from developed countries. Indeed basic knowledge in selected disciplines of such candidates could be higher than for students from developing countries being trained to more general knowledge.

In terms of efficacy, however, the problem lies in the unsatisfactory number of graduates who finish the doctoral programme within the standard period of study (four years). As mentioned above, there are several obstacles to successfully completing the programme. Our assessment of the situation is that, beside the requirement of sufficient publications, the problem is mainly caused by few social guarantees and low income of the doctoral candidates, who have to work parallel to doctoral studies. The doctoral allowance is not particularly competitive (currently 422 EUR a month) and therefore doctoral studies may not attract the people most suited. The Committee understands that the stipend will be raised very soon to about 660 euros, but even this is insufficient. Research groups sometimes give additional support to supplement the income to the median level of Estonia. This is good, but not implemented in all programmes.

There is a constant number of enrolled candidates (around 230 in both SPGs together) and admission (during last years 27 in the SPG of Medicine and 3 in the PhD programme of Exercise and Sport Sciences). However, the ratio between graduated students and the number of enrolled candidates do not improve (around 8%) over time. Thus, there appears to be a number of candidates blocked in the system. The prolonged graduation time questions whether resources are used efficiently. This may challenge sustainability in the future.

In conclusion, there are sufficient resources and infrastructure in general. However, the prolonged graduation time raises the question whether these resources are used efficiently.

Strengths

- The preclinical investigations are carried out in modern conditions equipped with state-of-the-art technology. There are excellent research facilities, and for the Neurosciences programme excellent experimental facilities including genetic engineering in animals.
- The international reputation of most of the research groups is high.
- Access to a wide selection of scientific journals.

Areas of improvement and general recommendations

- Currently, in terms of infrastructure, there is sufficient funding, but there are concerns about the availability of future funding. We recommend strategies to improve competitiveness and international visibility of the University of Tartu via specialty societies, improving the website and bilateral cooperation.

- There is excellent equipment available in the preclinical faculties, but these resources needs to be maintained. We recommend that funding is found to be allocated for maintenance.
- Efforts to find funding for doctoral candidates by stakeholders (industry, health sector, public authorities) should be increased.
- In general the ratio of teaching staff to candidates is satisfactory, however, in certain small speciality groups the Panel heard there are not enough experienced supervisors. A more equal distribution of teaching staff and groups is recommended.
- The administrative aspects of following the progress of PhD candidates through the Study Information System (SIS) should be improved (where the new SIS may be expected to help).
- The university should improve the objective indicators on the efficiency of PhD studies, i.e. the follow-up of graduated PhD candidates over many years after graduation.
- Although the overall output is excellent, there are inequalities among different disciplines and the University has to check carefully the areas of training where some weakness are detected, for example looking at the extent of drop-out, difficulties in funding research for students and reaching international standing of publication.
- Research funding does not provide sufficient resources for all specialities, especially for small research groups.

Specific strengths and recommendations

Exercise and Sport Sciences

Strengths

- A high number of competent supervisors.
- A good ratio between the number of faculty members with supervision competence and number of students.

Recommendations

- A clear strategy for increasing international collaboration defining for example what partners are needed and why. Competence of staff and quality of infrastructure is high, and joint programmes within an EU framework should indeed be possible.
- More efforts should be made to top-up the stipends of PhD candidates.

Medicine

Recommendations

- All staff should apply for funding.
- The University of Tartu should ensure the sustainability of medical science in all its specialities. During the interviews the Panel received the impression that some specialities are scientifically weak and the University of Tartu should take steps to ensure that candidates choosing to work in these areas have sufficient scientific support.

Pharmacy

Recommendations

- We recommend that more, if not all, senior staff should actively apply for funding.
- Joint projects and funding opportunities with industry and other stakeholders should have higher priority.

Neurosciences

Recommendations

- We recommend increasing the number of funded positions for the PhD in Neuroscience, perhaps in collaboration between the Neurosciences and Medicine programmes under a brain research umbrella.
- Possible funding of doctoral candidates through the pharmaceutical industry has to be explored.

Teaching, learning, research and/or creative activity

Standards

✓ Uniform principles, based on best international practices and agreed upon at the university level, shall be followed while implementing doctoral programmes and assuring the quality of the doctoral studies (including supervision of doctoral theses).
✓ Doctoral studies support students' personal and social development, including creating an environment which will prepare them to successfully participate in international working environments at research and development institutions, as well as in the business and public sectors.
✓ Supervision of doctoral theses; modern methodology used in teaching and research; organisation of studies; and doctoral students' professional research, development and/or other creative activities all support achievement of the objectives and learning outcomes of doctoral studies.
✓ Assessment of outcomes of the learning, research and creative work done by doctoral students is relevant, transparent and objective, and supports the development of doctoral students.
✓ Doctoral students are asked for feedback regarding supervision on a regular basis and the results of these surveys are taken into account for quality improvement activities.
✓ Effectiveness of the doctoral studies is analysed and such analyses serve as a basis for planning quality improvement activities.

General comments

The university has indicated that the quality of the PhD thesis is ensured through multiple step quality control mechanisms. Regarding the internal organization of the doctoral programmes the University of Tartu has developed a document entitled G*ood Practices of Doctoral studies* that is in line with the agreement on good practices regarding quality established for the Estonian universities at national level with the view to improve the efficiency of doctoral studies. PhD studies at the University of Tartu were thus established

on the basis of four-year duration although, as previously mentioned, mean duration of studies on doctoral programmes evaluated here is often six years and more, probably due at least to the parallel working of most of the PhD candidates.

Doctoral students are supervised by a professor, an associate professor or a senior research fellow with a doctoral degree (sometimes two to three supervisors). The follow-up of the student is guaranteed by the individual study plan made by student and supervisor and containing a detailed research plan and the schedule for completing various courses. The supportive role by the doctoral studies depends heavily on the possibilities of the research group and the personal wishes of the doctoral student.

Interestingly, the university developed a plan to improve efficiency of supervision of PhD candidates especially for new supervisors. We have not noticed in the documents regulating PhD training a limitation of the number of PhD candidates to be supervised or co-supervised by a single person but we have observed that one given supervisor can be involved in the supervision of numerous PhD candidates, although it is on the basis of a co-supervision. Limiting the number of candidates per supervisor could contribute to improve supervision in line with the good practices policy. There is the follow-up procedure of the supervision with the annual progress review by the evaluation committee. While this is an excellent practice, this is unequally implemented and the candidates do not always receive specific feedback after the review.

The doctoral studies curriculum is extremely diverse in content and also in working formats. These courses are structured in modules and not only organised by the faculty of medicine but also by other faculties. The use of modern e-learning is limited. University has recently launched the development of a completely new version of the SIS to ensure students can get the essential information to make a good choice for the 60 ECTS points and complete their studies in a good way.

Interactions between programmes in the Faculty seem to the Panel to be limited. Furthermore, social activities appear to be restricted. Structured social activities such as PhD days and days out could thus be implemented. Since PhD training is internationally viewed primarily as training by research to educate young scientists to become independent researchers, the Committee has paid special attention to the research units contributing to PhD training. In particular, the Committee has examined the role of the *Estonian Genome Centre (EGC)*, the *Institute of Biomedicine and Translational Medicine* (including the *Institute of Sport sciences and Physiotherapy* and the *Institute of Pharmacy*), and the *Institute of Molecular and Cell Biology (IMCB)* together with the Faculty of Sciences and Technology in the PhD training. An evaluation of research at the University of Tartu was performed some months ago under the auspices of the Estonian Research Council. The report shows world-class experimental facilities including an animal house and emphasizes the leading role of the university in different fields of biomedical research at international level, namely molecular biology and genetics, biology and biochemistry, clinical medicine and neuroscience.

But we are unsure whether the university is creating an environment which will prepare the candidates to successfully participate in international working environments at research and development institutions, as well as in the business and public sectors, as there are limited career options for candidates which are not medical doctors in Estonia. Committee believes, however, that there should be a wide range of potential employment opportunities for PhD graduates in Estonia as it is the case in other developed countries, and that more effort should be made to identify these and to ensure that all PhD candidates are aware of these.

We further recommend that the top researchers should be more involved in teaching since this motivates PhD candidates.

The final evaluation of the doctoral candidates is controlled by the academic secretary of the University of Tartu, who gives evaluation about accordance of the level of the publications and controls fulfilling of the curriculum. In the next step two reviewers and an external opponent evaluate the present thesis. The necessary improvements must be implemented according to the requests of the reviewers after discussion. A foreign opponent with high standing research experience is obligated by the defense and this is an excellent practice.

Regarding the defense of the thesis, in case of proposal including submitted publications besides published papers, the PhD evaluation committee and two reviewers of which one should be a highly competent external, preferentially international reviewer, would have the role to evaluate the compliance of the submitted manuscripts with international standards. These recommendations would maintain the current standard of three peer-reviewed papers. We further recommend that publications with an equal first authorship be included in the thesis of all the candidates equally involved in the publication.

At the moment, feedback is mainly gathered via an episodic exchange of information through the collegial communication of information between doctoral students and teaching staff. Thus, the standards requiring that doctoral candidates are asked to give feedback regarding supervision on a regular basis and the results of these surveys are taken into account for quality improvement activities is not fully met. Feedback from doctoral students is not collected in a systematic manner and it is not clear how the feedback of the candidates have changed current practices. Students give feedback on the courses, but the feedback is mainly used by other students and we are uncertain whether this feedback is also implemented when designing the courses for subsequent years. The mandatory evaluation must guarantee the monitoring development of the doctoral student, progress in research and the completion of the studies based on the individual plan. We recommend implementing the feedback in a more structured manner.

The assessment of transferable skills (management and teamwork skills, instructional and teaching skills, and the proficiency of a foreign language at a level that enables them to cope adequately in an international work environment) is difficult and not totally transparent. The faculty has included in the university-wide electives module a subject on pedagogical practice, which is good.

Doctoral students usually participate in carrying out seminars and practical studies and to a lesser extent, lectures. Student feedback for the doctoral student is usually given through the SIS. Feedback analysis and relevant recommendations are managed by the teaching staff responsible for it. The fulfilment of the teaching duty can be monitored in the SIS that displays the lecturers of each lesson. Teaching outside of the university is confirmed by documents issued by the responsible persons. The faculty has a good practice for recognising prior learning by using the ECTS system. The general need is to transfer credits for foreign university courses and summer courses.

Strengths

- High competence of supervisors in the field of their expertise.
- The established use of Individual Study Plan and agreement in the PhD studies.
- Active participation of the PhD students in teaching.

- Overall good integration of research and teaching.

Areas of improvement and general recommendations

- The tool for assessment of supervising in the feedback system should be improved.
- Feedback from doctoral students is not collected in a systematic manner and it is not clear how the feedback of the candidates have changed current practices.

Specific strengths and recommendations

Exercise and Sport Sciences

Strength

- Good integration of PhD candidates into teaching and the academic milieu.

Recommendations

- Integrate to a larger extent PhD students from other faculty programmes in the Exercise and Sport sciences and vice-versa.
- Structure and systemize to a larger extent the supervision process (formalize rights and obligations of student and supervisor, procedures for how can challenges in supervision be addressed and met, etc.).
- The implementation of e-learning should be developed in the programme.

Medicine

Strengths

- The Committee was impressed with the flexibility of the course programme and the transparency of the candidate assessments of these. This transparency allows candidates in following courses to determine which courses would be most beneficial to them.
- The Committee appreciated hearing from the interviewed candidates that many courses could be followed on-line using e-learning.
- The established use of Individual Study Plan and Agreement in the PhD studies.
- Joint supervisions for doctoral students, multidisciplinary studies.
- The use of visiting international academics in all stages of PhD studies: teacher, co-supervisor and opponent.
- Active participation of the PhD students in teaching.

Recommendations

- Although the flexibility of the programme is obviously a strength for PhD training, it appears, however, that in some case the course programme could be more structured. In such a case it would be an advantage if candidates choose their courses more closely in consultation with their supervisors to ensure that the

courses will contribute to the goals of their PhD programme.

- The tool for assessment of supervising in the feedback system should be improved.

Pharmacy

Strengths

- PhD students are well integrated into the Institute of Pharmacy because they are encouraged to take actively part in all Institute's activities, also other than teaching and research activities.
- International research networks.

Recommendations

- The implementation of e-learning should be included to a greater extent in the pharmacy programme.
- In the pharmacy program, modern learning techniques were not implemented sufficiently (PhD candidates).
- The use of visiting senior scientists as teachers to fill the existing expertise gap should be more frequent.

Neurosciences

Strengths

- PhD candidates are well-integrated in research teams.
- Frequent use of international co-supervisor.

Recommendation

- Neuroscience candidates are a small proportion of the SPG at the Faculty of Medicine and particular attention should be paid to organizing PhD scientific activity and social activities together with the other SPGs to promote interdisciplinarity and social interactions to better integrate them into the larger community at the University of Tartu.

Teaching staff

Standards

✓ Teaching staff participate in research, development and/or creative activity at the level of and to the extent sufficient to conduct doctoral studies in the curriculum group and to supervise doctoral theses. ✓ Teaching staff develop their supervisory competences and share best practices with one other. ✓ Teaching staff collaborate in fields of teaching, research and creative work within the university and also with stakeholders outside the university (public sector organisations, enterprises, other research and development institutions).

- ✓ Teaching staff further their skills at foreign universities or other research institutions, participate in international research and creative projects, and present papers at high-level conferences.
- ✓ Qualified international and visiting teaching staff are involved in conducting doctoral studies, participating in doctoral thesis defence panels and/or reviewing doctoral theses.
- ✓ When assessing the work of teaching staff (including their evaluations), the effectiveness of their teaching as well as of their research, development and creative works is taken into account; including the effectiveness of their student supervision, development of their teaching and supervisory skills, and their international mobility.

General comments

To be qualified as a doctoral supervisor, faculty members have to be actively involved in research and development activities at a level and in the scope that will enable the doctoral thesis to be successfully conducted. We found that the majority of the staffs were engaged in research. Moreover the project as developed by the candidate doctoral student and the supervisor has to pass a quality assessment by the faculty council and the availability of sufficient resources is also estimated. The doctoral students have to be involved in their respective supervisor's research projects, so their research work is most directly connected with their doctoral thesis.

The past effectiveness of the supervisor's teaching and mentoring skills as well as doctoral thesis supervision is also considered. The rate of graduations of doctoral students in nominal time is used as a strong indicator for supervisor's performance.

Senior colleagues are mentoring junior colleagues not only in supervision but also in teaching activities. The practice of co-supervision is widespread, especially for multidisciplinary topics. Some teaching staff collaborates not only within the university but also with stakeholders outside university (public sector, organisations, enterprises, other research and development institutions). Some students have an international co-supervisor. This could be implemented more frequently. However, it may be a concern that in some cases there are limited opportunities for the PhD candidates to interact with their international co-supervisors. In such a case we recommend more frequents visits of these professors.

More effort can be dedicated for teaching staff to develop their supervisory competences and share best practices with one another. We are highly positive about the planned courses for supervisors. This course should be promoted and mandatory for young supervisors.

The university has set up a mobility requirement for all teaching staff and researchers of the university but the committee would like clarity on the extent of the mobility. Some teaching staff present their research at international conferences, but it would be beneficial if more opportunities existed for them to further develop their skills at foreign universities.

The final objective of taking the effectiveness of teaching into account when assessing the work of teaching staff is in our opinion not met. There are limited incentives for the supervisors to ensure graduation within four years and supervisors who have had several candidates which exceed the nominal duration face little consequences. This current system fosters the culture where exceeding four years is the norm, rather than the exception. The

establishment of a system of employment contracts with periodic attestations is very interesting and might be a useful tool to stimulate good practices on a continuous basis.

Strengths

- Mostly highly qualified, dedicated and active teaching staff.
- A good ratio of staff to candidates in general.
- There is a planned course to professionalize the supervision with courses for supervisors.
- More young researchers with PhD degree have joined the academic staff in several departments.
- The use of visiting international academics in all stages of PhD studies: teacher, co-supervisor and opponent.

Areas of improvement and general recommendations

- Supervision of PhD students is a key point for strong and efficient training. The maximum number of PhD candidates supervised at the same time by a supervisor should be defined. According to international practice, in the field of biomedical sciences no more than 3-4 doctoral candidates should be simultaneously supervised. Moreover, it should be the aim that junior supervisors receive obligatory training in supervision and we recommend that incentives should be implemented to motivate the supervisors to shorten the time to graduation. Indeed, the University of Tartu should improve motivation of young colleagues choosing a vocation in research and teaching in Estonia. Finally, collecting feedback from supervisors/teaching staff is not systematic and should be made systematic.
- There are insufficient backup supervisors to take over if problems with the primary supervisor arise.
- Supervising skills of academic staff involved in the process could be further developed by organizing supervision seminars at a regular basis.
- Effort should be made to involve employers in the organization of the curriculum to increase the visibility of the programmes locally and improve the employability of graduates in order to reduce a possible brain drain.
- Looking into the future, most of the programmes will become thin at senior staff member level. Therefore a long-term personnel strategy plan would improve their sustainability.

Specific strengths and recommendations

Exercise and Sport Sciences

Strength

- Good integration of students in research laboratories.

Recommendations

- Organize supervision seminars and formalize the supervision process (define rights and duties of supervisors and students, follow up-procedures to meet challenges in supervision, etc.).
- Systemize feedback and involvement from stakeholders from the health sector, sports, and the public sector. The representatives we met seem highly motivated to contribute in this respect.

Medicine

Strengths

- Strong clinical supervision ensuring clinical relevance of PhDs in Medicine. In all specialties the qualifications of the academic staff allow for conducting high-quality research.
- Many teaching staff members are leading experts in their field.
- More young researchers with PhD degree have joined the academic staff in several departments.

Recommendations

- Too many candidates per supervisor. The Committee recommends that there should be not more that 3-4 candidates per (principal) supervisor and that the number of co-supervisors per candidate should be limited to almost 1-2.
- Motivation of young colleagues choosing the researcher and the teacher career must be supported.
- Brain drain of researchers must be avoided through development of a policy at governmental level to improve social position and employment of PhD.
- Make sure that good researchers are available for teaching.
- Supervising skills of academic staff involved in the process should be improved.

Pharmacy

Recommendations

- The use of visiting international senior scientists and teachers should be more frequent.
- Several senior staff members are close to retirement and therefore a recruitment plan is strongly need.

Neurosciences

Strength

- Strong supervision in general.

Doctoral students

Standards

- ✓ When admitting students to doctoral study, their suitability for successful completion of their studies is assessed on the basis of transparent criteria.
- ✓ Doctoral students plan their studies as well as research and development activities in collaboration with their supervisor(s), setting out specific objectives for each year and taking responsibility for achieving these objectives.
- ✓ Evaluation of doctoral students is transparent and impartial. Its purpose is to support development of the doctoral students, provide an opinion regarding the effectiveness of their work to date, and assess their capabilities to complete their studies on time and successfully defend their doctoral theses.
- ✓ Universities offer doctoral students counselling on completing their studies and planning their further careers.
- ✓ Doctoral students' extracurricular teaching, research and/or creative activities or other work-related activities at the university support successful completion of their doctoral studies.
- ✓ Doctoral students participate in international mobility programmes or take advantage of other opportunities for learning or research at foreign universities and/or research and development institutions[1].
- ✓ Alumni are regularly asked for feedback on the quality of the doctoral study, and employers are asked for feedback on the preparation of the graduates.

General Comments

The admission of candidates is based on the completion of at least a master's degree or equivalent. Doctoral students' admission to studies is usually carried out on the basis of the assessment of research plans submitted by them and their potential supervisor. The selection of students is made by the admission committee, which makes an overall evaluation of the level of the research, the doctoral student's preliminary research experience, the effectiveness of the supervisors and the existence of research funding.

There is limited possibility for admission by topic-based study positions which are funded by external programmes (i.e., Dora Plus) and might, in some cases, cover additional costs as well. The topic-based admission may be suitable for biomedical themes where medical experience is less important. In addition, the topic-based approach is more suitable for international candidates. In the case of topic-based admission, the role of the supervisor of a given topic plays a greater role in assessing the candidate. As a rule, foreign candidates are interviewed via Skype.

The first standard of transparent admission criteria is not fully met. The positions are not always widely advertised and supervisors indicated that some candidates are hand-picked. Although it is positive that their suitability for successful completion is evaluated, this is not done in a fully transparent manner. Further, this system excludes promising candidates from abroad to compete for these positions. We recommend an external evaluation of the suitability of the candidates prior to interviewing them. But the panel noticed that efforts

[1] In the context of this document, 'research and development institutions' denote both research institutions and research-intensive companies.

have been made to provide more transparency by having an admission committee (with members coming from different departments) to check the suitability of the candidates prior to interviewing.

The objective of the study plan is met. Following admission to doctoral studies a *doctoral study agreement* is established between the PhD candidates, supervisor(s) and the university, based on the development of an *individual study plan,* which will serve as a basis for further doctoral studies development. A *progress review report* after one year is a necessary step to be admitted in the second year of the studies. Annual repetition of the procedure provides a close follow-up of the progress of the training. The evaluation of doctoral candidates during the annual progress review is sometimes very formal with limited personalized feedback and does not necessarily help the candidates to progress. This process could be streamlined with administrative support. Its purpose is to support development of the doctoral students, provide an opinion regarding the effectiveness of their work to date, and assess their capabilities to complete their studies on time and successfully defend their doctoral theses.

Following admission to doctoral studies, financial support from the university is provided for the PhD candidate and will be increased from January 2018. This support is however still to be largely insufficient and we appreciate the efforts of the Vice-Rector to increase this to the median Estonian income.

The University of Tartu encourages international mobility during PhD training. Participation in meetings, workshops or winter-summer schools as well as some stay of various durations in foreign laboratories is considered as a very positive research experience for the PhD candidates, in close agreement with international practice. The majority of interviewed doctoral students participated in international mobility programmes or took advantage of other opportunities for learning or research at foreign universities. This is excellent but self-evaluation report, however, did not provide sufficient information to appreciate the extent of the mobility of those candidates who participated in the interviews.

Evaluation of the final doctorate degree is impartial as this is based on the acquisition of credits and three published articles. The Committee finds the general conditions for PhD candidates to be good. Doctoral candidates at the University of Tartu are considered as junior researchers and colleagues of the research/teaching staff as stated in the good practices declaration of the university regarding doctoral studies.

Doctoral students without medical education do not find so easy to obtain a job on the labour market after graduation and need often support to find a job. The extent of career counselling is rather limited. The majority of interviewed candidates did not utilize the career office and students who are not medical doctors had limited ideas and expectations of career options outside of the University of Tartu.

The relative number of drop-out/interruptions remains high and the study time is often more than four years. In some cases, the doctoral students' extracurricular teaching, research and/or creative activities or other work-related activities at the university support successful completion of their doctoral studies, but many candidates also work outside the university. The research time taken up by these extracurricular activities should be kept in mind.

We recommend creating the options to contribute part-time to the PhD program. According to international practice, a part-time PhD should not exceed six years. Further in general, women presently take a longer time to complete their PhD or drop out. This is partially due

to maternity leave in some cases and we recommend increased efforts to reintegrate women in their studies as soon as possible after interruption.

The alumni were occasionally asked for feedback on the quality of the doctoral study, but we recommend that this be conducted more systematically and frequently and more alumni be reached. We were unclear whether changes were implemented after feedback from alumni.

The extent to which the employers are asked for feedback on the preparation of the graduates is inadequate. We recommend that employers are systematically and frequently asked to give input on the content of the curriculum, as this will increase the career opportunities for the students outside of the University of Tartu.

Strengths

- Student representatives of all four programmes were highly motivated and expressed enthusiasm and genuine interests in their research areas.
- International mobility of the candidates we interviewed was excellent and there were many opportunities to go abroad.
- Although the income by the stipend is limited, the endeavour by some research groups to increase this to the median income of Estonia is positive.
- Newly established junior research fellow position enables better efficiency of doctoral studies.

Areas of improvement and general recommendations

- We recommend formalizing the supervisor – candidate relationship by defining rights and obligations of both supervisor and candidate in the way of a doctoral contract.
- We recommend formalizing procedures to handle challenges in the supervision process. One step to be taken would be the implementation of a confidential counsellor for the Faculty of Medicine to mediate problems which may occur between candidates and supervisors to protect both the university and candidates from liability.
- We recommend that current practices of some research groups to increase the stipends to the median income of Estonia should be extended to all candidates.
- International mobility through joint programmes could be improved.
- Career development opportunities (information about positions offered to PhD) should be further developed.
- The doctoral student scholarship is not competitive and a large workload outside doctoral studies increases the completion time of the thesis.
- A structured part-time PhD programme should be created, with a maximal duration of six years.
- More efforts should be made to reintegrate women into their studies after maternity leave.
- We recommend increasing the competitiveness of applicants through increased transparency by wide advertising of positions and a quality assessment of the candidates by an independent evaluation group prior to interviewing the candidate. In practice the supervisor and candidate write the project, which the candidate

presents to a committee including the supervisor. There is a need for more external input to the process.
- We recommend that the faculty and programmes set the criteria for applicants prior to application, then the applicants are evaluated for meeting these criteria by a panel prior to interviewing and final selection by the supervisor. This ensures fair competition for positions and selection of the best candidates.
- International candidates are mainly recruited on an ad hoc basis from developing nations. Effort should be made to recruit talented international candidates from a wider selection of countries.

Specific strengths and recommendations

Exercise and Sport Sciences

Strength

- Good involvement of students in research and teaching.

Recommendation

- Develop recruitment strategies based on formulation of research fields and priorities (recommended above) to clarify the competencies available in the programme. Indeed, the field covered by the PhD training is rather large and focus should be made on topics covered by research groups.

Medicine

Strength

- The international research networks and contacts for mobility for doctoral students.

Recommendations

- Some of the candidates interviewed gave the impression that their PhD programme was just a minor part of their daily activities, and one that could be completed in due course. This approach is not consistent with current international norms.
- Make doctoral student scholarships more competitive.
- Large workload outside doctoral studies increases the completion time of the thesis and this must be avoided.

Pharmacy

Strengths

- Practically no drop-out.
- Outward mobility of PhD students at high level.

Recommendation

- More international students should be recruited, especially from developed countries and also with non-pharmacy background.

Neurosciences

Strength

- The Neurosciences programme has excellent outward mobility to developed countries.

Recommendation

- Efforts should be made to increase the inward mobility of PhD candidates from developed countries to the University of Tartu, perhaps in the frame of joint-programmes since the Neuroscience programme has excellent, modern research infrastructure available, which could be attractive to candidates from developed nations.