



Self Evaluation Report 1

Stage one

Norwegian School of Veterinary Science



EAEVE visit 24.-28. March 2014

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Definitions and abbreviations used in this document

Institutions and organizational units

NMBU: Norwegian University of Life Science

NVH: Norwegian School of Veterinary Science

UMB: University of Life Science

Board: Highest institutional unit

Rectorate

Rector: The Chair of the Board

Prorector: Deputy to the Rector

Four departments responsible for the veterinary education:

SportFaMed: Dept. of Companion Animal Clinical Sciences

ProdMed: Dept. of Production Animal Clinical Sciences

BasAM: Dept. of Basic Sciences & Aquatic Medicine

MatInf: Dept. of Food Safety & Infection Biology

Sections at NVH: Each department is divided into sections

BasAM:

Section for Anatomy and Pathology

Section for Biochemistry and Physiology

Section for Genetics

Section for Aquatic Medicine and Nutrition

Section for Clinical Pathology

MatInf:

Section for Arctic Veterinary Medicine

Section for Pharmacology and Toxicology

Section for Food Safety

Section for Microbiology, Immunology and Parasitology

ProdMed:

Section for Small Ruminant Medicine

Section of Experimental Biomedicine

Section for Stationary Clinics

Section for Herd Health and Field Service

SportFaMed:

Section for Anaesthesia and Radiology

Section for Equine Medicine and Surgery

Section for Small Animal Medicine and Surgery

Administrative positions

Head of Department

Head of Section

Academic positions

Professor
Associate professor (1st Amanuensis)
Assistant professor (Lecturer)
Post doc
Diplomat
PhD student
Resident (Diplomate student)
Interns

Administration

General Director: The Secretary of the Board
Secretariat
SFA: Department for Academic Affairs and Research Administration: "Study Department"
SEVU: Center for Further and Continuing Education
Technical services
Library
Communication Department
Personnel Department
Department of Finances
Information Technology (IT) Department

Administrative positions

Head of Administrative Departments
Head of Studies
Senior Adviser, Internationalization
Senior Adviser, Research
Student Adviser
PhD Adviser

Committees at NVH:

SU: Committee for Undergraduate and Continuing Education Programmes: "Study Committee"
IU: International Committee
PhDU: Committee for PhD and Residency Programmes
RSA: Council for Cooperation with Stakeholders
LMU: Learning Environment Committee
UFE: Committee for Research and Ethics
AMU: Work Environment Committee
Board's Appeals Committee
Admission Committee
Appointments Committee

Organization of teaching

Block: Teaching period for integrated disciplines
Block Leader: Academic staff member responsible for the block
Teacher: Academic staff member responsible for a topic within a block

Interest groups at NVH:

VSU: Students' Political Organization

VSF: Students' Social Organization

DIOV: PhD Students' Interest Group

SIOV: Residents' Interest Group

DNV: The Norwegian Veterinary Association

Quality Assurance

EAEVE: European Association of Establishments for Veterinary Education

NOKUT: Norwegian Agency for Quality Assurance in Education

ENCA: European Network for Quality Assurance in Higher Education

ACOVENE: European Accreditation System for Veterinary Nurse Training Colleges

Other abbreviations

DBH: Database for Higher Education

FS: National Electronic Student Administrative System

SO: The Norwegian Universities and Colleges Admission Service

SiO: A Student Welfare Organization in Oslo and Akershus County

ECTS: European Credit Transfer System

EBVS: European Board of Veterinary Specialization

HMS: Occupational Health, Environment and Safety

Formal documents and procedures

“Allocation and directive letter”: Formal letter from the Ministry of Education and Research about expectations and budget for the next year.

“Management and dialogue meeting”: Formal meeting once a year between the school leaders and the Ministry of Education and Research.

Strategy: Goals for NVH in different areas.

Action plan: Measures to be implemented in the next year to reach the goals.

Study quality report: Annual report of the study quality and suggestions for measures to be taken.

Appraisal review: Organized meeting annually between each employee and his/her immediate leader.

Foreword

This Stage 1 self-evaluation report (SER-1) from the Norwegian School of Veterinary Science (NVH) is produced as part of the evaluation of the institutions that provide veterinary training in Europe. This is the third time NVH is to be evaluated and visited by a panel of European experts. The first time was in 1995 and the second time in 2004. This third visit will take place in Oslo on March 24-28, 2014.

The European Association of Establishments for Veterinary Education (EAEVE) is the official accreditation authority for veterinary education establishments within Europe (www.eaeve.org). Furthermore, the mission of the EAEVE is to evaluate, promote and further develop the quality and standard of veterinary medical establishments and their teaching within, but not limited to, the member states of the European Union (EU).

The evaluation of veterinary faculties in Europe as a whole is carried out by the EAEVE in co-operation with the Federation of Veterinarians of Europe (FVE). The evaluation system is managed by EAEVE in cooperation with FVE through the European Committee on Veterinary Education (ECOVE).

The minimum compulsory requirements for veterinary training in Europe are described in the EU Directive 2005/36/EC, which governs – among other professions – that of veterinary surgeon. The evaluation system consists of two stages of similar mechanical steps, but with a different approach and intention. The first stage provides approval that the Faculty conforms with Directive 2005/36/EC, regarding the training of veterinary surgeons. The second stage provides accreditation that the Faculty is following generally accepted and appropriate academic standards and providing learning opportunities of acceptable quality. A Faculty that has reached this level is to be regarded as accredited by ECOVE.

This SER-1 describes the aims, structures, system of organisation, methods, resources, mode of operation and results of NVH, according to the EAEVE guidelines. It contains, in standardized form, full but concise quantitative and qualitative data to allow for a proper evaluation of the training of veterinary surgeons in conformity with Directive 2005/36/EC. On the other hand, the SER-1 does not give the complete picture of all activities at NVH. The veterinary nurse programme, the extensive research activity and the services that NVH provide to the relevant authorities, the veterinary profession and the society in general are not covered in this report.

The SER-1 consists of the report itself and an appendix with the most relevant documents. Other documents of interest for the expert committee will be made available to them at the site visit.

Yngvild Wasteson
Rector

Birger Kruse
Director General

INTRODUCTION

Important decisions made by the management of the Faculty, or by the authorities responsible for it

The EAEVE visitation report from 2004 concluded that the most important need for NVH was a decision on its future physical and organizational location and a commitment to funding necessary new facilities. The Norwegian Parliament in 2008 decided that NVH and the University of Life Sciences (UMB) at Ås are to be merged into a new university, Norwegian University of Life Sciences (NMBU). NMBU is to be a university with responsibilities in bioproduction, food science and aquaculture. The Norwegian Parliament decided that new buildings and facilities are to be constructed on the Ås Campus to house NVH and that NVH is to be relocated to the Ås Campus when the new buildings are completed. The Parliament decided that the Norwegian Veterinary Institute (VI) will also be relocated to Ås Campus and be housed in the new buildings. The estimated date of completion of construction of these buildings and facilities is 2019. In May 2013, the Norwegian Parliament initiated the budgetary processes to build and refurbish the facilities to house NVH and VI on Campus Ås and indicated a financial commitment of 6.3 billion NOK for the building project. Another 1.2 billion NOK will be spent to provide these facilities with the necessary scientific infrastructure, equipment and furniture. This commitment represents the largest single investment in the higher education sector in Norway's history.

The creation of NMBU represents an opportunity for NVH to move into new facilities and to become part of a university with a wider portfolio of research groups and education programmes in the life sciences. The new buildings for veterinary activities at Campus Ås (NVH and VI) will cover in total 63 000 square meters and these buildings are being planned in close collaboration with Statsbygg and the consulting firm PG. Statsbygg is the Norwegian government's key advisor in construction and property affairs, building commissioner, property manager and property developer. However, the necessary planning work for this large and technically complicated project has placed considerable demands on NVH. The planning work is cumbersome and draws more and more resources from the daily work at NVH. The planning of the new buildings has involved a lot of employees and to a certain degree also students at NVH. An interim board was established to lead the process for the merger of NVH and UMB from 2008-2010. Since 2010, a joint board from NVH and UMB has led this work with authority on behalf of the new university.

Main organizational changes

For the last 10 years, NVH has been organized into four academic departments, in addition to the central administration unit. The four departments are Basic Sciences and Aquatic Medicine (BasAM), Food Safety and Infection Biology (MatInf), Production Animal Clinical Sciences (ProdMed) and Companion Animal Clinical Sciences (SportFaMed).

With the creation of NMBU on 1st January 2014, NVH will undergo a major organizational change. NMBU will be organized into three faculties. The four NVH departments will be part of the Faculty for Veterinary Medicine and Biosciences (VETBIO) along with three

Departments from UMB. The Faculty will be governed by a Board and is to be led by a Dean. Each Department will have a Board and an appointed leader.

The diagrams 2 and 4 in Chapter 2 show the changes from the current structure in NVH to the new organization in NMBU.

Other organizational changes have been introduced at NVH in the last 10 years. In 2010, the NVH Rector and Prorector were elected as a team. Both positions have been full-time positions since 2005. Further changes include the organizing of the former Research animal unit as the Section for Experimental Biomedicine under the Department of Production Animal Clinical Sciences. The research farm at Dal outside Oslo has been closed due to high running costs and low income. The Board of NVH has decided to transfer the activity at Section for Arctic Veterinary Medicine (SAV) to University of Tromsø. SAV was evaluated by an external evaluation committee in 2011 to provide a thorough background for a decision by the Board on the future of the section. The recommendations from the evaluation committee were discussed with the Ministry of Education and Research before the Board made its final decision. This transfer will be implemented from 2014. From April 2013, NVH has run a 24/7 small animal clinic providing around the clock hospital care and emergency veterinary services.

New regulations related to teaching

The Quality Reform of higher education was introduced by the Norwegian government in 2003. The reform called for a new degree structure based on a Bachelor degree and a Master degree. Veterinary science and some other professional educations were allowed exemption from this degree structure. Central elements in the quality reform were the following-up of students, new examination and evaluation forms, new study support measures and increased internationalization. The goals of the reform were to improve the quality of higher education and research; to increase the intensity of study by improving study progression and; to increase internationalization by improving student mobility. An evaluation of the reform presented by the government in 2007 showed that many of the goals of the reform had been achieved. Universities and institutions of higher education including NVH had received greater freedom and more responsibility for strategic leadership, the students had received closer follow-up and the institutions had implemented systems for quality assurance. It was a further requirement of the reform that all higher education institutions establish a qualification framework for all study programmes. This framework was to describe the learning outcomes that all students were expected to have at the completion of their education. Learning outcomes describe the knowledge, skills and general competence acquired by the graduate and as such the outcomes provide important guidance for students. The identification of learning outcomes also contributes to shift the educational focus from what is taught by the teacher to what is learnt by the student. The implementation of the qualification framework was part of Norway's adherence to the Bologna Process.

As part of the Quality Reform, NVH has implemented a quality assurance system. The "Quality Cycle" is central to this system. The quality assurance system requires that work relating to teaching is done in a systematic manner and is documented. The system requires that changes to teaching are introduced on the basis of knowledge and are not random. Each year a comprehensive Study Quality Report is compiled from the academic year's study data and the work with the quality of teaching is gathered and analyzed. The report is presented to the Board of NVH, which prioritizes new measures that are to be implemented to improve

further the quality of teaching. In 2007, NVH was evaluated by the authority controlling educational activities at all Norwegian higher education institutions (NOKUT) and received a very good response to the quality assurance work and was encouraged to build on the existing system. NOKUT has decided that a new evaluation of the quality assurance system at NVH will take place after the incorporation of NVH in the new university, NMBU.

New buildings or major items of equipment

As recognized in the EAEVE visitation report in 2004, the uncertainty surrounding the future location of NVH has hindered major investment in the School's buildings at the Adamstuen Campus. In the 10 years since that report, there have been no new buildings at the Adamstuen site but there has been a decision on the future location of NVH, as discussed above. To maintain the old buildings and to meet educational, biosecurity and health and safety standards, NVH has undertaken continuous upgrading of its buildings and facilities. An important improvement has been the development of the Multimedia Room/Training Clinic. To promote the use of audiovisual aids and other alternatives/supplements to the use of animals in teaching, a multimedia room/training clinic equipped with a selection of relevant products suitable for use at all stages of the veterinary and veterinary nurse courses was opened in 2009. In 2012, the Training Clinic was moved nearer the clinics to be more accessible for the students and the multimedia facilities (CD's and videos) were moved to the library to be available through the library's services. Other renovations include the upgrading of auditoria, seminar, reading and computer rooms to accommodate the increase in student numbers in 2007. All auditoria were equipped with new computers and projectors and auditoria 3, 4 and 6 were extensively refurbished to improve their quality and seating capacity. Reading rooms have been equipped with new chairs, lamps and bookshelves. In response to the students' priorities to LMU, the students' data facilities were upgraded in 2007, with new computers in the students' computer room and the installation of two advanced printers and a wireless network. Three new seminar rooms have been built (Hesteloftet). New laboratories have been established or re-fitted for Food Hygiene, Zebra fish research and Animal Welfare. Major equipment investments include the acquisition of a CT and the fitting of a room to house this advanced diagnostic equipment. Numerous biosecurity measures have been implemented to maintain the functionality of the building mass on the Adamstuen campus. The student accommodation facilities on the Sandnes campus have been refurbished.

Main changes to the study programme

In 2006, the Board ratified the full new "2002-curriculum" for veterinary education at NVH. This curriculum had introduced a block structure and the opportunity for specialization through differentiation tracks, and is the current curriculum that is presented in this report. Minor changes are continuously undertaken according to the results presented in the annual Study Quality Report. In response to an increasing student failure rate following the introduction of the new curriculum, a redistribution of workload between blocks was undertaken and retake examinations were moved from within semesters to a week before semester start during the summer and Christmas holidays. In 2010, NVH coordinated its qualification framework with the identification of EAEVE's day-one skills in the curriculum.

In 2007, NVH increased the number of enrolled veterinary students from 60 to 70 students per year. All higher education institutions in Norway were encouraged by the Ministry of Education and Research to increase the number of students within natural sciences and

mathematics to meet the estimated future needs of society. The NVH Board decided to increase the number of annually enrolled students to 70. The Board concluded that income generated by the ECTS points produced by the additional students would cover extra educational needs. Unfortunately, the extra expenses have so far not been compensated for by an increase in income. It is crucial that NVH in the years ahead takes decisive action to ensure that 70 enrolled veterinary students complete their study programme each year.

In 2009, NVH decided not to enroll students in the two international master programmes “Aquatic Medicine” and “Food Safety” as the academic level of the applying students was declining and there was little funding available for international students. The revival of these programmes will be considered within the framework of NMBU.

In 2012, two changes were made in the differentiation track clinical programmes. The Food Safety track and the Production Animal Medicine track were merged because of low recruitment of students to the Food Safety track. The study programme of the combined track fulfills the requirements of EU Hygiene Package 3 and qualifies students to the title of Official veterinarian. The students following the other differentiation tracks need to take a course after graduation to qualify for this title. A new Project-related track directed towards students interested in a career in research was also introduced. The Project-related track involves thesis work weighted to 40 ECTS and the students are integrated into one of the active research groups at NVH or at the Norwegian Veterinary Institute.

In 2013, NVH received financial support from the Ministry to establish a research year in Biomedicine for veterinary students. The goal for the programme will be to stimulate veterinarians to choose a career in research. Veterinary students will apply to be admitted to the research program and will be integrated into the best research groups at NVH. The programme will consist of a full-time research year after the 4th semester. During the remainder of their veterinary studies, the student will engage in part-time research activity. At the end of their veterinary studies, the student will have completed 2 years of research work but will only have extended their studies by one year. It is envisaged that newly graduated veterinarians with this research background will be attractive for and competitive in other research environments and will contribute to cross-disciplinary contact with a larger portion of research environments in Norway.

Also in 2013, the Rector gave the Study Plan committee (SU) a mandate to revise and develop the existing veterinary curriculum to meet the future needs for veterinary education in Norway including an increase in student numbers. The new facilities at Campus Ås that are planned to stand ready in 2019 are being designed for the enrollment of 90 veterinary students per year. After the incorporation of NVH into the new university, NMBU, veterinary education will continue to be a highly structured professional education.

Major problems encountered by the establishment, whether resolved or not

All the important challenges that NVH faces are listed as goals and actions in the Strategic Plan 2011-2013.

A challenge facing NVH is the aging building mass on the Adamstuen campus. This problem will be resolved when NVH moves into new buildings on the Ås Campus of NMBU in 2019. In the intervening period, large external investments from the government for the buildings at

Adamstuen will not be forthcoming. NVH will need to continue its policy of upgrading and modifying buildings on an ad hoc basis and a limited budget. In general, the economic situation is becoming tighter. The planning of the new buildings at Campus Ås and the re-organization processes to incorporate NVH into NMBU take internal resources away from NVH's core activities. A major concern is the projection that income generated by NVH from its research and teaching activities will be reduced in the coming years. Under the current national result based net-funding system, income generated from research projects has been falling and income generated from teaching faces limitations. The national result based net-funding system for higher education institutions was established in 2002-2003. The system represents a challenge for NVH because the research-based incentives are part of a zero-sum play, while the ECTS-based incentives are not. NVH can only harvest a minor budget-increase from ECTS-increase compared with very many of the other Norwegian higher education institutions, and even though NVH has increased the production of peer-reviewed publications and PhD-candidates, other higher education institutions have increased their production even more. Funding from the Research Council of Norway and EU Frame Programmes is decreasing. NVH has control of its current financial situation and is managing on the short term, but NVH does not have enough available funding for long-term investments in research and clinical equipment and to promote strategic initiatives. A process was started in 2012 to decrease the number of permanent employees to allow the reallocation of funds from salary to investments. The maintenance of the quality of teaching was central to this process, which was concluded in February 2013 when the Board reallocated about 9 million NOK.

The limitations on ECTS-based incentives have been exasperated by an emerging trend that more students than previously are quitting their studies before completion and it is difficult to find a replacement intake to maintain NVH's production of ECTS. These negative influences have been countered to some extent by NVH's actions to increase student numbers and to change the curriculum for a more effective retake examination system and lower failure rates.

Measures taken following the EAEVE Report 2004

The EAEVE report from 2004 identified specific areas and conditions that needed to be improved or implemented at NVH. Specific areas or conditions addressed by the 2004 report were the following:

- Teaching in the small animal area was identified as requiring improvement, along with the development of specialty areas and the development of services such as anesthesiology, diagnostic imaging and, in particular, an intensive care unit (ICU). The teaching of exotics and birds was also regarded as insufficient. This situation has been resolved by the implementation of several changes in the curriculum after 2004. Training in areas such as diagnostic imaging, anesthesiology and exotics and birds are now included in the core clinical curriculum and differentiation tracks. NVH now offers a 24 hour clinical and hospital service. The committee recommended that the small animal clinical activities should be integrated within a single and comprehensive clinical building with sufficient space and appropriate layout for the efficient and effective conduct of basic and specialized clinical activities. The activities are still operating in the same buildings as in 2004. While we are awaiting new clinical facilities at Ås, the current buildings are continuously upgraded within our budgetary frames.

- NVH currently has 41 European or American specialists on its staff from 17 disciplines. The 2004 EAEVE report had commented on the lack of formally qualified specialists/diplomats in the animal clinics. Over the last 10 years, NVH has pursued the training and appointment of qualified specialists in its clinics and increasingly requires “double competence” of applicants to senior academic clinical positions.
- The evaluation report in 2004 stated that activities in the farm animal species were based mainly on the traditional model of single animal clinic work and called for more emphasis to be placed on herd health oriented teaching and disease prevention. NVH has introduced changes that include more herd health visits in Ambulatory clinic; extended use of the facility in Sandnes; and more systematic teaching of disease prevention and herd health management. However, continued activity in the production animal stationary clinic has been maintained as there is good access to clinical cases, which are a valuable teaching resource.
- The 2004 report called for more attention to be given to biosecurity practices, and that the physical provision of isolation facilities for large animals was not satisfactory. This point has been largely resolved through temporary measures to avoid the important shortcomings. Currently, isolation areas for both horses and small animals are in the process of being renovated.
- A clearer organization of pathophysiology teaching was required in the 2004-report. In response, NVH has appointed an Associate Professor in pathophysiology in the Department of Basic Sciences and Aquatic Medicine. This member of academic staff has undertaken the co-ordination and teaching of this subject across the curriculum.
- The report also commented on “noticeable shortcomings in the anatomy facilities” and comments were also made on the pathology facilities. The overall building-related problems of the anatomy and pathology teaching facilities remain but specific improvements have been made and for anatomy class sizes have been halved by introducing double teaching. Biosecurity issues have been addressed particularly through the documented instruction of students.
- The evaluation committee expressed some concerns about the teaching in food safety and that this should be done in closer contact with the Norwegian Food Safety Authority. In 2005, NVH and the Authority entered a bilateral agreement that is evaluated and renewed each year at the annual meeting between the two leaderships. A new Food Safety course has been established during the 9th semester of the veterinary curriculum, and the production animal medicine/food safety differentiation track includes visits and job training at the Food Safety Authority. This track now fulfills the EU’s requirements for Hygiene Package 3.
- The structural changes in the labour market for veterinary surgeons that were identified in the NVH’s 2004 SER have continued over the last 10 years. Veterinary surgeons in Norway have experienced increased activity in aquaculture and aquatic medicine, an increased demand for clinical services for companion animals and an increased awareness of food safety matters and animal welfare. Concomitant with these increases, there has been a decline in clinical practice for farmed animals, especially for pig single animal practice. The establishment of a Council for

Cooperation with Stakeholders (RSA), which has been a Ministry requirement since 2011, has created a forum for contact between NVH and the veterinary community.

Over the last 10 years, NVH has continued to deliver veterinary graduates with an education that is relevant for the Norwegian market. The major employers such as the Norwegian food Safety Authority and the aquaculture industry have found use for graduates with the research based track education provided by NVH. Veterinary education has benefited from the high quality of veterinary research at NVH. The evaluations of research activity in NVH's departments and centres (MatInf 2005; BasAM 2006; ProdMed 2007; SportFaMed 2008; Centre for Epidemiology and Bioinformatics 2010; Section of Arctic Veterinary Medicine 2011) and the Norwegian Research Council's Evaluation of Biology, Medicine and Health research in Norway 2011 have given good feedback on the quality of research groups at NVH and provided valuable guidance for strategic research initiatives and resource allocations. Norway has a good standard of animal health but will need veterinary graduates capable of delivering even higher standards of veterinary medicine in the future. The emphasis placed by NVH on active international level veterinary research groups and on the specialist education of its clinical staff should provide the teachers and the academic environment to deliver that education.

Chapter 1. OBJECTIVES

1.1 FACTUAL INFORMATION

Overall objectives of the Norwegian School of Veterinary Science

The Norwegian School of Veterinary Science (NVH) is the only veterinary education institution in Norway and has a national responsibility for the development of veterinary science and for research and education in veterinary science. The School's vision is to be among the leading and most progressive veterinary institutions in Europe within research, education and communication of knowledge.

NVH is a specialized university institution and is encompassed by the general goals for universities and colleges determined by the Norwegian Parliament under the Act relating to Universities and University Colleges (2005) (<http://www.lovdata.no/all/hl-20050401-015.html>). The overall objectives for NVH are ratified by the NVH Board in the School's Strategic Plan. The formulation of these objectives is appraised and revised at intervals of four to five years in association with NVH's strategic planning. The Strategy Plan is developed by the Head of School (Rector) and School Board following consultation with the Central Management group.

The objectives of the School in education are to produce veterinarians who:

- have good basic knowledge and skills in veterinary medicine so that they can work to improve animal health, public health and animal welfare
- understand both the meaning of the terms "one health - one world" and "animal's own value" and act ethically in line with this
- have a broad understanding of the nature of scientific issues and are able to identify, formulate and solve complex problems within the veterinary field of work and research
- have the ability to communicate in an understandable, efficient and respectful manner with clients, the public, colleagues and responsible authorities
- know their professional limitations, and safeguard professional liability through further education, training and professional development throughout life

The achievement of the School's objectives is subjected to examination each year in the School's annual report that is sent to the Ministry of Education and Research (KD). The achievement of the School's objectives is considered during the annual steering meeting that the Ministry has with NVH. The Strategy Plan identifies key performance indicators for monitoring the School's activities. The achievement of the School's objectives is further considered in every national and international evaluation of education and research. A list of the international and national evaluations of the School during the past decade appears in the Introduction.

1.2 COMMENTS

NVH has gone a long way to achieving its goals. The work tasks in the Action Plan for 2013 are all on track and at the graduation ceremony before summer 2013 all graduates had received offers of jobs. NVH has had good feedback on its study quality from the Ministry. Selected quotes from the “Ministry letter for 2013”:

“The Ministry acknowledges NVH’s thorough work with study quality.”

“The Ministry notes that NVH has good results with student progression and completion times. The percentage of completed PhD candidates who were admitted to studies 6 years previously is at a satisfactory level. The Ministry notes that NVH continues to have very good student recruitment.”

The main strengths and weaknesses of the school

The main strength of NVH is its talented and motivated students. Veterinary science is one of the most popular courses of study in Norway and NVH is the only institution in Norway offering a veterinary education. NVH attracts resourceful, talented and motivated students. Even though veterinary science is considered a demanding course, NVH stands out with a very high student production in relation to most other higher education institutions in Norway and there is little or no unemployment among new veterinary graduates. A further strength is the good quality of research conducted at NVH. NVH scores well with the research indicators for research production, and individual research groups are competitive at a high international level. There has been a consistently good increase in the production of PhDs. NVH’s research commitment particularly in aquatic medicine has been a strength for the research-based education of veterinarians to service the large Norwegian aquaculture industry. The support and commitment of the Norwegian government for veterinary education gives NVH a solid foundation. The commitment to build new veterinary buildings at Campus Ås is a large investment and recognition of the important social functions of veterinary science in delivering safe food to the Norwegian people and ensuring good health and welfare for production and companion animals.

The main weakness of NVH is its small size. Limited financial resources make it difficult to renew and upgrade equipment and to follow the latest technological developments. NVH has limited economic freedom to implement strategic initiatives in relation to personnel or scientific and diagnostic equipment. NVH has active research groups that perform well in international research evaluations but the research project portfolio at NVH is getting smaller. In recent years, less national research funds have been awarded to the veterinary disciplines in the fields of food safety and animal health. NVH has not been effective enough in repositioning itself to be competitive for EU research funds. The funding system for higher education institutions in Norway does not favor small profession-based institutions. NVH has a limited capacity to increase its ECTS production and while the school has increased its scientific production it has not increased as much as other competing larger institutions.

The incorporation of NVH into a new university will create a larger institution better able to meet the demands for investment and strategic initiatives in veterinary science. NMBU has been created to be a University with special responsibilities to meet the large global questions in the areas of the environment, sustainability, human and animal health, climate change, food production and resource use. Within this new University, NVH should be well placed to

participate in the research initiatives and developments of the EU and to meet the requirements to deliver veterinary education at the highest international level.

1.3 SUGGESTIONS

No further suggestions

Chapter 2. ORGANISATION

2.1 FACTUAL INFORMATION

Details of the Institution (as of December 2013)

Name of the School: The Norwegian School of Veterinary Science
(Norges veterinærhøgskole, NVH)
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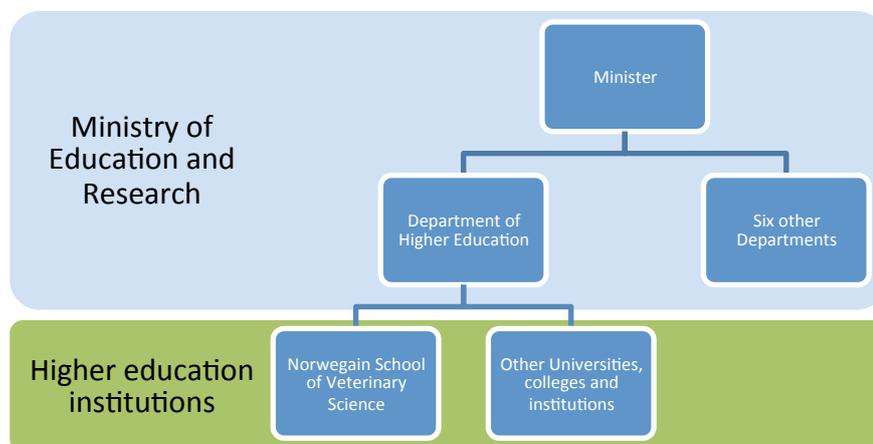
Title and name of head of the School: Rector Yngvild Wasteson

Details of the competent authority overseeing the School

At the time of submission of the self-evaluation report (December 2013), NVH is not within a university. The Norwegian School of Veterinary Science is an independent institution under public-sector administration and is supervised by the Ministry of Education and Research (KD) as determined by the Norwegian Parliament under the Universities and University Colleges Act (2005).

Diagram 1. Administrative structure of the School in relation to ministerial structure

The Ministry of Education and Research consists of 7 Departments. The Department of Higher Education has administrative, supervisory and overall management responsibility for state universities (6), specialized university institutions (5) including the Norwegian School of Veterinary Science, university colleges (25), national academies of the arts (2), as well as for the Norwegian Centre for International Cooperation in Higher Education (SIU), and the Norwegian Agency for Quality Assurance in Education (NOKUT).



On 1st January 2014, NVH will be incorporated into a new university. The name of the university is to be the Norwegian University of Life Sciences (NMBU) and it will be under

the supervision of the Ministry of Education and Research. For the period 2014-2019, NMBU will have three campuses, one in Oslo (NVH), one in Sandnes (NVH) and one at Ås (UMB). In 2019, NVH will be relocated to new purpose-built facilities on the Ås campus.

The responsibilities, constitution and function of the main administrative bodies

The Board

The Board is the highest authority of the institution and answers to the Minister of Education and Research for the activities of NVH including the administration of NVH's collective resources. The Board has eleven members that include an elected Rector, six members represented and elected from among the students and academic and non-academic staff and four external members appointed by the Ministry (KD). The Rector is chairman of the Board.

- The Board is responsible for ensuring that NVH's professional activities hold a high standard and that the institution is run effectively and in accordance with the laws, regulations and rules that apply, and the framework and goals specified by the relevant authorities.
- The Board determines strategies for the institution's teaching, research and other professional activities and lays plans for its professional development in accordance with the goals set out by the relevant authorities.
- The Board is responsible for the management of NVH's economic resources and properties in accordance with the decisions of the Ministry (KD), and according to any stipulations from funding organizations or other binding decisions.
- The Board determines the internal organization of all levels of activity at NVH.
- The Board submits each year, according to guidelines laid down by the Ministry, a document called The Report and Plan. This document consists of a report presenting the results of NVH's activities from the previous year in relation to the goals for that year and the plans and goals for the current year. This document is based on a risk analysis.

The Rector

The Rector is the chairman of the Board and, on behalf of the Board, has responsibility for and leadership over the activities of the institution and its administration. The Rector is the institution's legal representative and the institution's spokesperson in regard to all public authorities and the public.

- The Rector and Prorector are elected as a pair for a period of four years. Both positions are full-time (100%) positions.
- All permanent employees with at least a 50% teaching or research position are eligible for election, as are fixed-term employees in at least 50% teaching or research position, or in the position of head of department, if the term of employment covers the term of election.
- The election is conducted in an electoral meeting composed of employees in academic positions, technical and administrative employees and students.

Director General

The Director General is the overall leader for the collected administrative activities of NVH, within the framework determined by the Board. The Director General is appointed by the Board following external and internal announcement of the position. The Director General is secretary for the Board.

- The Director is responsible for initiation of the resolutions ratified by the Board and for allotting of resources and property in accordance with the resolutions of the Board.

- The Director is responsible for the collected economic management of NVH and that it occurs in accordance with the Ministry's general precepts for economic management and for allotting of funds. The Director prepares and presents to the Board budget suggestions and the annual financial statement and keeps the Rector and Board continually orientated on financial and other matters of significance for the activities of NVH.

NVH Central Management Group

The Central Management Group of NVH consists of the Rector, Prorector, Director General, Head of communication and the four Heads of Department. The Rector is chairperson and in the Rector's absence the meetings are led by the Prorector. The group is a forum for information and discussion and addresses matters of strategic character and coordinates action. All matters that are handled by the Board are discussed and anchored in the Board's decisions. Student representatives are invited to attend meetings when student matters are discussed. The group meets every week.

Heads of Department

NVH has four Departments: Basic Sciences and Aquatic Medicine (BasAM); Food Safety and Infection Biology (MatInf); Production Animal Clinical Sciences (ProdMed); and Companion Animal Clinical Sciences (SportFaMed). The Head of Department is appointed by the Board following external and internal announcement of the position. The appointment is for a four-year term and a Head of Department may be re-appointed twice.

Sections and Section Leader

The Departments at NVH are organized into Sections. The Section Leader is leader for the employees of a section on the delegated authority of the Head of Department. The Head of Department is the immediate superior of the Section Leader. The Section Leader is elected by the employees of a Section for a period of four years.

- The Section Leader is responsible that the Section performs its teaching, research, communication and clinical and laboratory activities in accordance with the strategic and annual plans.
- The Section Leader is responsible in cooperation with the Head of Department and Departmental Administrative Officer that a budget is established and followed for the Section. The Section Leader is to hold the Head of Department continually orientated on financial and other matters of significance for the activities of the Section.

Committees advising the Rector at NVH (SU, UFE, IU, PhDU)

Veterinary Undergraduate and Continuing Education Programmes Committee (SU)

SU advises the Rector in matters relating to veterinary education at NVH. The committee is appointed for a period of four years by the Rector on the advice of the Departments and the Veterinary Student's Organization (VSU). The committee consists of a leader (a Head of Department), an academic employee from each of the Departments (4) and two veterinary students. The Head of the Studies is the secretary for the committee.

Research and Ethics Committee (UFE)

UFE advises the Rector in matters relating to research, research politics, research education and research ethics at NVH. The Prorector was the leader of the committee until 2010, when the Rector assumed leadership of UFE so as to release the Prorector to undertake extensive tasks related to the establishment of NMBU and as part of a division of duties within the

NVH's leadership team based on individual competences. The UFE committee also includes a representative from each of the Departments (4) and two PhD students. The research and development adviser is secretary for the committee. The committee is appointed by the Rector for a period of four years on the advice of the Departments and the two academic unions (Norwegian Association of Researchers and Norwegian Veterinary Association).

International Committee (IU)

IU advises the Rector in matters relating to the internationalization of NVH. The leader of the committee is appointed from one of the clinical departments and there is one representative from each of the other departments (3) and one student representative. Academic members of the committee are appointed for two years and students are appointed for a minimum of 1 year. The committee is appointed by the Rector on advice of the Heads of Department and the veterinary student's organization (VSU).

PhD and Residency Programmes Committee (PhDU)

PhDU advises the Rector in matters relating to work to increase the quality and effectiveness of research and post-graduate education at NVH. The committee is led by the Prorector and the other members are one representative from each of the four Departments and two PhD students. The Rector appoints the Department members of the committee for four years and the PhD students for 2 years, on the advice of the Departments and NVH's postgraduate organization (DIOV).

Committees required by Norwegian Law

Learning Environment Committee (LMU)

LMU promotes student health, security and well-being. The committee is composed of 3 students, 3 representatives from the staff at NVH, the Prorector, leader of NVH's technical and services division and one Head of a clinical department (appointed by Rector for 2 years). The administration provides a secretary. The LMU committee reports directly to the Board and leadership alternates every second year between the student and staff representatives.

Appeals Committee

The Appeals committee consists of an external leader with judicial experience, 2 staff at NVH, and 2 students. The students are appointed for one year and the other members of the committee for four years. The leader of the Secretariat is secretary for the committee. The committee handles complaints relating to decisions of the Study Administration, the Director or Rector, decisions related to admission outside the national admission scheme, formal errors with examination, annulment of examinations or approval of courses and the exclusion or expulsion of students. The decisions of the Complaints committee cannot be appealed.

Work Environment Committee (AMU)

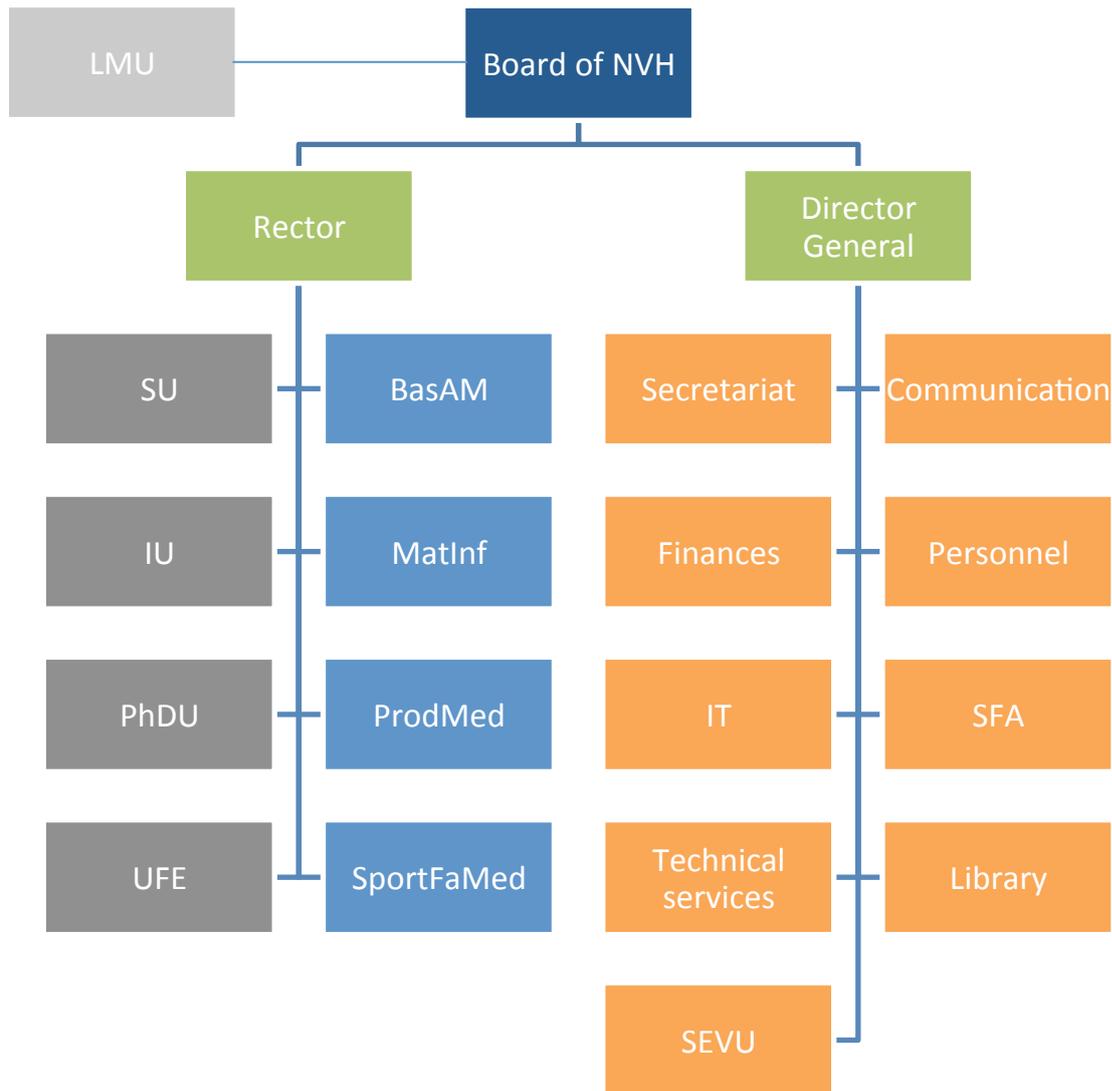
AMU has 8 members with an equal number of representatives from employer and employees. The committee is led by the Director General and the committee's secretary is the HMS coordinator at NVH. The committee works to implement a satisfactory work environment. AMU participates in the planning of safety and environmental work and closely follows development in matters relating to health, safety and welfare.

Council for Cooperation with Stakeholders (RSA)

This council was established at NVH in 2012. The RSA is made up of members of staff, students and various veterinary employers. A variety of issues are on the agenda. The minutes are distributed to SU and VSU. SU discusses follow-up.

NVH also has committees for Admissions and Appointments.

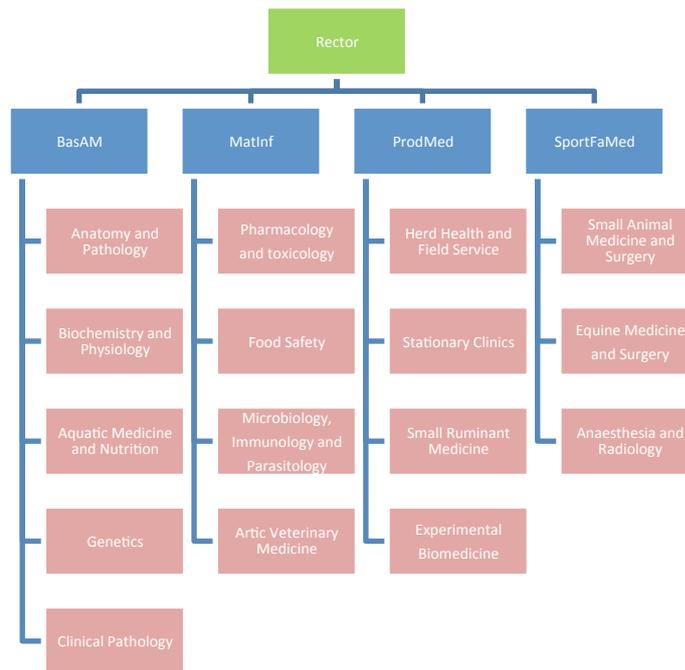
Diagram 2. Internal administrative structure of the School.



Abbreviations: LMU Learning Environment committee, SU Committee for undergraduate and continuing education programmes, IU International committee, PhDU Committee for PhD and residency programmes, UFE Committee for research and ethics, IT Information technology, SFA Department for academic affairs and research administration, SEVU Center for further and continuing education.

Note that committees for Work environment, Appeals, Admissions and Appointments and the Council for cooperation with stakeholders are not shown.

Diagram 3. Departmental structure of the School



Abbreviations: BasAM Department of Basic Sciences and Aquatic Medicine, MatInf Department of Food Safety and Infection Biology, ProdMed Department of Production Animal Clinical Sciences, SportFaMed Department of Companion Animal Clinical Sciences

The involvement of the veterinary profession and the general public in the running of the School

The Board of NVH has four external members that are appointed by the Ministry to represent the general public. A regular annual meeting is held with NVH's supervising Ministry (KD) and regular meetings are also held with other relevant stakeholders such as the Ministry of Agriculture and Food, the Ministry of Fisheries and Coastal Affairs, the Research Council of Norway and the Norwegian Food Safety Authority.

In accordance with government regulations, NVH has established a Council for Cooperation with Stakeholders (RSA). Various veterinary employers are represented on this council. It is anticipated that this new body, which was established in 2012, will provide a significant venue for contact with the veterinary profession. The School's leadership maintains close links with the leadership of the Norwegian Veterinary Association (DNV). The center for further and continuing education (SEVU) at NVH participates in the running of continuing education courses given by DNV (see Chapter 11).

NVH has good collaboration with animal owner organizations in Norway including the breeding organizations for cattle (GENO) and for pigs (NORSVIN), and small ruminants (NSG), poultry, fur animals and the Norwegian Kennel Club. There are good contacts with the farmer owned production companies in agriculture including the dairy company TINE and the Norwegian Meat and Poultry Research Center (Animalia). In collaboration with the

University of Life Sciences (UMB), NVH has established a contact forum with the political associations in agriculture and farming in Norway (Federation of Norwegian Agricultural Cooperatives, Norwegian Farmers' Union, Norwegian Farmers and Smallholders Union). NVH has good relations and close contact with the largest association of the farmed fish industry as well as contacts with larger companies operating in aquaculture in Norway. There are also good relations and contacts with the public employed veterinarians in the districts and counties of Norway (Norwegian Food Safety Authority). There has been a long-standing cooperation in teaching and expert evaluations with the National Institute of Health and NVH employees have served on the Norwegian Scientific Committee for Food Safety. NVH has broad contact with the Norwegian Veterinary Institute (VI) on scientific (research), administrative, educational and political issues.

External participation on boards and advisory committees within the School

The Board of NVH has four external members who are appointed by the Minister (KD). The research director at the Norwegian Veterinary Institute is a member of the PhDU committee. Many contacts that NVH has with the general public and collaborating institutions are used as members of advisory committees for large research projects that under consortium agreements are governed by an advisory committee. Colleagues in collaborating academic institutions are often used as PhD supervisors and as external examiners at undergraduate and post graduate levels.

2.2 COMMENTS

Organization during transitional period 2014-2019 (at time of visitation)

Following its creation on 1st January 2014, NMBU is to be organized into three Faculties that will contain a total of 13 Departments. In the transition period 2014-2018, NMBU will have three campuses (NVH in Oslo and Sandnes and UMB at Ås). The University, each Faculty and each Department will have their own Board. The Board of the University will consist of 3 academic staff (one from NVH; one from UMB; and one from a common election meeting), two students (one from NVH; one from UMB), one representative of the technical and administrative staff (common election meeting); one representative from the temporary academic staff (common election meeting), and four (4) external members appointed by the Ministry of Education and Research. The leader of the Board is appointed by the Ministry from the external members.

Organization after co-localization to Ås campus (beyond 2019)

After the period of the first Board (2013 – 2017), the composition of the University Board will follow the “normal model” as specified in the Universities and University Colleges Act §9-1.

NMBU

University Rector and Prorector

For the transition period (2014-2017), the Rector and Prorector are appointed by the University Board, but an election is the basis for the appointment. In May 2013, Mari Sundli Tveit (UMB) and Halvor Hektoen (NVH) were elected Rector and Prorector, respectively, of NMBU and will assume these positions from 1st January 2014.

The Rector's responsibilities and tasks are described in the Universities and University Colleges Act §10-4. The Protector's tasks are delegated by the Rector and the Prorector can deputize for the Rector. The Rector has full responsibility for administrative tasks but can delegate responsibilities to one or more Director Generals. The Rector's management groups include: a) Central Management group consisting of the Rector, Prorector, the Deans of the Faculties (3), the Director(s) General that report to the Rector and the leader of the Student Organization; and b) Extended Management group consisting of the Rector, Prorector, the Deans, the Heads of Department, the Director(s), leader of the Student Organization and other leaders that the Rector considers appropriate.

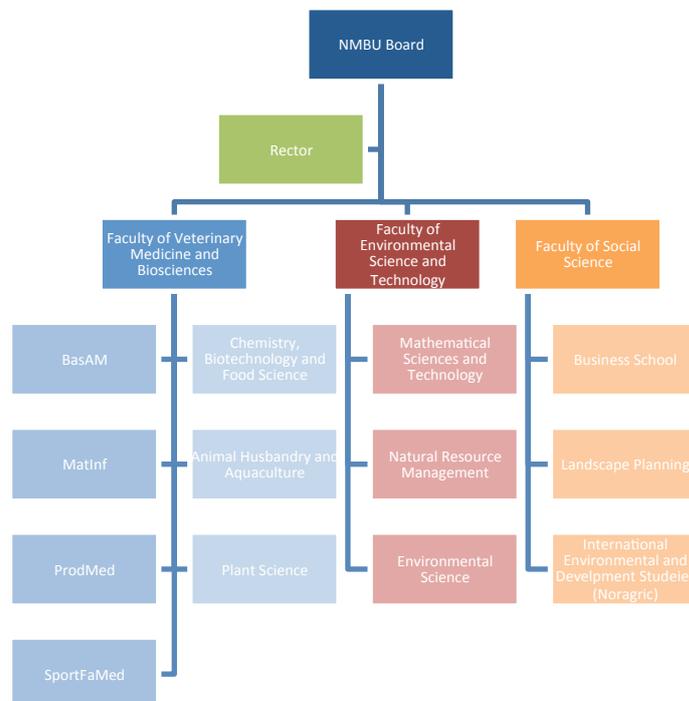
The University Board has the following law regulated permanent committees: Learning Environment Committee (LMU), Board's Appeal Committee and Work Environment Committee.

NMBU has also decided to have the following strategic advisory committees for the Rector: Central Research Committee, Central Education Committee, Central Admission Committee and Central Appointment Committee. It has not been decided whether the Council for Cooperation with Stakeholders (RSA) should be organized centrally or locally. The Rector may decide to appoint additional central committees.

The Faculties and Faculty Leadership

The University is to be organized academically into three Faculties: Faculty of Veterinary Medicine and Biosciences; Faculty of Environment Science and Technology; and Faculty of Social Science. Each Faculty will be further organized into Departments. The internal organization of the Faculties in NMBU is shown in Diagram 4.

Diagram 4. Internal administrative structure of the new University (NMBU)



Abbreviations: BasAM Department of Basic Sciences and Aquatic Medicine, MatInf Department of Food Safety and Infection Biology, ProdMed Department of Production Animal Clinical Sciences, SportFaMed Department of Companion Animal Clinical Sciences

The Faculty Board will be the Faculty's governing body. The Board will have responsibility for the Faculty's strategy and academic priorities within the University's academic strategic plans and will set priorities for strategic budgetary funds in relation to the overall strategic plans of the University. The Faculty Board will have 11 members: Leader (external), 4 academic staff (including 1 temporary staff member), 2 students, 1 technical/administrative staff member and 3 external members (in addition to the Leader).

The University Board will appoint a Dean of the Faculty. The Dean is the academic and administrative leader of the Faculty and can appoint a Pro-Dean. The Dean reports to the Faculty Board in matters covered by its authority and in other matters to the Rector. The Dean of a Faculty is a member of the Rector's Central Management group and the Extended Management group and is secretary of the Faculty Board. In September 2013, Øystein Lie from MareLife and Oslotech AS was appointed Dean of the Faculty of Veterinary Medicine and Bioscience.

The organization of committees in the Faculties has not been decided at the time of writing the SER.

The Departments and Department Leadership

The Department Board will be the Department's governing body and will be concerned with running and development of the central activities of the Department. The Department Board will have 9 members: Head of Department (Leader of Board and Secretary of Board), 3 academic members (including 1 temporary member of staff), 2 students, 1 technical/administrative staff and 2 external members (one outside NMBU).

The Faculty Board appoints a Head of Department who is a member of the Dean's management group and the Rector's Extended Management group.

The Veterinary Curriculum

To ensure that the veterinary curriculum is properly integrated with effective central veterinary control, NMBU will establish the position of School Director who will be in charge of the veterinary and animal nurse programmes. The School Director will be appointed by the Dean and will be a veterinarian with competence and experience within teaching, research and pedagogy. The tasks and authority for the School Director are set out in a mandate. School Director will have close collaboration with the Dean and the Heads of the Departments. The Heads of the Departments and their Boards shall delegate authority to the School Director to coordinate and develop the veterinary study programme. NMBU will establish an advisory committee for the School Director, which will have the same duties as the current Study Committee (SU). The School Director may appoint other advisory committees such as International Committee, local Admission Committee and local Council for Cooperation with Stakeholders. NMBU has decided that each Campus will have its own local Learning Environment Committee that reports to the Central Learning Environment Committee. School Director is to have regular meetings with student organizations on Campus Adamstuen.

The responsibility for the annual review of study programmes shall be delegated from the Departments to the School Director. The responsibility for major revisions of the veterinary study will be delegated to the Faculty Board. A coordinated approach between the Boards of the four veterinary departments will be necessary for the adoption of study programmes in accordance with the university regulation for Admission, Studies and Examinations.

At NMBU, the responsibility for the allocation of financial resources to teaching programmes will rest with the Department Boards as each department receives a budget directly from the University Board based on the university budget model that has been adopted. The economic sustainability of the veterinary programme will require a joint approach from the four Departmental Boards. It should be goal for veterinary education at NMBU that a single veterinary controlled entity controls the veterinary study programme including the financial resources for the programme and the responsibility for its revision and content.

The Study department at Campus Adamstuen will become a part of the Central Administration at NMBU, but it will give administrative support and services to the four departments, to the School Director and to the students and staff at Campus Adamstuen. A new regulation for Admission, Studies and Examinations was adopted by NMBU in December 2013. The veterinary and animal nurse studies have received sufficient exceptions to the general university rules to ensure these courses retain their structure and form.

The Norwegian School of Veterinary Science is acknowledged as a well-known and valuable name, and is regarded as an attractive brand for NMBU. The term *NMBU- School of Veterinary Science* will therefore be used as a communication tool in the marketing of NMBU.

2.3 SUGGESTIONS

The organization of NMBU has been a controversial question as the two institutions forming the new university have not had faculties with a dean as an organizational level between their rector and departments. The organizational model for NMBU involves the faculties adopting a strategic role and the deans mandated to encourage collaboration both within and between the faculties. NVH has been critical to this model, which creates a faculty level that does not have any economic authority over the departments.

The governance and administration of NMBU will become apparent after the new university is established on 1st January, 2014. The leadership and administration of the new university should be held in focus to ensure effective central veterinary control of the veterinary programme at NMBU.

Chapter 3. FINANCES

3.1 FACTUAL INFORMATION

3.1.1 GENERAL INFORMATION

NVH's current financial model meets the School's mission.

The allocation of funding (including public funding) is mainly dependent on the yearly public funding by the Norwegian government. Public funding amounts to about 65% of the total funding for NVH. The Ministry of Education and Research (KD) has established a model to allocate funds to institutions within the higher education sector. The financing model consists of a basic allocation and several incentive components.

The basic allocation of funding contributes about 60% of total funding. This allocation is adjusted each year for increases in wages and inflation costs. The remainder of public funding is made up from several incentive components. The incentive allocation includes components for:

- Educational credits (student points, ECTS) produced in the last measured year.
- Students that have been on an exchange study for more than 3 months.
- Publishing activities are rewarded based on the type of publishing (book, paper, etc.) and publishing channel.
- EU-funded research projects are rewarded with credits for each Norwegian krone (NOK) paid for by the EU.
- Norwegian-funded research projects are rewarded with credits for each Norwegian krone (NOK) paid for by the Norwegian Research Council.
- PhDs completed in the last measured year. In 2013, the reward for a completed PhD was about 46,835 Euro (370,000 NOK).

The education of veterinary students is funded at the highest level (category A) by the Norwegian government. There are six categories of funding in the higher education sector. The other disciplines funded at category A in Norway include medicine and dentistry. In 2013, the total funding for each full-time veterinary student at category A was about 42,911 Euro (339,000 NOK). The level of category B funding in 2013 was about 32,405 Euro (256,000 NOK).

The allocation of funds within NVH depends on an internal financing model. The model is in principle similar to the national funding model but it has a larger basic allocation and smaller incentive components. The departments at NVH receive between 90-95% of funding as a basic allocation and between 5-10% of funding based on incentives such as completed PhDs and publishing. The basic allocation of funds is high for the departments under the current budget model as teaching is considered a common task that crosses departmental divisions. Under the NMBU budget model (see Comments), ECTS will be allocated to departments.

The funding of major equipment and its replacement is derived from three sources:

- Annual funding allocated to the departments by NVH.
- Funds set aside by the Board in the budget. These funds are applied for by the departments and research groups and allocated by UFE following criteria set from NVH's research strategy.

- External services provided by some academic groups generate a profit that may be used to fund equipment and its replacement.

The funding of capital expenditure such as building work, and the funding of building maintenance are mainly provided for through the budget of the Technical Services. The Technical Services department makes an assessment each year of the need for building and other works. The Board of NVH also sets aside funding for capital expenditure, if available in the budget. The amounts set aside by the Board have been in the range of 0.13- 1.3 million Euro (1-10 million NOK).

3.1.2 INFORMATION ON EXTRA INCOME

Under the current financial model, NVH is not required to give any of its funds generated by clinical or diagnostic work, research grants or other sources to any other body.

The veterinary students at NVH are required to pay a semester registration fee of about 70 Euro (550 NOK). This fee is determined by the Norwegian student welfare organization SiO and is regulated for inflation. The fee is collected by the Study department at NVH and passed on to SiO for use in the provision of student facilities and services such as accommodation, canteen and medical services.

3.1.3 OVERVIEW INCOME (REVENUE) AND EXPENDITURE

Table 3.1: **Income/Revenue in million NOK**

Year	State (government)		Income generated by the Faculty		Total
	To university administered outside the Faculty	Direct to Faculty	Income from services provided	Research	
2013*		278.2	54.7	62.5	395.4
2012		264.9	50.1	68.0	383.0
2011		259.9	49.4	85.5	394.8

*year prior to visitation (visit 2014)

Table 3.2: **Expenditure in million NOK**

Year	Pay	Non Pay			Total
	Salaries	Teaching support	Research support	Clinical support	
2013*	286.9	33.4	57.7	18.5	396.5
2012	271.5	34.9	63.2	16.8	386.4
2011	262.3	34.7	82.3	11.0	390.3

*year prior to visitation (visit 2014)

3.2 COMMENTS

The NMBU budget model is based on the principles laid down by KD and will consist of a basis allocation and a “result-based” component. The result-based component will be transferred to the Departments in NMBU in accordance with the economic interests of NMBU and the Departments. The result-based categories are only research and teaching. For teaching and research and for new student places, a flat rate of 65% of the money amount NMBU receives from KD will be transferred to the Department that “produced” the result. The remaining 35% will be used for common services and to strengthen strategic initiatives. The framework for departmental budgets in 2014 will be calculated on the basis of the 2013 budget models for NVH and UMB so as to avoid redistribution effects during the initial transition year.

The basis allocation of each department will be calculated as the difference between the framework for 2014 and the result-based allocation the department would have received under the KD model. This will be Basis Allocation for the 2015 budget and as such is decided on the basis of history and not criteria, goals or strategy.

As commented in Chapter 2, NVH has been critical to the faculty model proposed for NMBU. The challenge for veterinary education will be that the central university budget model will decide the budget for each department and the Board of the Department will be responsible for the further allocation of financial resources. The faculty level will only have minor strategic funds available that are to be used to encourage collaboration within the faculty. Although the School Director and the veterinary study programme committee will decide the curriculum, the School Director will have to rely on close collaboration with the Heads of Department to secure satisfactory allocation of resources to teaching.

3.3 SUGGESTIONS

The administration and management of financial resources in the new university must be adequate to sustain the veterinary educational programme. The administration of the new university should ensure that the veterinary environment at NMBU has the financial resources to meet its societal missions.

Chapter 4. CURRICULUM

4.1 FACTUAL INFORMATION

The Norwegian School of Veterinary Science is the only education institution in Norway providing undergraduate education in veterinary medicine and veterinary nursing. The Veterinary Study programme at NVH is governed by Universities and University Colleges Act (2005). The responsibilities of a veterinary surgeon are regulated by the Act relating to veterinarians and other animal health personnel (2001-06-15 nr 75). The veterinary education is a highly structured professional education and undergraduate training comprises 5.5 to 6 years of study and leads to the degree *Candidata/candidatus medicinae veterinariae* (*Cand.med.vet.*). All veterinary graduates from NVH receive a general authorization as a Veterinary Surgeon from the National Food Safety Authority (Department of Food and Agriculture). The common authorization allows a free choice of fields of work after graduation, regardless of the topic chosen by a student during the differentiation year. NVH is also authorized to award a Master degree (1.5-2 year), a Philosophiae doctor (PhD, 3 year) and Doctor philosophiae (Dr. Philos.). The academic years are divided into two semesters and teaching is conducted in 11 semesters. The entire veterinary curriculum is equivalent to 330 ECTS. The veterinary education at NVH is thus comparable to, but longer and more extensive than a Master's degree (five years, 300 ECTS).

Management of the veterinary curriculum

NVH is a specialized university institution and has the authority to decide itself which study programmes and disciplines the institution shall provide, and which shall form part of the basis of lower degree studies or professional training courses within the framework of the Universities and College Act (2005). The Act requires NVH to have a satisfactory internal system for quality assurance including student evaluation of courses and to meet the requirements of the Norwegian Agency for Quality Assurance in Education (NOKUT). NOKUT is a professionally autonomous state body which, by means of accreditation and evaluation, monitors the quality of Norwegian institutions that provide higher education. NOKUT is a member of the European Network for Quality Assurance in Higher Education (ENCA).

NVH's Board approves the programme description for the veterinary medicine programme. All changes of course content are subject to the approval of the Veterinary Undergraduate and Continuing Education Programmes Committee (SU), and major curriculum changes also require the Rector's and School Board's approval.

The Board of NVH adopted a quality control system for its study programmes in 2004. A major instrument for the evaluation and management of the veterinary curriculum is the annual report on study quality submitted to the Rector and School Board. SU has a central role in the collection, analysis and the recommendation of actions related to the veterinary curriculum. The report provides the status of course evaluations, a presentation of student results and an analysis of previous year's teaching and study. Cycles of quality control operate at the local level within the teaching blocks and at the aggregate level to produce the report (Fig. 4.1 Quality Cycle). Each teaching block submits an annual report to the responsible Head of Department. Each of the four Departments at NVH submits a combined annual report

for the portion of the curriculum for which the Department is responsible. The Study administration combines the departmental reports into a final report that the Rector submits to the Board. Following the tabling of the report, the Board makes recommendations to the administration and the organizational units and committees that are aimed to improve the quality of the veterinary curriculum in the following academic year. The committees pass on the recommendations to the Departments so that the teaching blocks can incorporate the recommended improvements into their planning for the next academic year. The cycle of quality control within the teaching blocks consists of an annual round of planning, implementation, evaluation and improvement.

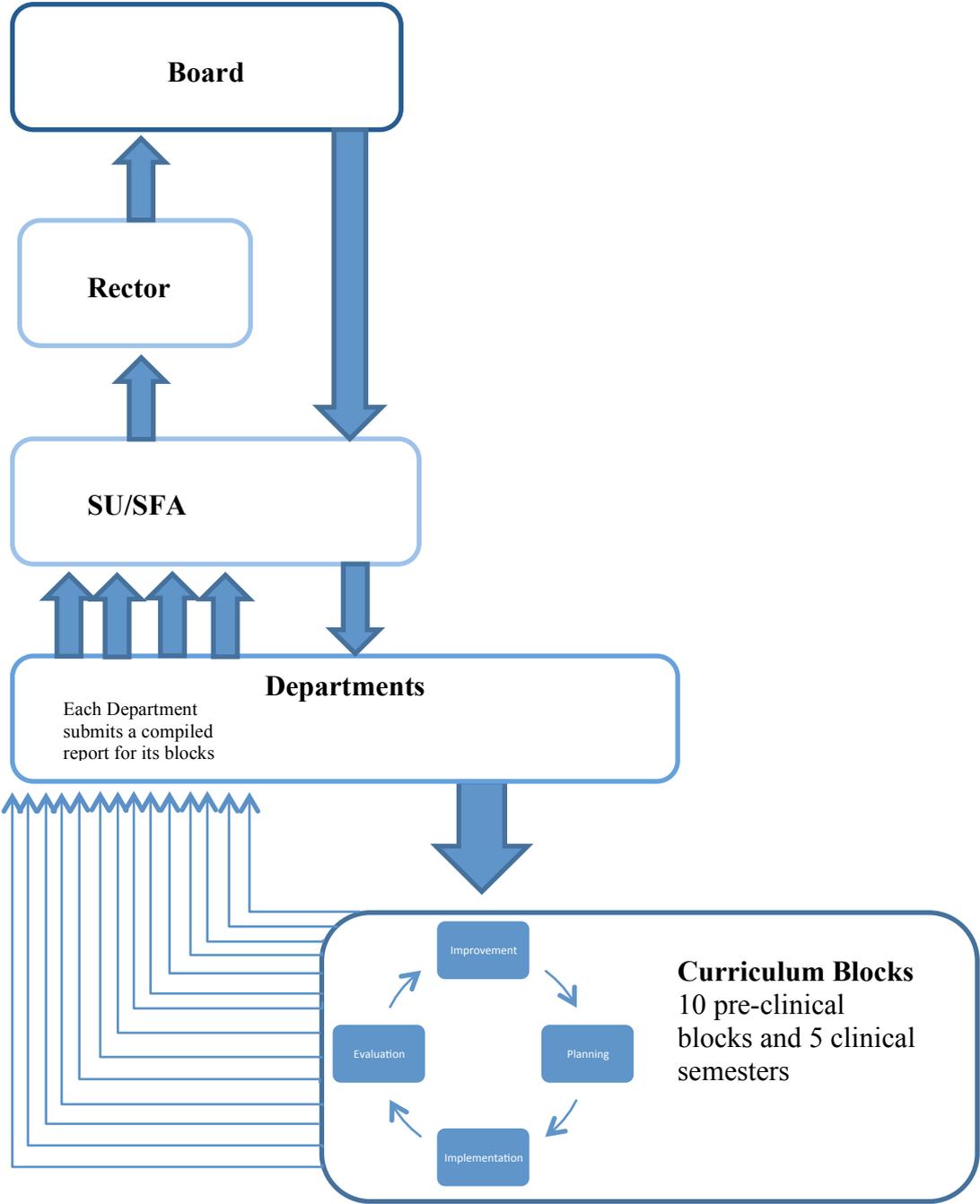
NOKUT evaluated NVH's quality assurance system in 2007 and gave good feedback, encouraging NVH to build on its existing system. The latest revision of the NVH system was undertaken in 2012 and recommended changes were adopted by the Board in 2013.

The Rector has responsibility for the allocation of hours and distribution of teaching within the veterinary curriculum as specified in the quality control system. Major revisions of the curriculum require the approval of the Board, as stipulated in the regulations and laws governing the School.

SU is required both by the quality control system and the regulations governing the school to conduct an annual revision of the veterinary curriculum. This revision is based on information obtained through the quality control system such as responses to questions of workload, comments of students, feedback scores of blocks, failure rates, input from committees such as RSA and in consideration to day-one skills and EAEVE reports, and the comments of teachers and Departments. During the 10 year period since the last EAEVE report, these annual revisions have resulted in changes to the length and content of blocks and to the procedures and organization of examinations.

The assessment of the balance between theoretical and practical teaching occurs with a major revision of the curriculum. It has been difficult to adjust the balance in the compulsory clinical semesters (semesters 8 and 9) but more surgery and clinical skills preparation has been allocated to semester 7 (preparation for clinics).

Figure 4.1 Management flow for the veterinary curriculum



4.1.1 POWER OF SUBJECTS AND TYPES OF TRAINING

4.1.1.1 POWER OF SUBJECTS

An overview of the curriculum is shown in Fig. 4.2. Most of the veterinary curriculum is composed of “core” subjects that must be taken by every student. These subjects account for 278.5 ECTS of a total of 330 ECTS and are mainly in semesters 1 to 9. There are some compulsory subjects in the final 2 semesters (8.5 ECTS). For the final 2 semesters of the veterinary curriculum, the students must an “elective” track from five (5) differentiation programmes, i.e., Production Animal Medicine and Food Safety, Small Animal Medicine, Equine Medicine, Insight into Aquatic Medicine, and Research project. The elective subjects account for 51.5 ECTS and may be taken in either semesters 10 and 11 (“autumn” graduates) or 11 and 12 (“spring” graduates). The veterinary students are required to perform 4 weeks of obligatory extramural farm work in the vacations between year 1 and 2.

4.1.1.2 TYPES OF TRAINING

The curriculum provides a considerable variety of teaching forms for the veterinary students including lectures, seminars, self-directed learning, desk-based and laboratory practical exercises, non-clinical practical exercise and clinical work. Table 4.1.1 shows the distribution of curriculum hours between the different types of training for “core” subjects. Tables 4.1.2 – 4.1.6 show the distribution of total curriculum hours for the five “elective” tracks including the graduation thesis.

4.1.1.2.1 Theoretical training

The EAEVE definitions of lectures and seminars have been followed. Lectures convey theoretical knowledge to the student and complement knowledge gathered from textbooks and increasingly from the internet. Lectures provide the student with a perspective of a subject and introduce students to concepts and principles and how they can be used in a particular subject. In general, lectures are given for an entire annual intake of students and are not obligatory.

Seminars can also be described as tutorials or group work and are supervised teaching sessions for smaller groups of students in which the students work as a team on aspects of theoretical, practical or case work. Curriculum hours allocated to preparation for seminars have been included in self-directed learning.

Self-directed learning refers to sessions of individual students making use of defined teaching material provided by the School (and other supportive material if they wish). It is related to theoretical training and also to preparation and deepening in practical matters. The hours for self-directed learning in Tables 4.1 and 4.2 do not include study work allocated to the student after curriculum contact hours. These hours also do not include time allocated for examination preparation. The writing of clinical case reports and pathology reports and a large component the graduation thesis in the differentiations tracks have been defined as self-directed learning. The differentiation tracks for Production Animal Medicine and Food Safety, Small Animal Medicine and Equine Medicine give the student the option of presenting a graduation thesis that is a literature review/case study, in addition to an experiment or clinical based study. For these three differentiation tracks, all curriculum hours for the graduation thesis have been

described as self-directed learning. For the differentiation tracks in Aquatic Medicine and in Research Project, the student is required to present a graduation thesis that involves an experiment or clinical based study. For these tracks, one third of the curriculum hours have been assigned to self-directed learning, one third to laboratory work and one third to clinical work.

Time allocated in the curriculum for examinations and time used by students for self-study and examination preparation are not included in the tables presented in this chapter.

4.1.1.2.2 Supervised practical training

The EAEVE definitions of laboratory and desk based work, non-clinical animal work and clinical work have been followed.

Laboratory and desk based work includes teaching sessions where students themselves actively perform laboratory experiments or use microscopes for the examination of histological or pathological specimens. It also includes work on documents and idea-formulation without the handling of animal, organs, objects or products (e.g. essay work, clinical case studies, handling of herd-health monitoring programmes, risk-assessment computer-aided exercises).

Non-clinical animal work are teaching sessions where students themselves work on normal animals, on objects, products or carcasses (e.g. animal husbandry, ante mortem and post mortem inspection, and food hygiene) and perform dissection or necropsy. Excursions to farms, slaughterhouses and processing plants and extramural training have been included in the “Other” category in Tables 4.1.

Clinical work has been used to describe strictly hands-on procedures by students which include work on normal animals in a clinical environment, on organs and clinical subjects including individual patients and herds, making use of the relevant diagnostic data. Surgery or propaedeutic hands-on work on organ systems on cadavers to practice clinical techniques are also classified as clinical work.

4.1.2 UNDERGRADUATE CURRICULUM FOLLOWED BY ALL STUDENTS

An overview of the undergraduate veterinary curriculum is shown in Figure 4.2. Most of the curriculum consists of “core” subjects that are compulsory for every student. The core pre-clinical subjects are organized into 10 “blocks” that represent a horizontal integration of EU-listed subjects taught in the first three years (6 semesters) of the curriculum. Each block adds a certain number of ECTS points (ca. 1.5 ECTS per week of teaching) and is concluded with an examination. During the summer vacations of the first or second years of study, each student is required to accumulate four weeks of determined practical work on a farm as part of the obligatory requirements of the curriculum.

The clinical training consists of one and a half years (3 semesters) of compulsory core training and one year (2 semesters) of elective track training (curriculum differentiation). The students can elect to undertake differentiation training in one of the following five tracks: Production

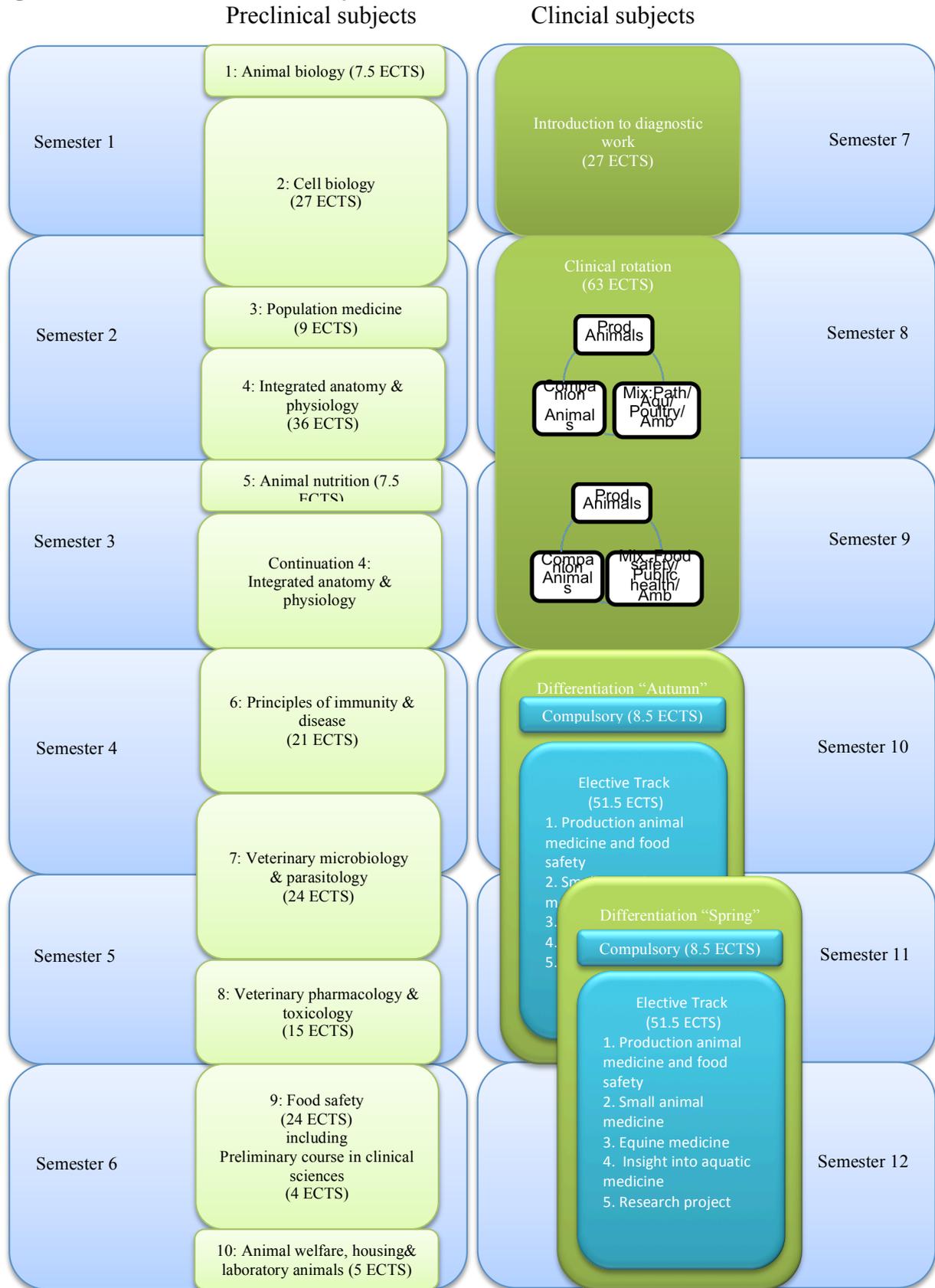
animal medicine and food safety, Small animal medicine, Equine medicine, Aquatic medicine or Research Project programme.

The first semester of core clinical training (7th semester) prepares the student for their subsequent training in the School's clinics. The two remaining semesters of core clinical training are organized into a rotation through the two clinical departments and a mix rotation in the disciplines of Food Safety, Pathology, Disease Control, Public Health and Fish Health. The eighth semester is earmarked as an international exchange semester.

The final year of the veterinary curriculum at NVH is devoted to elective track training. The numbers of study places in the respective tracks are: Production animal medicine and food safety 35, Small animal medicine 25, Equine medicine 10, Aquatic medicine 12 and Research Project programme variable. In the final year of study, the student is required to produce an essay (final graduation thesis).

The students can choose to graduate in the autumn and complete their final year in semesters 10 and 11 or they can graduate in the spring and study in semesters 11 and 12. This choice is made at the end of semester 8 and the division between autumn and spring graduates is approximately 45/25. The students that choose to graduate after the 12th semester do not take the two main clinical examinations in the 9th semester but instead takes these examinations in the 10th semester. During the 10th semester, these "spring graduates" do not follow normal teaching at NVH.

Figure 4.2 Overview of Veterinary Curriculum



4.1.2.1 CURRICULUM HOURS

Table 4.1.1: General table of curriculum hours taken by all students

Year	Hours of training						Other (G)	Total
	Theoretical training			Supervised Laboratory and desk based work (D)	practical training			
	Lectures (A)	Seminars (B)	Self- directed learning (C)		Non-clinical animal work (E)	Clinical work (F)		
First	281	152	179	88	65	0	7	772
Second	266	109	51	116	98	8	8	656
Third	320	143	55	114	6	33	9	680
Fourth	232	138	326	3	83	534	0	1315
Fifth*	64	48	38	0	27	455	0	632
Sixth*	18	36	0	0	0	0	0	54
Total	1181	626	649	321	279	1030	24	4110

* Excluding elective track courses 51.5 ECTS

Table 4.1.2: Curriculum hours in years 5 and 6 and for the full programme for students following the Production Animal and Public Health tracking programme

Year	Hours of training						Other (G)	Total
	Theoretical training			Supervised Laboratory and desk based work (D)	practical training			
	Lectures (A)	Seminars (B)	Self- directed learning (C)		Non-clinical animal work (E)	Clinical work (F)		
Fifth		105	50		58	225	20	458
Sixth		10	375		50	203		638
Total*	1181	741	1074	321	387	1458	44	5206

*Including obligatory teaching hours from years 1-6

Table 4.1.3: Curriculum hours in years 5 and 6 and for the full programme for students following the Small Animal Medicine tracking programme

Year	Hours of training						Other (G)	Total
	Theoretical training			Supervised Laboratory and desk based work (D)	practical training			
	Lectures (A)	Seminars (B)	Self- directed learning (C)		Non-clinical animal work (E)	Clinical work (F)		
Fifth		75	188	22		326		610
Sixth		38	188			321		546
Total*	1181	739	1024	343	279	1677	24	5266

* Including obligatory teaching hours from years 1-6

Table 4.1.4: Curriculum hours in years 5 and 6 and for the full programme for students following the Equine Medicine tracking programme

Year	Hours of training							Other (G)	Total
	Theoretical training			Supervised Laboratory and desk based work (D)	practical training				
	Lectures (A)	Seminars (B)	Self- directed learning (C)		Non-clinical animal work (E)	Clinical work (F)			
Fifth		95	258	18		281		614	
Sixth		38	233			295		528	
Total*	1181	759	1064	339	279	1605	24	5251	

* Including obligatory teaching hours from years 1-6

Table 4.1.5: Curriculum hours in years 5 and 6 and for the full programme for students following the Aquatic Medicine tracking programme

Year	Hours of training							Other (G)	Total
	Theoretical training			Supervised Laboratory and desk based work (D)	practical training				
	Lectures (A)	Seminars (B)	Self- directed learning (C)		Non-clinical animal work (E)	Clinical work (F)			
Fifth		42	91	101	40	84		360	
Sixth		35	147	86	41	191		500	
Total*	1181	703	888	509	360	1305	24	4970	

* Including obligatory teaching hours from years 1-6

Table 4.1.6: Curriculum hours in years 5 and 6 and for the full programme for students following the Research Project tracking programme

Year	Hours of training							Other (G)	Total
	Theoretical training			Supervised Laboratory and desk based work (D)	practical training				
	Lectures (A)	Seminars (B)	Self- directed learning (C)		Non-clinical animal work (E)	Clinical work (F)			
Fifth			169	244	85	159		657	
Sixth			169	169	84	159		582	
Total*	1181	626	987	734	448	1349	24	5348	

* Including obligatory teaching hours from years 1-6

Table 4.2: Curriculum hours in EU-listed subjects taken by each student (2012/2013)

Subject	Theoretical training			Supervised Laboratory and desk based work	practical Non-clinical animal work	training Clinical training	Other	Total
	Lectures A	Seminars B	Self directed learning C					
1. Basic Subjects								
a) Physics								
b) Chemistry								
c) Animal biology	26	4	57 [□]	8	9			104
d) Plant biology [□]	4			4				8
e) Biomathematics								
<i>1- Total number of hours</i>	30	4	57	12	9			112
2. Basic Sciences								
a) Anatomy (incl. histology and embryology)	88	27	15	64	154	8		356
b) Physiology	77	13	6	15				111
c) Biochemistry, cellular and molecular biology	68	71	18	26				187
d) Genetics	53	43	47				2	145
e) Pharmacology and pharmacy	66	20		4				90
f) Toxicology (incl. environmental pollution)	18	4		4				26
g) Microbiology (incl. virology, bacteriology and mycology)	68	18	24	66				176
h) Immunology	34	40	12	14				100
i) Epidemiology (incl. scientific and technical information and documentation methods)	46	51	42				1	142
j) Professional ethics	1	3						4
<i>2- Total number of hours</i>	521	290	164	193	154	8	7	1337
3. Clinical Sciences								
a) Obstetrics	45	9	9		7	66		136
b) Pathology (incl. pathological anatomy)	79	102*	35	33	57			306
c) Parasitology	28	16	12	18				74
d) Clinical medicine and surgery (incl. anaesthetics)	318	61	240	28	34	501		1182
e) Clinical lectures on various domestic animals, poultry and other animal species	22	6	3					31
f) Field veterinary medicine (ambulatory clinics)	5	6	4			99		114
g) Preventive Medicine	18	25	48	3	13	22		129
h) Diagnostic imaging (incl. radiology)	29	9	11			48		97
i) Reproduction and reproductive disorders	12	1	11	9		88		121
j) Veterinary state medicine and public health			38					38
k) Veterinary legislation and forensic medicine	23	6	30		24			83
l) Therapeutics	9		30			7		46
m) Propaedeutics (incl. laboratory diagnostic methods)	19	43	24	3	1	3		93
<i>3- Total number of hours</i>	607	284	495	94	136	834		2450
4. Animal Production								
a) Animal production	3		1				2	6
b) Animal nutrition	73	7	3				8 [•]	91
c) Agronomy								
d) Rural economics								
e) Animal husbandry	6	1	4				2	13
f) Veterinary hygiene	18	36						54
g) Animal ethology and protection	25	3	5				2	35
<i>4- Total number of hours</i>	125	47	13				14	199
5. Food Hygiene/Public Health								
a) Inspection and control of animal foodstuffs or foodstuffs of animal origin and the respective feedstuff production unit					3 [•]		9 [•]	12
b) Food hygiene and technology	48	68	30	62		38		246

c) Food science incl. legislation	62	21				38		121
d) Practical work (incl. practical work in places where slaughtering and processing of foodstuffs take place)					24			24
5- Total number of hours	110	89	30	62	27	75	9	402
6. Professional Knowledge								
a) Practice management	34	25						59
b) Veterinary certification and report writing						26		26
c) Career planning and opportunities								
6- Total number of hours	34	25				26		85

The entrance requirements for veterinary science at NVH require the students to have graduated from Norwegian upper secondary school with extended courses in mathematics and chemistry. These requirements are considered sufficient for the Basic Subjects of physics, chemistry and biomathematics.

□ Students work in groups of 5 - 6 to complete assignments on animal classification, osmoregulation, reproduction, homeostasis, tissue classification, transport within the body, reflexes and sensory systems. The groups deliver reports.

□ Taught in Veterinary pharmacology and toxicology in semester 5

*All students are able to participate in demonstration of pathology specimens every day for 1 year. The demonstration is held at 12.30 and lasts on average for 20 min, equivalent to around 80 lectures per year. For 20 weeks, the demonstration includes slaughterhouse material one day per week. Older students, clinicians and pathologists also participate and cases and findings are discussed.

• Visit to feed mill and experimental station. Excursions (e.g. to farms, slaughterhouses, processing plants) and extramural training are included in non-clinical practical work.

Table 4.3a: Curriculum hours in EU-listed subjects offered and to be taken as electives - Differentiation Production Animal and Public Health

Subject	Theoretical learning		Supervised practical training	Other	Hours to be taken by each student per group	
	Seminars	Self directed learning				
	A	B	C	D	E	F
Basic Subjects						
Basic Sciences						
Clinical Sciences						
Obstetrics: Clinical Reproduction					38	
Field veterinary medicine: Ambulatory clinic Emergency					113 40	
Clinical medicine, surgery and obstetrics: Hospital Porcine medicine Sheep lambing	10			10 20	38 65 45	
Preventative medicine: Herd health cattle Herd health sheep poultry	10			20 30	55 35	
Reproduction: Insemination course*					38	
Animal Production						
Food Hygiene/Public Health						
Veterinary public health Production hygiene Food safety****	50 45** 25	50 40		28*** 10		20
Professional Knowledge						

* May be elected instead of one week clinical training

** Including work in group (5-7 students after visits to food companies)

*** Visit to food production units.

**** May be elected instead of two weeks of clinical training. This course is planned according to each student's interests (food processing/technology, food inspection, advanced food microbiology/molecular microbiology etc.).

Table 4.3b: Curriculum hours in EU-listed subjects offered and to be taken as electives - Differentiation Small Animal Medicine

Subject	Theoretical learning		Supervised Laboratory and desk based work	practical training		Other	Hours to be taken by each student per group
	Seminars A	Self directed learning B		Non-clinical animal work D	Clinical training E		
Basic Subjects							
Basic Sciences							
Laboratory animal science*	12			8		4	
Clinical Sciences							
Clinical medicine and surgery:							
Small Animal Clinic					375		
Extra Clinic*					75		
Emergency	22		4		80		
Anaesthesia and pain	30				45		
Clinical neurology							
Pathology:							
Clinical pathology	8		14		16		
Diagnostic imaging:							
Small animal radiology	38				38		
Reproduction and obstetrics:							
Production animal	15		4		19		
Insemination course*					38		
Animal Production							
Food Hygiene/Public Health							
Professional Knowledge							

*2 weeks (75 hours) must be elected from these subjects or additional 2 weeks work on graduation thesis.

Table 4.3c: Curriculum hours in EU-listed subjects offered and to be taken as electives - Differentiation Equine Medicine

Subject	Theoretical learning		Supervised Laboratory and desk based work	practical training		Other	Hours to be taken by each student per group
	Seminars A	Self directed learning B		Non-clinical animal work D	Clinical training E		
Basic Subjects							
Basic Sciences							
Laboratory animal science*	12			8		4	
Clinical Sciences							
Clinical medicine and surgery:							
Equine clinic					375		
Extra clinic*					75		
Emergency					80		
Equine diseases	40	20					
Anaesthesia and pain	22		4				
Pathology:							
Clinical pathology	8		14		16		
Diagnostic imaging:							
Equine radiology	18				20		
Reproduction and obstetrics:							
Equine reproduction	20	8			10		
Insemination course*					38		
Animal Production							
Animal nutrition:							
Equine nutrition*	25	13					
Food Hygiene/Public Health							
Professional Knowledge							

*3 weeks (113 hours) must be elected from these subjects or additional 2 weeks work on graduation thesis.

Table 4.3d: Curriculum hours in EU-listed subjects offered and to be taken as electives – Differentiation Aquatic Medicine

Subject	Theoretical learning		Supervised practical	training		Other	Hours to be taken by each student per group
	Seminars	Self directed learning		Laboratory and desk based work	Non-clinical animal work		
	A	B	C	D	E	F	
Basic Subjects							
Basic Sciences							
Laboratory animal science*	12			8		4	
Pharmacology and pharmacy: Pharmacology	12				6		
Immunology: Comparative immunology Vaccinology	20	45	5				
Clinical Sciences							
Clinical medicine: Infectious diseases and diagnostic principles Disease control Clinical nutrition	10 15	15 6	20				
Field veterinary medicine: Clinical practice Extra practice* Ambulatory clinic*					75 75 75		
Reproduction: Insemination course*					38		
Animal Production							
Animal ethology and protection: Fish welfare	20	10			38		
Food Hygiene/Public Health							
Professional Knowledge							

*2 weeks (75 hours) must be elected from these subjects or additional 2 weeks work on graduation thesis.

Table 4.3e: Curriculum hours in EU-listed subjects offered and to be taken as electives – Differentiation Research Project

Subject	Theoretical learning		Supervised practical training			Other	Hours to be taken by each student per group
	Seminars	Self directed learning	Laboratory and desk based work	Non-clinical animal work	Clinical training		
	A	B	C	D	E	F	
Basic Subjects							
Basic Sciences							
Laboratory animal science*	12			8		4	
Laboratory methods: Infection medicine/vaccinology*			75				
Laboratory courses*			75				
Experimental laboratory course*				38			
Clinical Sciences							
Field veterinary medicine: Ambulatory clinic*					75		
Fish Clinical practice*					75		
Reproduction and obstetrics: Insemination course*					38		
Animal Production							
Food Hygiene/Public Health							
Professional Knowledge							

*6 weeks (225 hours) must be elected from these subjects.

Table 4.4: Curriculum hours in subjects not listed in Table 4.2 to be taken by each student, including Diploma work (final graduation thesis, or final graduation work)

Subject	Theoretical training			Supervised practical training			Other	Total
	Lectures	Seminars	Self directed learning	Laboratory and desk based work	Non-clinical animal work	Clinical training		
	A	B	C	D	E	F	G	
Laboratory animal science (6. Semester)	14							14
Diploma work (final graduation thesis for: Production Animal and Public Health Small Animal Medicine Equine Medicine)			375					375
Diploma work (final graduation thesis Aquatic Medicine)			163	163	81	81		488
Diploma work (final graduation thesis Research Project)			338	338	169	169		1013

4.1.3 FURTHER INFORMATION ON THE CURRICULUM

Obligatory parts of the programme and measurement of attendance

The obligatory requirements of the curriculum are specified in the Study Plan and are subject to Norwegian legislation (§5.4, 6.2 and 6.3). If a student discontinues their study without permission for longer than 3 months, they lose their right to study at NVH. If a student does not attend examinations or obligatory teaching and does not respond to the inquiries of the Study Department (SFA) for a period of 3 months, the student is deemed to have discontinued their studies.

The specific requirements of the blocks and clinical semesters are specified in the Study Plan. In general if absent from obligatory teaching, the student should deliver a doctor's certificate or other confirmation of absence to SFA. The student should also contact the Block Leader or responsible course teacher to organize to meet the obligatory requirement. Varying methods are used for replacing absences. The Block Leader or responsible course teacher is required to report to SFA before the final examination all students that have not fulfilled the obligatory requirements. Students lacking the obligatory requirements are either not allowed to take the final examination or approval of the final examination is withheld until the obligatory requirements are met. Students are required to have produced a certain number of credits to continue to the next academic year after the retake period in August. The attendance record used in the clinics confirms that students have the necessary clinical teaching and routines are in place to check that students show the appropriate professional and ethical attitudes.

In general, all lectures are voluntary and all supervised practical teaching is obligatory (80% - 100% attendance is required based on the type of exercise). An attendance list is commonly used in large groups.

Specific information on practical clinical training

The clinical training at NVH consists of one and a half years (3 semesters) of compulsory core training and one year (2 semesters) of elective track training (curriculum differentiation). The compulsory core clinical training occurs in semesters 7, 8 and 9.

Prior to the commencement of clinical training, the students undertake a “Preliminary course in clinical sciences” in semester 6. This course is embedded in Blocks 9 and 10 and involves groups of students (4 groups of 15 students) rotating through clinical themes each Wednesday morning for the first 14 weeks of the semester. Parallel with Block 10, the students receive an orientation on clinical training to commence in the following semester, in addition to courses in Obstetrics and Diagnostic Methods.

The 7th semester is entitled “Introduction to diagnostic work” and prepares the student for their subsequent participation in the obligatory clinical rotations in the School’s clinics. The teaching is based on organ systems of animals that are presented as thematic modules, in addition to further courses in Obstetrics and courses in Preventative medicine and Reproduction. The students are divided into 6 groups (ca. 10 students per group). Each morning (3 hours from 09-12) for the first 6 weeks of the semester, the groups rotate through Pathology (9 mornings), Production Animal Clinic (6 mornings), Equine Clinic (2 mornings), Small Animal Clinic (0.5 morning), Herd Health (5 mornings) and Laboratory Animals (2.5 mornings). There is also a course in Preventative Medicine.

The core clinical training that occurs in semesters 8 and 9 is organized into a rotation through the two clinical departments and a mix rotation in the disciplines of Food Safety, Pathology, Disease Control, Public Health and Fish Health. Courses and clinical duty are compulsory. Weekend and on-call duties are compulsory.

In the 7th and 8th semester, groups of students (ca. 8-12 students) are given obligatory practical training in Pathology. These students are divided in 2-4 smaller groups depending on number of cases delivered for autopsy. All students participate in this activity for 4 periods in total (5+5+4+4 days) from 9am – 12 am every day. The students perform an autopsy on their own case for 2 hours and then each group presents its findings for the other students. The activity is supervised by a pathologist. The groups present a written summary on their case with descriptions of findings and suggestions of morphological diagnoses and possible etiologies. This written summary has to be approved by the teacher.

The 8th semester begins with a week of teaching in “Diseases in wildlife and semi-domesticated reindeer”, “Aquatic animal medicine and fish health” and “Disease of poultry”. Subsequently the students are divided into 3 groups (ca. 20 students per group) for rotation through 1.) Production Animal Clinic; 2.) Small Animal and Equine Clinics; and 3.) Mixed block of Pathology, Aquatic Medicine, Poultry Medicine and Ambulatory Clinic. For 2 weeks in this semester, all the students are located at NVH’s facilities in Sandnes on the Norwegian south-west coast. The students are divided into two groups and each group has one week of Aquatic Medicine at Hjelmeland and one week of Small Ruminant Medicine at Sandnes.

For the compulsory clinical rotations through the Clinics, the three groups of students are further divided into 5 sub-groups of ca. 4 students.

The compulsory clinical rotation through the Small Animal and Equine Clinics occurs in semesters 8 (5 weeks per group) and 9 (4 weeks per group). Each sub-group receives in total 2 weeks of small animal surgery (1+1 week), 2 weeks of small animal medicine (1+1 week), 2 weeks of First Opinion practice (1+1 week) and 3 weeks of equine medicine and surgery (2+1 week). Teaching in Diagnostic Imaging is included in the rotations. Anaesthesia is taught during small animal surgery rotation. The Emergency Services of the Small Animal and Equine Clinics are part of the structure clinical rotations. All students participate in evening and nights on-call, up to a maximum of 3 nights per rotation week.

The compulsory clinical rotation through the Production Animal Clinical Sciences involves 4 weeks in both semester 8 and semester 9. The sub-groups of students receive 3 weeks teaching in the Medicine/Surgery/Obstetrics Clinic (2+1 week), 2 weeks in the Reproduction Clinic (1+1 week), 1 week in Herd Health (8th semester) and 2 weeks in the Ambulatory Clinic (9th semester). The students participate in the Emergency Services of the Production Animal Clinic.

The compulsory mixed clinical rotation in 8th semester involves the sub-groups participating in Pathology, Ambulatory clinic and Pathology/Poultry/Aquatic Medicine. A course in Professional Ethics is conducted in 8th semester. In the 9th semester, the sub-groups rotate between Food and meat inspection (1 week in Sandnes), State Veterinary Medicine (1 week including 3 days at Norwegian Food Safety Authority, Oslo) and Epidemiology (1 week).

For the Differentiation track in Small Animal Medicine, the student is required to spend 10 weeks in the clinics (First opinion practice, Surgery clinic, Medical clinic) and can elect to spend an additional 2 weeks in the clinics. During this period in the Small Animal Clinics, each student participates in 1 shift (8 hours) of on-call duty per week. The student must deliver 20 case reports for patients that the student has had responsibility and these reports are to be approved by the supervising clinician. The differentiation student will work on clinical cases with the younger rotation students and is expected to give these students guidance and advice in clinical work.

The activities and case responsibilities in which students participate in the clinics

During their clinical rotations, students participate in all the work of the clinic under the supervision of veterinary teachers and other staff. The students work in the Small Animal Hospital, the Equine Hospital and the Production Animal Hospital (including the Ambulatory Clinic). Students learn to handle animals, communicate with clients, assess the clinical condition of the patient and apply their theoretical knowledge in practical work. The activities and responsibilities of the students vary between the hospitals and clinical services. In all clinical services, students are responsible for taking a thorough medical history and performing a physical examination of all patients. Based on that, the students create a problem list, differential diagnosis and diagnostic plan, which they present to an attending clinician and with whom they discuss the case. The guidelines for the practical work are given in each unit separately, and general information is available on Fronter.

At the Small Animal Hospital, students discuss information about the patients the day before or latest on the same morning. In the Internal Medicine Service, the students read the referral letters and patient files the day before and present their cases in the morning discussions. The case presentation includes a detailed description of clinical signs (signalment), a problem list,

differential diagnosis and diagnostic plan, and these are all discussed with together with the attending clinicians.

Students are involved with all diagnostic tests performed on their patients. They are responsible for taking the laboratory samples from their patient with the help of veterinary nurses and/or clinicians. Students are also responsible for taking their patients to diagnostic imaging services and for helping with other diagnostic procedures their patients need. The students perform basic surgical procedures with the clinicians and assist surgeons in more advanced surgical procedures.

Students are responsible for recording the patient's history and physical examination findings in the patient files. In surgery services, the students are responsible for describing the surgical procedures. The students also write the discharge statement. The clinician confirms that all the information is correct and finalizes the patient files. The students are given problem-orientated teaching and are expected to write problem-orientated journals. Each student must deliver 5 journals from each of their rotations in the Small animal internal medicine clinic, the First opinion practice and the Small animal surgery service. These 15 journals must be approved by the supervising clinician for each rotation.

Students assigned to Small Animal Internal Medicine attend morning rounds where new hospitalized patients from the Emergency Service and new internal medicine cases are presented. The students then work with the admission of external patients including the taking of histories and communication with clients. The students examine the old and new patients in their care and update the patient's journal in consultation with the clinician. The students give a short presentation of their cases (white board meeting) and the proposed diagnostic plan. The students participate in further diagnostic procedures, journal writing and eventual discharge of patients. An afternoon white board meeting is held to summarize the status of patients that are not to be sent home. This meeting is attended by students that will be on emergency duty. A systematic presentation of cases or a special clinical theme is presented at lunch meetings on Tuesdays and Thursdays.

In 8th and 9th semester, students participate in various organized activities in the Small animal surgery service. The students participate in the work-up of surgical patients for 2-3 days a week. One day per week, the students receive basic surgical training, mainly ovariohysterectomy of cats. For one day per week, the student is involved in the anaesthesia of different patients and for another day the works with diagnostic imaging. With the work-up of surgical patients, there is a meeting every morning where students are assigned to patients for the duration of the patient's hospitalization period. The students are responsible for daily physical examinations, daily status updates, medication administration, bandage/dressing changes and other care of their patients. In the afternoon at the end of the day, there is a discussion concerning the treatment or diagnostic plan for the day's patients and planning for the next day's patients.

In Diagnostic Imaging, students practice taking and evaluating radiographs. Radiographic evaluation is practiced with a formal session where the students spend one day with small animal radiographs and one day with large animal radiographs, in addition to the evaluations that occur during each case workup. The students follow ultrasound examinations. The students also participate in seminars on radiographic and ultrasonographic physics and techniques. The differentiation track students have an elective two week course in diagnostic

imaging for small animals, and one week for large animals. A one-hour demonstration of clinical cases takes place every week during the last month before final examinations.

In the Equine Hospital, students are divided into internal medicine and surgery. In the morning rounds, each student presents information on their hospitalized patient. The students take the patient's medical history, perform a physical examination and write a problem-orientated summary for each patient, but unlike the Small Animal Hospital, students in the Equine Hospital are not responsible for writing patient files or discharge statements. In the afternoon, all patients staying in the hospital overnight are briefly discussed with the emergency clinician. Teaching rounds are held once weekly on Wednesday afternoons.

At the Production Animal Hospital ("Stationary clinic – surgery and medicine"), the students are assigned to specific hospitalized animals and are expected to do a full patient work-up including the necessary diagnostic tests and diagnosis. The students administer the necessary treatment in agreement with their teacher. A student version hospital journal (on paper) is used as a teaching and assessment tool. The student also provides frequent oral status reports to their teacher.

Students take part in night duty which consists of night rounds to assess the condition and progress of patients, as well as providing medication and extra feed to patients in need of additional nutrition e.g. young calves that depend on a milk diet.

All aspects of stationary clinic duties are mandatory. The students are required to have their attendance record for each week in each clinical service signed by that week's teacher. The completed form is delivered at the end of the Production Animal rotation to the Leader of the stationary clinic who is responsible for examinations.

Students assigned to Production Animal courses at the Section for Small Ruminant Research and Farm Animal Health at Sandnes are given wide responsibilities in handling the Section's own 180 sheep during lambing, as well as sheep received from the region. There are one to several caesarians performed per day during 4 weeks of the lambing season (two courses), as well as handling of numerous other diseases around lambing. The county of Rogaland has the highest population of farm animals in the country, and particularly during the lambing season, the availability of animals, both live and dead, is very good. The students are expected to have direct contact with the farmers, and treatment and recommendations are given related to the flock situation, and in agreement with the teachers.

Student involvement in the emergency and hospitalization activities of the clinics

Students participate in on-call and emergency work during semesters 9, 10 and 11. The Emergency Service of the Small Animal Hospital is a part of the structured clinical rotation.

In the Emergency Service of the Small Animal Hospital, students take the patient's medical history, perform a physical examination and then present the patient to the clinician as they do during normal working hours. The problem list, differential diagnosis and diagnostic plan are discussed with the clinician. Diagnostic procedures are performed by the students with the help of a clinician, and the students, together with the clinician treat the patient accordingly. The students are responsible for recording the medical history and physical examination findings in the patient files and on discharge statements.

In the Emergency Service of the Equine and Production Animal Hospital, students assist the clinicians in treating the patients. The students perform a physical examination for each patient and assist the clinician with diagnostic and treatment procedures.

At the Production Animal Hospital, students perform night checks of the patients and administer the necessary medications.

Student participation in the activities of the mobile (ambulatory) clinic

The mobile clinic operates as a regular farm practice, based at the veterinary school. A group of two to four students accompanies the clinician to the farms. Student involvement is profound as our goal is to have the student take responsibility for all steps of the work, from history taking to diagnosis and treatment. The student is expected to suggest the relevant additional tests and to investigate the relevance of preventative measures in each case. Student involvement applies to surgical cases as well as medical cases and herd health visits. Students are also responsible for some maintenance and tidiness of drugs and equipment used by the mobile clinic.

Student performance is in part monitored directly by teacher supervision. There is an extensive use of student journals, presentations and case reports. Participation in all aspects of the mobile clinic is mandatory and attendance records are kept by the teachers.

In the course of their mobile clinic rotation, the students take part in a mandatory on-call duty during which they are available for emergency calls for about two weeknights and one weekend. The students are also involved in the clinical work of these emergency calls.

4.1.4 OBLIGATORY EXTRAMURAL WORK

In the summer vacation between the first and second year of study, veterinary students are required to work for four weeks on a farm to gain practical knowledge and experience of normal farm production in Norway. The practice should preferably be on a dairy farm, but milking goats or piglet production is also accepted. There must be at least 10 cows in production (or 20 goats milking or 10 sows farrowing) in the period of the student's visit. Each week must have at least 37.5 hours of work.

After the period of extramural work, the students must write an individual report that has to be approved by the supervising teacher. The report must contain data from the production and the health status of the farm and compare this with the average in Norway. There must also be a description of the farm and how the animals are held including descriptions of housing, feeding, milking procedures, biosecurity, management and observations concerning animal welfare and how the farm's production is in accordance with Norwegian legislation. Students that have been excused from these four weeks because of previous practice must also write such a report.

After completion of the 3rd year of study (semester 6) and before the end of their studies, students must complete 4 weeks of extramural work in veterinary practices. The students are required to spend 2 weeks in a production animal practice, 1 week in a small animal or horse practice. The student is free to choose the type of practice for the 4th week of extramural

practice work. The veterinary practice may in Norway or abroad. The hosting veterinary practitioner must complete a form confirming that the student was present for the allocated period (one week is 37.5 hours).

Table 4.5: Obligatory extramural work that students must undertake as part of their course

Nature of work	Hours	Percentage of total study time (4970h-5348h) ²⁾	Year in which ¹⁾ work is carried out
Practical farm work (4 weeks)	150	2.80%-3.02%	Year 1
Extramural veterinary practice work (4 weeks)	150	2.80%-3.02%	Year 3 – Year 5

¹⁾If these periods of extramural work take place during vacations, then the preceding academic year should be entered in the last column of Table 4.5

²⁾From Tables 4.1.2-4.1.6

4.1.5 SPECIFIC INFORMATION ON THE PRACTICAL TRAINING IN FOOD HYGIENE/PUBLIC HEALTH

The basis for the practical training in meat inspection and related topics and food control is the theoretical teaching in the 6th semester, which includes a full-day excursion to abattoirs that also perform deboning and processing. Half of the students (35 students) visit the Nortura abattoir at Rudshøgda (150 km from Oslo), which is an abattoir slaughtering cattle, pigs and sheep/lambs and the other half of the students visit the Nortura abattoir at Tønsberg (103 km from Oslo), which is an abattoir slaughtering cattle and pigs. Both plants have facilities for deboning, processing and packaging.

During the rotation in the 9th semester, groups of four to six students live at campus Sandnes for one week and are trained in meat inspection including animal welfare, slaughter hygiene and HACCP. The students have to demonstrate theoretical knowledge within these topics during the examination held on the last day of the rotation week. In addition, the students also have to demonstrate practical skills related to the post-mortem inspection. In the 9th semester, three abattoirs are used for training in meat inspection and related topics for four-legged animals and one abattoir for poultry. Details about the content of the training and information about the abattoirs such as name, animal species slaughtered, travel distances and the duration of training each day are presented in Table 4.6. On one visit, groups of two to three students join officers from the Norwegian Food Safety Authority to inspect food businesses in the Sandnes region.

A Veterinary Officer employed by Norwegian Food Safety Authority in Sandnes is responsible for the training during the rotation week. The responsible veterinary officer works with and delegates training tasks to the official veterinarians at the relevant slaughterhouses. He/she also works in close contact with the Professor responsible for meat inspection at NVH in Oslo. The Professor responsible follows the training of one of

the groups during one whole rotation week at least every second year for revision of the training and the system.

	Monday	Tuesday	Wednesday	Thursday	Friday
Abattoir Food producers etc.	Fatland , Jæren Slaughter cattle, sheep/ lambs, pigs. Deboning	Nortura Egersund Slaughter cattle	Nortura Hå, Kviamarka Slaughter poultry, processing, packaging and Norwegian Food Safety Authority, Sandnes: Inspection of food producers, restaurants etc.	Nortura Forus Slaughter pigs, sheep/ lambs:	Fatland, Jæren
Travel distance from Campus Høyland by car (km)	13	55	30	10	13
Training hours:	7	7	4 + 3	6	-
Topics: Theory (T) Practical (P)	HACCP (T/P) Evaluation of slaughter hygiene (T/P). PM* (P)	Cattle: Transport, AM**, PM, animal welfare, slaughter hygiene, HACCP, emergency slaughter, SRM, byproducts (T/P)	In the morning: Slaughtering of poultry, animal welfare, AM, PM In the afternoon: Inspection of food businesses	Pigs and sheep/lambs: AM and PM, animal welfare, slaughter hygiene (P)	Oral examination (P/T)

PM*= Post-mortem inspection

AM**= Ante-mortem inspection

4.1.6 RATIOS

4.1.6.1 GENERAL INDICATORS TYPES OF TRAINING

	Total training incl. Prod Anim & Pub Health track	Total training incl. Small Anim Med track	Total training incl. Equine Med track	Total training incl. Aquatic Med track	Total training incl. Research Project track	EAEVE guidelines
Ratio R6						
Total theoretical training (A+B+C), hours	2996	2944	3004	2772	2794	
Total supervised practical training (D+E+F), hours	2166	2299	2223	2174	2530	
Denominator of (A+B+C)/(D+E+F), as 1/denominator	0.723	0.781	0.740	0.784	0.906	0.576
Ratio R7						
Total clinical work (F), hours	1458	1677	1605	1305	1349	
Lab work and desk-based work (D) + non-clinical animal work (E), hours	708	622	618	869	1182	
Denominator of F/(D+E), as 1/denominator	0.486	0.371	0.385	0.666	0.876	1.952
Ratio R8						
Self-directed learning (C), hours	1074	1024	1064	888	987	
Total teaching load (A+B+C+D+E+F+G), hours	5206	5266	5251	4970	5348	
Denominator of C/(A+B+C+D+E+F+G) as 1/denominator	4.847	5.143	4.935	5.598	5.420	2.576-103.746

4.1.6.2 SPECIAL INDICATORS OF TRAINING IN FOOD HYGIENE/PUBLIC HEALTH

	Core veterinary programme training	Total training incl. Prod Animal and Public Health track	EAEVE Guidelines
Ratio R9			
Total compulsory training load in food hygiene/public health (X), hours	402 ¹	595 ³	
Total compulsory training load (Y), hours	4110 ²	5206 ⁴	
Denominator of X/Y, as 1/denominator	10.224	8.750	0.725 – 98.437
Ratio R10			
Total compulsory training load in food hygiene/public health (X), hours	402	595	
Total compulsory extramural work within Veterinary Inspection (Z), hours	27 ⁵	27 ⁶	
Denominator of X/Z, as 1/denominator	0.067	0.045	0.061-0.881

Origin numerators, denominators

1: Total as derived in Table 4.2, Subject 5

2: Total as derived in Table 4.1.1

3: Total as derived in Table 4.2, Subject 5 and Table 4.3a

4: Total as derived in Table 4.1.2

5: Total from 27 h in 9th semester. Off-site visits that occur in 6th semester have not been defined as extramural as veterinary students are accompanied by teachers from NVH and/or work with tasks defined by NVH.

6: Total from core curriculum (27) only and none from Table 4.3a. Off-site visits that occur in the final differentiation year have not been defined as extramural as veterinary students work with teaching material and tasks defined by NVH.

4.2 COMMENTS

The major change to the veterinary curriculum at NVH in the last 10 years has been the introduction of the tracking system in the final year of study. It has been NVH's experience that the veterinary students graduating from these 5 tracks have better competence in their selected track than graduates had in these fields after completing the previous curriculum. This increased competence better prepares the graduate for the selected sector of the veterinary profession. An important development of the veterinary curriculum at NVH has been the education of veterinarians to a level of competence that gives a competitive advantage for work within the aquaculture sector in Norway. Norway is the world's leading exporting country for Atlantic salmon and the aquaculture industry is of great importance for Norway. The core curriculum introduces the veterinary students to the industry. The differentiation track in Aquatic Medicine deepens knowledge of the veterinary challenges facing the industry and provides training in the field and exposure to an "aquaculture network".

The differentiation tracks give graduates added competence in a selected sector of the veterinary profession but the core veterinary curriculum at NVH qualifies all graduates to receive authorization as veterinary surgeons from the Norwegian Food Safety Authority and to be able to work within all fields of the veterinary profession. In the first years of their professional career, many graduates change their field of work or find employment in combined practices. The current curriculum and the tracking system do not hinder graduates from working in fields other than their tracking field. The core curriculum necessarily gives less clinical training in for example equine medicine for those students that do not follow the Equine Medicine track compared to the amount of clinical training given in that field to all students in the previous curriculum. However, the many comparative aspects of the three clinical tracks contribute to giving the graduates a depth of clinical insight and training that can be applied to other sectors of the veterinary profession.

The establishment of the project-related track at NVH has encouraged veterinary students to plan for a career in research. NVH believes that veterinarians can contribute to research not only at NVH/NMBU and the Norwegian Veterinary Institute but also in other life science arenas both nationally and internationally. In the national budget for 2014, the government will fund a research year for seven veterinary students each year. Whether the project-related track will continue with the introduction of a research year will have to be evaluated.

The Aquatic Medicine track and the Project-related track do not contain as much traditional veterinary clinical training as the three other tracks. However, these two tracks give the students extensive practical laboratory training in addition to field training in the aquaculture industry or with their research group. Aquatic Medicine track students may choose to take some of their elective weeks in clinical practice.

The curriculum and its courses undergo adaption and modification each year. For the academic year 2013/2014 changes have been made for example to the 7th semester and 8th semesters. In 7th semester, a course in Therapeutics has been introduced and an additional week of clinical preparation and an additional course in surgical technique. In 8th semester, the Professional Ethics course has been included. Each student gets 12 hours from 2014.

The current curriculum has been in place for over 10 years and the Rector has initiated in 2013 a total curriculum revision. As commented upon above, the current curriculum has shown certain strengths but it has also revealed some weaknesses. Following the move to the Ås campus of NMBU in 2019, it is planned that veterinary studies will admit 90 students each year. The current curriculum is not designed for this number of students. A great challenge for the current curriculum has been “curriculum overload” and a course of study that begins with large, theory intensive blocks and delays clinical and animal contact. It has been for example difficult to introduce new topics focusing on acquisition of generic and professional skills into an overloaded curriculum.

4.3 SUGGESTIONS

The experience gained from the current curriculum and its strengths should be taken into work with the total revision of the veterinary curriculum to produce a course of study suited to its new place in NMBU and the needs of the veterinary profession in Norway.

Chapter 5. TEACHING AND LEARNING: QUALITY AND EVALUATION

5.1 FACTUAL INFORMATION

5.1.1 THE TEACHING PROGRAMME

5.1.1.1 Coordination and evaluation of teaching and courses

The veterinary curriculum at NVH is organized into blocks for the pre-clinical teaching and clinical semesters for the clinical teaching (See Figure 4.2). The Rector is advised on the veterinary curriculum by the Undergraduate and Continuing Education Programmes Committee (SU). SU cooperates with the Head of Studies (SFA) in the overall coordination of the curriculum. The responsibility for an individual block or clinical semester is assigned to one of the Heads of Department at NVH who in turn assigns the academic and administrative responsibility for coordinating teaching to a Block Leader (or Semester Leader). Within a block or semester, the teachers may be organized into courses that are coordinated by a Course Leader who reports to the Block Leader.

The general evaluation framework for quality assurance in teaching of the veterinary curriculum entails a “Quality Cycle” that consists of an annual process of planning, implementation, evaluation and improvement and this cycle is used at the local level in each block, at the aggregated level in each department and at the overall level of the institution. These cycles culminate each year in an annual report of study quality that is submitted to the Board. The report provides the status of evaluations and presents student results and analyzes that have been made in the preceding year. The report contains suggestions for measures to improve veterinary education for the coming year. In the following academic year, the administration, the committees and academic departments in the various subjects initiate actions. These are ongoing processes aimed steadily to improve study quality. The annual processes of preparing the study quality report and implementation of action are shown in Figure 4.1. The quality assurance framework at NVH was evaluated by the Norwegian Agency for Quality Assurance in Education (NOKUT) in 2007. NOKUT is the controlling authority for educational activity at all Norwegian universities, special field universities, university colleges and institutions with single accredited higher education programmes and is a member of the European Network for Quality Assurance in Higher Education (ENCA). Through an evaluation procedure, NOKUT decides on the recognition of the institution’s internal quality assurance systems and carries out checks to see whether their educational provision meets national quality standards. NOKUT is an independent organization under the Department of Education (KD) and its authority is regulated by the Universities and College Act. NVH received a very good response to the quality assurance work and was encouraged to build on the existing system. NOKUT has decided that a new evaluation of the quality assurance system at NVH will take place after the incorporation of NVH in the new university, NMBU.

5.1.1.2 Pedagogical strategies at NVH

Research based education

NVH is a specialized university institution and is required by law to have research and education as its primary activities and deliver research-based education. The School's strategy states: "NVH will provide research-based educational programmes that meet the Norwegian and European accreditation requirements and qualifications framework." In NVH's document "Research-based education", the School presents its understanding of the term and how education and teaching are research-based at NVH. The majority of NVH's teaching is conducted by active researchers, who divide their time between teaching and research. The students from early in the veterinary curriculum and through-out the curriculum are exposed to research methods and are taught from updated and evidence-based knowledge. The veterinary curriculum also gives students the opportunity to engage in research through interaction with the active research groups at NVH.

Block structure

The veterinary curriculum has been organized into blocks to provide for a horizontal integration of EU-listed subjects during the first three years of study. The block structure presents students with knowledge from across traditional fields of study. This interdisciplinary approach to pre-clinical subjects aims to promote a broader understanding of biological principles. The curriculum contains elements of spiral teaching in that some themes are presented in a number of blocks and are developed through the course of study. For example, pathology is introduced as a theme in semester 4 in the block "Principles of immunity and disease" and is returned to in the clinical semesters 7 and 8. The theme of pathology is continued into the core clinical semesters 8 and 9 through the coordination of pathophysiology teaching. The vertical nature of a veterinary education is retained in the curriculum particularly with the transition from pre-clinical to clinical subjects. In semester 6, propaedeutics and some clinical themes are introduced breaking up the block structure of the semester.

Lectures, seminars and courses

Teaching is delivered predominantly through lectures, seminars and practical courses in the preclinical blocks. Problem-based learning is not used in its pure form, but elements of it can be found in various teaching situations. Case-based and case-orientated teaching is used throughout the studies. Small group teaching and learning are used in various forms including seminars and self-directed learning. Practical exercises, especially those with hands-on experience are greatly valued particularly for anatomy dissections, microscopy, necropsies and examining microbiological samples or physiological preparations. Experience with problem-solving in small groups and a familiarity with hands-on practical work are considered important preparations for clinical learning.

5.1.1.3 Textbooks, course note materials and e-learning

The students are encouraged to use veterinary textbooks, even though most textbooks are in English. All course descriptions contain a reference list of textbook materials on which the course syllabus is based. Course notes including copies of PowerPoint presentations, compendia and self-directed learning exercises are made available to students on NVH's intranet (Hippocampus; Fronter). Students prefer having copies of the teacher's PowerPoint presentations available in good time before the lectures. Teachers in some disciplines

supplement the textbooks with compendia, particularly if the national context differs considerably from that of the textbook. Supplementary audio-visual materials such as videos of demonstrations and non-clinical/clinical practical exercises are available through the Library. Students are encouraged to use the internet as a source for supplementary material.

eLearning

In 2013, NVH will move from "*Hippocampus*" as a student information web channel to "*Class Fronter*" as an E-learning platform. This platform will provide new opportunities, as it will be possible to post videos, and will make a greater degree of interactivity possible. In population medicine, posting lecture recordings on the web has been tried. This has been popular with students.

5.1.1.4 Extramural teaching arrangements

Extramural teaching arrangements are organized by the departments or Block Leaders at the different departments to support undergraduate teaching within the veterinary curriculum. The following contractual arrangements with farms, veterinary practices and slaughterhouse companies have been established:

Farms

The ProdMed Department has an agreement with UMB that makes available the milking herd at UMB for teaching veterinary students pregnancy diagnosis and for the teaching of rectal ovarian palpation for herd reproductive performance and health. The herd has about 50 cows.

The field course in aquatic medicine held in 8th semester is conducted in collaboration with Marine Harvest (<http://www.marineharvest.com/>), one of the largest fish-farming companies in Norway. The field course is run in Hjelmeland (50 km from Sandnes campus) on the western coast and allows the students to visit several fish farms and to become familiar with the possibilities and also the challenges in fish farming. The course includes visits to hatcheries, smolt farms and sea-sites for salmon, land-based and cage farming of halibut, slaughterhouse, well-boat, visit to an enhancement plant for wild salmon (hatchery), necropsy sessions and assignments. This arrangement provide a first class contact between fish health practitioners, staff at the fish farms and the students and is an excellent arena for discussions on relevant fish health and welfare topics.

Slaughterhouses and State veterinary services

NVH and Norwegian Food Safety Authority have a bilateral agreement regarding teaching in meat inspection. NVH has an agreement with the District Offices of Midt-Rogaland and of Dalane, Sirdal and Flekkefjord to provide teaching in meat inspection for students from NVH. The teaching takes place in slaughterhouses and food companies in Rogaland and is performed by official veterinarians. NVH determines the scope of instruction and the topics that are taught.

5.1.1.5 General learning objectives underlying the veterinary curriculum and how these are ensured

As detailed in the Study Plan of 2012, the general learning objectives for the veterinary curriculum are:

NVH will educate veterinarians that:

- have good basic knowledge and skills in veterinary medicine so that they can work to improve animal health, public health and animal welfare
- understand both the meaning of the terms "one health - one world" and "animal's own value" and act ethically in line with this
- have a broad understanding of the nature of scientific issues and are able to identify, formulate and solve complex problems within the veterinary field of work and research
- have the ability to communicate in an understandable, efficient and respectful manner with clients, the public, colleagues and responsible authorities
- know their professional limitations, and safeguard professional liability through further education, training and professional development throughout life

To ensure the achievement of these objectives, SU has worked with the Block Leaders and Clinical Semester Leaders to identify both the goals for each Block or Clinical Semester and the learning outcomes. A learning outcome is the knowledge, skills and generic competencies that the student will have with the successful completion of the course of study. The learning outcomes for each Block or clinical course are detailed in the Study Plan of June 2013.

5.1.1.6 Assessment of Day 1 competences

In parallel with the work to identify learning outcomes, the contribution of all Blocks and clinical courses in the veterinary curriculum to the EAEVE Day-1-skills of the graduate have been specified in the Study Plan. The learning outcomes of the Quality Reform and the Day-1-skills of EAEVE are both systems that use the terms knowledge, skills and generic competencies of the graduates. Thus, passing all obligatory studies ensures that the student has acquired the necessary knowledge and skills during the course of study to fulfill the requirements of Day-1-skills as a new graduate.

All clinical rotations are mandatory, and it is the students' responsibility to ensure their attendance is recorded and signed off. There are stipulated demands for competencies and attitude while in the clinic. These stipulations are to be found in the document called "Approval of clinical rotations on the veterinary science course".

While on clinical rotations, the students participate actively in the diagnostic work-up of the patients. They work independently, and under guidance of the clinical staff. These rotations are not demonstrations, on the contrary, it is expected that the students work actively and independently in all aspects of patient work-ups, including client communication.

After 9th semester, veterinary students at NVH can apply for a license as a veterinarian ("student license"). For the granting of this license, it is a requirement that the student has completed 3 of 4 weeks of extramural practice work (in production animal and in small animal and equine practice) and all compulsory clinical teaching in 9th semester has been approved. The Study department collects information on the approval of clinical teaching from the clinics at NVH and checks submitted documentation of extramural practice work. Based on this information, the Study department submits the necessary documentation and a list of students to the Norwegian Food Safety Authority, which is the authority that grants the license.

RSA committee is a forum for contact between NVH and the veterinary profession and has been a venue for discussion of the quality and competence of veterinary graduates.

5.1.2 THE TEACHING ENVIRONMENT

5.1.2.1 Staff development facilities, particularly in relation to teaching skills

Veterinary surgeons and veterinary nurses in Norway are obliged by the law governing animal health professionals to keep professionally up to date. The development of teaching staff is a responsibility of the Departments at NVH. Staff members are encouraged to take part in national and international congresses and in continuing education.

NVH has a policy of research based education and encourages Professors and Associate Professors in teaching positions to conduct research as part of their job. The teaching staff is encouraged to present their research at national and international conferences and establish international networks. There is a system for sabbaticals that allow academic staff to take a leave of absence from their teaching duties at NVH to travel and stay abroad to increase their research and teaching skills. As with other academic institutions in Norway, Professors and Associate professors are entitled to one year's paid leave after every 6 years of teaching. Teaching staff that may fulfill the requirements for a full professor position or an associate professor position are encouraged to apply for promotion. Deadline for applications is September 15 every year. Successful applicants receive a personal promotion.

The Veterinary Undergraduate and Continuing Education Programmes Committee (SU) is responsible for organizing educational seminars for the teachers at NVH. Both national and international lecturers have been used for this purpose. Various assessment methods in veterinary medicine and professional ethics among others have been topics. There has been great interest among the teachers for these seminars. SU also arranged meetings where various educational topics have been up for discussion, such as the implementation of learning outcomes in the study programs descriptions. The teachers have asked for more seminars about education and the new university may provide more resources in this field.

5.1.2.2 Reward for teaching excellence

NVH has a system for rewarding teaching excellence. The Pegasus Prize is awarded by the Board at the end of year graduation ceremony to individuals who have distinguished themselves in teaching and communication. The prize has been awarded 6 times since 2004. A Committee proposes candidates on the basis of nominations from students and staff. The prize consists of a diploma and 6250 €.

Teaching blocks that receive very good evaluations in the Study Quality Report are given special attention at the annual review of the report by NVH's central management group. Heads of Department relay this praise to the block leaders and teachers.

Pedagogical skills and the development of new teaching programmes are one of five criteria taken into consideration during local salary negotiations for academic staff. This financial

incentive supports teaching as an area of expertise and encourages good performance. The teachers are also evaluated by scientific merit.

5.1.2.3 Other measures taken to improve the quality of teaching and of learning opportunities

The importance of didactical and pedagogical development is generally raised in the annual appraisal meetings between a teacher and their nearest leader, usually the section leader. Various aspects of the teacher's work are discussed such as evaluation of teaching, scientific production, external funding, career developments and plans for the coming year. These meetings help to identify needs for teacher development. The Head of Department is responsible for following up individual teachers and to convey both praise and criticism given through student evaluations.

Employment regulations for teachers at NVH require documented competence in relevant educational theory and practice. A lack of pedagogical skills has to be compensated within the first two years of employment by attending a course in pedagogics (10 ECTS credits).

5.1.3 THE EXAMINATION SYSTEM

Examination policy

Enrolled students are assessed regularly using consistently applied, published criteria, regulations and procedures. Examination and assessment are strictly controlled through national legislation and local regulations at NVH. Plans for examinations, different assessment methods and grading system are made publicly available on the internet every May for the upcoming academic year through the published "Study Plan" at NVH. According to the Universities and University Colleges Law, there must be external examiners for all University examinations in Norway. Furthermore, the achieved grade from the examinations is to be available on the student's internet account 3 weeks after the examination. The law requires a regulated complaints procedure. NVH has regulations and procedures to follow when students fail an examination. Regulations also require that all the grades are entered in the Student administrative system (FS) and aggregated student results are reported and published on the website of the Database of Higher Education (DBH). In the annual Study Quality Report, the grade distribution and failure rates are given for each block and clinical rotation for the year. NVH's quality policy is to have transparency with the examinations and student results.

NVH's examination system and grading are strictly regulated through "Regulations for Admission, Studies and Examinations at NVH". Further instruction and guidelines are given in the following documents:

1. For internal and external examiners:
 - "Study plan and term schedules"
 - "Manual for Block leaders"
 - "Academic and formal quality assurance for written examinations"
 - "Guidelines for External Examiners' Manuals"
 - "Guidance for External Examiners"
 - "Criteria for grading in Norwegian and English"

2. For students:
 - “Study plan and term schedules”
 - “Manual for students”
 - “Sheets for Examination Applications”
 - “Instructions for examination candidates on written examinations”
 - “Information about failure monitoring”
 - “Complaint Sheets and information about the complaint procedures”
 - “Criteria for grading in Norwegian and English”

3. Staff at Study department
 - “Study plan and term schedules”
 - “Administrative procedures and forms for SFA”

Additional documents:

- “Guidelines for Clinic Approval for 8th and 9th Term”
- “Guidelines for thesis work”

All these documents are publicly available on NVH’s Web site (www.nvh.no).

Forms of examination and examination periods

In the current curriculum, the teaching is organized into blocks and clinical rotations. Each block involves teaching across several EU-listed subjects, and is concluded with an examination. Some blocks also have mid-term examinations.

NVH uses mostly written and to a lesser extent oral examinations at the end of a block. Often the written examinations are a mixture of short answer assignments, multiple choice questionnaires, photo assignments and essays. Several blocks also have written examinations in the middle of a block that contribute to the final grade. The final examination may then be a major written examination or an oral examination. After the 9th semester, there are large clinical examinations (“long case”) in production animal medicine including poultry and in small animal medicine and in equine medicine. Students must write a report in the style of a scientific paper in the wild and reindeer medicine in 8th semester and a thesis is submitted in the final year (15-20 ECTS). Students, who have chosen the research project differentiation, have to write a thesis at Master level (40 ECTS) and perform a presentation and discussion with the examiners. In most blocks, there are also requirements that must be passed in order to take the examination. These requirements can be in the form of group work and presentations, case discussions, testing laboratory skills, written tests and compulsory courses, which require the presence and optionally submitted reports and journals. There is a separate approval for the clinic weeks, and students who show poor attitude and behavior can have one or more weeks disallowed.

Detailed descriptions of examinations and the requirements to pass the examinations are available in the “Study Plan” and on the student intranet site (Hippocampus to 2012 and Fronter from 2013). Students have access to previous written examinations. Some blocks give students the opportunity to take a test examination, and the examiners tell them how they will have judged this examination. The clinical departments have a trial examination, and the students are allowed to watch clinical examinations and presentation of the thesis. However, very few students use this opportunity. The students also have the right to see their assignment, any examiner manuals and complaints after a written examination.

Examinations and retakes

Final examinations occur at the end of each block. Students are normally free to read 1-3 weeks before the examination. Retakes are placed in the last week of the summer holidays or in the Christmas holidays. The curriculum requires that students have produced a certain number of credits to continue to the next academic year after the retake period in August. In some cases, exemptions can be granted after application to the Rector, but usually professional and academic standards are given most weight in assessment of the student's circumstances. Students who fail three times at the same examination lose their right to study at NVH. The student can apply to the Rector for a 4th attempt. The Rector decides whether a 4th attempt will be permitted after a conversation with the student and Head of the Studies. These decisions may be appealed to the Board of Appeals. The maximum time a student may use to study veterinary science is 8 years. Legal leave such as maternity leave is added to this period.

In May/June, every student that has failed a final examination is advised in a letter from the Study department of the consequences of not achieving the required production of credits after the retake period of August. The student is informed of the examination rules and of the consequences if they do not pass the examination at retake. The student is invited to a counseling session at the Study department, if they want. If a student does not pass the retake examination and is not allowed to continue to the next year of study, the student must have a meeting with the Head of the Studies and Rector.

External examiners and grading of examinations

Examinations can be graded either as pass/fail or as A-F equivalents on the ECTS scale. NVH always uses more than one examiner, and includes at least one external examiner. One of these examiners is normally experienced. The Rector appoints external examiners for 5 years. The Act relating to Universities and University Colleges states that: "An external evaluation shall be made of the assessment or assessment arrangements." The normal practice at NVH is to employ external examiners for each student examination. However, when an examination is of a pass/fail multiple choice format an external assessment is made of the examination arrangements but the actual grading is performed internally. An external examiner's manual is available that is relevant for most blocks. External examiners also participate in examination meetings to discuss the awarding of a grade for each student. The grading form for each examination is signed by all external examiners and the internal block leader before it is delivered to the Study department. For the written examinations, the document "Academic and Formal Quality Assurance for Written Examinations" serves as a checklist and quality assurance of the examination and examiners.

The examiners have three weeks to submit the grading after the examination. The student's grades are made available to the student at their anonymous account through the student web (part of the FS system). The grades are also exported to the Norwegian State Educational Loan Fund. The achievement of ECTS credits and study progression allows some of a student's study loan to be converted to a scholarship. NVH reports all student data to the Database for Higher Education once to three times a year. NVH is required by law to have quality control procedures for checking the correctness of student data and this may be controlled by the Office of the Auditor General of Norway. Students' examination papers are stored centrally according to the Archives Act (1992) and the student's final graduation thesis is supplied to the NVH library.

5.1.4 EVALUATION OF TEACHING AND LEARNING

The assessment of the quality of teaching and learning in NVH is conducted through the recruitment, development and evaluation of teaching staff. In addition, the quality of learning is assessed through the definition of learning outcomes and attention given to the acquisition of Day-1-Skills in veterinary graduates.

Recruitment

The regulations for the recruitment of staff at NVH are based on “Norwegian Act Relating to Civil Servants” and “Norwegian Act Relating to Universities and University Colleges”. These regulations define the requirements for teaching, postgraduate supervision and scientific merit of educational staff. Documented competence in relevant educational theory and practice based on training or on teaching and supervision is a criterion for employment. If lacking, pedagogic skills have to be acquired within the first two years of employment by attending a course in pedagogics (10 ECTS). This requirement is normally emphasized both in instructions for the position and in the job posting. The hiring process is assured by both appointing an expert evaluation committee, a recommendation committee and the Appointments Board of NVH. The expert evaluation committee produces an assessment based on the applicant’s qualifications, including teaching skills. From this assessment, the recommendation committee invites selected applicants for interviews and decides whether trial lectures are required. The recommendation committee submits a graded evaluation of applicants to the Appointments Board for quality assurance and a final decision on the applicant to be offered the position.

Development

Veterinarians and veterinary nurses in Norway are obliged by the Act relating to Veterinarians and other animal health personnel (2001 no. 75) to be professionally up to date. Development of teaching staff in accordance with this law is a responsibility that lies at the department level at NVH.

The needs and requirements for staff members to develop their competence in teaching are important topics of discussion at the annual appraisal meetings that are conducted at NVH. A teacher has the appraisal meeting with their nearest leader, usually the Section Leader. For staff members with teaching and research responsibilities, these discussions include the evaluation of teaching, scientific production, external funding, career development and plans for the coming year. A plan of action for each member of staff is drawn up at the interview for implementation during the following year.

The Head of the Department is responsible for following-up individual teachers where the students have a complaint and to convey both praise and criticism that emerge from student evaluations.

Role of students in assessing teachers

NVH has had a student evaluation system in operation for more than 30 years. The student evaluation system was digitalized in 2005 and further developed in 2011. With the introduction of a computerized system in 2005, the students are able to comment anonymously on the performance of teachers at the completion of each block. The Head of

Department responsible for a block receives these comments and has the responsibility to follow-up. NVH does not collect scores for individual teacher. The follow-up is usually in the form of a conversation between the teacher and the Head of Department. At one department all the teachers receive the uncensored comments about themselves. If the nature of the criticisms warrants it, the Head of Department initiates a followed-up. If the problem is not resolved through a conversation, other measures may be introduced including use of teaching aids, changes in teaching methods or in extreme cases assignment to non-teaching tasks. Mentoring, supervision from colleagues and pedagogic training may also be tried.

Through the evaluation system, NVH obtains information about the students' results and the students' satisfaction with different blocks. With the identification of a problem, SU may instigate a review process for a block. If a block receives a poor student evaluation or experiences a high failure rate (over 15%) then a series of measures is implemented. The initial response is that the Block Leader must submit a report identifying the problem(s) and proposing measures to improve the teaching performance of the block to the Head of Department. If the Head of Department considers it appropriate, external evaluators or external pedagogic assistance are enlisted to aid the Block Leader in addressing the identified problems. This process has for instance been undertaken for the blocks in Animal Biology, in Population Medicine and in Anatomy and Physiology in the current study plan. The Block Leader together with the other main teachers has cooperated with pedagogic competent person(s) in developing the didactic and pedagogic components of the blocks. Such a process also improves the teachers' pedagogical skills.

5.1.5 STUDENT WELFARE

Zoonoses and physical hazards

All students are required to be vaccinated against tetanus at the start of veterinary studies. Vaccination is available through the SiO health service. If students are to take part in an exchange to countries where rabies is present or where other vaccines are required, students are also required to ensure that they have the appropriate vaccination status. Pregnant students need to take special precautions when handling certain agents or animals suspected of suffering from a zoonosis. Pregnant students are encouraged to inform teachers at startup in subjects that could pose a risk.

The students at NVH, along with all university staff, are covered by the Norwegian Working Environment Act regarding health, environment and safety (HMS). The HMS system at NVH has a central HMS coordinator. The Department responsible for the teaching has the responsibility for the necessary safety training of students and the implementation of Norwegian HMS regulations. HMS instructions for the appropriate use of laboratories, clinics and pathology and anatomy dissection halls must be followed. (See chapter 6).

The "Manual for students" deals with all matters in relation to environment, health and safety measures for students. The handbook contains information on emergency fire routines, security measures in laboratories, procedures for injuries or accidents and other matters such as allergies. The handbook is available on the NVH intranet, Synapse. Information detailing protocols to be followed when students are injured is given in "Manual for students". All injuries that occur are required to be reported to the HMS committee that is required to follow up on the matter. There has been some concern that too many students are injured during their

study time at NVH. In 2012, 9 students reported injuries and by November 2013 injuries had been reported by 7 students.

Under each subject in the Study plan, the safety training given in the block is specified. The students receive general information on safety matters during their first days of study at NVH and compulsory instruction in emergency fire routines on their second day of study. At the commencement of a course or study that involves special risks such as laboratory work, dissection work in anatomy and pathology and work in the clinics, the students are given special instruction in security routines, requirements for behavior, use of equipment and handling of animals. The students also receive instruction in routines to be followed in the case of injuries or accidents. The students are covered by the Norwegian national health insurance for injuries that occur during teaching at NVH. NVH as a governmental institution does not have personal accident insurance for its students. The students are strongly recommended to have private health insurance to cover chronic injuries. Students are encouraged to attend the annual first aid course, which is an initiative by the student organization VSU.

Facilities (not related to the teaching programme) provided for students

Foundation for Student Life (SiO)

SiO (www.sio.no) is a student welfare organization for all students in Oslo and Akershus county. All universities and colleges that receive government grants are associated with a student welfare organisation whose role is to look after the students' welfare needs at their places of learning. SiO provides services to approximately 55,000 students at 26 educational institutions in Oslo and Akershus. The membership of SiO is obligatory and the compulsory semester fee is 550 NOK (ca. 70 EUR). SiO has psychologists, social workers and doctors and is a free, low threshold service for all student members. SiO provides student housing, fitness facilities, bookstores, dentists and kindergartens for all students in Oslo and Akershus. The canteen and bookstore in the welfare building on NVH's Campus are run by SiO. The welfare building also provides fitness rooms, locker rooms and a bodega on campus for students at NVH.

At NVH there is a private kindergarten, which students and employees with children can use. There is also a kennel for students and employees dogs.

Student Organizations

The Veterinary Students' Organization (VSU) is a political organ for students at NVH and is the official link between veterinary and veterinary nurse students and NVH. VSU has meetings with Rector, Director, Prorector and Head of the Studies every six weeks, and informs the rest of the students weekly by mail about their work. Students run many social activities for students through the Students Social Organization (VSF). VSF has regular meetings twice a year with Rector, Director, Prorector and Head of the Studies.

Guidance offered by the School for students with problems

The Study Department

At the start of study, students are informed orally and given written information about being a student at NVH. Students have their own mentor programmes and many social activities for the new students. The Study department informs about the curriculum, regulations and the student organization for all students in Oslo and Akershus (SiO). The Head of the Studies also organizes a meeting where students who have studied one year at NVH inform the new

students on study techniques and habits. Information meetings are also given later in the study organized through the Study department. Center for Further and Continuing Education (SEVU), Study department and associations for veterinarians and veterinary nurses organize a career day at NVH. In 2013, about 137 students participated. At NMBU, there will be a Careers Center for Students.

The Study department practices an open door policy. Students do not need to make appointments to talk to a supervisor. The Study department has an international adviser who takes special care of students going on exchange or international students who come to NVH. The study department systematically monitors the student exam results and has routines for written information and follow-up of students with study problems (See SER2). If a student is unable to follow the expected progression, a new education plan is made for the student. If necessary, the supervisor at NVH informs the student about the health care at SiO.

LMU

Under the Universities and Colleges Act, NVH is required to have a Learning Environment Committee (LMU) that works with the students' physical and psychological learning environment. This committee reports directly to the Board and produces an annual report on its activities and the status of NVH. In 2005, LMU completed a major health and welfare survey in collaboration with psychologists and doctors at SiO and students at NVH. LMU has subsequently completed 3 learning environment surveys in 2007, 2009 and 2011. Students participated very actively in the efforts to create and follow-up these investigations. In anticipation of a planned national survey in 2013, a special learning environment survey at NVH is not planned for 2013. These surveys among other things monitor how satisfied students are with the school's support and welfare services. NVH also obtains information about academic stress and work pressure on the students. SiO psychologists who have participated in these surveys have offered stress management courses open only to students in NVH. NVH has collaborated with student advisers at the SiO student counseling to offer courses on study technique. Interest among students has dropped off in recent years, so these courses are currently not offered.

5.2 COMMENTS

NVH has had very few pedagogical resources. The new university will be a larger institution and will have increased resources available for teaching and learning. From 2014, new possibilities for example regarding e-learning as a pedagogic tool will be available as UMB has both experience and educational expertise in this area.

NVH considers that there have been too many injuries to students in the clinics and laboratories. To address this concern, NVH has appointed a HMS coordinator and has included HMS in the student evaluation questionnaire completed by students at the end of each block or clinical rotation. In student evaluations from 2012, students have been asked whether they have received adequate safety training, and whether they felt that the necessary precautions to avoid injury and zoonosis were taken. Most students from the preclinical years (ca. 90%) report that they have received adequate instruction in HMS but fewer students from the later clinical years (ca. 70%) are satisfied with the instruction received. The responsibility to follow-up on HMS lies with the Head of the responsible Department. In 2013, a programme of HMS risk-assessment analysis was initiated.

5.3 SUGGESTIONS

The systems set in place to follow-up injuries to students and staff should be given more resources to promote awareness and to prevent injuries at NVH. The programme of risk-assessment analysis in the laboratories, clinics and teaching facilities at NVH should be followed.

Chapter 6. FACILITIES AND EQUIPMENT

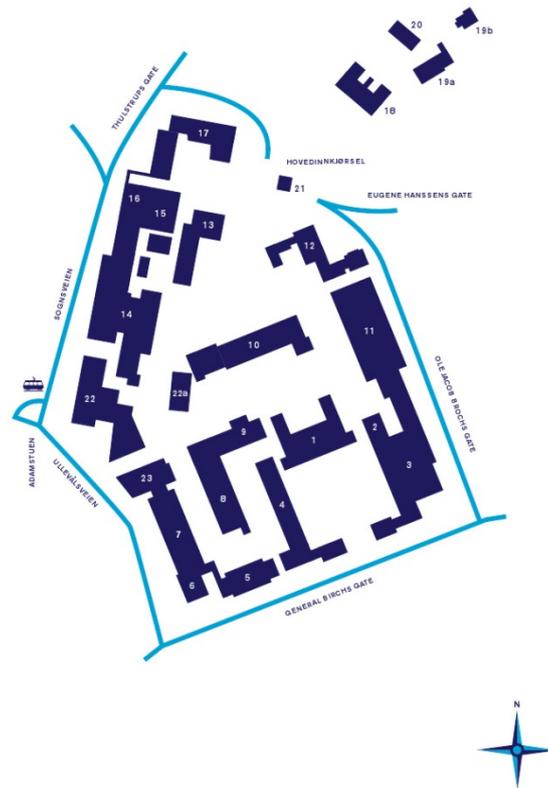
6.1 FACTUAL INFORMATION

6.1.1 PREMISES IN GENERAL

The Norwegian School of Veterinary Science has its main campus at Adamstuen in Oslo. NVH also has a research farm at Sandnes and farm facilities on the campus of the University of Life Sciences (UMB) at Ås.

The Adamstuen Campus covers approximately 6 hectares close to the centre of Oslo and has good transport links to the various parts of the city. The Norwegian Veterinary Institute (NVI) and the Norwegian Food Safety Authority (Mattilsynet) share the site. Campus Adamstuen is close to the main buildings of the University of Oslo (UiO) and to the largest Norwegian teaching hospital (Oslo University Hospital). At the Adamstuen Campus, the academic departments and teaching facilities of NVH are housed in about twenty buildings, which include the national veterinary library, which is part of NVH and student and staff welfare facilities.

Figure 6.1.1a Adamstuen campus of NVH



1. Main Building: Administration, Section for Anatomy and Pathology (BasAM), Section of Genetics (BasAM), Ceremony Hall, Auditorium 1 and 2, Computer rooms (2) and student reading rooms (2).
2. Veterinary museum
3. Equine clinic (SportFaMed), Horse Loft seminar rooms 1, 2 and 3, and student reading room
4. Production animal medicine, surgery and obstetrics clinic (ProdMed), Auditorium 3
5. Norwegian Veterinary Institute
6. Norwegian Veterinary Institute
7. Norwegian Veterinary Institute
8. Section of Genetics (BasAM), Norwegian Veterinary Institute
9. Pathology necropsy rooms (BasAM)
10. Technical services
11. Ambulatory clinic (ProdMed), First opinion practice "Poliklinikk" (SportFaMed), Small animal surgery clinic (SportFaMed), Auditorium 5, and student reading room
12. Internal medicine (SportFaMed), IT department, and Parasitology (MatInf)
13. Reproduction clinic (ProdMed), NKK sperm bank, and Auditorium 6
14. Pharmacology and toxicology (MatInf), Section of Biochemistry and Physiology (BasAM), Section of Genetics (BasAM), Section of Experimental Biomedicine (ProdMed), Auditorium 4, Auditorium 11 (Biochemistry laboratory), Auditorium 12
15. Food Safety (MatInf)
16. Auditorium 7 (Microbiology and Microscope laboratory)
17. Student welfare building: Canteen, dining room, book store (Akademika), training room, and changing rooms.
18. Microbiology and Immunology "Lindern" (MatInf)
19. a. Guest Hostel (3 units); b. Student and Staff Kindergarten
20. Gym Hall
21. Security Station
22. Library, Common Auditorium, and Norwegian Food Safety Authority
23. Centre for Epidemiology and Biostatistics (EpiSenteret), Aquatic Medicine (BasAM)
24. VESO

The original veterinary school buildings (Buildings 1-4, 9-12 on map) were built in 1925/35 and the general structure of these buildings are under the protection of the Directorate for Cultural Heritage. These facilities were originally designed to accommodate 30 students but are now used to service an intake of 70. The age of the other buildings ranges from the 1950's (Buildings 13) to 1995 (Building 22). The buildings that house the teaching facilities vary considerably in age and quality. Investment in new buildings at the Adamstuen campus will not occur given the decision of the Norwegian Government to fund the building of new veterinary facilities at Campus Ås in association with the establishment of the Norwegian University of Life Sciences.

Lecture theatres:

The School has six lecture theatres of 68 - 80 places located in Buildings 1, 4, 14, 11 and 13 (Table 6.3; see Map). The theatres are equipped with modern data projection and audiovisual equipment. NVH shares the use of a 180 place auditorium (Common Auditorium) and seminar room (AUD 8) that was built in 1995 with VI and NFSA. The lecture theatres (AUD 1 - 4, 6) have been renovated to accommodate the increased intake (from 60 to 70) of veterinary students.

Teaching laboratories

For the pre- and paraclinical disciplines, NVH has a large laboratory (AUD 7, "Microbiology and Microscope laboratory") that can accommodate the increased intake of veterinary students (70 places). The laboratory is used for teaching histology, embryology, microbiology, parasitology and histopathology. There is a further general teaching laboratory (AUD 11 "Biochemistry laboratory") with capacity for 34 students working in pairs (17 work stations). This laboratory is used for teaching biochemistry, pharmacology and toxicology, cell biology and physiology. Other working rooms (such as blood chemistry room) are also used for practical teaching.

Clinics

The clinics on the Adamstuen campus (see map) include the Equine clinic, Production Animal Medicine Surgery and Obstetrics, Small Animal Medicine, Small Animal First Opinion practice, Small Animal Surgery Clinic, and Reproduction clinic.

Seminar rooms

For student seminars and group work, NVH has four blocks of seminar rooms placed adjacent to the building 15. There are a further two seminar rooms in the Library (Auditorium 8). Three rooms for group work have recently been built in connection to the Equine clinic (Loft 1-3, see Table 6.4). There are also rooms for practical work within the various departments and sections.

Computer rooms and facilities

NVH has two computer rooms with available computers and printer/copier options. NVH has a wireless network (WiFi) available for students across NVH.

Anatomy teaching

Anatomy teaching is given in the facilities located in the original NVH building that was designed for 30 students. The first dissection room is about 80 m² with stainless steel tables. It is joined by a further dissection room of similar size, which is partly occupied by tiered seats. There is a cool room adjacent to this dissection room. A spiral staircase leads up to a similar space on the floor above, which houses an anatomy museum and student study area. A

separate student changing room is located on the same floor as the dissection rooms. The data and audio-visual facilities have been upgraded to improve teaching in the two dissection rooms and a lift has been installed between the two floors to improve movement of specimens and equipment.

Pathology teaching

The necropsy facilities are located in Building 9 and comprise a student changing room, a staff changing room, a demonstration room with 70 seats and a necropsy room of about 150 m². The necropsy room contains a rail hoist, fixed and moveable stainless steel tables and a chilling room for carcasses. The staff and student changing room is shared with VI as its necropsy facility adjoins that of NVH.

Student facilities

NVH has a range of rooms available for small group work including student self-directed studies. There are 5 student reading rooms with places for ca. 200 students. There are two computer rooms with 35 computers that students have access to from 08:00 – 23.00. The rooms available for group work include rooms with practical material, such as the anatomy museum/study area and the histopathology group room. Access is based on swipe cards and/or numeric keypads.

Various non-academic facilities for the veterinary students are available at the Adamstuen campus, mainly within the welfare building. There is a student refectory (canteen) where lunch and dinner are served on weekdays, a bar (bodega), a training room and changing rooms with showers and a sauna. The students have their own office for the activity groups in the School. There is a sports pitch and a separate student gym on campus and a student cabin at Lommedalen. Students are entitled to 8 of the 38 kindergarten places available at NVH. Veterinary students are affiliated with the Foundation for Student Life in Oslo (SiO), which manages several thousand student room accommodation in the Oslo area. SiO also offers a broad spectrum of sporting and social activities. SiO catering service has the contract to run the student refectory.

Biosecurity and renovation work at Adamstuen Campus

Biosecurity at the Adamstuen Campus has specific challenges in its aging buildings, increasing patient, staff and student numbers exceeding the capacity of buildings and facilities and insufficient internal barriers and outdoor zones. Nevertheless in the last ten years, there has been an increased focus on biosecurity to reduce the risk of introducing transmissible diseases to the Adamstuen campus and to avoid transmission within the campus. NVH has corrected deficiencies where possible and raised awareness towards biosecurity in general. These measures include improvements to buildings, implementation of protocols and general practices for students and staffs and guidelines for visitors/owners, as well as alterations in the curriculum and other structural modifications.

Some specific measures have been:

- i. Sluice areas are established in all production animal clinics.
- ii. Isolation facilities for large animals and small animals, respectively, are established.
- iii. Protocols for admissions/hospitalization of production animals and horses have been developed. General practices concerning personal protective clothing and quarantine procedures have been established.

- iv. Guidelines posted as signs at entrances for horse and dog/cat owners give instructions about bring animals into the entrance or waiting areas.
- v. Students are given a lecture in Biosecurity early in the first semester with emphasis on how to behave at Campus Adamstuen in general and the Microbiology and Microscope laboratory (AUD 7) in particular. Students are also given a one-week mandatory course (2 ECTS) in biosecurity during their final year.
- vi. NVH has appointed one person to be responsible for the biosecurity at Adamstuen Campus.

Biosecurity is central in the planning of the new buildings and facilities at Campus Ås.

External facilities

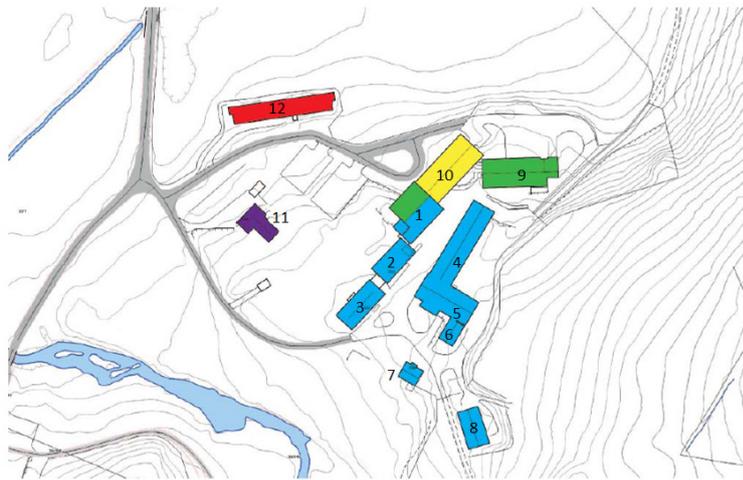
NVH has farms and field stations in different parts of Norway;

1. Research farm at Ås (together with UMB), 40 km south of Oslo, with cattle, small ruminants, pigs and other species.
2. Research/Teaching farm at Sandnes, Rogaland County on the south-west coast of Norway, about 600 km away from Oslo with small ruminants and abattoir facilities.
3. Artic veterinary research centre in Tromsø, in the far north of Norway. This facility will no longer be part of NVH from 01.01.2014 and will be incorporated into the University of Tromsø.
4. Use of the sea farm services at Frøya on the west coast and Hjelmeland on the south-west coast for aquaculture and aquatic medicine teaching. These sites cover the entire production chain (principally salmon), including brood-fish stations, hatcheries, production units and abattoirs.

Sandnes Campus

The Sandnes campus of NVH is located at Høyland in Sandnes, Rogaland County on the south-west coast of Norway and is about 600 km away from Oslo. The region has the most highly concentrated number of farm animals in Norway and one of the highest in Europe.

Fig. 6.1.1b Sandnes campus of NVH



NVH's buildings are shown in blue and purple. Buildings shared with Norwegian Veterinary Institute (NVI) are shown in green. Norwegian Food Safety Authority (NFSA) build is shown in red. The laboratory building is shown in yellow and is shared between NVH, NVI and NFSA.

1. Offices and Auditorium
2. Laboratories
3. Library and student accommodation
4. Research farm
5. Isolation facilities
6. Surgical facility
7. Farm manager
8. Agricultural equipment
9. Necropsy facility
10. Shared laboratories
11. Student accommodation
12. Norwegian Food Safety Authority

The campus houses the Section of Small ruminant research and farm animal health of the ProdMed Department. The campus has 10 buildings, a sheep house with space for 180 winterfed sheep, around 600 ha of agricultural land (the experimental farm), isolation facilities (closed entity with 9 boxes for 27 sheep, and 11 open boxes for 35-40 sheep), surgery facilities, post mortem rooms, laboratories for clinical pathology, pathology and molecular biology, bacteriology and parasitology. Presently, there are active research projects within prion diseases and in vector borne and parasitic diseases. The regional laboratories of the Norwegian Veterinary Institute and the Norwegian Food Safety Authority are also located at the site, and altogether there are around 100 persons working within veterinary areas on the Sandnes campus. Research cooperation involves the regional university hospital, research institutes and the University of Stavanger (UiS). The Section is accredited by the ECSRHM as a European Specialist Training Centre for veterinarians. There are specific plans for a new building for experimental biomedical research (SEARCH) in cooperation with the regional University Hospital, UiS and others. The Norwegian Parliament decided that with the move of NVH from the Adamstuen campus to the campus at Ås, the Sandnes campus should be further developed.

The teaching of veterinary students in small ruminant diseases in the 8th semester takes place at Sandnes and or the Production animal and public health track differentiation in the 10th and 11th semesters. Furthermore, Sandnes is the base for teaching in practical meat inspection in the 9th semester. The number of small ruminant cases available for teaching at the site averages around 400 each year. Teaching also occurs in other farm animal species as swine, poultry and veterinary public health.

Student facilities include two apartments with altogether 19 beds and a separate house, which has 16 beds. There is also an apartment for a researcher and family, with two bedrooms, and two separate rooms for researchers. The auditorium has places for a maximum 45 students. In addition, there are two group rooms and one student study office.

6.1.2 PREMISES USED FOR CLINICS AND HOSPITALISATION

Table 6.1: **Places available for hospitalisation and animals to be accommodated**

	Species	No. places
Regular hospitalisation	Cattle	37
	Horses	29*
	Small ruminants	7 ^a
	Pigs	12 ^a
	Dogs	40**
	Cats	17***
	Other	
Isolation facilities	Farm animals and horses	21 [#]
	Small animals	4 ^{##}
	Other	5 ^{###}

^a pens between 4 and 10 m². Note that the 19 pens for the 180 small ruminants in Sandnes are not included in Table 6.1.

*Horse boxes including 1 box for intensive care of foals and their mothers

**Dog kennels: 34 dog kennels in 8 different rooms, 6 intensive care kennels (under construction).

***Cat kennels: 17 cat kennels in 3 rooms

[#]One large animal isolation facility available for horses and farm animals at Adamstuen and 20 pens at Sandnes including an open isolate – 9 boxes for max. 27 sheep; closed facility – 11 boxes with ca. 35 sheep.

^{##}Under renovation

^{###}Includes 1 isolation kennel scintigraphy for dogs; 2 cat kennels for radioactive iodine; and 2 boxes for horses post scintigraphy

The Equine Hospital is a referral hospital that also has a few research and teaching patients. The hospital runs a 24 hour service involving the students in most of the clinical work. The hospital expects to see 1200 patients (journals) during 2013.

The Small Animal Hospital consists of a first opinion practice (“Poliklinikken”) and a referral hospital. The Small Animal Hospital expects to have approximately 13 000 patients in total in 2013.

The First Opinion Practice (Poliklinikken) has a large customer base recruited from the city of Oslo. The caseload has an excellent variation for our educational needs. The first opinion

practice has by far mostly feline and canine patients, but will also treat rabbits, small rodents and birds. The students are expected to work with considerable independence in the first opinion practice under the guidance of the teaching veterinarian, which gives the student a solid and varied grounding in first opinion practice.

The Small Animal Referral Hospital shares the premises with the first opinion practice and there is a common reception area and shop. The referral hospital consists of the Section of Internal Medicine and the Section of Small Animal Surgery. The veterinarians in the referral hospital are mostly associate professors, but the hospital also employs one professor in small animal internal medicine and one European Diplomat in Neurology and one American Diplomat in Small Animal Internal Medicine. There is also an ophthalmologist in the small animal hospital, serving all species on site and running an ophthalmology consultancy. The anaesthesiologists have offices in the Equine hospital. The Radiology unit is situated conveniently between the Equine clinic and the Small Animal Hospital. The Anaesthesia and Radiology Section provides services to all species on campus.

The Production Animal Medicine, Surgery and Obstetrics Clinic has approximately 200 cattle, 200 pigs and 50 small ruminants of all ages available for teaching purposes. The cattle and small ruminants are referred from neighbouring veterinarians and the ambulatory clinic. Pigs are predominantly bought from farmers in the region. Most animals and all pigs are autopsied. Currently about a third of the ruminants are returned to the farm of origin.

The Reproduction Clinic houses 15 healthy cows, 2 rams and 7 mares for teaching in reproductive techniques. The clinic also provides services (such as A.I., breeding) for reproduction in dogs dealing with 600 cases a year.

Sandnes Campus has teaching in health and management in small ruminants, partly also pigs and other farm animals, and herd health. The section receives 400 – 500 dead or live animals from the neighbouring area, and there is a very good cooperation with the farmers, farmers' associations and industries. Specific tailored individual journals covering anamnestic information, symptoms, treatment, clinical pathology, post mortem, bacteriology, parasitology and histopathology are used. The veterinary students following the differentiation track in production animal medicine have responsibilities for contact with farmers and most of the practical work, while under supervision at the Sandnes campus.

6.1.3 PREMISES FOR ANIMALS

In Oslo, the Reproduction clinic has 15 healthy cows or heifers and 7 healthy horses are available for students training in ovarian palpation and pregnancy diagnosis throughout the year. In Sandnes, a flock of approximately 180 winterfed ewes are available for practical training of the students especially in the lambing season. This training includes obstetrics, caesarian sections, lamb care, examination and treatment of diseased animals. The flock is also used for practical training in for example clinical examination, blood sampling and hoof care.

Small animals

Only dogs are used in the teaching of small animal medicine and these animals are recruited from the dogs of the staff and students. Some students and staff have the use of free kennels at NVH in the former hospital building (Bygg 12) on the condition that their pet dogs may be used for teaching or demonstration purposes, as required. There are 4 large kennels and 22 normal sized kennels in this building in addition to one large and one small examination room. There are plenty of dogs available for teaching. The dog owners are themselves responsible for the care and wellbeing of their kennelled dog and this is a system that gives the “teaching dogs” excellent care.

Birds, laboratory animals and exotics

The teaching of handling and management of small mammals is performed by the laboratory animal unit in the pre-clinical years. The students receive a separate course on avian medicine, given by an external lecturer. The students may encounter avian patients in the first opinion rotation (“Poliklinikken”) or during their emergency rotation. There is a general national ban on keeping reptiles in Norway, so NVH does not place much emphasis on teaching this subject.

6.1.4 PREMISES USED FOR THEORETICAL, PRACTICAL AND SUPERVISED TEACHING

Table 6.2: Premises for clinical work and student training

Small animals	No. consulting rooms	11*
	No. surgical suites	5**
Equine and food animals	No. examination areas	9***
	No. surgical suites	4****
Other		

* 11 rooms for small animals include 5 consulting rooms, 4 larger examination rooms and 2 rooms for conventional radiography

**5 rooms for surgery include 4 surgical suites and 1 training clinic

***The examination areas in the Equine Facility include 1 examination room for 2 horses, 1 large area for 4 horses, 1 procedures room for standing procedures/examinations, 1 Treadmill for dynamic evaluations, 1 Smithy and shoeing area, 1 CT room, 1 Ultrasound room, 1 conventional radiography room and 1 scintigraphy room.

****There are two equine surgical suites and one food animal surgical suite on the Adamstuen campus and one food animal surgical suite on the Sandnes campus

Table 6.3: Premises for lecturing

Number of places per lecture hall								
Hall	AUD 1	AUD 2	AUD 3	AUD 4	AUD 5	AUD 6	Sandnes	Felles
Places	72	73	90	68	82	72	45	180
Total number of places in lecture halls on Adamstuen campus (Sandnes): 637 (45)								

Abbreviations: AUD Auditorium, Felles Common lecture theatre

Table 6.4: **Premises for group work** (Number of rooms that can be used for supervised group work)

Room Places	AUD 8 18	Block1 20	Block2 20	Block3 20	Block4 12	Sandnes1 8	Sandnes2 6	Sandnes3 8
Room Places	Loft1 20	Loft2 30	Loft3 30	Meeting1 30	Atrium 15	Meeting2 6	Common room 6	
Total number of places in rooms for group work on Adamstuen campus (Sandnes): 227 (22)								

Abbreviations: AUD Auditorium

Table 6.5: **Premises for practical work** (Number of laboratories for practical work by students)

Laboratory Places	AUD 7 70	AUD11 34	Anat 35	Path 12	S_Clin Path 6	S_Bact 6	S_Necro1 20	S_Necro2 2
Laboratory Places	MK Lab 10	Stud. Lab 4	Horse Lab 5					
Total number of places in laboratories on Adamstuen campus (Sandnes): 170 (34)								

Abbreviations: AUD Auditorium, Anat Anatomy, Path Pathology, S_Clin Path Sandnes Clinical Pathology, S_Bact Sandnes Bacteriology, S_Necro Sandnes necropsy, MK Lab Medicine laboratory, Stud Lab Student laboratory

NVH has placed detailed information in relation to environment, health and safety measures (HMS) for students and staff on its internal website Synapse. The webpages of Synapse contain information on emergency fire routines, security measures in laboratories, procedures for injuries or accidents and other matters such as allergies. Information on HMS for students is also available in a handbook for students “Manual for Students”. Each course in the Study Plan gives details of the HMS status and requirements for the course.

The students receive general information on safety matters during their first days of study at NVH and compulsory instruction in emergency fire routines on their second day of study. At the commencement of a course or study that involves special risks such as laboratory work, dissection work in anatomy and pathology and work in the clinics, the students are given special instruction in security routines, requirements for behavior, use of equipment and handling of animals. The students also receive instruction in routines to be followed in the case of injuries or accidents. The students are covered by the Norwegian national health insurance for injuries that occur during teaching at NVH. NVH as a governmental institution does not insure its students. The students are strongly recommended to have their own health insurance to cover chronic injuries. The students are required to ensure that they are vaccinated against tetanus. Vaccination is available through the SiO health service.

Microbiology and Microscope Laboratory (AUD 7)

The students receive a lecture on microbiological safety before they enter AUD 7 for the first time in 1st semester in the Animal Biology course. The students are instructed on the proper use of the sluice area, use of laboratory coats, routines to be followed on entering or leaving the laboratory and on use of equipment in the laboratory. Detailed instruction is given (as an

oral presentation) in relation to microbiological contamination, risks associated with chemicals and routines to follow in case of accidents. The safety instructions are repeated prior to courses in Principles of Immunity and Disease in the 4th semester and Food Safety in the 6th semester. Written safety instructions are available in relation to each course on NVH's intranet.

Biochemistry Laboratory (AUD 11)

The biochemistry laboratory has capacity for 34 students working in pairs at 17 work-stations. The laboratory is equipped with 3 fume-hoods and emergency showers and eye-washing equipment. There are 3 emergency exits. Prior to entering the laboratory for the first time in 2nd semester in the Cell biology course, students are informed about all health, safety and environment measures that are in place. All students wear laboratory coats at all times and safety goggles and gloves when needed (specified in laboratory journal and by the supervising teacher). Appropriate handling of waste is specified in the laboratory journal and is supervised during courses. All accidents (or near accidents) are specifically reported to NVH's HMS officer.

Anatomy Dissection room

Health and safety measures

1. The class is divided into two for many practical sessions to reduce student density and the risk of injuries with sharp instruments such as knives and scalpels.
2. There is a medicine chest in the room for first aid treatment of injuries such as cuts.
3. There is a container for used sharps.
4. The students are given a talk and demonstration on the correct use of dissection equipment at the commencement of anatomy teaching.
5. Formalin-fixed animals are stored in an ethanol-water bath for several months minimum prior to the start of practical work so that formalin is replaced by ethanol.
6. Emergency eye washes are installed in the dissection room.

The Necropsy premises are considered to be at BSL2 level and there is a stringent line between the outer "clean" environment and the side where the contaminated area is defined. In the necropsy hall, the students must read and sign that they have read a description of how to behave according to biosafety measures. At their first attendance, the students are shown how the rules are to be followed in practice. During their work period, the students are told to change practice if the rules are not followed in a proper way.

Sandnes campus

During the first day at Sandnes campus, the students are informed about actions to be taken in the case of fire. They are informed about the evacuation routes and meeting points and where fire extinguishers are placed in the different buildings. All students have to sign a paper stating that they have attended to this session.

Female students are encouraged to inform the section leader if they are pregnant. These students are given adjusted training to minimize to risk of coming in contact with material possibly containing abortive agents as *Listeria monocytogenes* or *Toxoplasma gondii*. At the entrance of the necropsy room, the sluice in the sheep house and at the main entrance for the surgical theater and hospitalization area a note on health and safety measures and infection control for the actual area is placed easily visible. The students are informed about these measures the first time they enter the premises.

There are eye showers in “poderommet” next to the necropsy room, in the clinical pathology laboratory, in the bacteriology laboratory and in the sheep house. There is first aid equipment at the same places.

6.1.5 DIAGNOSTIC LABORATORIES AND CLINICAL SUPPORT SERVICES

- **Diagnostic laboratories**

Histology and immunobiology laboratory

The necropsy (pathology) service is supported by a histology laboratory and an immunobiology laboratory for standard histology preparation and immunohistochemistry. In addition to the necropsy material, 250-300 biopsies from the NVH clinics are processed each year.

Central Laboratory

The Central Laboratory is a diagnostic service and research laboratory for veterinary medicine and clinical pathology. The laboratory is a section in BasAM and the laboratory is located on ground floor in building 14, and has a size of 200 square meters. The working area consists of six consecutive rooms, including the combined lunch and meeting room with two working desks, administration office/sample preparation room, a room for microscopy (hematology and cytology), two rooms where the clinical chemistry, endocrinology and hematology are performed, one office for the laboratory manager and a storage room. In the close vicinity of the laboratory there are offices for the clinical pathologists. The laboratory uses modern analysis systems with high capacity and analyzes more than 200,000 samples each year.

Bacteriology Laboratory

The Bacteriology Laboratory performs bacteriological and mycological diagnosis on clinical and pathological samples. In 2013 the laboratory analyzed about 2000 samples, of which ca. 700 samples were from external clinics and 1300 samples were from the clinics at NVH. The Bacteriology laboratory is a National Reference Laboratory (NRL) for bacterial and fungal diseases of bees and analyses between 150 – 200 samples in a year. The laboratory operates under the quality assurance system of the department but it is not accredited.

Parasitology Laboratory

The Parasitology Laboratory is a research laboratory that also offers diagnostic services. The laboratory is accredited by Norsk Akkreditering for analysis of water for the parasites *Cryptosporidium* and *Giardia*, and, depending upon demand, analyzes around 60-70 water samples annually; for these analyses the laboratory is the National Reference Laboratory (NRL) for the Norwegian Food Safety Authority. Food samples may also be examined for contamination with these parasites, and NVH has led the development of the ISO Standard for these analyses. The Parasitology laboratory is also the NRL for parasites of bees and, again, depending upon demand, analyzes around 50 bee samples annually.

In addition to NRL and accredited analyses, veterinarians regularly send in samples from animals for Parasitology Diagnostics – these are mostly fecal samples (for intestinal parasites and lung worms), but may also include skin scrapes, individual parasites for identification and autopsy specimens. Over 3000 samples are sent in annually from external clinics and veterinarians, and around 700 samples from NVH clinics.

Hormone laboratory

A hormone laboratory supports scientific work and education in reproduction

Semen laboratory

A semen laboratory supports scientific work and education in reproduction.

Clinical laboratory

A clinical laboratory supports the students in their work with the animals in the medicine clinic

Diagnostic Laboratories on Sandnes campus

- Clinical pathology: There is a well-equipped clinical pathology laboratory with the most important instruments being Pentra 400 and atomic absorption spectrophotometer AA300 for clinical chemistry and ADVIA 120 for hematology. Other instruments/methods in the laboratory are electrophoresis and gamma-counting. Fecal parasitic egg counting and blood smear evaluation are also performed in this laboratory. There is equipment used for immunological studies.
- Bacteriology: There is a small bacteriology laboratory, which is a part of a larger laboratory shared with the Norwegian Veterinary Institute Sandnes. Routine bacteriology is performed and there are facilities for the students to work on their own.
- Small laboratory in conjunction with the necropsy room: A microscope placed here is used for investigation of direct smears / wet preparations prepared at the necropsy room.
- Histology laboratory: A small histology laboratory is a shared facility with the Norwegian Veterinary Institute Sandnes.

- **Central clinical support services**

Diagnostic Imaging Service

The diagnostic imaging section is equipped with x-ray, CT, ultrasound and scintigraphy. The section transferred to digital radiography equipment in 2005, and the small animal facility was upgraded from computed radiography (CR) to direct radiography (DR) in 2010. The section's CT scanner was upgraded to a new unit in 2009. MR studies are performed at human facilities, and the section receives the images for interpretation. The section has a PACS archiving communication system from Carestream.

The diagnostic imaging service is organized with four radiologists who rotate between the different modalities. Rounds for the radiologists and other colleagues are held in the morning. A known case conference is held each month and a journal club has regular meetings. The section currently has two-board certified radiologists and one board-eligible radiologist and has conducted resident training since 2006.

Anaesthesia services

The two anaesthesiologists and the PhD-student in anaesthesia are organized within the Section of anaesthesia and radiology. The technical staff is organized within the small animal and equine sections, respectively. Anaesthesia is equipped with anaesthetic machines ranging from the basic to advanced anaesthetic machines for both large and small animals, and there are several anaesthetic monitors available.

When students are in the clinics, there is an anaesthesiologist in the small animal clinic to provide general anaesthesia, and in the equine clinic there is either a human anaesthetic nurse, an anaesthesiologist or a PhD-student available to provide this service. This staff also provides an out of hours on call service for general anaesthesia in equines. In the small animal clinic, there is a technician on call to provide general anaesthesia under supervision of the surgeon on call.

6.1.6 SLAUGHTERHOUSE FACILITIES

Two slaughterhouses, Rudshøgda and Egersund, which are 160 and 600 km, respectively, from Oslo are used in courses on artificial insemination in cattle. During the courses the students train using cows brought into the slaughterhouse. It is estimated that between 350 and 400 cows per year are used in the AI courses.

NVH has access to abattoirs that are government inspected slaughterhouses where Good Manufacturing Practices (GMP) and Good Hygienic Practices and HACCP systems are implemented. The animal welfare at these facilities is a priority issue and no animal is killed unless they are stunned.

The abattoirs that are used for a full-day excursion in the Food Safety course in 6th semester: Nortura abattoir at Rudshøgda. This abattoir slaughters each year about:

Cattle: 27,000

Pigs: 200,000

Sheep/lambs: 80,000

Deboning, processing and packaging are performed at the site.

Travel distance by bus from NVH campus in Oslo: 150 km

Nortura abattoir at Tønsberg. This abattoir slaughters each year about:

Cattle: 20,000

Pigs: 130,000

Deboning, processing and packaging are performed at the site

Travel distance by bus from NVH campus in Oslo: 103 km

The abattoirs that are used for training purposes in meat inspection and related topics in the 9th semester are:

Nortura abattoir at Forus. This abattoir slaughters each year about:

Pigs: 220,000

Sheep/lambs: 135,000

Travel distance by car from NVH campus at Høyland, Sandnes: 10 km

Nortura abattoir at Egersund. This abattoir slaughters each year about:

Cattle: 28,000

Travel distance by car from NVH campus at Høyland, Sandnes: 55 km

Fatland abattoir at Jæren. This abattoir slaughters each year about:

Cattle: 14,000

Pigs: 100,000

Sheep/lambs: 60,000

Deboning is performed at this site.

Travel distance by car from NVH campus at Høyland, Sandnes: 13 km

Nortura abattoir at Hå. This abattoir slaughters each year about:

Chickens: 16,000 tons

Travel distance by car from NVH campus at Høyland, Sandnes: 30 km

Processing and packaging are performed at this site.

6.1.7 FOODSTUFF PROCESSING UNIT

The veterinary students at NVH have access to the meat processing units at Nortura facility at Rudshøgda and Nortura facility at Tønsberg during the excursion in the Food Safety course in 6th semester.

The students also visit the processing facilities for poultry at Nortura, Hå during the rotation meat inspection week in the 9th semester. Students join officers from Norwegian Food Safety Authority to inspect food businesses in the Sandnes region. The inspected sites include businesses associated with the fish industry and different food processing plants, shops and restaurants depending on the tasks assigned to the officer for that day.

6.1.8 WASTE MANAGEMENT

At the Adamstuen campus, the carcasses of dead animals from the clinics are transferred from the necropsy hall directly to a container in a separate adjacent room. The top of the container is at floor level and the carcasses of large animals are transported via a roof rail into the container. All biological tissue material is placed in the container except the carcasses of pet animals that are to be individually cremated at the owner's expense. The container is transported on a truck to an incineration facility outside NVH. Blood, excreta and water from cleaning processes are all drained with other wastewater.

Course in aquatic medicine in Hjelmeland: necropsy on dead, slaughterweight salmon; standard disposal where carcasses are disposed of in containers; acid-treatment.

In Sandnes, cadavers and organs are emptied in a container placed in a cooled room in conjunction with the necropsy room. The container is collected by a contractor and replaced with an empty one when necessary. The contents are processed as contagious material. Glasses of blood and blood products such as blood agar plates and other bacteriological agars are put in plastic boxes or plastic bags and autoclaved before they are disposed of in ordinary garbage bins. The remains of fecal samples after egg counting are put in plastic bags and disposed of in ordinary garbage bins.

Radioactive and toxic wastes at NVH are handled in accordance with Norwegian legislation.

6.2 COMMENTS

Many of the buildings on the Adamstuen campus are old and worn and have a limited capacity to house a new curriculum for an expanded number of students. This situation will not change until new veterinary buildings are completed on the Ås campus in 2019. Until the new buildings at Ås are available, the buildings at Adamstuen will continue to be maintained in as good a condition as possible. The teaching facilities and in particular biosecurity measures will be given priority. The challenge for NVH as an institution is to meet the need for essential maintenance and also to find the resources to develop its scientific and teaching facilities.

Maintenance work at NVH is financed through the budget allocations to Technical Services and from expenditure by the academic departments on interior renovations. The energy (heating) costs at NVH account for about 30% of the Technical Service's budget and this large variable cost influences the amount of funds available for maintenance work. Over the last 10 years, the annual expenditure on maintenance has been around 5 million NOK (ca. € 600,000). NVH has allocated considerable central funds to the improvement of teaching and student facilities in addition to necessary building maintenance. In consultation with LMU, the student facilities that have been improved or renovated include the lecture theatres, the bodega, clinical training room, gym hall, and the ventilation in the reading rooms. A volley ball court and a training room have been established. In general building maintenance, priority has been given to new roofing, the painting of windows, fire security and the replacement of the old electrical installations. Priority has also been given to biosecurity measures including the improvement of sluice facilities in the animal house. Automatic gates have been installed to improve the outer security of the campus against escaped animals.

New teaching facilities have been established at NVH including a number of new seminar rooms to support the small group and self-directed learning work in the curriculum. The atria in the Small animal medicine clinic and in the intensive care unit have been closed in and a room refurbished to house the CT equipment. An isolation facility for small animals has been established and the clinical training room has been relocated to a new facility.

The employees and some students at NVH have participated extensively in the planning of new facilities at the Ås campus of NMBU and this planning work will continue in the coming years. An overview of the planned 63,000 m² of buildings is presented in the Appendix.

6.3 SUGGESTIONS

In the period before the move to new veterinary building on the Ås campus of NMBU, it will be important to allocate sufficient resources to maintain existing and develop new facilities at the Adamstuen and Sandnes campuses of NVH.

Chapter 7. ANIMALS AND TEACHING MATERIAL OF ANIMAL ORIGIN

7.1 FACTUAL INFORMATION

7.1.1 ANATOMY

Table 7.1: **Material used in practical anatomical training**

	Dog		Ruminant		Equine		Other	
	Year 2013*	Year 2012	Year 2013*	Year 2012	Year 2013*	Year 2012	Year 2013*	Year 2012
Live animals ¹⁾	14	14	5	5	4	4	0	0
Cadavers ¹⁾	16	16	18 ³⁾	18	0	0	100 ⁴⁾	100
Cadaver parts	16	16	130 ⁵⁾	130	33 ⁶⁾	33	110 ⁷⁾	110
Specimen ¹⁾ Skeletons, fixed or plastinated organs	95	95	140 ⁸⁾	140	140	140	80 ⁹⁾	80
Other ²⁾								
eg ultrasound								
Computer assisted teaching								

¹⁾give figures, ²⁾indicate, *year prior to visitation

³⁾16 goats and 2 calves; ⁴⁾4 pigs, 16 cats, 46 chickens and 32 salmon; ⁵⁾Cattle: fore and hind limbs, heart, lung, liver, udder, penis, uterus, pregnant uterus; ⁶⁾Horse: head, fore and hind limbs; ⁷⁾Pig: heart, lung, stomach, intestines, liver, spleen penis, uterus, pregnant uterus; ⁸⁾Specimens mostly from cattle, sheep and goat;

⁹⁾Specimens mostly from pig, cat and chicken

The live dogs used in the teaching of anatomy are made available by the students of the year. An agreement is entered into between NVH and the individual student and the student is paid for making their animal available for teaching purposes.

The dog whole cadavers and cadaver parts are obtained from local dog breeders and from NVH's small animal clinic. Dogs obtained from NVH's Small Animal clinic are healthy dogs submitted for euthanasia and the bodies are used in teaching with the consent of the owners. The dog cadavers or cadaver parts are used either fresh or are preserved in ethanol.

The live cattle used in the teaching of anatomy are available in NVH's Production Animal clinic. The whole cadavers of goats and calves are obtained from local farmers. The cadaver parts are obtained from a local slaughterhouse. Some specimens are used fresh while others are either frozen or preserved in ethanol.

The live horses used in the teaching of anatomy are made available to NVH by the Mounted division of Oslo Police. The cadaver parts of horses are obtained from NVH's Equine clinic from healthy horses that are submitted for euthanasia.

The cadavers and cadaver parts from other species (pig, cat, chicken and salmon) are obtained from local farmers, from University of Life Sciences, from local slaughterhouses, from NVH's clinics and from retail fish outlets. These specimens are either used fresh or frozen or preserved in ethanol.

7.1.2 PATHOLOGY

Table 7.2: **Number of necropsies over the past 3 years**

Species		Number of necropsies			Average
		2012/2013*	2011/2012	2010/2011	
Food-producing animals	Cattle	120	109	99	688
	Small ruminants**	374	454	453	
	Pigs	136	175	137	
	Other farm animals	2	3	2	
Equine		115	66	79	87
Poultry***		200	200	200	208
Rodents incl. rabbits		16	3	6	
Companion animals/exotic	Dogs	160	123	148	192
	Cats	61	37	38	
	Other****	2	1	5	

*year prior to visitation

**Most small ruminant necropsies (ca. 400 per year) are performed at Sandnes

***Approximately 200 poultry are used each year for teaching

****Very few exotic animals are submitted for autopsy at the NVH.

Additional sources of material

Organs are collected from the slaughterhouse and demonstrated in connection with necropsy material every Friday during the 8th semester.

Around 250-300 biopsies (from NVH clinics) are evaluated each year. This material maintains staff competence and is used in teaching.

7.1.3 ANIMAL PRODUCTION

Food producing animals available for practical teaching of students

a) on campus

In Oslo, one of the clinics with 15 healthy cows or heifers and 7 healthy horses are available for students training in ovarian palpation and pregnancy diagnosis throughout the year. In Sandnes, a flock of approximately 180 winterfed ewes are available for practical training of the students especially in the lambing season. This training includes obstetrics, caesarian sections, lamb care, examination and treatment of diseased animals. The flock is also used for practical training in for example clinical examination, blood sampling and hoof care.

a) on other sites

The milking herd at UMB is used extensively for the teaching of pregnancy diagnosis and for the teaching of rectal ovarian palpation for herd reproductive performance and health. The herd has about 50 cows.

The field course in aquatic medicine is held at Hjelmeland in the 8th semester in collaboration with fish health staff of Marine Harvest. The course includes visits to hatcheries, smolt farms and sea-sites for salmon, land-based and cage farming of halibut, slaughterhouse, well-boat, visit to an enhancement plant for wild salmon (hatchery), necropsy sessions and assignments. In the differentiation track, there are visits to hatcheries, smolt farms, cage sites, slaughterhouses and well boats in the Hitra/Frøya region.

7.1.4 FOOD HYGIENE/PUBLIC HEALTH

The availability of farm animals and products of animal origin for the practical teaching of students in veterinary public health, food hygiene, inspection and technology are described in 4.1.5, 6.1.6 and 6.1.7

7.1.5 CONSULTATIONS AND PATIENT FLOW SERVICES

7.1.5.1 CONSULTATION

Production Animals Clinics

The stationary clinic accepts cases 27 weeks of the year. The ambulatory clinic operates continuously (52 weeks of the year). Veterinary students are present in the clinic most of the year. The Production animal clinic consults 5 days of the week. The consultation hours are 08.00-15.45 (08.00-15.00 during summer).

Small Animals Clinics

The Small Animal Clinics operate an emergency 24 hour service and accept cases 52 weeks of the year. Veterinary students are present in the clinic most of the year. The clinics consult 6 days of the week and the drop-in consultation hours are Monday – Friday 16.30-19.00 and Saturday 10.00-12.30. Normal consulting hours are from 09.00-14.30 on weekdays.

Equine Clinic

Equine Clinic has a 24 hour emergency service 52 weeks a year, and receives mostly referred cases. The consultation hours are from 8.00-15.45 (15) Monday to Friday. Some cases are first opinion, but the majority of cases are referred. The students are present in the clinic most of the year.

7.1.5.2 PATIENT FLOW

Table 7.3: **Number of cases: a) received from consultation, and b) hospitalized in the Faculty clinics, in the past three years.**

Species		Number of cases						Average
		2012/2013*		2011/2012		2010/2011		
		a	b	a	b	a	b	
Food producing	Bovine		204		227		238	517
	Ovine, caprine	1	54	3	117	18	96	
	Porcine		205		238		140	
	Other farm animals**		5				5	
Poultry								95
Rabbits		36	1	67		182		
Equine		400	750	400	761	400	864	1192
Companion animals/exotics	Canine	9879 [#]	2470	9862	2466	9823	2456	15616
	Feline	2370 [□]	474	2598	520	2717	543	
	Other***	159	0	203	0	309	0	

*year prior to evaluation, **alpaca; ***the exotic animals treated at NVH's small animal clinic include rats, ferrets, guinea pigs, hamsters and wild birds

#The Profvet journal system gave the total number of canine cases for the year and the division between consultations and hospitalized cases was estimated to 1 in 5.

□The Profvet journal system gave the total number of feline cases for the year and the division between consultations and hospitalized cases was estimated to 1 in 6.

7.1.6 VEHICLES FOR ANIMAL TRANSPORT

Two animal transport trucks are available for bringing animals to the production animal out-patient clinic. This service is free of charge. Transport of horses and small animals is not provided by the establishment.

7.1.7 ON-CALL EMERGENCY SERVICE

The Equine Hospital has a veterinary surgeon, a veterinary nurse/assistant and an anaesthesiologist on call 24/7. The service relies on external veterinary surgeons phoning in emergency referrals. The students are heavily involved in the out-of-hour service at the Equine Hospital.

The Small Animal Hospital at NVH provides a full-time service (24/7). In the evenings and during the daytime on weekends, there are 2 veterinary nurses, one veterinary surgeon and normally 2 students manning the clinic. At night (22.00-08.00), the hospital is manned with one veterinary surgeon, accompanied by one or two student most nights. There is an on-call back-up consisting of one surgeon, a surgical nurse and an anaesthesiologist. This back-up team can be called out whenever their assistance is needed.

The evening and night staff provide veterinary care for the first opinion and referral hospital's in-patients. Emergency first opinion and referred emergency patients will be admitted at all times. A receptionist works for 4 hours on Saturdays and Sundays and from 08.00 until 20.00 on weekdays.

Production Animal Clinics

The Production Animal clinics operate a large animal emergency service available to the public in general. The service is in operation outside the regular working hours of the ambulatory clinic (including weekends).

7.1.8 ON FARM TEACHING AND OUTSIDE PATIENT CARE

7.1.8.1 AMBULATORY (MOBILE) CLINIC

The emergency service of the Ambulatory Clinic operates from 16.00 to 08.00 on weekdays and on weekends. The large animal emergency service includes horses and operates a compulsory on-call rotation for students so that one or more students will always attend the calls in the field. The students are on-call for certain periods during their ambulatory clinic rotation, i.e. 8th and 9th semesters and during the production animal track for an additional three weeks in 10th semester.

On average, a student is on emergency call one to two weeknights (16.00 – 08.00) and one to two weekends (Friday 16.00 – Monday 08.00) during their rotation. It should be noted that

there may not be any emergency call during a given weeknight, but on most weekends there are calls. The average number of visits per day varies between 8 and 12 throughout the year. The vehicles used by the mobile clinic are three Volkswagen Caravelle (-98, -04, -08 models) and two Toyota HiAce (-04 and -06 models) vans all with seating for five persons.

Table 7.4a: **Number of cases seen by the Ambulatory (mobile) clinics in the past three years.**

Species		Number of patients			Average
		2012/2013*	2011/2012	2010/2011	
Food-producing animals	Cattle	3352	3352	3352	4273
	Small ruminants	640	640	640	
	Pigs	4238	4238	4238	
	Other farm animals				
Poultry (no. of flocks)		7 [#]	7	7	7
Rabbits (no. of prod. units)					
Equine		565	630	500	565
Other					0

*year prior to visitation

Please note: The mobile clinic's present database system is not able to produce the exact case numbers without artificial inseminations or vaccinations, which would produce a distorted view of the case load. To avoid this distortion, the figures in table 7.4a are based on the case load of 2010, which was the year prior to upgrading of the current software version. However, the Ambulatory clinic's case load has stayed on the same level for the last few years, and we therefore believe that the estimates are acceptably valid.

For your information, the number concerning *pigs* in the table includes 2277 piglet castration cases, i.e. one litter per case.

[#]Two poultry flocks are visited in 8th semester, one flock is visited in 9th semester and four flocks are visited in 11th semester.

7.1.8.2 OTHER ON FARM SERVICES AND OUTSIDE TEACHING

In addition to the herds in the ambulatory clinic area, the students are brought to farms outside the area, both in Oslo and in Sandnes. In two of the farms, UMB at Ås and Kalnes at Sarpsborg, 8th and 9th semester students and Production animal differentiation track students are trained in ovarian palpation and pregnancy diagnosis every second week throughout the year.

Table 7.4b: **Number of patients seen on outside teaching in the past three years.**

Species		Number of patients			Average
		Year 2012/2013*	Year 2011/2012	Year 2010/2011	
Food-producing animals	Cattle	390	380	360	435
	Small ruminants**				
	Pigs	40	30	105	
	Other farm animals				
Equine					0
Other					0

*year prior to visitation,

** In Sandnes, 1-2 sheep flocks are visited in the 8th semester course and two to three sheep flocks are visited and examined in the Herd Health course. Average flock size – 100 ewes per flock. Varying number of patients examined or treated in these flocks.

7.1.9 OTHER INFORMATION

In the Preliminary course in clinical sciences and as part of reproduction training, sexual organs from cows are brought from slaughterhouses for use in teaching.

Areas of clinical specialization and the balance between primary (first opinion) and referral cases

The areas of clinical specialization in the **Small Animal Clinic** are Gastrointestinal tract, Endocrinology, Cardiology, Dermatology, ophthalmology, surgery, neurology, internal medicine and oncology. There is a European diplomat or an associate professor within these areas and they all see patients one day per week. Ophthalmology also has surgical patients several times per week.

The Equine Hospital has 8 veterinary surgeons employed; one professorship, 3 ECEIM diplomats, 2 ACVS/ACVS diplomats, one national specialist in equine practice, one radiology certificate holder and one intern. There are two PhD students, one is an ACVS Diplomat and the other is an ECEIM Diplomat. Six of the veterinarians have a PhD or Dr philos, and 2 more are working towards a PhD. There is a strong drive amongst the veterinarians in the Equine Hospital towards double competence (PhD and specialist diploma).

The Small Animal First Opinion Practice (Poliklinikken) is manned by veterinarians with different backgrounds and qualifications varying from national specialisation in small animal practice (Norwegian or Swedish specialisation), internships, Associate Professors and some are senior veterinary teaching staff (Assistant Professor). The first opinion practice teaches first opinion clinical work in all domestic small animal species and covering all diseases.

The **Small Animal Hospital** and the **Equine Hospital** are served by the **Anaesthesiology and Radiology Section** with European specialists in anaesthesia and analgesia and diagnostic imaging. The hospitals collaborate with the European specialists in pathology and clinical pathology on campus.

The Department of Small Animal Medicine and Surgery has a good relationship with outside practices. The Clinic receives satisfactory referral work, allows residents (specialist candidates) to see practice and work alongside in-house specialists during their specialist training and there is a phone service for external practitioners to use when in need of advice.

The Small Animal Hospital and The Equine Hospital receive referrals from colleagues outside the school. Customer service and good relationships towards referring veterinarians is considered important.

The SportFaMed Department also uses external specialists as external examiners during the final clinical examinations at the end of the 9th semester.

Production Animal Clinics

The cases seen in the on-campus Production Animal clinic are almost 100% by referral from outside practitioners. The Ambulatory clinic practice is almost exclusively first opinion cases.

There are presently 13 persons teaching in the **Ambulatory clinic** part time or full time. Six of the teachers are PhDs of fields related to animal production and health. Two of the PhDs are also nationally certified herd health specialists. Three Ambulatory clinic employees do not hold PhD degrees, but one is a nationally certified herd health specialist. One teacher position is an internship. The rest of the teachers in the Ambulatory clinic are either on a track towards a PhD degree or qualifying for membership of a European specialist college.

The Section for small ruminant research and farm animal health (Campus Sandnes):

Altogether five veterinarians are employed; presently all have a PhD in sheep (4) or pig (1) medicine; four are ECSRHM diplomats (small ruminants), one is specializing in pigs (ECPHM).

The clinics in the ProdMed Department have a very good relationship with outside practitioners and veterinarians in Geno, Norsvin, Helsetjenestene for storfe, småfe og gris and Nortura. Students are required to have two weeks of “seeing practice” in a large animal practice before graduating as part of their extramural practice.

Journal system

The computerized journal systems used in the clinics are in accordance with national Norwegian legislation on veterinary medical journal keeping. The software used is named ProfVet (www.profvet.com) and is one of two national providers of record systems for the veterinary profession. ProfVet communicates electronically with several external laboratories. The record system (ProfVet) is constantly being changed and upgraded. The patient records are stored electronically on a NVH central server.

Data are either plotted manually into ProfVet i.e., with registration of a new client in the reception. Clinical notes are plotted manually into the journal system in the consulting room by the treating veterinarian, by the students or by the veterinary nurses. Laboratory reports are received either electronically or as paper copies. The electronic record is automatically attached to the correct record in the journal system. Paper reports are scanned on receipt and the digitalized document attached to the patient record in the journal system. Patient records, such as anaesthesia records and medication sheets are plotted manually in the clinic on paper that is scanned into the right record. Medication given to horses has to be reported to the national Norwegian Food Safety Authority. This is done electronically via ProfVet.

The students have access to the patients’ records, except at times close to their clinical examinations.

Production Animal Clinics

Case records are kept using a commercial dedicated veterinary practice database system (ProfVet Practice/ProfVet Clinic). The system is centralized on campus and records can be accessed by those who a) have a general username and password to the NVH’s intranet and b) have a local copy of the (customized) software installed on their personal computer.

7.1.10 RATIOS

Table 7.5: **Animals available for clinical training (in the clinics of the Faculty or seen through the Ambulatory clinic) as ratio to the number of students in the last full year of clinical training.**

					Denominator
R11:	$\frac{\text{No. of students graduating annually}^{\text{a)}}}{\text{No. of food-producing animals seen at the Faculty}^{\text{1)}}$	=	$\frac{56}{517}$	=	$\frac{1}{9.232}$
					9.232
					Denominator
R12:	$\frac{\text{No. of students graduating annually}^{\text{a)}}}{\text{No. of individual food-animals consultations outside the Faculty}^{\text{2) 3)}}$	=	$\frac{56}{4273}$	=	$\frac{1}{76.304}$
					76.304
					Denominator
R13:	$\frac{\text{No. of students graduating annually}^{\text{a)}}}{\text{No. of herd health visits}^{\text{3) 4)}}$	=	$\frac{56}{47}$	=	$\frac{1}{0.84}$
					0.84
					Denominator
R14:	$\frac{\text{No. of students graduating annually}^{\text{a)}}}{\text{No. of equine cases}^{\text{1)}}$	=	$\frac{56}{1757}$	=	$\frac{1}{31.38}$
					31.38
					Denominator
R15:	$\frac{\text{No. of students graduating annually}^{\text{a)}}}{\text{No. of poultry/rabbit cases}^{\text{1)}}$	=	$\frac{56}{95}$	=	$\frac{1}{1.70}$
					1.70
					Denominator
R16:	$\frac{\text{No. of students graduating annually}^{\text{a)}}}{\text{No. of companion animals}^{\text{1)}} \text{ seen at Faculty}$	=	$\frac{56}{15616}$	=	$\frac{1}{278.86}$
					278.86
					Denominator
R17:	$\frac{\text{No. of students graduating annually}^{\text{a)}}}{\text{Poultry (flocks)/rabbits (production units) seen}^{\text{2) 3)}}$	=	$\frac{56}{7}$	=	$\frac{1}{0.125}$
					0.125

^{a)}see Annex Ia, 2.2b; ¹⁾Table 7.3, average; ²⁾Table 7.4, average; ³⁾where applicable use or add information provided in chapter 7.1.8.2; ⁴⁾see 7.1.8.1

Table 7.6: **Animals available for necropsy**

				Denominator
R18:	$\frac{\text{No. of students graduating annually}^{\text{a)}}}{\text{No. necropsies food producing animals + equines}}$	=	$\frac{56}{775}$	=
			$\frac{1}{13.839}$	13.839
				Denominator
R19:	$\frac{\text{No. of students graduating annually}^{\text{a)}}}{\text{No. of poultry/rabbits}^{\text{1)}}$	=	$\frac{56}{208}$	=
			$\frac{1}{3.714}$	3.714
				Denominator
R20:	$\frac{\text{No. of students graduating annually}^{\text{a)}}}{\text{Necropsies companion animals}^{\text{1)}}$	=	$\frac{56}{192}$	=
			$\frac{1}{3.429}$	3.429

^{a)}see Annex Ia, 2.2b;

¹⁾Table 7.3, average;

²⁾Table 7.4, average;

³⁾where applicable use or add information provided in chapter 7.1.8.2;

⁴⁾see 7.1.8.1

7.1.11 OTHER SPECIES

Fish

Veterinary students are taught fish embryology, anatomy, physiology, nutrition, infectious diseases and food safety in the first 3 ½ years of the curriculum. In addition, the students are taught fish reproduction and welfare and how this relates to modern aquaculture. This teaching is a part of Blocks 2 (Cell Biology), 4 (Anatomy and physiology), 5 (Animal nutrition), 6 (Principles of immunity and disease), 7 (Veterinary microbiology and parasitology) and 9 (Food Safety). A course on aquatic medicine is given in the 8th semester and includes fish clinical nutrition, fish diseases, fish immunology, host-pathogen interactions and fish pathology. The focus in the teaching of aquatic medicine is on farmed fish species, with emphasis on salmonids. The aquatic medicine course also includes a field course in collaboration with Marine Harvest, one of the largest fish-farming companies in Norway. The field course is run in Hjelmeland on the western coast and allows the students to visit several fish farms and to become familiar with the possibilities and also the challenges in fish farming.

The field course at Hjelmeland in the 8th semester is mandatory for all students and is organized in collaboration with fish health staff of Marine Harvest. The course includes visits to hatcheries, smolt farms and sea-sites for salmon, land-based and cage farming of halibut, slaughterhouse, well-boat, visit to an enhancement plant for wild salmon (hatchery), necropsy sessions and assignments. This arrangement provide a first class contact between fish health practitioners, staff at the fish farms and the students and is an excellent arena for discussions on relevant fish health and welfare topics.

In the clinical differentiation semesters 10 and 11, Aquatic Medicine is one of the elective tracks. The students are given courses in disciplines that include treatment practices and principles (pharmaceuticals), in infection medicine (virus, bacterial, fungal and parasitic), in comparative immunology and vaccinology, clinical nutrition and disease control. A course in fish welfare is also included and is a course including lectures and group work, plus one week with visits to hatcheries, smolt farms, cage sites, slaughterhouses and well boats. The focus is on animal welfare throughout this course.

7.2 COMMENTS

The students in the veterinary curriculum at NVH have good access to animal and clinical material in all the major veterinary species in Norway. The clinical case load in the small animal and equine clinics on the Adamsten campus is high compared to the number of students graduating annually from NVH. The veterinary students on the Adamstuen and Sandnes campuses have good exposure to food producing animals and herds. This high clinical load generates animal material for necropsy and diagnostic investigation that is important for teaching in the paraclinical subjects of pathology and microbiology. Atlantic salmon and the aquaculture industry are important for the veterinary profession in Norway. Atlantic salmon and other aquaculture species are available for teaching through the veterinary curriculum and access to industrial facilities are provided in the core curriculum and the differentiation track in Aquatic Medicine.

As commented upon in chapter 4, the Rector at NVH has initiated a full revision of the veterinary curriculum with goals to increase the contact of students with the large animal material available in the School's clinics. The Rector has indicated to the SU that the revised veterinary curriculum should give the student contact with animals and the clinical aspects of the profession earlier in their studies and throughout their studies. A further plan for the veterinary curriculum at NVH is that the intake of students will increase from the current 70 to 90, when the School moves in 2019 to the new buildings to be constructed on the Ås campus of NMBU. The current supply of animal material and clinical cases should be sufficient to support this increase in student numbers. However, the School must work to maintain its case load through the provision of high quality professional services and good relationships with the veterinary profession in the wider Oslo and Sandnes districts. The further development of the companion animal referral clinics and the emergency services will be important for the animal material available to the future veterinary curriculum at NVH.

7.3 SUGGESTIONS

No further suggestions

Chapter 8. LIBRARY AND LEARNING RESOURCES

8.1 FACTUAL INFORMATION

8.1.1 LIBRARY AND OTHER INFORMATION TECHNOLOGY SERVICES

The library of the Norwegian School of Veterinary Science is the only library on the Adamstuen campus. There are no subsidiary libraries or branch libraries. The primary users of the NVH Library are the students and staff of the school and the National Veterinary Institute. The NVH Library is the only library in Norway within the field of veterinary science and it serves as a national subject library and services the veterinary community in Norway.

The Library is managed by the head librarian who reports directly to the Director General. There is no library committee or council. The head librarian is responsible for the economy, budget, staff, acquisition, planning of new services, contact with the school's administration and cooperation with other libraries and library associations nationally and internationally.

The library's priorities are to:

- render good and efficient services to the users at all levels
- offer a relevant and updated collection of or access to printed and electronic books and journals and other relevant resources.
- provide good working environments for different kinds of study including quiet reading, colloquia, watching films and using the Internet.
- arrange courses in literature searching and reference handling (RefWorks, Reference Manager/EndNote)

Main library:

The area of the library is 660 m² and with additional closed stack rooms. The staff consists of 1 head librarian and 3 senior librarians. The library has two full time employees (Head librarian and one senior librarian) and two part-time employees (two senior librarians, respectively 40% and 50%). The total FTE of the staff is 2.9.

The library subscribes to 138 journals each year as hard copies and has full access to 5212 electronic journals. The main electronic journal packages are: ASM Journals, ScienceDirect, Wiley Online Library (STM) and SpringerLink.

Online literature searches are possible through access to the following bibliographic databases:

CAB Abstracts Archives 1910-1972

Animal Production 1973 –

Veterinary Science 1973 –

Biological Abstracts 1985 –

ISI Web of Science 1945 -

PubMed

DIALOG. We have a password to the system and literature searches in the different databases can be performed upon request.

The library purchases at least two copies of all the textbooks on the students' reading lists. All textbooks are on open shelves and may be borrowed for four weeks. One of these copies is placed on a separate shelf and may not be taken out.

All printed and electronic resources are registered in BIBSYS, which is a shared national library system for all Norwegian university and college libraries.

The library is open all week days during term-time and closed on the weekends. The opening times during term are: Monday and Friday 8.00 – 15.45 (15.00 May – September); Tuesday, Wednesday and Thursday 8.00 – 18.00. During vacations the opening hours correspond with the ordinary working times (8.00 – 15.45 or 15.00 in summer). The library is closed on Saturdays and Sundays.

The library is used by the students for borrowing books (ILL incl.), searching literature, especially for the graduation thesis project, working and colloquia. Introductory courses in library use are given to all new students (veterinary and veterinary nurses). A more extended course comprising literature searching and the use of RefWorks is given to the students before they start their graduation thesis project in the 9th semester. The students are offered guidance in searching literature and in how to set up reference lists.

There is no separate reading room in the library, as reading space is available for all the students elsewhere at the campus. There are 68 working places for the users of the library, of which 19 are desks in a quiet area. Two smaller rooms can be used for colloquia/group work and to watch DVDs/video. The students have access to 10 computers and one photocopier/printer.

Information services and student access

The library has 10 computers for student use and there are a further 30 computers available to students in two PC rooms in the Main Building of the Adamstuen campus. There are two WIFI-spots in the library and there are WIFI-spots in every auditorium and student reading room. The library has a multifunctional photocopier/printer available for students. All students have their own user account for accessing information technology resources at NVH.

All auditoriums have:

Widescreen HD-projectors (except for one)

Stationary PC available for the lecturer

Connection cable available for lecturer's laptop

Microphone and speakers

8.2 COMMENTS

The library has a small staff (only 2.9 FTE) and the provision of services by the library including opening hours can be vulnerable to absences due to meetings, conferences, vacations or illness. The lack of staff limits the implementation of new services and the development of the library. There can be insufficient space available for students to work or for colloquia. The space limitations can result in disturbances through noise. More rooms for groups work are required.

With the merger of NVH into the new university NMBU, the library will be combined administratively with the library at UMB. The facilities, staffing and services on the Adamstuen campus will continue at the pre-merger levels although there will be an increase in the access to electronic journals and the total library staff will be larger.

The library has some interactive resources as a supplement to lectures, colloquia and reading. However, the library needs an information technology qualified librarian.

NVH provides only about 40 computers for students but has a student mass of about 400. This provision of computers is low but there are seldom queues in the PC rooms. The development in information technology has been that most students have bought their own computer, tablet or mobile phone. It is estimated that about 90% of students at NVH have their own laptop computer or tablet and many students increasingly use their mobile phone to access the information services at NVH. This development in the use of information services by students has placed increased demands on NVH's WIFI network. It is expected that this trend will continue and that there will be need for more WIFI hotspots and more capacity on NVH's intranet. NVH does not provide a WIFI network for its staff. The staff at NVH participates in the same information technology trends as NVH's students. The provision of WIFI network for staff will be a necessary development of information services at NVH.

8.3 SUGGESTIONS

Small group work and self-directed learning are important components of the current curriculum and are anticipated to increase in a revised curriculum. The provision of group rooms and IT facilities and support will be necessary for an expansion of these teaching approaches at NVH. The two group rooms available in the library are currently supplemented by simple temporary buildings. An IT qualified librarian, the integration of electronic platforms and the development of WIFI services for students and staff will allow NVH teachers to keep pace with learning needs and trends of its students.

Chapter 9. STUDENT ADMISSION AND ENROLMENT

9.1 FACTUAL INFORMATION: UNDERGRADUATE COURSES

9.1.1 UNDERGRADUATE STUDENT NUMBERS

The minimum number of years (MNY) allowed to complete successfully the veterinary curriculum at NVH is 5.5 years.

MNY: 5.5 years

Table 9.1: Undergraduate student composition in year prior to visitation

	Total number of undergraduate students	388
	Total number of male students	48
	Total number of female students	340
	Foreign students	
	- From EU countries	23
	-from non-EU countries	7

9.1.2 STUDENT ADMISSION

Applicants for admission to NVH must meet the minimum requirements for Higher Education Entrance Qualification in Norway (“*generell studiekompetanse*”) and fulfill the language requirements in Norwegian and English. For admission to the veterinary program, applicants need extended courses in mathematics and chemistry from upper secondary school.

According to the National Recording Regulations, NVH admits 50% of its student intake on the basis of the first passed diploma and 50% have taken further education or other issues that give extra points. Since 2004, the underrepresented sex has received 2 additional points, because NVH wants more male students. This measure has been approved by the Norwegian government.

Applicants from most European countries are eligible for admission upon completion of the secondary school leaving certificate that provides the basis for admission to university studies in their home country. Entrance requirements for applicants from non-European countries may include one or two years of university studies in addition to secondary school. Applicants who do not fulfill the entrance requirements can take supplementary examinations in the Norwegian upper secondary school.

In 2007, the number of veterinary students admitted each year was increased from 60 to 70. The government provides full financing for 56 student places and only partial financing for the remaining 14 places. In 2013, the government agreed to finance 7 student places for a research year after semester 4.

All applicants must use the online application form called *nettsøknad*, which is available from 1 February on www.samordnaopptak.no. The deadline is 1st March for applicants with

foreign education or special requirements, and 15th April for other applicants. It is possible to list up to 10 different programs, in order of priority. When the application is registered, the applicant receives an application file in their online application. The applicant must fill in information about their educational background and return it with copies of relevant documents. Applicants must document their education with copies of certificates, diplomas and transcripts in the original language and with authorized translations to Norwegian or English, if the original documents are not in English or a Scandinavian language. Both upper secondary and higher education must be documented. For Norwegian applicants, there is a national databank that contains all diplomas of pupils educated in the recent years. The diplomas and certificates of a Norwegian applicant become available in NVH's student administration system (FS). Applicants are still required to send in paper copies of all documents. Applicants must fulfill all requirements before 1st July. Applicants with foreign secondary education will be assessed individually and NVH decides who will be offered a place. The assessment is based on the grade point average/grades from upper secondary school/high school, the grade or points in the examination in Norwegian amongst other things.

The offers of study places are published on 20th July and the applicant has to accept or decline the offer by a given deadline. Admission to the veterinary study in Norway is highly competitive. There are 70 veterinary places and about 1000 applicants each year.

The requirements set by the national admissions scheme contributes to the students admitted to NVH having a very homogenous academic background. Surveys of students conducted at NVH indicate that academic background was not a decisive factor in predicting results obtained in the course and study progression. The student survey in 2005 indicated that students entering NVH directly from senior high school experienced less examination failures than students that had entered NVH after studying at another higher education institution. This observation could be confounded by the age of students with older students subjected to more commitments outside their studies.

Local admission

NVH is able to refill its intake from the waiting lists for the first month after the admission response deadline. For subsequent vacancies, NVH has each year a replacement admission for students studying veterinary medicine abroad. This admission is regulated through the School's regulations and guidelines. NVH is especially aware of the falsification of documents and will invariably report these instances to the police. This policy is communicated to the applicants. There is great competition for these admissions and these admissions are the responsibility of NVH's local admissions committee. This Committee has student representation.

The Norwegian Food Safety Authority considers applications for authorization. Veterinarians from abroad, who are not authorized by the Norwegian Food Safety Authority, may apply to NVH to take additional courses that qualify for authorization. These additional courses take 2 years. NVH requires that the veterinary diploma of the foreign applicant is approved by the National Agency for Quality Assurance in Education (NOKUT) as insurance against false documentation. NVH also demands that the applicants have a B or higher grade in Norwegian. NVH has approximately 2 students for additional training annually.

Information and public criteria for these local admissions are available on NVH's web site.

Table 9.2: **Intake of veterinary students in the past five years**

Year	Number applying for admission	Number admitted	
		“standard” intake	Other entry mode ¹
2012*	1148 (164)	72 (10)	16 (2)
2011	1152 (168)	71 (9)	4 (0)
2010	1313 (203)	72 (10)	-
2009	1336 (217)	72 (8)	2 (0)
2008	1217 (173)	70 (13)	-
Average	1233 (185)	71 (10)	4

*year prior to evaluation = 2012; ¹Replacement admissions; () male students

The replacement admission students are following these classes:

2012: 2
 2011: 6
 2010: 7
 2009: 5
 2008: 2

9.1.3 STUDENT FLOW

Table 9.3: **Student flow and total number of undergraduate veterinary students**

Number of students present after each year of study			Number of additionally admitted students
	1 st year (Intake 2012)	70	6
	2 nd year (Intake 2011)	59	8
	3 rd year (Intake 2010)	62	5
	4 th year (Intake 2009)	62	1
	5 th year ¹⁾ (Intake 2008)	57 ²⁾	6 ²⁾
	6 th year (Intake 2007)	45 ³⁾	1 ³⁾
	>6 th year	6	
	Number of undergraduate veterinary students	361	27
Total number of veterinary students = 388 (Table 9.1)			

¹⁾ year matching MNY; ²⁾ Includes 30 graduated (Autumn 2012); ³⁾ Includes 30 graduated (Spring 2013)

Table 9.3.2: **Student flow – Follow up of the 70 students who began their studies in 2007**

		Number of additionally admitted students
1 st year of study (2007)	70	
2 nd year of study (2008)	66	
3 rd year of study (2009)	62	5
4 th year of study (2010)	60	
5 th year ¹⁾ of study (2011)	59	

6 th year of study (2012)	39	
>6 th year	12	
Number graduating after MNY	18	2
Number graduating after 6 th year	27	3
Number dropped out during study	12	
Number remaining after 6 years	13	11 active in following year (2008); 2 on maternity leave

¹⁾ year matching MNY

Table 9.4: Number of students graduating annually over the past five years

Year	Number graduating (male)
2012/2013*	60 (10)
2011/2012	54 (12)
2010/2011	64 (15)
2009/2010	50 (14)
2008/2009	49 (8)
Average	56 (12)

*year prior to visitation

Table 9.5: Average duration of studies (distribution of students in years)*

Duration of attendance (for students graduating in 2012/2013* = 60)	number
Year 0 ¹⁾ = students that used minimum time i.e. 5.5 years	20
Year 1 = students that used 6.0 years	30
Year 2 = students that used 7.0 years	7
Year 3 = students that used 8.0 years	0
Year 4 = students that used 9.0 years	2
Year 5 = students that used 10.0 years	0
Year >5 = students that used 11.0 years	1

¹⁾Year matching MNY allotted to the veterinary curriculum *year prior to visitation

Order of completion of studies

The curriculum requires that students have produced a certain number of credits to continue to the next academic year after the retake period in August. The number of credits to be produced each academic year is specified in the Study Plan. In some cases exemptions can be granted after application to the Rector, but usually professional and academic standards are given most weight in assessment of the student's circumstances. Students who fail three times at the same examination lose their right to study at NVH. The student can apply to the Rector for a 4th attempt. The Rector decides whether a 4th attempt will be permitted after a conversation with the student and Head of the Studies. These decisions may be appealed to the Board of Appeals. The maximum time a student may use to study veterinary science is 8 years. Legal leave such as maternity leave is added to this period.

In May/June, every student that has failed a final examination is advised in a letter from the Study department of the consequences of not achieving the required production of credits

after the retake period of August. The student is informed of the examination rules and of the consequences if they do not pass the examination at retake. The student is invited to a counseling session at the Study department, if they want. If a Student does not pass the retake examination and is not allowed to continue to the next year of study, the student must have a meeting with the Head of the Studies and Rector.

9.2 COMMENTS

Standard of students starting the course

Many higher education institutions in Norway have problems with low quality of student intake, large drop-out rate and low study progression. Some of the reasons for these problems are that students have many studies to choose from, education is free, there are good study loan and financial supports available and the general welfare standard in Norway is high. Therefore, many students try different educations before making a final choice.

In the national context, the standard of students entering NVH is very good as are the completion rate and study progression. In the table below, figures have been extracted from the national database to compare veterinary studies at NVH with the average from all universities and with Dentistry at Oslo University. Dentistry (Odontology) is a professional education consisting of theory and practical studies and has a very similar student intake quality and length of study to veterinary science.

Table 9.6 DBH data on average failure rates (%) at all Norwegian universities compare with failure rates in veterinary studies at NVH and Dentistry at Oslo University.

%	2007	2008	2009	2010	2011	2012
All Norwegian universities	7.9	7.4	7.5	7.5	7.2	7.3
Veterinary science at NVH	7.7	6.0	4.8	3.5	4.4	5.8
Dentistry at Oslo University	10.8	10.8	11.4	12.3	9.9	12.7

NVH has worked systematically with study quality to reduce the failure rate, which was at a high of 11% in 2006. The measures that have been implemented in the blocks and with the study plan have had good effect. Many students that continue to struggle often have problems outside their studies such as difficulties with their life situation, their health or their personal relationships. The Study Department at NVH has a system to monitor and identify students with study problems and a follow-up program of meetings and support for these students.

Table 9.7 DBH data on average study point production for students at all Norwegian universities compare with the production by students in veterinary studies at NVH and Dentistry at Oslo University.

The maximum study point production in a year is 60 points.

	2008	2009	2010	2011	2012
All Norwegian universities	40.4	40.5	40.8	41.1	40.7
Veterinary science at NVH	51.5	48.9	50.5	51.1	47.0
Dentistry at Oslo University	52.2	51.3	51.8	51.8	50.2

Table 9.7 DBH data on the completion rate (%) for students at all Norwegian universities compare with the completion rate of students in veterinary studies at NVH and Dentistry at Oslo University.

%	2008	2009	2010	2011	2012
All Norwegian universities	82.3	83.0	83.3	84.1	83.2
Veterinary science at NVH	97.0	93.5	92.9	94.9	90.8
Dentistry at Oslo University	93.3	93.4	91.7	95.0	95.5

A more detailed presentation of students that have dropped-out of veterinary studies or taken leave in the period 2008-2012 is presented in Table 9.10

Table 9.10 Data on the number of students that have taken leave or dropped-out of veterinary studies at NVH in the period 2008-2012.

Student Intake year	Active students (October 2013)	On leave as per October 2013	Dropped-out of studies in 2012/2013	Dropped-out in a previous study year	Total Dropped-out per Intake year
2012	72	4	8	-	8
2011	63	4	8	6	14
2010	65	2	4	5	9
2009	60	3	0	16	16
2008	70	0	0	15	15

In the academic year 2012/2013, 20 students dropped-out of veterinary studies at NVH. Over the 5 year period from 2008-2012, 62 students have dropped-out of studies. Table 9.1 shows that the uptake of students in the period 2008-2012 was 379. This gives an overall drop-out rate of 16.4%. Dropping-out of veterinary studies and study problems often occur in the first years of study and often represent a realization of incorrect choice of education or a difficulty in adapting study strategies to cope with the large content of courses in the veterinary curriculum. Information and assessment from the monitoring and follow-up system of the Study Department indicate that study problems are often combined with personal difficulties. Student surveys (“Temperature measurements”) indicate a high level of satisfaction with courses and study life at NVH. This contradiction draws attention to the relationship between

the structure of the Study Plan, curriculum overload and the quality and type of student that enters NVH.

9.3 SUGGESTIONS

Priority should be given to communication work to inform the large, highly qualified body of potential applicants to NVH of the nature of veterinary studies and about the veterinary profession in Norway. NVH should continue its follow-up of students to gain a better understanding of the reasons for students discontinuing their studies. The revision of the veterinary curriculum should consider adopting measures to promote student motivation and progression.

Chapter 10. ACADEMIC AND SUPPORT STAFF

10.1 FACTUAL INFORMATION

Table 10.1: Personnel in the establishment provided for veterinary training

	Budgeted posts (FTE)		Non-posts	Budgeted (FTE)		Total (FTE)	
	VS	NVS		VS	NVS	VS	NVS
1. Academic staff							
Teaching staff (total FTE)	84.2	12.8	0.5	1.2	84.7	14.0	
Research staff (total FTE) *	6.5	3.55	14.5	15.55	21.0	19.1	
Others* (FTE)	2.75	0	0	0	2.75	0	
Total FTE	93.45	16.35	15.0	16.75	108.45	33.1	
Total FTE (VS+NVS)	109.8		31.75		141.55		
FTE providing last year teaching					141.55		
2. Support staff							
a) responsible for the care and treatment of animals	47.4		7.23		54.63		
b) responsible for the preparation of practical and clinical teaching	3.4		0		3.4		
c) responsible for administration, general services, maintenance, etc.	84.8		7.8		92.6		
d) engaged in research work	22.6		26.2		48.8		
e) others (please specify) Routine histology laboratory Diagnostic laboratory (Central Lab)	2.4		8.2		10.6		
Total support staff	160.6		49.43		210.03		
3. Total staff	276.4		81.18		357.58		

*Includes 25% teaching requirement for PhD candidates with a 4 year scholarship (0.25 FTE)

Table 10.2: Allocation of academic (veterinary surgeon and non-veterinary surgeon) teaching staff – expressed as FTE – and support staff to the various departments

Department name	Academic teaching staff										Support (see table 10.1)	staff table (a)	Admin/ (c)	
	Full		Associate		Assistant		Assistant		Other ¹⁾					Technical (b+d+e)
	VS ²⁾	Prof. NVS ³⁾	VS	Prof. NVS	VS	Prof. NVS	VS	NVS	VS	NVS				
BasAM	7.6	2.0	7.3	2.6	0	0	0	0	5.0	0.5	24.4	0	6.0	
MatInf	10	2.5	5.5	4	0	0.8	0	0	4.25*	0	22.6	0	13.1	
ProdMed	5.7	1	11.5	1.2					8.25		15.8	22.53	11.8	
SportFa	2	0	15.0	0	6.75	0	3.0	0	7.0	0	0	32.1	4.4	

¹⁾ please specify: Førstelektor = Associate Professor, universitetslektor = Assistant Professor, klinikkveterinær = clinical veterinarian, 25% PhD, interns and residents

²⁾ veterinary surgeon; ³⁾ non-veterinary surgeon

* 17 PhD students with 4 year contracts (17 x 0.25 = 4.25 FTE)

Table 10.3: **Ratios students/staff**

					Denominator
R1:	$\frac{\text{No. total academic FTE in veterinary training}^{3)}}{\text{No. undergraduate students veterinary students}^{2)}$	=	$\frac{141.55}{388}$	=	$\frac{1}{2.741}$
					2.741
					Denominator
R2:	$\frac{\text{No. of total FTE at Faculty}^{3)}}{\text{No. undergraduate students at Faculty}}$	=	$\frac{357.58}{388}$	=	$\frac{1}{1.085}$
					1.085
					Denominator
R3:	$\frac{\text{No. total VS FTE in veterinary training}^{3)}}{\text{No. undergraduate veterinary students}^{2)}$	=	$\frac{108.45}{388}$	=	$\frac{1}{3.578}$
					3.578
					Denominator
R4:	$\frac{\text{No. total VS FTE in veterinary training}^{3)}}{\text{No. students graduating annually}}$	=	$\frac{108.45}{56}$	=	$\frac{1}{0.516}$
					0.516
					Denominator
R5:	$\frac{\text{No. total FTE academic staff in veterinary training}^{3)}}{\text{No. total FTE support staff in veterinary training}^{3)}$	=	$\frac{141.55}{210.03}$	=	$\frac{1}{1.484}$
					1.484

¹⁾applies only to those Faculties, which offer additional courses to the veterinary curriculum,
²⁾Table 9.3 ³⁾Table 10.1

Allocation of staff

The allocation of staff to the departments occurs either directly following negotiations with the central management of NVH or through a departmental decision to allocate or reallocate staff members financed directly by the department. Each department at NVH receives a lump sum every year to cover all expenses including salaries, investments, equipment and animals. The department has the authority to make changes to staff composition, with the exception of full professorships that are always negotiated with and finally decided by the School's central management.

Recruitment of staff

Over the last 10 years, vacant positions at NVH have usually attracted sufficient numbers of qualified applicants. There has been a trend that it has been difficult to attract veterinary

graduates to apply for PhD positions and that those veterinary graduates that have applied have not been as competitive for laboratory based research positions as applicants with non-veterinary education such as a Master's of Science. The establishment of a Project-related differentiation track and an Aquatic Medicine track that both have strong laboratory based components has been a measure to correct this trend and attract veterinary graduates into careers in research. The recent support from KD for the creation of 7 places for veterinary students to have a research year after the completion of the 4th semester will further promote the recruitment of veterinary graduates into research positions.

In Norway, the salary level of academic staff is, in general, comparable to the level in the private sector. The general level of income for veterinarians does not vary too much between academics and non-academics. A new trend within small animal practices in Norway has been the buying up of privately owned clinics by two competing Swedish companies that have established networks of practices with a single large referral clinic. These companies appear to be able to offer better salaries than are offered in academic positions for those veterinarians with competences such as European or American diplomat status.

Regulations for employment

The clinics are able to use revenues from clinical and diagnostic work to employ additional staff, if appropriate and if funds are available.

Outside work including consultation and private practice is permissible at NVH as long as the work does not inhibit or delay the primary employment at NVH. Furthermore, the outside work should not threaten to damage the reputation of NVH, involve a mixing of assignments and resources between primary and secondary employment and should not contribute to disloyal competition with NVH.

Scientific meetings and sabbaticals

The financial model at NVH gives the departments a proportion of their income based on scientific production. These funds can be used to support the attendance of staff at scientific meetings. Members of staff with externally funded research projects have the possibility to attend scientific meetings.

UFE allocates funds to support applications for sabbatical leave for academics at NVH. The regulations and entitlements of sabbatical leave are the same as for other higher education institutions in Norway. After 6 years in a permanent position, a senior academic is entitled to one year's paid sabbatical leave.

10.2 COMMENTS

The total numbers of personnel in academic and support staff positions at NVH are satisfactory in relation to meeting the School's mission and comparable to levels in other Nordic veterinary schools. NVH has 77% veterinarians on its academic staff (see Table 10.1). NVH is the only veterinary education institution in Norway and has considerable responsibilities in veterinary research and communication. NVH has built up large robust research groups that are active in health and disease control particularly in relation to the aquaculture industry. NVH has also built up companion animal and production animal clinics with a large case load. The level of academic staffing enables this high case load to be

sustained and allows the teaching of students in small groups. The staffing levels and animal and clinical material available at NVH will be needed to meet the planned increase in student intake from 70 to 90 students, when the School moves to new buildings in 2019.

There is a trend for increased competition for veterinarians with postgraduate professional qualifications particularly in the disciplines in small animal practice. NVH has a strategy to develop the Referral Hospital in its Small animal clinic. This strategy includes the education of diplomats in selected fields. NVH wants to recruit staff who are interested in teaching and research and who are committed to creating new knowledge within veterinary medicine and the life sciences. NVH is contributing to the demand for veterinarians with diplomat status but is also contributing to the supply through its education programmes. The large clinical loads at NVH's clinics and the prospect of new buildings fitted with up-to-date equipment on the Ås campus in 2019 will make NVH an attractive work environment and give a competitive advantage in recruiting and retaining academic personnel. The challenge for NVH in the intervening period is to maintain and develop the work environments on the Adamstuen and Sandnes campuses. The merger with UMB to establish NMBU and the move to campus Ås have been controversial at NVH. The administrative merger of the two institutions will be effective from 1st January 2014 and some administrative staff members have left their jobs at NVH. The same trend has not been seen in academic staff but the retention of academic staff may be problem as the move in 2019 approaches.

10.3 SUGGESTIONS

Veterinary students should be given an increased opportunity to engage in research during their studies. The development of professional environments capable of training veterinarians to diplomat status should be continued at NVH and the large robust research groups should be encouraged and supported in international competition for research projects. The provision of a large animal and clinical material for teaching and small student group sizes should continue to be a priority in the development of the veterinary curriculum.

Chapter 11. CONTINUING EDUCATION

11.1 FACTUAL INFORMATION

The legal basis and official requirement for continuing education in Norway are set by the Ministry of Education (KD), which has the statutory authority to require that all universities offer continuing education for their professional groups. The NVH Board established the Center for Further Education (SEVU) in August 2006. SEVU reports to the Director General. SEVU provides continuing education for veterinary surgeons, veterinary nurses, food authorities, blacksmiths, behavioral consultants and physiotherapists for dogs and cats. The courses for veterinary surgeons are conducted in cooperation with the Norwegian Veterinary Association (DNV).

All continuing educational activities at NVH are administrated by SEVU and consist of:

- a. Courses for individuals. These courses may or may not offer ECTS (European Credit Transfer and Accumulation System) points.
- b. Teaching assignments. An institution or enterprise may book a particular academic course.

Each educational activity is organized as a project where SEVU is responsible for scheduling, organization, implementation and evaluation. The activities are academically sourced from the teaching Departments at NVH. The different academic Departments at NVH play a crucial role in initiating the specific fields and subjects of further education. Every further and continuing educational course arranged by SEVU has a responsible scientific coordinator from the respective Department. The teaching at the courses is provided by NVH academic staff wherever possible. Each continuing education program undergoes quality assurance by Veterinary Undergraduate and Continuing Education Programmes Committee (SU), which also approves the allocation of ECTS points. SU monitors the design, implementation and quality of the offered courses. Each continuing education program is evaluated by the participants and the results are distributed to the involved academic Departments.

Many programs of continuing education are held in cooperation with the Norwegian Food Safety Authority including fish health, exotic animal diseases, serious contagious and vector borne diseases (5 ECTS), detection of food-borne disease outbreaks (2 ECTS), course in statistical analysis of data in connection with outbreak of contagious diseases (2 ECTS) and repeated courses to qualify as an “official veterinarian” (10 ECTS).

List of courses offered in 2012/2013:

- 1) Reproduction large ruminants: “Good fertility – foundation for the economy” for veterinarians
- 2) Odontology (dogs, cats, rabbits) for veterinary nurses – 10 ECTS. This course is arranged every second year.
- 3) Course in Laboratory Animal Science for Research Workers – 6 ECTS. This course is conducted two to three times every year.
- 4) Neuropsychology and psychopharmacology (dogs and cats) for veterinarians, veterinary nurses and behavioral consultants – 5 ECTS

- 5) Endo-parasitological diagnostics of horse, dog and cat for veterinarians and veterinary nurses.
- 6) Anaesthesia and analgesia (dogs and cats) for veterinary nurses – 15 ECTS. This course is arranged every second year.
- 7) Rehabilitation and physiotherapy in small animal practice for veterinarians, veterinary nurses and physiotherapists – 30 ECTS
- 8) Horse dermatology for equine veterinarians
- 9) Serious contagious and vector-borne diseases – 5 ECTS. For veterinarians in the Norwegian Food Safety Authority.
- 10) Small animal cardiology for veterinarians
- 11) Emergency and intensive care in small animal practice.
- 12) Challenges in internal medicine of the cat.
- 13) The veterinarian and modern cattle husbandry.
- 14) Course in fundamental bird and reptile medicine.
- 15) Feeding the horse.

The evaluations by the participants have been good in all of the courses. The course on reproduction of large ruminants was cancelled because of too few participants.

11.2 COMMENTS

The quality of the continuing education programmes in which NVH is involved is good. The teachers involved are always of the highest quality. If necessary expertise to run a course is lacking NVH's academic staff recommend appropriate lecturers be hired in from abroad. The use of international expertise in continuing education courses contributes to advancing the knowledge of local veterinarians and the competence of NVH's academic staff. Every course is evaluated by the course participants. The results of the examinations and the participant evaluations provide important feedback on the quality of the continuing education programmes.

The Norwegian Veterinary Association is responsible for the approval of national specialists and runs short courses for veterinary practitioners. Many of these courses use lecturers from NVH.

The degree of participation of veterinary practitioners in the continuing education programmes involving NVH that are offered by SEVU varies. Courses directed towards small animal practitioners are usually fully booked. Equine courses are so far mainly held by the Norwegian Veterinary Association and others using NVH's professionals. However at the one course offered by NVH for equine practitioners, the participation was very good. SEVU is working to develop more courses for equine practitioners. Continuing education in poultry, porcine and small ruminant medicine is still at the planning stage.

All the courses that are conducted in cooperation with the Norwegian Food Safety Authority work very well. The courses are usually designed for the Food Authority's own employees, but are also open for the participation of other veterinary practitioners. These courses are always fully booked by veterinarians.

In collaboration with UMB, SEVU and key academic staff at NVH are about to present a more comprehensive package in Veterinary Public Health (VPH) leading to a full Master's degree.

Continuing education is an excellent way to keep in contact with the practitioners throughout the country. Since veterinary medicine is an evolving profession it is crucial for everyone who practices veterinary medicine to keep up to date with new technology and research.

11.3 SUGGESTIONS

NVH should increase the quantity of courses offered and work to include small ruminants, porcine and poultry medicine in the continuing education program. More courses should offer ECTS. Courses with ECTS are more time consuming for the academic staff, which makes it more difficult to implement.

The work with the VPH-master degree should be given focus and priority.

Chapter 12. POSTGRADUATE EDUCATION

12.1 FACTUAL INFORMATION

12.1.1 CLINICAL SPECIALTY TRAINING (INTERNS AND RESIDENTS)

Table 12.1.1: Clinical specialty training

Clinical discipline	No. of interns	No. of residents	Diploma or title anticipated
Animal Reproduction	1	1	Dipl. ECAR
Bovine Health Management	0	1	Dipl. ECBHM
Equine Internal Medicine	2*	0	Dipl. ECEIM Dipl. ACEIM
Porcine Health Management	0	3	Dipl. ECPHM [#]
Veterinary Clinical Pathology	0	1	Dipl. ECVCP
Veterinary Dermatology	0	1	Dipl. ECVD Dipl. ACVD
Veterinary Diagnostic Imaging	0	2	Dipl. ECVDI Dipl. ACVDI
Veterinary Internal Medicine – Companion Animals	6*	1	Dipl. ECVIMCA
Veterinary Ophthalmology	0	1	Dipl. ECVO
Veterinary Pathology	0	2	Dipl. ECVPH
Veterinary Public Health	0	1	Dipl. ECVPH [#]
Total	9	14	

*Interns in horse medicine and small animal medicine

[#]In addition to residents in training, two associate professors are each following a specialty training programme for Dipl. ECPHM and Dipl. ECVPH, respectively.

In Norway, the candidates in the residency programs require an undergraduate veterinary degree equivalent to a cand.med.vet. is required. The candidates are regular employees during the residency period and are given a salary and have the same rights as other academic employees.

Certified training programs have been established in veterinary pathology (European College of Veterinary Pathologists, ECVPH) and clinical pathology (European College of Veterinary Clinical Pathology, ECVCP). The Section for small ruminant diseases in ProdMed is accredited by the board of the European College of Small Ruminant Health Management (ECSRHM) as a European Specialist Training Centre for veterinarians. There are approved residency training programmes in Anaesthesiology, Ophthalmology, Diagnostic Imaging and equine surgery.

12.1.2 RESEARCH EDUCATION PROGRAMMES

Table 12.1.2: Number of research students enrolled in different programmes

Type of degree	Fulltime	Part time	Duration
PhD	127		3-4 years
Other doctoral level ¹⁾ Dr. Philos.	2		Unspecified

¹⁾please specify

In Norway, the PhD candidates are regular employees during the PhD period and are given a salary and have the same rights as other academic employees. Therefore, all PhD positions are openly announced and there is no discrimination between national or international students other than for some projects that require knowledge of the Norwegian language. Applicants are required to have completed a higher degree equivalent to the cand.med.vet. degree, a relevant 5-year Master's degree or other relevant professional degree from a Norwegian institution or equivalent foreign institution. For some positions especially in clinical studies, an undergraduate veterinary degree equivalent to a cand.med.vet. is required. The applicant must be able to document a strong academic background from previous studies. To select between the applicants, a committee is appointed by the relevant Head of Department. On the basis of the committee's evaluation of the applicants' competences, the Head of Department makes a recommendation to the NVH Appointments committee, which makes the final decision on employment based on a total evaluation of the candidates. The PhD candidate will normally be given a contract for three years' employment.

NVH has 32 PhD positions funded by the Ministry (KD) through its core allocation of funds and 8 PhD quota grants funded by the Norwegian quota-program. These positions are allocated to research groups by the Committee for Research and Ethics (UFE). The research groups have to compete for all strategic funding according to the research priorities listed in the Strategic Research Plan for NVH. The other PhD positions at NVH are funded by external research grants. The main sources of this funding are the Norwegian Research Council (NFR) and European Union (EU).

12.2 COMMENTS

The number of postgraduate diplomas/titles awarded annually at NVH over the last 4 years is present in Table 12.2.1.

Table 12.2.1. The number of postgraduate diplomas/titles awarded annually

Diploma/title	2009	2010	2011	2012
Diploma				
PhD	19	16	19	21
Dr.Philos.	2	1	2	1

All candidates participating in the residency program are required to have an undergraduate veterinary degree equivalent to a cand.med.vet. For the research education programmes, 63 of 99 PhD candidates (64%) registered in the FS database have a veterinary degree. Of the 63 veterinarians entered in the FS database, 41 had taken their undergraduate degree at NVH (65%).

NVH does not offer a part-time PhD course. PhD students are regular employees so are entitled to leave of absence and other benefits under the Norwegian social security scheme. Legal leave of absence such as maternity or paternity leave will extend the duration of the PhD course.

12.3 SUGGESTIONS

Many of the clinical disciplines at NVH are experiencing an increased demand from its graduates to obtain so-called “double-competence”. This involves the obtaining of both a PhD and Diploma (from the relevant European or American College). NVH should continue to promote its research groups and their recruitment of PhD students from veterinary graduates. NVH should also continue its policy of employing Diplomats in clinical positions and expanding the number of clinical disciplines offering residencies and Diplomat education through the European Board of Veterinary Specialization-approved programmes.

Chapter 13. RESEARCH

13.1 FACTUAL INFORMATION

In 8th semester of the veterinary curriculum, the students have to write a report on wildlife health in the style of a scientific paper. The students are required to use the Library to find sources and literature for the report.

In the final differentiation year (semesters 10 and 11 or 11 and 12), all veterinary students participate in a compulsory course in Research methodology and scientific writing (2 ECTS) and complete a research task or project to write a final graduation thesis within their elected differentiation. The research task or project is the most important opportunity in the veterinary curriculum at NVH for the student to acquire knowledge of and experience with scientific methods and the principles of scientific research.

There are 5 differentiation tracks:

- Production Animal Medicine and Food Safety
- Small Animal Medicine
- Horse Medicine
- Aquatic Medicine
- Project-related

Students that select one of the four clinical differentiations must complete a research task worth 15 ECTS (Production Animal Medicine and Food Safety, Small Animal Medicine and Horse Medicine) or 20 ECTS (Aquatic Medicine), amounting to 10 weeks' or 13 weeks' work, respectively. Students that select the laboratory differentiation (Project-related) must complete a research project worth 40 ECTS, which amount to 27 weeks' work. The student may elect to spend an additional 2 weeks on their research task in the Aquatic Medicine, Small Animal Medicine and the Horse Medicine differentiations.

The research tasks or projects must be scientifically relevant to their selected differentiation track and be within the field of veterinary medicine. Two to three students within the same differentiation track may work on the same task or project. If two or more students submit a single research task or project, a single signed co-author declaration shall also be submitted that describes the contribution of the individual students.

The submitted research task is in the form of a final graduation thesis and consists of approximately 20 – 40 type written pages including appendices. The thesis for the Project-related track is to have a higher standard of quality and originality and a higher standard of scientific presentation than the final graduation thesis for the other differentiation tracks.

The students shall deliver a plan for the research task or plan after consultation with their supervisor.

The final graduation theses from the four clinical tracks are evaluated by an examiner and the supervisor and are awarded either pass or fail. The Project-related theses are evaluated by two examiners, where at least one of which is external to NVH, and are awarded a graded character from A to F. If the project is considered suitable for a passing grade (A-E), the

student holds a 30 minute public presentation of the project followed by a discussion with the examiners and supervisor. On the basis of the submitted written work, oral presentation and discussion, the student is awarded a grade (A-E).

Final examination certificates are awarded only after the approval of the final graduation thesis or project-related thesis. The differentiation track and the title of the graduation thesis or project-related thesis are recorded on the final examination certificate.

13.2 COMMENTS

After considerable lobbying by NVH, the Ministry (KD) has agreed to the establishment of a Research Year as part of the veterinary curriculum. This is an initiative to create a “Research track in Biomedicine” for veterinary students that is similar to the model used for medical students. The financing of the scheme is not yet in place. The motivation for this initiative is that NVH wants to encourage newly educated veterinarians to pursue a career in research. The students that enter NVH are recruited from the highest academic background and have the ability and interest to contribute to the advancement of knowledge and the development of veterinary science as a research-based discipline.

It is proposed that students will submit an application to be admitted to the Research Track. The study will consist of a continuous full-time research year after the 4th semester and part-time research activity during the remainder of the veterinary curriculum. The students will be integrated into the best research groups at NVH and will in cooperation with these groups perform 2 years research work before the end of the veterinary studies. The overall veterinary studies will only be extended for one year because the student will perform the additional year of research work in parallel with the remainder of the veterinary studies. The Research Track will be composed of a theoretical part including a research methods course and a practical part that will be work on the research project. The final examination and the delivery of the research thesis will occur at the end of the veterinary studies and the thesis will be equivalent in content to 2 research publications. The Research Track will make the graduate from NVH well prepared for a research career that has already commenced during their undergraduate studies. The veterinary graduate will be better qualified and motivated to apply for research positions. The theory component of the Research Track is to be approved as the theory component of a Doctoral programme and will represent a corresponding shortening of the Doctoral studies. Newly graduated veterinarians with this research background will be attractive for and competitive in other research environments and will contribute to cross-disciplinary contact with a larger portion of research environments in Norway. The scheme could also increase recruitment to veterinary research and contribute to attract students that are interested in a possible research career.

13.3 SUGGESTIONS

The establishment of a research year as an option in the veterinary curriculum will strengthen the association between the many active veterinary research groups at NVH and veterinary students. NVH should continue its work to engage students throughout the veterinary curriculum in the research activities available on its campus.

