



LUND UNIVERSITY

Medical education in Sweden.

Lindgren, Stefan; Brännström, Thomas; Hanse, Eric; Ledin, Torbjörn; Nilsson, Gunnar; Sandler, Stellan; Tidefelt, Ulf; Donnér, Jakob

Published in:
Medical Teacher

DOI:
[10.3109/0142159X.2011.570816](https://doi.org/10.3109/0142159X.2011.570816)

2011

[Link to publication](#)

Citation for published version (APA):

Lindgren, S., Brännström, T., Hanse, E., Ledin, T., Nilsson, G., Sandler, S., Tidefelt, U., & Donnér, J. (2011). Medical education in Sweden. *Medical Teacher*, 33(10), 798-803.
<https://doi.org/10.3109/0142159X.2011.570816>

Total number of authors:
8

General rights

Unless other specific re-use rights are stated the following general rights apply:

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Read more about Creative commons licenses: <https://creativecommons.org/licenses/>

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00

“Medical education around the world” series

Medical Education in Sweden

Running head: Medical Education in Sweden

Authors: Stefan Lindgren¹, Thomas Brännström², Eric Hanse³, Torbjörn Ledin⁴, Gunnar Nilsson⁵, Stellan Sandler⁶, Ulf Tiddefelt⁷, and Jakob Donner¹

Affiliations: ¹Lund University, Sweden, ²Umeå University, Sweden, ³University of Gothenburg, Sweden, ⁴Linköping University, Sweden, ⁵Karolinska Institutet, Sweden, ⁶Uppsala University, Sweden, ⁷Örebro University, Sweden

Corresponding author: S. Lindgren, Department of Clinical Sciences, Malmö, SUS Malmö, SE-205 02 Malmö, Sweden, Tel: +46 40 33 23 06, Fax: +46 40 92 32 72, email: stefan.lindgren@med.lu.se

Abstract

Undergraduate medical education in Sweden has moved from nationally regulated, subject-based courses to programmes integrated either around organs or physiological and pathophysiological processes, or organized around basic medical science in conjunction with clinical specialities, with individual profiles at the seven medical schools. The national regulations are restricted to overall academic and professional outcomes. The 5½ year long university undergraduate curriculum is followed by a mandatory 18 months internship, delivered by the county councils. While quality control and accreditation for the university curriculum is provided by the Swedish National Agency for Higher Education, no such formal control exists for the internship. The undergraduate medical education is thereby in conflict with EU directives from 2005. The Government is expected to move towards 6 years long university undergraduate programmes, leading to licence, which will facilitate international mobility of both Swedish and foreign medical students and doctors.

Ongoing academic development of undergraduate education is strengthened by the Bologna process. It includes outcome (competence) based curricula, university Master level complying with international standards, progression of competence throughout the curriculum, student directed learning, active participation and roles in practical clinical education and a national assessment model to assure professional competence. In the near future, the dimensioning of Swedish undergraduate education is likely to be decided more by international demands and aspects of quality than by national demands for doctors.

Background

Undergraduate medical education

The 5½ year undergraduate medical programme in Sweden is offered by seven universities, one of which is only starting in 2011. In all, approximately 1.570 students are accepted yearly. This should be related to a population of approximately 9 millions.

Until 1977 the content of undergraduate medical education was nationally regulated and identical at all six universities. It started with two years of courses in anatomy, histology, physiology and physiological chemistry. The third year was of a clinical preparatory character, still with very limited patient contact, and in addition it contained courses in pharmacology and diagnostic disciplines. Then followed courses of specified duration in all clinical disciplines, starting with internal medicine and surgery followed by courses in other clinical disciplines in a rather random succession. The end of the last clinical course was also the exit from the 5½ year long education and there were no direct interactions between the different courses. There was no mandatory individual project work.

Since 1977 each university has been allowed to develop its own curriculum, with an ideology that diversity is important and that each university should be allowed to exhibit a profile of its own. The overall goals are, however, nationally regulated. Generally, over the last decade the curricular models have moved from a series of subject based individual and basically unrelated courses to programmes integrated around various principles such as organs, physiological functions and pathophysiological mechanisms. Still, some programmes have retained a structure around basic medical science in conjunction with clinical specialities. It has been easier to accomplish horizontal than vertical integration, although early patient encounters characterise all programmes. In addition, student activating learning methods have been introduced to varying extents in the different programmes.

Admission to the medical schools is controlled and administered at a national level. For the majority of students, admission is based on high school grades or the Swedish scholastic aptitude test evaluating abilities for university studies that students may sit several times after finishing their high school studies. In addition, local admission is allowed by the authorities to part of the positions through individual evaluations, for instance interviews. This possibility has been used by some universities in periods. Although some advantages related to time to completion of studies and reduction of study failures have been noted, the resources and costs spent have been judged to be disproportionate. In practise, admission required the highest possible grades from high school, and even that was no guarantee to be admitted. This situation has encouraged less valuable, tactical studies during high school. The Government, therefore, has tried to stimulate in depth studies in central subjects by adding special credits. However, this may lead to exclusion of groups of students with old grades or high school grades from abroad, so it is currently uncertain whether this will really be established.

The MD diploma is followed by an internship period of 18 months which is mandatory before licensing to practise medicine can be granted. The internship includes additional supervised practical clinical work related to internal medicine, surgery, psychiatry, primary care and some additional theoretical studies. Internship is offered by the county councils and it takes place at hospitals of varying size, from university hospitals to the smallest local hospitals, and out-patient facilities. The university programmes are accredited by the Swedish National Agency for Higher Education, while no formal accreditation process exists for the internships. Licence to practise is obtained from the National Board of Health and Welfare, based on positive recommendations from department heads at the hospitals and primary care facilities, a knowledge based written examination constructed by a group of university representatives

chaired by the Karolinska Institutet in Stockholm, and a patient based examination. This split responsibility between universities and county councils for the undergraduate education leading to license is in conflict with an EU directive from 2005 stating that undergraduate medical education should comprise a total of at least 6 years of study at, or under the supervision of, a university. Due to the increasing awareness of this problem, the Swedish government is expected to give directives to construct a new undergraduate education programme under the leadership of the universities with the national Agency for Higher Education as accrediting body. This new programme will integrate the current MD programme with the 18 months of internship into a 6 year long undergraduate medical programme leading to license. If implemented, this reform will offer an extraordinary opportunity for the seven medical schools to cooperate to produce a new curriculum with clearly defined outcomes in association with all other stakeholders, without being tied up by local academic restraints or interests originating in regional demands for physician workforce supply.

Postgraduate medical education

Postgraduate medical education is offered by the county councils and is not the responsibility of the universities. Most postgraduate programmes are 5 years long but for some specialities the physician must first obtain competence in a basic discipline, for example internal medicine or surgery, before moving on to a subdiscipline such as cardiology or urology, requiring approximately another two years of training. The training is outcome based and mainly delivered through practical clinical work in that discipline and related disciplines according to a plan specified by the National Board of Health and Welfare. The practical training is supplemented by external courses, usually offered by university teachers, as needed. There is yet no formal assessment to be passed before obtaining a specialist diploma,

provided that the outcomes of the training are considered to have been met by supervisors and department heads. The specialist diploma is issued by the National Board of Health and Welfare.

A lot of possibilities exist for continuous professional development as a specialist in Sweden. Most of them are provided by the professional specialist organisations. But also others, like the pharmaceutical industry, universities or county councils, may be providers. Quality, transparency and independency is guaranteed through the mandatory evaluation of all courses offered by a national organisation formed in cooperation between the professional organisations and the county councils named IPULS – Institute for the Professional Development of Physicians in Sweden. Efforts are undertaken to structure individual development plans for each specialist depending on the needs of the trainee and the clinical department, but yet with limited success. Instead most continuing professional development activities depend on the initiative of the individual specialist. One problem that has been noted is that areas that the specialist already masters tend to dominate, while in particular broader aspects of professionalism are underrepresented in the continuing professional development portfolio. There are no formal systems for continuing medical education credits.

National evaluation of undergraduate medical education in Sweden.

The Swedish laws regulating undergraduate medical education offer a lot of freedom to a university to decide on the curriculum model and the content of the programme. There are no national exit exams, and thus each university has a responsibility to develop and reform its training programme and to evaluate the effects of the reforms. In addition, the Swedish National Agency for Higher Education evaluates all university programmes at regular intervals and decides on accreditation. In 2006-2007, a large nationwide evaluation was

performed of all 136 programs within medicine and health care (SNAHE 2007) including the six undergraduate medical programmes in existence at the time. The overall focus was on the general academic goals of university education and the quality of the practical education during clinical rotations. The cardinal question of the whole evaluation was “*How does the university make sure that the expected learning results are achieved by all students?*” The evaluation of the undergraduate medical programmes was based on six dimensions and carried out by evaluators from all the Nordic countries:

- Management and resource allocation
- Determination and ability to develop quality
- Study environment
- Content and structure of the curriculum
- Quality of the practical clinical training
- Pedagogic development and research

In addition, the evaluation was related to the World Federation for Medical Education global standards (WFME 2003) and the SPICES model (Harden *et al.* 1984). The conclusion of the evaluation was that the Swedish undergraduate medical education is of good quality by international standards. Although, as a result of the evaluation, all six programmes were accredited, some strengths and weaknesses were documented, with clear variations between the different programmes.

Strengths

The evaluators concluded that generally the educational facilities are of high quality and the students have excellent access to libraries, study facilities and information and communication technologies. The formal education and academic level of teachers and supervisors in clinical practise is high and adequate. All programmes are firmly research

based. Furthermore, the clinical departments and general practises are open for students and, in general, patients are positive to encounters with students. This means that the opportunities for clinical practical education are good as are the possibilities for individual meetings between students and patients. The best ranked programmes are characterised by a positive educational culture, professional long-term management and development focusing on the general academic goals and students learning. Furthermore they are based on a clear pedagogic vision devoted to principles, mechanisms and exemplarity instead of an ambition to cover everything, as well as alignment between expected learning outcomes, educational processes and assessment.

Weaknesses

Factors that were found to have a negative impact on quality were difficulties to handle long-term reform processes, department and subject based curricula, lack of management and models for resource allocation based on the need of the undergraduate education and lack of a pedagogic model. In particular, a comprehensive assessment model that covers and blueprints all important aspects of competence is generally lacking. All the six universities evaluated in 2006 are primarily research focused. It was concluded that if the needs of the common outcomes of the educational programme are not specifically considered, then integration, inter professional learning and educational development will not be stimulated and reimbursed. A lack of clear merits for pedagogic scholarship adds to this lack of incentives. This criticism is also reflected by the low number of publications from all universities within pedagogy and education and a limited number of research and development projects. Furthermore, the National Agency for Higher Education remarked that no programme had formal degree projects, neither at the bachelor, nor at the master level. Finally, clinical practical education is often delivered without reference to expected learning outcomes for that particular part of the

curriculum and without knowledge about what the students have learnt previously. Often, clinical skills are not assessed, neither in a formative, nor in a summative way, and thus guarantee for progression is lacking. Too often, the students are spectators rather than active participators. A high turn-over of in-patients adds to the difficulties and the pedagogic models used to give students active roles in out-patient clinics are insufficient. In summary, it was concluded that the educational activities must be given higher priority by the universities, management must be professional, resource allocation directed to the needs of education, and students given clearer roles and responsibilities during their practical training.

National harmonization and academic development

Meeting Bologna requirements, degree projects and electives

It is remarkable that such long academic educational programmes have had no formalized demands for degree projects until this was stipulated by the Higher Education Ordinance for students beginning their education from year 2007. It is now mandatory to include 30 ECTS-credits (20 weeks) for a scientific degree project, and this has been accomplished in all programmes. However, only one of the old medical schools and the new programme in Örebro require a 15 ECTS-credits degree project at the bachelor level followed by a 30 ECTS-credits degree project at the advanced level, giving an international fully Bologna-compatible Masters degree. Without doubt, the legal pressure from national regulations and the Bologna process has stimulated a rapid introduction of degree projects in the Swedish MD programmes. However, continued uncertainty about the applicability of the two cycle model to a programme that, as a whole, is positioned at the advanced level and the relative importance of the academic bachelor and master degree in relation to the professional MD degree, combined with unwillingness to “give up” space in the curriculum from traditional subjects are obstacles for further compliance to the Bologna structure. This is also the likely

explanation why most curricula are still dominated by core content with relatively limited space and opportunities for electives. The final full transformation of the Swedish MD programmes to comply with international standards is probably, like in many other European countries, dependent on external pressure from legal bodies, different stakeholders outside of the universities and, not least, from an increasing number of students planning international careers. It is clear, however, that academic aspects on undergraduate medical education have a stronger position today than previously. Time allocated for degree projects and electives are also the most suitable periods for international exchange studies used by many but not yet the majority of students.

Ongoing national curriculum reforms

A new undergraduate medical programme started in 2011 at Örebro University. It was developed in close collaboration with the universities in Maastricht and Glasgow with the conclusions and recommendations from the latest evaluation by the Swedish National Agency for Higher Education and international developments in mind. The accreditation of the Örebro MD programme was based on the fulfilment of demands regarding an academic learning environment, teacher competence, infrastructure, curriculum plans and methods for quality assurance. That programme may therefore serve as an example of the main principles for curriculum reform work in all Swedish medical schools, although this reform is, of course, always more complicated and complex in established schools with a long history. The main trends in ongoing national curriculum reforms are somewhat consistent (**Box 1**) :

Box 1

Trends in ongoing national curricular reforms

- Theme based programmes with clear progression
- Outcome based programmes with defined levels of learning
- Problem based and student activating learning as an important strategy for vertical integration
- Primary Health Care as a significant and early area of learning
- Specific tracks for professional and scientific development
- Structured practical and professional education and training of skills
- Interprofessional education
- New assessment strategies including a learning portfolio
- International exchange opportunities

Clinical units specifically designed for inter professional training where students from different programmes are assigned responsibility in their professional roles and in team-work are included in the clinical rotations, usually in the later parts of the programmes. Thereby, the students are better prepared for the next stage of their clinical education during internship and specialist education.

(Desired position for Figure 1)

An overview of the curriculum example from Örebro is presented in **Figure 1**. It is built on four stages, each integrating perspectives of biomedicine, clinical medicine and professional development, with functional themes that are dealt with in progression in three spirals.

Outcomes have defined levels of learning at each theme. A degree project constituting 15 ECTS-credits is included during semesters five and six and another constituting 30 ECTS-credits occupies the tenth semester. Practical clinical education constitutes 121 credits (80 weeks), beginning at semester one with early contact with patients in Primary Health Care. Problem based learning is the dominating educational mode of work and a portfolio assessment model is included to supplement knowledge based assessments. Skills labs and other specific training facilities will be used on a regular basis to complement practical clinical training in the health care settings.

A national assessment and core competence model

All programmes aim at becoming outcome-based (competency-based), again a development assisted by the Bologna process emphasizing “expected and achieved learning outcomes”. Initiatives to define a national core curriculum derived from the increasing differences between the programmes have been transformed into efforts to construct a common and clearly defined competence base for all graduated medical students in Sweden, independently of where they have undertaken their undergraduate studies. The advantage with this approach is that it is focused on the results at the programme level and thus allows varying curriculum models. Another advantage is that it can be used also for planning additional training for students and doctors entering the Swedish health care system with degrees from other countries (see below).

Table 1.

Topics under discussion for a national assessment model.

<i>Assessment of</i>	<i>Examples of what could be assessed</i>	<i>Possible national collaborative actions</i>
"Know"	The core of the cognitive outcome	Collaboration around progress testing based on a common data base of questions
"Knows how"	<i>E.g.</i> degree projects	Establishing a common set of criteria for the assessment of degree projects
"Do the right things"	The core of outcome of skills	Defining the necessary skills and collaborating on ways to assess them, <i>e.g.</i> through OSCE
"Do the right things in the right way"	The outcome of competence	Development and validation of a portfolio of methods for assessment through direct observations, of the ability to analyse and synthesise complex situations and the ability for reflection

All medical schools in Sweden have been invited to discussions regarding a national assessment model (**Table 1**). The intention is to use this model to document core competencies for all medical students graduating from Swedish medical schools. The assessment model and its methods can be used at different stages in the curricula and the choice of methods from the portfolio package may differ between universities. So far, four Schools have agreed to develop a common progress test as the preferred method to ascertain basic knowledge, with a data base of questions developed and used in collaboration. This assessment model will give valid information related to the strengths and weaknesses of the programmes and assist quality development. It should also provide the schools with a valuable research data base. If the Swedish undergraduate medical education system moves towards a six years curriculum leading to license, the assessment model can be easily modified and thereby provide a standard that can be used also for the introduction into the Swedish health care and postgraduate education systems of doctors licensed in foreign countries.

International harmonization and mobility

Due to the limited number of positions available at medical schools in Sweden, an increasing number of Swedish students move abroad to receive their undergraduate medical education. Most of them go to Poland or Denmark: presently approximately 700 Swedish students are found in these two countries. Hungary and Romania are two other countries of importance in this regard. The majority of these students plan to return to Sweden for their professional work as physicians, but the exact proportion is unknown. During the last years, however, more than 50% of the licences to practise as a physician in Sweden were issued to students with their undergraduate education from abroad. Still, many of them may choose to practise in another country in spite of this. This situation has consequences for the dimensioning of educational programmes in Sweden. On the other hand, politically, Sweden is a strong supporter of free mobility of citizens and work force, both inside and outside of Europe. Initiatives to facilitate entrance to the Swedish health care system for physicians trained abroad are therefore given high priority. One possibility to make this possible can be offered by the previously mentioned assessment model. Although licenses from other European countries are accepted without restrictions, a defined way to specify professional competence may assist the individual doctor to document competence in order to increase competitiveness and to plan necessary additional training. For physicians educated outside of Europe, in the future, documentation of actual competence will probably be necessary, to grant the possibility of work in Sweden.

However, Sweden is also a rich country with an obligation to assist the development of health care in poorer countries. A strategy to assist “brain circulation” instead of just importing doctors from poor countries is beginning to show. This could mean that Sweden as a rich

country would offer its full capacity to train the number of physicians both at undergraduate and postgraduate level that it is able to do at a high quality level, although the language of course is a potential problem. Doing so would mean not having Swedish health care but rather international service as target market, and that could help to counteract the unilateral global flow of trained physicians from the poorer to the richer parts of the world. This international perspective ought to be of relevance also for other rich countries, since the cost of health care is rising unsustainably in many of them and a discussion on the values and the professional role of the doctor is necessary. It is impossible to finance a continuous increase in the number of doctors also in rich countries and probably it is not even desirable from a public health care perspective (Gordon and Lindgren 2010). In these discussions, the universities should be much more active than presently and contribute to the education of tomorrow's health care professionals rather than just providing programmes that reflect the needs of today or even yesterday. One step to facilitate mobility and international harmonization is the expected move towards a 6 year university based undergraduate education programme to comply with EU regulations, allowing students trained in Sweden access to international service without limitations. Adherence to the Bologna principles with a full and unrestricted master level after the completion of undergraduate training is another step.

Conclusions

Undergraduate medical education has a strong history in Sweden. In the past years resources were abundant and the number of students low in relation to a high number of hospital beds with patients staying for a longer time. Knowledge and skills within each subject were delivered with little attention to overall outcomes and general academic or professional competence. The international perspective was limited. Today the health care arena in Sweden is different. There is much more focus on outpatient and primary care, the number of

in-hospital beds per capita has decreased and hospital stays of the patients are very short termed. This is a challenge to the provision of practical clinical education and it necessitates detailed planning of expected learning outcomes for each stage as well as progression of competence, supervision, complementary use of skills labs and simulated learning processes, as well as comprehensive assessment of clinical competence. All seven medical schools in Sweden aim at designing outcome (competence) based curricula, providing horizontal as well as vertical integration of basic and clinical sciences and to rely on student directed learning activities. The main obstacle to this is the research based structure of the universities with limited incentives for pedagogic development and overall educational management of the entire programmes. Instead, promotion of teachers is still mainly based on research and department heads often have financial reasons to retain subject based rather than integrated structures to control allocation of resources and money. One consequence is that teachers tend to have narrow and highly specialized approaches to teaching rather than an approach based on overview and, therefore, they feel more comfortable giving controlled lectures instead of taking on roles as tutors and facilitators of student learning activities. Students also mainly meet highly specialized physicians as their teachers rather than generalists. Another consequence is that teachers in basic sciences seldom have a clinical or even medical background. In that perspective students also tend to favour defined space given to each discipline, particularly for the clinical disciplines, instead of integrated, professional competence perspectives. A prerequisite for future successful development will be strong programme management in close collaboration with students directed by the educational needs of the programme and with a mandate to allocate resources according to educational needs. Clearly, this development must be guided by an international rather than national perspective.

Practice points

- Undergraduate medical education in Sweden is developing into an internationally compatible (and competitive) programme professionally and academically.
- Overall management and assessment at programme level is a prerequisite to reach and document expected learning outcomes related to professional and academic competence at graduation.
- Ongoing development include structured practical, professional and inter professional clinical training with clear tasks, individual responsibility for students and complementary simulated skills training, to strengthen progression throughout the whole programme.
- Medical education in Sweden moves towards a continuum comprising both undergraduate and postgraduate education with clear outcomes for all stages and with clearly defined competence of the licensed doctor as fundament.

Declaration of interest

The authors report no declaration of interests.

References

Gordon D, Lindgren S. The global role of the doctor in health care. *World Medical & Health Policy* 2010; 2: 19-29.

Harden RM, Sowden S, Dunn WR. Educational strategies in curriculum development: the SPICES model. *Med Educ* 1984; 18: 284-297.

SNAHE 2007 Evaluation of undergraduate programmes in Medicine and Health Care at Swedish universities and university colleges. Swedish National Agency for Higher Education. Retrieved as 2007:23 R on February 6, 2011.
<http://www.hsv.se/aboutus/publications/reports/reports/2007/evaluationofundergraduateprogrammesinmedicineandhealthcareatswedishuniversitiesanduniversitycolleges.5.3c1b9686119162e52038000604.html>.

WFME 2003 Basic Medical Education. WFME Global Standards for Quality Improvement. World Federation for Medical Education. Retrieved February 6, 2011.
<http://www.wfme.org>.

Notes on contributors

STEFAN LINDGREN MD, PhD is Professor of Medicine at the Department of Clinical Sciences Malmö, Faculty of Medicine, Lund University, Sweden.

THOMAS BRÄNNSTRÖM MD, PhD is Associate Professor of Pathology at the Department of Medical Biosciences, Umeå University, Sweden

ERIC HANSE MD, PhD is Professor of Neurophysiology at the Department of Neuroscience and Physiology, Sahlgrenska Academy, University of Gothenburg, Sweden

TORBJÖRN LEDIN MD, PhD is Professor of Oto-rhino-laryngology at the Department of Clinical and Experimental Medicine, Faculty of Health Sciences, Linköping University, Sweden

GUNNAR NILSSON MD, PhD is Professor of General Medicine with emphasis on medical informatics at the Department of Neurobiology, Care Sciences and Society, Karolinska Institutet, Stockholm, Sweden

STELLAN SANDLER MD, PhD is Professor of Medical Cell Biology at the Department of Medical Cell Biology, Faculty of Medicine, Uppsala University, Sweden

ULF TIDEFELT MD, PhD is Professor of Medicine at the School of Health and Medical Sciences, Örebro University, Sweden

JAKOB DONNÉR MD, PhD is Associate Professor of Physiological Chemistry at the Department of Clinical Sciences Lund, Faculty of Medicine, Lund University, Sweden.

Figure 1.

An outline of the undergraduate programme starting in 2011 at Örebro University. The figure depicts the four stages and the content of each semester. Practical clinical work involves most weeks during stage 3 and semester 11. Structured basic clinical work during stage 2 is designated “Basic VFU”.

