



Education and Culture DG



COMMON LEARNING OUTCOMES / COMPETENCES FOR THE BACHELOR OF MEDICINE IN EUROPE

THE MEDINE2 BOLOGNA FIRST CYCLE TUNING PROJECT

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EXECUTIVE SUMMARY

The Bologna Process requires European Higher Education institutions to adopt a three-cycle system of Bachelor, Master and Doctor degrees. A research-based approach to gain consensus on core learning outcomes for these was developed by the Tuning Project, and previously used by Tuning (Medicine) for primary medical degrees (Master of Medicine) across Europe. The Bachelor of Medicine remained controversial, however, with differing opinions on whether core learning outcomes could or should be defined. This booklet reports the findings of the MEDINE2 (www.medicine2.com) Workpackage 4 study on common learning outcomes / competences for the Bachelor of Medicine in Europe. An online survey, based on Tuning (Medicine) results, was developed and widely disseminated to stakeholders. Respondents indicated, on a Likert scale, to what extent they thought students should have achieved each learning outcome on successful completion of the first three years (180 ECTS) of university education in medicine. There were 560 responses, representing medical students, academics, graduates, employers and patients from virtually all EU countries. Respondents broadly agreed that all learning outcomes defined by the Tuning (Medicine) project for primary medical degrees should be achieved to some extent in the First Cycle. Free text comments suggested some additional learning outcomes, and reinforced the importance of early patient contact and practical clinical experience. Broad consensus was achieved from a range of key stakeholders across Europe on core learning outcomes for a Bachelor of Medicine degree. Defining the Bachelor of Medicine degree in this way promotes early patient contact and clinical experience, and thus promotes integration in the undergraduate medical curriculum and may also facilitate mobility.



BACKGROUND

The Bologna Process

The Bologna Process requires all European Higher Education institutions to adopt a three-cycle system of Bachelor, Master and Doctor degrees (www.ehea.com). These three 'cycles' are defined for all academic disciplines by the 'Dublin Descriptors' (Joint Quality Initiative 2004). The Bologna Process, and the Bachelor of Medicine in particular, has been controversial in medicine, and is strongly debated in the literature (Christensen 2004; AMEE et al. 2005; Rigby 2007; AMEE et al. 2010; Cumming 2010; Davies 2010; Patrício and Harden 2010). Potential benefits reported include enhanced transparency (with easily readable and comparable degrees); mobility and choice (with transferable degrees and additional exit points); and enhanced patient safety (since medical graduates can already freely move around Europe, but may have very different competences). Potential concerns reported include loss of integration of medical curricula; standardisation and lowering of quality; competitive entry to Masters degree programmes so some students are unable to continue their medical studies or find a suitable job; Bachelor of Medicine graduates being employed as a cheaper alternative to trained doctors; risks to patient safety; and increasing outside interference with medical training.

Implementing the Bachelor of Medicine

Many countries have been slow to adopt the three-cycle system (Patrício et al. 2008). A recent survey only 32 of the 442 medical schools in Bologna signatory countries had adopted the Bachelor-Master two cycle medical curriculum, with most of the others retaining a single undergraduate primary medical degree (Patrício et al. 2012). Medical schools which had adopted the two cycles in Belgium, the Netherlands, Denmark, Switzerland, Armenia, Portugal and Iceland, reported no significant problems in implementation or any significant interference with curriculum integration (Patrício et al. 2012). One medical school studied the impact on student career choices and found no increase in students interrupting, discontinuing or transferring their medical studies after the Bachelor phase (van den Broek et al. 2010)

The Tuning Project (Medicine)

A research-based approach to gain consensus on core learning outcomes / competences was developed by the Tuning Project ([http://www.unideusto.org/tuning/;](http://www.unideusto.org/tuning/)), and used by Tuning (Medicine) to gain consensus on core learning outcomes for primary medical degrees (Master of Medicine) across Europe (Cumming and Ross 2007, 2008). This resulted in consensus on twelve broad 'Level 1' learning outcomes, each of which could be divided into more detailed 'Level 2' learning outcomes, and also a series of learning outcomes in medical professionalism.

The results have been widely accepted and influential. For example, 'Outcomes' section of the third (2009) version of Tomorrow's Doctors from the GMC, draws heavily on the Tuning (Medicine) outcomes, which are also referenced in that document (GMC 2009). The aim of the current research was to use Tuning methodology to explore stakeholder opinions and, where possible, identify consensus on core learning outcomes for the Bachelor of Medicine degree programmes across Europe. These would systematically link with the previously identified Tuning (Medicine) outcomes for the primary medical degree, in order to promote curriculum integration, transparency of graduate competences, and transferability of teaching and learning materials, strategies, students and staff between institutions.



The Tuning Learning Outcomes/ competences for Primary Medical Degrees in Europe

LEVEL 1

Graduates in medicine will have the ability to:

- carry out a consultation with a patient
- assess clinical presentations, order investigations, make differential diagnoses, and negotiate a management plan
- provide immediate care of medical emergencies, including First Aid and resuscitation
- prescribe drugs
- carry out practical procedures
- communicate effectively in a medical context
- apply ethical and legal principles in medical practice
- assess psychological and social aspects of a patient's illness
- apply the principles, skills and knowledge of evidence-based medicine
- use information and information technology effectively in a medical context
- apply scientific principles, method and knowledge to medical practice and research
- promote health, engage with population health issues and work effectively in a health care system

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Terminology

For this study, the original terminology of the Tuning Project was adopted, whereby “learning outcomes” (LOs) were considered to belong to a specific University degree, as specified by the awarding institution, and “competences” to belong to the graduate from that degree programme. At the point of successful graduation, the competences of the graduate are considered to be at least equivalent to the specified learning outcomes. For the purposes of this research the terms can therefore be used interchangeably, but here we generally refer to learning outcomes.

Bologna First Cycle in Medicine

MEDINE2 Workpackage 4

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Introduction

European Ministers of Education have stated, through the Bologna Declaration and subsequent Bologna Process, that all European Higher Education Institutions should adopt a three cycle system of degrees – Bachelor, Master and Doctor. A robust approach to agreeing core learning outcomes / competences for each cycle in all disciplines was developed by the Tuning Project (www.unideusto.org/tuningeu). This was used by a working group of the MEDINE Network to reach consensus on core learning outcomes for primary medical degrees (Bologna second cycle / Masters) in medicine across Europe. The results of that research have been widely disseminated in booklet form and online (www.tuning-medicine.com), and have been very influential across Europe and elsewhere. Now, as part of the MEDINE2 Erasmus Academic Network (www.medine2.com), the Tuning approach is being used to define core learning outcomes for Bologna first cycle / Bachelor degrees in medicine across Europe (Figure 1).

Workpackage overview

The aim of Workpackage 4 (WP4) of the MEDINE2 Network is to seek opinions and if possible Europe-wide consensus on core learning outcomes for Bologna first cycle (Bachelor) in Medicine using Tuning methodology. Members of WP4 have met to discuss and plan the project in a series of workshops, undertaken a review of the literature, agreed a definition of the ‘Bachelor of Medicine’, and agreed the contents and wording of the Tuning (Medicine) web-based survey for Bologna first cycle. This survey is currently live, and all medical academics, graduates, students and employers are strongly encouraged to participate online at <http://tinyurl.com/1stcycle>.

When sufficient survey responses have been collected, these will be analysed in detail by WP4 and used to inform MEDINE2 Network recommendations on core learning outcomes for Bachelor degrees in medicine in Europe.

Bologna first cycle in Medicine

The Bologna three cycle model for medical education has been controversial. Some countries have implemented the three cycles, but there is great variability and ongoing concerns about the comparability of Bachelor (first cycle) degrees and the subsequent education and career choices of graduates.

The ‘Master of Medicine’ (Bologna second cycle) was previously defined by Tuning (Medicine) as the primary medical degree – i.e. meeting the EU Council Vocational Directive that the graduate must have spent 5,500 hours of 8 years under instruction at an accredited medical school (EU Parliament and Council Directives 81/157/EEC, 1985, 2005-36-EC, 2007).

The ‘Bachelor of Medicine’ (Bologna first cycle) was defined by WP4 as the first three years of university education in medicine (i.e. 180 ECTS). It is thus mid-way in a student’s journey between commencement of undergraduate medical education and satisfaction of the EU Directives for practice as a medical doctor (Figure 2).

Survey learning outcomes

To ensure vertical integration between Bologna first and second cycles (Bachelor and Master of Medicine) it was decided to use the learning outcomes previously developed for primary medical degrees as part of the MEDINE Network (Figure 3, available in full at www.tuning-medicine.com). These outcomes are expressed as a two-level model, with 12 major ‘level 1’ outcomes further defined by a set of more detailed ‘level 2’ outcomes, and a set of outcomes for medical professionalism.

Level of outcome achievement

Respondents are being asked to indicate, using a rating scale based on Miller’s triangle, to what extent they think each of the second cycle learning outcomes should have been achieved by a student who has successfully completed the first three years of university education in medicine (Figure 4). Each learning outcome can be rated as ‘not learned’ (students need not achieve this by the end of their third year); ‘knows’ (students will be able to demonstrate their understanding of relevant basic sciences / issues); ‘knows how’ (students understand the principles and will be able to explain how and why they would do it); ‘shows how’ (students will be able to demonstrate their competence in a simulated / artificial situation); or ‘does’ (students will be able to demonstrate mastery in a real clinical situation / consistently in real practice).

Online survey

Following Tuning methodology, a web-based survey has been developed to seek the opinions of medical academics, graduates, students and employers on core learning outcomes for the ‘Bachelor of Medicine’ (Bologna first cycle). This survey is now live online, so please take a note of the web address or scan the QR code with your smart phone and have your say on learning outcomes for the first three years of undergraduate Medical Education in Europe!

Have your say in the future of medical education in Europe by following the link or QR code to complete the survey

<http://tinyurl.com/1stcycle>



Figure 1 - Substantive diagram of the current situation regarding the Bologna three cycles in Medicine

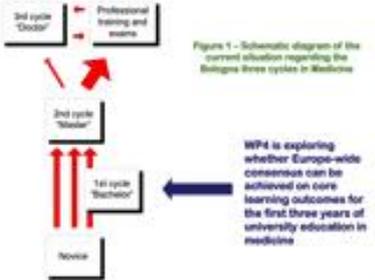


Figure 2 - Bologna first cycle as the mid-point in an integrated curriculum

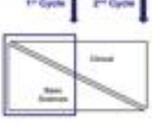


Figure 3 - Learning outcomes taken from Tuning (Medicine) for primary medical degrees (Bologna second cycle)



Figure 4 - sample page of the Bologna first cycle online survey



METHODS

Research process

Members of the MEDINE2 Thematic Network from all across Europe met in a series of workshops to review the Tuning (Medicine) learning outcomes for primary medical degrees, and how these related to existing literature on the Bologna First Cycle in Medicine. They also considered and discussed the ethical and political implications of the research. On the basis of these discussions, the group formalised a questionnaire and process for data collection, which was reviewed and approved by the wider MEDINE2 Network before being translated into English, German, French and Spanish. The questionnaire was made available using an online survey tool (www.surveymonkey.com) from June 2011 to June 2012. Invitations to participate were disseminated by members of the MEDINE2 Network, posted on the Network website, distributed by various international and national medical education organisations and at conferences, and sent to undergraduate teaching Deans across Europe. Results were compiled and analysed by a small international working group, before being presented and critiqued by a specially invited group of experts in a ‘consensus conference’ and then by all members of the wider MEDINE2 Network.

Questionnaire design

For each of the Level 1 and Level 2 learning outcomes / competences arising from the Tuning (Medicine) Project (Cumming and Ross 2008), participants were asked to “*Please rate the following learning outcomes / competences on the extent to which you think they should have been achieved by a student who has successfully completed the first three years of university education in medicine*” on the following Likert scale, which is based on Miller’s triangle (Miller 1990):

- | | |
|-----------------------------|-------------------------------|
| • Not Learned | allocated “1” on Likert scale |
| • Knows (about it) | allocated “2” on Likert scale |
| • Knows How (to do it) | allocated “3” on Likert scale |
| • Shows How (in simulation) | allocated “4” on Likert scale |
| • Does (in real practice) | allocated “5” on Likert scale |

For each of the learning outcomes / Competences in Medical Professionalism arising from the Tuning (Medicine) Project, participants were asked to “*Please rate the following learning outcomes / competences relating to medical professionalism on the extent to which you think they should have been achieved by a student who has successfully completed the first three years of university education in medicine*”:

- Not Learned allocated “1” on Likert scale
- Knows (aware of issues) allocated “2” on Likert scale
- Knows How (understands principles) allocated “3” on Likert scale
- Shows How (in artificial scenarios) allocated “4” on Likert scale
- Does (consistently in real practice) allocated “5” on Likert scale

Free text responses were sought on any additional LO they thought were important for students to have achieved at the end of the first three years, respondent demographic information, and any other comments about the questionnaire, the Bachelor of Medicine, or the Tuning process.

Data analysis

Demographic data were collated, and qualitative data were analysed thematically. Quantitative data from all four language versions of the survey were combined into a single Excel spread-sheet for analysis. All responses for each Level-1, Level-2 and Medical Professionalism learning outcomes item were charted as bar graphs and the mean and median values calculated. The Leik measure of ordinal consensus was calculated for each item and group of items (Leik 1966), and Intra-class Correlation Coefficients (ICC) were used for sub-groups analysis.

RESULTS

Respondent demographics

There were 560 responses to the survey in total, representing all EU countries except Bulgaria, Cyprus and Luxembourg. Respondents represented medical students, academics, graduates, employers and patients / members of the public, most of whom were associated with a university medical school within the EU.

Quantitative data

Seven Level-1 LOs had a median rating of 3 (Knows How), three of 4 (Shows How), and two of 2 (Knows). Thirty-six Level-2 LOs had a median rating of 3 (Knows How), fourteen of 4 (Shows How), twelve of 2 (Knows), and seven of 5 (Does). Seventeen LOs for Medical Professionalism had a median rating of 4 (Shows How), and nine of 3 (Knows How). None of the LOs had a median rating of 1 (Not Learned). Respondents therefore considered that all of the learning outcomes/ competences defined by the Tuning (Medicine) Project for the primary medical degree (Bologna Second Cycle) should be achieved to some degree by the end of the first three years of study (Bologna First Cycle). Leik measures of consensus for each of the LOs were calculated as 'moderate' (0.41-0.60) for ninety-six, 'substantial' (0.61-0.80) for nine, 'good' (>0.80) for one ('Measure blood pressure'), and 'fair' for one ('Communicate by telephone'). No LOs had 'poor' (<0.20) consensus. Consensus was generally highest for Level-1 LOs, followed by Level-2 and then Medical Professionalism LOs.

Level 1 Outcomes	Median	Leik Consensus
Carry out a consultation with a patient	3	0.49
Assess clinical presentations, order investigations, make differential diagnoses, and negotiate a management plan	2	0.56
Provide immediate care of medical emergencies, including First Aid and resuscitation	4	0.51
Prescribe drugs	2	0.66
Carry out practical procedures	3	0.49
Communicate effectively in a medical context	4	0.53
Ability to apply ethical and legal principles in medical practice	3	0.49
Assess psychological and social aspects of a patient's illness	3	0.56
Apply the principles, skills and knowledge of evidence-based medicine	3	0.55
Use information and information technology effectively in a medical context	4	0.49
Apply scientific principles, method and knowledge to medical practice and research	3	0.54
Promote health, engage with population health issues and work effectively in a health care system	3	0.51

Level 2 Outcomes	Median	Leik Consensus
Take a history	4	0.62
Carry out physical examination	4	0.64
Make clinical judgements and decisions	3	0.57
Provide explanation and advice	3	0.54
Provide reassurance and support	3	0.50
Assess the patient's mental state	3	0.51
Recognise and assess the severity of clinical presentations	3	0.57
Order appropriate investigations and interpret the results	3	0.54
Make differential diagnoses	3	0.54
Negotiate an appropriate management plan with patients and carers	2	0.58
Provide care of the dying and their families	2	0.62
Manage chronic illness	2	0.62
Recognise and assess acute medical emergencies	3	0.50
Treat acute medical emergencies	3	0.52
Provide basic First Aid	4	0.58
Provide basic life support and cardio-pulmonary resuscitation according to current European guidelines	4	0.57
Provide advanced life support according to current European guidelines	3	0.47
Provide trauma care according to current European guidelines	2	0.49

Prescribe clearly and accurately	2	0.60
Match appropriate drugs and other therapies to the clinical context	2	0.60
Review the appropriateness of drug and other therapies and evaluate potential benefits and risks	2	0.60
Treat pain and distress	2	0.59
Measure blood pressure	5	0.83
Venepuncture	4	0.48
Cannulation of veins	4	0.43
Administer IV therapy and use infusion devices	3	0.45
Subcutaneous and intramuscular injection	4	0.50
Administer oxygen	4	0.47
Move and handle patients	4	0.45
Suturing	4	0.42
Blood transfusion	2	0.50
Bladder catheterisation	3	0.42
Urinalysis	3	0.43
Electrocardiography	4	0.48
Basic respiratory function tests	3	0.49
Communicate with patients	5	0.65
Communicate with colleagues	5	0.64
Communicate in breaking bad news	3	0.54
Communicate with relatives	3	0.50
Communicate with disabled people	3	0.44
Communicate in seeking informed consent	3	0.47
Communicate in writing (including medical records)	3	0.47
Communicate in dealing with aggression	3	0.46
Communicate by telephone	3	0.39
Communicate with those who require an interpreter	3	0.43
Maintain confidentiality	5	0.57
Apply ethical principles and analysis to clinical care	4	0.46
Obtain and record informed consent	3	0.48
Certify death	2	0.53
Request autopsy	2	0.55
Apply national and European law to clinical care	2	0.54
Assess psychological factors in presentations and impact of illness	3	0.51
Assess social factors in presentations and impact of illness	3	0.52
Detect stress in relation to illness	3	0.49
Detect alcohol and substance abuse, dependency	3	0.51
Apply evidence to practice	3	0.53
Define and carry out an appropriate literature search	4	0.50
Critically appraise published medical literature	3	0.46
Keep accurate and complete clinical records	3	0.48

Use computers	5	0.64
Access information sources	5	0.64
Store and retrieve information	5	0.52
Provide patient care which minimises the risk of harm to patients	3	0.47
Apply measures to prevent the spread of infection	4	0.46
Recognise own health needs and ensure own health does not interfere with professional responsibilities	3	0.42
Conform with professional regulation and certification to practise	3	0.44
Receive and provide professional appraisal	3	0.43
Make informed career choices	3	0.44
Engage in health promotion at individual and population levels	3	0.47

Outcomes in Medical Professionalism	Median	Leik Consensus
Probity, honesty, ethical commitment	4	0.51
Commitment to maintaining good practice, concern for quality	4	0.50
Critical and self-critical abilities, reflective practice	4	0.50
Empathy	4	0.55
Creativity	4	0.47
Initiative, will to succeed	4	0.50
Interpersonal skills	4	0.54
Ability to recognise limits and ask for help	4	0.48
Capacity to deal with uncertainty and adapt to new situations	4	0.47
Ability to lead others	3	0.51
Ability to work autonomously when necessary	3	0.47
Ability to solve problems	4	0.51
Ability to make decisions	3	0.49
Ability to work in a multidisciplinary team	4	0.46
Ability to communicate with experts in other disciplines	3	0.47
Capacity for organisation and planning (including time management)	3	0.47
Capacity for analysis and synthesis	4	0.49
Capacity to learn (including lifelong self-directed learning)	4	0.50
Capacity for applying knowledge in practice	4	0.53
Ability to teach others	3	0.46
Research skills	3	0.50
Appreciation of diversity and multiculturalism	4	0.44
Understanding of cultures and customs of other countries	3	0.43
Ability to work in an international context	3	0.44
Knowledge of a second language	4	0.43
General knowledge outside medicine	4	0.42

Subgroup analysis

Overall, no large subgroups were found to have an undue impact on the rankings of the whole sample (n=560), with high or very high Intra-Class Correlation. Mean responses from large subgroups in Portugal (n=104) and Belgium (n=68) differed by a full Likert point on only six items, all of which were Level-2 practical procedures. Mean ratings by Academics (n=144) and Students (n=193) were not separated by a point on any item.

Qualitative data

A number of themes emerged from analysis of the free text responses. Several respondents voiced concerns about defining a Bachelor of Medicine, suggesting that the 3-Cycle system may not work in certain countries, that defining a Bachelor may lead to a loss of integration in the undergraduate medical curriculum, and that Bachelor graduates may work as “*Semi-literate doctors*” and put patients at risk. One respondent wrote that it would “*Need a clear protocol for what first cycle graduates are and are not allowed to do, with safety checks and monitoring*”. Others highlighted that the Bachelor of Medicine should itself be a useful qualification, more than just half way to a medical degree, and that we should think about the employability of graduates, who may require more skills in lifelong learning, creativity, managing and critically evaluating information if they do not go on to do the Masters of Medicine. Some also emphasised the need for early patient contact and practical experience, commenting that students “*Need patient contact from start of Year 1*”, and “*Medicine is very practical so need to gain practical experience*”. A few raised philosophical concerns about defining core learning outcomes, for example writing, “*Education should stimulate diversity of opinion and competences rather than trying to create a uniform group of doctors*”, and “*LOs may mean different things to different people – particularly when translated*”. A number of respondents suggested additional or more detailed learning outcomes, which can be explored in subsequent research.

COMMENT

Key findings

Mean ratings for each of the learning outcomes were greater than 1 (Not Learned), and therefore collectively respondents felt that all of the LO for the Masters of Medicine (primary medical degree) should be achieved to some extent in the Bachelor cycle (first three years). Most individual respondents attributed some importance to all of the LOs for the Bachelor phase, including many clinical LOs. As reiterated in the free text comments, this would therefore require the Bachelor of Medicine to include early clinical experience, and supports the idea of a vertically integrated curriculum, rather than the more traditional curriculum design with a preclinical/clinical divide. The seven LOs with a mean rating of 5 (which survey respondents considered students should be able to do in real practice after 3 years at medical school) were considered by all participants in the final MEDINE2 meeting to have face validity. They were also considered to be consistent with competences which medical schools who do not award the Bachelor of Medicine degree would expect a student to demonstrate on successful completion of their third year. Being able to communicate with colleagues and patients, maintain confidentiality, use computers and information sources, and undertake a simple clinical procedure such as measuring blood pressure, together with less well-developed competences in all other areas, define accurately what a Bachelor of Medicine graduate can, and importantly cannot, do. Whilst potentially enhancing employability, it is also very clear that such graduates would not be able to practise as medical doctors without further training.



Conclusions and implications

The most powerful impression given by the results is that there is promotion of a fully integrated curriculum, with the same learning outcomes being sequentially achieved during both the Bachelor and Master phases of medical education. The results support an integrated approach to curriculum design and early clinical experience and skills acquisition, rather than a split of undergraduate medical curricula as had been feared by some. The LOs match well with the Dublin Descriptors for Bachelor degrees and thus will be easily readable and comparable with degrees in other disciplines, and they appear to have face validity.

The results emphasise that Bachelor of Medicine graduates would not be ready to practise as 'cut-price doctors'. This may be useful to regulatory bodies and licensing authorities in considering roles and boundaries. They do, however, present a helpful, clear indication of the sort of competences that could be expected of a student after the first three years of undergraduate medical education in Europe. For those students who decide against completion of their medical studies or are unable to continue, who can be considerable in number (Arulampalam et al. 2004) this could also be very helpful in terms of their employability and mobility.

The results do not suggest that there should be rigid uniformity across medical school curricula, but indicate that a degree of harmonisation, based on consensus, is achievable. Differences in detailed learning outcomes will continue to exist between programmes, but for the first time this research offers an 'image' of a European Bachelor of Medicine. Since Bachelor of Medicine degrees are currently being awarded after 3 years of study in many countries and institutions in Europe, without prior discussion or agreement at European level as to what these graduates have learned or are able to do, we hope that these findings will stimulate further consideration and collaboration in this area of practice.

REFERENCES

- AMEE, EMSA, IFMSA (2010) The Bologna Process and its implications for medical education. The Association for Medical Education in Europe, European Medical Students' Association, International Federation of Medical Students' Associations. *Medical Teacher* 32: 302-304.
- AMEE, WFME, ASMSE, WHO-Euro (2005) Statement on the Bologna process and medical education. Prepared by the Association for Medical Education in Europe, and the World Federation for Medical Education, in association with the Association of Medical Schools in Europe, and the World Health Organisation, Europe. Copenhagen, Denmark: World Federation for Medical Education.
- Arulampalam W, Naylor RA, Smith JP (2004) A hazard model of the probability of medical school drop-out in the United Kingdom. *Journal of the Royal Statistical Society: Series A (Statistics in Society)* 167(1): 157-178.
- Christensen L (2004) The Bologna Process and medical education. *Medical Teacher* 26(7): 625-629.
- Cumming AD (2010) The Bologna process, medical education and integrated learning. *Medical Teacher* 32: 316-318.
- Cumming AD, Ross MT (2007) The Tuning Project for medicine – learning outcomes for undergraduate medical education in Europe. *Medical Teacher* 29(7): 636-641.
- Cumming AD, Ross MT (2008) The Tuning Project (medicine) – learning outcomes / competences for undergraduate medical education in Europe. Edinburgh: The University of Edinburgh. Available online: <http://www.tuning-medicine.com>. Accessed 25th January 2013.
- Davies H (2010) A chance too good to miss. *Medical Teacher* 32: 284-287.
- GMC (2009) Tomorrow's Doctors: outcomes and standards for undergraduate medical education. London: General Medical Council.
- GMC (2009) Tomorrow's Doctors. London, General Medical Council. Online: http://www.gmc-uk.org/education/undergraduate/tomorrows_doctors_2009.asp
- Joint Quality Initiative (2004) Shared 'Dublin' descriptors for Short Cycle, First Cycle, Second Cycle and Third Cycle awards. Online: <http://www.jointquality.nl/content/descriptors/CompletesetDublinDescriptors.doc>.
- Leik RK (1966) A measure of ordinal consensus. *The Pacific Sociological Review* 9(2): 85-90.
- Miller GE (1990) The assessment of clinical skills / competence / performance. *Academic Medicine* 65(9 Supplement): S63-67.
- Patrício M, Harden RM (2010) The Bologna Process - a global vision for the future of medical education. *Medical Teacher* 32: 305-315.

Patrício M, den Engelsen C, Tseng D, ten Cate O (2008) Implementation of the Bologna two-cycle system in medical education: where do we stand in 2007? - Results of an AMEE-MEDINE survey. *Medical Teacher* 30: 597-605.

Patrício M, de Burbure C, Costa MJ, Schirlo C, ten Cate O (2012) Bologna in medicine anno 2012: experiences of European medical schools that implemented a Bologna two-cycle curriculum - an AMEE-MEDINE2 survey. *Medical Teacher* 34(10): 821-832.

Rigby E (2007) Taking forward aims of the Bologna Declaration: European core curriculum - the students' perspective. *Medical Teacher* 29: 83-84.

Tuning Project website (Accessed April 2013): <http://www.unideusto.org/tuning/>

Van den Broek S, Muller B, Dekker N, Bootsma A, ten Cate O (2010) Effect of the new Bologna bachelor degree on career considerations of medical students in one medical school. *Medical Teacher* 32: 997-1001.



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