



EAFP Annual Conference

Catania, 24th - 26th June 2010



PROGRAMME (at the Benedictine Monastery)

Thursday, 24th June 2010

13:00 -15:15 Registration and poster set-up

15:15 -16:00 Opening Remarks

Prof. Antonino Recca - Rector of the University of Catania

Prof. Giuseppe Ronsisvalle - Organizing Committee President

Prof. Bart Rombaut - EAFP President

Dr. Andrea Mandelli – F.O.F.I. President

Dr. Gioacchino Nicolosi - Federfarma vice-President

Awarding to the Former Dean of the Faculty of Pharmacy of Catania Prof. A Vanella

16.00 -18:30 Multidisciplinary Education & Training (MDE&T)

Chairmen: Carlo Rossi, Università di Perugia - Karen Ulshagen, Universitetet i Oslo

16:00 - 16:15 Introduction to MDE&T and Joint Courses on Med Chem & Pharmacology (G.

Ronsisvalle - Università di Catania)

16:15 - 16:30 European Pharmacy (F. Babylon - PGEU President)

16:30 - 17:00 Coffee break

17:00 - 17:30 Multidisciplinary Lab, (Bio)-Pharmaceutical analysis (Y. V. Heyden - Vrije Universiteit Brussels)

17:30 - 18:00 The experience with the Master Programme in Regulatory Affairs at the University of Lisbon (J. G. Morais - Universidade de Lisboa)

18:00 - 18:30 GIMMICS at the VUB: Pharmacy practice in an academic setting (K. De Paepe - Vrije Universiteit Brussel)

18:30 - 20:00 Welcome Reception (wine & cheese cocktail)

21:00 Symphonic Concert at Vincenzo Bellini's Theatre

Friday, 25th June 2010

9:00 - 12:00 Interdisciplinary Education & Training (IDE&T)

Chairman: José G. Morais - Universidade de Lisboa

9:00 - 9:30 Introduction to IDE&T - Solving medical problems - collaboration between new groups of undergraduate students (A. Brauner & E. Ehrenborg - Karolinska Institutet, Stockholm)

9:30 - 9:45 Hospital Pharmacy and Academia in Leipzig: working together for the best education of students (R. Frontini, Universität Leipzig)

9:45 - 10:00 Specialization in Hospital Pharmacy in Italy (S. Spampinato, Università di Bologna)

10:00 - 10:30 The Medical Education in Europe (MEDINE) Networks and the Tuning Project (Medicine) (A. Cumming - University of Edinburgh)

10:30 - 11:00 Coffee break

11:00 - 11:30 Interdisciplinary Teaching: Experiences from a revised curriculum in Norway (H. T. Johansen - Universitetet i Oslo)



11:30 - 12:00 Biotechnology and Bioengineering - Pharmaceutical Engineering: The Lisbon Masters Program (J. Cardoso de Menezes - Universidade Tecnica de Lisboa)

12:00 - 13:30 Lunch break

13:00 - 14:00 Poster Session

14:00 - 14:30 General Assembly

14:30 - 17:45

The Pharmacist as part of the Health Team: Practical Experiences

Chairman: Ian Bates - University of London

14:30 - 15:00 Experiential Learning - the Preparation of Pharmacists for Real Life (S. Hudson - University of Strathclyde, Glasgow)

15:00 - 15:30 Industrial Pharmacy - "Skills needed for Industrial Pharmacy" (L. Martini - EIPG President)

15:30 - 16:00 Coffee break

16:00 - 16:15 A New Pharmacy of Services (*Dr. A. Racca* - Federfarma President)

16:15 - 16:45 Can you teach interprofessional education online? Views from the Aberdeen IPE programme (H. L. Diack - Robert Gordon University, Aberdeen)

16:45 - 17:15 Clinical Chemistry/Biology and Medicinal Chemistry/Pharmacology (A. Marcincal, Université de Lille)

17:15 - 17:45 Nutritional Pharmacy (A. Arnoldi, Università di Milano)

21:00 Social Dinner (at the Orto Botanico)

Saturday, 26th June 2010 (Parallel sessions)

at the Faculty of Pharmacy (University Campus - Viale Andrea Doria, 6)

8:00 - 12:00 **Pharmine update** (J. Atkinson, Université de Nancy)

9:00 - 12:00 **Conference of Vice-Deans for International Affairs** (M. Rizzo - Università di Catania)

9:00 - 12:00 Meeting of European Students of Pharmacy (Student)

Sponsored by:





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EAFF 2010 SPEAKERS

Prof. Giuseppe Ronsisvalle – University of Catania



Prof. Giuseppe Ronsisvalle, born in Catania (I) 12/03/46.

Professor and Dean, University of Catania [UNICT].

Dean from 1996-2002 and from 2008-to date.

President of the Italian Conference of Deans of the Faculties of Pharmacy.

Bologna Expert from 2006, Ministerial Delegate in the IMHE-OECD Governing Board from 2000, Italian Representative in the CD-ESR of the Council of Europe from 2000 and now Bureau member of CD-ESR.

Member of the ExCo of the European Association of Faculty of Pharmacy (EAFP) and former vice-president.

Coordinator of the international Doctorate in Pharmaceutical Sciences (Double Title) and Paul Ehrlich MedChem EURO-PhD Network Coordinator

Fellow of Academia Gioenia of Natural Sciences of Catania.

Former president of the Centre for Continuing Education of the UNICT.

Member of the EUA panel for Doctoral Studies in 2005.

Member of the Grundtwig EU Working party in 2000-05.

Former president of the Division of Medicinal Chemistry of the Italian Chemical Society.

Member of European Continuing Education Network EUCEN (2000-02).

Rector Delegate for International Relations and Member of the UNICT Committee for CRE Evaluation (1994-97).

Member of the Ministerial Committee (1998-2005) for the Evaluation of Strategies for the Internationalization of the Italian University System.



Sabbatical Leaves: Polytechnic of Milan (I) (1972-73) and University of Minnesota (MN, U.S.A.) (1981-82).

Actual role:

Dean of the Faculty of Pharmacy of the University of Catania.

Coordinator of Paul Ehrlich European Medicinal Chemistry Ph.D. Network

Italian Deans' Conference President

Dr. Filip Babylon - PGEU President



Filip Babylon is President of the Pharmaceutical Group of the European Union (PGEU) representing European Community Pharmacists and is since nine years alternatively Vice-President and President of the Belgian federation of independent community pharmacists (APB). He is also member of the Commission for Reimbursement of Drugs (National Institute for Health and Disability Insurance). He is past president of the Institute for Pharmaco-Epidemiology of Belgium (Ipheb) and past president of the Royal Association of the Pharmacists of Bruges. Filip Babylon has a 30-year breadth of experience as a pharmacy-owner, after obtaining his pharmacy degree at the University of Ghent.

Actual role:

President of the Pharmaceutical Group of the European Union (PGEU).

Prof. Yvan Vander Heyden - Vrije University of Brussels



Born on 21 May 1964 in Ninove, Belgium. Obtained the diplomas of laboratory technician in 1986, of pharmacist in 1991 at the Vrije Universiteit Brussel - VUB, and a Ph.D. in Pharmaceutical Sciences in 1998 at the same university (promoter: D.L. Massart).

Since 1998 he was a postdoctoral fellow at the same department, became a guest professor in 2001, an associate professor in 2003 and a full-professor in 2004.

At the moment he is heading a research group on chemometrics and separation science in pharmaceutical analysis at the same University. His publication record contains 7 book chapters, 250 manuscripts of which about 225 in peer reviewed journals. He is or was member of the Scientific or Organizing Committees of several international congresses and of the editorial boards of four journals. Since 2006 he also is the editor of the 'Practical Data Handling' column in LC/GC Europe.

Actual role:

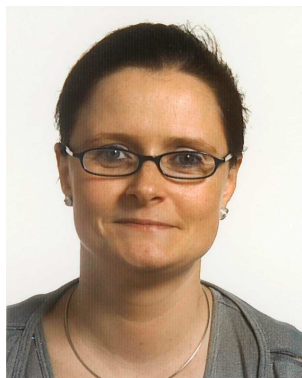
Head of the research group "Analytical Chemistry and Pharmaceutical Technology". Teaching courses on Analytical Chemistry, Method Optimization and Data Handling in the Pharmaceutical Sciences Programs.



Prof. José Guimaraes Morais – University of Lisbon

INFORMATION NOT SUBMITTED

Prof. Kristien De Paepe - Vrije University of Bruxelles



Kristien De Paepe (16 November 1970, Mechelen, Belgium) became professor at the Vrije Universiteit Brussel in 2005 at the department of Toxicology, Dermato-Cosmetology and Pharmacognosy and is responsible for various courses, including Pharmaceutical technology, compounding and dosage forms. She is co-teacher for the Primary pharmacy practice training and the Pharmacy practice game (GIMMICS) of the 2nd Master students. Ever since she graduated, she combines her research work with the part-time function of pharmacist in a public pharmacy. She is member of the board of IPSA (*Institute for permanent education of pharmacists*), editorial board member of the journal '*Skin Pharmacology and Skin Physiology*' and a member of the '*Belgian Association of Cosmetic Chemists*' (BVCS) and the '*International Society for Biophysics and Imaging of the skin*' (ISBS).

Actual role:

Professor at the Vrije Universiteit Brussel at the department of Toxicology, Dermato-Cosmetology and Pharmacognosy.

Prof. Annelie Brauner & Ewa Ehrenborg Karolinska Institutet, Stockholm

Annelie Brauner



Ewa Ehrenborg



Annelie Brauner and **Ewa Ehrenborg** have together designed a new interprofessional course for medical students and biomedical science students. We have also collaborated on interprofessional courses for biomedical, physiotherapy, nursing and medical students. Annelie Brauner has received the following pedagogical awards: 2000, Pedagogical Prize from the Medical Students' Association; 2005, Karolinska University Hospital Pedagogical Distinction; 2008, Karolinska Institutet Pedagogical Award.

Ewa Ehrenborg has received the Pedagogical Prize from the Biomedical Students' Association in 2005.

Actual role:

Annelie Brauner: Director of undergraduate studies in clinical microbiology for medical students at Karolinska Institutet Director of specialist training for medical doctors to become clinical microbiologists at the Karolinska University Hospital. Member of the department's management group

Ewa Ehrenborg: Vice Director of undergraduate studies in molecular medicine for biomedical students at Karolinska Institutet Director of Clinical Education, region NW at Karolinska Institutet

Prof. Roberto Frontini, University of Leipzig



After completing the school education he moved to Germany 1969 and studied first musicology and conducting at the University and the High School for Music in Frankfurt/main.

He was from 1976 to 1981 resident conductor at the theatre of Lübeck and 1978 to 2002 chief conductor of the Youth Symphony Orchestra Lübeck.

After obtaining the German nationality 1988 he studied Pharmacy at the University of Hamburg from 1988 to 1992 and was post graduate student in pharmaceutical technology at the same University till 1992. 1993 he obtained the PhD (Dr.rer.nat.) and worked at the hospital of the University of Lübeck until 1995. 1996 he obtained specialisation degree in Hospital Pharmacy and become 1996 head of the Pharmacy of the St.Franziskus-Hospital in Cologne. Since 2001 he is Director of Pharmacy at the University Hospital of Leipzig.

He was trainer for pharmaceutical technology at the Chamber of Pharmacy Hannover between 1994 and 2005 and since 2004 he is holding the lecture on Pharmacoepidemiology and Economics at the University of Leipzig, school of Pharmacy.

2005 he was elected as Director of Finances of the European Association of Hospital Pharmacists (EAHP) and since 2009 he is its president.

Qualifications

1988 Obtained Degree in Pharmacy, University of Hamburg

1993 Obtained PhD (Dr.rer.nat), University of Hamburg

1996 Obtained specialty degree in clinical pharmacy



Professional Experience

1988 Community pharmacy "Hanse Apotheke" Lübeck, pharmacist

1988 - 1992 University of Hamburg, Institute of Pharmaceutical Technology, assistant

1992 - 1995 Pharmacy of the Hospital of the University of Lübeck, pharmacist for pharmaceutical technology and oncology

1994 - 2005 Trainer for pharmaceutical technology at the Chamber of Pharmacy, Hannover

1996 - 2001 Director of Pharmacy, St. Franziskus Hospital in Cologne

since 2001 Director of Pharmacy, Hospital of the University of Leipzig

since 2004 Lecture on Pharmacoepidemiology and economics at the Pharmacy school University of Leipzig

2005-2009 Director of Finances of the European Association of Hospital Pharmacists (EAHP)

since 2009 President of the European Association of Hospital Pharmacists (EAHP)

Languages

Italian (native speaker)

German (fluent)

English (fluent)

Other Activities

1969 - 1971 Studied musicology and philosophy, University of Frankfurt/M

1971 - 1976 Studied music (conductor), Academy of Music Frankfurt/M

1976 - 1981 Conductor at the Theatre of the City of Lübeck

1978 - 2002 Chiefconductor of the Youth-Symphony-Orchestra Lübeck

Interests Hiking, scuba diving, swimming, literature, modern art, classic music

Actual role:

President of Finances of the European Association of Hospital Pharmacists (EAHP)

Prof. Santi Mario Spampinato - University of Bologna



Academic Year 1975-76 Doctoral Degree cum laude obtained from the Faculty of Pharmacy - University of Catania.

May 1977-October 1980. Fellow - Chair of Pharmacology and Pharmacognosy - University of Catania. Ph.D. in Pharmacology.

October 1980-December 1981. " Research fellow " Addiction Research Foundation Stanford University. January 1982-October 1992. Researcher, Faculty of Pharmacy, University of Catania and Bologna). October 1987-September 1988. " Visiting Scientist " - Mental Health Research Institute – University of Michigan (USA).

November 1992-September 2001. Associate Professor of Pharmacology, Faculty of Pharmacy, University of Bologna. October 2001- Full Professor of Pharmacology and Pharmacotherapy, Faculty of Pharmacy of the University of Bologna.

November 2003- Director of the Post-graduate School of Hospital Pharmacy of the University of Bologna.

Actual role: Full Professor of Pharmacology and Director – Post graduate School of Hospital Pharmacy – Faculty of Pharmacy – Alma Mater Studiorum – University of Bologna.

Prof. Allan Cumming - University of Edinburgh



Professor Allan Cumming graduated in medicine in 1975 from the University of Edinburgh, then trained in general and renal medicine. He studied at the University of Western Ontario, 1984-5, and graduated MD (University of Edinburgh) 1990. He was appointed Consultant Nephrologist in Edinburgh in 1989, and is a Fellow of the Royal Colleges of Physicians of both Edinburgh and London. He continues active clinical practice in renal medicine.

From 1998 he led the introduction of a reformed medical curriculum in Edinburgh and established a programme of educational research and development. He became Director of Teaching for Medicine and Veterinary Medicine and Professor of Medical Education, University of Edinburgh in 2003.

He was a major contributor to the new guidance to medical schools from the UK General Medical Council, "Tomorrow's Doctors 2009". He led the Tuning (medicine) Project, which generated learning outcomes/competences for medical graduates in Europe (www.tuning-medicine.com). He is Chair and Coordinator for the new Erasmus Academic Network in medical education, MEDINE2 (www.medine2.com).

Actual Role:

Professor Allan Cumming is Director of Undergraduate Learning and Teaching for the College of Medicine and Veterinary Medicine, University of Edinburgh, and Professor of Medical Education, University of Edinburgh. He is also a Consultant Nephrologist and works in renal medicine with NHS Lothian.

Publications concerning the argument presented:



Cumming AD, Ross MT. The Tuning Project for medicine: learning outcomes for undergraduate medical education in Europe. *Medical Teacher* 2007; 29: 636-641.

Cumming AD. The Bologna process, medical education and integrated learning. *Medical Teacher*, 2010; 32: 316-318.

Prof. Harald Thidemann Johansen – University of Oslo



Prof. Harald Thidemann Johansen is a Master of Pharmacy from the School of Pharmacy since 1979. He defended his thesis for the degree of PhD at the same institution in 1986. His scientific interests are primarily in the field of drug effects on proteolytic enzymes, and in recent years primarily lysosomal cysteine proteases. He has taught most aspects of pharmacology, but also physiology and cell biology. He has courses in problem based learning and university teaching, and has been active in developing internet based courses in physiology and pharmacology.

Actual role:

Professor in pharmacology at the School of Pharmacy, University of Oslo.

Prof. Josè Cardoso de Menezes

Technical University of Lisbon



Jose Menezes has a Chemical Engineering degree (1985) and a Masters in Catalysis degree (1988) from the Technical University of Lisbon (TUL) and a PhD in Biochemical Engineering (1996) and a Post-Doc in advanced monitoring of bioprocesses (1999) both taken in industry. He holds an MBA from ISCTE-INDEG Business School (2005).

He is co-founder coordinator of the Masters Program in Pharmaceutical Engineering jointly offered by the Faculty of Pharmacy (Lisbon University) and TUL, started in October 2007. From March 2009, Dr Menezes became also invited Associated Professor of Lisbon University's Faculty of Pharmacy.

Dr Menezes is Professor at IST (TUL) and a senior researcher at the Institute for Biotechnology and Bioengineering (IBB). His work deals with the development and use of several systems engineering tools in diverse processing industries with a stronger focus in the bio/pharmaceutical areas, namely Process Analytical Technologies (PAT), Industrial Chemometrics (IC) and Multivariate Statistics Process Control (MSPC) for active pharmaceutical ingredients and for finished dosage forms production. He has published extensively on those subjects (<http://bsel.ist.utl.pt>).

Actual role:

Professor at IST (TUL) and a senior researcher at the Institute for Biotechnology and Bioengineering (IBB).

Prof. Steve Hudson - University of Strathclyde, Glasgow



BPharm MPharm FESCP FRPharmS

Steve Hudson is Professor of Pharmaceutical Care, University of Strathclyde, Glasgow, Scotland UK.

He joined the University of Strathclyde full-time as the first Professor of Pharmaceutical Care in the UK in January 1995. The new Chair was established jointly by the Scottish National Health Service and has also been supported by Boots plc (1998-2003).

The Pharmaceutical Care Health Service Unit is the SIPBS interface with NHS services and is focussed on Health Services Research related to pharmacy practice, in the fields of Pharmaceutical Care and Pharmaceutical Public Health.

Current research interests cover a range of general and specialised clinical applications. The fields include Pharmaceutical Care Models, Quality of Medication Use, Pharmaceutical Care Tools and Pharmaceutical Public Health Strategies.

Career Summary

Nottingham University 1973 BPharm

Registration Pharmacist 1974

Bradford University Postgraduate Masters Clinical Pharmacy

Leeds General Infirmary Clinical Residency 1974-77

Leicester Royal Infirmary, Regional Information Centre and Clinical Pharmacist Practitioner 1978-1983

Lecturer and Course Organiser MSc Clinical Pharmacy Edinburgh (Heriot-Watt University) 1983-1989

Principal Clinical Pharmacist Edinburgh Hospitals 1983-1994



Professor of Pharmaceutical Care University of Strathclyde and Course Director
MSc Clinical Pharmacy 1995-present

Adjunct Professor II appointment as Faculty member Institute of Pharmacy,
University of Tromsø, Norway (Current since 2002)

Offices/Awards

Past Chairman (1988-1992), Editor and Founding Committee Member UK Clinical
Pharmacy Association

Past Chairman British Pharmaceutical Conference Practice Research Adjudicating
Panel (1998-2000)

Fellow Royal Pharmaceutical Society of Great Britain (1998)

Fellow European Society of Clinical Pharmacy (2009)

Executive Committee Member, European Association of Faculties of Pharmacy
(since 2004, Current)

Actual role:

Professor of Pharmaceutical Care, University of Strathclyde, Glasgow, Scotland UK.

Prof. Luigi Martini - EIPG President



Gino Martini obtained a Degree in Pharmacy and PhD from the University of Manchester.

Since joining GlaxoSmithKline Pharmaceuticals in 1996 he has performed a variety of roles, from solid dosage form development, to drug delivery. He is currently is Senior Director in Asia Pacific, Japan and Emerging Markets Business Unit within R&D.

Dr Martini is a Visiting Professor at John Moores Liverpool University School of Pharmacy and a Visiting Lecturer at Kings College London School of Pharmacy. He was designated a Fellow of the Royal Pharmaceutical Society of Great Britain in 2008. He has published and presented widely on a range of scientific and technical subjects.

His statement is focused on:

'The importance of Pharmacists to be educated in science which underpins dosage form design and formulation, this is one discipline which differentiates Pharmacists from Clinicians'

Actual Role:

Senior Director at GlaxoSmithKline Pharmaceuticals



President of European Industrial Pharmacists Group <http://www.eipg.eu/>



Dr. Annarosa Racca - Federfarma President

INFORMATION NOT SUBMITTED

Prof. Hellen Lesley Diack
Robert Gordon University, Aberdeen



Hellen Lesley Diack is the senior lecturer in Elearning at the School of Pharmacy and Life Sciences at the Robert Gordon University in Aberdeen. She is a Fellow of the Higher Education Academy and has postgraduate qualifications in online tutoring, web course design and designing activities. She has been developing online material for over 15 years but have been lecturing within HE for over twenty-five years. She has published widely on interprofessional education and elearning and in 2008 She was the author of the report on interprofessional education to the Scottish Government. She has been the principal investigator on a number of funded interprofessional education projects including one funded by the Royal Pharmaceutical society of Great Britain in 2006 entitled 'Elearning for sharing.'

Actual Role: Senior Lecturer in Elearning/Education Research Group
Convenor/School Research Ethics Committee Convenor



Prof. Annie Marcincal – University of Lille

INFORMATION NOT SUBMITTED

Prof. Anna Arnoldi - University of Milan



Degree in Chemistry; from 1981, researcher in the Faculty of Agriculture; from 1992, professor of Food Chemistry in the Faculty of Pharmacy University of Milan. Coordinator of the degree in Sciences and Technologies of Medicinal Plants. Main research interests: bioactive components of grain legumes, nutraceuticals for the prevention of cardiovascular disease, development of innovative methods for the quality assurance of functional food by mass spectrometry and proteomics. One of the major world expert on lupin. Coordinator of 3 EU project and numerous national projects. Member of the steering committee of Società Italiana di Nutraceutica (SINUT) and the International Food Legume Conference. Co-founder of HPF-Nutraceuticals SRL, an Academic spin-off developing new nutraceuticals. Authors of over 150 papers on international journal and books, over 150 congress lectures or communications and 5 patents.

Actual role:

Professor of Food chemistry in the Faculty of Pharmacy of the University of Milan (Italy).

Publication concerning the argument presented:

Sirtori C. R., Galli C., Anderson J. W., Sirtori E., Arnoldi A. Functional foods for dyslipidaemia and cardiovascular risk prevention. *Nutrition Research Reviews*, 2009, 22, 244–261.

Sirtori C.R., Galli C., Anderson J.W., Arnoldi A. Nutritional and nutraceutical approaches to dyslipidemia and atherosclerosis prevention: focus on dietary proteins. *Atherosclerosis* 2009, 203, 8-17.



EAFP 2010 ABSTRACTS



Introduction to MDE&T and Joint Courses on Med Chem & Pharmacology

Giuseppe Ronsisvalle

*Department of Pharmaceutical Sciences, University of Catania, Viale
Andrea Doria, 6 – 95125 Catania (I) – giuseppe.ronsisvalle@unict.it*

Relevant changes in Pharmacy education are required to respond to the adoption of Pharmaceutical Care, to the need of continuing changes in therapy and to prepare community pharmacists to offer new services essential to societal changes. A common approach to interdisciplinary teaching is the only possibility to avoid overwhelming programmes of different curricular disciplines. Notwithstanding the absence of an integrative teaching partnership, each faculty member can change his classical way of teaching.

Medicinal/Pharmaceutical Chemistry courses incorporating explicitly the concept of biochemistry, physiology, clinical pharmacy and pharmacology can help students in learning a “critical thinking” and becoming also able to apply SAR of drugs solving therapeutic and clinical cases.

Content integration across the whole pharmacy curriculum and interdisciplinary teaching by pharmacy faculty remain the ultimate educational goal. Book review, professional doctorates’ development and the use of new technologies can help to accomplish this target.



BABYLON'S ABSTRACT NOT SUBMITTED

Multidisciplinary lab, (Bio)-Pharmaceutical analysis

D. Mangelings¹, S. Sarre², K. De Paepe³, K. Demeyer³ Y. Vander Heyden¹

¹Analytical Chemistry and Pharmaceutical Technology, ²Pharmaceutical Chemistry, Drug Analysis and Drug information, ³Toxicology, Dermato-Cosmetology and Pharmacognosy, Center for Pharmaceutical Research (CePhaR), Vrije Universiteit Brussel - VUB, Laarbeeklaan 103, B-1090 Jette, Belgium, Tel +32 2 477.47.34, email: yvanvdh@vub.ac.be

Problem: Since several years, the Pharmacy program of the Vrije Universiteit Brussel contains project-based education so that students acquire additional competences, such as teamwork, working in an integrated environment, and thinking in a problem-solving way. Most types of project-based education currently include the discussion/examination of a problem in group, and usually results in the collection of parts of the information by individual students, combining it and presenting in front of a jury. In the Multidisciplinary lab, students get the opportunity to translate the information into protocols and then bring them into practice.

Setup and method: This lab is organized by three departments of CePhaR and has four coordinators (with different specializations). Each coordinator has given a personal touch to this lab, which is built around sample diversity and the fact that one technique does not allow analyzing one substance in all samples.

The lab is organized in the last semester of the Bachelor program. The students work in groups that should be equally good. Each group gets a specific molecule, occurring in some matrices, which have to be analyzed. For example, the bulk drug substance and its related impurities, a home-made formulation, a commercialized formulation and a biological sample (plasma, urine). No analysis procedures are provided. Students derive protocols from scientific articles, which are tested in the lab. In addition, a phytotherapeutical sample must be analyzed according to the official monograph and to a method from a scientific journal, and both results compared. Every technique available in a CePhaR lab, in principle, can be used. The students experience that not all matrices can be analyzed using the same method/technique and that it is not always evident to translate scientific literature into practice. They also learn that in practice close relationships exist between the different courses taught in the Bachelor years.

Besides the group assignment, an individual task is scheduled where every student gets a specific molecule. The student then has to search the literature describing



the molecule's quantification in both a commercial and a biological sample. Based on the publications found, protocols are derived, but these experiments are not executed. It is required to write the protocol in such a way that when given to a technician, it can be executed and results reported, without having to consult any document other than the provided protocol. In this way, it can be evaluated to which extent the student is able to write a protocol individually.

Conclusions: Competences acquired during this lab are the ability to extract relevant information from scientific literature, to write a protocol individually, to think in a problem- solving way and to work in a team. Overall, students find this lab quite interesting, but also hard. Moreover, they appear to be more independent than the students in the old KaLi education system, at the same point in the education.



The experience with the Master Programme in Regulatory Affairs at the University of Lisbon Faculty of Pharmacy

J. G. Morais (Faculdade de Farmácia, Universidade de Lisboa - FFUL)

Regulatory science has evolved as an independent field due to the complexity associated with the assessment of efficacy / safety / quality of new drug products.

Drug policy pursued by the European Union as well as individual member states involves stimulation of drug research, satisfaction of healthcare needs and a sound economic policy including healthy competition and collaboration of stake holders.

Ever since the inception of drug regulation prompted by historical toxicological disasters (sulfanilamide elixir in U.S. and thalidomide in Europe) a complex body of legislation has been built covering all aspects of drug development relevant to the benefit/ risk profile of each individual medicinal product as well as its impact on public health and associated costs.

The high level of sophistication reached in the science underlying drug design and development translates into the need of detailed guidelines helping the task of competent authorities in public health protection.

There is therefore a need and an opportunity for specific education and training dedicated to this vast and complex subject.

An advanced Master Programme in Regulation and Evaluation of Medicinal and other health products has been in operation since 2003 at the University of Lisbon Faculty of Pharmacy.

The programme is offered once every two years and consists of one curricular year (three 14 week terms including examination period) covering subjects ranging from quality, pre-clinical and clinical drug development and assessment, including drug design, conduct and appraisal of clinical trials, to pharmacoeconomics, patent protection issues and risk management.

A fourth term in which students are exposed to discussion seminars led by experts in the different fields completes the requirements for a post-graduate diploma. For the Masters degree a dissertation, often in the form of a monograph based on published literature is required in addition.



The attendance, student satisfaction and job opportunities make this programme a success and a major asset at the FFUL.

GIMMICS at the VUB: Pharmacy Practice in an Academic Setting

*Kristien De Paepe¹, Sophie Sarre¹, Evelyn Schaafsma², Claudia Dantuma-Wering²,
Diane van Wieren³, Sofie Vanhecke¹, Lies Leemans¹, Han De Gier², Marcel L. Bouvy³
and Bart Rombaut¹*

¹Vrije Universiteit Brussel, Brussels, Belgium, ²University of Groningen, Groningen, The Netherlands, ³Utrecht University, Utrecht, The Netherlands.

Correspondence to Kristien De Paepe, Department of Toxicology, Dermato-Cosmetology and Pharmacognosy (FAFY), Vrije Universiteit Brussel (VUB), Laarbeeklaan 103, B-1090 Brussels, Belgium. Tel : +32 / 2 477 45 96 ; Fax : +32 / 2 477 45 82 ; e-mail : kdepaepe@vub.ac.be

The main learning objective of the pharmacy practice training for all final year pharmacy students is to prepare the students – coached daily by a senior pharmacist – for all aspects of the pharmacy profession in a community pharmacy. This includes the correct dispensing of drugs – on prescription and OTC – as well as medical devices and nursing materials; the preparation of compounded dosage forms; the provision of pharmaceutical care; pharmacovigilance; legislation; deontological rules; social competences; and the organization and management of a community pharmacy.

During this training, pharmacy students of the 2nd Master should apply integrated knowledge, competences and skills, acquired during previous courses. GIMMICS (**G**roningen **I**nstitute **M**odel for **M**anagement in **C**are **S**ervices) [Dutch website: <http://www.gimmics.nl/brussel/>] is a teaching game in which a primary pharmacy is simulated at the university in a controlled academic setting. Preferably, it is organized halfway through the students' primary practice training. Until now, 3 faculties of pharmacy in both The Netherlands (Groningen and Utrecht) and Belgium (Brussels) are using this teaching model. Students work in small teams to run their own pharmacy during 4 weeks. This teaching game combines real life situation cases including mystery guests role-playing as patients, prescriptions, dispensing of drugs, medical and pharmaceutical cases by phone or email, preparation of compounded dosage forms, pharmaceutical care and training of communication skills.

The teaching goals of GIMMICS differ from university to university, but are in all cases: (i) to better prepare students for their responsible and challenging tasks as pharmacist, (ii) to improve the quality of pharmaceutical care in the primary setting,

(iii) to meet any heterogeneity between different pharmacy practice trainings, and (iv) to help students reflect and correct for their mistakes. Feedback by the game supervisors is provided only indirectly, but sufficient time is given to practice highly demanding and responsible tasks. GIMMICS also provides the opportunity to organize seminars together with medical students, as well as therapeutic cases focussing on clinical pharmacy in e.g. geriatrics and oncology. In 2010, in Brussels, the medical students preparing to become general practitioner joined GIMMICS for one week during which two general practices were established. Apart from their own gaming and assignments, both groups of students were confronted with specific cases and tasks requesting mutual communication and action.

In general, pharmacy students experience the gaming period as an intensive training with a high workload. However, they appreciate that GIMMICS improves their competences and general skills to become a pharmacist. They develop a more structured approach towards problem-solving and improve their communication with other healthcare professionals. GIMMICS not only eases the path from practice training to community pharmacy, this type of active learning style and reflective learning also stimulates the integration of academic knowledge and social competences, including the awareness of the importance of life-long learning.

Solving medical problems – collaboration between new groups of undergraduate students

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Development of future drugs and diagnostics demands collaboration between clinical and experimental oriented professionals. Interprofessional collaborations are therefore regarded as the base for future excellent health care. Thus, it is important to offer meaningful interdisciplinary assignments that require both theoretical and practical skills already at the undergraduate level to students with and without direct patient contact. Not only do they need to know each other but even more importantly they need to know about their respective professional competences. The presentation will focus on how to promote interprofessional relations between clinically and experimentally oriented students by working with disease-related projects using different approaches to facilitate interprofessional collaborations. The student groups involved are from the biomedicine, medical, nursing and physiotherapy programmes.

The readiness for interprofessional assignments and the importance of the students' responsibility for learning will also be discussed in the light of our experience.



Hospital Pharmacy and academia in Leipzig: working together for the best education of students

Dr. Roberto Frontini

The Hospital of the University of Leipzig is a tertiary care hospital with 1,350 beds providing care to 54,000 in- and 180,000 outpatients.

The 50 Students of the faculty of pharmacy have the opportunity to work in small groups together with experienced hospital pharmacists as teaching practitioners.

Hospital pharmacy is in some aspects different to community pharmacy due to the acute and specialised care in hospitals. Students have training in the preparation of cytotoxics as well as in clinical pharmacy at the patient's bed.

The collaboration with the faculty of pharmacy includes also scientific research in clinical pharmacy and financial support by the hospital creating a win-win-situation for faculty and hospital.



Specialization in Hospital Pharmacy in Italy

Prof. Santi Spampinato

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University of Bologna, Italy*

The School of Specialization in Hospital Pharmacy has been recently changed and now is a four-year course aimed to warrant professional training for hospital pharmacies and pharmaceutical services offered by the Italian public health service. Eligible candidates must hold a degree in Pharmacy or in Pharmaceutical Chemistry and Technologies and pass a written exam. This novel and full-time course, adopting a multidisciplinary approach and following the evolution of hospital pharmacy, provides students with the knowledge and skills necessary to undertake all aspects required by this health profession. During the last term, the students can follow two different curricula focused on clinical pharmacy or on territorial pharmaceutical services in health care agencies. The program comprises taught modules run in the Faculty of Pharmacy (overall 30% of time) and placements at hospital pharmacies and pharmaceutical services (overall 70% of time). The subjects are taught as integrated modules to a better understanding and to emphasize the interdisciplinary approach inspiring the whole course. The subjects include those of the pharmaceutical, technological and pharmacological areas focused on drug analysis and pharmacokinetics, compounding and pharmacotherapy and are integrated by microbiology, immunology, hygiene, dietetics, pathology and chemical-clinical analysis. Emphasis is also given to modules of clinical therapeutics dealing with the major therapeutic areas and to pharmacovigilance, pharmacoeconomics, pharmacoepidemiology as well as the emerging role of pharmacogenetics and of biotechnology products is also highlighted. Each student will gain intensive practical experience during his or her hospital/pharmaceutical services clerkship programme under the guidance of assigned tutors that provide for an increasing degree of responsibility. The practice is organized into three areas: a) knowledge of comprehensive services provided by the hospital pharmacy and pharmaceutical services (e.g. medicines information, dispensary functions, use of the hospital formulary, administration and management, purchasing; attendance to ethical committee sessions); b) compounding and artificial nutrition (e.g., extemporaneous formulations and quality assurance, total parenteral nutrition, and other medications given intravenously like neonatal antibiotics and chemotherapy, preparation and delivery of radioactive drugs); c) clinical pharmacy. The emphasis in this latter part of the



course is: on monitor of patient medications working closely with physicians to evaluate the appropriate drug therapy for their patients, evaluation of effectiveness of treatment regimens, safety of medications (i.e., drug interactions) and patient compliance issues. Finally, the students will take part to therapeutic committees where overall policy is determined in relation to drug and medical device clinical trials and will prepare a written dissertation.



The Medical Education in Europe (MEDINE) Networks and the Tuning Project

Prof. Allan Cumming

The presentation will address the following areas:

1. The development of medical education in Europe and the current diversity and variability of practice.
2. The implications for medical education of the Bologna Process.
3. The utility of learning outcome frameworks and outcome based curricula as an approach to harmonisation within Europe.
4. The proposed workplan for the MEDINE2 Erasmus Academic Network in Medical Education, 2009 to 2012."

Interdisciplinary Teaching: Experiences from a revised curriculum in Norway.

Johansen, H.T., School of Pharmacy, University of Oslo, Norway.

Working as a pharmacist is indeed a multi-disciplinary activity. The handling of a prescribed drug should evoke reflections on both how the drug works, its chemistry, its dosage form, the patient at hand, regulatory restrictions etc. But how is this reflected in traditional teaching programs where each discipline is taught separately and often without any reference to other subjects? Should not a curriculum in pharmacy more closely reflect what lies ahead for our students?

In 2002 the School of Pharmacy started the implementation of a revised curriculum based on interdisciplinary teaching. This should be a monumental departure from a sequence of restricted subjects with their own favoured textbooks, into a new world of integrated efforts towards a common goal. A short introduction to pharmacy was to be followed by four courses over three years that aimed at answering the following questions: "How do drugs work?", "How are drugs produced and distributed?", "How are drugs used?" and "How are new drugs developed?".

Implementation of the new curriculum thus required for the first time cooperation between departments in establishing joint teaching modules, and thus agreeing on both content and form. This process disclosed differences between lecturers/departments concerning perception of their own specialities role in the integrated courses. Also, attitudes towards teaching methods in general were not uniform. In the years following the first intake of students in 2003, the new curriculum underwent several consecutive changes. The original 5 courses have been divided into 16 smaller entities. Also, the integration of some disciplines failed completely, and the order by which different subjects are introduced has been changed.

In spite of some setbacks, having the optimistic starting point in mind, the new curriculum has brought significant progress towards a more integrated approach to teaching different disciplines simultaneously. Pharmacology, medicinal chemistry and physiology all take part in explaining how drugs work. Also, when approaching the treatment of asthma both social pharmacy, pharmacotherapy, pathology and analytical methods used in therapeutic drug monitoring are presented in parallel.

In 2007 The Norwegian Agency for Quality Assurance in Education conducted an external quality evaluation of the School of Pharmacy. Their conclusions were very positive stating that: "The University of Oslo has adequately managed to integrate a traditional natural science oriented pharmacy education with a health science profile, where students are taught a pharmaceutical way of thinking."



Illustrative examples of successes, failures and unexpected obstacles will be presented together with some advice to others with ambitions to carry out similar processes.

Pharmaceutical Engineering: The Lisbon Masters Program

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Keywords: pharmaceutical engineering, PSE, quality control, quality assurance

Topic: Integration of life sciences & engineering.

Process analytical technologies (PAT) are “systems for analysis & control of manufacturing processes based on timely measurements of critical quality parameters and performance attributes of raw-materials and in-process products, to assure acceptable end-product quality at the completion of the process”, i.e., quality by design (FDA, 2004).

PATs are a landmark in the acceptance of process systems engineering (PSE) tools in modern pharmaceutical manufacturing and quality assurance of food and drug processes in general. PATs involve the application of process analytical chemistry (i.e., in-process monitoring techniques), chemometrics (e.g., data-based modeling techniques) and process control techniques (viz., intelligent use of process data with multivariate supervision and diagnosis strategies).

In this talk we present a prospective view on how this new field made up from integrating established engineering approaches and other scientific areas into pharmaceutical and biologics production will play a decisive role in leading to better, safer and less expensive medicines, and eventually to a “pharmaceutical engineering” discipline itself.



The joint 3-year long experience of The Faculty of Pharmacy University of Lisbon and The Technical University of Lisbon, in a Masters Program in the area of Pharmaceutical Engineering will be described.

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Experiential Learning - The Preparation of Pharmacists for Real Life

Steve Hudson, Professor of Pharmaceutical Care

University of Strathclyde, Glasgow, UK

The student's journey to become a competent, effective and advanced practitioner is a complex one that is still poorly thought out by the profession. Healthcare practice and science change quickly. Educational programmes at both undergraduate and postgraduate levels find it hard to change with them.

We have a problem in not yet producing a graduate that enters the profession to become a pharmacist who can really help solve modern drug related problems in a complex society. I see three reasons for this

The pharmacist does not speak the same language as the doctor and so doctors can argue there is no reason to give pharmacists medical information about the patient's status...so learning in the clinical environment is limited in practice.

Universities do not recognise the importance of learning in the clinical working environment, because it is seen as inferior to the laboratory working environment. It is also complex to arrange. Real life is uncontrolled.

The result is that pharmacists are trained with a bias to handle singular problems within specialised concepts; and they are not prepared adequately prior to registration for the complex combinations of problems which make up real life

In 1910 John Dewey, the famous US educationist and philosopher, recognised the value of practical experience in learning. He argued eloquently that experiential learning is a powerful factor in the growth of human adult intelligence and ability to contribute effectively to the real world. Now exactly 100 years later our growth of universities out of the technical schools has resisted 'experiential learning' – the earning of PhD for most academics had a large experiential component.

This presentation will go back to 1910 ('The Way We Think'; John Dewey) and see what messages we can relearn about the route from learning Science in order to deliver Care

Hudson SA, Johnson BJ, McAnaw JJ. Changing Roles of Pharmacists in Society. International eJournal of Medical Education. 2007: 1: 22-34.



Industrial Pharmacy – “Skills needed for Industrial Pharmacy”

Prof Luigi Martini – EIPG President

The pharmaceutical Industry is developing more and more innovative medicines and its markets are becoming more and more complex and diverse.

Recently, many Pharmaceutical Companies have announced their plans to expand their operations in the emerging markets and specifically: Brazil, Russia, India, China, Mexico, Turkey and Korea.

The traditional model of a large integrated Pharmaceutical Company reliant upon blockbuster compounds is becoming obsolete as they reinvent their business models.

Evidently, Pharmacists who enter the Pharmaceutical Industry will need to understand the Global nature of the business and the importance of communication and other interpersonal skills.

This presentation will discuss the changing Pharma Model and suggestions for skills required to be taught to all undergraduates and ideas for Post-Graduates in order to pursue a successful career in the Industry.



RACCA'S ABTRACT NOT SUBMITTED



Can you teach interprofessional education online? Views from the Aberdeen IPE programme.

Dr Lesley Diack - Robert Gordon University, Aberdeen

Interprofessional education (IPE) in Aberdeen commenced in 2003 with a collaborative partnership between the two universities: Robert Gordon University and the University of Aberdeen. The professions of diagnostic radiography, medicine, midwifery, nursing, nutrition and dietetics, occupational therapy, physiotherapy, pharmacy and social work, together created an IPE experience in the first two years of undergraduate programmes as well as at other times in their undergraduate careers. This paper gives an overview of the last seven years of the programme and discusses the advantages and disadvantages of the various methods used to develop IPE.

Following the success of the initiative and with the development of social networking a decision was taken to capture informal, serendipitous or hidden learning which will enhance and develop the formal learning. The underpinning philosophy of interprofessional learning relates to behaviour, attitudinal change and the breaking down of stereotypical professional barriers. Classroom based achievement of such learning outcomes can prove difficult. This project builds on pedagogical evidence that deeper and more influential learning can evolve from students communicating with each other to complement and enhance formal learning.

This paper further describes a project to set up IPE buddy groups for September 09 undergraduate programmes for the ten professions mentioned which was implemented.

The aim of this stage of the project was to create a face to face meeting with approx. 800 students in small mixed groups of 10-12. Students were encouraged to use WEB2.0 technology (e.g. E mail/ SMS/MSN/ Facebook/ Twitter) to link up with each other and using specifically designed e learning space engage with e learning IPE activities prior to their formal IPE classroom based sessions. Facilitators from the different professions and students in their buddy groups were encouraged to stay together 'virtually' working on activities throughout their undergraduate programmes.

The Readiness for Interprofessional Learning Scale has been used for the last seven years to provide a measure of the effectiveness of this approach in developing mutual respect and understanding for the different professions and results from this will be highlighted throughout the paper.



MARCINCAL'S ABSTRACT NOT SUBMITTED

Nutritional Pharmacy

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A food can be regarded as “functional” if it can demonstrate a beneficial efficacy on one or more target functions in the body in a convincing way. Beyond adequate nutritional qualities, functional foods should either improve the state of health and well-being and/or reduce disease. Thus, functional foods marketed with specific health claims must demonstrate their activity. For example, in case of heart disease reduction, the focus is primarily on the major risk factors, i.e. cholesterol, diabetes, and hypertension. Some of the most innovative products in this area are designed to be enriched with ‘protective’ ingredients, believed to reduce risk. They may contain for example soluble fibre, phytosterols/stanols, soy protein n-3 fatty acids, and polyphenols (1). Another main area is that of probiotics, the beneficial microbes found in many products in the market today, which are most commonly consumed as fermented dietary products or as dietary supplements. Their use is based on the activity on the immune function, the beneficial activity in gastroenteritis, and the antimicrobial properties against pathogenic microorganisms.

Regulation (EC) No 1924/2006 harmonises the provisions that relate to nutrition and health claims and establishes rules governing the Community authorisation of health claims made on foods. As foreseen in the Regulation, the EFSA Panel on Dietetic Products, Nutrition and Allergies (NDA) issued an opinion in 2007 providing scientific and technical guidance for the preparation and presentation of the application for authorisation of health claims.

Currently, the application of this new regulation is representing a big challenge to companies, since most of the opinions released until now have been negative, being the substantiation of the health claims very weak. It is certainly one of the tasks of the Faculty of Pharmacy to prepare professionals endowed with all the expertises necessary to deal with this delicate issue which is so crucial for the survival of nutraceutical companies in Europe.

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Promoting Erasmus student mobility

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Introduction: Student mobility within the European Union is supported through the Erasmus programme. This activity allows for student mobility between higher education institutions and provides exposure to students to different cultures. The aim was to promote the Erasmus student mobility amongst students following the undergraduate pharmacy programme at the University of Malta. Method: Pharmacy students who are in the sixth semester of their studies are asked to participate at an information session and a workshop. During the session students are informed about the aims of the programme and the opportunities available where the department of pharmacy has Erasmus mobility agreements with partner institutions. At the workshop, students who have already benefitted from the activity are asked to share their learning experience. Students are encouraged to take up the activity during the seventh semester when an experiential learning attachment is undertaken. During this experiential learning attachment students follow an experience in one of the areas: clinical analysis, clinical pharmacy, hospital pharmacy, pharmacy administration, pharmaceutical analysis, pharmaceutical industry. Students are asked to keep a logbook and keep contact with a local tutor via electronic communication. Upon their return they participate in a seminar organized for all students in the seventh semester of studies to evaluate their activity. The experiential learning attachment is allocated 20 ECTS. Results: The department of pharmacy at the University of Malta has agreements for undergraduate student mobility with 20 schools of pharmacy from the European Union. The number of students since 2004 who took up this activity and the percentage from the eligible cohort are: 2004- 6 (26%), 2005- 10 (29%), 2006- 14 (50%), 2007- 9 (32%), 2008- 7(23%), 2009- 16 (43%). Over the past 6 years, 62 students have participated and they were hosted in pharmacy schools in: Belgium (6), France (14), Germany (3), Italy (21), Spain (10), United Kingdom (8). Student feedback regarding the learning experience as shared during the workshop was reported to be excellent and they strongly recommend it to fellow students. Conclusion: Undergraduate pharmacy students have responded very well to the promotion of Erasmus student mobility of 3-4 months duration during the seventh semester of studies. The percentage number of students taking up the activity is



comparatively high when compared to students following other courses at the University of Malta.

Integrating professional standards into practical classes: teaching extemporaneous preparations to first year undergraduate students in a 'real life' situation

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In our Practical Dispensing and the Science of Medicines Manufacture laboratory classes, first year pharmacy students learn how to make different types of personalised medicines such as liquid medicines, creams, ointments and suppositories, according to quality standards in place in a hospital pharmacy manufacturing unit or any laboratory where medicines are made on a small scale for individual patients. Our aim is not only to teach our students the practical skills needed to prepare those medicines but also the importance of applying good working practices so that safe, effective and high quality products are delivered to patients at all time. Each practical is preceded by lectures on the properties of drugs and excipients, medicine formulation and manufacture. The exercises are presented as standard prescriptions for extemporaneous preparations. Students have to consult reference text books to find out information they need to manufacture the medicine and fill in their lab report. This consists of a batch manufacturing record sheet (BMRS) similar to those in use in the medicines preparation unit of the university hospital plus sections on the properties of ingredients and medicine stability. The BMRS contains a detailed formulation for the medicine to be made, a manufacturing protocol and a 'final product quality check' that the students complete after manufacture, packaging and labelling of their product. Students have also to produce a label instructing the patient on how to take their medication that complies with legal requirements and that they apply on their final product. Each class starts with a stage-by-stage demonstration of the correct techniques to prepare the medicines, including the use of appropriate protective clothing and safe waste disposal, by the academic in charge using a range of audio-visual tools. Thereafter, students are assisted at the bench by teaching pharmacists. In one of the sessions, a video filmed 'live' both in the hospital dispensing pharmacy and medicine manufacturing unit is projected to place their learning in the context of their future profession. The classes are designed to introduce students to their future professional environment. They gain a thorough understanding on the different steps between patients being prescribed



an individualised medicine and them actually receiving it from their pharmacist, on the importance of dispensing high quality medicines and on the contribution of the pharmacist in those processes at a very early stage of their training. This is often their first contact with 'real life' pharmacy and some of them are slightly disoriented initially. However, they become more confident as time goes by and their feedback is usually very positive with the vast majority of the students enjoying the classes.



Student-Health Professional Relationships in the learning process at the Pharmacy Faculty of Salamanca University, Spain.

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The Pharmacy Faculty at Salamanca University in Spain has established different relationship between students and professionals either at the undergraduate and postgraduate levels. As stated in the European Directive 2005/36/EC, the degree in Pharmacy includes a six month-training period located at the second semester of the final year (the 5th), when the students have passed all the degree subjects, so they possess the knowledge necessary to initiate the practical experience through an internship either at a community pharmacy or at pharmacy hospital service. During that period, the students are incorporated to the receptor centre and start their contact with patients and other health professionals. The learning process of each student is directly followed by two health professionals, a pharmacist tutor who is a worker at the receptor centre where he/she is done the placement, and an associate professor who develops his work, preferably, in a different centre. Both professionals are coordinated from the Faculty and have to watch over the correct learning process and be sure that the student acquires the proper competences associated to the degree in pharmacy. At the postgraduate level, The Pharmacy Faculty at the USAL has two master courses, one dealing with the pharmaceutical industry and other with the design, synthesis and evaluation of drugs, in both the students have to be in contact with different professionals. Especially in the master related to the Pharmaceutical industry, in which each student has to do an internship at a pharmaceutical company, during that stage the student acquires good skills to interact with a multidisciplinary team. The Faculty receives the feedback of these practical trainings through surveys that students have to fill in at the end of the period, the analysis of them allow us to improve the process for the following years and we have seen that the students really appreciate the contact with health and other professionals.

Approaching testwiseness amongst Portuguese pharmacy students

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Introduction: As in other educational areas, it is not rare that pharmacy students under assessment utilize the characteristics and formats of the test and/or test-taking situation to receive a higher score. Testwiseness has been defined as the cognitive ability to respond advantageously to multiple-choice questions/items (MCQ) containing extraneous clues and, therefore, to obtain credit without knowledge of the subject matter being tested.(1) Objective: To develop and validate a testwiseness instrument amongst a sample of Portuguese experienced pharmacy students. Methods: Based on five major cueing strategies, lecturers from five main pharmacy education areas (pharmacology, genetics, epidemiology, pharmaceutical technology and molecular biology) were asked to produce five MCQ (4 options each) comprising exceptionally hard issues, never addressed in the Master's program. A 25 MCQ questionnaire was developed, face and content validated within the lecturers panel, and administered to 207 students attending the 5th grade in the Faculty of Pharmacy, University of Lisbon. Ethical and informed approval was obtained. Results: A total of 223 students participated in the study, with 206 valid questionnaires (2/3 completion). Mean age was 22.3 years, with 71.8% females, 3% of foreign students and 7.3% student workers. From the 25 MCQs used, 10 were successful in their testwiseness capacity: 2 'grammatically correct stem', 3 'strong modifiers', 1 'excess specificity', 3 'longest answer', 1 'implausible distracters'. Correlational and factorial testing by PCA did not extracted factors corresponding to the five strategies under study, confirming the need for a deeper analysis of the answering profile, further examination and adjustment of MCQ construction/phrasing (including a focus group with students), and subsequent piloting. Some statistically significant associations were found between the valid MCQ 'grammatically correct stem' with students who have missed subjects ($Q_1 \text{ Chi}^2=19.186, p<0.001$) and those with foreign nationality ($Q_{16} \text{ Chi}^2=8.880, p=0.034$); this indicates a potential association of testwiseness with subnormal progression, as well as with potential language barriers. Conclusion: Testwiseness skills seem to exist amongst experienced Portuguese pharmacy students, but the instrument was not able to prove its dimensional structure, thus not trustily capturing the prevalence of these behaviours. Further study is needed before a reliable assessment of these skills, therefore controlling for undue influence of testwiseness and improving fairness in students' marks. References: 1.



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Interdisciplinary Education and Teamwork: The Role of Human Patient Simulation

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Human patient simulation has been widely incorporated into the educational programs of medical schools and residency education programs. These high-fidelity human patient simulators deliver computer-driven scenarios and computerized virtual reality experiences that accurately simulate dynamic medical conditions. The use of human patient simulation thus provides an ideal opportunity for “hands on” problem-based learning where learners have the ability to practice their skills in lifelike circumstances without risk to the patient. Here at the University of Rhode Island, College of Pharmacy, we have integrated human patient simulation into the existing Doctor of Pharmacy curriculum. In the first professional year (P1), simulation is used to illustrate basic pharmacologic principles including autonomic pharmacology. This progresses to the use of simulation to demonstrate the challenges of managing complex disease states such as septic shock. In the second professional year (P2), students practice physical assessment skills and formulate therapeutic recommendations for a simulated patient with an acute COPD exacerbation. In the third professional year (P3), we use simulation in a multi-disciplinary setting to foster communication, mutual understanding and teamwork between students from pharmacy, nursing and medicine. The scenarios at this level emphasize realism to best prepare students for what they will encounter in the workplace. Finally, in the fourth and final professional year (P4), simulation is used as an advanced pharmacy practice experience (APPE) to allow for further exploration of clinical challenges.



The role of Universities: sharing knowledge in a multicultural society

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Nowadays ethnic and cultural integration is the main issue to complete the social and political global society frame. Universities, as institutions of high social level, have the task to mediate this process. According to the “Council of Europe White Paper”, students of undergraduate, graduate, postgraduate courses are the major actors of an intercultural dialogue having the opportunity to spend periods of their study and research abroad. For years, European Universities have been establishing several partnership agreements with other areas of the world, offering to students a broad range of partners from different cultural, linguistic and academic backgrounds. Since November 2009, the PhD course in Pharmaceutical Sciences being part of “Paul Ehrlich European Medicinal Chemistry PhD Network” intend to promote international research training, mobility and experience of PhD students, researchers and professors at European level. In fact, the higher education institutions should work to offer training in intercultural awareness and dialogue to all members, regardless of their level and academic specialization, through lifelong learning programs and courses, and valuating and promoting interdisciplinarity as a basis for intercultural learning.



Keywords: cultural integration, Council of Europe White Paper, Paul Ehrlich Network, PhD students mobility, lifelong learning programs, interdisciplinarity, intercultural learning.

The Use of High-Fidelity Human Patient Simulation in an Advanced Pharmacy Practice Experience.

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Medical simulation is a growing cross-disciplinary field that is gaining wide acceptance among all healthcare disciplines. While multiple tools and formats of medical simulation exist, high-fidelity human patient simulators provide the most intensive, immersive experience by simulating dynamic disease states in a safe, yet realistic, environment. While this traditional use of simulation is invaluable, we determined that advanced pharmacy students could derive further clinical insight through actively researching, developing and presenting complex disease states within the context of a human patient simulator. Fourth professional year (P4) pharmacy students enrolled in a 5-week advanced pharmacy practice experience (APPE) were assigned a complex disease state and asked to accurately model that disease state into a human patient simulator. Modeling of assigned disease states required students to use foundational knowledge of physiology and pharmacology as well as data from clinical cases to accurately program hemodynamic and pulmonary parameters into simulated patients. The simulated patient cases were analyzed for physiologic and pharmacologic accuracy. After programming, students presented their simulated patient case which included a discussion of disease management and optimization of therapeutic interventions. This simulation-based APPE provided students with a unique opportunity to test their knowledge of physiology and pharmacology and relate these foundational studies to active disease management.

Multidisciplinary Education in Pharmacy: are students aware of its importance?

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Ana PUJA*

European Pharmaceutical Students' Association (EPSA)

It is consensual that among Health subjects multidisciplinary education and training is required in order to provide students with a wider range of information acquisition, professional practice and scientific expertise. This applies especially to Pharmacy Education, due to its heterogeneity and diversity of fields that can go from the clinical concepts, the social approaches to the patient or the drug information that is essential to transmit to the individual. All of these topics need to have a global and holistic approach in order to assure that the students get the desired competences from the most suitable professionals in the area. With this as an aim of the modern educational institutions, it's now important to assess what Pharmacy students think about the relevance of a multidisciplinary education in their curricula. A survey was carried out among Pharmacy students from all over Europe with some key questions regarding the availability of multidisciplinary training in their Faculties and the degree of importance they attribute to such learning environments. EPSA also wanted to assess whether there is any interest in joining forces with other Healthcare students and assess their perception of how this will effect their professions in the future, Misconceptions about collaboration between various Health professionals in the common Health education curricula were also targeted. Finally, this survey also attempted to explore the opinions of students from other Health fields like Medicine, Dentistry and Nursing, among others, about what they think of the professional collaboration with the Pharmacist. According to the results gathered, most of the students who answered the survey have good notions about the usefulness of a multidisciplinary education within the Pharmacy Education and agree that it is surely important not only for their undergraduate curriculum and hence providing them with a well-rounded education but also for the professional development that follows it. However, according to the same survey, there are also limitations to the ideal situation, which include the average quality of the programs and the rising of some competitive scenarios that can disrupt the educational purpose of the cooperation.



Novel online interprofessional education in Prescribing Science for pharmacy and medical interns and undergraduate medical students

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Background Medication errors contribute to patient morbidity and mortality. The report of the National Commission on Patient Safety and Quality Assurance "Building a Culture of Patient Safety" noted that poor teamwork and lack of integration of primary care professionals contributed to adverse events in Ireland. The Commission called for multi-disciplinary education programmes and a greater priority for multi-disciplinary team skills at both undergraduate and postgraduate level (Department of Health and Children, 2008). The introduction of a new National Pharmacy Internship Programme, a competency based Masters Level (90 ECTS) licensure qualification, provided an ideal opportunity for an interprofessional approach to address patient safety. Summary of work The Interprofessional Prescribing Science module (15 ECTS) was delivered to postgraduate pharmacy interns (PPI) postgraduate medical interns (PMI) and final year medical students (FYM). Baseline competence was assessed. This was followed by an online teaching programme using problem based clinical quizzes, evidence-based e-tutorials, a discussion forum and links to research resources. Summary of results A total of 655 enrolled in the module with over 90,000 logged activities recorded over 6 months. There was no overall difference between the 3 groups in the baseline competency, all scoring below 35%. Sub-analysis demonstrated differences related to professional background. Post-course analysis showed significant improvement for the PPIs, with analysis of the other groups to follow. On-line discussion between the professional groups was limited, and students and interns will be paired to undertake joint prescribing exercises for the next intake. Conclusions Online Interprofessional education can effectively facilitate learning for large groups of different professions dispersed geographically. It provides an opportunity for characterising knowledge and learning patterns of healthcare graduates. This data can be utilised to inform curriculum review and methods for improving collaboration. There is no legislative base for pharmacist prescribing in Ireland at present. This study, which provides an evidence base for competence in prescribing, along with the proposed expansion of the module to provide a certificate in prescribing/prescribing sciences, will facilitate policy development in



this area. References Department of Health and Children (2008) Building a Culture of Patient Safety (Madden report), Dublin.



Interdisciplinary connections during teaching of pharmaceutical chemistry in Ukraine

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Pharmaceutical education in Ukraine as in all postsoviet countries has some especialities. This is connected with traditions in pharmaceutical branch of our country. Thus, traditionally pharmacy in Ukraine is not only distributor of pharmaceutical preparations but also manufacturer of some ones. In this case pharmacy must assure good quality of manufactured formulations and professional quality assessment in accordance with the requirements of the State Pharmacopoeia of Ukraine which is harmonized with European pharmacopoeia. The person who assures and assess quality of ex tempore preparations in pharmacy is provisor(pharmacist)-analyst. So one of the directions in pharmacy student's education is competencies connected with pharmaceutical analysis. In these conditions the main subjects of pharmaceutical chemistry are chemical principles of action of pharmaceuticals and methods of quality control them. The chemical bases of pharmacy students' knowledge are formed during 1st and 2nd year in many disciplines: inorganic, organic, analytical, physical and colloidal chemistry. Especialities of manufacturing of different dosage forms are discussed in drugs technology. Programs of all these subjects are agreed with pharmaceutical chemistry. In same queue in 5th year students learn Good practices in pharmacy, for which knowledge and skills from pharmaceutical chemistry are obligatory. Understanding of chemical bases of pharmacology is integrated with such modules as biophysics, biochemistry, pharmacology, pharmacotherapy and clinical pharmacy. Next period in co-operating of obtaining knowledge and skills in pharmaceutical chemistry and other may be foundation of the multidiscipline such for example chemical pharmacology (biophysics + organic chemistry + pharmaceutical chemistry + biochemistry + pharmacology), pharmaceutical analysis (inorganic + organic + analytical + physical + pharmaceutical chemistries + technology) and other. Till this year we had four practical oriented exams during state attestation: pharmaceutical chemistry and pharmacognosy; technology of drugs, management and economics in pharmacy and clinical pharmacy. The minimal competency of graduates of pharmacy faculties of Ukraine is assessed by Centre of testing of Health Ministry of Ukraine (test exams "Step 1" and "Step 2"). Now in our curriculum there are two complex practical oriented exams: pharmaceutical chemistry + pharmacognosy + clinical pharmacy; and technology of



drugs + management and economics in pharmacy. Thus integration and interdisciplinary relations are important characteristics of modern pharmacy education in different countries and pharmaceutical chemistry is one of the key participant in this process.

New Grade of Pharmacy in Complutense University

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The Directive 2005/36/EC of the European Parliament and the Council of September 7th, 2005, on the recognition of professional qualifications, in its Section 7, article 44, describes the formation of the pharmacist. Evidence of formal qualifications as a pharmacist shall confirm the education during at least five years, including at least: (a) four years of full-time theoretical and practical training at a university or at a higher institute of a level recognized as equivalent, or under the supervision of a university; (b) six-month traineeship in a pharmacy which is open to the public or in a hospital, under the supervision of that hospital's pharmaceutical department. That training cycle shall include at least the programs described in Annex V, point 5.6.1.: — Plant and animal biology — Physics — General and inorganic chemistry — Organic chemistry — Analytical chemistry — Pharmaceutical chemistry, including analysis of medicinal products — General and applied biochemistry (medical) — Anatomy and physiology; medical terminology — Microbiology — Pharmacology and pharmacotherapy — Pharmaceutical technology — Toxicology — Pharmacognosy — Legislation and, where appropriate, professional ethics. According to this Directive, Spain, by the publication of ORDER CIN/2137/2008, of July, 3rd, 2008, has established the requirements for the verification of the official university titles, which qualify the owner for the exercise of the profession of Pharmacist. All the above mentioned subjects, as well as those of Nutrition and Bromatology, Parasitology, Planning and Management, Pharmaceutical Care, and Public Health, have been considered. These courses, with a minimum of 240 ECTS, constitute the core of the pharmaceutical studies in Spain, and they have been grouped in the following modules: Chemistry (54 ECTS), Biology (42), Physics and Mathematics (12 ECTS), Pharmacy and Technology (24 ECTS), Medicine and Pharmacology (66 ECTS), Legislation and Social Pharmacy (12 ECTS), Stages and Work degree (30 ECTS). The studies on the Faculty of Pharmacy (University Complutense of Madrid), extended over a five years period, are organized in the corresponding training courses covering 300 ECTS (60 ECTS by year); 42 ECTS of those are related to core subjects recommended in the CIN/2137/2008, while the



other additional 18 ECTS, corresponding to both optional and free-choice subjects. These ECTS incorporated, are dealing with different subjects such as Soil Sciences, Pharmaceutical History, Computer Sciences, Phytochemistry, Biotechnology, Medical Devices and Biomaterials.



Interdisciplinary courses at the Faculty of Pharmacy, Jagiellonian University Medical College, Cracow

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Contemporary pharmaceutical practice becomes gradually more and more sophisticated and complicated task. We expect pharmaceutical care to be one of the pharmacists' activity in the nearest future. So the aim of didactic process is to teach our student how to recognize and solve drug-related problems (DRP). To do that they need appropriate skills and knowledge. This requires appropriate curricula adjustments in order to fulfill today's practice requirements. Nowadays on our pharmaceutical care course student works independently from the others with his virtual patient, in one hand it reflects his future work with patient, in the other it teaches him seeking solutions and professional counseling. However our several years' experience showed that sometimes student failed and could not integrate the knowledge from the different areas. Our proposition of the multidisciplinary and interdisciplinary classes for the 5th year pharmacy students, addressing above mentioned issues, is a practical pharmacy course held together with pharmaceutical care. These two subjects are accomplished in the cooperation between the Chair of Pharmaceutical Technology and Biopharmaceutics and the Unit of Pharmacoepidemiology and Pharmacoeconomics. The joined syllabus was developed based on the consultations with the practitioners, due to the fruitful cooperation with Local Pharmaceutical Chamber in Cracow. The discussions were directed towards identification of the key pharmaceutical activities requiring additional training exceeding above the standard syllabus offered for students. Consequently there were following groups of topics to be addressed by interdisciplinary classes: 1) asthma; 2) hypertension; 3) self-medication; 4) rheumatic diseases; 5) type 2 diabetes mellitus. The key factor of the teaching scheme would be the synchronization the topics of the practical pharmacy with the issue of pharmaceutical care. The workshop in each topics will consists of an introduction and pharmaceutical care. The students will be asked to solve short and simple cases. The main aim is to show them how to use their knowledge of



pharmaceutical technology in a daily practice. An example could be solid dosage forms of antihypertensive and antidiabetic treatment, where the major topic is the issue of pharmaceutical formulation composition, its design and other technical issues, which have impact on the practical applications of drugs in mentioned diseases. Each case and its solution will be presented in the front of the class. Afterward, in the pharmaceutical care part of the workshop the DRP of virtual patient will be interspersed with similar in type problems so the student will become more and more familiar with them. In order to improve teaching quality there will be introduced experienced practitioners from local pharmacies as teachers and instructors. The results of students' work with virtual patient will be documented in internet application dedicated to pharmaceutical care.



Evolution of the training placements of the Faculty of Pharmacy of Seville (Spain)

Jos Angeles

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Evolution of the training placements of the Faculty of Pharmacy of Seville (Spain) Orta MM, Sánchez-Bursón J, Jos A, Vega Jm Faculty of Pharmacy. University of Seville. Profesor Garcia Gonzalez 2, 41012, Seville, Spain

The university reform necessary to achieve the objectives set by the European Higher Education Area, requires among others, to promote changes in teaching methods, the main point in the student's learning process, through which new skills, knowledge, behaviors, or values are acquired as a result of the study, experience, training and observation. In this sense, the team in charge of the Practical Training in the Faculty of Pharmacy, University of Seville, has changed the students learning process and since more than five years ago it has been actively working in the adaptation of this subject to the new Pharmacy Degree. This evolution in the learning process of the Practical Training was especially difficult due to the idiosyncrasy of the subject. Students are required to complete a six month stay in a pharmacy and / or hospital pharmacy service to perform the structured practical training. During this time they acquire specific skills that will be very useful in their professional development. Moreover, students receive a previous course and they are continuously supervised by the teachers of the subject. In this communication we would like to show the tools used in the adaptation process, emphasizing the use of information and communication technologies in the educational process, training in generic and specific skills and the use of problem based learning systems (case studies). To achieve the objectives set in this process, the team responsible of the Practical Training has participated in several calls from the Ministry of Education and Science, and the University of Seville: Audiovisual Services and Institute of Education Sciences, both of them belonging to the University, with the aim of developing teaching innovation projects. During the years 2004-2006, the team has worked on developing a National Plan I + D + i project, that has identified the key skills for the professional development in the field of the Community Pharmacy and the Hospital Pharmacy. Moreover, the specific skills the students will be trained in have been selected in order to educate future professionals able to provide a good service to the society. As a teaching tool, guides for students and tutors, regarding to Community and



Hospital Pharmacy, were published both in Spanish and English. In these guides, for every specific skill, five different levels have been described to get the objective, and in this way the students can easily evaluate their progress. Acknowledgements: Authors wish to thank the I Plan Propio de Docencia de la Universidad de Sevilla for the support to this study



The Problem of Pharmaceutical Internship: Community Pharmacy

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According to the legislation of the Russian Federation on education, the internship is compulsory for graduates of pharmacy school. The Primary goal of internship is to widen and improve theoretical background and practical skills of graduates. Graduates can choose and continue the training on one of three specializations in profession: «management and economics of pharmacy», «pharmaceutical technology» and «pharmaceutical chemistry and pharmacognosy». More than a hundred of interns at the Department of Management and Economics of pharmacy of PFUR are simultaneously trained. The training program corresponds to the State standard and provides lectures and practical work for interns. The lectures and practical works have the following themes: modern models of management, including quality management; the state regulation of pharmaceutical activity; features of pricing on medical products; system of the state quality assurance of medicines; studying of consumer behavior, etc. Independent work of interns is carried out in the chemist's organizations and directed to gain key practical skills: the analysis and planning of economic indicators of drugstore activity; preparation of the accounting statements; marketing research; monitoring of consumer demand, etc. A significant role in the problem of integration of graduate and postgraduate professional education plays the succession at the stages of learning. The provision of permanent educational process and integration of the system of the graduate and postgraduate training is possible under a following condition. It is necessary to develop a complex of educational materials, manuals, textbook on the continuous professional training, including is curriculum of pharmacy postgraduate and additional education. It is possible to work out of the unique program on all three levels of educational process. It excludes duplication and repetition of different sections of certain discipline.



Pharmaceutical Industry Advanced Training (Piat) – Accredited Professional Development for the Medical and Healthcare Industries

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Career development and progression for staff in the industry and ancillary organisations is as important for employers as employees. PIAT programmes are unique in their distance learning format, and have contributed to industry success for nearly 20 years. The original PIAT programme was proposed in 1989 in collaboration with the UK Pharmaceutical Industry, who financed the writing of the course material. Modules were written by experts based in major Pharma from UK, Japan, Switzerland, Thailand and academia. Originally there were eight modules, now there is a choice of 17 modules available in the Industrial Pharmacy Programme. The modules have EU and US relevance, and are applicable worldwide due to the overriding importance of FDA and EMEA regulations. The aims of the programme were to have a flexible structure of free standing modules. These have an open and distance learning style, allowing minimum time to be absent from the workplace, which benefits both employer and student. Rigorous quality assurance is carried out by the University of Manchester. All module tutors are accredited University staff, and results are moderated by an accredited external examiner. There are a range of entry options; a minimum of an HND is usually required for a Diploma, and a degree level scientific qualification for is usually needed for an MSc, most students are science graduates. No prior learning is required for individual modules, but four credited modules with a pass mark of 50% equate to BSc degree equivalence. Individual course modules have a Workload of 150 hours per module, and the course content consists of a workbook of 150-300 pages, written assignments, and a workshop (tutorial) of 2-4 hours with the module tutor. There is a 2 hour written examination required for most modules. Other benefits include fulltime contact with a tutor, available via e-mail, and continual updates of Modules on an annual basis. University awards include Module credits, 15 per module, a Diploma for 8x15 credits, and an MSc is gained after the Diploma, plus Dissertation of 60 credits, making a total of 180 credits. The degree awarded for this is an Industrial Pharmaceutical Sciences MSc. Distinctions are awarded for marks of ³ 70% in all the Modules and the Dissertation, and 12 have been awarded over the last



4 years. To date there have been over 200 MSc s, and 3000 individual modules gained in the PIAT programmes. Students have come from a wide range of employers including major Pharma, biotech companies and the NHS, and have been mainly staff from Production, and R & D. Worldwide take-up of the programmes includes S. America, N. America, the Far East, and Europe. New programmes started in 2007 include Clinical Trials, Toxicology, Pharmaceutical Microbiology, and Pharmaceutical Business and Development. Two of these programmes were funded by HEFCE & NWRDA, and others by the University of Manchester. Currently we are working on production of 1-3 credit units for CPD.



Formation of professional competencies for pharmacists: multidisciplinary approach

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The contents of the pharmaceutical activity were essentially changed last years, because of there are new functions at the chemist's organizations, new positions for specialists, more strict consumers' requests to a standard of service in a drugstore etc. Competencial approach allows to harmonize curriculum knowledge and abilities of the graduates with requests of the pharmaceutical organizations. It is necessary to form professional competencies consecutively for modernization pharmaceutical education training of the pharmacist. The competency is understood as ability to apply knowledge, skills for successful activity in the field of practical pharmacy. Formation professional competencies puts in practice in two directions: 1) laboratory work; 2) trainings of the chemist's. Laboratory and a practical work takes about 60 % of academic hours of the student. The multidisciplinary approach assumes use of knowledge in pharmaceutical chemistry, pharmaceutical technology, pharmacognosy, pharmacology in a certain educational situation in management and economics of pharmacy. For example, on case studies on pharmaceutical examination of recipes or the organization of pharmaceutical dispensing etc. Practice takes about 20 % of academic hours of curriculum. On the first year there is a propaedeutic practice on management and economics of pharmacy and pharmaceutical technology where students get acquainted with a drugstore. Practice on botany is conducted on the second year. On a third year practice on the first pre-medical help in hospital is conducted. The main task for training in pharmacy on the fourth and fifth year is adaptation to professional work and fastening of the practical skills received on classes. This practice is conducted on separate disciplines: pharmaceutical technology, pharmaceutical chemistry, management and pharmacy economics. At the same time students-probationers should solve multisubject problem. Besides, the State exam is constructed on the basis of the multisubject approach - testing and interview on a profession "pharmacy". Therefore, it is important to form polysubject thinking at students at university (while it is probably only during training in pharmacy). For an establishment of intersubject interaction between fundamental and special disciplines is carried out analysis and updating of the contents of the basic educational curriculum for pharmacists. Thus, improvement of pharmaceutical education at university is directed on overcoming of gaps between



subjects' teaching and a multisubject estimation of total results of education and also the contents of professional competencies.



Student's autoevaluation in General Chemistry.

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Over the last decade, lifelong learning has come to be seen as a cross-cutting issue, inherent in all Bologna educational directives. Specifically over the last two years, we have gained an appreciation of how Bologna's "tools" can support learning: tools such as learning outcomes, credit-based curricula, national qualification frameworks, recognition of prior learning including informal and non-formal learning, and flexible learning pathways. The modern professor should be regarded more as a facilitator than the sole source of knowledge - a student is never just an empty vessel to be filled with information. Learning is not a spectator sport. Based on this idea, we have developed and successfully tested a computer application program in order to involve students in their own assessment. It has been designed for first year "General Chemistry" Pharmacy students. The program developed centers around:

- Participation and joint responsibility of students in the evaluation of the subject.
- Search and wording of questions, covering the entire subject syllabus.
- Objective assessment system: 3 responses with only 1 real answer.
- Immediate possibility of consulting error test score.
- The ability to repeat the test for an average of the 2 best scores.
- Walk-through times, types and global-response profiles and quartiles of qualification.

To carry out the evaluation, the student, after having been identified with the pin that is assigned, answers 50 questions. The student is allotted one minute for each question that has been randomly selected from the question database which currently consists of 1000 questions that are updated annually. Selecting questions for tests requires knowing content subject and managing bibliographic material in order to separate the key points from the others. The computer system selects questions at random and juggles 3 responses weighted by chapters, previously chosen by the teacher. A history file customizes each student's exams based on their successes/failures while allowing them to review their mistakes. Once the test is finished, the program assesses the student from 1 to 10 points and depending on the score obtained, it allows them to revise their mistakes showing them the correct answer and the wrong one (grade from 7 to 10), the wrong answer only (grade from 5 to 7), the wrong question without answers (grade from 3 to 5) or it indicates that he/she should study more and it doesn't show him anything (grade below 3). To avoid



continuous repetitions on the same day of the tests, one test can only be done twice at a minimum of 6-day intervals. Software application support allows the teacher to evaluate the behavior of students during testing to improve their teaching. The students want to pass; we want them to learn; we come to a compromise in which learning ensures passing situation.

**The pharmacy model is changing from a package-service to a service-package:
are community pharmacists and academia working together to develop the
European pharmacist?**

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Purpose: The aims of this international study were to identify if and how community pharmacists assess patient adherence to prescribed medication for long-term conditions (asthma), and to identify if and how they intervene to increase adherence to these medications; to explore community pharmacists role in relation to ensuring best use of medicines. **Background:** About 50 percent of patients typically take their medicines as prescribed and poor adherence rates are recognized as “a worldwide problem of striking magnitude” (WHO, 2001). Anti-asthmatic prescription drugs account for €3.6 billion in Europe. The cost of patient non-adherence is therefore approximately €1.8 billion. MURs (medicine use reviews) is a clinical service provided by community pharmacists in the UK, the aim of which is to improve patient adherence. An equivalent service to MURs is not yet in place in either Italy or Switzerland. **Method:** An 11-item on line survey was used as the research instrument. The survey was distributed to pharmacists via email: 370 UK, 101 Italy, and 38 Switzerland. The survey had three language options: English, French and Italian. **Results:** 317 (86%), 28(76%) and 52(52%) of pharmacists from the UK, Switzerland and Italy, respectively, correctly identified the meaning of adherence. MURs were recognised as the second most common approach in the UK. A relationship was found between the country of work and method of identifying non adherence ($p < 0.05$). The first approach chosen by pharmacist in order to identify patient non adherence was: 275 (UK) talking to patients, 62 (Italy) patient queries, 25 (Swiss) PMR. Pharmacists from all three countries intervened to improve adherence. However, again a significant relationship ($p < 0.001$) was observed between the country of practice and the type of intervention. UK pharmacists favoured review of patients’ inhaler technique whereas Swiss and Italian Pharmacists re-iterated the purpose of the medicine. **Discussion:** The online survey showed differences in approach to addressing issues of patient adherence between European countries. However all pharmacists, irrespective of their country of practice, considered adherence and intervened to improve it. This study emphasized a significant correlation between pharmacist’s responsibility and



medication usage ($p < 0.001$). It provides insight into the different approaches to providing pharmacy services on a continuum between the package service and service package approach. By undertaking comparative studies the strengths of each country service can be identified and developed to achieve the optimal European community pharmacy model. Joint educational and practitioner initiatives are needed to harmonise community pharmacy services in order to achieve best care for patients. The willingness to create a European Standard for community pharmacists will be one of the major drives for the years to come because European Patients deserve European Pharmacists.

Designing a new pharmacy degree program: a focus on pharmaceutical care practice

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Any health care profession (medicine, nursing, odontology...) agrees on a commonly understood philosophy of practice, which constitutes their professional mission and the focus of their respective university education curricula. In the case of pharmacy, pharmaceutical care is becoming the new paradigm of practice worldwide. The new Pharmacy Degree program at Universidad San Jorge (Spain) has been designed considering these premises, in connection with the main European and international guidelines and streams of professional renewal. The intellectual, social, personal and professional needs of a student that will become a pharmacist in a few years time -in a context of profound renewal, collective reflection and unavoidable change- have been thoroughly reviewed. Specifically, the implemented changes stem from considering pharmaceutical care not as an isolated course inside the curriculum, nor as a specialization. Rather, pharmaceutical care has been accepted as the generalist professional mission for the future generation of pharmacists and, therefore, the focus of the curricular program. In practice, pharmaceutical care as the focus of the new Pharmacy Degree program translates in the following: 1. Pharmaceutical care as a basic subject: - Pharmaceutical Care I (first year, 6 ECTS): philosophy of practice, patient care process, practice management (documentation, assessment, quality, communication skills). - Pharmaceutical Care II (third year, 6 ECTS): practice with real patients and review of pharmacotherapy based on patient cases. - Pharmaceutical Care III (fourth year, 6 ECTS): practice with real patients and review of pharmacotherapy based on patient cases. - Practicum (fifth year, 24 ECTS) 2. Pharmaceutical care as the focus of the curriculum: - Group meetings among the professors (creating the "culture") - Student exchange programs with other Universities 3. Promote the implementation of pharmaceutical care in the professional environment: - Applied research - Collaboration with institutions and professional associations - Involving professionals in the education process (at degree, master and doctorate levels) The new Pharmacy Degree program at Universidad San Jorge started in 2008-2009. Designing a degree program from



scratch constitutes a unique opportunity -and a great responsibility- to implement a pharmacy curriculum that will match the needs of the next generation of practitioners. Therefore, at this stage of the development of the curriculum, all discussions among practitioners, students and academia from other universities are key for the process of shaping the required content and course alignment to build the best possible curriculum, in the greatest interest of our students and their future patients.



Multidisciplinary and Interdisciplinary Aspects of Pharmacists Training in Riga Stradins University

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Community pharmacy, hospital pharmacy, scientific pharmacy, pharmacists training system, as well as assessment of forensic medicine need specialists of great erudition, with good practical skills in pharmaceutical and medicinal chemistry, analytical toxicology, plant and animal biology, pharmacognosy, technology of dosage forms, practical pharmacy, pharmaceutical care, pharmaceutical legislation, microbiology, biochemistry, physiology, pharmacotherapy, phytopharmacy, pharmaceutical information and so on. The study programmes for students of Faculty of Pharmacy of Riga Stradins University (RSU) for obtaining of theoretical training and practical experience are multidisciplinary and interdisciplinary. During the five academic years students have to study 38 obligatory subjects and 29 optional subjects, out of which chemical subjects are 16,92%, medicinal subjects - 29,23%, pharmaceutical subjects - 36,93%, general education subjects – 16,92%. Implementation of multidisciplinary study programme for training pharmacists as a part of the health team is connected with interdisciplinary theoretical education, laboratory training and practical skills obtained during practice in community pharmacies, hospital pharmacies and chemical laboratories of Institute of Organic Synthesis and medicines manufacturers in Latvia. The study programme subjects of Faculty of Pharmacy of RSU are arranged in a logical sequence to develop interdisciplinary net between chemical subjects, subjects connected with herbals, technological subjects, medical subjects and subjects of different others branches. Interdisciplinary approach to pharmacy education helps students to better understand the meaning of multidisciplinary study programme in the study process during the five academic years.

Safety Sciences for Medicines Training Programme.

Project of an European Masterate.

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Project intends to develop a theoretical and practical training program ascending from in silico to in vitro, to in vivo on animal, and to in vivo on human in the European Academy of Drug Research which is intended to set up by Innovative Medicine Initiative. As a new approach, the research and training programs will try to add to usual toxicological programs some mathematical – biostatistics tools to Analyze, Correlate, Model, Predict and Validate - ("ACMPV" approach), in the estimation of effects at a higher level starting from data accumulated at inferior levels. Consortium includes as partners European Center for Validation of Alternative Methods (ECVAM), International Federation of Pharmacy (FIP), Université de la Méditerranée, University of Copenhagen, Faculty of Pharmaceutical Sciences, Ominis Research Ltd., Institute of Neurobiology, Bulgarian Academy of Sciences, University of Oslo, Medicinski fakultet Univerzitet u Novom Sadu, University of Oulu. Almost all partners cooperated from long time in the frame of European COST actions and Ispra Joint Research Center. Correlation and validation of in vitro methods alternative to in animals methods would be considered starting from ECVAM standard modular approach. In vivo results on animals and in vivo human results will be correlated based on concepts of physiological pharmacokinetics starting from Action COSTB 25 ("Physiological based Pharmacokinetics and Dynamics") experience. Quantitative structure – pharmacokinetics, activity and toxicity relationships will be based on global, molecular physico-chemical, on presumed concentrations at site of action in living body and pharmacokinetic-pharmacodynamics coupling models. Prediction of pharmacokinetics will be based on physicochemical properties, Biopharmaceutical Classification System (BCS) and Biopharmaceutical Drug Disposition System (BDDS). As another new field proposed to be included in safety science the authors consider also nanotoxicology and more general colloid toxicology, connected with increased use of active substances in colloid forms or embedded in colloid vectors in order to increase the bioavailability of poorly soluble drugs. Key persons in project have double specializations: pharmacy and chemistry,



pharmacy and mathematics, pharmacology and clinical toxicology, pharmacokinetics and pharmaceutical medicine etc., working in the same time in universities and research units, or industry, or hospitals.

The Role and Place of Pharmaceutical Care in the Education Program at the Faculty of Pharmacy of the Medical University of Silesia in Poland

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The pharmacy practice continuously evolves, changing from a historical emphasis on the preparation and dispensing of drug products to new activities and responsibilities that focus on the optimal, safe and cost-effective pharmacotherapy. Nowadays to realize the mission of pharmacy practice, the pharmacist must be able to provide pharmaceutical care service for chronically ill outpatients. This service remains an integrated part of proper and effective treatment process. From the professionalism and competence of pharmacists, therefore, often depends on whether the patient will take personal responsibility for their own health. Pharmacists from the public pharmacies are required to provide advice on medical problems that not require medical intervention. Such advice is extremely responsible and demanding extensive content-related knowledge. Therefore, new demands and expectations of society to pharmacy practice necessitate a concurrent change in the pharmacy education requirements. Pharmaceutical care and clinical pharmacy are emphasized as a key field in the didactic program realized at Faculty of Pharmacy at the Medical University of Silesia in Poland. The "Practical pharmacy" course dedicated for five-year pharmacy students is designed to enable students to develop and practice skills needed to professional implementation of pharmaceutical care in a variety of practice setting. Students develop their interpersonal communication skills and learn how to prepare and monitor pharmaceutical care plans and provide patients counseling. The pharmaceutical care training program in hypertension and type 2 diabetes (FONTiC) provide a real experience, which prepare future pharmacists to implement as asses pharmacotherapy in order to optimize therapeutic outcomes. This model of pharmaceutical care project include teaching pharmacy students' how to collect information about patient and prescribed and used drugs, how evaluate patients' knowledge about the disease, how document the problems found, monitor drug therapy and implement health promotion program or activity. To provide professional pharmaceutical care practice pharmacists should have the knowledge needed to interpretation of all tests carried out on the samples from the human



body in connection with diagnosis initial and follow-up treatment. Therefore, current University program contains the course "Diagnostic aspects of the pharmaceutical care", which acquaints fourth- year students of pharmacy with the achievements of medical sciences in the field of laboratory diagnostics of civilization illnesses and explores the pathological mechanisms that may produce changes of the measured level of analytes. During this course student develops skills of critical evaluation and interpretation of data derived from laboratory measurements. In summary, new requirements concerning the role of pharmacists in health care system make necessary to adopt the model of education to the needs of modern medical system

Physician – pharmacist – student; interdisciplinary synergy

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The introduction In order to maximize the benefits of interdisciplinary approach to patient care and to prepare students for multidisciplinary thinking necessary for any future pharmacist, the Faculty of Pharmacy in Brno cooperates with The University Hospital Brno. The framework of such cooperation is enabled by a Clinical Pharmacology course (recommended in the fifth year of study). The course Clinical pharmacology is an interdisciplinary domain, integrating experimental pharmacology with clinical and paraclinical disciplines. It studies and objectively evaluates the effect of drugs on both healthy and ill humans. The aim of the course is to facilitate efficient pharmacotherapy in hospitals and in the field and using cost-effective evaluation to minimize side effect of drugs, drug overuse. During the theoretical part of the course, physicians from clinical departments of The University Hospital Brno, Children's Hospital and the Merciful Brothers' Municipal Hospital give lectures on various topics from the area of clinical pharmacy and pharmacology. In the practical part, students visit clinical department of the hospital, switching departments every day for a week. They take part in patient evaluation and discuss treatment rationalization with a clinical pharmacist. The focus The focus of the course is on - providing new stimuli for studying pharmacogenomics, biotransformations and experimental interactions - studying pharmacokinetic specifications for individualized pharmacotherapy - observing the variability of drug response, compliance, adverse reaction and clinically important interaction - studying the data from pharmacoepidemiological studies - harmonizing rational drug prescription, analysing and regulating drug consumption, reducing drug overuse and evaluating cost-efficiency The feedback Every year, students use an online form to anonymously evaluate courses and teachers. This is what they had to say about the interdisciplinary course: "The internship was very helpful, giving us an opportunity to get to know clinical departments. I wish it were longer." "This was the best way to learn about the human body. The opportunity to discuss issues with a practicing expert was invaluable". "The course is what I imagine the future of Pharmacy to be. Another step could be starting a course together with students of Medicine."

Qualified Person Learning Programme Development: An Example of the Tempus Joint Project Activity

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The role of Qualified Person (QP) is a pivotal one in Quality Assurance within the pharmaceutical industry. The competences required are usually achieved through work experience and more formal forms of learning, such as postgraduate MSc and/or relevant short-term courses. The aim of this work is to provide an example of an outcomes-based interactive approach to curriculum development performed through an international joint-project collaboration activity. Duties of QP in the pharmaceutical sector in Serbia used to be performed by expert pharmacists with the relevant industrial experience and a Postgraduate Specialization Degree in Drug Analysis and Quality Control. However, it has been recognized that the learning needs of QPs should be extended to include knowledge of drug formulation and manufacturing processes. Taking into account the pre-accession status of Serbia, harmonization with EU practice and policies has been emphasized. In particular, compliance with EU directives 2001/82/EC and 2001/83/EC, which detail the role of, and academic qualifications required by a QP will be necessary. In order to respond to this need which has been highlighted within the sector, the Faculty of Pharmacy, University of Belgrade (FP) took responsibility for establishing the relevant postgraduate course, and set this as one of the priorities of the current Tempus PQPharm Project. An outcomes-based active learning approach to curriculum development and delivery has been devised with five elemental steps involving identification of learning needs, content design, learning activities planning, assessment and feedback. Identification of learning needs and the desired learning outcomes was established through the collaborative efforts of the FP academic staff and experts from the Ministry of Health, Drug Agency and Pharmaceutical Manufacturers Group Council. Relevant curricula from a number of EU Universities have been examined and a number of brainstorming sessions held in order to design the appropriate educational content. Modular curriculum design has been accepted with a number of core and elective modules. Common modules have been



identified linking the existing postgraduate courses. Curriculum content, learning and assessment activities will be designed through the intensive collaboration and exchange with Trinity College Dublin, University of Greenwich and University of Ljubljana. Academic staff and industrial pharmacy professionals will work together to design flexible learning materials, activities and resources in their area of expertise. Pilot course implementation is planned and is expected to provide valuable feedback that will contribute to refinement of the proposed curriculum.

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The System of the Postgraduate Pharmaceutical Education In Ukraine

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The formation of Ukraine as the modern independent state is accompanied by the significant social and economical changes. The stages of education as well as the opinions about their content are changing, the national standards of education as the complexes of the interrelated normative documents are introduced, the system of the attestation of the specialists' is reformed, and the certification based on the results of the state attestation is introduced. It is well known that the continuous education is the substantial element of the European Higher Education Area. The conception of the development of the higher pharmaceutical postgraduate education according to the principles of the Bologna process should be based on the world experience of the specialists' training and on the modern positive achievements of the educational systems. The postgraduate education of pharmacy specialists should be carried out through the introduction of the new methodology of the educational process according to the ECTS and should be based on the educational professional programmes that correspond to the International Standard Classification of Education, International Standard Classification of Occupations, State Classifier of Occupations and State Classifier of the Economical Activities. Such changes will ensure qualitative professional changes for the future pharmacy specialists. The programme of the development of the pharmaceutical postgraduate education should be based on its conception and the main principles such as:) The reform of the post graduate education management, the increasing of the role of the professional associations.) The renovation of the system of standards of the postgraduate education (vs. educational professional characteristics and programmes, the methods of certification by each specialty) and new sectoral normative base of the postgraduate education.) The reform of the postgraduate education content according to the European and world requirements.) The optimization of the internship, of the specialization, of the thematic courses and preattestation courses for the bachelors and masters degree holders, their harmonization with the European and world requirements as well as the training and professional skills improvement of the academic staff of the higher education establishments.) The restructurization of the specialists training, the forming of the perspective plans of the specialists training concerning the new actual fields of medicine and pharmacy.



‖ The monitoring and the attestation of the specialists according to the system of the credits, modules and ratings. Thus, the continuous postgraduate education of the bachelors and masters of pharmacy is the system of the different interrelated aspects and forms of education which are conducted during whole period of their professional activity. This system ensures constant maintenance and improvement of the qualification and the perfection of the professional skills.

Biopharmaceutical Investigations and Interdisciplinary Aspects of Pharmacy Education

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The goal of pharmaceutical chemistry is to support the availability of safe, effective, good-quality pharmaceutical care. That is why it is important to provide not only an excellent opportunity of drug control quality using modern analytical methods, but also to know the mechanisms of biological activities including different aspects of drug biotransformation. Biopharmaceutical investigations as the part of pharmaceutical chemistry are in the centre of basic and special pharmaceutical disciplines: pharmacology, toxicological chemistry, microbiology, biochemistry and etc. The therapeutic drug monitoring and biokinetic models with the complete laboratory check-up (creatinine, urea, leucocytes, cholesterine, ALT, LDG, AST, bilirubin, essential macro- and microelements level) may be used to estimate the efficacy and safe of pharmacotherapy of new and generic drugs with low therapeutic index (cyclosporine after allograft kidney transplantation, gemcitabine for patients with pancreatic cancer, methotrexate and its antidote calcium folinate for children with osteosarcoma). Kinetic parameters (rate constants, half-times of restoration and extreme values of drug concentration at the beginning of infusion) allowed to set the optimum time interval between infusions of drugs for minimization of toxic effects. Kinetics of drug-induced death of *Spirostomum ambigua* can be described similarly to ligand-enzyme interaction, including fast reversible binding of the ligand and slow transformations of the ligand-cell complex according to Arrhenius temperature dependence, it have been shown using another aspect of biokinetic findings . This method has been used for the research of action on different modelling test-cultures and pharmaceutical and chemical substances, for example, aminoacids and zinc ions. The activation energy of the ligand-induced process of cell death can be strict characteristic of the substance and may be used for its identification. The specified kinetic scheme of cell-ligand interaction has allowed to describe complex processes, for example, occurrence of drug resistance of tuberculosis mycobacterium. It has been shown, also, that waters of the internal seas render toxic influence on a cellular biosensor. The analysis of water supramolecular structure can serve the express train-estimation of water quality that is important for application in the medical purposes. The molecular-genetic



analysis of epidemic strains of influenza A viruses subtypes H1 and H3 which isolated at the Russian Federation in 1995–2007 has been detected of different Remantadine-sensitivity. Sequencing of the M2 genes for 15 influenza A(H3N2) and 17 - A(H1N1) epidemic strains has been detect the S31N substitution early known as marker of Rimantadine-resistant strains and new additional mutation, which may be considered as new markers for the identification of strains resistant to Remantadine.



Interaction of Pharmacy and Medical Students for Training Interdisciplinary Team Cooperation and Mastering Professional Skills in Clinical Pharmacy as An Attractive and Stimulative Part of Pharmacy Education

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Completeness of pharmacist's education requires mastering of the fundamentals of natural ("hard") sciences such as chemistry, biology and physics as well as attaining special skills, namely (beside the classical pharmaceutical profile disciplines) the art of emphatic communication with patients. It does not mean merely to dispense the medicine but to be able to discuss with the patient his/her problems, to recommend appropriate medication, to draw patient's attention to likely complications (including adverse effects of the drug) and to point out possible interactions of the active principle with other drugs, nutritional supplements or common food components. Needless to say, future pharmacists learn to master such skills and manage to apply them in real contact with the patient at school under the supervision of experienced pharmacists, psychologists and other experts in "pharmaceutical care". In accordance with the idea of "learning through playing" ("schola ludus") promoted by famous European educationalist of Czech origin J. A. Comenius as early as in the 17th century, Faculty of Pharmacy in Hradec Králové started to organize a students' contest in dispensation skills. Any student of pharmacy participating in the contest has to meet model situations bringing him/her into contact with patients acting in various moods. The patients may be affable as well as in bad mood, discourteous or not willing to cooperate. Hence the students learn to react properly to situations and problems that they will definitely have to solve in their professional life. The contestant's behaviour and activity is video-taped and assessed by a jury of experts. The opinion of the jury is conveyed to the student, his/her mistakes are discussed and proper solutions are commended. Moreover, the recorded scenes serve as study material in the seminar classes of all pharmacy students in the subject of Social interaction and communication. The contest used to take place in the Czech Republic at national level each year but in 2010 it was organized as international contest of qualified Czech and Slovak students of pharmacy. Recently the idea was further enhanced through the initiative of our students and a new contest – contest in clinical skills – was established. This contest brings together students of pharmacy and students of medicine. Its objective is to train team collaboration of a future pharmacist with a



future physician. These two students suggest and evaluate together the therapy of real hospitalized patients. Because of ethical regulations the students cannot communicate directly at the patient's bed but complete case history of the patient is at their disposal. The aim is to demonstrate to the students of both healthcare professions the benefits of mutual cooperation since it is clear and often evidenced in real life that thinking of physician and pharmacist is sometimes different while their mutual communication may bring real benefit to the patients.

Interdisciplinary Connections in the Developement of Educational Standards for Pharmacy Students

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Recently in Ukraine pharmaceutical education can be got in colleges (junior specialist – pharmacist) and in a university (specialist – provisor). The college of the National University of pharmacy prepares junior specialists for all pharmaceutical industry on specialities “Pharmacy”, “Analytical control of chemical medicinal compounds”, “Production of pharmaceutical preparations”. On the instructions of Ministry of education and science of Ukraine we took part in development of industry standards of higher education for these specialities. Standard includes educational qualifying description (EQD), educational professional program (EPP) and means of diagnostics. During development of educational qualifying description (EQD) we analyzed the existent circle of position requirements, professional abilities and skills which allow executing a certain function of graduating students on existing workplaces according to their qualification. Next constituent of standards of education is the educational professional program (EPP) which exposes by what disciplines and in what volume EQD is provided. Here very expressly and interdisciplinary connections, interdisciplinary integration and sequence, appear clear. During the preparation of junior specialists in pharmacy the short cycle of teaching is used in a college. In the conditions of deficit of educational time value of interdisciplinary connections increases. The logically lined up the sequence of study of discipline promotes to increase of level of knowledge which were got, abilities and professional competence. The presence of a few associate chains in the structural-logical chart of teaching of pharmacist determines the order of the stages of «increase of knowledge»: a) anatomy, physiology, bases of medicinal knowledge, pharmacology; b) general, inorganic, organic, analytical, pharmaceutical chemistry. Compactness of discipline due to interdisciplinary integration: anatomy with bases of physiology, bases of medical knowledge, organization and economics of pharmacy. A large significance is attached for the practical teaching. Practice allows student to connect and filter all complex of necessary knowledge, abilities and competences in the conditions of maximal close to activity of specialist. According to the standard of education State attestation of graduating students takes place as a complex interdisciplinary examination on core



disciplines. On speciality «Production of pharmaceutical preparations» defence of a thesis of diploma project takes place. Graduating students demonstrate ability of complex application of knowledge, their synthesis, and understanding of tasks which decides on concrete workplaces due to qualification which is got. Thus method of development of education standards of the direction «Pharmacy» for junior specialists orients teaching on practice and interdisciplinary co-operations. They are modern basic resources of upgrading of the quality of education.



A new approach to curricular internship period of the Portuguese Pharmacy Master Degree: a survey to pre-graduate students of the University of Coimbra

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Under the scope of a rational planning of the next academic year (2010/2011) in the Faculty of Pharmacy of Coimbra University, a survey was performed to assess the expectations of pre-graduate students for the curricular internship of the Master in Pharmaceutical Sciences. A total of 120 surveys was validated which represent 85% of the students population that will presumably do the curricular internship during the next academic year. The obtained data clearly demonstrated the student's desires to perform a curricular supplementary internship in other professional field than Community and/or Hospital Pharmacy. The preferred areas were Pharmaceutical Industry, Scientific Research and Clinical Analysis. Furthermore, 87 respondents would like to go abroad temporarily to complement the internship, mainly in the fields of Scientific Research (56) or Hospital Pharmacy (30). In conclusion it can be considered that the results demonstrate that the pre-graduate students of the Faculty of Pharmacy of the University of Coimbra are prepared to participate in an innovative internship model. On the other hand, the internationalization of the course will contribute to promote the Master Pharmaceutical Sciences degree within the recent adaptation of the degree in Pharmacy to the European Higher Education Area.



Master of Pharmacy in Utrecht, the Netherlands: Product, patient or both?

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The pharmacy curriculum in Utrecht (the Netherlands) has a full bachelor master structure. The 3-year bachelor programme lays a broad foundation of natural sciences and academic skills. In the 3-year master programme students are prepared for pharmacy practice while their scientific skills are further extended. The master programme consists of three parts: 1) two years of obligatory and elective courses; 2) a 6-months' research project; 3) six months of practical training in community and hospital pharmacies. In addition, groups of 5 students have to run a virtual pharmacy during four weeks and can opt for a 5-week training in another institution. Students are trained 1) to develop and formulate new drugs (product oriented) 2) to act as clinical pharmacological experts involved in drug safety and pharmaceutical patient care (patient oriented). All courses are problem based and use representative material from pharmacy practice. The programme is divided into three phases with obligatory courses in phase I and III and electives in phase II. During phase I all students spend 15 weeks on drug compounding and quality control of compounded preparations and 15 weeks on disease management, drug interactions, pharmacokinetics, methodology of clinical research, and communication with patients and prescribers. In phase II students can choose product- or patient-oriented subjects. We designed eight different 5-week elective courses. The courses with a product-related profile are Analytical chemistry, Pediatric product formulation, Drug development (including industrial production of drugs) and Pharmaceutical biotechnology. The courses with a patient-related profile are Cardiovascular pharmacotherapy, Pharmacotherapy of the central nervous system, Clinical pharmacotherapy (including clinical toxicology, clinical chemistry) and Evidence based medicine (including regulatory affairs). Each patient-oriented course is scheduled in parallel to a product-oriented course, enabling students to choose for a full product or patient profile or for a path combining aspects of both profiles. In phase III all students are brought back together in a 10-week project-based course Integrated pharmacy in which elements from the drug and patient profiles are combined. In this course students have to take care for a virtual patient suffering from cancer with increasingly complex therapeutic and product related problems. By designing a master programme consisting of both obligatory and elective courses we hope to prepare our students for an increasingly



diverse work environment. The distinction between a product- and a patient-oriented profile gives students the possibility to follow their own interest within the confines of a general pharmacist's license.

Development of point-of-care testing skills

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Introduction: Point-of-care testing involves the use of medical devices to carry out diagnostic testing in a community or hospital setting that takes place away from the conventional laboratory but next to the patient. Point-of-care testing can be provided by pharmacists enabling the pharmacist to participate in rapid response to acute symptom presentations and in chronic disease management. The aim was to provide the skills to pharmacy students that are necessary for the development of point-of-care services. Method: Within the pharmacy practice module, students are first introduced to the concept of point-of-care testing and to various medical devices that could be used namely blood glucose measuring equipment and blood cholesterol meters. Subsequently the application of point-of-care testing when responding to minor symptoms and during chronic disease (diabetes, cardiovascular disease) monitoring is elaborated upon. In addition some students are assigned to projects involving the implementation of point-of-care programmes in community or hospital setting. Results: The department of pharmacy of the University of Malta has developed a Point-of-Care laboratory which includes a Coaguchek S meter (for measuring prothrombin time in patients receiving warfarin), DCA 2000 HbA_{1c} analyzer, Ultimed Helicobacter pylori kit, Bayer Contour blood glucose meter, Bionime GM 550 blood glucose meter and the Accu-Chek cholesterol meter. Students participated in projects for the implementation of point-of-care testing of: INR monitoring in 70 patients attending community pharmacies and 60 patients attending a hospital anticoagulant clinic, HbA_{1c} testing in 50 patients attending a community pharmacy where HbA_{1c} was monitored over 6 months with three readings (time 0, 3 months, 6 months) and the use of Helicobacter pylori serology test kit in 17 patients presenting at a community pharmacy with symptoms of dyspepsia. Conclusion: By exposing students to different devices adopted in point-of-care testing and to the implementation process in community and hospital pharmacy settings, pharmacy graduates acquire skills necessary for the provision of the service.

Integrated, interprofessional education for first year undergraduate medical, physiotherapy and pharmacy students

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Background The World Health Organisation envisaged the introduction of Interprofessional Education (IPE) as a continuum, beginning early in undergraduate programmes. (WHO, 1998) Positive outcomes have been demonstrated at undergraduate level in relation to learning experiences, skill acquisition and changes in attitudes. IPE is used increasingly at early stages in students' professional development with the aims of developing teamworking skills and dispelling stereotypes. Research is required to determine how best to design IPE to overcome pre-existing role stereotypes which are formed before students embark on their undergraduate training. **Summary of work** A formal, compulsory, IPE learning opportunity was introduced for medicine, physiotherapy and pharmacy students. The module (5 ECTS), entitled "Medicines: Concept to Patient", aimed to explore the multi-faceted nature of healthcare from first principles of drug design through to patient care and was designed to allow students to begin to appreciate the role of the various healthcare professionals. Aspirin was chosen as the integrating strand throughout the module to provide context. Lectures, integrated clinical cases, quizzes and exercises were delivered. A mixed methods study, controlled before and after study and qualitative evaluation, was undertaken. The students were surveyed at the beginning of the module and again at the end. Third year students had not undertaken any IPE and so were surveyed to provide the control. The Readiness for Interprofessional Learning Scale (RIPLS) was used to determine if there was evidence of changing attitudes to IPE. The Attitudes of Health Professionals Questionnaire (AHPQ) was also used to assess interprofessional attitudes. The study was approved by the Research and Ethics Committee of the Royal College of Surgeons in Ireland. **Summary of results** The intervention did not significantly alter the attitudes of the students to IPE or other healthcare professionals. The study did, however, demonstrate that students had a statistically significant improved appreciation of their future professional roles. Students were generally positive about learning together, recognising that such collaboration would be beneficial to the care of patients. **Conclusions** IPE may have the potential to improve collaboration amongst healthcare professionals, but further research is required to determine how best to design IPE and when best to



deliver it. References World Health Organisation.(1988) Learning together to work together for health. Geneva, WHO

New insights on Pharmacy education in Turkey

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Ankara University Faculty of Pharmacy is Turkey's first Faculty of Pharmacy was established in 1960. Since 2005-2006 academic years, Pharmacy Education in Turkey has been reorganized as 5 year education. For this reason, new curriculum is applied to 1st (Semesters 1-2) and 2nd (Semesters 3-4) graduate students until they graduate, on the other hand previous curriculum is applied to 3rd (Semesters 5-6) and 4th (Semesters 7-8) graduate students until they graduate. The new curriculum is prepared under three divisions namely Division of Basic Pharmaceutical Sciences, Division of Pharmaceutical Technology and Division of Professional Sciences of Pharmacy. Also Clinical Biochemistry and many elective courses are added to the programme. Pharmacy education with new trends is carried out with a staff of 53 professors, 10 associated professors, 5 assistant professor, and 46 teaching assistants, 2 specialists. At present approximately 600 undergraduate, over 140 masters and 60 PhD students are being trained at the Faculty of Pharmacy of Ankara. The new 5 year pharmacy curriculum is planned to produce pharmacists who have all the skills which are necessary to achieve following outcomes: • Providing pharmaceutical care to patients • Developing and managing medication distribution • Managing the pharmacy • Supporting public health • Offering drug information and education These courses are designed to give a background to students with the many skilled processes used in pharmacy, to initiate the different forms of medicines, and to teach them how to dispense medication accurately and skillfully. Pharmacy practice is that area within the pharmacy curriculum which deals with patient care, placing an emphasis on drug therapy. Pharmacy practice gives a patient-oriented approach. With new education system, Ankara University Faculty of Pharmacy is keeping up the developed links and the student exchange within the Lifelong Learning Erasmus Programme programme with Universidad Complutense de Madrid, Vrije Universiteit Brussel, Università Degli Studi di Torino, Catania, Parma, Calabria, Messina, University of Veterinary and Pharmaceutical Science, Brno and Medical University of Gdansk.

Multidisciplinary approach to pharmacy master studies at the University of Tartu, Estonia

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At the University of Tartu the pharmacy master studies have been organized according to the course system where a student passes the subjects in a strict order provided by the curriculum. The curriculum consists of theoretical studies, traineeship and independent research work. The subjects in the theoretical programme are divided into obligatory, elective and optional subjects. Traineeship is arranged during the fifth year of studies at community and hospital pharmacies. The basic course terminates with the defence of the research paper and a final examination. The pharmacy master studies in Estonia could be classified as pharmaceutical product based with medical approach studies. Through five years of studies there could be followed four different interdisciplinary flow charts: medical subjects; drug design and pharmaceutical technology; drug analysis and social pharmacy. Medical subjects Starting with basic disciplines as anatomy, human physiology, medical microbiology and pathophysiology, on the second year primary care medicine has been introduced to increase the professional competency of future pharmacists working at community pharmacy. To support knowledge in clinical pharmacy, principles of laboratory medicine on the third year and immunology, drug toxicology and clinical pharmacology on the fourth year of pharmacy master studies have been taught. Described courses have been given by different departments within the Medical Faculty of the University of Tartu. Drug design and pharmaceutical technology Starting with course of pharmaceutical excipients on the second year of pharmacy studies this flow chart continues with pharmaceutical technology disciplines and physical pharmacy and biopharmacy on the third and fourth year respectively. All of described courses are taught by the staff of Department of Pharmacy. Drug analysis The current flow chart is provisionally divided into analysis of synthetic and natural substances. In the first category the studies start with general, inorganic and analytical chemistry followed by pharmaceutical chemistry course on the third year of studies. "Natural" flow chart starts with introduction to botany on the first year followed by pharmacognosy and phytochemistry on the third year of studies. The described courses are given by the teaching staff of Department of Pharmacy and in



cooperation with Faculty of Science and Technology. Social pharmacy Current flow chart consists of several different courses starting with pharmaceutical terminology, pharmacy history and Latin in pharmacy on the first year followed by bioethics on the second, pharmacoepidemiology and pharmacoeconomics and social pharmacy and drug safety on the fourth year of pharmacy master studies. In the teaching of current courses several different institutions e.g. State Agency of Medicines as well as different departments of Medical Faculty are involved.

Assessment of Pharmacy Curriculum at Faculty of Pharmacy in Belgrade before Bologna Declaration by employers

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Objective: The purpose of this study was to investigate the estimation of employers in different pharmacy branches (predominantly community pharmacy) in order to evaluate our curriculum established in 1991, which was not in the line of Bologna Declaration. **Design:** The question form was sent to employers addresses by mail. The level of theoretical, practical and organizations skills acquired at Faculty of Pharmacy were evaluated, as well as the personal motivation and individual ambitions of pharmacist who graduated after 1996. Evaluation was achieved by marks from one to five, as well as with descriptive comments from employers. **Participants:** Forty six community pharmacies, six hospital pharmacies, five drug sale companies, and three institutes were included in the investigations. In total, 458 pharmacists were verified. **Results:** The average value of marks was 4.67 for theoretical skills, 4.06 for practical skills, 3.88 for organizations skills, 4.43 for personal motivation for work and 4.72 for individual ambition for continuing education. The whole average mark was 4.46 (out of 5.00). **Discussions:** The lowest mark pharmacists got for their practical and organizations skills. The difference in the average marks for theoretical and practical skills was also pointed out through employers' observations. Many comments refer to the disagreement in very high theoretical knowledge gained during schooling and significantly lower practical and organization skills. Several employers remarks emphasize that pharmacists have more theoretical knowledge that is really necessary for working in community pharmacy. The highest mark gained for individual ambition for continuing education and specialisation is not surprising, since the great number of pharmacists attend courses organised by Pharmaceutical Chamber, Pharmaceutical Society or Faculty of Pharmacy. **Conclusion:** Although the very high average mark was gained and the employers are very satisfy with quality of pharmacists who graduated at Faculty of Pharmacy in Belgrade, it is evident that pharmacists should be more prepared for practical work. We hope that new curriculum establish in 2006, which is completely in line with Bologna Declaration, will enable better practical education for students.