Education in Pharmacy
Purposes, knowledge and identities

Pharmacy facts
- Pharmaceutical sciences are in biomedical sciences.
- Faculties of pharmacy are in biomedicine, among biomedical faculties.
- Physician, nurse and pharmacist are key health professionals – without them health care can not be delivered.

Thinking about...
Where we were in the past?
Where are we now?
Where are we going?
Where will we be or could be in the future?

PHARMACY PRACTICE
- Long and proud tradition
- Pharmacist is drug expert from the very beginnings, and still is
- Pharmacists are valued, trusted, and respected members of their communities playing many different roles

Professional purpose
To serve the needs of the society through the practice, at an individual patient or consumer level and the wider population level.

Pharmacy profession
- Has undergone a change in the way it is practised
- It is a consequence of technological advances
- Contribution to changes in the nature of health care delivery
CHANGES & CHALLENGES

Assuming a greater responsibility for the safe and effective use of medicines by patients and populations

ADDITIONALLY KEY ROLES

FROM

Development
Production
Safe distribution of pharmaceutical products

TO

Health promotion
Disease prevention
Management of systems and resources associated with healthcare delivery

HEALTH CARE REFORM

AIM

• Public health priorities
• Patient safety and risk management
• Costs and effectiveness
• Population demographics
• Health technology = new drugs/medicines

PHARMACY PRACTICE

Direct influences

• The demand for advice over the counter (OTC)
• The desire for patients to self-medicate increases globally on a daily basis
• Deregulation of medicines from the prescription-only category to pharmacy medicines
• More and more medicines for minor disorders treatment

PHARMACY PRACTICE

Additionally...

• Changes in many countries to meet the needs of patients
• Recommendations for other professionals to take on the role of prescriber besides doctors
• Self-medication with focus on primary care
• The shifting emphasis towards disease prevention
• Changes in leading of health services
---alter the way in which patients receive their care, especially for chronic disease and for minor ailments.

PHARMACY PRACTICE

The New contribution to Society

Effective use of medicines
Safe use of medicines
Cost effective use of medicines
Education relevant for continued professional development
Science & practice – relevant to applied drug science

Pharmacists’ role

• Issues such as collaborative practice (or prescribing - pharmacist in UK)
• Deregulation of the pharmacy sector
• Leadership and succession
TO MEET THE NEEDS OF SOCIETY

Imperative for pharmacy education

- Greater level of knowledge and understanding
- about commonly occurring medical conditions
- new drugs and therapies
- key concepts and strategies to prevent medication error especially of DRUG SAFETY (pharmacovigilance)
- PROCESS SAFETY (preventing medication errors in healthcare)

For the sake of patient safety and obtaining the best therapeutic outcomes.

Focus on

Effective education

- Evidence based practice
- Knowledge, skills, competence

Expected outcomes

- Quality of care to society
- Safety of medicines
- Cost effective use medicines
- Competencies for the future

The need for reconstruction of education

DRIVING MACHINE

- Knowledge and data expansion
- The progressing profession
- Social and cultural shifts

Does pharmacy education meet these changes and challenges?

- NOT always

- Variously in many countries
- Traditionally, education has been a strong driver of change in practice, but sometimes
  it may lag behind the needs of practice

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  it may lag behind the needs of practice
**DIVERSITIES**

- Different type of schools
- Different emphasis on certain content
- Different pedagogical approach
- Different standards
- Different length of education
- Different titles of qualification

**PHARMACY FROM TECHNICAL TO CLINICAL PROFESSION**

**CURRICULUM**

- Adopted in many countries to new educational needs
- Still heavily loaded with emphasis on science
- Traditional disciplines - distinct with independent outcome

- A focus have to be
  - Upon professional relevance and vocational outcomes
  - Patient focussed and clinical
- High regard for clinical learning and for integrated workplace experience

**GLOBAL LEVEL**

- Established joint FIP/WHO Pharmacy Education Task force group
  - FIP/WHO (Salvador 2006)
- 2nd Global PE consultation (Peking 2007)

**FIP & WHO INITIATIVES**

- Chemistry (all types)
- Pharmacology
- Biotechnology
- Genetics
- Medicine analysis
- Formulation and medicine science
- Pharmacognosy/phytochemistry
- Drug design
- Pharmacokinetics
- Therapeutics and clinical pharmacy
- Pharmaco-epidemiology
- Pharmaco-economics / health economics
- Proteomics
- Law, Licensing & marketing
- Microbiology
- Biochemistry, toxicology, drug metabolism
- Genomics
- Social & behavioural sciences

**AIM OF CONSULTATIONS**

- To develop a collaborative global framework
- To quantify the required pharmacy workforce levels
- To develop models to build training capacity for the scaling up pharmacy education and training.
- To provide technical support for country level action and human resources for health planning to ensure the provision of essential pharmaceutical services and care.

Participants at 2nd Global Pharmacy Education Consultations have voted for Action Plan in Peking (China) 2007, [www.fip.org](http://www.fip.org)
Bologna & European Higher Education Area (EHEA)

"easily readable and comparable degrees"

"adoption of a two UG cycle system", and
doctoral studies as 3rd PG cycle

"establishment of a system of credits"

EHEA (2010)

DELIVERY AND TEACHING TRENDS IN

Research
Evaluation
Teaching
Mentoring & training
Evidence-based practice

DIRECTIVE 2005/36/EC OF THE EUROPEAN PARLIAMENT AND
AND
S.S.I. On the recognition of professional qualifications/Course of
training for pharmacists

1. Plant and animal biology
2. Physics
3. General and inorganic chemistry
4. Organic chemistry
5. Analytical chemistry
6. Pharmaceutical chemistry, including analysis of medicinal
products
7. Pharmacology and applied biochemistry (medical)
8. Anatomy and physiology; medical terminology
9. Microbiology
10. Pharmacology and pharmacotherapy
11. Pharmaceutical technology
12. Toxicology
13. Pharmacognosy
14. Legislation and, where appropriate, professional ethics.

The balance between theoretical and practical training shall, in respect of each subject, give sufficient
importance to theory for the university character of the training.

How relevant are directives 2005/36/EC and 85/432/EEC to current professional needs? Debate of directives is timely.

BOLOGNA AT
FACULTY OF PHARMACY AND BIOCHEMISTRY
University of Zagreb

UG PROGRAMMES
Pharmacy studies
Pharmaceutical and Biochemical Sciences

Titles:
Master of pharmacy
Master of medicinal biochemistry

DOCTORAL STUDIES - BIOMEDICINE AND HEALTH
Pharmaceutical and Biochemical Sciences

Title: Dr. sc. (Ph. D.)

PG PROFESSIONAL STUDIES & SPECIALISATIONS
In process

ZAGREB REFORM

STRATEGIC DIRECTIONS
- to integrate the UG curriculum with practice
- to develop pharmaceutical care skill base
- to develop education, training and research
as a means to improve health outcomes

DIRECTIVES & RECOMMENDATIONS
EC, EFPA, FIP, EuroPharm Forum WHO/EURO, PGEU, PCNE...
Community pharmacists (70%) Hospital pharmacists (20%) Industry and represent. agencies (11%) Whole sales (5%) Education (4%) Community health institution (3%) Other (2%).
5th Year

Module 1. Drug Research and Development

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject</th>
<th>Status</th>
<th>Hours</th>
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<tbody>
<tr>
<td>F1-31</td>
<td>Social pharmacy</td>
<td>E</td>
<td>3</td>
<td>30</td>
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<tr>
<td>F1-32</td>
<td>Industrial pharmacy</td>
<td>E</td>
<td>3</td>
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<tr>
<td>F1-33</td>
<td>Dietotherapy</td>
<td>E</td>
<td>2</td>
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<tr>
<td>F1-34</td>
<td>Pharmacogenetics</td>
<td>E</td>
<td>3</td>
<td>30</td>
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<tr>
<td>F1-35</td>
<td>Molecular pharmacology</td>
<td>E</td>
<td>3</td>
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<tr>
<td>F1-36</td>
<td>Molecular basis of diseases and therapy</td>
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Module 2. Pharmacy

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<th>Code</th>
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<tbody>
<tr>
<td>F1-37</td>
<td>Quality assurance and registration of drugs</td>
<td>E</td>
<td>3</td>
<td>30</td>
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<tr>
<td>F1-38</td>
<td>Analytics of development of pharmaceutical products</td>
<td>E</td>
<td>1.5</td>
<td>15</td>
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<tr>
<td>F1-39</td>
<td>Novel drug delivery systems</td>
<td>E</td>
<td>1.5</td>
<td>15</td>
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<tr>
<td>F1-40</td>
<td>Selected topics in pharmaceutical chemistry</td>
<td>E</td>
<td>3</td>
<td>30</td>
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<tr>
<td>F1-41</td>
<td>Biochemical basis of endobiotics and xenobiotics</td>
<td>E</td>
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Obligatory subjects for both modules

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<tr>
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<td>Quality assurance and registration of drugs</td>
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<tr>
<td>F1-43</td>
<td>Analytics of development of pharmaceutical products</td>
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<td>Novel drug delivery systems</td>
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Additional elective courses

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<tbody>
<tr>
<td>F1-46</td>
<td>Sociological studies</td>
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<td>3</td>
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<tr>
<td>F1-47</td>
<td>Pharmacy ethics and deontology</td>
<td>E</td>
<td>2</td>
<td>20</td>
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<tr>
<td>F1-48</td>
<td>Biostatistics</td>
<td>E</td>
<td>2</td>
<td>20</td>
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<tr>
<td>F1-49</td>
<td>Metalloproteins</td>
<td>E</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td>F1-50</td>
<td>Bioinformatics</td>
<td>E</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td>F1-51</td>
<td>Selected topics in pharmaceutical chemistry</td>
<td>E</td>
<td>3</td>
<td>30</td>
</tr>
</tbody>
</table>

Changes and challenges

- Reduction of teaching hours in some general subjects
- Introduction of new contents related to practice and science (~30 new subjects in total)
- Increasing in pharmaceutical (10%), biomedical (15%) and humanistic (6%), and decreasing of general subjects (10%)

Consequences and still opened questions

- Programme comprises 3525 teaching hours in total
- ~ 40 Obligatory courses
- ~ 30 Elective courses is offered, student need to elect ~ 18

Congress and Conferences

- 1st Congress of Croatian Society of Medical Oncology of CMA (Opatija 2003)
- 1st Course of Oncological Pharmacists (Opatija 2003)
- 3rd Croatian Congress on Pharmacy (Cavtat/Dubrovnik 2005)
- 4th Croatian Congress on Pharmacy (Osijek 2007)
- PharmaCon 2007 (Dubrovnik 2007)
THANK YOU FOR YOUR ATTENTION!