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**В.Е. Радзинского, А.М. Фукса**

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# GYNECOLOGY

## TEXTBOOK

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## ABBREVIATIONS

♣	— commercial product name
∅	— the medication is not registered in the Russian Federation
a.	— <i>arteria</i>
ACTH	— adrenocorticotropic hormone
AFP	— fetoprotein
AIDS	— acquired immunodeficiency syndrome
ALT	— alanine aminotransferase
AMA	— American Medical Association
ART	— assisted reproductive technology
ARVI	— acute respiratory viral infection
AST	— aspartate aminotransferase
AUB	— abnormal uterine bleeding
BMI	— body mass index
BV	— bacterial vaginosis
CAD	— coronary artery disease
CAH	— congenital adrenal hyperplasia
CAM	— cyclic adenosine monophosphate
CDC	— centers for disease control and prevention
CEA	— carcinoembryonic antigen
CFU	— colony forming units
CG	— chorionic gonadotropin
CHC	— combined hormonal contraceptive
CIN	— cervical intraepithelial neoplasia
CMV	— cytomegalovirus
CNS	— central nervous system
COC	— combined oral contraceptive
DGT	— diabetic glucose tolerance
DHEA	— dihydroepiandrosterone
DIC	— disseminated intravascular clotting (syndrome)
DMPA	— Depot medroxyprogesterone acetate
DNA	— deoxyribonucleic acid
EEG	— electroencephalography
ESR	— erythrocyte sedimentation rate
f.	— <i>fascia</i>
FDA	— Food and Drug Administration
FHA	— Functional hypothalamic amenorrhea
FSH	— follicle stimulating hormone
GABA	— gamma aminobutyric acid
GnRH	— gonadotropin releasing hormone
GPP	— Good practice point
GTD	— gestational trophoblastic disease
Hb	— hemoglobin
hCG	— Human chorionic gonadotropin

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Hct	— hematocrit
HDL	— high density lipoprotein
HIV	— human immunodeficiency virus
HMB	— heavy menstrual bleeding
HPV	— human papilloma virus
HSIL	— high-grade squamous intraepithelial lesion
HSV	— Herpes simplex virus
IgA	— immunoglobulin A
IHD	— ischemic heart disease
IUD	— intrauterine device
IVF	— in vitro fertilization
KPI	— karyopyknotic index
LDL	— low density lipoprotein
LH	— luteinizing hormone
LHRH	— luteinizing hormone releasing hormone
lig.	— <i>ligamentum</i>
LSIL	— low-grade squamous intraepithelial lesion
LUF	— luteinized unruptured follicle
m.	— <i>musculus</i>
MCA	— mucin-like cancer associated antigen
n.	— <i>nervus</i>
NSAIDs	— nonsteroidal anti-inflammatory drug
PCOS	— polycystic ovary syndrome
PCR	— polymerase chain reaction
PHT	— premenopausal hormone therapy
PID	— pelvic inflammatory disease
PMDD	— premenstrual dysphoric disorder
PMS	— premenstrual syndrome
POP	— progestin only pill
PSTT	— placental-site trophoblastic tumor
RAS	— Russian academy of sciences
RBC	— red blood cell
RNA	— ribonucleic acid
SSBG	— sex steroid-binding globulin
STD	— sexually transmitted disease
STI	— sexually transmitted infection
TDF	— testis determining factor
TLR	— toll-like receptors
TPG	— trophoblastic beta-globulin
TTH	— thyrotropic hormone
UNICEF	— United Nations International Children's Emergency Fund
v.	— <i>vena</i>
VIN	— vulvar intraepithelial neoplasia
WBC	— white blood cell
WC	— waist circumference
WHO	— World Health Organization

## INTRODUCTION

**Reproduction**, process by which organisms replicate themselves, is the main biological function of the human race. This is a point on which most religions and schools of philosophy agree. **Reproductive medicine** is an interdisciplinary field studying the theory and practice of reproduction based on current philosophical, moral, and scientific views held by the human race. As new knowledge is accumulated, previously held ideas are viewed and understood differently, so clinical practice sees new approaches to implementing scientific findings into common practice.

Obstetrics, helping women in childbirth, is the oldest branch of medicine; even rock carvings show images of women giving birth. Nevertheless, until the sixteenth century obstetrics was not regarded as science, or as a branch of medicine!

Beginning with Hippocrates, all classical medical authors were scholastics; they offered all recommendations on managing a childbirth based on speculations that were unrelated to human anatomy. The Hippocratic statement that the fetus should necessarily be born in cephalic presentation was refuted by Cornelius Celsus as late as the first century AD; internal podalic version and delivery of the fetus in breech presentation were developed. One would think that art and science were to unite, which is nowadays the case with obstetrics... However, that was not to happen. Here is what E. Bumm, founder of modern European obstetrics, writes about it: "From this time on, considerable progress could be noted. Its turning point was Alexandria where Greek arts and sciences flourished under the aegis of the Ptolemaic dynasty; physicians from all lands started coming to Alexandria to study at renowned medical schools. It was here that a dead body was first dissected for the purpose of investigation; it was probably here that physicians were able to pull back the shroud of secrecy covering the childbirth." Quite soon, however, regression could be noted: "a hundred years later, podalic version was abandoned, and dissecting instruments were put to their previous use".

Evaluating the Middle Ages as "barbaric" in what concerns obstetrics in all countries E. Bumm points out that physicians had no access to the birth bed, empirical approach was abandoned and replaced with theoretical speculations. He remarks that even Avicenna (980–1036) failed to rise to the level of Celsus times. Describing famous schools of Middle Ages (Salerno, Naples, Paris, Montpellier) of the twelfth to fifteenth century Bumm writes sardonically that "the outcome of their activity consisted in unreadable theoretical reasoning on all kind of possible and impossible medical issues, commenting on and compilation of the works by Greek, Roman and Arabic authors. But in the area of obstetrics they produced fewer new ideas than in all other medical fields."

In the sixteenth and seventeenth centuries emotions ran high about many issues of medical theory including follicles describes by Renier Graaf (1641–1673) and the dictum by William Harvey (1578–1657) going as *Omne vivum ex ovo* (Latin for "every living thing is from an egg") which was finally proved as late as the beginning of the twentieth century.

Harvey, Malpighi, Schwammerdam... these great thinkers, and others, conceptualized the most important points, but it was all shelved away for centuries. However, the craft of midwifery flourished, helped on by surgeons who discovered the profits



that could be gained attending the pregnant wives of the nobility, rich merchants, and last of all, of the common folk.

E. Bumm, founder of classical obstetrics, is credited with scientific rationale of obstetric care, consolidation of the entire experience accumulated by humanity in this oldest branch of medicine. This happened not so long ago, in the beginning of the twentieth century, just a hundred years ago! It was E. Bumm who set up the science of obstetrics as a field of medical knowledge. He was the first to consolidate the stand-alone outstanding achievements of his predecessors like Smellie, Levret, Rederer from France; Ozzie Ander, Busch, Naegele, Schroeder, Bandl from Germany; Porro from Italy; Fergusson, Hamilton, Simpson, Braxton-Hicks, Duncan from England; Bush, Willy, Schultze, Slaviansky from Russia; Davies, Parvin from the United States. E. Bumm developed a united multifaceted system of knowledge about obstetrics as a science. He is widely credited with scientific recognition and consolidation of findings concerning ether and chloroform anesthesia. He also always asserted the priority of I. Ziemmelweis as the discoverer of antiseptics, although he did not always succeed. Here is how he estimated Ziemmelweis, who was almost his contemporary: "... antiseptics, the glory of nineteenth-century medicine, as good as stemmed from obstetrics. Two decades before Lister, Ignatz Philipp Ziemmelweis (1865) cherished and put into practice the idea which later made its victorious march from England to medical practice in all countries: antiseptic treatment of wounds. Ziemmelweis fought for his idea bravely and with tenacity which are only possible when there is a strong inner conviction underneath, but in vain: his contemporaries did not acknowledge the truth of his convictions. It took the death of many thousands of birthing mothers to give antiseptics the right to enter the field of obstetrics again, now in the guise of Joseph Lister's discovery, to wipe away the deadly epidemics of puerperal fever at obstetric clinics and to do away with such fatal cases as when a single examination could entail a deadly infection, which deprived obstetrics of every possibility to rejoice about the fruits of one's industry".

The twentieth century dubbed as "media age" was the turning point in dissemination of new knowledge. The Internet, freedom of movement for specialists, and information exchange constitute actual globalization of the modern world. New reproductive technologies, accessory technologies in the first place, that offer tangible help to people, are conceptualized and implemented virtually simultaneously all over the world. A still more important point was the return to traditional methods of nursing validated by centuries of utilization: exclusive breastfeeding from the moment of birth, feeding the baby on demand, rooming-in, no recourse to drinking water, pacifiers, feeding bottles. From the early 1980-s onwards, these perinatal technologies have spread around the world at an amazing rate as they are indispensable in reducing the incidence of postpartum and neonatal infection (including collective flare-ups of infection), inducing involution of uterus, enhancing both the health index and the IQ of the newborn.

It has been proposed to regard the twenty-first century as an age of learning; however, what is meant is not total training of everybody in everything (that was only possible in the Antiquity); the objective is much broader than that: it is the priority of problem-oriented learning, that is training specialists in areas relevant for the society, the state, and the human race.

**Gynecology** (health practice dealing with the health of the female reproductive systems, from *gyne*, the Greek for *woman*, and *logos*, the Greek for *study*) is a branch of medicine studying the normal physiological function of female genitals and any abnormality emerging in them, as well as their prevention and treatment.

**Obstetrics** is a branch of medicine encompassing the knowledge about female reproductive system and dealing with management of normal and abnormal pregnancy, delivery and postpartum period. An important division of obstetrics is prevention aimed at avoiding any abnormality that can arise during pregnancy.

Elaborating on this definition, one can add that obstetrics is a branch of human activity whose objective is to help a woman during pregnancy, childbirth and in the postpartum period. Like medicine in general, obstetrics, as a part of Gynecology, is a fine blending of art and science<sup>1</sup>. Sometimes they maintain a perfect balance, but science may outstrip the needs of real life (which does not often happen); most often, the major goals of obstetrics — preserving the mother and baby's health and life — are achieved through the art of foreseeing and preventing complications, the skill of dealing with arising abnormalities based on intellectual conceptualization of childbearing. The groundwork for these is constituted by the theory and organization of obstetric care, its standardization in contrast to individualized approach to pregnancy and childbirth in a given woman.

“A true obstetrician is on edge at each delivery as a true sailor is agitated by each sunrise!” (V.V. Konetsky). This agitation is justifiable as there can be no absolute prognosis in obstetrics. The daily routine of an obstetrician consists in patient, attentive, honest execution of preventive check-up protocols in accordance with risk strategy in obstetrics and perinatology, working to create most natural conditions for a normal delivery, and timely referral to a maternity clinic for childbirth when gestational complications develop. A decision made correctly has a direct impact on the life of two human beings — the mother and child, and an indirect impact on the family and society.

Thus, obstetrics and gynecology in general are practical branches of reproductive medicine aimed at enhancing the outcome of reproduction as well the health of people, both qualitatively and quantitatively.

As early as in 1865 A. Krassovsky, the founder of Russian obstetrics, in an introduction to the first edition to his textbook wrote that obstetric skills were necessary for all graduates of higher medical training establishments: “what is the moral condition of a doctor who knows that the patient's life can be saved but he cannot do it just because he chose another specialty rather than obstetrics? I believe that at such a moment a young doctor, provided he is responsible enough, would give anything at all to be able to make a decision: choosing an expectant approach relying on our mother nature, or making recourse to the Art...”

A physician of any specialty should master the basics of obstetrics as sooner or later there will occur an unpredictable situation (in the desert or tundra, on board a plane or ship) where a woman in labor needs medical attention; another reason

<sup>1</sup> *Science* is a complex phenomenon of public life; its main purpose is to gain objective knowledge about the world. *Art* is a practical or spiritual activity of mastering and implementing esthetic values. “Two branches of human activity — childbirth and marine navigation — are neither art nor science in pure form, but a conglomerate of these higher spheres of human existence” (V.V. Konetsky).

why obstetrics should be studied is the growing incidence of extragenital disease. That is why all doctors, including specialized ones, should know the specifics of treating various diseases in pregnant women, and also have an idea of the origin of gestational complications and their drug therapy.

Teaching medical courses to international students has its specifics: they are to gain fundamental training in each specialty keeping in mind that in three or four years the future doctors will be certified in accordance with requirements of the country where they will practice. The experience of the RUDN Institute of Medicine in training doctors for working abroad indicates that a graduate of a higher training establishment in this country needs no less than 2, and sometimes 3 years to prepare for certification oriented at test control in English language settings, often in diagnostic and therapeutic standards accepted in the United States of America. Naturally, both the graduate and their family who paid all the tuition fees are interested in reducing the preparation period. That is why instruction of international students in the English language using all kinds of textbooks from abroad is gaining popularity at the RUDN. However, this approach has apparent faults: without mastering Russian terminology, and often not fluent in Russian in general, the graduate of an English medium class cannot pursue postgraduate courses in Russia while there is great interest in postgraduate education. On the other hand, such a student failed to read in Russian textbooks about the priorities in Russian obstetrics; moreover, these priorities were recommended by the World Health Organization (WHO) for implementation in the health care system in the countries with state-funded health care, preventive medical checkups of pregnant women in particular (Declaration on primary health care, WHO, 1978, Almaty).

The present textbook shows a fundamental distinctive feature in that the authors attempted to integrate the current knowledge of obstetrics in the broad meaning of the word, and basic obstetric aid methods into a uniform system highlighting the differences taught in the Russian Federation on the one hand, and in western countries on the other hand. Thus the present textbook developed in accordance with the Federal Educational Standard in Obstetrics and Gynecology courses ensures that the student gets necessary instruction when doing the course, familiarizes themselves with the priorities in Russian teaching and has all the supplementary information necessary for board certification in a country where they are planning to live and/or work.

Another distinctive feature of the present textbook is that from the year 1998 on, according to the syllabus, **gynecology is studied first to be followed by obstetrics and perinatology**. This change in the order of course implies that it is expedient to study the normal functioning of the female body and its abnormalities outside a pregnancy, and then, once all basic regularities of specific female functions have been mastered, the regularities of the reproductive system are studied: learning the regularities of fertilization, conception, pregnancy developing over time, labor and postpartum period, and the basic of perinatology as well. Our experience like that of other specialists who taught these courses in this particular order, demonstrates that both Russian and international students beginning to do gynecology with algorithms familiar from courses in propedeutics of internal diseases and surgery can better assimilate the anatomical and physiological specifics of the female body,

the semiotics and diagnostics of women's disease (fourth year), and on this foundation they start mastering obstetrics (fifth and sixth year).

These distinctive features that are steps of implementing the Bologna process enable students to grasp the affinity of global principles and methods utilized by scientific and applied reproductive medicine and to learn how different western systems of gynecological, obstetric and perinatal care are.

Thus, maternity hospitals abroad have no departments for pathologic pregnancy, or observation departments; there are no rural health posts which in their time solved the problem of maternal mortality and which continue to deal with this problem. Knowledge of this is extremely important for students from developing countries where the issue of maternal mortality is extremely acute both in health care in politics. On the other hand, the versatility of foreign doctors who work as obstetricians, gynecologists including gynecologic oncology and mammology, offers a challenge to those who are training international student in the Russian Federation: ensuring a comprehensive training to medical school graduates who could integrate the achievements of Russian and international health care systems.

The readers of this textbook will learn in the twenty-first century, an age of learning according to the UNICEF. However, the basis of training comprises teaching the knowledge needed by the humanity so that doctors of all specialties could give care to the pregnant, parturient and puerperal woman.

The writing team wish every success to all those to do obstetrics and gynecology with this textbook.

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# Chapter 1

## MEDICAL EDUCATION IN RUSSIA, IN THE UNITED STATES OF AMERICA AND IN EUROPE

**Medical education** is a system of training health care workers which ensures a study of general and specialized courses as well as mastering the necessary practical skills. The development of medical education is determined by the country's needs for health care providers and is of planned, state-regulated nature.

**Medical education in Russia** is provided by higher medical schools in the system of Public Health **Ministry** and the Ministry of Education and Science (46 higher educational establishments and Departments/Institutes of Medicine at classical Universities in the country) which comprise from one to five departments (General Medicine, Pediatrics, Public Health, Dentistry, Pharmaceutics). Many higher educational establishments are publicly funded national institutions. They accept individuals aged under 35, school leavers or those with a different higher educational background, or a diploma of a vocational college, who passed the entrance examinations.

The course of study is six years; junior students receive instruction in preclinical and theoretical courses (Anatomy, Histology, Physiology, Biology, Biochemistry, Physics, etc.). In the third year curricula begin to differentiate: students do specialized courses and general medical training whose content varies from department to department. Training in major clinical specialties like obstetrics and gynecology, therapy, surgery and the like is mostly offered in the fourth to sixth years; the teaching proceeds in clinics and hospitals under supervision of experienced teachers. Upon completion of the sixth year of study students take state final exams and are granted the status of doctors. After that, for two years of residency each doctor studies the chosen clinical specialty in depth, for instance, obstetrics and gynecology.

Pre-diploma and post-diploma specialization ensured a transition from training general practitioners to training specialists in main clinical disciplines, and on this foundation one can acquire a particular specialty.

Training of research and teaching personnel is implemented through a system of postgraduate education and doctoral programs.

The Russian Federation has recently initiated a project of continuing medical education; its main principles are maintaining the required level of doctor's expertise (continuity), implementation of self-study electronic educational content, and keeping track of the instruction received in credits, conventional units.

**Medical education in the United States of America** is a lengthy, costly and competition-driven process aimed at selecting the most gifted students.

To become a doctor in the United States one should leave high school and enroll for a four-year **premedical study course** in a college of allied specialty; this is step one, and it provides a higher education. College students are referred to as undergraduate students meaning they have not completed their higher education.

Then education continues at a **medical school** for another four years, as a rule. The first two years of study are described as preclinical years as during this time students have virtually no access to clinical settings studying the basic medical disciplines. However, as early as in the second year they are taught to take the patient's history and the methods of objective examination. Starting in the third year the situation changes drastically: the student encounters the patient for the first time. The academic year is usually broken into periods of 6 to 8 weeks: the student rotates between departments of obstetrics and gynecology, pediatrics, therapy, surgery, psychiatry and family medicine. During the fourth year the amount of practical on-the-job training expands, the student is given more responsibility regarding patients and does series of chosen one-month courses.

Next comes the **residency**. This is a time of additional training taking three to five years, in the area which is of particular interest to the future doctor. Residency in obstetrics and gynecology takes 4 years. The first year of residency in the United States is called internship. During this year the intern spends five months in outpatient care (4 months are devoted to family medicine and internal disease, and one month — to emergency care). One month is given to working at intensive care unit for newborns, two months — to gynecology, and four months — to obstetrics. In the second year of study residents devote eight months to gynecology, and four months — to obstetrics. In the third year residents are rotated in outpatient care (including the study of pathology), do obstetrics for two months, two months are given to a chosen specialty, and another 6 months — to gynecology. In the fourth year two months are given to mastering administrative skills (each fourth-year resident devotes two months to learning to supervise obstetric, gynecological, oncological and endocrinological service).

During residency the resident is hired by the hospital and receives a salary working 60–80 hours a week and provides care to patients under supervision of a qualified specialist. Upon completion of this level the graduate is a fully licensed specialist.

Starting in the early 1970-s, three-year fellowship programs in the United States of America offer a more focused specialization after residency. During the course of fellowship the doctor's pay is 40–50 thousand dollars a year which is relatively little; however, in many cases there are opportunities for additional earnings like nights on duty or other authorized health care services. Besides, fellows often have their expenses covered when they go to a conference, engage in research, etc. Obstetrics and gynecology offer the following ramifications of the main specialty: care for mother and fetus (perinatology), urogynecology and pelvic floor, reproductive endocrinology and infertility, and **gynecologic oncology**.

The notion of continuing medical education provides a most accurate description of the current system of postgraduate medical education in the United States, which is widely spread and well developed.

Over the last thirty years doctors engaging in continuing medical education programs are granted Physician's Recognition Award from the American Medical Association. This certificate is proof that the doctor strives to master the most up-to-date expertise in their profession. To qualify for the certificate, one should undertake at least fifty hours of studies meeting AMA requirements, on a yearly basis.

In the USA there is a distinction between two categories of credits. The first category is related to participation in conferences, publishing papers in annotated

editions, and the like. Credits of the second category are given in the United States for activities undertaken by a doctor on their own: consultation with colleagues or experts, searching for medical information and learning in the Internet, teaching other health care providers, reading reputable medical literature.

We will consider **medical education in Europe** on the example of Sweden since it is considered equivalent to corresponding education in other European Union countries.

In Sweden doctors receive their pre-diploma education with curricula similar among all universities and at university clinics which are regional hospitals.

A distinctive feature of the Swedish system is **cooperation between universities and regional hospitals**. Chief medical doctors of these hospitals are professors or teachers or research fellows. The government provides financial assistance to regional hospitals if the latter show research and educational activities. Medical departments at universities provide medical education and research while the government and Ministry for education are responsible for education and research in various fields.

To become a medical student in Sweden, one should pass a complicated elimination round based on school grades. As a result medical students cope with their studies relatively well. This is also due to the fact that doctors enjoy good pay and a high social status.

One usually becomes a medical student at the age of 18 to 20, after leaving the secondary school which takes up ten years. Pre-diploma training lasts for five and a half years. Earlier, it used to be organized in rigid systems of modules consisting of specific courses, first theoretical course and then the share of clinical disciplines increased. Over the last decades pre-diploma training has become more object- and problem-oriented when various medical issues are dealt with by specialists from different specialties.

During clinical training students come in contact with patients, keep their records and study various methods of examination, with emphasis not only on diagnosis and treatment, but also on prevention programs, social medicine and ethics.

The post-diploma training begins with an **internship** in therapy, surgery, psychiatry and general practice; it lasts for 21 months. This is a period of salaried work supervised by experienced specialists. Upon completion of the internship and passing qualification tests the doctor becomes a licensed professional.

After the registration procedure the doctor has the right to practice, work in hospitals and other health care establishments, but on the condition that she is supervised. That is why after working for four years in one of 60 specialties almost all doctors continue their post-diploma training. During this period of residency a doctor performs salaried work in various fields of medicine in accordance with a program set for each specialty, and takes qualification tests. Upon a successful completion of post-diploma training they are granted the specialist certificate and the right to practice on their own.

The responsibility for organization and control of post-diploma training of doctors is vested with the National Department for Health and Welfare under the Ministry for Public Health and Social Provision. The procedures of planning and controlling, especially in what concerns residency, involve such organizations as the Swedish Medical Organization and Swedish Medical Society.



In Sweden medical research is of great international importance. It is marked by integration of fundamental and clinical studies; it is applicable to practical health care, especially at the level of regional hospitals or university hospitals. Research is mostly financed from the state budget channeled through universities and research councils, but county councils and pharmaceutical companies also offer financing for clinical research if it is related to practical health care. Almost one third of all sums spent by universities on research goes to studies in various fields of medicine.

Universities have a specialized research training program that ends in an examination for MD degree which is an equivalent of PhD degree. PhD is a doctoral degree equivalent to the Candidate of Science degree in Russia, where the field of science is specified: Doctor of Philosophy in Medicine.

As can be seen from the brief overview of medical education in different countries across the world, its essence is actually the same: it is continuing education starting with a study of fundamental medicine, basic course like anatomy, histology, physiology, biochemistry, microbiology, general pathology in the first years, and a transition to clinical courses, so that by the time of graduation the student has mastered the required bulk of knowledge in general practice of medicine, which will be followed by mandatory postgraduate education. The existing differences encompass terms of study, especially in postgraduate programs, and the ways of continuing professional development.

The Bologna process is mostly aimed at development of unified programs, at least for establishments of higher education. The process itself causes much debate in Europe and other countries across the world.

These data indicate that the basic principles and methods of training in the system of educational institutions are the same in Russia and in most other countries. Postgraduate education (residency) shows a great variation in the length of study. In particular, postgraduate programs in obstetrics and gynecology require four years in Germany and in the United States, five years in Israel, and six years in Greece.

This diversity may well persist in future as it is determined by the state policy in the area of health care, obstetrics and gynecology included. The same can be also said about professional development during one's medical career: national governments set up the rules, terms and programs for lifelong education for health care practitioners.