

# Model of Electronic Health Record for Gynecology practice in Bulgaria

P.Mihova<sup>1</sup>, I.Pendjurov<sup>2</sup>, J.Vinarova<sup>3</sup>, D.Asenova<sup>4</sup>

<sup>1,2,3</sup> New Bulgarian University, Sofia, Bulgaria

[pmihova@nbu.bg](mailto:pmihova@nbu.bg)<sup>1</sup>, [penjurov@nbu.bg](mailto:penjurov@nbu.bg)<sup>2</sup>, [jvinarova@nbu.bg](mailto:jvinarova@nbu.bg)<sup>3</sup>,

<sup>4</sup>Government university hospital "Lozenec", Sofia, Bulgaria,  
[dorina\\_mbg@abv.bg](mailto:dorina_mbg@abv.bg)<sup>4</sup>

**Abstract:** The Health Information Management Systems Society's (HIMSS) definition of EHRs is: "a longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting. Included in this information are patient demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data, and radiology reports. The EHR automates and streamlines the clinician's workflow. The EHR has the ability to generate a complete record of a clinical patient encounter, as well as supporting other care-related activities directly or indirectly via interface—including evidence-based decision support, quality management, and outcomes reporting."

It is important to note that an EHR is generated and maintained within an institution, such as a hospital, integrated delivery network, clinic, or physician office. An EHR is not a longitudinal record of all care provided to the patient in all venues over time.

This paper presents a functional software development, specialized for obstetrics and gynecology practice in Bulgarian medical environment. The record design is subordinated to the Bulgarian and international medical laws for tracing the pregnancy period. It consists of three separated modules – medical history of the patient, administrative data, tracing the pregnancy in 3 trimesters with various tests and medical analyzes, different for each trimester. It allows multimedia history archive, heart rate records, 3D/4D video records, fetal morphology history, biochemical screening record, weekly echograph records and full laboratory history at simple screen.

It performs telemedical functions through the possibility to connect from every point with Internet and to be accessible both – for patient and doctor.

The EHR is unique for Bulgarian gynecology medical practice. It combines the validate paper version of pregnant patient record with separate medical exams that are performed from different specialists and genetic laboratories.

## Introduction

The definition of medical information is a set of data, facts and information (retrospective and prospective) for perceived phenomena, processes, objects, ideas and theories related to medicine – as practice, specialized work and science.

It should be presented in a form suitable for use by doctor or PC. Health information is presented orally or recorded in due form, in various medium and it is related to past, present or future physical or mental health or condition of the individual. It is created or received by a health officer, public health authorities, health insurers and all specialized healthcare organizations to collect, classify and use such information.

Medical (health) record is a standardized presentation of specialized medical and health information and the physical form of this information. It includes all historical and modern technological forms of presentation of information: correspondence, memoranda, books, plans, maps, images, charts, graphs, photographs, films, microforms, sound recordings, videotapes, machine records and all documented materials, regardless the physical media and performance.

## Methods

In the practice of providing health care to women of exceptional degree of importance is to have accurate and timely information for managing the dynamic and complex health needs of their patients. Increasingly, developers of software solutions aim to create technology that can help and meet the challenge of caring for women, based on analysis of complex issues, follow-up preventive measures and prenatal risk management.

In the field of gynecology practice there are number of software solutions, specialized and only for specific needs, or as a part of a common electronic file of patient, respectively of the newborn. Obsteric practice is definitely unique. Patients are monitored for various reasons and often for several reasons at once.

The EHR, presented here, is a set of considerations required by BG regulation studies, which are: adapted from the paper equivalent, required data and additional performance information, generated by long experience and practice in the monitoring of the pregnancy.

The record consists of 5 main screens, namely - Administrative and passport data of patients, Medical history, First, Second and Third trimester.

Administrative data are presented with standard parameters for patient information - name, ID number, phone, age, address, doctor and facility,

and specialized information - previous births, marital status, insurance status and employer.

After introducing administrative and passport data, the doctor continues to the medical history screen, where are entered: first day of last menstrual period, and based on the date which is generated automatically, the system calculates the term of birth and gestational week. There is also specific information, consisting of menstrual history, parents history, past and present illness, intake of medications, allergies and harmful habits.

3-ти триместър

Пациент  
Имена: \_\_\_\_\_ Не бремена: \_\_\_\_\_ Дата: \_\_\_\_\_  
ЕГН: \_\_\_\_\_ Възраст: \_\_\_\_\_

Лечебно заведение  
Име: \_\_\_\_\_ Рег. номер: \_\_\_\_\_  
Имена: \_\_\_\_\_ ИДИ: \_\_\_\_\_

Медицински данни  
Гестациона седмица: \_\_\_\_\_ Тегло: \_\_\_\_\_ Ръст: \_\_\_\_\_ Сексуална активност: \_\_\_\_\_ Пушане: \_\_\_\_\_  
Колка в МПС: \_\_\_\_\_ Тегло на заришца: \_\_\_\_\_ Ръст на заришца: \_\_\_\_\_ Възвита поливентриал: външни размери на таза: \_\_\_\_\_  
Размер на заришца: \_\_\_\_\_ Пулс на заришца: \_\_\_\_\_ Кръвна налягане на майката: \_\_\_\_\_

Екография: \_\_\_\_\_ Съдечен тон на заришца: \_\_\_\_\_ Фетална морфология: \_\_\_\_\_

Лабораторни изследвания  
Хемоглобин: \_\_\_\_\_ Еритроцити: \_\_\_\_\_ Хематокрит: \_\_\_\_\_ Лейкоцити: \_\_\_\_\_ MSU: \_\_\_\_\_  
MCN: \_\_\_\_\_ CRP: \_\_\_\_\_ Кръвна заришца: \_\_\_\_\_ Урина - осадмент: \_\_\_\_\_ Урина - уробилиноген: \_\_\_\_\_  
Урина - кетони: \_\_\_\_\_ Микробиология: \_\_\_\_\_ АСАТ: \_\_\_\_\_ АЛАТ: \_\_\_\_\_ Уриксатоза: \_\_\_\_\_  
Гинекологичен статус: \_\_\_\_\_ Фиброиди: \_\_\_\_\_ АРТТ: \_\_\_\_\_

Към Word Print Запис

Fig.1. Third trimester

Once stored, this information is available at any time to track a patient's pregnancy. After finishing the basic documentation, the doctor starts to enter information for the first trimester, where personal data patient and hospital, are generated automatically.

The medical record includes all required data such as: sexual life, whether the patient is traveling and using a belt, ultrasound images of the examinations and the possible presence of the optional survey data "biochemical screening."

The entrance to the menu software can make references and various reports on specific parameters preset and required by the authors team.

Demand is realized through choice of a function from the following drop-down menus - "Personal data", "Visits" and "References", where each of them offers the possibility to search with the patient ID number.

During the first visit of the first trimester it is obligate to make any regulations and necessary laboratory tests, and whatever exam the doctor finds as an appropriate. A full gynecological status and review can be described in a free text entry field - a gynecological status.

In each trimester (Fig.1.), there can be entered various number of visits, each with its own unique ID, generated automatically by the system when starting "New visit" from the menu Visits. Here are added urine tests, and

urine ketones, urobilinogen, a recording of fetal heart tone data and images from fetal morphology.

The software is compared to 5 international solutions and 1 paper version of the EHRs for OG practice. The comparison is developed on the base of 35 parameters, in 4 points scale. The total maximum points from the parameters is  $4 \times 35 = 140$ , where with the largest sum is Acrendo's OB / GYN EMR file with 112 points, with minimum, no doubt - Paper Bulgarian file with total of 60 points, followed by Basic Baby solution - 65 points.

All solutions offer a well-organized introduction and storage of administrative-passport data and print mode for displaying paper equivalent of the file. All records, except paper, offer automated removal of data from the system. Laboratory results are well organized except the Bulgarian version of EHR with 1 point less, because the authors believe that foreign records offer more opportunities. Only in Bulgarian EHR is offered the opportunity to transfer to Excel and Word, and one extremely important parameter - archiving and storage of information.

It is necessary to mention, that the presented solution was introduced in Government university hospital "Lozenec", used by three different specialists and evaluated as an excellent model for innovative work, according to the world tendencies – electronic healthcare and services.

### Conclusion

The software solution is composed and approbated by medical practioners in Bulgarian healthcare system model, which provides better informed treatment methods, where the patient`s history plays a fundamental an central role in monitoring fetal development and last but not least – the patients health.

Medical and health informatization is an evolving process and prosperous health service - an important characteristic feature for the provision of good healthcare. Received and stored in electronic form information ensures patient with greater degree of security and awareness, constant access to the actual information at any time.

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