INTRODUCTION: With the continuously growing number of people using online sources for health information and services, the concept of eHealth is progressively developing and it is a high-priority topic for the European Union. The absence of centralized internet-based eHealth platform in Bulgaria results in deficiency in the information exchange among physicians and other healthcare providers. The question about the readiness and the attitude towards the eHealth concept among all participants in the healthcare system in Bulgaria still remains to be clarified and the purpose of the current study is to assess the opinion of healthcare providers and consumers about the electronic way of receiving laboratory test results. We also try to explore the existing preference trend in relation to the socio-demographic characteristics of the studied population.

MATERIALS AND METHODS: In the current work, we investigated the needs and recommendations of 1039 patients, laboratory staff and out-of-hospital general practitioners in Northeastern Bulgaria (regions of Varna, Dobrich and Shumen). The responders were divided into three groups:

1. First group – 502 patients of different gender and age (over 18 years), selected randomly and contacted immediately after a visit to a medical diagnostic laboratory or a general practitioner (GP).
2. Second group – 52 clinical laboratory doctors (from 63 registered in the list of Bulgarian Medical Association for the studied regions) and 96 laboratory assistants (more than 90% of all laboratory professionals). All outpatient laboratory services in the regions of Varna, Dobrich and Shumen were included.
3. Third group – 389 GPs working in individual or group practices in the regions of interest. The distribution of GPs among the three regions was as follows: Varna – 262, Dobrich – 69 and Shumen – 58. This covers 64% of all GPs in the studied regions.

We used a short questionnaire which was distributed among participants and collected in the same day. The questionnaire was divided into 2 main sections: (1) descriptive demographic and work (or residence-) related characteristics (age, sex, place of residence – for the first group of responders or age, sex, type and years of work experience and place of residence – for the second group) and information exchange among the different partners (6). The question about the readiness and the attitude towards the eHealth concept among all participants in the health care system in Bulgaria still remains to be clarified. Most of the physicians express positive attitude towards information technologies and recognize the need of computer literacy (7), but the actual expectations about using electronic information systems, especially in the field of laboratory testing are unknown. Therefore, the purpose of the current study is to assess the opinion of health care providers and consumers about the electronic way of receiving laboratory test results. We also try to explore the existing preference trend in relation to the socio-demographic characteristics of the studied population.

CONCLUSION: The actual opportunities for online communication provoke active participation of all players in the health service market and require a novel model of communication among healthcare providers.

Keywords: communication, feedback information, laboratory tests, e-Health

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The studied sample

The age ranged between 35 and 65 with a mean of approximately 60%. Of all participating GPs were females. Seventy-one percent of responding GPs were from Varna (67.1%), followed by those from the region of Dobrich (22.4%) and Shumen (17.2%). The majority of them were working in the main cities of Varna, Shumen and Dobrich, whereas 37% of them worked in the region of Shumen (37%). The professional diversity and age distribution in the third group of responders was as follows: from the region of Shumen, for example, laboratory specialists were women (91.5%) and the mean age of the sample was 45.3 years (range 21-68). Laboratory specialists were women (91.5%), and the mean age of the sample was 45.3 years (range 21-68). Laboratory specialists were mainly from the Varna region (60.4%), followed by the Dobrich region (22.4%) and Shumen (17.2%). The majority of them were working in the main cities of the studied regions (75.4%), whereas 24.6% were working in small towns and villages.

The same patterns were observed in the residence and age distribution in the third group of responders. Most of the GPs were from the region of Varna (67.1%), followed by those from the region of Shumen (17.4%) and the region of Dobrich (15.6%). Seventy-one percent of responding GPs were from the big cities and only 29.3% were from small towns and villages. The same patterns were observed in the residence and age distribution in the third group of responders.

The age range between 35 and 65 with a mean of approximately 60%. Most of the responders in the group of GPs working in medi-diagnostic laboratories considered that patients prefer to receive their results via the Internet. Approximately 26% of the responders in this group pointed out receiving in the lab as the most preferable, and 22.1% favored receiving from the physician in charge. Almost the same opinion was shared by GPs – in their view, patients prefer electronic results (57.1%) to receiving directly from the lab (29.4%) or from the doctor in charge (13.4%).

A difference was found between beliefs of medical specialists from big cities (Varna, Shumen and Dobrich) and from small towns and villages. The major proportion (50%) of doctors and laboratory technicians working in the main cities of the region assumed patients preferred to receive results online, followed by direct obtaining from the laboratory (32%) or from the GP (18%). Responders (laboratory staff and GPs) in small towns and villages shared almost the same preference for online receiving (41%) and personal receiving of results from the laboratory (37%), followed by contact with the ordering doctor (22%) (Table 1). Patients in big cities (Varna, Dobrich, Shumen) preferred to receive their lab test results online (41%) to personal collection from the laboratory (28%) or physician in charge (33%). Most of the patients in the rural areas (45%) wished to receive their results from the doctor in charge rather than via an online platform (30%) and the smallest proportion (25%) agreed direct contact with the lab to be the most desirable way (Table 1). The difference in the proportions regarding the preferences of patients from different in size place of residence is statistically significant.

DISCUSSION

The results from our study show clearly the readiness and the positive attitude among all participants in healthcare towards the use of online systems for laboratory results communication. Providers and consumers are both convinced that electronic receiving is the most preferred and comfortable way for patients to receive their results. The major recommendations for lab improvement also concern the establishment of an effective electronic platform for online result communication. This leads to the need of a new model for electronic platform under the form of social network. Well-functioning and high-effective systems exist in Japan (8), China (9), USA (10) and many European countries (11). For all people accepting the health concept as life style, the creation of a social network will facilitate communication and information access. This will give new possibilities for interactive health products and services. In the social network all health providers registered (doctors, patients, institutions) will have permanent access to current information, test results, data exchange and feedback. The competence, achievements and professional experience could be easily accessible. The obviation of practice – for the second and third group of responders; (2) attitude towards internet-based laboratory services – including a question about the preferred way to receive test results and an open question concerning recommendations to medical diagnostic laboratories. The anonymity of participants was guaranteed and their oral informed consent was obtained before completion of the questionnaire and after clear description of study objectives.

The statistical analyses were descriptive statistical methods, contingency table analysis and chi-square. All statistical analyses were performed with EpiInfo7. A p-value of <0.05 was considered statistically significant.

RESULTS

Socio-Demographic Characteristics of the Studied Sample

From 502 patients enrolled in our survey, 75.2% were from Varna region, 13% from Dobrich region and 11.8% from Shumen. The mean age of the sample was 51.1 years with range from 18 to 90 years. Women were 56.3% and men – 43.7%.

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tained information could help to restore the trust in the health system and to create a new quality-based business approach in the medical field. With such a platform, the consumers will be able to make an optimal choice of a specialist (e.g. laboratory). They could also directly communicate with doctors, institutions and organizations to facilitate the obtaining of the newest information and expert consultation. In this platform, institutions, such as Ministry of Health, National Health Insurance Fund, Bulgarian Drug Agency, Bulgarian Medical Association, Bulgarian Pharmaceutical Union, scientific organizations and patients associations could participate. This will be an excellent way to improve the communication among all considered players. In the same time the transparency of the process will be guaranteed (Fig. 3).

The generated information in the form of a database will lead to better management of the public health in Bulgaria. With an electronic platform, the major problems in our public health will be minimized: the absence of patients' registry (by region and by diagnosis); the absence of electronic patient’s file and e-Health card; the absence of e-prescriptions; the absence of transparency in the management of the health budget; the total deficiency in the communication among the patients and health providers.

**CONCLUSIONS**

The new possibilities for online communication encourage the active participation of all players in the health service market. With the implementation of a working e-Health model the patients will receive better orientation in the market and facilitated medical access. Our study shows that the need for a more electronically oriented health care management, especially in the field of laboratory testing, already exists. Both providers and end-users are continuously seeking faster, easier and better communication. The positive attitude is widely declared but still remains to be realized especially in small towns and villages.

**REFERENCES**