PRACE NAUKOWE UNIWERSYTETU EKONOMICZNEGO WE WROCŁAWIU nr 119
Informatyka Ekonomiczna 18 2010

Anna Maria Bąkała, Karol Korczak
University of Lodz

ACCESSIBILITY OF E-HEALTH SERVICES FOR PEOPLE WITH DISABILITIES

Summary: In this article the authors present the concept of online health services in Poland with taking the disabled people into account. In subsequent points of this paper there are presented: comparative analysis between e-health solutions in Poland and other European Counties, profile of selected e-health services which are or might be implemented in health-care of people with disabilities, examples of existing e-health solutions in Poland, set of standards and requirements which have to be fulfilled by e-health services in order to be useful for the disabled and elderly people. In further work the authors plan to carry out a survey among this target group and explore real demand on e-health services.

Key words: eHealth services, people with disabilities.

1. Introduction

Information technology is nowadays a very important factor influencing efficiency growth of numerous economic and social sectors. Internet enables easier and faster access to information, data interchange, communication or realization of services. However the adjustment of some areas to digital platform can encounter many barriers and be connected with high level of risk. In Poland, one of such areas seems to be health sector. Due to low quality and difficulties of access to e-health services, the whole health sector is negatively perceived by public opinion in Poland. According to *Health Consumer Powerhouse* Poland is placed on 25-th position among 31 European Countries (Euro Patient Empowerment Index 2009) when regarding health care system quality from the patients' point of view. In order to prevent still growing crisis, there are plans to make high-quality online health services available to the whole society, with a special inclusion of the people with disabilities. *World Health Organization (WHO)* assumes among others that "eHealth should have an impact on health systems by making health services more efficient and improving access to care, especially in remote areas, for people with disabilities and for the elderly. It should benefit health-care providers, professionals, and final users through higher quality of care and health promotion. It should also af-

fect the cost of care by reducing redundancy and duplication of examinations and making possible economies of scale" [World Health…, p. 2].

In Poland there are a few initiatives tending to apply eHealth tools in the disabled people's health services. The main aim is to take advantage of still growing number of Internet disabled users and their access to advanced hardware and software. For that reason such changes seem to be reasonable. In spite of many real difficulties, putting new ideas into practice is very important, it may have significant influence on effectiveness and development of patient service.

The aim of this paper is to show possibilities of using Internet technologies to improve access and quality of health services in the environment of people with disabilities. This paper consists of five chapters. Second part includes description of e-Health tools use and possibilities of introducing it in European countries, with particular emphasis on Poland. In the third chapter e-health services are listed and described. In the fourth part the Authors present some requirements which have to be fulfilled to enable people with disabilities to use eHealth services. The last chapter deals with conclusions and probable further changes connected with e-health services for people with disabilities in Poland.

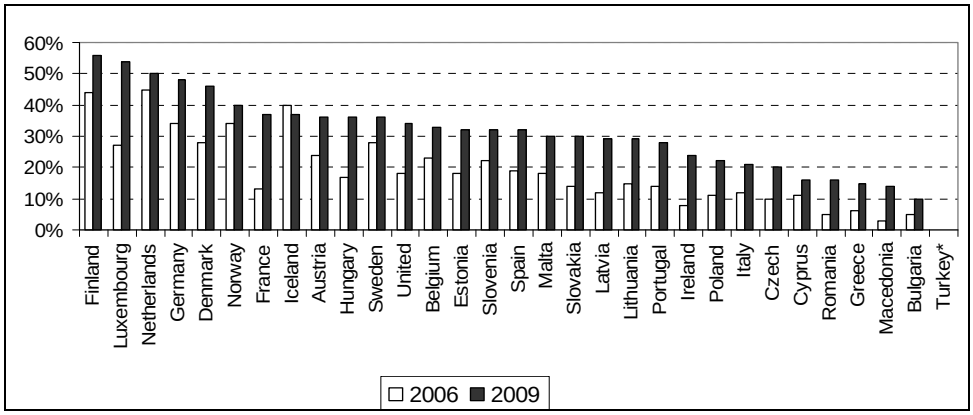
2. eHealth in Poland and other European countries

There is no particular definition of the term eHealth yet, even though many organizations have been working very actively in this area. The "*Action Plan for a European eHealth Area*" defines and describes eHealth as "the application of information and communications technologies across the whole range of functions that affect the health sector. eHealth tools or solutions include products, systems and services that go beyond simply Internet-based applications. They include tools for health authorities, healthcare provider organizations (HPO) and healthcare professionals at all levels, as well as personalized health systems for patients and citizens (…)" [Commission of the…]. As it follows from this definition, Internet is the medium that allows eHealth services to be realized. Still more people seek health – related information on the Internet. As we can see on Fig. 1 in 2009 in Poland more than 20% of individuals aged 16-74 searched such information. In most countries the data concerning this issue is available from 2006, that's why it has been put as the second series for comparison.

This comparison also shows the growth in each country. Poland is one of the countries, where the growth rate is the biggest. Within 6 years the interest in seeking health and related information on the Internet has grown over 4 times (from 5 to 22%).

The 22% in Poland mean about 6 millions citizens (aged 16-74) who may benefit the Internet health-related service. The numbers show how the Internet becomes still more important source of information about health. It indicates the necessity of enabling health care services via Internet; it's more convenient and still

more common to handle matters from home instead of going to an institution (e.g. banks). Due to upcoming large increase in the number of older people (the increase peak is predicted to be about the year 2030 [European Commission, *eHealth*…]) it is essential to prepare the eHealth system accessible for this large population. Their skills, attitudes and lifestyles will vary significantly, as well as the possibility to use ICTs, but it can be assumed that longer and healthier lives change habits and lifestyles and there can be a trend towards active ageing. Also considering eHealth services for people with disabilities, we must remember that still more of them use the Internet as an everyday tool for communication.



* Data unavailable.

Fig. 1. Individuals using the Internet for seeking health – related information.
Individuals aged 16-74 in 2006 and 2009

Source: own elaboration.

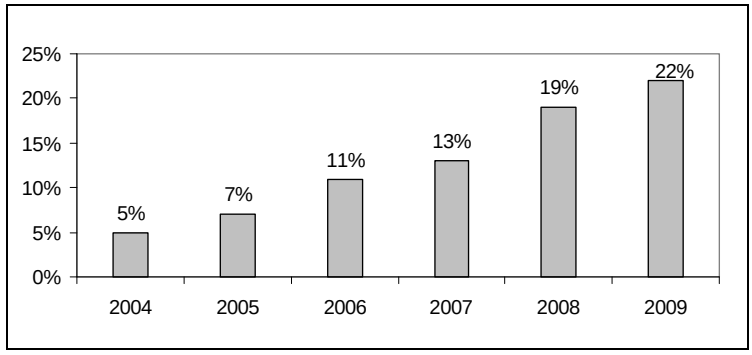


Fig. 2. Percentage of individuals using the Internet for seeking health – related information in Poland (age 16-74)

Source: own elaboration.

From the GPs point of view Internet can be used for information research and interactive services such as online ordering of supplies or patient monitoring. According to a survey on eHealth published by the European Commission [European Commission, *Benchmarking*..., p. 16] about 70% of GP practices in the EU27 Member States have an Internet connection (Poland – 60%) but only 28% of them have a website (Poland 34%). Using the Internet by GPs can be the alternative of electronic data interchange (EDI) by media like CD-ROMs, but the advantage of Internet relies on the wide availability of getting and sending information, thus this indicator was so important.

Computer can be also used during the consultation with the patient. It allows seeing his medical history or supporting the doctor in making a diagnosis or in choosing the right medications for prescription.

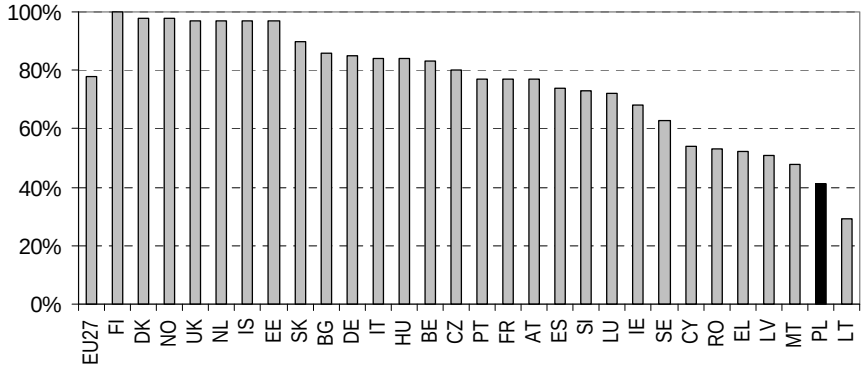


Fig. 3. Computer access during consultation

Source: empirica, Pilot on eHealth Indicators, 2007.

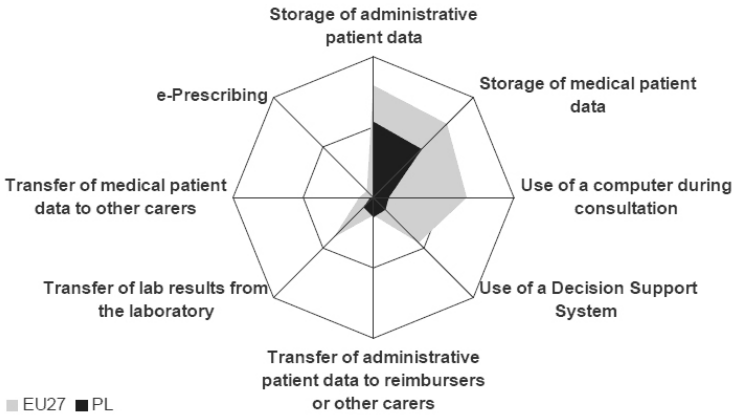


Fig. 4. Compound indicators of eHealth use, % values

Source: empirica, Pilot on eHealth Indicators, 2007.

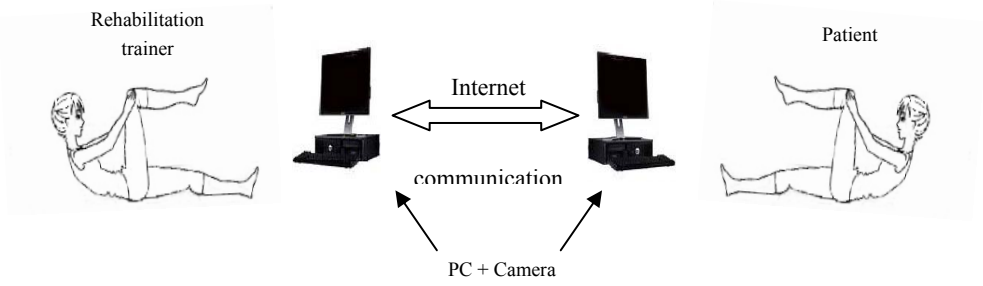
In Poland only 11% of the GP practices use computers in consultation with the patients while in EU – 66%. The use of Decision Support Systems is also not common (19% of Polish GPs).

Considering the above approach it should be unfortunately added that generally in terms of the use of electronic solutions in healthcare Poland lags behind the EU average. Most indicators such as the availability of ICT infrastructure and its use for health-related purposes by general practitioners (GPs) in Poland are far below the average of EU. The only better area is the one of patient data storage (Fig. 4).

3. eHealth tools for the disabled and older people

The Internet is one of the most important sources of information. Using it we can also accomplish a variety of services. In Poland there are a few eHealth projects in the testing and introducing phase. They can be very helpful to people with disabilities, who need specialized healthcare and the contact with doctors more often than other groups of patients. First of all, they have or will have the opportunity to use Internet as a medium in following situations:

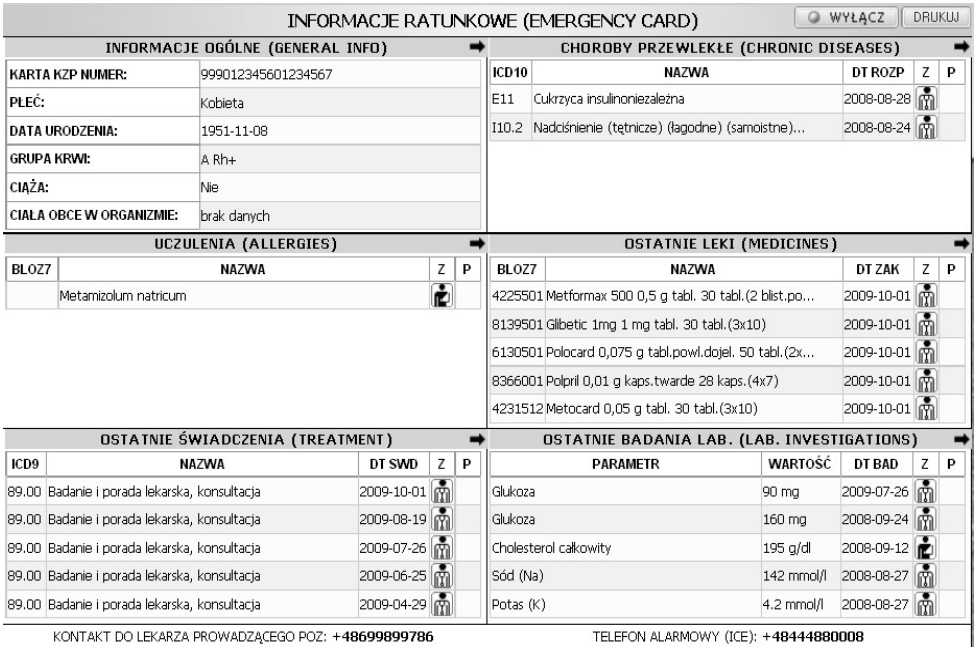
- *making an on-line doctor appointment*, thanks to this a patient is enabled to access the doctor's appointments schedule and set a suitable date. Sometimes it is obligatory to confirm a meeting with the doctor,
- *access to medical advice*, available by e-mail, chats, communicators or VoIP. This service is dedicated to those who have problems with arriving health service institution. What is important, there are possibilities to get professional medical advice without leaving home, from any place in the world, which saves a lot of time and decreases the cost of visiting a doctor,
- *video-consultations*, such solutions secure specialist's supervision exercise for patients. Since 2005 in Poland various research centers have tested telerehabilitation systems (for example "System Telerehabilitacja v.1.0" [see Glinkowski et al. 2008, p. 225-248]).



Picture 1. Scheme of communication in telerehabilitation web-system

Source: own elaboration.

It should be emphasized, that tested applications are very effective, there are no significant differences between results achieved via Internet and in personal contact supervisor-patient – *state of health monitoring* – called an electronic health record (EHR), in Poland also known as "patient diary" or "electronic patient card". It is a collection of electronic health information about patients (individuals or whole populations). EHR consists of information about personal details, case histories (treatment), examinations, prescriptions (medicines), allergies, etc. Data can be entered into the system by doctors or patients (for example blood pressure measurement). If something goes wrong, doctor can react very fast.



INFORMACJE RATUNKOWE (EMERGENCY CARD)

WYŁĄCZ DRUKUJ

INFORMACJE OGÓLNE (GENERAL INFO)

KARTA KZP NUMER:	9990123456012345 67
PŁEĆ:	Kobieta
DATA URODZENIA:	1951-11-08
GRUPA KRWI:	A Rh+
CIĄŻA:	Nie
CIALA OBCE W ORGANIZMIE:	brak danych

CHOROBY PRZEWLEKŁE (CHRONIC DISEASES)

ICD10	NAZWA	DT ROZP	Z	P
E11	Cukrzyca insulinoniezależna	2008-08-28		
I10.2	Nadciśnienie (tętnicze) (łagodne) (samoistne)...	2008-08-24		

UCZULENIA (ALLERGIES)

BLOZ7	NAZWA	Z	P
	Metamizolum natricum		

OSTATNIE LEKI (MEDICINES)

BLOZ7	NAZWA	DT ZAK	Z	P
4225501	Metformax 500 0,5 g tabl. 30 tabl.(2 blist.po...	2009-10-01		
8139501	Glibetic 1mg 1 mg tabl. 30 tabl.(3x10)	2009-10-01		
6130501	Polocard 0,075 g tabl.powl.dojel. 50 tabl.(2x...	2009-10-01		
8366001	Polpril 0,01 g kaps.twarde 28 kaps.(4x7)	2009-10-01		
4231512	Metocard 0,05 g tabl. 30 tabl.(3x10)	2009-10-01		

OSTATNIE ŚWIADCZENIA (TREATMENT)

ICD9	NAZWA	DT SWD	Z	P
89.00	Badanie i porada lekarska, konsultacja	2009-10-01		
89.00	Badanie i porada lekarska, konsultacja	2009-08-19		
89.00	Badanie i porada lekarska, konsultacja	2009-07-26		
89.00	Badanie i porada lekarska, konsultacja	2009-06-25		
89.00	Badanie i porada lekarska, konsultacja	2009-04-29		

OSTATNIE BADANIA LAB. (LAB. INVESTIGATIONS)

PARAMETR	WARTOŚĆ	DT BAD	Z	P
Glukoza	90 mg	2009-07-26		
Glukoza	160 mg	2008-09-24		
Cholesterol całkowity	195 g/dl	2008-09-12		
Sód (Na)	142 mmol/l	2008-08-27		
Potas (K)	4.2 mmol/l	2008-08-27		

KONTAKT DO LEKARZA PROWADZĄCEGO POZ: **+48699899786** TELEFON ALARMOWY (ICE): **+48444880008**

Picture 2. Emergency card. It is only a part of advanced EHR in OSOZ System

Source: screen from www.osoz.pl, 2.11.2009.

In addition, according to Ministry of Health, in 2015 e-prescription will be available in Poland. Based on information saved in EHR, we will be able to buy medicines in any pharmacy without paper prescription. Instead of that, we will use smart card (most likely it will be electronic identity card with special chip) that will eliminate difficulties of reading paper prescriptions by pharmacist. The main idea of this solutions is to introduce interoperability standards and exchange health information between health service institutions, pharmacies, electronic health records, lists of specialists, prescriptions and pharmaceutical warehouses,

– *ordering prescription*, service dedicated to people with disabilities and patients with chronic diseases. If the treatment goes properly (EHR analysis), a physician can write out prescription and live it for the patient in registration office. In this case patient is not obligated to see doctor before receiving prescription,
– *programs for a specified groups of patients*, persons in aggravated risk groups (for example pregnant women, babies, the elders or addicted persons) have ability to use web-based systems to detect disability or illness. In Poland, good practices are applied for example in the Institute of Physiology and Pathology of Hearing in Warsaw (www.ifps.org.pl [access: 12.01.2010]). IFPS web service enables users to check and detect hearing, seeing and speech defects.

Listed above on-line health services are expected to be up to following main difficulties in medical care [European Foundation…, p. 51]:
– distance to doctor's office/hospital/ medical centre,
– delay in getting appointment,
– waiting time to see the doctor on the designated day of appointment,
– cost of seeing the doctor.

4. How to enable people with disabilities to use eHealth services

There are still more and more facilities trying to meet the standards of using eHealth services by people with disabilities (especially the blind, colour-blind persons, deaf people, people with dyskinesis or disturbances of cognitive functions) and the elderly. Examples of good practices can be as follows (based on Szafranek]):
– software reading the contents of web service (solution for the blind, called screen reader), rarely convert contents to Braille code,
– possibility of increasing service contents without quality loss (very often service contents are presented on pictures which are dim after increasing),
– adding texts to multimedia files (for deaf people),
– navigation based colour buttons should be connected with text description (colour--blind persons),
– compatibility webs services with specialist hardware and software for people with disabilities. It is a very significant factor but we have to remember that there is no need to create new local standards and software. In most cases people with disabilities already have specialist hardware and software for it. The most reasonable solution is to secure software interoperability for them and simplify using it.

Nowadays we can observe the formation and development of standards concerning interaction between web services and people with disabilities. In 1997 World Wide Web Consortium (W3C) created Web Accessibility Initiative (WAI) which focuses on the accessibility of eHealth services for people with disabilities. The main ideas of WAI are published in guidelines (reports):

– Web Content Accessibility Guidelines (WCAG),
– Authoring Tools Accessibility Guidelines (ATAG),
– User Agent Accessibility Guidelines (UAAG),
– XML Accessibility Guidelines (XAG),
– Accessible Rich Internet Applications (WAI-ARIA).

It is worthwhile to use specialist portals (web content accessibility validation solution) in order to validate content of web service. One of the most popular is the portal contentquality.com. It identifies errors in web service content including "Section 508 standards and/or the WCAG guidelines". Naturally, to check availability of our web service we can also use one of various on-line W3C's Open Source Software.

5. Conclusions

In Poland there are still a lot of barriers in accessibility of e-health services for people with disabilities. In most cases this people need regular healthcare. eHealth solutions should be the real facilitation in the communication process with the doctors and specialist knowledge. Probably first integrated eHealth services in Poland will be introduced in 3-5 years. Probably in order of priority the most important target group will be the patients with ailments and diseases, but without disabilities. The authors draw a conclusion that there are possibilities to adapt already prepared services to work with people with disabilities. Considerations included in this paper will be continued. The authors are involved in preparing own research connected with demand of eHealth services among disabled people. Results should highlight the necessity of such services interest in future using them.

Literature

Commission of the European Communities, *e-Health - making health care better for European citizens: An action plan for a European e-Health Area*, Brussels, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2004:0356:FIN:EN:PDF (01.02.2010).

European Commission, *Benchmarking ICT use among General Practitioners in Europe* Final Report, empirica, Bonn 2008, http://ec.europa.eu/information_society/eeurope/i2010/docs/benchmarking/gp_survey_final_report.pdf (25.02.2010).

European Commission, *eHealth in the context of a European ageing society* Executive Summary, 2004, ftp://ftp.jrc.es/pub/EURdoc/21377-ExeSumm.pdf (01.02.2010).

European Commission, *Europe in Figures. Eurostat yearbook 2009*, http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-CD-09-001/EN/KS-CD-09-001-EN.PDF (25.10.2009).

European Commission, *Sources of financing and policy recommendations to Member States and the European Commission on boosting eHealth investment*, DG INFSO & Media, December 2008, http://www.financing-ehealth.eu/downloads/documents/FeH_D5_3_final_study_report.pdf (01.02.2010).

European Foundation for the Improvement of Living and Working Conditions, *Second European Quality of Life Survey – Overview*, www.eurofound.europa.eu/pubdocs/2009/02/en/2/EF0902EN.pdf (01.11.2009).

Glinkowski W., Wasilewska M., Mąkosa K., Górecki A., *Telerehabilitacja – aplikacje praktyczne w ortopedii i traumatologii narządu ruchu*, [w:] Z. Wróbel, *Zarządzanie i technologie informacyjne. Tom 3 – Technologie informacyjne w medycynie*, Wydawnictwo Uniwersytetu Śląskiego, Katowice 2008.

http://epp.eurostat.ec.europa.eu/ (30.10.2009).

Ministerstwo Zdrowia, *Strategia E-zdrowie Polska na lata 2009-2015*, http://www.csioz.gov.pl/pliki/projekt_sezdrowie_16042009.pdf (11.07.2009).

Szafranek K., *Dostępność usług internetowych dla osób niepełnosprawnych*, http://szafranek.net/works/articles/accessibilitylaw/ (20.01.2010).

Web Accessibility Initiative (WAI), http://www.w3.org/WAI/ (14.02.2010).

Web Content Accessibility Guidelines 1.0, www.w3.org/TR/WCAG10/ (14.02.2010).

Web Content Accessibility Guidelines 2.0, www.w3.org/TR/WCAG20/ (14.02.2010).

World Health Organization, *eHealth*, http://apps.who.int/gb/ebwha/pdf_files/EB115/B115_39-en.pdf (31.10.2009).

World Wide Web Consortium (W3C), www.w3.org/ (14.02.2010).

www.healthpowerhouse.com (28.10.2009).

DOSTĘPNOŚĆ SERWISÓW Z ZAKRESU E-ZDROWIA DLA OSÓB NIEPEŁNOSPRAWNYCH

Streszczenie: Artykuł prezentuje koncepcję internetowych usług medycznych w Polsce ze szczególnym uwzględnieniem osób niepełnosprawnych. W kolejnych punktach artykułu znajdują się: analiza porównawcza z zakresu e-zdrowia w Polsce oraz innych krajach europejskich, charakterystyka poszczególnych usług e-zdrowia, które są lub mogą zostać zastosowane w opiece zdrowotnej osób niepełnosprawnych, przykłady istniejących już rozwiązań w Polsce, zestaw standardów oraz wymagań, które takie serwisy powinny spełniać, aby mogły z nich korzystać osoby niepełnosprawne oraz starsze. Autorzy planują również przeprowadzenie własnego badania, które pozwoli określić zapotrzebowanie na usługi e-zdrowia w omawianej grupie docelowej.