

USP Drug Quality and Information Program (USPDQI)

First Quarter Program Report – FY 2006

October - December 2005

Program Activities

Common Agenda

- A. Smine made a poster presentation on Ghana Drug Quality at the ASTMH meeting in Washington
- J. Carpenter and M. McGinnis revised the drug quality report matrix and disseminated it on the USP DQI website. Twelve copies were distributed to visitors of the USP DQI exhibit booth at the ASTMH annual meeting in Washington, D.C., in December.
- J. Carpenter organized and chaired the program for the USAID's New Entry Professionals visit to USP.
- J. Carpenter and A. Smine gave a presentation on USP DQI pharmaceutical anticounterfeiting activities at the USAID initiative, Maximizing Access and Quality (MAQ) Mini-University, held at the Academy for Educational Development in Washington, D.C.
- J. Carpenter organized a program for CitiHope staff visiting USP from Kyrgyzstan to learn about drug information activities. A. Smine provided an overview of USP and spoke about the USP DQI program; D. Seyoum discussed USP development of drug information; and M. Foster presented an overview of USP's work with drug information centers.
- N. Davydova revised and updated the HPLC and Dissolution training modules designed for countries that seek to improve their drug quality control systems.
- S. Phanouvong made and sent a finalized selection of Centers of Excellence to USAID for confirmation and approval.

SO 3: Child Survival

- J. Carpenter and A. Smine started drafting zinc specification guidelines for the Zinc Task Force.
- J. Carpenter contacted speakers and submitted an abstract for a panel session on zinc for the treatment of childhood diarrhea to the Global Health Council for its 2006 annual conference.
- D. Seyoum assisted in the research on the side effects of chlorhexidine
- J. Carpenter, E. Toledo, and A. Smine attended the Chlorhexidine Working Group meeting and gave presentations on the safety, efficacy, and side effects of chlorhexidine as a neonatal and maternal wash, as well as quality, stability, and availability of the product.
- After a thorough review of published studies and assessment of viable potential uses of chlorhexidine as an infection prevention agent for mothers and newborns, D. Seyoum developed a PowerPoint presentation on the adverse effects and pharmacology of chlorhexidine as well as drug resistance.
- A. Smine and E. Toledo visited the Rodael manufacturing plant in France and worked with Nutriset and Rodael on how to improve their GMP and prepare for the UNICEF GMP assessment.
- J. Carpenter, E. Toledo, and A. Smine — via calls, meetings e-mails, and teleconferences — provided USAID with needed information about zinc sulfate based on GMP visits to Bangladesh and India.
- A. Smine and Edwin Toledo made a presentation about the zinc monograph specifications and GMP findings, and updated the Zinc Working Group at the BASICS office in Arlington, Va.
- A. Smine, A. Barojas, and S. Bradby tested zinc samples and sent the data to Lawrence Evans to correct the monograph for zinc tablets.
- A Smine, S. Phanouvong, and J. Carpenter drafted two papers on guidelines **about rolling in zinc drugs** in developing countries.

SO 4: HIV/AIDS

- D. Seyoum worked closely with Boehringer Ingelheim (BI) in the development of analytical methods for Nevirapine Tablet. Based on the analytical methods that Boehringer Ingelheim, as promised, submitted for Nevirapine Tablet, USP is developing a USP/NF monograph for it.
- D. Seyoum continues to develop information on antiretroviral drug interactions.
- D. Seyoum reviewed HIV/AIDS-related articles for the USP DQI website monthly update.

SO 5A – Tuberculosis

- D. Seyoum presented an abstract entitled “Multidrug-resistant Tuberculosis and the Importance of Development and Dissemination of Drug Information and Quality Monographs for Fixed-dose combination (FDC) Antituberculosis Drugs” at a poster session of the 36th IUATLD World Conference on Lung Health held in Paris, France.
- D. Seyoum started working on antituberculosis drug resistance and multidrug-resistant tuberculosis (MDR-TB).
- D. Seyoum reviewed tuberculosis-related articles for the USP DQI website monthly update.

SO 5B – Malaria

- USP DQI exhibited at the 54th Annual Meeting of the American Society of Tropical Medicine in Washington, D.C., which drew many visitors from South America, Asia, Cambodia, and Africa, especially Mali and Ghana. Many were interested in the 2006 Spanish edition of the *U.S. Pharmacopeia-National Formulary* and the *Operational Guide* that were displayed and asked how to acquire them. For the first time since USP DQI staff began exhibiting, a number of those who visited the booth knew either USP DQI programs or the staff (I. Isakova, J. Murphy, L. Straker, M. Foster, S. Phanouvong, K. Burimski, and M. Welsch) who worked the booth.

SO 5-AMR/Infectious Diseases

- ◆ D. Seyoum worked on the position statement that will be voted on for adoption at next year’s FIP Congress.
- ◆ E. Ushkalova and D. Seyoum reviewed AMR/Infectious Diseases-related articles for the USP DQI website monthly update.
- USP’s *Ensuring the Quality of Medicines in Low-Income Countries: An Operational Guide* was launched at a meeting in Siem Reap, Cambodia, in October.
- S. Phanouvong and J. Murphy worked with Madagascar, Senegal, Laos, and Cambodia on their proposed workplans to field-test the *Operational Guide*.
- In Russia and NIS, 22 students(256 in total) completed the Distance Learning Continuing Education Course provided by the Smolensk Medical Academy; another 11 students are enrolled currently.
- Secondary Distance Learning Continuing Education Centers in Yekaterinburg, Penza, Vladivostok (Medical University), and Minsk (Belarus) began training students:
 - Yekaterinburg – two students completed the course, 2 students are enrolled currently;
 - Penza - three students are enrolled currently;
 - Vladivostok Medical University – one student is enrolled currently;
 - Minsk (Belarus) – three students are enrolled currently.
- Distance Learning Continuing Education Centers in Khabarovsk, Volgograd, Novosibirsk, began enrolling students.
- Agreements were signed to establish new secondary centers in Samara, Tumen, Archangelsk, Dnepropetrovsk (Ukraine), and Osh (Kyrgyzstan).
- Eight students in Russia and NIS (31 at all) were trained to become instructors of the Distance Learning Course.

- The Smolensk team presented results of the Distance Learning Course at medical conferences held in Yekaterinburg, at two conferences in Minsk (Belarus), and at the 45th Interscience Conference on Antimicrobial Agents and Chemotherapy held December 16-19 in Washington, D.C., where a poster presentation “Learning without limits: Russian experience in creation of distance education courses via Internet for physicians” was made (see Appendix 1). Four articles were published in the medical journal *Clinical pharmacology and therapy*, Proceedings of the International Conference on Advanced Information and Telemedicine Technologies for Health (Nov. 8-10, 2005, Minsk), and Proceedings of the 45th Interscience Conference on Antimicrobial Agents and Chemotherapy (p. 489, abstract W-193).
- On the www.antibiotic.ru website, 42 new topics were added: seven devoted to TB, five to *STDs*, two to avian flu and five to AMR. Titles of selected topics include: “Isoniazid hepatotoxic reactions in TB treatment,” “New approaches to the treatment of TB,” “Treatment multidrug resistant TB in pregnancy,” “Influence of inappropriate initial antimicrobial therapy on mortality level in infections caused by Enterobacteriaceae strains producing beta-lactamases,” “Infection caused by MRSA as a new problem in pregnant women,” “Optimization of the treatment of the infection caused by antibiotic-resistant strains of *Neisseria gonorrhoeae*,” and “Avian flu.”
- The Smolensk team moderated forums for health care professionals about antimicrobial therapy on the www.antibiotic.ru site. Topics included: “Management of Urinary Tract Infections,” “Antimicrobial prophylaxis,” “Sepsis,” “Microorganisms and microbiology,” “New antimicrobial drugs,” discussion of new guidelines “Therapy of community-acquired pneumonia in adults,” and “Infectious exacerbation of COPD.”
- The on-line version of the *Infectious Diseases Textbook* was visited 344,261 times during this quarter, bringing the total number of visits to 2,351,758
- The on-line version of the *Guide of Infection Control in the Hospital* was visited 26 803 times this quarter, bringing the total number of visits to 163,375.
- K. Burimski visited Moscow in November to meet with USAID/Moscow Mission, discuss progress to date, review future plans, and meet with Russian Health Care Foundation and other counterparts. (See trip report sent Jan. 25, 2006.)
- E. Ushkalova made a presentation on the “Role of Drug Information Centers in Monitoring Adverse Drug Reactions” at the Conference on Qualitative Drug Use and Pharmacovigilance (Kazan).
- E. Ushkalova wrote and published four articles on the rational treatment of infectious diseases in the medical journal *Pharmateca*: “Use of Fluoroquinolones in Pediatrics,” “Fluoroquinolones in the treatment of urinary infections,” “Problems of rational antibiotic therapy of respiratory infections,” and “Use of doxycycline in children and adolescents.”
- E. Ushkalova participated in discussions on rational drug use in the Russian-language e-mail conference E-lek, a derivative of E-drug.

Vladivostok DIC staff

- With USP DQI technical support, the DIC received a \$ 30,000 grant from the Academy for the Educational Development (AED) for the realization of the USAID project START. Under START, AED assists USAID in conducting needs assessments, developing training plans, and strengthening its monitoring and evaluation systems. AED designs and implements short- and long-term training programs in areas such as economic growth, education, NGO and private enterprise development, management and public administration, health, the environment, agriculture, and democracy and governance, among others. The grant will be used for education of health care professionals of the Russian Far East in the area of rational antibacterial therapy. This quarter DIC staff developed a program and practical materials for the educational seminar “Rational Antibacterial therapy.”
- Answered 420 requests from health care professionals, including 129 requests on antimicrobials.

- Analyzed rationality of prescribing narcotic, psychotropic and antibacterial drugs in the Central Regional Hospital of Primorski Krai. The results of the analysis were presented at the meeting of the Hospital Medical Council.
- Sent 24 reports about serious adverse drug reactions and any not listed in the drug package insert to the Federal Adverse Drug Reactions Center.
- Analyzed rationality of pharmacotherapy of 11 lethal cases.
- Delivered eight presentations at physicians' morning conferences, two devoted to the problem of rational antimicrobials use: "Antibacterial therapy of infectious endocarditis" and "Evidence-based information on drugs used for influenza prophylaxis and treatment."
- Developed, published and distributed two issues of the drug bulletin among health care professionals, with the main topics:
 - Problems of antibiotic prophylaxis in cardiac surgery;
 - Pharmacoepidemiologic studies BEST (diagnostics and treatment of infections in pregnant women in real medical practice) and PRAGA (antibiotic prophylaxis in surgical interventions in pregnant women in real medical practice);
 - Antimicrobial resistance of Chlamidia trachomatis;
- Conducted three "Days of Clinical Pharmacologists." The discussed topics included problems of organization of antimicrobial chemotherapy in medical settings and problems of antibiotic prophylaxis in surgery.
- Conducted a course of antibiotics rational use for traumatologists of Craevaya Hospital.
- Conducted a course of rational pharmacotherapy for nurses of Craevaya Hospital.
- Conducted a seminar on the problems of pharmacovigilance in Primorski krai.
- Developed cards of antibiotic prophylaxis for surgical departments of Craevaya Hospital.

Ryazan Medical University staff:

- Updated tests for students on rational pharmacotherapy including rational antimicrobial therapy.
- Conducted 2 seminars for Ryazan physicians on the problems of rational drug use, including antimicrobials use.
- Participated in the work of Ryazan Oblast Formulary Committee.

Ryazan Oblast Hospital DIC staff:

- Answered 416 requests from health care professionals and consumers, including 132 requests on antimicrobials.
- Updated 43 protocols of treatment of different diseases in hospital departments, including 19 protocols of antimicrobial therapy.
- Sent 7 reports about adverse drug reactions to Federal Adverse Drug Reactions Center
- Participated in the work of Ryazan Oblast Formulary Committee.

Novgorod DIC staff:

- Novgorod DIC staff member I. Isakova began an internship at USP under the Special American Business Internship Training (SABIT) Program sponsored by the U.S. Department of Commerce, under which she will spend six month at USP working together with the staff on various drug quality projects.
- Answered 143 requests from health care professionals and consumers, including 44 requests on antimicrobials.
- Updated Novgorod oblast Formulary List.
- Organized and conducted eleven conferences for physicians of different specialities, including a conference on avian flu. Problems of rational antibiotic therapy and antimicrobial resistance were discussed at five conferences.
- Gave two presentations for physicians and pharmacists on problems of drug safety and antibiotics interactions.

Russia Far East Project

- Vladivostok Center of the Distance Learning Continuing Education Course (Craevaya Hospital) Three students (11 in all) completed the Distance Learning Continuing Education Course provided by the Vladivostok DIC during this quarter. Five students are enrolled currently.
- Vladivostok Medical University Distance Learning Center within the Vladivostok Medical University started enrolling students; one student is enrolled currently.

E&E-1: Freedom Support Act/Moldova/NIS

Moldova DIC of the National Institute of Pharmacy:

- Answered 57 requests from pharmacists, physicians, and nurses. The requests concerned full pharmacotherapeutic drug characteristics – 25%; drug ingredients – 14%; drug interactions – 7%; marketing information – 33%; indications – 15%; side effects – 8 %; use in pediatrics – 5%; toxicology – 2%; dietary supplements – 5%; and advices on pharmacotherapy – 8%.
- Developed, published, and distributed 2500 copies of a Drug Bulletin devoted to rational antimicrobials use and problems of avian flu to health care professionals.
- Two reports about adverse drug reactions were sent to the Center on Clinical Trials and Pharmacovigilance of the National Institute of Pharmacy.
- Three DIC presentations for TB physicians, out-patient physicians, and pharmacists were conducted.
- Four Minilabs were delivered to Central Asia Republics: Kazakhstan (2), Tajikistan (1), and Kyrgyzstan (1).
- S. Phanouvong and K. Burimski traveled to Almaty, Kazakhstan, to conduct a five-day training workshop on how to use Minilab kits and to discuss future plans with the local counterparts. (See trip report sent Jan. 17, 2006.)

E&E-2: Romania

- The drug information center in Cluj, Romania, responded to a total of 38 questions for the months of October through December. The questions received were specific details about drugs (17%), pediatric dosage (6%), dosage for pregnancy and lactation (4%), adverse reactions (3%), toxicology (2%), drug interactions (2%), pharmaceutical legislation (1%), pharmacokinetics (1%), therapeutic efficacy (1%), and other categories (1%). These queries came from pharmacists, nurses, and physicians from Cluj-Napoca, Brasov, Bistrita, Arad, Bihor, Timisoara, Zalau; other questions came from patients and students.
- The DIC produced a leaflet guide for healthcare professionals and patients about avian flu. These were distributed in all the pharmacy in Cluj-Napoca (2800 for patients and 128 for healthcare professionals) and added to the USP DQI website.
- In December the DIC staff, in collaboration with the Rheumatology Dept of Iuliu Hatieganu University of Medicine and Pharmacy, organized a roundtable conference on modern therapies on rheumatoid arthritis, a common ailment among Romanians. The DIC staff gave lectures to 70 participants that included physicians, pharmacists from hospitals and public pharmacies, and university teachers.

Nepal:

Although USP DQI no longer has funding for Nepal the drug information centers continue to function.

- The DInoN website (www.dinon.org) was updated regularly. New drug information bulletins were uploaded and made available at <http://dinon.org/mcoms/bulletins.htm>.
- The Pokhara DIC published and disseminated Volume 3, Issue 4 of the Drug Information Bulletin. Topics included: Problems with availability of drugs — a dilemma in ensuring rational use of drugs; Generic prescribing — a step to ensure rational use of medicines; Role of placebos in clinical

practice; Antibigram (Culture sensitivity pattern of different samples at Manipal Teaching Hospital), and others.

- The Pokhara DIC, in collaboration with the Department of Drug Administration DIC, continued pharmacovigilance activities in the Manipal Hospital. The pharmacovigilance cell of the DIC published the fourth issue of its quarterly publication, the Vigil.

RDM/A-4: Mekong Expansion

- S. Phanouvong planned training courses for Laos in Jan 2006 on basic testing, sampling, drug quality management; dissolution and HPLC; and GMP fundamentals application.
- S. Phanouvong routinely provided technical assistance and support to Cambodia and Laos in the expansion of drug quality monitoring for ARVs, anti-TBs, antimalarials, and antibiotics.

LAC-1- American Malaria Initiative

- A. Smine coordinated the first round of antimalarial drug collection and testing in three sentinel sites in Ecuador and reviewed plans submitted by AMI countries about the use of Minilabs for quality control of antimalarial drugs.
- A. Barojas, S. Bradby, and A. Smine purchased and sent Minilabs to Bolivia and Peru.

LAC-2- South American Infectious Diseases Initiative

- A. Barojas, S. Bradby, and A. Smine organized a training workshop on GLP, HPLC, Dissolution, and UV for the QC labs in Bolivia; A. Barojas and S. Bradby conducted the training.
- A. Barojas, S. Bradby, and A. Smine purchased and sent lab equipment to Peru, Bolivia and Paraguay.
- A. Smine, A. Baroja,s and N. Davydova organized a training workshop on GLP, HPLC, Dissolution, and UV for the QC labs in Peru.
- A. Smine organized an ISO audit of the QC lab in Peru, which was conducted by Keith Conerly and Anabelle Hernandez from the QA department.
- A. Smine organized a training workshop on good registration and the use of SIAMED for the Peruvian drug regulatory authority, with the collaboration of three experts of WHO, Imed Lassoued and Youssef Kheder from Tunisia, and Williams Monterroso from Guatemala.
- A. Barojas and A. Smine coordinated the selection and sampling of anti-TB and antibiotic drugs from Peru, Paraguay and Bolivia.

Madagascar, Senegal, and Ghana

- A. Smine coordinated preparations for the Pharmacovigilance Workshop to be held the first week of February with Madagascar organizers, including the various consultants to be invited.
- A. Smine and A. Barojas sent Minilabs, equipment, and lab supplies for the training workshop on basic tests in collaboration with the School of Medicine in Antananarivo.
- A. Smine and J. Murphy met with CDC, MSH, and J. Hopkins about the Pharmacovigilance Workshop in Madagascar and reviewed the proposed concept paper, prepared a power point presentation, and participated in conference calls and discussions with MAC partners about PV activity.
- J. Murphy conducted a literature search on PV in developing countries.
- A. Smine visited Senegal in November, met with local partners and push-started drug quality activities for this year's activities.
- A. Smine reviewed the University of Dakar (Senegal) workplan, sent the budget for the year, and purchased and sent two Minilabs for trainings to be conducted locally.

Planned for Next Quarter

- Revise and disseminate drug quality report matrix.
- Continue phase two activities of USP SOW for zinc program.
- Submit zinc specification guidelines draft to USAID and WHO for review and comments.
- Conduct a follow-up visit of Nutriset to discuss stability and disintegration results for zinc tablet and collect samples for testing.
- Conduct a disintegration test of zinc samples collected from Nutriset at USP lab.
- Revise USP monographs on zinc based on USP testing results.
- Conduct a GMP assessment on one zinc manufacturer in Nepal, to be identified by USAID.
- Follow up with USAID/Bangladesh regarding recommendations resulting from the GMP assessment of three local zinc manufacturers.
- Follow up with Citihope on the proposed collaboration to organize a roundtable conference on drug information in Kyrgyzstan.
- Review the stability report of Square Laboratory on zinc.
- Start working on clinical information on antimicrobial drug resistance.
- Continue to review information on antiretroviral drug interactions.
- Plan and participate in a meeting for February/March in Thailand for representatives of participating Centers of Excellence to develop an MOU with USP and to develop individual business plans.
- Collect comments on the *Operational Guide* revise accordingly.
- Continue to collect data on counterfeit and substandard antimalarial, antituberculosis, antibiotic, and antiretroviral drugs for analysis as part of drug quality monitoring in the Mekong region.
- Expand drug quality monitoring in Laos to include antibiotics, anti-TBs, and antiretrovirals.
- Meet in February with other Malaria Action Coalition partners (CDC, MSH, WHO-AFRO, etc) and the Madagascar Agence de Medicament and Ministry of Health to assess the drug regulatory environment; subsequently, develop an initial pharmacovigilance plan for implementation.
- Conduct MiniLab training in Madagascar and participate in pharmacovigilance workshop there.
- Visit Rodael/Nutriset and follow up on recommendations made last November.
- Follow up on drug sampling and testing by SAIDI countries.
- Work with zinc group on finalizing the papers about the guidelines
- Organize and prepare USP DQI symposium at the “Man and Drug” conference.
- Continue communications with the Russian Health Foundation regarding possible collaboration.
- Follow up with Roche to develop a pharmacopeial monograph for drugs used to combat the avian flu.
- Discuss with German Pharma Health Fund, which produces the Minilab, the possibility of including testing methods for oseltamivir (Tamiflu®) in a Minilab kit.

Appendix 1

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LEARNING WITHOUT BORDERS: RUSSIAN EXPERIENCE IN CREATION OF DISTANCE EDUCATION ON ANTIMICROBIAL CHEMOTHERAPY VIA INTERNET

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Abstract:

Background: Traditional forms of professional development do not meet the needs of physicians in getting post-graduate education. It is especially evident in countries with large territories. Distance education (DE) using Internet is a priority in improving physicians' professional level.

Objectives: To summarize experience in creation of post-graduate DE courses on antimicrobial chemotherapy (AC) in Russia and CIS countries with support of international organizations.

Methods: DE courses are organized under the auspices of the Institute of Antimicrobial Chemotherapy (Smolensk, Russia) with the support of the US Pharmacopeia and the USAID. Web-site for medical professionals www.antibiotic.ru serves as a basis for DE Internet-center. Linux and Solaris operating systems are used for domain's hosting; RDBMS PostgreSQL and MySQL are applied for management of the web-site's content.

Results: Two courses are currently available: "AC for general practitioners" and "AC of socially most important diseases." DE programs consist of 28 and 14 specific topics respectively. The first course is divided into 3 levels ("Basics of clinical microbiology," "Antimicrobials" and "Rational choice of antimicrobials"). The second course includes diagnostics and treatment of HIV-infection, tuberculosis, chronic hepatitis and STDs. Every topic comes complete with educational materials, on-line tests and clinical cases (972 tests and 319 cases were elaborated). After final exam students get the official certificates. Since 2002, 224 physicians from 26 Russian regions, Belarus, Kazakhstan, Kyrgyzstan, Lithuania and Ukraine have been trained using DE. Extension of DE with establishing of regional DE centers throughout Russia and CIS countries is in the stage of implementation.

Conclusions: 1) DE on AC via Internet seems to be an upcoming form of physicians' postgraduate education. 2) DE can be implemented on the international level.

Background:

E-Learning (so-called distance education - DE) is a totally new, progressive way of education. This type of education is based on the idea of a student's self-dependent interactive work and on the maximal use of the modern informational technologies, i.e. PC, e-mail, Internet.

The ultimate use of informational technologies creates a number of advantages over traditional educational forms:

- "Flexibility" (convenient time, place and pace for lessons);
- "Parallelism" (studying while working in hospital);
- "Long-distance action" (distance is no longer an obstacle for effective educational process);
- "Asynchronism" (convenient curriculum both for tutor and student);

- "Practical implementation" (possibility to apply obtained knowledge directly into medical practice);
- "Social equality" (avoiding social conditions, such as place and living conditions, hindering educational possibilities);
- "Timely updating" (possibility of timely updating contents in accordance with the latest data);
- "Tailored approach" (individual approach to every student);
- "Cost-effectiveness" (cost of education reduced 3-5-fold).

DE is well integrated in the educational process of liberal and technical universities in Russia. At the same time DE is not so widely applied for medical education. That is why using of DE for post-graduate medical training is a truly promising issue. This issue is reflected and supported by a number of official documents released by Ministries of Health and Education of Russian Federation. Traditional forms of post-graduate education do not completely meet needs of professional development of physicians. It is especially evident in countries with large territories. Therefore DE using Global Information Network is of a priority setting and perspective form of improving physicians' professional level.

Objectives: To summarize experience in creation of post-graduate DE courses on AC in Russia and CIS countries with support of international organizations.

Methods: Internet centre of DE on AC in Russia and beyond was founded under the auspices of the Institute of Antimicrobial Chemotherapy (IAC) (Smolensk, Russia) with the support of the United States Pharmacopeia (USP) and the United States Agency for International Development (USAID) on the basis of the web-site for medical professionals «Antibiotics and Antimicrobial Therapy» (<http://www.antibiotic.ru>). Linux and Solaris operating systems are used for organization of domain's hosting www.antibiotic.ru.

Results: IAC has obtained the official approval for implementation of post-graduate education courses for medical professionals on AC using DE technology from the Ministry of Health of Russian Federation (letter № 15-15/252 dated 25.04.2001). DE courses were officially approved for post-graduate system of physicians' additional professional education by the Teaching Methodical Council (TMC) for Medical and Pharmaceutical Education of the Higher Education Institutions of Russia in 2004 (Statement of the Ministry of Education and Ministry of Health of Russian Federation, TMC-575 Document dated 30.09.2004).

Two courses are currently available: "AC for general practitioners" and "AC of socially most important diseases." DE programs contain 28 and 14 specific topics respectively. The first course starts with the preliminary on-line test composed of 20 questions randomly selected from the database of about 150 questions on antimicrobials, clinical microbiology, AC, etc. This test allows to determine physicians' basic level of knowledge in AC. This course is divided into 3 levels ("Basics of clinical microbiology," "Antimicrobials" and "Rational choice of antimicrobials"). The second course covers diagnostics and treatment of HIV-infection, tuberculosis, chronic viral hepatitis and STDs. Every topic of both courses comes complete with educational materials, on-line tests and clinical cases (972 tests and 319 cases were elaborated). In addition to the specifically prepared topics DE ground base utilizes all materials (monographs, practical guidelines, articles, etc.) from the www.antibiotic.ru library.

Upon completion of each topic "students" are offered control tests to enable tutors evaluation of their level of knowledge. Intermediate examination (on-line testing and practical tasks) is conducted upon completion of the level. The final exam is held in the presence of tutor(s) (obligatory) and includes testing and interview. As groups are formed on regional basis tutor(s) come to the appropriate city for final exam. Physicians are awarded the official state certificate confirming the improvement of knowledge in the field of AC upon passing successfully the final exam (Fig.1).

Assessment of the urgency of distance education courses for Russian physicians performed as on-line survey on www.antibiotic.ru revealed that DE in the field of AC via Internet is a demanded form of

post-graduate education among healthcare professionals. According to this survey (n=522) more than 70% of participants responded positively (Fig.2).

DE course effectiveness was evaluated as change of the level of knowledge upon completion of the first DE course in comparison with baseline level. Analysis of the DE results revealed the obvious increase in the quantity of the correct answers given by physicians in preliminary test and final exam, confirming the effectiveness of DE (Fig.3).

Since 2002, 224 physicians from 26 Russian regions, Belarus, Kazakhstan, Kyrgyzstan, Lithuania and Ukraine have been trained using DE.

Extension of DE with establishing of regional DE centers seems to be helpful in solving a number of existing problems with the current DE system in Russia. Our DE in AC program is being realized on the basis of one educational institution and as it is further DE development is confounded by 1) a limited number of trained qualified tutors; 2) the need for tutors' trips to remote regions to held a final exam; 3) the certificates of Russian educational institutions are not valid in some CIS countries.

These problems call for handing over our DE technology to other centers (higher education institutions) both in Russia and in CIS countries. For that reason IAC started formation of a network of distance education centers on AC both in Russia and CIS countries with aim to increase the number of healthcare professionals potentially engaged in the distance education course on AC since 2004. IAC provides the support to these DE centers on the stage of training of their tutor staff and developing a system for independent work. Currently 9 regional DE centres in Vladivostok (2 centers), Ekaterinburg, Novosibirsk, Penza, Samara, Minsk (Belarus), Dnepropetrovsk (Ukraine) and Osh (Kyrgyzstan) are working, 3 centres in Chabarovsk, Tyumen and Vitebsk (Belarus) are ready to be opened and additionally future tutors are completing of E-learning courses in other 3 cities: Archangelsk, Ivanovo and Karaganda (Kazakhstan).

Conclusions:

1. DE on AC via Internet seems to be an upcoming form of physicians' postgraduate education.
2. DE can be implemented on the international level.

Author Disclosure Block:

L.S. Stratchounski, The United States Agency for International Development D; The US Pharmacopeia D.