



ZdravReform
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TRIP REPORT NO. RUS-11

**INFORMATION SYSTEMS RELATED TO
HEALTH CARE FINANCE AND
CLINICAL SYSTEMS**

**February 15–March 8, 1995
Novosibirsk, Russia**

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Submitted by the *ZdravReform* Program to:
AID/ENI/HR/HP

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SUMMARY

The author conducted a technical assistance visit in the Novosibirsk Oblast from February 15 through March 8, 1995. A planning session was conducted in Washington D.C., prior to the visit. An additional planning session was conducted with USAID/Moscow en route to Novosibirsk, and an exit debriefing was conducted with USAID/Moscow at the conclusion of the work in Novosibirsk.

The primary objectives were as follows:

1. Gain an understanding and provide overview documentation of the flow of health care financing in Novosibirsk.

An overview and flow of health care financing funds for the Novosibirsk Oblast was obtained and is documented in the body of the report. As of the time of the visit government and mandatory health insurance funds were consolidated by the Oblast Health Care Committee. Funding of individual health care facility budget-based requirements was accommodated from both sources based approximately on the proportion of patient load that was employed (mandatory health insurance Funds) to that which was not employed (government funds)

2. Gain a reasonable understanding of the information systems data that support health care financing and clinical activities in the Novosibirsk Oblast.

The nature of oblast health care financing and clinical computing is documented in the body of the report. The City Information Department provides a demographic database on disk and provides most of the system applications in use by the polyclinics and smaller hospitals. Larger hospitals and some clinics have developed additional applications. Additional coordination is required. All equipment and operating systems were of U.S. origin; all were microprocessors from XT to 486 in power. About one-third of the computers were connected via local area networks (LANs). There were no wide area networks (WANs) in operation.

3. Provide specific assistance related to health care financing and systems support of health care financing and clinical practice as might be requested by the chairman of the Novosibirsk Health Care Committee.

A half-day seminar on clinical systems, Western insurance systems, and key interfaces was conducted at the request of the chairman of the Oblast Health Care Committee. In addition, technical assistance visits were made to twelve facilities.

Primary findings and recommendations include the following:

Financing Management

One hundred percent of the population has health care coverage, paid either through an employer tax or through government-funded “necessary medical insurance.” Coverage for employed adults is funded by a 3.6 percent wage tax paid by employers. Medical costs of unemployed adults and children are funded by the government. Individual insurance companies receive funds from the Territorial Insurance Fund and make disbursements to health care facilities. Health care facilities report services performed and receive funds from the central government and the Territorial Insurance Fund based on the percentage of employed versus unemployed patients treated. The Territorial Insurance Fund works with hospitals and clinics to estimate the cost of medical services, and is responsible for allocating payments where available funds are not sufficient to meet incurred expense, which is often the case. Currently, the Oblast Health Care Committee administers the consolidated funding of health care for both employed and unemployed people. Those people who desire coverage for additional services may purchase voluntary insurance. The voluntary insurance companies may write policies and collect premiums. The voluntary insurance program is new and generally considered experimental.

Budgeting

The overall health care budget is keyed to anticipated diagnosis within the population and is divided among providers based on services performed and associated demographics. The health care budgeting process begins with the formulation of requirements at the individual hospital and clinic/polyclinic level. Because of very high inflation rates (currently around 20 percent per month), budgets are drawn up twice a year. Each budget follows official guidelines in planning for inflation.

Information Systems

Programming efficiency was the best I have seen. Programmers are fully exploiting the power of available equipment. All of the computing equipment observed were personal computers of AT, 286, 386 and 486 models. All were Intel-based and all were operating on Microsoft DOS, primarily versions 6.22. About a fourth to a third of observed personal computers were connected to LANs. None were connected to WANs. There were no client-server applications. Most of the applications were developed using intermediate applications/database programs, primarily FoxPro, FoxBase, dBase IV, and Clipper. Some direct programming was done in the C language.

However, a significant challenge looms for health care managers in Novosibirsk. To avoid the processing overhead associated with Windows and similar operating systems, such as OS/2, they have stayed with a Microsoft DOS standard. All observed systems had the current 6.2 version installed. Microsoft is expected to begin selling Windows 95, as an upgrade to the current Windows software, later this year. Unlike current Windows 3.1, Windows 95 does not have a DOS layer. Microsoft has indicated that DOS 6.2 will probably be the last version of DOS that supports commercial grade products. As a result, all vendors of commercial products are expected to migrate those products to Windows 95, Windows NT, or both. It can be expected that DOS versions will

quickly leave the shelves and support will become limited a year or so after the new versions are released.

Health care systems in Novosibirsk are effectively tied to DOS because their limited computer power constrains the use of Windows operating systems. Within one to two years, the key commercial packages they use will no longer be on a DOS operating system. The problem is exacerbated by high hardware costs as compared to the U.S. market. Planning to accommodate this problem must begin on a priority basis. This need was communicated to appropriate systems leadership, as reflected in the Exit Report.

It was recommended that the acquisition of new equipment be restricted to 486s or more powerful equipment. It was further recommended that the acquisition of some personal computers be deferred in lieu of more powerful servers. The demand is most pressing for the regional hospital. The insurance companies will also require similar computing power as they mature. Those servers would then run Windows NT or UNIX and appropriate database software. The recommendation was approved during the exit meeting. Additional technical assistance to assist with the transformation was requested. The Oblast Health Care Committee accepted Kevin Woodward's invitation to participate in USAID-sponsored training programs. The Health Care Committee also requested additional assistance to aid with the efficient design of the projected systems and for the design of appropriate WANs.

Health Care Quality

The oblast uses a very interesting approach to medical outcome and related quality issues. At the point of diagnosis, or hospital admission for acute cases, an outcome goal is specified for each patient. The goal-setting process includes consideration of the problem's severity, comorbidity and related factors such as age, and the nature of the disease or injury. The goal is established, generally approved and entered into the patient's medical record. Where automated systems are in use, it is also entered into the admission or "new outpatient episode" record. At the point of discharge or "cure," the actual outcome is compared with the goal and a quantitative score is recorded. Objective outcome scores can then be used as a basis for comparison, improvement, and so forth. Such an approach would improve many U.S. clinical quality measurement systems. With the concurrence of Russian authorities, a joint U.S./Russian paper would be helpful.

The usefulness of procedure data was discussed during the exit meeting. It was pointed out that U.S. and European health care financing mandate the procedure code as the fundamental basis for payment in many instances. The usefulness of the information for medical quality analysis was also discussed. The director of the Oblast Health Care Committee, Dr. Falatov, asked for copies of Russian translations of the ICD-9 procedure table. Kevin Woodward took responsibility to meet the request.

Next Steps

Actions to be taken by the Novosibirsk Health Care Committee include:

- Three physicians to participate in medical quality training in the United States.
- Three professionals to be identified for training in the United States in the areas of pharmacy utilization, cost/benefit analysis, and clinical effectiveness.
- Work to support the development of a private health care clinic.
- Promotion of cooperation among information systems departments in the oblast.

Actions to be taken by USAID include:

- Additional assistance in making specific recommendations for technical systems design and methodology.
- Detailed planning to establish an appropriate Wide Area Network capability.
- Assistance in formulating an Oblast Health Care and Insurance Systems Plan.
- Include Novosibirsk technical staff in advanced systems training to be conducted in Moscow or Siberia.
- Provide copies in Russian of ICD-9 procedure codes.

Actions to be taken by consultant include:

- Development of a joint U.S.–Russian paper regarding the oblast’s approach to medical quality measurement.
- Arrange translation services for correspondence between Dr. Anatoli Grigoryevich Kononov, manager of the automated systems department at the Novosibirsk Regional Hospital, and a U.S. counterpart.

OBJECTIVES

The primary objectives of the technical assistance visit to Novosibirsk Oblast were as follows:

1. Gain an understanding and provide overview documentation of the flow of health care financing in Novosibirsk.
2. Gain a reasonable understanding of the information systems data that support health care financing and clinical activities in the Novosibirsk Oblast.
3. Provide specific assistance related to health care financing and to systems support of health care financing and clinical practice as might be requested by the chairman of the Novosibirsk Health Care Committee.
4. Potential areas of support include the following:
 - Systems support of health care financing.
 - Systems support of clinical applications.
 - System and data interface between clinical and health care financing systems.

- Provide initial exposure to U.S. managed health care and related systems.
- Provide any required assistance with systems management.
- Provide any required assistance with systems equipment and commercial software acquisition.

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 - Provide any required assistance with systems management.
 - Provide any required assistance with systems equipment and commercial software acquisition.

FINDINGS

A. Health Care Financing

Management

One hundred percent of the population has health care coverage, paid either through an employer tax or through government-funded “necessary medical insurance.” Coverage for employed adults is funded by a 3.6 percent wage tax paid by employers. Upon withdrawal of the payroll from the bank, 3.3 percent is forwarded directly from the bank to the Territorial Insurance Fund and .3 percent is forwarded to the Central Health Fund in Moscow (see diagram below). These funds are designated to pay the medical costs of the working population. Medical costs of unemployed adults and children are funded by the government.

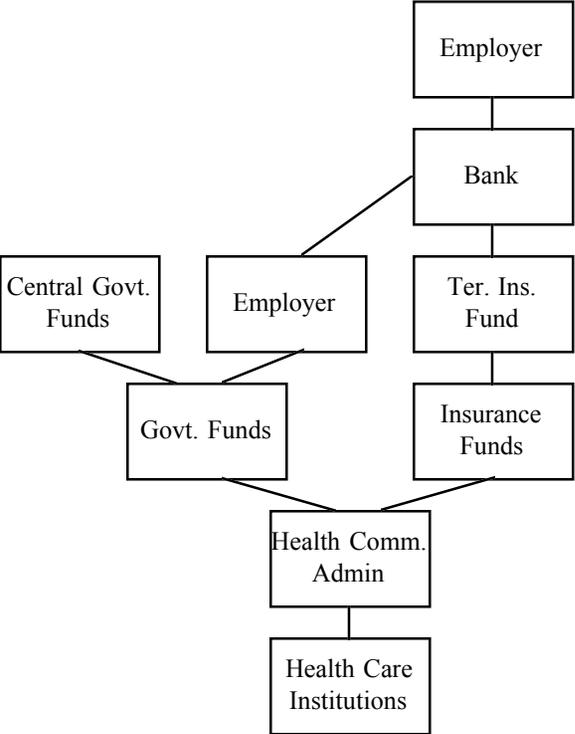
Individual insurance companies receive funds from the Territorial Insurance Fund and make disbursements to health care facilities as directed by the Administrator General of Territorial

Insurance. Disbursements are not tied to the costs incurred by specific covered individuals; instead, health care facilities report services performed and receive funds from the central government and the Territorial Insurance Fund based on the percentage of employed versus unemployed patients treated. The Territorial Insurance Fund also works with hospitals and clinics to estimate the cost of medical services, and is responsible for allocating payments where available funds are not sufficient to meet incurred expense, which is often the case.

The services for which coverage is provided are called “necessary care” and defined by the government. Each facility can charge for services it performs beyond the “necessary” level and can retain the related income. Paid services must not be included within “necessary” services or must be provided outside of normal working hours. Those patients who desire coverage for additional services may purchase voluntary insurance. The voluntary insurance companies may write policies and collect premiums. The voluntary insurance program is new and generally considered experimental.

Insurance payments are indirectly related to services performed. Reimbursement is made at the end of an outpatient episode or at discharge of an inpatient. The actual payment appeared to be based on budget considerations and the availability of funds. Insurance claims from health care facilities report the same diagnosis-based information as is contained in mandatory reports to the government. With the exception of primary surgical procedures, specific medical procedures are not captured on inpatient and outpatient automated records. The insurance companies, which are overseen by the Territorial Insurance Fund, are authorized to deduct up to fifteen percent for detected quality discrepancies.

Oblast Health Care Finance Flow Diagram



Budgeting

The overall health care budget is keyed to anticipated diagnosis within the population and is divided among providers based on services performed and associated demographics. The health care budgeting process begins with the formulation of requirements at the individual hospital and clinic/polyclinic level.

Currently, the Oblast Health Care Committee administers the consolidated funding of health care for both employed and unemployed people. Its budget is used for funding all thirty health care districts in the oblast and is split among the districts based on their requirements. Each district has a chief doctor responsible for budgeting and administering the district's funds.

Because of very high inflation rates (currently around 20 percent per month), budgets are drawn up twice a year. Each budget follows official guidelines in planning for inflation. Significant budgetary shortfalls occur, recently in the range of forty to sixty percent. As the law does not permit reduction of facilities or staff, the shortfall manifests itself mostly in facility maintenance and nonessential equipment. Chief doctors must ensure that government medical quality standards are met.

Some restrictions have been placed on special health care facilities operated for the use of individual companies or unions. All businesses are subject to the 3.6 percent tax, and no allowance is made for those that provide other support for health care facilities. While some facilities do have a special relationship with a company or union benefactor, the legal basis is cloudy at best.

Privatization

The privatization of health care in the oblast has just begun. Government regulations allow laws to be enacted regarding the creation and operation of private clinics, although as of this writing, there is no provision in the law for private health care facilities. For the most part the planning, funding, and administrating process resembles state management much more than a free market. Three primary factors are responsible for the current situation:

- Russian political and medical leaders have not yet determined the exact nature of the medical system they would like to create.
- Based on the above, the legal framework governing medical practice and financing is incomplete.
- High inflation rates inhibit the spending needed to establish privatized health care.

The *ZdravReform* Project funded by USAID is supporting the development of a private clinic to be operated by ASOPO, a private health insurance company. The project is under the close supervision of the Oblast Health Care Committee.

B. Information Systems

Overview

The majority of current health care financing systems support is dedicated to the computation of budget requirements, administering facility budgets, and reporting cases to the appropriate source for payment. Clinical support beyond accounting and budget reconciliation is largely unaddressed. As a result, practitioner requests for pathology or radiology consumed significant practitioner time. However, the regional hospital has achieved significant progress in clinical computing and provides strong practitioner support in some departments, and the cardiology clinic has incorporated computer power into its diagnostic and therapeutic systems.

Individual departments

The regional hospital has a sophisticated systems staff of about ten professionals who developed all the applications running at the hospital. In some cases, they use a database engine designed by the Computer Sciences Department at the Novosibirsk Institute. Their response time was the best I have encountered, given equipment in use and database size.

The oblast insurance management administration has a systems staff of six professionals. The staff has prepared applications to support the current scheme of health care financing within the oblast. Their system runs on a single Novell LAN and is oriented primarily toward accounting applications associated with current reimbursement methods. The current scheme does not require claims adjudication, nor was any automated adjudication capacity noted.

The Novosibirsk City Health Committee includes a systems department, which has developed a patient demographic application using Clipper that is in wide use within the city hospitals and polyclinic. The department also supports a complex system to assist with the computation of appropriate health care production rates for each of the health care provider organizations. The systems receive productivity data from the supported activities and provide summarized and “rolled up” reporting to the Oblast Health Care Committee.

Individual health care facilities have also developed some specialized applications. The diagnostic center had a reasonably sophisticated artificial intelligence application for computer-assisted diagnosis. City Polyclinic Number One had a similar application. No other use of computerized diagnosis assistance was noted.

Equipment, Operating Systems, and Commercial Software in Use

The largest computer identified during the visit was an IBM-clone 486 processor, 66 MHz, 16 megabytes RAM and 250 MD Disc. The majority of the processors in use are 386 technology, with some 286 and fewer 486. All 486 servers either are currently in use or are intended for near-term use as servers. About one-third of the PCs are connected to LAN equipment. The primary operating system in use is Microsoft DOS 6.2. There is very limited use of Microsoft Windows. LAN

technology is Novell (various releases) with one ArcNet installation. There are no fiber optic applications and only the regional hospital employed a LAN-to-LAN bridge. Two LANs were connected at that site.

Commercial software in use included dBase IV, FoxPro, Clipper, and Corriel development products. Some C programming is evident; however, the majority of the applications were generated within dBase, FoxPro, Clipper, or Corriel. There was no evidence of IBM OS/2, UNIX, Windows NT, or other advanced operating systems. There were no Microsoft Access applications in use or development. The staff we spoke with indicated a desire to use the object-oriented capabilities of the systems but were constrained by the overhead associated with Windows. There were no traditional proprietary operating systems, Russian computer systems or operating systems, or commercial, clinic, hospital, or insurance application systems in use.

Challenges Facing Oblast Health Care Information Systems

Compared to the U.S. health care system, the current health care system in Russia is burdened by relatively high costs and limited available capital to finance necessary equipment. As a result, available Russian computer power is a tiny fraction of that commonly in use in the United States. For example, there are sixty personal computers in use at the regional hospital. A comparable U.S. hospital would have a mainframe near the small end of the IBM 3090, several minicomputers in departmental or client-server roles, and at least several hundred personal computers. Most computers would typically be connected via several LANs. Clinical computing would add fifty to one hundred additional special purpose processors in several applications, such as pathology, intensive care, and medical transcription. The average MIS budget of a U.S. hospital would exceed the entire operating budget of a Russian hospital of comparable size.

While the U.S. health care system depends on raw computing power, the Russians either do without, as is generally the case, or use an exceptionally talented systems staff to get the best possible support. In Novosibirsk, the regional hospital systems staff provides the greatest possible computing power from the available equipment.

A significant challenge looms for health care information systems managers in Novosibirsk. To avoid the significant processing overhead associated with the Windows and similar operating systems, such as OS/2, they have stayed with a Microsoft DOS standard. All observed systems had the current 6.2 version installed. Microsoft is expected to begin selling Windows 95, as an upgrade to the current Windows software, later this year. Unlike current Windows 3.1, Windows 95 does not have a DOS layer. Microsoft has indicated that DOS 6.2 will probably be the last version of DOS that supports commercial grade products. As a result, all vendors of commercial products are expected to migrate those products to Windows 95, Windows NT, or both. It can be expected that DOS versions will quickly leave the shelves and support will become limited a year or so after the new versions are released.

C. Health Care Quality

A Goal-Oriented Approach to Health Care

Health care facilities in the oblast use a goal-oriented approach to medical outcome and related quality issues. At the point of diagnosis, or hospital admission for acute cases, an outcome goal is specified for the patient. The goal-setting process includes consideration of the severity of the problem, comorbidity and related factors such as age, and the nature of the disease or injury. Once the goal is established and approved, it is entered into the patient's medical record and, where automated systems are in use, into the admission or "new outpatient episode" record. At the point of discharge or "cure," the actual outcome is compared with the goal and a quantitative score is recorded. Objective outcome scores can then be used as a basis for comparison, improvement, and so forth. For example, the Novosibirsk eye clinic established its goals in terms of visual acuity, a directly measurable standard. The eye clinic maintains a formal quality review process, with a senior practitioner measuring discharge acuity and assigning the scores.

Length of Stay: An Unusual Phenomenon

As part of the extensive planning process, an anticipated length of stay for each diagnosis is established. It was noted that the actual length of stay was almost always precisely the same as the estimated length of stay. Normal statistical distribution would infer a spread of actual lengths of stay that would be represented by a bell curve. Even very high confidence intervals, which in this case would be based on extremely accurate predictions, do not support the high correlation observed. This was discussed at the exit interview, and oblast medical leadership attributed it to very accurate planning. Another possible explanation is that the projected lengths of stay, which are very long by U.S. standards, result in patients who are otherwise ready for discharge being kept longer to comply with planning factors. It is also possible that the reports are generated for funding purposes and may not represent the actual discharge date. The time available and more pressing work did not allow further examination of this phenomenon.

It should also be noted that no evidence was seen of practices or reimbursement methodologies designed to reduce medical cost by reducing subacute inpatient days.

Additional Observations

The oblast approach to rural medicine is also noteworthy. In short, the approach is to "stabilize and transport" the acute patient. Remote medical practice is restricted to those procedures that can be accomplished without inappropriate expense. The "stabilize and transport" concept would seem to have applicability in the United States as more rural hospitals close and as inadequate results continue to be observed from those that remain.

RECOMMENDATIONS

Health Care Financing

1. The usefulness of procedure data was discussed during the exit meeting. It was pointed out that U.S. and European health care financing mandate the procedure code as the fundamental basis for payment in many instances. The current international standard is IDC-9. The usefulness of the information for medical quality analysis was also discussed. Dr. Falatov, the director of the Oblast Health Care Committee, asked for copies of Russian translations of the ICD-9 procedure table. Kevin Woodward took responsibility to meet the request.
2. Several alternatives are available to provide incentives to reduce nonacute hospital days, including a flat diagnosis-related payment and declining per diem rates. USAID will be able to provide additional ideas for consideration.
3. Regarding the “length of stay” phenomenon, excessive correlation of actual performance to plan often indicates that an audit is appropriate.

Information Systems

1. **Equipment.** Health care systems in Novosibirsk are effectively tied to DOS because their limited computer power (personal computers) prevents them from running any version of Windows. However, within one or two years, the key commercial packages they use will no longer be on a DOS operating system but will only operate on Windows, forcing the oblast to make the transition to Windows. The difficulties associated with this impending change are exacerbated by high hardware costs in Russia. Planning must begin immediately as to how this to address this problem on a priority basis. This need was communicated to appropriate systems leadership, as reflected in the Exit Report.

Current 486-based processors are not powerful enough for anticipated requirements. For larger scale facilities, consideration should be given to obtaining some larger scale servers in lieu of additional personal computers; recommendations include the IBM RS6000 and Hewlett-Packard HP9000. This type of processor offers more computing power at less cost than a comparable number of personal computers connected via LAN. Local technical support for UNIX is available. No local support for Windows NT was identified during the visit. The demand is most pressing for the regional hospital, although insurance companies will also require similar computing power as they mature.

Additional technical assistance to assist with the transformation was requested. The oblast accepted Kevin Woodward’s invitation to participate in USAID-sponsored training programs. They also requested additional assistance to aid with the efficient design of the projected systems and for the design of appropriate LANs or WANs.

2. **Database and applications support.** The use of a higher powered database and applications support subsystem such as Microsoft Access should be explored. The current release is version 2.0; the use of versions 1.0 or 1.1 is not recommended.
3. **Clinical support.** Additional clinical support systems such as those in use in the regional hospital could be used throughout the hospital and polyclinic facilities to increase practitioner efficiency.
4. **Documentation.** Because all of the hardware and commercial software packages in use originate in the United States, all related technical documentation is written in English. Although many systems professionals have responded by developing reasonable English reading skills, Russian language technical references would be of considerable help.
5. **Local support.** Local training and support are not available for much of the equipment and many of the packages that would have immediate benefit. Some of the critical training will be provided through the *ZdravReform* Project. There is no shortage of technically capable people in the area. Presumably, local support will improve as the marketplace matures.

Health Care Quality

The goal-oriented approach to outcome-based medical quality could improve many U.S. clinical quality measurement systems. With the concurrence of Russian authorities, a joint U.S./Russian paper would be helpful.

NEXT STEPS FOR NOVOSIBIRSK OBLAST

During the exit meeting with Dr. Falatov, next steps were discussed as detailed below.

Actions to be taken by the Novosibirsk Health Care Committee include:

- Three physicians to participate in medical quality training in the United States.
- Three professionals to be identified for training in the United States in the areas of pharmacy utilization, cost/benefit analysis, and clinical effectiveness.
- Work to support the development of a private health care clinic.
- Promotion of cooperation among information systems departments in the oblast.

Actions to be taken by USAID include:

- Additional assistance in making specific recommendations for technical systems design and methodology.

- Detailed planning to establish an appropriate Wide Area Network capability.
- Assistance in formulating an Oblast Health Care and Insurance Systems Plan.
- Include Novosibirsk technical staff in advanced systems training to be conducted in Moscow or Siberia.
- Provide copies in Russian of ICD-9 procedure codes.

Actions to be taken by consultant include:

- Development of a joint U.S./Russian paper regarding the oblast's approach to medical quality measurement.
- Arrange translation services for correspondence between Dr. Anatoli Grigoryevich Kononov, manager of the automated systems department at the Novosibirsk Regional Hospital, and a U.S. counterpart.

ANNEX A

Agenda as Approved by the Oblast Health Care Committee

Agenda

Novosibirsk Assistance Visit
February 15–March 8

Wednesday	2/15	Travel: U.S. to Frankfurt, Germany
Thursday	2/16	Travel: Frankfurt to Moscow
Friday	2/17	Moscow: Preparation meetings with USAID
Saturday	2/18	Travel: Moscow to Novosibirsk
Sunday	2/19	Preparation, coordination with interpreter, etc.
Monday	2/20	Oblast Insurance Administration
Tuesday	2/21	Government Finance Administration
Wednesday	2/22	Mayor's Health Committee, Regional Diagnostic Center, Polyclinic Number Four
Thursday	2/23	Regional Hospital
Friday	2/24	Polyclinic Number One, Maternity Home Number Four
Saturday	2/25	Assemble flow and IS deliverables
Sunday	2/26	R&R
Monday	2/27	City Emergency Hospital
Tuesday	2/28	Eye Hospital/Clinic, Private Cardiology Clinic
Wednesday	3/1	Seminar and Exit Report preparation
Thursday	3/2	Seminar: Clinical Systems, Insurance Systems, and Primary Interfaces
Friday	3/3	Oblast exit meetings
Saturday	3/4	Draft USAID initial Trip Report
Sunday	3/5	R&R (USAID Draft Report)
Monday	3/6	Travel: Novosibirsk to Moscow
Tuesday	3/7	Presentation to USAID
Wednesday	3/8	Travel: Moscow to U.S.

ANNEX B

Persons and Facilities Visited

February 20

Dr. Vadim Borisovich Falatov, Director, Health Care Committee, and key staff members
Dr. Nikita Ilvovich Tov, Deputy Director, Health Committee
Andrey Veniaminovich Reshetnikov, Administrator General, Insurance Fund
Vira Bochkareva Nekolaevna, Deputy Director, Insurance Fund
Territorial Fund Technical MIS Staff
Fund Accounting Manager

A visit was conducted to the Office of the Administrator General of Oblast Health Insurance. After an initial meeting with Dr. Andrey Veniaminovich Reshetnikov, the host was Ms. Vira Bochkareva Nekolaevna. During the visit information was collected regarding the operation of the Territorial Insurance Fund, which is responsible for financing the health care of 850,000 employed people within the oblast. The fund's close relationship with the government allows it to participate in the projection of oblast health care costs and related budget activities.

A technical session was conducted with the information services staff. The problem related to the projected demise of Microsoft DOS was discussed. The facility is equipped with several personal computers with a Novell Local Area Network (LAN). Applications are developed with dBase and FoxPro. The primary database contains demographic data on the full employed population. While there was a significant discussion of U.S. health insurance systems, it was determined that the oblast and U.S. systems are different enough to allow only limited inferences at this time.

February 21

Yelena Andreyevna Ignatenko, Financial Manager, Regional Health Care Department
Dr. Anatoli Ivanovich Orobei, Doctor-in-Chief, Diagnostic Hospital

A visit was conducted to the Territorial Fund Administration. The host was Yelena Andreyevna Ignatenko. The findings are reflected in Chapter 2 of this report. Ms. Ignatenko and her staff made every reasonable effort to provide all of the information required.

A visit was conducted to the Novosibirsk Diagnostic Hospital/ Clinic during the afternoon of February 21. The host was Doctor-in-Charge Anatoli Ivanovich Orobei. A brief tour of the facility was provided. There was no one present to discuss technical information systems issues. The facility is equipped with an extensive array of diagnostic equipment.

Doctor Orobei demonstrated a personal-computer-based automated diagnosis application. The application runs on a LAN and is available to appropriate staff members. As no basis existed for the evaluation of medical effectiveness and the technical staff were not available to discuss design of

the system, no formal appraisal was attempted. Significant computer power is applied to budgeting and reporting against the budget.

February 22

Sergei Borisovich Dorofeyev, Deputy Chairman of Novosibirsk Health Care Committee
Victor Nikolayevich Bulkin, Deputy Chair For Medical Insurance for Novosibirsk Health Care Committee
Dr. Vera Vladimirovna Protalina, Head Physician, Polyclinic Number Four
Mikhail Vitalyevich Gusev, Director Medical Information Economic Center, Health Care Committee

A visit was conducted to the Mayor's (Novosibirsk) Health Care Committee. The hosts were Sergei Borisovich Dorofeyev and Victor Nikolayevich Bulkin. The committee oversees the work of polyclinics and hospitals located inside the city. The committee manages more than one hundred facilities. Key areas of responsibility include budgeting and managing performance of the facilities. The City Medical Economics Center includes the information systems staff and also has responsibility for ensuring quality. The center can and does reduce payments as much as fifteen percent for detected quality problems.

The City Health Care Committee's information services staff produces most of the applications used by city health care facilities. All of the programming is applied to personal computers using the Microsoft DOS operating system. The basis for budgetary planning and productivity reporting on those systems are the standard diagnosis-related categories and demographic factors associated with each activity.

A technical session was conducted with the information systems staff. The DOS problem was discussed and they appear well-positioned to move to server and then to client-server applications. Funding is the primary constraint. An examination of a price list revealed prices well above those in the United States. The staff provided copies of many of the applications they had designed; most were in Clipper with the remainder in C. They had Windows loaded on at least one computer. The technical exchange was cordial and beneficial to the information services staff and to the information gathering project.

A visit to Polyclinic Number Four was also conducted on February 22. The visit was hosted by Dr. Vera Vladimirovna Protalina. One doctor is assigned to the clinic per eight hundred to one thousand children. Each doctor has an assigned district and does much of the work with home visits. The clinic operates four personal computers. Primary systems are provided by the City Health Care Committee's information services staff. A brief half-hour session was held with the technical support person at the clinic, and assistance was provided with short- to intermediate-term planning.

February 23

Dr. Vitali P. Pushkaryov, Head Physician, Novosibirsk Regional Hospital
Boris Grigorievich Galitsky, Director of Financial Calculating Center/Insurance
Victoria Victorovna Kostyukhina, Head, Economic Calculating Department
Dr. Anatoli Grigoryevich Kononov, Manager of Automated Systems Department

A visit was conducted to the regional hospital. The initial host was Dr. Vitali P. Pushkaryov. A short session was conducted with Ms Victoria Victorovna Kostyukhina, head of the Economic Calculating Center. The remainder of the day was spent with Dr. Anatoli Grigoryevich Kononov, Chief of the Information Services staff and other technical staff members.

The hospital is very large, with 41 departments and about 1,800 beds. It also has a large polyclinic attached. There are 65 computers, most of which are connected to one of three networks. Two of the networks are connected and the other is used solely by the information services staff. Equipment ranges from XT though well-configured 486 processors configured as file servers. The LANs run on Novell 4.01. Twenty-four-hour support is provided, because many of the applications directly support clinical processes such as patient notes and pathology and radiology orders. Patient demographic data is entered once on initial admission and is available though the net thereafter.

The initial discussion of the medical quality field and its use took place during the meeting with Ms. Kostyakhina of the Economic Calculating Center. The center is responsible for economic and statistical support of the planning and budgeting mechanism, organizational methodology, the evaluation of new technology, and the voluntary insurance interface. The regional hospital has an interesting and unique application, a subsystem within the quota reporting application that addresses medical quality. At the point of initial diagnosis the best reasonably achievable outcome is identified. Then, at discharge for inpatient or end-of-episode for outpatient services, the actual outcome is noted and given a score of zero to ten in a "quality" field. Such an approach could have wide applicability within U.S. managed care.

Technical management has been very successful in obtaining greater productivity from available equipment than would seem possible. Dr. Kononov would very much like to visit or at least correspond with a similar facility in the United States or Europe. If such a relationship materializes he will teach as much as he learns.

A session was conducted with the entire systems staff. After a few introductory remarks, which included DOS concerns, a lively question and answer session was conducted. The questions revealed a mastery of the equipment and software on hand.

February 24

Dr. Yuri Alexeievich Saparonov, Doctor-in-Chief, Polyclinic Number One
Dr. Ivan Mikhailovich Pozdnyakov, Doctor in Chief, Maternity Home Number Four
Dr. Tatyana Vladimirovna Filatova, Deputy Director in Chief, Insurance and Information Systems

A visit was conducted to Novosibirsk Polyclinic Number One during the morning. The host was Doctor-in-Chief Yuri Alexeivevich Saparonov. Key items discussed included normal data flow for private insurance billing, an important topic because the polyclinic has been the initial testing ground for many of the health care financing reforms.

The polyclinic uses the applications developed by the City Health Care Committee MIS staff. There are seven personal computers in the polyclinic and a LAN is installed. Two of the processors are currently connected to the LAN. We discussed the requirement for procedure codes for commercial insurance billing.

A brief technical discussion was conducted with the technical staff, all of whom were highly qualified.

A visit was conducted to Novosibirsk Maternity Home Number Four during the afternoon. The hosts were Doctor-in-Chief Ivan Mikhailovich Pozdnyakov and Dr. Tatyana Vladimirovna Filatova (Deputy Doctor-in-Chief for Insurance and Information Systems). The facility includes a 260-bed maternity hospital and two female polyclinics. It serves a population of 200,000, including approximately 70,000 women of child-bearing age. Full-time staff includes one hundred doctors and 330 paraprofessionals and related staff. Births have dropped from 5,200 in 1991 to 3,190 in 1994. The supported population has remained constant. The birth rate for 1994 was higher than the death rate.

Several questions were answered regarding health care finance in the West. The facility has ten personal computers with a small technical support staff. Applications in use were generated by the City Health Committee MIS staff. The facility has some local applications, including a locally developed automated diagnostic aid.

A short session was conducted with the technical staff. Questions centered around anticipated changes to support billing private insurance companies and some technical issues. The support staff is highly qualified.

February 27

Dr. Vladimir Ivanovich Yarakno, Doctor-in-Chief, Emergency Hospital of Novosibirsk
Ms. Marina Sergyevna Kondratenko, Deputy Director, ASOPO Health Insurance Company

A visit was conducted to the Novosibirsk City Emergency Hospital in the morning. The host was Doctor-in-Chief Vladimir Ivanovich Yarakno. Several years ago Dr. Yarakno participated in an exchange program and visited Massachusetts General Hospital and Brigham and Women's Hospital in Boston. He gained a reasonable understanding of U.S. health care financing during that stay. His questions centered around the adequacy of commercial insurance to meet billed amounts and the extent of direct government involvement in health care finance. He also asked several questions regarding health care reform in the United States.

The hospital is equipped with eight personal computers. There are four 286, two 386, and two 486 processors. A LAN is planned for later this year. The hospital stores summaries on its 17,000 annual discharges that occupy five megabytes per year. The staff uses FoxPro and FoxBase for its applications, all of which are locally produced and maintained. The hospital currently produces a list bill based on discharges on a monthly basis. A separate bill is produced for necessary and voluntary insurance. The basis for billing is compliance with the mandated diagnosis-based MES schedule. The other primary application supported includes the accounting function and mandatory productivity reporting.

The potential problem with future use of DOS-based applications was discussed with the technical staff. They asked about the reported problem with the Pentium chip and asked several server-related questions. The technical quality of the staff is very high.

A technical assistance visit was conducted with the ASOPO Health Insurance Company at the request of the *ZdravReform* consultant. The primary point of contact was Marena Sergiyevna Kondratenko, a company director. Key MIS technical staff were also involved in the discussions.

A patient-based clinical support system was outlined. Key databases were defined and primary applications were described. A four-step process was outlined as follows:

1. Patient registration with related demographic files and the production of a specialty dependent visit form.
2. The clinical visit and the completion of the visit form by the attending physician with appropriate checks for diagnosis, procedures, required pathology and radiology procedures, prescription orders, and a memo field for notes.
3. The form is collected and appropriate pathology, radiology, and prescription forms are generated and signed by the physician as required. The claim is prepared and submitted as required.
4. Upon payment the record goes to the history file.

The basic outline of a claims processing system was also discussed. Notable exceptions from normal design included accommodation of the diagnosis-based bill for necessary insurance cases and the related rate file, which would need to be based on oblast-mandated rates keyed to MES standards.

Significant discussion was also conducted on the interfaces required between payer systems and provider systems. Special attention in this case was directed to the interfaces between the ASOPO insurance company and the captive clinic under design.

February 28

Dr. Olga Gennadievna Gusarevitch , Doctor-in-Chief, Novosibirsk Eye Clinic/ Hospital
Dr. Nataly Georgiyevna Mezentseva, Chief of Regional Cardiology Clinic/ Hospital

A visit was made to the Novosibirsk Eye Center. Clinic Director Dr. Olga Gennadievna Gusarevitch served as host. The facility's contemporary design and state-of-the-art technology, and the obvious professionalism of the staff, gave a strong positive impression.

The facility has about twenty personal computers, twelve of which are 286 and AT and the remainder of which are 386 and 486 processors. A LAN is operated with Novell Netware version 3.11. The operating system in use is Microsoft DOS 6.22. Some of the equipment is integrated into therapeutic process: for example, a PC is used to compute implant lens requirements based on patient optical metrics. B-Trive and Microsoft C are in use for applications development. A clinical and demographic application is shared by all users connected to the LAN. A temporary lodging facility is also supported with a PC application.

A one-hour technical session was conducted with the manager of information services and his staff. Key points discussed included the DOS problem and potential for migration to client server. A lively question and answer session included technical questions and the use of information services in U.S. health care.

A visit was conducted to a private cardiology clinic in Novosibirsk. The host was Dr. Nataly Georgiyevna Mezentseva. As far as could be determined, the "private" nature of the clinic was restricted to the ownership of the building. The clinic/hospital was functioning but still awaiting delivery and installation of some equipment. The clinic is currently able to perform coronary arterial bypass graft and valve replacement surgeries at the location. Very low temperatures are used in lieu of heart, lung equipment, although it was not determined if that is the method used in all cases.

The clinic uses applications developed and supported by the City Health Care Committee information services staff. Some personal computers are integrated into the diagnostic and therapeutic processes. One interesting application appeared to involve mild application of limited electrical current to specific body locations. The process is interactive, with the computer indicating the point of contact, etc. The practitioner indicated that it represented an accommodation of Eastern and Western medicine.

The information systems staff was not at the clinic during our visit.

ANNEX C

Seminar Outline

Clinical and Health Care Financing Systems Support
Novosibirsk, Russia
March 2, 1995

1. Clinical Systems

Overview and purposes of the system
System flow
Primary files
Primary applications
The use of history data
Questions and discussion

2. Insurance Systems

Overview and purposes of the system
System flow
Primary files
Primary applications
The use of history data
Questions and discussion

3. Interfaces Overview

Traditional Western insurance
Managed health care
 Outpatient
 Discounted fee for service
 Capitation ???
 Inpatient
 Discount fee for service
 Per diem
 DRG—diagnostic-related group
 Traditional
 Medical protocol based
Other models
 Canadian
 United Kingdom
 German

Questions and dicussion

4. Technical Issues

Operating systems

DOS, Windows, Windows95, Windows NT, UNIX

Application Languages

C, C++, BASIC, Visual Basic, Others

Platforms

Client server

Personal computers

Servers

Networks

LAN-Local Area Network

WAN-Wide Area Network

Bridges and Gateways

Encourage coordination and cooperation

Questions and discussion

5. Wrap Up

ANNEX D

Oblast Health Care Committee Exit Document

Observations/ Recommendations

Novosibirsk Assistance Visit

Loren Shellabarger

February 20–March 5, 1995

Observations

A list of the facilities and persons visited is attached

Technical

The efficiency of the programming is the best I have seen. The programmers are fully exploiting the power of the available equipment.

All of the computing equipment observed were personal computers of AT, 286, 386, and 486 models. All were Intel-based and all were operating on Microsoft DOS, primarily version 6.22.

About a fourth to a third of observed personal computers were connected to Local Area Networks (LAN). None were connected to Wide Area Networks. There were no client-server applications.

Most of the applications were developed using intermediate applications/database programs, primarily FoxPro, FoxBase, dBase IV, and Clipper. Some direct programming was done in the C language.

The regional hospital has achieved significant progress in clinical computing and provides strong practitioner support in some departments.

The Cardiology Clinic has achieved significant power through the incorporation of computer power into its diagnostic and therapeutic systems.

Health Care Financing

The enthusiasm of medical and systems professionals was exceptional. They are clearly dedicated to providing the best possible health care.

A very interesting approach to measuring and recording clinical quality was noted. At diagnosis the best reasonable outcome is recorded. At discharge the actual outcome is compared with the goal and stored as a numeric value. In some cases the discharge evaluation is done on a formal basis by a designated practitioner.

The current method of financing health care is based on a budget keyed to anticipated diagnosis within the population. The result is a total budget which is divided among the providers based on the services performed and associated demographics.

The majority of current health care financing systems support is dedicated to the computation of budget requirements, administering facility budgets, and reporting cases to the appropriate source for payment.

Clinical support beyond accounting and budget reconciliation is largely not addressed. As a result, practitioner requests for pathology or radiology consumed significant practitioner time.

With the exception of primary surgical procedures, specific medical procedures are not captured.

Insurance payments are indirectly related to services performed. Reimbursement is primarily at the end of an outpatient episode or at discharge of an inpatient. Actual payment appeared to be based primarily on budget considerations and the availability of funds.

There was a higher correlation of anticipated to actual length of stay and outpatient planning factors than has been observed in other health care settings.

I did not observe practices or reimbursement methodologies designed to reduce medical cost through reducing subacute inpatient days.

Recommendations

Technical

Current 486-based processors are not powerful enough for reasonably anticipated requirements. Consideration should be given to obtaining some larger scale servers in lieu of three or four personal computers for larger scale facilities. The demand is most pressing for the regional hospital. The insurance companies will also require similar computing power as they mature.

All current applications are running under the Microsoft DOS operating system. Microsoft has indicated that with the introduction of Windows95, DOS will no longer be required. No additional releases of the system are anticipated. For larger facilities, client-server technology based on at least Pentium-scale servers with Windows NT or UNIX operating systems is the most cost-effective solution. For smaller facilities, a gradual replacement of DOS-based applications with Windows based applications will need to be planned. XT and 286 processors will eventually be relegated to lower power functions such as word processing and comparatively small spreadsheet applications.

The use of higher powered database and applications support subsystem such as Microsoft Access should be explored. The current version is 2.0. It is recommended that you avoid the use of versions 1.0 or 1.1.

Additional clinical support systems, such as those in use in the regional hospital could find immediate application throughout the hospital and polyclinic facilities. Increased practitioner efficiency will be gained.

Health Care Financing

The approach to outcome-based medical quality measurement is noteworthy and would represent an improvement to many U.S. clinical quality measurement systems. A joint U.S./ Russian paper would be helpful, with the concurrence of the appropriate Russian authorities.

Most Western approaches to health care financing require the inclusion of specific procedures performed, which are reported with standard codes. The current international standard is ICD-9. CPT-4 and RVS are in common use in the United States.

Several alternatives are available to provide incentives to reduce nonacute hospital days. Examples include a flat diagnosis-related payment and declining per diem rates. USAID will be able to provide additional ideas for consideration.

Excessive correlation of actual performance to plan often indicates that an audit is appropriate.

Closing Remarks

The technical competence of the computer systems support organizations visited is truly exceptional. They are to be congratulated for their achievements.

The enthusiasm of the medical staff in difficult times is exceptional. Their commitment to the needs of their patients serves as a model to all. Evaluation of the clinical competence of the medical staff was outside of the capabilities of the visit.

I would like to thank all of the people that I was able to work with. The hospitality and professionalism demonstrated was truly exceptional.

ANNEX E

**Exit Briefing Document Presented to USAID/Moscow on March 7, 1995
(without attachments)**

INTERIM EXIT REPORT

February 15,–March 8, 1995, Novosibirsk

Prepared under Task Order 110 by:
Loren H. Shellabarger

Submitted by the *ZdravReform* Program to:
USAID/Moscow

AID Contract No. CCN-0004-C-00-4023-00
Managed by Abt Associates Inc.
with offices in: Bethesda, Maryland, USA
Moscow, Russia; Almaty, Kazakhstan, Ukraine

A copy of the exit briefing which also contains a list of all of the facilities visited and key contacts is attached in both English and Russian versions. I was requested to conduct a formal seminar to key Novosibirsk Health Care Management and Systems leadership on March 2. A copy of the seminar outline is also attached in English and Russian.

The formal objectives of the visit included:

Document the flow of health care funding in Novosibirsk Oblast.

Document key computer systems in use and primary interface points.

Provide technical assistance in the clinical and insurance areas as directed by the Russian hosts

An informal objective was to establish a positive relationship with key leadership to encourage their active participation in the *ZdravReform* project. The Novosibirsk Oblast participation had a level significantly below that of the other *ZdravReform* project oblasts.

The primary observations and recommendations are outlined in the exit document. A few of the items require additional comment.

Health care facilities in the oblast uses a goal-oriented approach to medical outcome and related quality issues. At the point of diagnosis, or hospital admission for acute cases, an outcome goal is specified for the patient. The goal-setting process includes consideration of the severity of the problem, comorbidity and related factors such as age, and the nature of the disease or injury. Once the goal is established and approved, it is entered into the patient's medical record and, where automated systems are in use, into the admission or "new outpatient episode" record. At the point of discharge or "cure," the actual outcome is compared with the goal and a quantitative score is recorded. Objective outcome scores can then be used as a basis for comparison, improvement, and so forth. For example, the Novosibirsk eye clinic established its goals in terms of visual acuity, a directly measurable standard. The eye clinic maintains a formal quality review process, with a senior practitioner measuring discharge acuity and assigning the scores.

The oblast approach to rural medicine was also interesting. In short, the approach is to "stabilize and transport" the acute patient. Remote medical practice is restricted to those procedures which can be accomplished without inappropriate expense. As more rural U.S. hospitals close and as inadequate results continue to be observed from those that remain, the "stabilize and transport" concept would seem to have applicability in the United States.

As part of the extensive planning process, the anticipated length of stay for each appropriate diagnosis is established. It was noted that the actual length of stay was almost always precisely the same as the estimated length of stay. Normal statistical distribution would infer a spread of actual lengths of stay that would be represented by a bell curve. Even very high confidence intervals, which in this case would be based on very accurate predictions, do not support the very high correlation

observed. This was discussed at the exit interview, and oblast medical leadership attributed it to very accurate planning. Another possible explanation is that the projected lengths of stay, which are very long by U.S. standards, result in the retention of patients otherwise ready for discharge to comply with the planning factors. The possibility also exists that the reports are generated for funding purposes and may not represent the actual discharge date. The time available and more pressing work did not support further examination of this phenomenon.

With the exception of inpatient surgical procedures, the inpatient and outpatient automated records do not capture or retain specific medical procedures which were rendered. The current system which is used to fund and monitor medical practice in the oblast is diagnosis-based. The usefulness of procedure data was discussed during the exit meeting. It was pointed out that U.S. and European health care financing mandate the procedure code as the fundamental basis for payment in many instances. The usefulness of the information for medical quality analysis was also discussed. The Director of the Oblast Health Care Committee, Dr. Falatov, asked for copies of Russian translations of the ICD-9 procedure table. Kevin Woodward took responsibility to meet the request.

A key systems-related technical issue emerged during the visit. All of the computer equipment within the oblast health care structure were personal computers, about a third of which are connected to Local Area Networks (LAN). There are no Wide Area Networks (WAN) in use. All of the computers use the Microsoft DOS operating system. Most are on the current (release 6.22) version. Most of the applications are programmed through application generation systems combined with database systems, such as dBase, FoxPro or Clipper. All of those applications also run on the Microsoft DOS operating system. Microsoft has indicated that with the distribution of Windows95 operating system, anticipated this summer, DOS will no longer be required with Windows. Application generation systems such as those used in the oblast are expected to quickly follow with non-DOS Windows95 versions. Support for DOS applications is expected to disappear over the next one or two years. About a third of the oblast computers are not powerful enough to run any version of Windows.

It was recommended that the acquisition of new equipment be restricted to 486 or more powerful equipment. It was further recommended that some personal computers be deferred in lieu of more powerful servers. Those servers would then run Windows NT or UNIX and appropriate database software. The recommendation was approved during the exit meeting. Additional technical assistance to assist with the transformation was requested. Mr. Woodward invited the oblast to participate in USAID sponsored training programs. The invitation was accepted. They also requested additional assistance to aid with the efficient design of the projected systems and for the design of appropriate or WANs.

Dr. Falatov requested the following at the exit meeting:

1. Additional assistance in making specific recommendations for technical systems design and methodology.
2. Detailed planning to establish an appropriate Wide Area Network capability

3. Assistance in formulating an Oblast Health Care and Insurance Systems Plan

At the completion of the meeting, Dr. Falatov also agreed to support the following activities:

1. Three physicians will participate in training in the United States related to medical quality.
2. Three professionals will be identified for training in the U.S. in the following areas: pharmacy utilization, cost/benefit analysis, and clinical effectiveness.
3. Additional work to support the development of a private health care clinic.

Dr. Falatov was most gracious in his comments regarding the effectiveness of this visit.