

TECHNICAL REPORT NO. CAR/KYR-1

**Cost Centers and
Step-down Cost Allocation:
Adjusting Hospital Cost Accounting
in Issyk-kul Oblast, Kyrgyzstan**

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Executive Summary

Background

Although health care reform has been mandated legally in the Republic of Kyrgyzstan, efforts to enact the new law have faltered. And although reform has been crippled partly by the shrinking economy and inconsistencies in the legislation, local decision-makers are having trouble developing a viable action plan and applying it to the oblast economies. There are many reasons for this, including inexperience and the lack of precedent. In March 1994, the Health Ministry scaled down the reform and implementation process to a regional experiment in Ysyk-Kul oblast and asked for technical assistance from USAID.

The technical assistance effort was designed to address the most urgent needs, which as of September 1994 included the development of

- Medical economic standards (in a more generic form, price schedule for services to be reimbursed from Territorial Sickness Funds)
- Weighted capitation fee as a bottom line for health sector funding
- Instructions describing operation of the Sickness Fund
- Operational guidelines for flow of claims and reimbursement within health facilities and to accredit institutions providing services under health insurance.

Discussion

The purpose of the current effort was to upgrade accounting practices at the hospital at Karakol Oblast by introducing the step-down method of apportioning administrative and paraclinical costs to the clinical departments. Calculating total costs by cost centers with subsequent step-down allocation of administrative and paraclinical costs to clinical departments has been applied as an integrated methodology.

Calculating indirect and then full costs provides valuable information on hospital costs, and step-down allocation of costs clearly defines the hospital's input-output structure. Separating direct from indirect and fixed from variable costs generates important data for budget analysis, helping hospitals prepare for the competitive environment which health financing is likely to bring.

The *ZdravReform* team accomplished the following:

- 1) Designed and applied accounting by cost center with step-down allocation of nonclinical to clinical costs to the 1994 annual projected budget of Ysyk-Kul Oblast Hospital located in Karakol.

- 2) Designed a programmed spreadsheet that details relevant interim or final outputs, including a) direct costs by chapter of operating expenditures and cost center; b) indirect costs by input category (as a component part of chapter allocations) and cost centers; c) total costs by cost centers; d) total costs of clinical departments including allocated costs of nonclinical departments; and e) total costs of nonclinical departments after step-down apportionment.
- 3) Wrote a manual in Russian explaining the concepts and practical use of the methodology and describing how the methodology was applied to Karakol hospital.
- 4) Conducted two seminars to teach economists from eight hospitals how to adapt the methodology to various hospital settings. Spreadsheets were demonstrated, and print-outs in both numeric and formula versions were provided.
- 5) Secured a 486 PC for local users of the methodology.
- 6) Organized training in Chimkent for economists and accountants of the local health care facilities, partly to determine the best way to teach the methodology.

Recommendations

Subsequent short-term (one to three months) activities are proposed for technical assistance donors to work with the managers of territorial health reform experiment and care providers. Recommended efforts include the following:

- Introduce the *Master Internal Structure of the Hospital*, which classifies of departments and services into Administrative/Ancillary, Paraclinical, and Clinical Departments.
- Develop price-adjusters by type of recurrent cost, initially taking into account inflation rates and the transition from subsidized government procurement to nonsubsidized purchases on the open markets.
- Develop legally endorsed operational profit conceptually and statistically, which should initially be mandated on a uniform basis across the hospitals of Ysyk-Kul Oblast.
- Build standard methodology on converting costs by clinical departments into unit costs by patient discharge.

Costs calculated by cost center according to the new methodology should be broken down into fixed and variable costs. Overall, in the absence of competition in most New Independent States (NIS) local health care markets, more costs should be treated and reimbursed as variables only. Otherwise, they will be absorbed in higher prices and recovered at full cost no matter how inefficient the hospital's performance may be.

Training is needed, including cost analysis training presenting managerial dilemmas and techniques that can resolve those dilemmas. Interactive workshops that apply new methodologies to local settings should be conducted. Based on evaluation of previous training sessions, future efforts should incorporate motivational and confidence-building activities and include strong audiovisual support. A manual on cost analysis should be prepared as another issue of the *Methodological Guidelines* to assist Ysyk-Kul health care reform experiment.

Chapter 1

Introduction and Background

The technical assistance effort undertaken in Karakol, Issyk-kul Oblast in September 1994 and described in this report derives from the health reform agenda set out in the Kyrgyz Republic in mid-1992. In its development since that time, the agenda has been updated through intensive discussions between the federal Ministry of Health and the Health Finance and Sustainability Project and *ZdravReform* teams of Abt Associates, Inc. in June-July and September 1994. This introduction describes the general framework of policy concepts and constraints that underlie this work.

In the Republic of Kyrgyzstan, Kyrgyz Health Insurance Law (Health Insurance Law, Kyrgyzstan, 1992) has mandated health care reform. Adopted July 3, 1994, the Law promoted mandatory health insurance, prospectively covering the costs of essential health services to everyone in Kyrgyzstan. Health insurance for employees will be funded by a 6 percent minimal payroll tax on employers earmarked for health insurance. For the unemployed, funding will occur by local (oblast) on-budget allocations on the basis of risk-adjusted capitation fees. Premiums from both sources will accrue to the territorial Mandatory Health Insurance (MHI) Fund for the oblast buyer of health care under the *Core Program* of health insurance. The Core Program has been conceptualized as the set of minimal match requirements for the Territorial MHI Programs. Public health, biomedical research and development, medical training, relief medical aid, services associated with catastrophic costs, equalization transfers to territorial MHI Funds, and a few other top public priorities will be funded by the Republic's Health Fund under the auspices of the Federal Ministry of Health. Allocations from the budget's general revenue will account for most of the fund's receipts, the latter being part of budgetary finance and bureaucratic resource allocation policy. Independent underwriters may provide voluntary coverage for services outside the core MHI program. The consumer's right to choose his or her health care provider has been set forth. Multiple ownership of health service institutions and even private practitioners have been suggested (although rather vaguely) by Provision 31-2 of the Health Insurance Law, legitimizing the idea of institutional reform in the health sector.

The Governmental Decree of August 16, 1993 (Government of Kyrgyzstan, 1993), set the schedule for enacting the new law. According to the Decree, mandatory health insurance will become effective on January 1, 1995. Territorial MHI programs should have been designed by September 1, 1993. Medical economic standards, comprised of diagnosis-specific levels of reimbursement and medical protocols, were also supposed to have been developed in 1993. Territorial MHI Funds and independent credentialing commissions were to be established in the same year. New elements have been added to the health reform agenda. For example, sick leave cash benefits have been transferred from the Social Insurance Fund (formerly operated by the labor unions) to under the umbrella of territorial MHI Funds. Most importantly, a large-scale effort has been undertaken to operationalize the whole framework of health reform, the latter only tentatively conceived in the Health Insurance Law. The Decree of August 16, 1993, includes by-laws that define the status and mode of operation of the territorial Sickness Funds¹, licensing and accreditation procedures for health institutions, physicians and health personnel, and insurance companies in voluntary underwriting. Master forms of MHI Policy, the MHI Contract between Sickness Fund and employer, and the MHI Contract between Sickness Fund and local government to cover unemployed citizens have been mandated. MHI's base program has been defined, with covered services classified in two large groups, with little specification within each.

1) Primary medical-sanitary services:

- Urgent care
- Diagnostic and curative outpatient care (including emergency and prephysician care)
- Preventive care and activities

2) Inpatient care

The Minister of Health's Order #276 of September 14, 1993 (Ministry of Health, Kyrgyzstan, 1993) reconfirmed 1993 as the deadline for completing the medical economic standards and establishing independent credentialing commissions. However, the deadline for designing Territorial MHI programs (based on federal guidelines set forth in the Core MHI Program) was moved forward six months to March 1, 1994.

By September 1994, the introduction of the Health Insurance Law had been postponed indefinitely *de facto*. A new law is currently under preparation to legitimize this decision by giving the President a free hand in deciding when to put MHI in place.

The evolution of health reform policy and legislation leads to the following observations and conclusions.

¹ The term *Sickness Fund* has emerged in Kyrgyzstan in 1993 to replace the *Territorial MHI Fund* as introduced by the Health Insurance Law of July 1992. The latter has been replicated from health insurance legislation mandated in Russia. Sickness Fund (literally *Sickness Kassa*), evidently, has been borrowed from Kemerovo, Western Syberia - a territory of the Russian Federation pioneering the way to insurance-based health financing. Syberians evidently picked the term from German *Krankenkassen*, also consonant with *Caisse Nationales*, as the mandatory health insurance funds in France.

There is a discrepancy between how much has been put on paper in the Law and by-laws and how little has been done. Clearly, reform action has been crippled in recent years at least in part by two conditions: 1) the economy has been shrinking dramatically, in turn shrinking both on-budget allocations and payroll tax revenues, the two primary sources of funding; and 2) the adopted legislation has had little impact due to intrinsic inconsistencies and conceptual and operational² flaws.

It is plausible to assume, however, that the main stumbling block to enforcing the Health Insurance Law is lack of competence. The domestic regulatory base is imported primarily from Russia and replicated from methodological materials generated in Western Siberia and other experimentation areas. It appears that local decision makers are unable to develop a viable action plan and apply it to specific macrofinancial settings of oblast economies. There are many reasons for this:

- Lack of expertise in managing economically independent health care facilities in a competitive environment,
- The fact that there has been no health insurance (and thus no precedent) in Soviet history since the 1920s;
- The general lack of initiative, stemming from feelings of provincial inferiority cultivated for seven decades by Moscow with respect to Kyrgyzstan and Bishkek with respect to its oblasts.

All these factors prevented health policymakers in Kyrgyzstan from eliciting response to and support for the health financing reform plans from the main stakeholders. The meaning and practical implications of the Law and by-laws are not understood either by the national capital city or locally.

Several consecutive delays in developing an operational framework for MHI brought no relief. A memorandum prepared at the Ministry of Health in September 1994 (Ministry of Health, Kyrgyzstan, 1993: Memorandum, p.2) highlights gaps in the regulatory mechanism, each gap indicating persistent violation (over two years) of the deadlines for developing respective pieces of regulation:

- Full-scale core program of Mandatory Health Insurance (federal standards to be met under territorial programs of MHI defining which services must have guaranteed access).
- Federal standards of quality of care.
- Nationally-applied uniform techniques of setting medical economic standards and prices.
- Standard credentialing procedures

² A more detailed review of Kyrgyzstan health reform legislation is planned under *ZdravReform* Program by agreement with the Federal Ministry of Health in Bishkek.

Unable to internalize the mechanisms developed elsewhere in the NIS, in March 1994 the Ministry of Health scaled down the reform and implementation process to a regional experiment in Issyk-kul^c oblast and asked for technical assistance from USAID. The agenda proposed by Kyrgyz counterparts addressed a comprehensive set of issues that may be classified into four areas:

- 1) Define the legal and operational status of MHI Funds, providers, employers, and consumers of health care.
- 2) Structure and regulate funding and contractual relationships within MHI-based system of health financing.
- 3) Control quality and penalize malpractice.
- 4) Enforce the introduction of MHI by securing mandatory enrollment of employers as payers of insurance premiums, and populations as MHI policy-holders.

The complete list of 21 issues originally set out in June (Langenbrunner J. et al., 1994, Summary) and reduced to 19 in September (Ministry of Health, Kyrgyzstan, 1993: Memorandum, p.4) suggests the following.

Those who provide technical assistance will receive a blank check in developing operational settings for the system only vaguely defined by the Health Insurance Law and subsequently adopted by-laws. The Ministry will encourage international expertise in addressing the health policy reform agenda from a zero-basis. Donors, however, must comply with a few requirements and constraints:

- 1) Be effective, thus maintaining a favorable contrast with domestic reformers who began with a comprehensive agenda yet failed to convert its concepts and general recommendations into operational guidelines that could be carried out by managers on a microlevel.
- 2) Do not emphasize the need to overhaul legislation at the national level. Revisions and amendments should be introduced quietly and gradually, initially serving the purposes of the demonstration in Issyk-kul Oblast. The coordinators of health reform at the federal level confirmed that there will be no impediment to tailoring the national legislation to the needs of local experimentation.
- 3) Sequence technical assistance in a way that addresses the most pressing needs of the reformers. As of September 1994 those were
 - medical economic standards (in a more generic form, price schedule for services to be reimbursed from Territorial Sickness Funds)
 - weighted capitation fee as a bottom line for health sector funding
 - instructions describing operation of the Sickness Fund

^c Key geographic names in this report are Issyk-kul and Karakol. Discussions have been held with the local executives on how to spell those names in Russian, given general shift in Kyrgyz toponimics from Russified back to original versions. The most accurate transliteration of officially updated names both of the oblast and its capital city are presented in this paper.

- operational guidelines for flow of claims and reimbursement within MHI-based system of care delivery
- procedures for licensing physicians and health personnel within health facilities
- procedures to accredit institutions providing services under MHI; contiguous to this is the issue of classifying hospitals and outpatient facilities into categories, each with the right to provide specific services and claim a certain level of reimbursement

From a perspective of the outlined agenda, cost accounting is relevant for calculating the cost of health services, which would also include capitation fees, user charges, and other payments. Insurance premiums are based on past and projected levels of spending as reported by providers. The provision of cost accounting generates information relevant for efficient micromanagement. In other words, technical assistance in upgrading the methodology of unit-costing addresses an important aspect of current health policy agenda in Kyrgyzstan and is a productive start in bringing about health reform.

Chapter 2

Methodology

Concepts and Terminology

Measuring the costs of hospital care is indispensable to: (1) determining financial requirements of the largest and most costly segment in the health system; (2) establishing fair and reasonable reimbursement schedules for providers; (3) calculating insurance premiums, capitation fees, and other rates of resource allocation to the health sector; (4) measuring the relative efficiency and cost effectiveness of alternative delivery strategies; (5) identifying alternative schemes of resource allocation across facilities and across services within hospitals; and (6) designing alternative cost-containment strategies.

To measure hospital costs, the cost center (CC) approach is the most well-developed and widely used methodology. The hospital's organizational structure is analyzed as a combination of CCs, each producing functionally distinct services and using inputs of production that can be easily identified. CCs largely match the structural units of the institution and/or may be distinguished as clusters of human and material resources focused on specific functions.

CCs may be classified into three types. *Final CCs* produce final output and elicit revenue from customers. In a hospital setting, these are clinical departments. *Intermediate CCs* produce essential goods and services. They provide necessary inputs and extensions to the core services, yet are complementary to the activities of the final CCs. In a hospital setting, intermediate CCs are paraclinical departments and services that are necessarily engaged in medical activities. Finally, *auxiliary CCs* provide nonmedical support services, such as administrative and housekeeping services. In contrast with administrative and housekeeping units, both clinical and paraclinical departments may be perceived as productive CCs; i.e., associated with activities that embody the mission of the hospital.

A qualitative analysis of the organizational structure and operational framework of the hospital is crucial for classifying costs centers as final, intermediate, or auxiliary. Information (initially in descriptive form) must be developed on the services that define relationships among departments. The hospital's final output should be deconsolidated along department-specific lines, in a way that emphasizes customer-supplier relationships between cost centers. Such analysis would be similar to the input-output method of data generation and analysis in macroaccounting.

Every cost center incurs direct and indirect costs. While *direct costs* are assigned to a specific cost center, *indirect costs* are incurred on an aggregate basis and allocated to CCs according to a specified method of apportionment. The cost center method of cost accounting implies that indirect costs are allocated among all CCs. As the next step, total (direct plus indirect) costs of administrative and paraclinical departments are apportioned onto the final costs (the costs of clinical departments). The apportionment may be carried out using different methods: (i) *direct apportionment*, where costs of auxiliary and intermediary CCs flow directly into the costs of final departments, (ii) *step-down allocation*, where costs are progressively apportioned from auxiliary to intermediary and further down to final CCs; and (iii) *double apportionment*, where two rounds of direct or step-down allocation take place. Any of the three methods requires choosing statistics to use as apportionment criteria, for allocating costs of auxiliary and intermediary CCs to the costs of final CCs.

Each apportionment method yields significantly different final costs, with values increasing from the first to the third method. Direct apportionment is likely to underestimate actual spending by neglecting the input-output relationships among each pair of auxiliary and intermediate CCs. The step-down allocation seems consistent in two ways: (i) it treats all functional units as cost centers; (ii) it provides a coherent interpretation of the hospital's technology and organization as a combination of direct input-output links among services and departments. Double apportionment exaggerates costs, although it is useful for analytic purposes in that it emphasizes indirect input-output relationships among CCs. The cost center methodology utilizing the step-down technique has been preferred and recommended for hospitals in the Issyk-kul demonstration area.

Algorithm

1) Identification of Cost Centers

In the current methodology, all operating costs must be assigned and allocated to auxiliary (administrative and housekeeping), intermediate (paraclinical), and final (clinical) cost centers. Most cost centers coincide with the structural units of the hospital. Auxiliary services, however, probably need to be defined as component parts of larger administrative departments. Thirty departments and services were identified within the current organizational structure of the Karakol Oblast Hospital, of which 10 were classified as clinical departments, 13 as paraclinical departments, and 7 as administrative (and housekeeping) departments. See Table 1 below.

The proposed list has since been slightly aggregated to reconcile the functional structure of the hospital with deficiencies in cost-accounting information revealed during the implementation process (see Chapter 3, "Implementation").

The Administrative Departments are nonclinical support areas that provide nonmedical service to all personnel and departments. They serve the management and operational needs of the facility. These departments perform organization, accounting, safety, sanitation, and other nonmedical functions.

The number of administrative departments can be increased or decreased based on the hospital's organization. This will be determined by the facility's ability to record direct, indirect, and depreciation costs for each department.

Paraclinical Departments are medical support departments. Each department provides medical services or support to inpatients and outpatients, including therapeutic and diagnostic services that support medical care.

Clinical Departments are classified by physician medical specialties. These departments direct and supervise services and procedures provided to inpatients. They are the final collection point for costs relating to the patient's treatment.

Table 1 Cost Centers by Functional Category

Administrative	Paraclinical	Clinical
General administration and miscellaneous administrative	Physiotherapy/Exercise Therapy	Surgical
Accounting	X-ray/Ultrasound	Traumatology
Security	Autopsy	Urology
Medical Transport	Endoscopy	Otolaryngology
Laundry	General Clinic	Ophthalmology

Kitchen	Dental Care	Internal Medicine
Methodology and Organization	Admission	Cardiology
	Emergency	Neurology
	Clinical Laboratories	Infectious Diseases
	Outpatient	Intensive Care
	Traumatology	
	Pharmacy	
	Surgical Theater	

2) Classification of Costs into Direct and Indirect

Operating costs for each administrative, paraclinical, and clinical department have been classified as direct or indirect. This is based on the established breakdown of operating expenses into 12 active chapters, each featuring an input-specific category of expenditure. Depreciation of fixed assets has been added as a nonclassifiable item to sum direct and indirect costs up to the total costs of each cost center.

Direct costs are those that relate to a department's operations and can be linked to specific departments based on the department's structure and use of resources. Thus, for each department, direct costs will include Chapter 1 *Wages and Salary*, which will be based on the department's personnel.

Indirect costs are chapter costs that do not relate directly to a specific department but can be spread among all departments based on a common functional use. These chapter costs are identified and recorded by functional area and by departmental classification (administrative, paraclinical, or clinical) and assigned based on a functional allocation statistic. For example, indirect costs include Chapter 3 *Office Supplies*, which are used by all departments and recorded to specific departments based on the supplies used.

As shown in Table 2, Chapter 18 (*Miscellaneous costs*) is classified in both the *Direct* and *Indirect* categories. Such classification implies that Chapter 18 subaccounts differ substantially, some neatly matching department-specific activities; others reflecting general functions unrelated to a specific department.

Table 2 Classification of Operating Expenses into Direct and Indirect Costs

Chapter Number	Direct Costs	Indirect Costs
1	Wages and salaries	
2	Payroll taxes and other labor surcharges	
3		Office and housekeeping
4		Business trip and per diem
5		Text books and other audiovisual supplies
8		Tuition
9	Food (Patient only)	
10	Pharmaceuticals and dressings	
12	Medical instruments (non-durable)	
14	Furniture and fixtures	
16		Capital repair
18	Miscellaneous	Miscellaneous

3) Selection of Apportionment Statistics for Allocating Indirect Costs to Costs Centers

A functional apportionment statistic must be selected to allocate each indirect cost chapter. *Table 3* suggests an apportionment basis for each indirect cost chapter. The facility should analyze available statistics and select those that functionally relate to the departments. Given the heterogeneous composition of chapters 3, 14, and 18, apportionment statistics vary by component parts of those chapters.

Some of the indirect costs in *Table 3* were interpreted originally as direct costs. The apportionment criteria for the respective items should be used only if the items themselves become indirect. Such shifts can occur whenever direct, intermediate, and overhead cost centers change place for the purposes of cost analysis, or when changes in the functional profile of departments or technological relationships among the departments occur. Fixed assets should be included in recurrent costs through capital consumption allowance calculated as annual depreciation. The calculation should assume straight-line depreciation of the book value of fixed assets, prospectively or retrospectively adjusted for inflation, and, preferably, for other factors that may significantly deviate replacement value from book value. Once depreciation is assessed, its total value is allocated to the cost centers according to their proportionate use of buildings and structures. The apportionment statistic for these types of assets would be space in square meters. Most medical and nonmedical equipment is acquired for and used by specific departments. Direct accounting, therefore, is the correct method of allocating depreciation to the cost centers.

Table 3 Criteria for Apportioning Direct to Indirect Costs

Chapter Number	Types of Indirect Costs	Apportionment Statistics
3	Heat and electricity	Square meter of building space
3	Maintenance of buildings	Cubic meter of building volume
3	Office supplies	Physician
3	Communications and postage	Physician, Telephone set
3	Contracted services	Unit of direct costs
3	Medical transport	Patient discharge
3	Maintenance of equipment	Direct accounting to departments
4	Business trips and per diem	Physician
5	Text books and other audiovisual support	Direct accounting to departments
8	Tuition	Direct accounting to departments
9	Food	Patient-day
10	Pharmaceuticals and dressings	Patient discharge
14	Uniforms	(Medical) Personnel
14	Linen	Patient-day
16	Capital Repair	Work order
18	Sanitary aviation	Direct accounting to departments

18	Milk for artificial feeding	Infant patient day
18	Dentures	Direct accounting

4) Hierarchization of Cost Centers for the Purpose of Step-Down Allocation of Costs

According to step-down procedure, administrative department and service costs are allocated to paraclinical and clinical departments, while costs of clinical departments are allocated to clinical departments only. In other words, the step-down method implies top-down allocation of costs. Costs of a *higher-ranking* department will be distributed among all the *lower-ranking* departments but will not be apportioned to a higher-ranking department.

Accordingly, the department or service that crowns the cost centers spreads its costs among all the structural units. The department ranking second allocates its costs to all but the *top-located* department, etc. Graphically, the step-down method may be represented as right-triangle matrix with a ladder-shape slope.

The outcomes of stepping down the costs will be sensitive to the order in which the cost centers appear on the vertical side of the triangle. The hierarchy must be more rigid than the real-life input-output structure of the facility. No two departments may have equal ranking. This often becomes somewhat arbitrary—many departments in the category of overhead cost centers, for example, provide services to all structural units.

The described problem indicates a limitation inherent in the step-down method. To minimize this flaw, serious attention must be focused on positioning each cost center within this top-down hierarchy. Administrative services are on top, being linked with all departments. Likewise, paraclinicals are next, being recipients of services from administrative departments and suppliers of services to the clinical departments. Finally, clinical departments are placed at the bottom of the list, as consumers of both administrative and paraclinical services. Within each of the three groups, universal suppliers should be positioned on top and net recipients at the bottom. It is assumed that there is no exchange between clinical departments—they all are treated equally as exclusive consumers of administrative and paraclinical services.

For the purpose of stepping down the costs, the cost center hierarchy may be defined in a descriptive way. A rectangular matrix may be built, with all consumer cost centers listed horizontally and supplier cost centers listed vertically. The squares in which closely related cost centers intersect should appear in one color; those featuring mid- and low-intensive relationships should be another color. Those connecting unrelated departments may be unpainted. The most intensively painted columns will show cost centers that should be high on the list. Ideally, a combination of in-depth discussions, interviews, and on-site verification of functional and technological focus of each department should be used to reinforce the above analysis.

Observing a few universal rules will make this methodology more productive: (i) inputs and outputs should be optimized in a way that reveals 80 percent of the input-output structure of the organization by analyzing the first 20 percent of the cost centers-suppliers of services; (ii) using direct accounting as a criterion of apportionment should be limited to departments whose costs cannot be stepped down in any other way; (iii) hierarchization should begin with the ancillary department that deals with the largest number of intermediate/final cost centers, or with the clinical department that has relationships with the fewest nonclinical departments.

5) Apportionment of Total Costs of the Overhead and Intermediate Departments to the Total Costs of Final Departments

There are no rigorous rules on how to apportion costs of administrative and paraclinical departments to the clinical departments. The statistic chosen for each department should be one that is able to serve as an integrative descriptor of the function and the technology of the cost center whose costs are to be apportioned. (Table 4 proposes statistics used for Administrative and Paraclinical Departments.) In some cases such criteria look quite obvious.

Table 4 Criteria of Apportionment of the Costs of Administrative and Paraclinical Departments to Clinical Departments

Administrative and Paraclinical Departments	Apportionment Statistics
General Administration and Miscellaneous Administrative	Personnel
Accounting	Direct Costs
Security	Depreciation
Laundry	Patient-days
Kitchen	Patient-days
Medical Transportation	Patient discharges
Methodology and Organization	Physicians
Admission	Direct Costs
Clinical Laboratories	Tests
Outpatient	Patient discharges
General Clinic	Tests
Pharmacy	Patient-days
X-Ray	Tests
Endoscopy	Patients diagnosed
Outpatient Traumatology	Personnel
Physiotherapy	Procedures (Sessions)
Dental	Patient discharged
Surgery Unit	Surgeries
Emergency	Visits
Autopsy	Lethal cases

For example, Autopsy costs may be allocated according to the number of autopsies performed for each clinical department. The technology and therefore the output of Autopsy are homogenous and easy to quantify using the proposed indicator. Likewise, the costs of Security may be apportioned to all departments according to the value of fixed assets or annual depreciation. The assumption here is that security services are valued according to the value of assets safeguarded.

In many other cases, however, the apportionment statistics are not at all clear and require in-depth qualitative and quantitative analysis. Preferably, it should integrate evidence from different hospitals. A sensitivity study revealing the impact on costs of shifting from one statistic to another may be an important part of the suggested analysis.

6) Calculation of Total Costs

Two stages may be distinguished in the calculation of total costs: (i) finding total costs of all cost centers; (ii) allocation of total costs of administrative and paraclinical departments to clinical departments. These two larger stages may be broken down into several more detailed steps:

1. Calculation of direct costs by all cost centers:

$$DC_i = OE_i^1 + OE_i^2 + OE_i^9 + OE_i^{10} + OE_i^{12} + OE_i^{14} + OE_i^{18} \quad (1)$$

where DC_i = direct costs of i - th cost center, OE_i^1 - costs on the first chapter of operating expenditures (basic and supplementary wages and salaries), OE_i^2 - costs on the second chapter (payroll taxes and other surcharges on labor), OE_i^9 - costs on Chapter 9 (food for patients), OE_i^{10} - costs on Chapter 10 (pharmaceuticals and dressings), OE_i^{12} - partially costs on Chapter 12 (non-durable medical instruments), OE_i^{14} - costs on Chapter 14 (furniture and fixtures), OE_i^{18} - partially costs on Chapter 18 (milk for infants, free dentures, sanitary aviation).

2. Calculation of indirect costs by all cost centers:

$$IC_i = OE_i^3 + OE_i^4 + OE_i^5 + OE_i^8 + OE_i^{16} + OE_i^{18} \quad (2)$$

where IC_i = indirect costs of i - th cost center, OE_i^3 - costs on Chapter 3 of operating expenditures (housekeeping), OE_i^4 - costs on Chapter 4 (business trip and per diem), OE_i^8 - costs on Chapter 8 (tuition), OE_i^{16} - costs on Chapter 16 (capital repair), OE_i^{18} - partially costs on Chapter 18 (except those classified into direct costs).

3. Aggregation of direct and indirect costs into total costs by each cost center:

$$TC_i = DC_i + IC_i \quad (3)$$

where TC_i - total costs of i -th cost center.

4. Step-down allocation of total costs of ancillary and paraclinical departments to total costs of clinical departments:

If i - ordinal number of the cost center in hierarchy considered on the forth step of the forth step of the algorithm, then:

$$i = 1, \dots, k, \dots, n,$$

where k - total number of administrative and paraclinical departments and services, while n - total number of departments and services. Thus, in the hierarchy of cost centers designed for step-down cost allocation, administrative and paraclinical departments will be assigned to ordinal numbers from 1 to k , while clinical departments will be assigned to numbers from $k + 1$ to n . The objective is to allocate total costs of the cost centers from 1 to k to the total costs of the cost centers from $k + 1$ to n .

The step-down allocation to the clinical department with the lowest number $k+1$ may be presented as follows:

$$TC_{k+1} = \frac{S_{k+1}^1}{\sum_{i=2}^n S_i^1} TC_1 + \frac{S_{k+1}^2}{\sum_{i=3}^n S_i^2} TC_2 + \dots + \frac{S_{k+1}^k}{\sum_{i=k+1}^n S_i^k} TC_k + TC'_{k+1} \quad (4)$$

Step-down allocation to the clinical department with the highest number n is featured by the following formula:

$$TC'_n = \frac{S_n^1}{\sum_{i=2}^n S_i^1} TC_1 + \frac{S_n^2}{\sum_{i=3}^n S_i^2} TC_2 + \dots + \frac{S_n^k}{\sum_{i=k+1}^n S_i^k} TC_k + TC_n \quad (5)$$

Essential elements of step-down allocation may be explained as component parts of the equation (5): TC'_n - total costs of n -th clinical department including stepped-down costs of non-clinical departments. Again, we consider $n-k$ clinical departments with the ordinal numbers from $k+1$ to n . Correspondingly, total costs of departments from 1 to k are subject to step-down allocation; $T\tilde{N}_i$ - total costs of n -th clinical departments as calculated according to formula (3), that is preceding step-down allocation of administrative and paraclinical costs; S_n^k - value for n -th clinical department of statistic S chosen for step-down allocation of costs of k -th non-clinical department. For example, if *Intensive Care Unit* is numbered n and step-down allocation of total costs of *Security* is based on the share of departments in annual depreciation, then S_n^k will equal depreciation for *ICU*; S_i^k - value for i -th department of statistic S chosen for step-down allocation of costs of k -th department. The sum of this statistic for all the departments located below k , provides the total against which the shares of specific departments are weighted, including n -th department.

Chapter 3

Implementation

Calculating total costs by cost centers with subsequent step-down allocation of administrative and paraclinical costs to clinical departments has been applied as an integrated methodology to Issyk-kul Oblast Central Hospital located in the city of Karakol. Data limitations and the distorting effect of economic conditions (hyperinflation, introduction of the national currency, abnormal relative prices) on value indicators affected the reliability and comparability of input statistics. Steps were taken to overcome these problems and to tailor the technique to the Karakol Hospital, including a combination of personal interviews, focus-group discussions, and examinations of accounting records and analytic reports.

- 1) Analysis of the organizational structure of Karakol Hospital identified 30 cost centers, including 7 administrative departments and services, 13 paraclinical, and 10 clinical departments (see spreadsheet 1 of the Annex).
- 2) Operating expenses were classified by input category into Directs Costs (chapters 1, 2, 9, 10, 14) and Indirect Costs (chapters 3, 4, 5, 8, 16, 18). In Chapter 18, only Sanitary aviation has been accounted for. The data on other component parts of Chapter 18 has not been recorded. Given the incidental nature of respective expenditures, it may be assumed that they were simply left out of the 1994 budget. Similarly, nondurable instruments and equipment under Chapter 12 had to be ignored.
- 3) Direct costs were identified and allocations under chapters 1, 2, 9, 10 and 14 were projected by Karakol Hospital for 1994. Projections were made by calculating Medical-Economic Standards—a schedule of diagnosis-specific reimbursement rates under mandatory health insurance. Those in-house generated projections were entered as primary data in fields B7:G38 of the spreadsheet (for a print-out of the programmed spreadsheet in its numeric and formulae versions see, respectively, Tables 1-3 and 1F and 3F).
- 4) Costs under Chapter 3 (*Housekeeping*) were identified for the first semi-annum of 1994 using the purchase order records (*Book of Accruals and Disbursements*: debit of Subaccount 200). Assessed amounts were multiplied by two to provide annual projected indicators. The following input items were considered under Chapter 3 allocations:
 - heat, electricity, gas and water
 - maintenance of buildings (including the elevator) and the territory, and sewage and sanitation
 - repair and maintenance of medical and household equipment
 - communications, postage, office supplies (including stationery and archive), medical literature, and subscription)
 - contracted services (laundry, lease, training of personnel, security)

- road transportation

- 5) Apportionment criteria were evaluated for allocating Chapter 3 to direct costs of all the hospital's cost centers. A trade-off was made to circumvent a drawback of accounting at Karakol hospital. There was no direct method of obtaining information on how space in cubic or square meters is distributed among the departments. In the absence of this important statistic, utilities and housekeeping expenditures were apportioned to cost centers according to each cost center's share of total direct costs of the hospital. Likewise, in the absence of annual depreciation of respective kinds of equipment, maintenance and repair of medical equipment and household appliances were allocated to cost centers in proportion to the department's total personnel.

Costs of communications, postage, etc. were apportioned per physician. Number of telephones was considered as an alternative statistic. The former criterion has been preferred since long-distance telephone bills are insignificant and so are basic telephone expenses. Here, as in most other cases, the choice was geared to a quantitatively more relevant component part of the chapter.

- 6) Since *Number of Personnel* has been used widely as a criterion of allocation of indirect costs to direct costs, decisions had to be made on how to identify the total and department-specific numbers of personnel. Actual number of personnel or number of positions occupied plus vacant could be used. The first option is preferred since most departments are understaffed and available personnel must handle excessive workloads. It stands to reason to reward hard-working departments by loading their direct costs with a relatively smaller share of indirect costs. This would present them as more efficient costs centers, providing planned amount of service at less expense. Hospital administrators could in turn use this as a criterion for bonuses or other economic rewards. In all, personnel has been numbered according to the information from the *Staffing Schedule for Medical, Pharmacist, and Teaching Personnel* for the Year 1994.

General and Miscellaneous Administration personnel were identified largely as a functionally residual group of employees; i.e. including: (i) physicians and nurses who are part of general administration (all but a few management positions in any NIS hospital are staffed with either physicians or nurses, the latter constituting the bulk of general administration personnel); (ii) Chief Nurse; (iii) nurses of the general hospital *staff*, that is, directing hospital services not associated with specific departments; (iv) about 40 employees of administrative and housekeeping departments who were not assigned to other cost centers.

The values of apportionment statistics for charging nonclinical costs to clinical cost centers as well as totals to be apportioned for each statistic were entered as primary data in cells N5:BU17 of the spreadsheet (see Table 2 of the Annex).

- 7) Annual depreciation of fixed assets was calculated apart from direct and indirect chapter allocations; i.e., as the third component part of the total costs before step-down allocation. A simple straight-line method was used. Hence, the annual depreciation is calculated by dividing the asset's cost by years in its life-cycle (zero salvage value is presumed for simplicity).

With respect to depreciation, it is important to figure the asset's cost, which may be used as the base for charging annual depreciation to the hospital's operating costs. In a rapidly changing economic and business environment, it is crucial to use replacement value rather than book value. Fortunately, book value was appreciated into replacement value of fixed assets for the entire health sector of Kyrgyzstan just a year ago. Evidently, the accuracy of the respective adjustment is more than questionable; the methodology has not been released. The revaluation was done as an *ad hoc* adjustment for the currency transition from ruble to som. Efforts were made to adjust for inflation over the past three years. It is hard to say, however, exactly what kind of deflator was used, although it was probably not a sector-specific cost index. Judging by the Russian experience, CPI is likely to have been used as a substitute for the health cost deflator. Besides, there is no mechanism for monitoring prices on the construction and machinery and equipment markets. Prices for both have been extremely volatile lately for two reasons: (i) economy-wide hyperinflation, and (ii) there has been a constantly changing supply mix since the collapse of centralized government as alternative sources of purchasing have not yet been found or remain unsteady.

With all the shortcomings deriving from the above mentioned problems, the replacement value of the fixed assets calculated at Karakol Hospital along the guidelines provided by Bishkek has been considered. Substantial macroinaccuracies, thus internalized in the calculation of depreciation, were accentuated by microflaws in accounting regulations and practices common to Kyrgyzstan health care sector in general and Karakol hospital in particular. The stumbling blocks are: book value accounting was abandoned a decade ago; when data on fixed assets was required, net depreciated value has been used instead; (ii) there is no perception of useful life for fixed assets in Kyrgyz health sector; the available instructions pertain only to commodity-producing industries, (iii) the lack of information measuring buildings and structures by department rendered invalid any customary approach to apportioning depreciation to the cost centers.

Given these limitations of the primary data, the following procedure has been applied:

- Given the high degree of wear and tear of the fixed assets at the Karakol hospital, an accelerated method of depreciation has been applied, uniformly setting the remaining life for buildings and structures at 10 years, and that of machinery and equipment at 3 years. This approach should compensate (at least in part) for decades of underinvestment in new technologies and should also remove worn-out assets from operation as soon as possible.

- Depreciation is calculated at 33 percent of the value of medical equipment (Account 013) and nonmedical equipment (Accounts 010, 011, 015, 016) as shown in the *Book of Value and In-kind Accounting of Material Resources* as of January 1, 1994. Equipment installed in the dormitory and warehouse was added to the assets of *General and Miscellaneous Administration*; the morgue to *Autopsy*, the central sterilization unit to *Surgical Unit*; personal computers to *Accounting* (given their exclusive use for processing time sheets and calculating monthly paychecks); dental prosthetic services to *Dental Department*; the War Veteran Department to the *Internal Medicine Department*, the kitchen that serves war veterans to the *Kitchen*.
 - Given thoroughly incomplete data on both book and replacement value of buildings and structures, listed elements were roughly estimated to account for 70 percent of the total value of fixed assets at each cost center. In other words, the value of buildings and structures derives from the value of machinery and equipment, given that the share of both larger component parts in the total amount of fixed assets is 30 and 70 percent respectively. Annual depreciation of buildings and structures has been taken at 10 percent.
 - The sum of annual depreciation of both machinery and equipment and buildings and structures has been entered as primary data in cells L24:L60 of the spreadsheet (see Table 3 of the Annex).
 - The above method of calculating depreciation should be upgraded in the future by incorporating price adjustment techniques. A coherent picture of changes in the replacement value of fixed assets may be obtained first on the basis of industry-wide capital consumption adjustment (i.e., annual change in the market price of fixed assets in the health sector), and second, by using annual deflators for prices on hospital construction and medical equipment with floating weights, (i.e., taking into account constantly changing mix of the sources of supply).
- 8) Total costs of *Administrative* and *Paraclinical* departments have been stepped down to the total costs of the *Clinical* departments.

Chapter 4

Findings

Comparative analysis of the traditional and newly proposed technique revealed three major differences between them, which are presented in Table 5.

Table 5 *Differences between Traditional and Newly Proposed Techniques of Cost Accounting in Karakol Hospital*

Traditional Methodology	Newly Proposed Methodology	Negative Effects of Using Traditional Methodology	Positive Effects of Introducing New Methodology
Administrative and paraclinical departments and services are disregarded as cost centers.	All structural units are treated as cost centers.	No attempt has been made to calculate full costs by nonclinical departments. Their role in the formation of final costs, therefore, is ignored.	Organizational structure of the hospital may be analyzed and streamlined from the viewpoint of cost-minimization.
Direct and indirect costs are not distinguished .	Chapter allocations are classified into direct and indirect costs.	The entire agenda of unit costing as analysis and management practice becomes impossible in the absence of the most essential data.	The nature of costs by every cost center is disclosed in a way that enhances cost analysis and facilitates management of unit costs.
Depreciation has been calculated on the basis of net depreciated value.	Depreciation is calculated on the basis of book value adjusted for inflation and growth of full replacement costs.	Since depreciation base has been diminishing from year to year, depreciation itself has been asymptotically approaching zero. As of 1994 its share in total costs has been projected at 0.01%.	Depreciation has become a visible component part of costs thus securing internally generated funds to cover at least part of the needs for fixed investment.

The impact of the above listed differences on the quantitative picture of costs is presented in aggregate form in Table 6.

Table 6 Cost Accounting at Karakol Hospital: Traditional versus New Methodology

Costs by Category	Costs by Groups of Cost Centers			
	Administrative	Paraclinical	Clinical	Total
Traditional Methodology				
<i>Costs in Primary Accounting</i>				
Direct Costs	NA	NA	1,593,147	1,593,147
Indirect Costs	NA	NA	3,086,297	3,086,297
Depreciation	NA	NA	NA	NA
Total of Chapters	405,912	1,575,906	4,679,444	6,661,262
<i>Costs to Allocate by Chapter to Clinical Departments</i>				
Direct, Nonclinical	NA	NA	NA	NA
Indirect, Nonclinical	NA	NA	NA	NA
Total, Nonclinical	405,912	1,575,906		1,981,818
Costs of Clinical Departments, incl. Allocated Nonclinical Costs			4,679,444	6,661,262
New Methodology				
<i>Costs in Primary Accounting</i>				
Direct costs	163,789	635,988	1,593,147	2,392,924
Indirect costs	242,123	939,918	3086297	4,268,338
Depreciation	225,644	381,261	164,299	771,204
Total	631,556	1,957,167	4,843,743	7,432,466
<i>Costs to Allocate by Cost Center to Clinical Departments</i>				
Total, Administrative	631,556			
Total Paraclinical		1,957,167		
Total				2,588,723
Costs of Clinical Departments, incl. Allocated Nonclinical Costs			4,843,743	7,432,466

The difference between total costs calculated using alternative techniques is attributed exclusively to the fact that depreciation grew from negligible to statistically significant. Proper inclusion of depreciation in health care costs pushed total hospital costs up by 11 percent.

Unlike the third innovation, the first two (see Table 4-1) did not affect total costs. However, they enabled the development of a cost profile of nonclinical departments, thus providing a coherent facility-wide picture of activity and expenditure flows among all the cost centers.

Chapter 5

Analysis and Discussion

The purpose of the current effort was to upgrade accounting practices at the hospital at Karakol Oblast by introducing the step-down method of apportioning administrative and paraclinical costs to the clinical departments.

Central Oblast Hospital was chosen as a site for demonstrating the step-down technique and customizing it to Soviet health cost accounting. Two circumstances drove this choice:

- Inpatient care accounts for about three-quarters of health expenditures in the Karakol experimentation area, thus making its hospital the most representative type of health care institution and a major target for any policy innovation.
- Central Oblast Hospital is by far the most diversified health care provider in the area, thus is an excellent showcase to demonstrate the technique. The more departments, units, and services in the facility, the higher level of sophistication required to build the correct hierarchy of departments for stepping down the costs, in addition to employing a larger variety of apportionment statistics. In other words, focusing the case approach on the most advanced and diversified facility will generate a master algorithm in its most comprehensive version. Other facilities can easily simplify the technique according to their needs.

The customary accounting structure and chapters of operating funds were analyzed thoroughly before testing and introducing an alternative methodology.

Kyrgyzstan's chapter accounting structure is similar to the Western fund accounting structure. The accounting structure identifies 18 chapter accounts. Each chapter is a functional field relating to a type of expenditure. Chapter accounting records a single expenditure by these functional fields. Once the funds allocated to a chapter are expended, no more transactions may be recorded to that field. This system is very similar to a cash basis system. One major difference is the restriction on reallocating funds from one chapter to another. For example, Wages and Salaries, Chapter 1, must be paid as such—it cannot be reallocated to Chapter 2, Payroll Taxes or any other chapter.

The present accounting structure uses 12 of the 18 chapters. The chapter headings are descriptive, identifying the input category and type of expenditure. Within each chapter, there are subfields for recording more detail. Although limited in number, these subfields provide details of expenditures based on single entries. Thus, it is assumed that an expenditure entry within a chapter means the funds have been distributed as cash. This system allows very little creativity. The chapters presently in use are

- Chapter 1, Wages and Salaries
- Chapter 2, Payroll Taxes
- Chapter 3, Office and Housekeeping
- Chapter 4, Business Trips and Per Diem
- Chapter 5, Text Books and other Audio Visual Support
- Chapter, 8 Tuition

- Chapter 9, Food (Patient only)
- Chapter 10, Pharmaceuticals and Dressings
- Chapter 12, Medical Equipment
- Chapter 14, Furniture
- Chapter 16, Capital Repair
- Chapter 18, Miscellaneous

Besides lacking flexibility and creativity, this structure fails to consider many expenditures of funds for assets or liabilities. Assets and liabilities are part of the Western accounting structure. Assets are transactions that record the present value of cash and cash holding, purchase value and adjusted market value of buildings and equipment, and other items and holdings that comprise the facility's total value. The opposite of an asset is a liability. Liabilities are future expenditures that will reduce the value of the facility. Accruals are liability transactions recorded and expended in the current period that will take place in a future period.

This does not mean that the chapter accounting structure should be changed. It is comparable to the Government Fund accounting structure, with minor modifications. Over the years, the financial economists have recognized the need to replace the assets of the facility. This led to the modification of the chapter system to include the recording of transactions that reflect the market value of assets for buildings and medical and nonmedical equipment. In accounting terms, this is described as accrual accounting. The specific transaction is the recording of asset depreciation.

The transactions to adjust the recorded values of assets, such as buildings and medical and nonmedical equipment, to market values are included as a below-the-line field in chapter accounting. The transactions, referred to as depreciation, record the adjustment in the value of each asset based on its purchase price and normal life span. These adjusted values are the recorded depreciation expenses for major assets: buildings and medical and nonmedical equipment.

These transactions are the largest noncash entries that are not assigned to specific fields within the chapter accounting structure. The accounting system did not ignore the need to record assets purchased; it simply did not provide a field in which to record the assets' market value, nor to recognize and accrue funds to replace these assets over time.

In the chapter accounting structure, transactions for construction of building and purchasing equipment were recorded within a separate field called the Capital Fund. The Capital Fund was based on the facility's planned budget. Funds for the construction of new facilities and purchase of medical and nonmedical equipment were allocated to this fund. The expenditure was recorded when the funds were authorized to acquire the asset.

On an annual basis, the planned budget estimated the funds required to repair buildings and equipment, renovate and construct buildings, and purchase equipment. As funds were approved, all but the construction and purchase expenditures were recorded in chapters 12, 14, or 16. Construction and equipment purchases were not recorded because, as described above, assets were purchased as needed and approved based on the capital budget.

In light of the shortcomings of the customary system, the proposed methodology has a few advantages that may have significant implications for health reform in Issyk-kul Oblast:

- 1) Indirect and then full costs are calculated for nonclinical departments. Statistically, this enables planners to take into account significant hospital costs that so far could escape the attention of accountants, budget planners, and analysts. Conceptually, calculating full costs across all departments (not just clinical ones) turns administrative and paraclinical units into cost centers.
- 2) Step-down allocation of costs provides a coherent picture of the input-output structure of hospital operation. This facilitates a variety of micromanagement decisions as to how to streamline the facility's organizational structure.
- 3) Separating direct from indirect and fixed from variable costs will generate information for budget analysis. This will be important to prepare hospitals for operating in a competitive environment, which is likely under health financing reform.

Upward reassessment of the actual unit costs of health care, as an outcome of applying step-down methodology, may lead to a more challenging projection of demand for health funding as expressed in capitation fee terms. Macrofinancial constraints would have to be reevaluated accordingly, and alternative approaches to health system design and financing may have to be considered seriously as policy options.

Chapter 6

Recommendations

The implementation of cost accounting by cost center with step-down allocation of non-clinical to clinical costs requires broad coordination on the Issyk-kul Oblast level. A number of short-term technical assistance activities are recommended:

- 1) Introduce the *Master Internal Structure of the Hospital* as a comprehensive listing of departments and services explicitly classified into Administrative/Ancillary, Paraclinical, and Clinical Departments. Hospitals should use this list to classify their structural units, tailoring it to the organizational realities of each specific facility. The organizational structure built under the current consultancy for Karakol Hospital may be easily upgraded to a Master Structure by including those few departments and services that exist in other hospitals but not in Karakol.
- 2) Develop a department-specific system of resource accounting that would assign each input to a specific organizational unit. The inflow of current resources should be classified automatically by departments according to their functional use and physical location. A universal coding system in use in the United States should be adapted to local cultural and technical conditions and then implemented. Stock and flow accounting will merge over time with the cost-accounting system. The technical and cost structure of the hospital will thus be presented in a coherent way that would enhance hospital management.
- 3) Develop price-adjusters by type of recurrent cost, initially taking into account inflation rates, and over the longer term appreciation of market value of fixed assets and changing mix of supply sources (transition from subsidized government procurement to nonsubsidized purchases on the open markets).
- 4) Develop operational profit—revenue in excess of costs—conceptually and statistically, and endorse it legally. The ability of health facilities to generate and retain a profit from operations should be mandated initially on a uniform basis across the hospitals of Issyk-kul Oblast. It should be developed as a trade-off between the system's ability to internalize profits in health care prices by allocating additional funds to the health sector, on the one hand, and helping providers generate funds to upgrade medical technologies and improve motivation of physicians and health personnel, on the other.] Macrofinancial constraints in the local economy and their effect on health care reimbursement should be simulated for different assumptions of profitability of health care providers. Shedding redundant supply of health care should be perceived as a variable in the model. To authorize a profit margin, the status of nonprofits should be recommended for providers of health care under MHI Program. Conceptually, introducing excess of revenue over costs will indicate the transition to the full price of the health care.

- 5) Build standard methodology on converting costs by clinical departments into unit costs by patient discharge. Neither the originally proposed severity bands nor medical economic standards provide a long-term approach to structuring the case mix for hospitals. The former are too aggregated, the latter are too disaggregated. Besides, neither of the two could classify inpatient care in a way that adequately captures clinical along with cost aspects of hospital activities. Diagnostic Related Groups, as originally conceived and evolved over 11 years of application in the United States, provide a good prototype for a case mix-based reimbursement system to be put in place in Kyrgyzstan. A conceptual description of clinical and statistical criteria that underlie formation of DRGs along with a description of the *grouping* methodology and computer program should be presented and converted into a manual for hospital managers.
- 6) Break down costs by fixed and variable costs calculated by cost center, in keeping with the new methodology proposed in this paper. Before such technical assistance is undertaken, consultants should agree on how to handle this problem conceptually. Unlike previous recommendations (*Haycock, 1994*), the authors believe that classifying costs into fixed and variables should not necessarily secure full cost recovery under current patterns of resource utilization. It should rather provide incentives for improving those patterns. Thus, depreciation on certain types of expensive yet predominantly idle equipment may be calculated against in-use time versus calendar time. This will encourage management to increase the capacity utilization ratio. By the same token, food should be apportioned to clinical departments according to the number of executed patient-days rather than capacity patient-days. Overall, in the absence of competition in most NIS local health care markets, more costs should be treated and allowed to be reimbursed as variables only. Otherwise, they will be absorbed in higher prices and recovered at full cost regardless of the hospital's level of efficiency.
- 7) Conduct cost analysis training, introducing techniques of unit, differential, sunk cost analysis, etc. Managerial dilemmas that can be resolved by those techniques need to be explained. Cases should be developed to facilitate participatory training, primarily through interactive workshops and preferably using local statistics and operational settings. A manual on cost analysis should be prepared to assist the Issyk-kul Oblast health care reforms.
- 8) Redesign the newly introduced methodology of cost accounting for polyclinics, given that polyclinics provide the second largest setting for delivering care within Kyrgyzstan's health system (hospitals provide the first). While the proposed algorithm is generic and valid for any type of institution, the list of cost centers should be overhauled to match the technology of an outpatient care facility. Most of the adaptation needs to focus on analyzing organizational structure, activity, and cost flows in the polyclinic. Preliminary examination of the profiles of polyclinics in the experimentation area suggests that Karakol City Polyclinic (affiliated with Karakol City Hospital) may be the best venue for tailoring the methodology to the peculiarities of outpatient care providers in Issyk-kul Oblast.

If recommended activities are carried out from November 1994 through February 1995, the innovation prompted by this consultancy may mature into a comprehensive reform in health accounting and management. The latter will provide necessary inputs to the reform of health care reimbursement and eventually will help redesign health care financing in Kyrgyzstan.

Chapter 8

Conclusions

The *ZdravReform* experience in provision of technical assistance to counterparts in Issyk-kul Oblast began in July 1994, with a consultancy led by Dr. John Langenbrunner (Langenbrunner et al., 1994, Unabridged). Below is a list of outputs that have been delivered to date:

- 1) The methodology of accounting by cost center with step-down allocation of nonclinical to clinical costs has been designed and applied to the 1994 annual projected budget of Issyk-kul Oblast Hospital located in Karakol.
- 2) A programmed spreadsheet has been designed. It is comprised of three segments, each generating relevant interim or final outputs: (i) direct costs by chapter of operating expenditures and cost center; (ii) indirect costs by input category (as a component part of chapter allocations) and cost centers; (iii) total costs by cost centers; (iv) total costs of clinical departments including allocated costs of nonclinical departments; (v) total costs of nonclinical departments after step-down apportionment.
- 3) A manual has been written in Russian explaining the concepts and practical use of the methodology, including a detailed description of how the methodology was applied to Karakol hospital.
- 4) Two seminars were conducted (over six hours total) to train economists from eight hospitals on how to adapt the methodology to various settings of hospital operation. spreadsheets were demonstrated as print-outs in both numeric and formulae versions. After the first seminar, the audience was asked to work out the list of cost centers and calculate direct and indirect costs by each cost center. Counterparts provided feedback to *ZdravReform* staff during the second seminar. Experience initially acquired by the local managers and accountants has been shared and enhanced by in-depth explanations by the consultants.
- 5) Additional discussions were arranged with Mr. Eugene Kutanov, system programmer working for Abt's Regional Office in Central Asia. According to specifications provided by the consultants, Mr. Kutanov converted the initially programmed spreadsheet into a user-friendly, menu-driven software product based on Excel 5.0 for Windows. Even the inexperienced user is comfortably guided through the algorithm using newly created toolbars and menus.
- 6) An advanced 486 PC has been secured for local users of the methodology through negotiations held by consultants with the Labor and Employment Office of the Oblast Government Administration, Karakol's only public owner of PCs with the necessary configuration. A local specialist has been trained in concepts and algorithm of the methodology. Mr. Kutanov added subsequent training on menu-driven software and will serve as an interface between local hospital accountants and the spreadsheet.

A training-session has been organized in Chimkent for the economists and accountants of the local health care facilities. Its purpose was to disseminate the methodology and to determine the best way to teach it to people with no prior exposure to an alternative system of cost accounting. A few conclusions about future training sessions follow. (i) Seminar attendants must be properly motivated to understand the methodology. Oblast health administrators should present the training as an inherent part of health care reform bound to be endorsed for mandatory use in the near future; (ii) Strong audiovisual support is necessary. An overhead projector, preferably with LCD panel, should become a standard part of the seminar to make it fully interactive and productive; (iii) Workshops should build confidence among the participants in their ability to use the technique.

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К Методическим рекомендациям по расчету полных удельных затрат на оказание больничной помощи

	К	L	M	N	O	P	Q	R	S	T	U	V	W
1	ТАБЛИЦА 2. РАСЧЕТ КОСВЕННЫХ ЗАТРАТ ПО ОТДЕЛЕНИЯМ И СЛУЖБАМ БОЛЬНИЦЫ												
2													
3													
4	Статьи и виды косвенных затрат	Калькуляционный объект (критерий отнесения косвенных затрат на прямые)	Число учетных единиц по каждому калькуляционному объекту) - всего по учреждению	Стоимость затрат - всего Сомов	Хирургия	Травматология	Урология	Отоларингология	Офталь				
					Число калькуляционных объектов по отделению	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению
5	3. Отопление, освещение, газо- и водоснабжение	На единицу прямых затрат	2635847	3409830	242923	314255	253126	327454	157794	204129	142685	184582.576	107708
6	3. Содержание зданий (вкл.лифт) и территории, санитарная очистка	На единицу прямых затрат	2635847	311524	242923	28710	253126	29916	157794	18649	142685	16864	107708
7	3. Ремонт и обслуживание мед. и бытовой техники	На одного работника	719.5	56350	36	2819	54	4229	28	2193	26.5	2075	19
8	3. Связь, почтовые расходы, канц. прин., мед. лит-ра, подписка	На врача	124.75	16020	10	1284	8.75	1124	2.75	353	3	385	2.5
9	3. Услуги, приобретенные на стороне (стирка, аренда, учеба, охрана)	На единицу прямых затрат	2635847	18357.22	242923	1692	253126	1763	157794	1099	142685	994	107708
10	3. Автотранспорт	На выбывшего больного	9638	302600	1240	38932	1000	31397	1000	31397	1000	31397	1000
11	4. Командировочные расходы	На врача	124.75	19980	10	1602	8.75	1401	2.75	440	3	480	2.5
12	5. Учебные пособия	Прямой учет											
13	8. Стипендии	Прямой учет											
14	16. Капитальный ремонт	Прямой учет											
15	18. Санитарная авиация	больного	9638	120600	1240	15516	1000	12513	1000	12513	1000	12513	1000
16	18. Молочное питание	На пациенто-день (по контингенту младенцев)											
17	18. Бесплатные протезы	Прямой учет											
18	ВСЕГО			4255261		404810		409796.8		270773		249291	

К Методическим рекомендациям по расчету полных удельных затрат на оказание больничной помощи

	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM
1																
2																
3	мология	Терапия	Кардиология	Неврология	Инфекционное	Реанимация	Физиотерапия и ЛФК	Рентгенодиагностика	Паталого							
4	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению
5	139334.7	229253	296570.2	225837	292150.7	99837	129153	212182	274486	164725	213095	58395	75541	27874	36059	24872
6	12730	229253	27095	225837	26691	99837	11800	212182	25077	164725	19468	58395	6901	27874	3294	24872
7	1488	34	2663	47.5	3720	17	1331	56	4386	16	1253	28	2193	11	862	11
8	321	4.25	546	5.5	706	1.5	193	4	514	8	1027	2.75	353	3	385	3.5
9	750	229253	1597	225837	1573	99837	695	212182	1478	164725	1147	58395	407	27874	194	24872
10	31397	1331	41789	1331	41789	387	12150	1049	32935	300	9419		0		0	
11	400	4.25	681	5.5	881	1.5	240	4	641	4.5	721	2.75	440	3	480	3.5
12																
13																
14																
15	12513	1331	16655	1331	16655	387	4843	1049	13126	300	3754					
16																
17																
18	198934		387595		384165		160405		352642		249885		85836		41274	

К Методическим рекомендациям по расчету полных удельных затрат на оказание больничной помощи

	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC
1																
2																
3	анатомия	Эндоскопия		Функциональная диагностика и УЗИ		Стоматология		Приемное отделение		Отделение плановой экстренной консультативной помощи		Клинико-диагностическая лаборатория		Травмотологический пункт		Апте
4	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению
5	32175	22096	28584	117273	151709	7166	9270	46515	60174	42255	54662	117280	151718	42593	55100	22354
6	2940	22096	2611	117273	13860	7166	847	46515	5498	42255	4994	117280	13861	42593	5034	22354
7	862	9	705	44.25	3466	3	235	24	1880	11.5	901	40.25	3152	18.5	1449	11
8	449	3	385	12	1541	1	128	5	642	3.5	449	13.5	1734	5	642	2
9	173	22096	154	117273	817	7166	50	46515	324	42255	294	117280	817	42593	297	22354
10	0		0		0		0		0		0		0		0	
11	561	3	480	12	1922	1	160	5	801	3.5	561	13.5	2162		0	
12																
13																
14																
15																
16																
17																
18	37159		32920		173315		10691		69318		61861		173444		62522	

К Методическим рекомендациям по расчету полных удельных затрат на оказание больничной помощи

	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS
1																
2																
3	ка	Операционный блок		Консультативная поликлиника		Оргметод. отдел		Прачечная		Пищеблок		Медицинский транспорт		Охрана		Бухгал.
4	Отнесенные на отделенные затраты	Число калькуляционных объектов по отделению	Отнесенные на отделенные затраты	Число калькуляционных объектов по отделению	Отнесенные на отделенные затраты	Число калькуляционных объектов по отделению	Отнесенные на отделенные затраты	Число калькуляционных объектов по отделению	Отнесенные на отделенные затраты	Число калькуляционных объектов по отделению	Отнесенные на отделенные затраты	Число калькуляционных объектов по отделению	Отнесенные на отделенные затраты	Число калькуляционных объектов по отделению	Отнесенные на отделенные затраты	Число калькуляционных объектов по отделению
5	28918	46177	59736	61138	79091	20788	26893	10924	14131	18233	23586	20065	25957	5965	7717	31610
6	2642	46177	5457	61138	7226	20788	2457	10924	1291	18233	2155	20065	2371	5965	705	31610
7	862	31.25	2447	25.75	2017	7.5	587	11	862	19.5	1527	14	1096	7	548	13
8	257	5.5	706	10.25	1316	4.5	578		0	0	0	0	0	0	0	0
9	156	46177	322	61138	426	20788	145	10924	76	18233	127	20065	140	5965	42	31610
10	0		0		0		0		0		0		0		0	
11	0		0		0		0		0		0		0		0	
12																
13																
14																
15																
16																
17																
18	32834		68669		90075		30660		16360		27395		29565		9012	

	BT	BU	BV
1			
2			
3	Материя	Прочие административно-хоз. подразделения	
4	Отнесенные на отделение затраты	Число калькуляционных объектов по отделению	Отнесенные на отделение затраты
5	40892	56204	72707
6	3736	56204	6643
7	1018	45	3524
8	0	0	0
9	220	56204	391
10	0		0
11	0		0
12			
13			
14			
15			
16			
17			
18	45866		83265