

TECHNICAL REPORT NO. UKR-5

**An Assessment of Plans
to Implement Per Capita Financing
in the Health System of L'viv Oblast**

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ACRONYMS

CDR	Crude Death Rate
DRG	Diagnosis-related Group
HMO	Health Maintenance Organization
IDS	Intensive Demonstration Site
IMR	Infant Mortality Rate
LOHA	L'viv Oblast Health Administration
LOS	Length of Stay
ZRP	<i>ZdravReform</i> Program

EXECUTIVE SUMMARY

1. **Project activities.** A two-person team from the *ZdravReform* Program visited L'viv Oblast in June–July 1995 to evaluate existing and proposed systems of health care financing within the oblast (province). In L'viv City, the team members consulted with officials of the oblast and city health departments, and gave a seminar to a conference of oblast physicians; they also visited health facilities in the city of Drohobych.
2. **Defects of recent system.** The oblast health authorities are in the process of changing the formulas by which oblast funds are allocated to local districts for health purposes. In the recent past, the funds have been allocated partly on the basis of the number of hospital beds in the district, and partly on the basis of the number of bed-days. The system created strong incentives to retain inpatients and keep beds filled, and weak incentives to provide outpatient treatment or promote preventive care. As a result, average lengths of hospital stay were very high by international standards.
3. **Status of interdistrict allocation reforms.** By January 1996 the oblast health authorities expect to adopt a new allocation formula, by which each local district will receive funds according to the size of its population. To be more sensitive to each district's health needs, the allocations will take into account the age-sex distribution of the populations. Eventually, adjustments may also be made for differences between districts in environmental conditions, the unit costs of providing services, and other factors.
4. **Status of intradistrict allocation reforms.** The effects of the new "per capita" financing on access, efficiency, and quality of care will be heavily dependent on how each district health authority distributes its funds between its hospitals and other facilities. The oblast authorities have given less attention so far to this lower-level but critical allocation problem. But as a result of local initiative, two models for intradistrict allocation have been developed within the oblast, respectively in L'viv City and Drohobych Region. The latter comprises Drohobych City and Drohobych Rayon (county).

Both models have the potential to produce good results, as judged by the criteria of access, efficiency, and quality of care. The L'viv City model assigns funds to the general hospital of a city ward on the basis of the ward's population; if a ward resident gets treated outside the ward, the hospital must make an "interfacility payment" to the place providing treatment. This system creates incentives for the hospital to cut costs, to promote outpatient and preventive care through its dependent polyclinics (diversified primary care facilities), and if the environment is competitive, to raise the quality of its inpatient care (so as not to lose patients and incur interfacility payments). A defect of the system is that it relies on demographic data which could be controversial.

The Drohobych Region model assigns funds to each of the region's hospitals on the basis of the inpatient cases actually treated, with a standardized payment per case depending on diagnosis. Like the L'viv City model, this system encourages cost-cutting; it has the

advantage of not relying on demographic data, and also does not necessitate interfacility payments (at least within the region); it is less stimulative of outpatient and preventive care.

5. **Proposals for further reform.** In addition to making a generally favorable evaluation of the allocation formula reforms, the team makes the following recommendations:
- Besides the two local models discussed above, the oblast might consider a capitation or subscriber model for intradistrict allocation in some settings. All individuals would subscribe (without charge) to the hospital-polyclinic complex of their choice, and each complex would receive government funds in line with the number of subscribers it was able to attract. This model would have the advantages of the L'viv City plan, but would not depend on demographic data collection.
 - Economic changes in Ukraine are shrinking the tax receipts that finance the health service allocations. Consideration should be given to new local taxes (earmarked for health services) which would reach the rapidly growing informal sector. That sector is now largely untaxed. Automobile taxation and head taxation merit examination.
 - To supplement the tax finance of government health services, user charges should be expanded. An obvious candidate for such financing is the provision of drugs during hospitalization. These are now free, whereas outpatients must pay for any drugs prescribed, a system which creates an inefficient bias in favor of hospitalization. The expansion of user charges (for the nonindigent) should be accompanied by the creation of a health insurance system, initially by the oblast authorities and eventually by the private sector.
 - The authorities should remove barriers to the private practice of medicine and to the circulation of information throughout the health "market".
 - In the recent past, hospitals served an important welfare function by providing shelter and food to the indigent elderly, particularly during the winter months. The incentives under the former system favored such an activity, since it was to a hospital's advantage to fill a bed with a patient requiring minimal treatment. Given the different incentives created by per capita financing, this welfare function should be taken over by other institutions, or hospitals should receive specific compensation for continuing to perform it.
 - The authorities at both the national and oblast levels should clearly state the objectives and constraints applying to the health sector. Health planning in Ukraine is now handicapped by the lack of such basic guidelines.
 - The country's health planning would also benefit from a large expansion of the information base. A series of empirical studies should explore such issues as patterns of household expenditure on health services, the effects of economic and environmental factors on health service utilization, and the accuracy of official population estimates.

CHAPTER 1

ASSIGNMENT BACKGROUND ¹

The *ZdravReform* (ZRP) Program was introduced to Ukraine in July 1994. At that time, senior project staff met with the Ministry of Health and also visited four oblasts (provinces) to assess them as potential intensive demonstration sites. As a result of these initial visits, three rapid response activities were identified, including: (1) an evaluation of an innovative hospital payment method in Drohobych; (2) a cost-effectiveness analysis of a pregnancy screening program using sonograms in Chernivtsi; and (3) an evaluation of a self-financing program of the Family Health Center in Odessa. In addition to these rapid response activities, an overall strategy for *ZdravReform* in Ukraine was designed.

1.1 Intensive Demonstration Site Planning Activity

The strategic plan for *ZdravReform* in Ukraine has three parts: national activities and intensive demonstration sites (IDS) in Odessa and L'viv. Two teams of ZRP consultants and local counterparts worked with local officials and decision makers in L'viv and Odessa in February–March 1995 to set the objectives for each of the IDSs for the 21-month period from April 1995 through December 1996. The intensive demonstration sites serve as areas where comprehensive and integrated market-oriented reforms are devised and tested with *ZdravReform* assistance.

The L'viv IDS activities include oblastwide work related to establishing per capita-based budgets and initiating development of patient classification systems, rayon-level planning of essential health services in Skolie and Zhovkva, facility-level experiments in establishing private practice, and four pilot facility activities on improving health care business skills and expanding user fees. The subject of this report is the establishment of a new per capita-based system of resource allocation in the health system of the L'viv Oblast. The report describes and evaluates both the existing system and the proposed per capita system of allocating health sector resources at the oblast level. The report also recommends a number of measures designed to make the new system function more effectively.

1.2 Context

The current system of health care in Ukraine is highly centralized. Resources are essentially allocated by the center to the periphery on the basis of a set of planning norms which reflect both population size and numbers and utilization of hospital beds. Although there is some dissatisfaction expressed about the division of resources between oblasts (i.e., those "closer to the center" have been favored with more beds and hence more resources over time), the two principal problems with the present resource allocation system are its rigidity and the incentives it creates for excessive use of hospitals:

¹ The authors are grateful to Annemarie Wouters and Boris Uspensky for helpful suggestions on an earlier draft.

- Managers receive their budgets in line item form (i.e., by "Article"), and there is no possibility of substituting resources across line items. If funds remain in any line item at the end of the year, the money must be returned to the center.
- Because resources for inpatient facilities are budgeted on the basis of number of beds and, in the case of some items, bed days, managers have an incentive both to increase the number of beds in their facilities over time and to maximize utilization of the existing beds in any given year. In fact, managers are in danger of losing beds if their utilization falls below a certain level.

A recent presidential order has decreed that the system will change on January 1, 1996 to one in which resources will be allocated between and within oblasts on the basis of a per capita mechanism. This change is intended to remove existing incentives for excessive hospitalization and to provide health system managers with more flexibility in managing the limited resources available to them. As part of this reform, managers will be able to substitute freely between line items in their budgets and to carry over unexpended funds from one year to the next.

In addition to the chronic problem of inefficiency, the health system in Ukraine is facing an acute crisis of resource *insufficiency*, due to shortfalls in annual budgets. The decline in state funding for health stems partly from an overall decline in the economy and partly from a shift in economic activity away from the traditional state enterprise sector, which formed a large part of the traditional tax base, toward a growing "shadow economy" (private nonenterprise sector) which is difficult to tax. In fact, presently high tax rates have provided a powerful stimulus to the shadow economy, since it is easier to conceal the income earned from these activities and thereby to avoid taxation.

1.3 Objectives

The original objectives of the field study upon which this report is based were as follows:

- To gather baseline data on L'viv Oblast and rayon health budgets, sociodemographic and economic characteristics, health status, health needs, and health utilization;
- To identify appropriate adjustment factors (age, sex, health measures, and other social characteristics) that should be used to adjust per capita allocations to rayons from the L'viv Oblast health budget;
- To identify legal requirements for implementing per capita methods for setting rayon health budgets;
- To identify information system requirements (e.g., demographic, epidemiologic, social, financial) for supporting the new per capita allocation system;

- To identify and work with staff of the L'viv Oblast Health Administration (LOHA) responsible for designing and implementing the new per capita allocation system;
- To draft a policy document on per capita allocation methods to rayons from the L'viv health budget; and
- To prepare technical documents to support the policy document on per capita allocation.

In their initial meeting with LOHA, the authors of this report (Barlow and Knowles) learned that an 11-person work team had been formed to develop recommendations to submit to the oblast *Rada* (legislature) on the implementation of per capita financing in L'viv Oblast. This work team, chaired by Dr. Nadia Melnick, Deputy Director of LOHA, had already met three times; and the authors were told that it had already developed a formula for allocating resources between rayons (counties). They were also informed that a formula for implementing per capita financing within rayons was to be tested beginning July 1 in Drohobych rayon.

The authors participated in the fourth meeting of the work team, which included a lively debate on the following two issues:

- Which types of health services should be included in a basic package of services to be provided to the population free of charge and which should be paid for through fee-for-service mechanisms; and
- Whether the government should subsidize the private sector for delivering this minimum package of health services.

It became clear through the authors' participation in this and other meetings that much more was expected of the new per capita financing system than simply a new way to allocate oblast resources between rayons. Rather it was intended to be an overall reform of public health sector financing, expected also to create a new set of incentives for operating units *within* rayons. At the same time, the authors were told that the health system was confronting a crisis of enormous magnitude from an anticipated shortfall of budgetary resources for the coming year (an estimate of expected funding equal to only 40 percent of the budget was mentioned repeatedly). Against this background, and in consultation with *ZdravReform* staff in Bethesda, the authors decided to broaden their scope of work to include the following additional objectives:

- To identify the new set of incentives provided to facility managers as the per capita system was implemented within rayons; and
- To identify alternatives for increasing the resources available to the health system in the short run.

Although Barlow and Knowles were able to achieve most of the objectives listed above, as reflected in this report, it is important to note that, contrary to expectations, they were not able to work on a sustained basis with any single counterpart group during their visit.

1.4 Methods

Barlow and Knowles used the following three criteria to evaluate both the allocation system recently in force and the new per capita financing system:

- **Access.** Does the financing system permit the entire population to have easy access to health care? Or are some citizens excluded, perhaps because it is too costly for them to obtain care? Are residents of some areas favored by easier access to care, either because more health care resources have been made available to them or because needs differ between areas due to environmental or geographical factors?
- **Quality.** Are consumers provided with services of a high quality? Or is service quality adversely affected because, for example, providers are poorly trained or poorly motivated? Do incentives provided by the system motivate providers to pursue objectives which conflict with the goal of providing services of a high quality?
- **Efficiency.** The health care system produces a certain improvement in the health of the population. Is this improvement achieved at minimum cost? Or would it be possible, by using the system's resources in a different way, to generate a larger improvement in health?

In analyzing the recent and proposed systems, the authors emphasize the role of *incentives*. Any new system is likely to install a new set of incentives for both providers and consumers, and thereby lead to changes in access, quality, and efficiency. In Ukraine, experience has demonstrated that health system managers respond strongly to incentives; it is therefore important to identify all of the incentives provided by a proposed new system as thoroughly as possible in order to understand how it is likely to perform in practice.

The methods used to collect the information contained in this report included: (1) a review of the literature on alternative methods of allocating health system resources in different countries; (2) a review of the available demographic, epidemiologic, social, financial, and health system data for L'viv Oblast; (3) a one-day team planning session with *ZdravReform* staff in Abt's Bethesda offices; (4) numerous discussions with health sector personnel and *ZdravReform* staff in L'viv Oblast; (5) a two-hour seminar on the recent and new systems of resource allocation presented to Oblast chief doctors at LOHA; and (6) a one-day field trip to the Drohobych region of L'viv Oblast.

This report is organized as follows. Chapter 1 (the present chapter) provides introductory and background information. Chapter 2 describes the recent system of resource allocation at the oblast level, including a discussion of the problems it has engendered. Chapter 3 describes the new system of per capita financing at the oblast level, i.e., the allocation of resources between

rayons. Chapter 4 discusses some alternative approaches to the allocation of resources at the rayon level under the new per capita allocation system, i.e., the allocation of resources within the rayon to individual health providers. Chapter 5 considers various options for mobilizing additional resources for the health system in the near to medium term (1–5 years). Chapter 6 provides the authors' recommendations.

CHAPTER 2

THE RECENT SYSTEM

By the "recent" system of financing health care in L'viv Oblast, the authors mean the arrangements prevailing in 1994–95. In this system (discussed in more detail in Annex A), the budget for each health facility administered by a suboblast "district" (city or rayon) was derived by using certain norms for the different budget categories. For example, budgeted salaries for a certain category of hospital staff were derived by multiplying the planned number of staff in that category by the appropriate salary rate; the planned number of staff was given by applying an oblastwide coefficient to the number of beds in the hospital (for a more detailed description of the recent system, see Annex A). Due to economic stringencies, in 1994–95 and in other recent years the facilities were obliged to operate at far below budgeted levels in most categories. In general, facilities had no significant source of income other than that provided by the health departments at the oblast, city, or rayon levels.

2.1 Performance under the Recent System

Setting aside the special problems caused by the recent stringencies, what are the advantages and disadvantages of this financing system for:

- Access to health services?

Because there were no official user charges, the system provided the population with broad access to health care. This conclusion must be modified to the extent that some providers expected to receive unofficial payments from their patients, which meant that some citizens enjoyed better access than others. In addition, the residents of some districts received more resources per capita than those of other districts and enjoyed closer proximity to specialized and tertiary care facilities.

- Quality of health services?

The recent system tended to produce excessively long hospital stays. This was an indirect result of the role of beds in the determination of budgets. Since more beds meant larger budgets because of the financing norms, hospitals had an interest in increasing their numbers of beds. The main way to get more beds (from the oblast) was to show a high occupancy rate. This provided an incentive to keep patients longer than the optimal period, in order to keep beds filled. At the same time there was an incentive to keep beds occupied by patients who required relatively little care, and to undertreat patients requiring substantial care. In many cases, the latter group was eventually referred to tertiary facilities, but only after having spent an excessive length of time in secondary-level inpatient facilities.

- Efficiency of health services?

The same interest in keeping beds filled led hospitals to encourage their affiliated polyclinics to maintain a high rate of patient referral. Hence a large number of patients visiting the polyclinics ended up hospitalized even when their conditions could have been treated adequately (and at lower cost in terms of real resources) at the primary care level. The managers of polyclinics had no incentive to resist this tendency towards overreferral, since their own budgets were not responsive to the amount of treatment provided at their facilities.

The extent to which incentives under the recent system led to excessive inpatient care is effectively illustrated by the fact that hospitals routinely filled their beds by providing shelter, including heating and food, to disadvantaged groups during the winter months. During summer months, when the demand for shelter was reduced, the hospitals would often close beds temporarily "for maintenance."

In general, polyclinic budgets did not include drugs, and patients therefore had to pay for the drugs prescribed at the polyclinics. For hospitalized patients, however, drugs were free. These pricing arrangements created further incentives—this time at the consumer level—favoring secondary care over primary care.

2.2 Management Structure under the Recent System

The entire management structure of the health system has evolved in such a way as to serve the financial objective of increasing the number of beds over time and levels of bed occupancy at a given time. The typical elements of this management structure are:

- Physician incomes include both a base salary and bonus, with the latter depending in some cases on the difference between authorized personnel costs (directly related to the authorized number of beds) and actual personnel costs (based on the actual number of personnel employed) and in other cases on the hospital's overall operating surplus. With this system, the incomes of medical staff depend on the financial operations of the hospital, thereby removing the healthy tension that exists when the objectives of doctors differ from those of administrators. In the American setting, for example, the main aim of the medical staff is to improve the quality of care, while that of the hospital administration is to control costs.
- Outpatient facilities (polyclinics) are made administratively subservient to the hospitals, with their budgets fixed by hospital administrators. Their medical staffs are swollen with large numbers of specialists (usually considered to be professionally less well qualified than corresponding inpatient specialists) whose primary mission is to refer patients to the corresponding specialty departments of hospitals. Primary care physicians within polyclinics are limited in number and serve a triage function of referring patients to an appropriate specialist. There are no incentives provided to treat patients at the outpatient level.

Although there are some interesting and encouraging exceptions to the above procedures (e.g., bonuses to medical staff related to quality of care), it is fair to say that the recent system's management structure has evolved in such a way as to reinforce the incentives provided under the recent system. This experience suggests that: (1) with new incentives, a new management structure would be likely to evolve; and (2) efforts to alter the management structure in the absence of changes in the underlying incentives would be unlikely to succeed.

CHAPTER 3

NEW SYSTEM: PER CAPITA ALLOCATION BETWEEN DISTRICTS

In L'viv Oblast, it is proposed that the budgets assigned by the oblast to its constituent districts (cities and rayons) be calculated according to their populations, rather than according to the input norms just described, and to modify in various ways a straight population basis for allocation. During the authors' visit, they learned that the L'viv Oblast Health Administration (LOHA) is planning initially to allocate funds to districts on the basis of their populations, adjusted for their age and sex compositions. It is their understanding that this same method will be used at the national level to allocate resources between oblasts. LOHA is also interested in adjusting for other factors, especially environmental health factors, but has not yet determined how to do this.

3.1 Alternative Allocation Formulae

What are the advantages and disadvantages of allocating resources between cities and rayons on the basis of:

- Population, unadjusted for other factors?

If the oblast allocates resources between its districts according to their populations rather than their health inputs (e.g. beds), this will change budgeting practices within each district. Management decisions at the facility level will tend to reflect the interests of the population being served, rather than producing the distortions noted in the previous section. To get these results, however, it will be necessary for population-based budgeting to replace input-based budgeting *within* districts as well as between them. (Issues of within-district budgeting are considered in the next section.)

The fairness of a population-based allocation depends on the accuracy of the population data employed. In L'viv, annual data on population by age and sex are available at the rayon level. These data are based on declarations of place of residency which are required of all citizens. However, it is clear that not all residents make such declarations. The authors heard reports, for example, that the populations of some rayons differ from such official estimates by as much as 20 percent. Experience in the U.S. and in other countries where population data are used as a basis for allocating resources between provinces or localities suggests that areas unhappy with the results of a per capita allocation will not hesitate to challenge the accuracy of the population data.

Patients often cross district boundaries in seeking health care, and it will be necessary to find a method of compensating those districts which are net importers of patients.

Some districts have per capita health care resource requirements which are above average, and they therefore ought to receive allocations which are above average. Such resource needs may be created by the presence of: (1) high-morbidity groups like the elderly; (2)

high costs of service delivery (e.g. transportation costs in remote regions); and (3) the presence of environmental factors which increase health care needs in some areas compared to others (e.g., pollution, adverse climate). These considerations lead to the following proposals for modification of the population basis for allocation.

- Population adjusted for age and sex?

Recognizing differences between districts in the age/sex composition of their populations will make it possible to give more resources to districts with relatively high needs for health care—due to such factors as the need for childhood vaccination, the need for pregnancy and childbirth services, and the need to treat the diseases of aging. Oblast health officials have indicated that their formula for per capita allocation will include adjustments for age and sex.

The appropriateness of the age/sex adjustment will depend on the accuracy of the coefficients representing relative need in each age/sex group. The coefficients currently favored in L'viv appear to be based on an analysis of international data on health care expenditures for a broad range of services, and their relevance for the specific requirements of L'viv Oblast needs to be assessed.

- Population adjusted for other factors, such as:

- ▲ Cost of delivering services?

If the aim is to give each district the means to achieve equal access to health care, it will be necessary to adjust per capita budgeted amounts for differences in service delivery costs and the cost of patient travel. Whereas the prices of many inputs are likely to be identical across districts (e.g. personnel, drugs), there may be some important inputs where prices differ. Particularly in rural areas, where population density is lower, the health system will not be able to exploit economies of scale and specialization to the same extent as in cities. Patients generally also have to travel further to receive care in rural areas, and must use less well-developed transportation networks.

- ▲ Environmental health factors?

Health needs in a particular district will not be adequately captured by the age/sex adjustment if the district is exposed to unusual environmental hazards (e.g., air pollution, occupational diseases in mining, temperature extremes raising risks of respiratory disease). To make the proper adjustment for such factors, it would be necessary to estimate the increase in health care resources required to compensate for the effects of these conditions. Oblast health officials have indicated their allocation formula will eventually include adjustments for environmental factors, but the exact method for doing so has not yet been determined.

▲ Health status?

The infant mortality rate is a readily available indicator of a district's health status. Across districts, it is likely to be well correlated with mortality and morbidity rates at other ages, because it is likely to reflect differences in socioeconomic factors, such as income and education, which determine an area's health status. An adjustment for the infant mortality rate might therefore be a useful supplement to the adjustment for age/sex distribution, in the attempt to recognize each district's relative health needs.

The crude death rate is another readily available indicator of health status at the district level. Unlike the infant mortality rate, however, the crude death rate also reflects variations in a district's age distribution.

One important drawback to the use of health status as a basis for allocating health system resources is that it would provide a perverse incentive to health system managers to keep health status low, since districts with lower health status would receive a larger share of oblast health resources. Oblast health officials recognize this problem and have indicated that the new allocation formula will not be based on measures of health status.

An alternative approach might involve rewarding districts with additional resources on the basis of their success in *reducing* mortality and morbidity over time. The use of such an outcomes approach to allocation is appealing because it would reward districts which make effective use of their resources. Since it is usually easier to reduce mortality and morbidity in areas where they are relatively high, an outcomes approach to allocation would also tend to favor areas with higher initial mortality and morbidity.

▲ Income?

After adjustments for age/sex differences, districts with lower per capita income are likely to have lower health status for a given level of health care resources. Per capita income is therefore an alternative to the infant mortality rate as a basis for adjusting the interdistrict allocation to reflect differences in age/sex-specific mortality and morbidity rates. Since income levels are beyond the control of health managers, the use of income as a criterion for allocating health system resources does not have the same limitations as the use of a health outcome measure, such as infant mortality.

Over time, income differentials between districts will also probably be closely related to the level of consumption of private health services, as well as an indicator of the capacity to pay user fees.

Oblast health officials have indicated an interest in adjusting resource allocation for income differences, but have indicated that the necessary data are not currently available.

3.2 Quantifying Adjustment Factors

Over time there may be a lot of interest manifested in refining the factors used to adjust per capita allocations. In such cases, the issue will inevitably arise as to the level of additional resources required to compensate for variation in such characteristics as the unit cost of delivering services, environmental health factors, and income. This question might be effectively addressed by a multivariate analysis of the factors which determine mortality and morbidity at the district level. With the results of such a study, health administrators would in principle be able to quantify the level of additional health system resources needed to compensate for variations in other determinants of health status, and to adjust norms accordingly. A detailed discussion of how such a study might proceed is presented in Annex B. At the same time, it is important to note that many such studies fail to demonstrate any statistical relationship between mortality and morbidity outcomes and health system inputs (presumably due to problems of measurement and specification). Still, given the modest level of effort involved—and assuming that the necessary district-level data are available for all or most of Ukraine—such a study should be undertaken.

3.3 Implications of Per Capita Formulas for Resource Allocation in L'viv Oblast

Basic data on district-level health expenditures, hospital beds, and population are presented in Table 3.1 (these data are discussed in detail in Annex C). Based on these data, Table 3.2 reports the percentage distribution of actual health expenditures by district for 1992 and 1993, together with hypothetical percentage distributions based alternatively on the number of hospital beds in 1992 and 1993, the 1994 population, and the 1994 age/sex-weighted population. Table 3.3 presents the rankings of districts according to their respective shares of 1992 and 1993 health expenditures as well as their rankings based on the alternative hypothetical distributions. It is clear from comparing the data in columns 2 and 3 of Table 3.3 to those in columns 6 and 7 that there will be a number of significant changes in rank in moving to the new per capita system. The major winners would be the rayons of Drohobych, Pustomyty, and Zhovkva. The principal losers would be the cities of Drohobych, Boryslav, and Chervonorad and the rayons of Skole and Stryi.

Table 3.1 L'viv Oblast: Population, Age/sex-weighted Population, Hospital Beds, and Actual Health Expenditures by District						
District (rayon/city) (1)	Total Actual Health Expenditures, 1992 (millions of kupons) (2)	Total Actual Health Expenditures, 1993 (millions of kupons) (3)	Number of Hospital Beds, 1992 (4)	Number of Hospital Beds, 1993 (5)	1994 Population (6)	1994 Age/sex- weighted Population ¹ (7)
RAYONS:						
Brody	151	5,195	655	655	67,399	72,430
Busk	96	2,962	615	570	52,096	56,776
Gorodok	137	3,450	710	680	77,202	80,921
Drohobych	67	2,084	330	330	76,900	82,005
Zhydachiv	193	5,238	705	735	83,772	92,934
Zolochiv	141	4,360	870	870	77,357	83,166
Kamianka -Buska	104	2,737	535	535	61,600	64,409
Mykolaiv	256	8,162	535	500	95,500	93,410
Mostyska	98	2,557	1,710	1642	62,552	66,631
Zhovkva	175	5,155	855	795	111,500	114,251
Peremyshlany	93	2,191	540	540	51,900	58,312
Pustomyty	104	2,861	605	605	112,000	113,867
Radehiv	80	2,818	470	450	53,801	57,276
Sambir	159	4,384	841	841	74,700	79,088
Skole	105	3,580	505	505	49,499	51,642
Sokal	160	4,478	815	785	98,700	103,536
Stary Sambir	139	4,002	780	780	85,800	91,045
Stryi	226	3,879	705	712	62,201	64,789
Turka	99	2,210	520	459	55,822	57,070
Yakoriv	214	6,401	1,090	1050	123,490	120,014
CITIES:						
L'viv	1415	49,476	4,995	4,764	779,876	724,992
Boryslav	120	3,896	470	450	44,702	45,342
Drohobych	425	9,104	1,425	1,420	104,401	99,761
Sambir	93	2,575	494	494	43,497	41,717
Stryi	248	4,247	515	635	77,720	73,691
Truskavets	68	2,224	360	350	26,500	26,396
Chervonorad	247	7,512	1,470	1152	94,799	89,815
TOTALS	5415	157,736	24,120	23,304	2,705,286	2,705,286

Source: L'viv Oblast Health Administration

Notes: ¹ The weights used to adjust the age/sex weighted populations are presented in Annex C (Table C.2).

Table 3.2
L'viv Oblast: Actual Percentage Distribution of 1992 and 1993 Health Expenditures by District
and Hypothetical Percentage Distributions Based on Number of Hospital Beds,
Population, and Age/sex-weighted Population

District (rayon/city) (1)	Actual Percentage Distribution of 1992 Health Expenditures (2)	Actual Percentage Distribution of 1993 Health Expenditures (3)	Hypothetical Percentage Distribution Based on 1992 Hospital Beds (4)	Hypothetical Percentage Distribution Based on 1993 Hospital Beds (5)	Hypothetical Percentage Distribution Based on 1994 Population (6)	Hypothetical Percentage Distribution Based on 1994 Age/sex- weighted Population (7)
RAYONS:						
Brody	2.79	3.29	2.72	2.81	2.49	2.68
Busk	1.78	1.88	2.55	2.45	1.93	2.10
Gorodok	2.54	2.19	2.94	2.92	2.85	2.99
Drohobych	1.24	1.32	1.37	1.42	2.84	3.03
Zhydachiv	3.57	3.32	2.92	3.15	3.10	3.44
Zolochiv	2.61	2.76	3.61	3.73	2.86	3.07
Kamianka -Buska	1.92	1.74	2.22	2.30	2.28	2.38
Mykolaiv	4.73	5.17	2.22	2.15	3.53	3.45
Mostyska	1.82	1.62	7.09	7.05	2.31	2.46
Zhovkva	3.23	3.27	3.54	3.41	4.12	4.22
Peremyshlany	1.72	1.39	2.24	2.32	1.92	2.16
Pustomyty	1.92	1.81	2.51	2.60	4.14	4.21
Radehiv	1.47	1.79	1.95	1.93	1.99	2.12
Sambir	2.94	2.78	3.49	3.61	2.76	2.92
Skole	1.94	2.27	2.09	2.17	1.83	1.91
Sokal	2.96	2.84	3.38	3.37	3.65	3.83
Stary Sambir	2.56	2.54	3.23	3.35	3.17	3.37
Stryi	4.18	2.46	2.92	3.06	2.30	2.39
Turka	1.83	1.40	2.16	1.97	2.06	2.11
Yakoriv	3.95	4.06	4.52	4.51	4.56	4.44
CITIES:						
L'viv	26.12	31.37	20.71	20.44	28.83	26.80
Boryslav	2.22	2.47	1.95	1.93	1.65	1.68
Drohobych	7.84	5.77	5.91	6.09	3.86	3.69
Sambir	1.73	1.63	2.05	2.12	1.61	1.54
Stryi	4.58	2.69	2.14	2.72	2.87	2.72
Truskavets	1.26	1.41	1.49	1.50	0.98	0.98
Chervonorad	4.55	4.76	6.09	4.94	3.50	3.32
TOTALS	100.00	100.00	100.00	100.00	100.00	100.00

Table 3.3
L'viv Oblast: Ranking of Districts According to Actual Distributions of 1992 and 1993 Health Expenditures
and According to Hypothetical Distributions Based on Hospital Beds,
Population and Age/sex-weighted Population

District (rayon/city) (1)	Ranking Based on Actual Distribution of 1992 Health Expenditures (2)	Ranking Based on Actual Distribution of 1993 Health Expenditures (3)	Ranking Based on Hypothetical Distribution by 1992 Beds (4)	Ranking Based on Hypothetical Distribution by 1993 Beds (5)	Ranking Based on Hypothetical Distribution by 1994 Population (6)	Ranking Based on Hypothetical Distribution by 1994 Age/sex-weighted Population (7)
RAYONS:						
Brody	12	7	14	14	16	16
Busk	22	18	15	17	22	23
Gorodok	15	17	11	13	13	13
Drohobych	27	27	27	27	14	12
Zhydachiv	8	6	12.5	11	10	8
Zolochiv	13	11	6	6	12	11
Kamianka-Buska	18	21	18.5	19	19	19
Mykolaiv	3	3	18.5	21	7	7
Mostyska	21	23	2	2	17	17
Zhovkva	9	8	7	8	4	3
Peremyshlany	24	26	17	18	23	20
Pustomyty	19	19	16	16	3	4
Radehiv	25	20	24	24.5	21	21
Sambir	11	10	8	7	15	14
Skole	17	16	22	20	24	24
Sokal	10	9	9	9	6	5
Stary Sambir	14	13	10	10	9	9
Stryi	6	15	12.5	12	18	18
Turka	20	25	20	23	20	22
Yakoriv	7	5	5	5	2	2
CITIES:						
L'viv	1	1	1	1	1	1
Boryslav	16	14	24	24.5	25	25
Drohobych	2	2	4	3	5	6
Sambir	23	22	23	22	26	26
Stryi	4	12	21	15	11	15
Truskavets	26	24	26	26	27	27
Chervonorad	5	4	3	4	8	10

Table 3.4 presents rankings of districts according to several possible additional adjusters: (1) percent of the population residing in rural areas (reflecting the cost of providing services); (2) the infant mortality rate (a measure of health status); and (3) the crude death rate (another measure of health status). In the case of percent rural, the major winners would be Brody, Drohobych, Sambir, Stryi, and Pustomyty rayons. The main losers would, of course, be the cities. In the case of the infant mortality rate, the main winners would be Turka, Gorodok, and Radehiv rayons and Truskavets and Stryi cities. The main losers would be Zhydachiv, Kamianka-Buska, and Sokal rayons and Boryslav city. In the case of the crude death rate, the main winners would be Peremyshlany, Busk, Zhydachiv, Zolochiv, and Brody rayons; the main losers would be the cities (except Sambir) and Mykolaiv and Yakoriv rayons.

Table 3.4 L'viv Oblast: Ranking of Districts According to Percent of Population Residing in Rural Areas, Infant Mortality Rate, and Crude Death Rate						
District (rayon/city) (1)	Percent Rural Population, 1995 (2)	Infant Mortality Rate, 1992/93 (3)	Crude Death Rate, 1992/93 (4)	Ranking According to Percent Rural Population (5)	Ranking According to Infant Mortality Rate (6)	Ranking According to Crude Death Rate (7)
RAYONS:						
Brody	95.9	12.85	15.40	1	15	5
Busk	67.1	11.95	15.70	12	19	2
Gorodok	66.0	18.50	13.05	14	2	12
Drohobych	91.2	13.20	14.50	2	14	8
Zhydachiv	60.3	9.35	15.65	18	26	3
Zolochiv	61.4	14.00	15.55	16.5	11	4
Kamianka-Buska	61.4	11.10	13.60	16.5	24	10
Mykolaiv	47.9	12.70	9.90	20	16	22
Mostyska	74.1	11.75	14.85	10	21.5	7
Zhovkva	66.6	11.80	12.70	13	20	13
Peremyshlany	76.0	15.05	15.90	8	6	1
Pustomyty	85.6	12.70	12.05	5	16	17.5
Radehiv	75.8	17.70	15.15	9	3	6
Sambir	89.7	13.85	12.05	3	12.5	17.5
Skole	73.4	14.80	12.60	11	7	14
Sokal	62.9	11.70	13.40	15	23	11
Stary Sambir	76.6	14.15	14.00	7	9	9
Stryi	87.3	14.10	12.05	4	10	17.5
Turka	83.0	26.50	12.35	6	1	15
Yakoriv	54.5	- ¹	10.05	19	-	21

CITIES:						
L'viv	0.0	12.15	9.05	24	18	23
Boryslav	0.0	11.00	11.05	24	25	20
Drohobych	0.0	14.60	6.15	24	8	27
Sambir	0.0	13.85	12.05	24	12.5	17.5
Stryi	0.0	16.25	8.95	24	5	24
Truskavets	0.0	17.40	6.65	24	4	26
Chervonorad	0.0	11.75	7.55	24	21.5	25

Source: L'viv Oblast Health Administration

Notes: ¹ No estimate available.

Table 3.5 reports two types of correlation coefficients (Pearson and Spearman) between actual 1992 and 1993 health expenditures by district and the following variables: 1992 and 1993 numbers of hospital beds; 1994 population; 1994 age/sex-weighted population; 1994 percent population rural; 1992/93 infant mortality rate; and 1992/93 crude death rate. The Pearson product moment (raw) correlation coefficient is a measure of the extent of linear relationship between two variables. It is bounded between one (perfect positive correlation) and minus one (perfect negative correlation), with a value of zero implying the absence of any linear relationship. Its principal shortcoming is that it is very sensitive to extreme values (L'viv City, in the present sample). The Spearman rank correlation coefficient, which is simply the Pearson correlation coefficient computed on the basis of the ordinal rankings of the two variables, does not have this shortcoming. The statistics presented in Table 3.5 point to the following conclusions:

- There is a very high correlation between actual expenditures by district in 1992 and those in 1993. At first this may seem surprising, since the absolute levels are so different due to hyperinflation. However, both correlation measures are unaffected by inflation. (Technically speaking, both are unaffected by a linear transformation of either variable).
- There is a close linear relationship between actual levels of health expenditures by district and both the number of hospital beds and population by district. The fact that the Pearson (raw) correlation coefficients are considerably larger than the Spearman rank-order correlation coefficients reflects the dominant size (statistically speaking) of L'viv City.²
- The linear relationship between health expenditures and population by district is actually stronger than that between expenditures and beds by district, suggesting that L'viv Oblast is actually closer to using a per capita system at present than the system it is believed to use (i.e.,

² With the observation for L'viv City excluded, the Pearson correlation coefficients between 1992 (1993) health expenditures and hospital beds drop to 0.51 (0.49), while those between health expenditures and population drop to 0.58 (0.65). The corresponding rank correlation coefficients drop to 0.57 (0.61) and to 0.67 (0.67).

one based on hospital beds).³ However, the weaker observed correlation between health expenditures and beds is due to only one or two extreme observations—those for Mostyska and Mykolaiv rayons.⁴

- There is a negative, but only marginally significant, correlation between health expenditures by district and the percent of a district's population residing in rural areas. This observed relationship is counter to what one would expect to observe, given the relatively higher costs of providing comparable services to dispersed rural populations. It may reflect a greater concentration of hospital beds with higher budget norms in urban areas.
- There is a negative, but only marginally significant, correlation between health expenditures by district and the crude death rate. The direction of this relationship is again counter to what would be expected. It suggests that relatively more resources are currently allocated to districts which enjoy lower levels of mortality. (An alternative explanation might be that causality is running in the reverse direction, i.e., from higher health expenditures to lower mortality.)
- There is no significant observed relationship between levels of actual health expenditures by district and levels of infant mortality rate. This is not surprising, since the relative rarity of infant deaths in a given district suggests that most of the observed variation between districts would be due to random fluctuation.

A multivariate analysis of these relationships yielded results which are consistent with all of the above conclusions.⁵ Specifically, it showed that the level of per capita health expenditures by

³ It is noted that the correlations are based on 1994 population estimates. Presumably correlations based on the 1992 and 1993 population estimates would be even higher. Unfortunately, the authors did not have access to estimates for the earlier years. It is also interesting to note that the positive linear relationship between health expenditures and population is nearly proportional. A regression of the log of 1992 and 1993 health expenditures on the log of population yielded an estimated "elasticity" (the percentage increase in expenditures which accompanies a given percentage increase in population) of 0.92 (1992) and 0.95 (1993). In another set of regressions, with per capita health expenditures as the dependent variable, the per capita number of hospital beds was statistically insignificant ($t=0.98$ in 1992 and $t=0.78$ in 1993).

⁴ For example, with only Mostyska excluded, both the Pearson and rank correlation coefficients between health expenditures and beds are very close to those between health expenditures and population in both 1992 and 1993.

⁵ The multivariate analysis involved pooling the data for 1992 and 1993, yielding a sample of 54 observations. Pooling the data required normalizing the per capita expenditure data to adjust for inflation by expressing each district's per capita health expenditure in a given year as a ratio to the overall (oblast) mean per capita health expenditure in the corresponding year. When the normalized per capita expenditure variable was regressed on a measure of relative age/sex health needs (the ratio of the age/sex-weighted population to the unweighted population), percent population rural, and the crude death rate, the R^2 was 0.51 and the estimated coefficients of all three variables were statistically significant, with that of the relative age/sex needs variable being positive ($t=2.11$) and those of percent population rural and the crude death rate being negative ($t=-2.65$ and $t=-3.51$ respectively). Neither the number of hospital beds per capita nor the infant mortality rate was statistically significant, whether entered by itself or in the presence of the other explanatory variables.

district is positively and significantly related to a measure of relative needs based on the age/sex composition of the population and negatively and significantly related both to the percent of the population residing in rural areas and the crude death rate.⁶ At the same time, it showed that per capita health expenditures are not significantly related to either the number of hospital beds per capita or the infant mortality rate.

Variable	Pearson (raw) Correlation Coefficients		Spearman (rank) Correlation Coefficients	
	Actual Health Expenditures 1992	Actual Health Expenditures 1993	Actual Health Expenditures 1992	Actual Health Expenditures 1993
Actual Health Expenditures, 1993	0.99*	-	0.91*	-
Number of Hospital Beds, 1992	0.94*	0.95*	0.61*	0.62*
Number of Hospital Beds, 1993	0.95*	0.95*	0.66*	0.65*
1994 Population	0.97*	0.99*	0.71*	0.71*
1994 Age/sex-weighted Population	0.96*	0.98*	0.66*	0.68*
Percent Population Rural, 1994	-0.41*	-0.37	-0.37	-0.39*
Infant Mortality Rate, 1992/93	-0.15 ¹	-0.17 ¹	-0.24 ¹	-0.35 ¹
Crude Death Rate, 1992/93	-0.39*	-0.33	-0.48*	-0.37

Notes: ¹ Correlation coefficient computed with N = 26.

The conclusion that emerges from the above analysis is that L'viv Oblast is already quite close to having a per capita allocation of health resources. In particular, the widely accepted view that the allocation of resources in the recent past has been more closely related to the number of hospital beds than to population size is at variance with the data examined for this report. However, the statistical analysis masks the significant changes in budget shares which would occur in some districts with the new per capita system. Since such changes are likely to cause serious short-run adjustment problems if introduced all at once, it may be preferable to phase in the new system gradually, for example, over a five-year period.

3.4 Treatment of Oblast-level Facilities

⁶ The estimated coefficient of the age/sex relative needs variable implies that a district with a value for this variable which is one standard deviation above its mean would have 16 percent higher health expenditures per capita, other things equal. Similarly, the results imply that a district with percent population rural one standard deviation above the mean would have per capita health expenditures 15 percent lower, other things equal, and a district with a crude death rate one standard deviation above the mean would have per capita health expenditures 27 percent lower, other things equal.

An important issue involved in implementing the new per capita system in L'viv Oblast has been the treatment of oblast-level facilities, such as the tertiary care hospital located in L'viv City. LOHA officials have indicated that a portion of oblast health resources will be reserved for the funding of oblast-level facilities, with the remainder being available for per capita allocation among districts. If this is the case, it is easy to foresee that it may give rise to several problems:

- If oblast-level facilities have their own resources, and if those resources do not depend on services provided, an important component of the oblast's health system will be shielded from the potential quality and efficiency gains of the new per capita system;
- Populations living near oblast-level facilities (e.g., residents of L'viv city) will continue to have favored access to such facilities; and this may need to be reflected in the level of resources provided under the district-level allocation of resources (the per capita allocation may require an additional adjustment for differential access to oblast-level facilities); and
- District-level facilities will have incentives, never previously in force, to refer their patients to oblast-level facilities in order to reduce their own costs.

These problems can be addressed most easily by including the oblast-level facilities within the new per capita system. Although it is desirable to reserve some oblast funds for the direct funding of the teaching and research functions of the oblast-level facilities, their patient care should be funded mainly by a system of payments from district fundholders directly to oblast-level facilities (or to LOHA). For example, services received at an oblast-level facility by a resident of L'viv City would be paid for by the L'viv City Health Administration; whereas those received by a resident of Drohobych would be paid for by the Drohobych district fundholder. Such district-to-oblast payments would be analogous to interfacility payments (discussed below) and would need to exceed the cost of treating the patients at the district level, so that districts would have an incentive to treat their patients at the district level (as they have had under the recent system).

CHAPTER 4

NEW SYSTEM: ALLOCATION WITHIN DISTRICTS

The per capita allocation, with or without adjustments, which has just been described would govern the distribution of resources *between* districts in L'viv Oblast. To predict the effects of the new system, it is also necessary to know how resources would be distributed *within* each district. If resources were to be distributed among institutions in each district in the same way as they have allegedly been distributed in the past (number of beds and bed occupancy), the system would be likely to function in much the same way as it has in the past. It is therefore essential to develop a new system of resource allocation *within* districts which effectively transfers the objectives of the new per capita system at the oblast and district levels to the managers of each facility.

How should resources be distributed between the institutions in each district? And what are the implications of each proposed method for the access, quality, and efficiency of health services?

Among the criteria which might be considered for within-district allocation are the following:

- Population served
- Services provided
- Subscribers enrolled

4.1 Within-district Allocation on the Basis of Population Served

Allocations to hospitals (and their dependent polyclinics) within a district might in theory be based on estimates of the population they serve (with or without adjustment for age/sex composition and other population characteristics). This approach is a natural extension of the logic underlying the per capita allocation between districts and is the method which the L'viv City Health Administration is proposing to use in an experiment with the "rayon" served by City Hospital Number One.⁷

In the case of other districts, the concept of the population served may not be as simple to identify as is the case with L'viv City's intracity rayons. Even in the case of L'viv City, however, an allocation based on population served confronts several problems. First, a significant share of the population in the rayon served by City Hospital Number One receives primary health services from facilities located in other rayons, while it has been estimated that as much as one-half of City Hospital Number One's services are provided to residents of other rayons. One reason for the

⁷ The word "rayon" is used for two types of locality, which in English would be called "counties" and "wards." Although L'viv City is subdivided into five ward-type rayons, there is no ward-level health administration. The L'viv City Health Administration is the fundholder for all five intracity rayons and can therefore be considered to be responsible for a single district.

latter is that each city hospital provides some specialized services not available elsewhere in the city. Second, there are a number of other institutions within the rayon that provide specialized services, and a method has to be devised for allocating resources to them.

The principle that resources should follow patients implies a system of interfacility payments in cases where resources are allocated on the basis of population served. The L'viv City Health Administration and staff of City Hospital Number One recognize this problem and have gone through the process of estimating the cost of various services provided within the rayon so that such interfacility payments can be set at appropriate levels.

Interfacility payments play another important role within a system in which resources are allocated on the basis of population served. In the absence of such payments, facilities would have no incentive to provide any services at all, since the resources they receive would not be linked to services provided. With interfacility payments, however, facilities have an incentive to provide services to populations from other rayons (since they receive an interfacility payment in this case), and failure to provide adequate services to their own rayon populations would mean that they would have to make interfacility payments to the facilities which did provide such services. Clearly, this presupposes that there is a sufficient basis for competition between providers (i.e., consumers are free to obtain services from other providers and can fairly easily do so).

When there is the potential for effective competition between providers, as is the case in L'viv City, and when a system of interfacility payments is in force, within-district allocation of resources on the basis of population served provides powerful incentives for cost-effective provision of health care. As with allocation on the basis of number of subscribers (discussed below), hospitals and their dependent polyclinics have an incentive not only to control costs for inpatient and outpatient services provided but also to provide preventive health care and to treat patients on an outpatient basis whenever it is cost effective to do so.

It is the authors' conclusion that the allocation of resources according to population served can be an effective basis for allocating resources within districts when the following conditions are met: (1) it is possible to identify the population served by the principal facilities; (2) a system of interfacility payments is in place so that resources can follow populations to facilities offering specialized services and to facilities serving other populations; and (3) there is a basis for effective competition between hospitals. In the absence of conditions (2) and (3) the population becomes a captive market, and the facility has no incentive to provide adequate services. In this case, attaining adequate levels of performance, in terms of access and quality, will depend on effective performance monitoring by the district fundholder.

4.2 Within-district Allocation on the Basis of Services Provided: Case-based Reimbursement

Resources can also be allocated to all facilities in a district by a central fundholder on the basis of services delivered. For example, polyclinics can be reimbursed on the basis of visits; and hospitals can be reimbursed on the basis of their actual numbers of patients, with patients weighted by the expected treatment cost associated with their diagnoses (i.e., case-based reimbursement). This is similar to the system which Drohobych region (which consists of Drohobych City and Drohobych Rayon) has adopted. In this case, case-based rates of reimbursement are defined for each inpatient department on the basis of the "expected length of stay" characterizing the department's cases.⁸ Allocating funds to institutions on the basis of services provided has several advantages over other methods:

- Institutions receive resources only when they provide actual services. This avoids a situation in which institutions with an assured source of revenue have no incentive to provide services.
- There is no need for interfacility payments within the district. Facilities receive payment from the district fundholder for any patient treated, regardless of the patient's place of residence (however, there is still a need for interdistrict payments in cases where patients from one district receive services from another).
- With a case-based reimbursement mechanism, inpatient facilities have an incentive to control costs, both by reducing the actual length of stay below the expected length of stay and by reducing costs per bed day.
- Facilities must attract patients to earn revenue. Thus, they have an incentive to provide a good quality of service. This quality incentive applies equally to inpatient and outpatient facilities.
- It is relatively easy to transform this system into a single-payer insurance scheme which might cover the services of private providers as well as those of public providers.
- The system can in principle be implemented in any district, since it does not require the ability to link up facilities with a given population and since it does not require competition between providers (facilities do not receive any payment without providing services to consumers).

At the same time, it is important to recognize certain limitations of this approach to intradistrict resource allocation:

⁸ Strictly speaking, the Drohobych formula is not "case-based" since transfer of a patient from one inpatient department to another makes the second department eligible to receive another reimbursement. For the details of the Drohobych formula, the reader is referred to Wouters and Quinn (1995).

- The fairness of this method depends on the accuracy of diagnosis, and on the realism of the treatment cost specified by the district for each type of case. There would be an incentive for hospitals to misrepresent diagnosis, so as to place each patient in a more expensive treatment category than is medically justified.
- The case-based reimbursement formula would also provide an incentive to transfer difficult patients to oblast-level facilities, particularly if no downward adjustment were made in the payment received by the referring facility (the district-level fundholder would have an incentive to penalize a hospital for referring patients to oblast-level facilities only if the district were obligated to reimburse the oblast-level facilities for such care, as discussed above).
- The incentive to overhospitalize which characterizes the recent system would remain intact, since hospitals would obtain revenue only when patients were admitted.
- As with any reimbursement system based on services provided, there would be an incentive to provide curative care but little if any incentive to provide preventive care.
- There is no mechanism to ensure that the level of payments to facilities remains within the overall budget of the district fundholder.
- The system would have inpatient facilities *competing* with outpatient facilities for patients.⁹ With patients free to go directly to an inpatient facility for care (as they must be able to do if there is to be effective competition between inpatient and outpatient facilities), and with inpatient facilities associated in the consumer's mind with higher quality, there would be a tendency for too much care to be provided by relatively expensive inpatient facilities, and too little by relatively inexpensive outpatient facilities.

To cope with these problems, the district-level fundholder will have to play an active role in orienting the overall system in the direction of providing cost-effective health care. This can be done most effectively by developing a mixed system of global budgeting to complement the Drohobych formula. The overall district budget can be divided into inpatient and outpatient shares, with the outpatient budget perhaps divided additionally into curative and preventive shares. Facilities would have to "earn" their budgets by providing services, as with the basic Drohobych formula; but they would not be able to skew overall resource allocation in the direction of inpatient care.

In addition to the mixed system of case-based reimbursement with global budgeting, district fundholders will also need to set aside some portion of the district's resources for a bonus pool (perhaps as much as 20–30 percent), with facilities rewarded at regular intervals (e.g., every three to six months) for cost-effective performance. For example, to deal with the problem of "DRG

⁹ In Drohobych City, the polyclinic already functions autonomously.

creep" (the tendency to classify patients into higher-cost "diagnosis-related groups" or DRGs), the district fundholder can provide a bonus to inpatient facilities based on the difference between the average of the expected lengths of stay of their cases during the period and the historical average length of stay of those cases. Similarly, polyclinics can be awarded a bonus partly on the basis of their ability to treat categories of patients for which inpatient care has been provided traditionally (e.g., minor surgery).

The authors conclude that an allocation based on services provided, particularly one which combines case-based reimbursement with global budgeting, is practical for all districts and is capable of promoting quality and efficiency in several areas. However, they also conclude that such a system will require the active intervention of the district fundholder, through the careful use of performance bonuses, to promote overall system efficiency. Lastly, it is important to note that considerable additional work will be needed to generalize the Drohobych formula for use in other districts.

4.3 Within-district Allocation on the Basis of Number of Enrolled Subscribers

Under this allocation method, citizens would choose the hospital (and associated polyclinic) where they wish to be treated; and the hospital would receive funds on the basis of the number of "subscribers" it was able to attract, i.e., a capitation fee, which might vary according to the age and sex of the subscriber. Since citizens would be free to change their selection of preferred provider at any time (transferring their capitation fee to the new provider), hospitals would have a strong incentive to retain their subscribers by providing good quality of care. A hospital would be able to increase its budget only by attracting more subscribers. This allocation mechanism would force hospitals to compete with each other; and it would only be practical in markets where effective competitors are present (which is clearly not the case in some districts). Where present, competition may raise the quality of the service offered; but it may also force the less successful facilities to undergo painful processes of restructuring or even liquidation.

It needs to be emphasized that the provider–subscriber relationship described above is very different from that in a U.S.-style Health Maintenance Organization (HMO). There would be no contract (or payment) between provider and subscriber. Providers would continue to provide health services only as long as their resources permitted. Facilities would therefore not assume any financial risk. The provider–subscriber relationship would only affect the allocation of resources between facilities.

Allocation on the basis of subscribers provides incentives similar to those provided by allocation on the basis of population served.¹⁰ Providers have an incentive to control costs for both inpatient and outpatient care, to provide preventive services, and to substitute outpatient for inpatient care whenever it is cost-effective to do so. In addition, allocation on the basis of subscribers eliminates the need for population data. Although per subscriber allocation still requires interfacility payments—to cover cases where a subscriber's hospital does not offer necessary specialized care—the more direct link between facilities and enrolled patients, as compared to a geographically determined "population served," should reduce the volume of interfacility payments.

In districts where competition between facilities is possible (cities, suburbs, some towns, some densely populated rural areas), allocation of resources on the basis of number of subscribers, as outlined above, might provide an attractive alternative to either of the other two allocation methods discussed above. It provides incentives for systemwide efficiency similar to those prevailing with allocation on the basis of population served, without requiring the use of population data; and it provides stronger incentives for systemwide efficiency than does allocation on the basis of services provided. In the absence of effective competition, however, the central fundholder would have to monitor carefully the quality of care provided to subscribers and reward or penalize facilities accordingly.

¹⁰ One difference, however, is that with allocation based on the number of subscribers, hospitals would have an incentive to attract relatively healthy subscribers, which would not be an option available to hospitals with resources allocated on the basis of population served. Such a tendency can be at least partially offset by making the capitation payment a function of such risk characteristics as age and sex and by requiring that hospitals accept all subscribers.

CHAPTER 5

AUGMENTING HEALTH SYSTEM RESOURCES

The allocation methods discussed above are associated with a system in which the health sector is financed overwhelmingly from tax collection. In L'viv Oblast and throughout Ukraine, the taxes in question have been principally those on value-added, enterprise income, and personal income. In the present economic situation in L'viv Oblast, the revenues from these taxes are insufficient to prevent a decline in the volume of health services provided. It is therefore desirable to consider other revenue options. These include:

- Levying additional local taxes;
- Charging user fees for public sector services (called "fee-for-service" in Ukraine);
- Privatization of health services; and
- Health insurance.

5.1 Local Taxes (District, Oblast)

The challenge here is to identify a tax which is administratively feasible and not regressive (unduly burdensome for the poor). Another important feature of any new tax should be its ability to tap the resources of the rapidly growing shadow economy, which is difficult to reach through the existing tax structure. In much of Europe and North America, an important local tax is based on the value of land and buildings, but this tax is not administratively feasible in Ukraine. Many developing countries are experimenting with local head taxes for the financing of social services. These require the payment of a fixed sum per person, and are hence regressive. Still, they are relatively easy to administer and can quickly mobilize some additional resources.

It is appealing to think in terms of levying additional taxes on consumption, particularly on those items such as tobacco, alcohol, and motor vehicles, which place additional burdens on the health system. Local alcohol and tobacco taxes are difficult to impose and tend to encourage illegal activity. However, an additional local tax on automobiles is something which should be considered. This is an important source of local tax revenue in many U.S. localities, and present automobile registration fees (and related environment and inspection taxes/fees) are relatively low in L'viv Oblast (as little as \$1 per year, depending on the vehicle's horsepower).

5.2 Fee-for-service in the Public Sector

Another approach to mobilizing additional resources is to permit hospitals and polyclinics to charge fees to patients for services rendered. In addition to increasing the availability of resources, a fee-for-service system would encourage consumers to be more efficient in their use of health services. In the absence of fees, consumers have reduced incentives to consume

preventive health services and to practice healthy behavior (e.g., refrain from smoking or drinking excessively, exercise, restrict fat intake in their diets). Yet another advantage of a fee-for-service system is that it would help "level the playing field" (create equal opportunity) for the private sector to compete with the public sector more effectively.

The principal drawback of a fee-for-service system is that it would almost certainly reduce access on the part of the poor to certain kinds of health services. Under these circumstances, it may be necessary to develop a system of "means testing" (procedure for certifying indigent status) to exempt the poor from having to pay fees. Alternatively, a package of basic services can be provided free to everyone, with fees charged for all other services. Achieving agreement on what constitutes such a basic package is often difficult in practice; and this approach has the added disadvantage of continuing subsidies to those financially able to pay for their health services.

It is important to note that fees are already informally paid for some types of health services in the public sector. Although most such payments involve relatively small "gifts" to providers, substantial fees are reportedly paid in some cases for complicated surgical procedures. In the absence of a household-level health expenditure survey, it is difficult to know how much these fees amount to. One additional advantage of a more formal system of collecting fees is that it could reduce consumer uncertainty about how much will need to be paid for various types of services.

5.3 Privatization

If a private medical sector were permitted, this would presumably attract the high-income clients who are presently using public facilities. This change in utilization could increase the volume of resources available per patient for those persons continuing to use the public facilities. Experience in other countries demonstrates that a vibrant private sector can also stimulate greater efficiency in the public sector, particularly where public sector reforms essentially place the public sector in competition with the private sector for clients (as would be the case for a within-district allocation method based on services provided).

One issue under active debate currently in L'viv Oblast is whether the public sector should reimburse the private sector for providing a basic package of health services. Although doing so would undoubtedly provide a powerful stimulus to private sector health service delivery—and would also be likely to stimulate improved efficiency on the part of the public sector—it would produce a net drain on public sector health system resources and would therefore work against the short-run goal of mobilizing additional public sector resources.

An alternative to public subsidization of private services is to offer health insurance to consumers which would include coverage for all public sector fee-for-service procedures together with limited private sector coverage. Discussed more fully below, health insurance would provide a powerful stimulus to the private sector, would mobilize additional funds from private consumers (including those working in the shadow economy), and would increase the degree of competition in health service markets.

5.4 Health Insurance

Health insurance, with premiums paid by employers (and with part of the premiums paid in some cases by employees and/or the government), is the method most widely used for financing health care in high-income countries. This approach to financing health insurance often raises problems of access and efficiency. Persons unemployed or outside the labor force may not be covered by employer-based insurance schemes, and will fail to obtain adequate medical care unless government subsidies are available for them. Providers may favor the insured, who can afford to pay more, so that access on the part of the uninsured suffers. Efficiency problems also arise with insurance, such as the "moral hazard" which tends to cause excessive consumption of care by the insured. Providers sometimes prescribe unnecessarily expensive treatments, knowing that the financial burden will not fall on their patients but on the insurance scheme.

Despite these problems, health insurance provides consumers with the ability to "pool" (share) risks associated with serious illness; and it is capable of mobilizing additional resources for the health system. As noted above, health insurance can also provide a powerful stimulus to the development of a private health care sector.

Various administrative controls, such as managed care, are needed in order to keep treatment costs down in a health insurance system; and it can take many years to develop these mechanisms and the institutions needed to support them. In the short run, probably the best prospect for developing health insurance in L'viv Oblast rests with public sector plans offered by district-level fundholders. These can cover both fee-for-service care in the public sector and comparable services in the private sector. Once Ukraine's nascent financial system has become sufficiently developed and the economy has stabilized, the provision of health insurance can (and should) be turned over to the private sector.

CHAPTER 6

RECOMMENDATIONS

6.1 Allocation between Districts (Rayons/Cities)

1. Preliminary calculations suggest that substituting a per capita system of allocation for the recent system of allocation would result in significant changes in allocations between districts in some cases. Some consideration should be given to whether the new system should be phased in gradually, say over a five-year period, to avoid significant disruptions in some districts. If this is done, then the number of beds should be frozen at 1995 levels, in order to remove any incentive for institutions to seek increases in the number of beds during the transition period. Such a phase-in would probably require authorization at the national level.
2. A national-level study is needed to answer the following questions:
 - Is the quality of population data available at the "district" (rayon, city) level adequate to support the new per capita system? Population data based on administrative records should be evaluated both for internal consistency and for their consistency with external sources, such as censuses and surveys.
 - Are the age/sex coefficients presently used in Ukraine appropriate for the kinds of services provided by the health system at this time? A more relevant set of coefficients might be based on actual rates of utilization, by age and sex, of the range of actual services to be financed by the new per capita system.
 - What additional resources are needed to compensate for other factors which vary across districts, such as the cost of health services, health status, and income? The proposed study would involve a multivariate analysis of the factors determining health status (mortality, morbidity), using district-level data (preferably longitudinal data, if available).

Such a study is needed in part because experience in other countries (including the U.S.) with allocations based on population data has resulted in the quality of the data being challenged vigorously by those unhappy with the results. A national-level study is needed because there are not sufficient data points within an oblast to conduct such a study at the oblast level and because it would be unnecessarily duplicative to have more than one such study.

3. Under the per capita allocation system, interdistrict payments are needed to compensate for the fact that there is some crossing of district boundaries in seeking health care. Some rayon facilities provide specialized services to populations beyond the rayon boundaries. In addition, a system of *interfacility* payments within districts may also be necessary if resources are allocated within districts on the basis of population served or the number of subscribers enrolled. It will be necessary to collect good cost data in order to set appropriate levels for such interdistrict and interfacility payments. Ideally, interdistrict payments for inpatient

services should use a case-based reimbursement formula, so that referral hospitals have strong incentives to maintain cost controls. For such a system to be operational throughout the oblast, it will be necessary to develop a common set of oblastwide case groupings.

An important additional issue concerns whether the interdistrict and interfacility payment levels should vary between facilities or a uniform fee should be paid for similar services to all facilities. It may be necessary for facilities to set their own fees initially, with the approval of oblast health authorities, relying on competition to bring the fees to a level approximating marginal cost. If normal market forces do not produce such a result, oblast authorities may have to set uniform fees for certain services as more information becomes available.

4. The manner in which resources are allocated to oblast-level facilities in the new per capita system will affect the nature of the incentives provided under the new system, and hence its likely performance. If oblast-level facilities are not included in the new per capita system—continuing to be funded as in the recent system—district-level facilities will have an incentive (not previously present) to refer *all* of their patients to oblast-level facilities. It would be preferable for each district to reimburse the oblast-level health facilities for all patients referred by the district, and this payment should be higher than the marginal cost of hospital care at the district level (to provide an incentive to treat patients at the district level). It may still be necessary to allocate some funds directly to oblast-level facilities to cover the cost of services other than direct patient care (e.g., training, research).
5. If oblast-level facilities continue to be funded as in the recent system, residents of L'viv City and other areas proximate to these facilities will continue to enjoy favored access to tertiary and specialized care facilities; and the allocation of remaining resources should reflect, and attempt to compensate for, this situation. One way to do this is to examine the patient records of oblast-level facilities to determine the distribution of inpatients and outpatients by district of origin. The resources used by these facilities to provide patient care would then be allocated to districts on the basis of the proportion of total care received by their residents and would be subsequently reflected in their per capita allocations. This exercise would not be necessary if the patient care services of oblast-level facilities were to be financed by payments from district fundholders to the oblast-level facilities, as recommended above.

6.2 Allocation within Districts (Rayons/Cities)

1. The method used to allocate resources within districts to institutions is of vital importance to the success of the new per capita system because it creates the incentives under which each institution's managers will operate in the future. For example, if resources continue to be allocated among institutions according to their numbers of beds, the new system will provide essentially the same incentives as the recent system. Because of the importance of the within-district reimbursement formula to the success of the new per capita system, there should probably be some experimentation with alternative reimbursement schemes (followed by careful evaluation). Another reason for experimentation is the possibility that the system will need to be adapted somewhat on the basis of local conditions (e.g., size of population served,

degree of potential competition, mix of facilities). A couple of promising formulas are discussed below.

2. The system developed in Drohobych district, which allocates resources to institutions from a central fundholder on the basis of services provided, is probably the system most generally applicable to other districts in L'viv Oblast. Its use of a case-based reimbursement formula to allocate resources to hospitals provides incentives to hospital managers to reduce the average length of stay. It also avoids the necessity to develop a system of interfacility payments *within* districts (although, as indicated above, a system of interdistrict payments will still be necessary). With each institution's revenue based on actual services provided, both inpatient and outpatient facilities have a strong incentive to attract patients by improving the quality of care.

The greatest shortcoming of the Drohobych reimbursement system is that it provides no direct incentives for patients to be treated more cost effectively in outpatient facilities (polyclinics), although outpatient facilities are granted managerial autonomy and allowed to compete with inpatient facilities for patients. For this reason (and other reasons noted in section 4.2), use of the Drohobych formula will require active intervention on the part of the district fundholder—through bonuses and administrative measures, such as global budgeting—to steer the performance of individual institutions in the direction of overall system efficiency. If this is done, the authors of this report feel that the Drohobych formula is quite well conceived as a method for allocating resources to institutions within districts.

3. The L'viv City Health Administration is planning to experiment with the use of population served (adjusted for age and sex) as a basis for allocating resources to one of its principal rayon-level hospitals (City Hospital Number One) and with a system of interfacility payments to compensate other facilities for providing specialized care and for providing services to the populations of other rayons. In the presence of competitors (there is ample potential competition in L'viv City) and careful monitoring of the quality of care—and assuming that a system of interfacility payments becomes operational—the L'viv City system should perform very well. In fact it provides all of the advantages of typical capitation reimbursement schemes, including incentives to provide preventive care and to substitute cost-effective outpatient care for inpatient care. In districts where the above conditions are met, the L'viv City model would offer certain advantages over the Drohobych model.

Although at the time of writing the authors had not yet had a chance to examine this plan in detail, they do not believe that the L'viv City model is as generally applicable to other districts of L'viv Oblast as is the Drohobych model. In districts where there are no other facilities to act as potential competitors (for example, in rural rayons where a single hospital has an effective monopoly), there would be no incentive to provide a high quality of service to attract and retain patients with an allocation based on population served. In theory, quality of care could be monitored by an external body (for example, an oblast-level committee of medical experts); but in practice, this would place too great a burden on the nascent quality monitoring capabilities of L'viv Oblast.

3. A slight variant of the L'viv City allocation method would involve providing resources to hospitals according to the number of persons who designate one of their dependent polyclinics as their primary care provider. With such a system, citizens would sign up for care with a given polyclinic; and the hospital supervising the polyclinic would receive a "capitation fee" (fixed payment, depending on the age and sex of the subscriber) to cover the cost of all care provided by the hospital and polyclinic to that subscriber.¹¹ Subscribers would be free to change to another polyclinic, and polyclinics would have to accept all applicants. Such a system would include all the strengths and weaknesses of the L'viv City system described above. However, unlike the L'viv City formula, a subscriber system would not require the use of population data, since the initial allocation of resources to institutions (prior to interfacility payments) would be done on the basis of numbers of subscribers instead of population. Allocating funds to institutions on the basis of numbers of subscribers would also presumably reduce the volume of interfacility payments. For these reasons, the L'viv City Health Administration may wish to adopt a system based on subscribers at some point in the future (for example, when the new system is implemented on a citywide basis).
4. A study is needed in L'viv Oblast to determine how much potential competition exists for various types of health services in each district. As the preceding discussion of alternative within-district allocation schemes illustrates, the best system in a given district may depend on the extent of potential competition within the district.
5. Any reimbursement formula which provides an incentive to hospital managers to reduce the average length of stay runs the risk of refusing care to some categories of patients (e.g., the poor elderly) who have come to rely on the public hospital system for care and shelter particularly during the winter months. Because of the incentive structure in the recent system, hospital managers have not discouraged prolonged occupancy by the elderly, who help to keep occupancy rates up without requiring intensive care. This "welfare" function of hospitals needs to be evaluated carefully to avoid adverse social consequences as a result of the reform process. For example, should special wards be established to care for poor elderly patients, with some of the cost shared by the welfare system? What is the actual marginal cost of sheltering such persons? Would it be more economical to convert one or two facilities to meet their specialized needs, or to use unoccupied beds in all facilities for this purpose, particularly during winter months?

¹¹ Use of a per-subscriber reimbursement formula would provide hospitals and their associated polyclinics with much the same incentive structure as Health Maintenance Organizations (HMOs). However, because there is no contract or payment involved between provider and patient, the use of a per-subscriber reimbursement formula in the public sector would not involve a formal commitment to provide for all the health care needs of the subscriber. Instead, the provider-subscriber relationship would simply serve as an alternative basis for allocating funds to individual facilities.

It is important that the costs of providing such combined welfare and health services not be borne exclusively by the health sector. The welfare system should share in these costs by providing a daily maintenance fee to hospitals, particularly during winter months.

6. In rayons, such as Skole and Zhovkva, where the *ZdravReform* Program is planning to assist with primary care and hospital reforms at the facility level, there should be a parallel effort to develop a supportive environment at the rayon level for allocating resources between facilities. This may involve transferring a suitably modified version of either the Drohobych or L'viv City models to these rayons. If resource allocation within these pilot rayons is permitted to continue as in the recent system, managerial improvements at the facility level will find themselves in conflict with strong counter-incentives at the rayon level. Developing an effective system for allocating resources within each of the two pilot rayons is, in the authors' view, the most appropriate next step for *ZdravReform* assistance in support of the new per capita system.

6.3 Augmenting Health System Resources

1. Some consideration should be given to collecting additional taxes at the local level to provide increased resources to the health system, particularly as an interim measure. The existing state tax system does not seem able to tap the resources of the dynamic "shadow economy" (private nonenterprise sector). National-level action is required to enable L'viv Oblast and its districts to experiment in collecting additional local taxes earmarked to support health services.

Two taxes appear to merit special consideration. A head tax in the amount of a dollar or two per person (or per adult) would provide an immediate addition to local health system resources. District legislatures should decide whether to levy such a tax, as well as the amount. The main problem with a head tax is that it is "regressive" (collects a greater proportion of a poor household's income than of a relatively well-off household's income). A highly "progressive" (falls more heavily on the rich) alternative (or addition) to the head tax would be an oblast-level tax on private automobiles. Present oblast-level motor vehicle taxes are quite low (only a few dollars annually, depending on horsepower). To earmark the proceeds of such a tax to support the health sector would be easy to defend on the basis of the additional burden to the health system imposed by treating those injured in motor vehicle accidents.

Although it is extremely appealing to consider recommending taxes on tobacco and alcohol consumption as a possible additional source of revenue for the health system, the authors hesitate to do so for two reasons: (1) such taxes would be difficult to enforce at the oblast level; and (2) they would provide additional impetus to illegal (black market) activities. The present very steep tax rates have probably contributed significantly to the growth of the shadow economy and to the erosion of the traditional tax base.

2. Charging user fees for selected services (fee-for-service) is another way to mobilize additional resources for the health system. However, many providers (especially surgeons) already

charge fees informally for services rendered; and it is necessary to consider what will be gained from collecting additional formal fees. For example, what will the revenue be used for, and what will it cost to collect and distribute it? If it is to be used to augment physician incomes, the present informal system of collecting fees may be cost effective. On the other hand, a more formal system of charging fees may lead to more equitable treatment of consumers, particularly if the poor and other disadvantaged groups can be exempted from paying on the basis of "means tests" (certifications of indigence).¹² Given these considerations, the authors would recommend experimenting with fee-for-service financing, with careful evaluation of its performance with respect to: (1) resource mobilization (does it produce more revenue than the current informal system of collecting fees?); (2) the administrative costs involved in collecting fees; and (3) its effect on utilization of health services by the poor.

3. One advantage of fee-for-service financing over financing services through taxes is that it provides incentives to consumers to use services only when necessary. In contrast, the current pricing of health services provides perverse price incentives to consumers. For example, if patients visit a polyclinic they are required to pay for drugs (i.e., purchase from a pharmacy any drugs prescribed at the polyclinic). However, if they are admitted as inpatients, they receive drugs free of charge. Whereas the authors of this report agree with the present system of charging for outpatient drugs, they would like to see a flat fee charged (as a payment for drugs) for each inpatient admission, regardless of the type of reimbursement mechanism adopted. Such a charge would mobilize some additional revenue at minimal administrative cost and would provide an incentive to consumers to have their health problems treated on an outpatient basis. It would also provide another much-needed incentive to consumers to practice preventive health.
4. There has been considerable discussion within L'viv Oblast of the possibility of providing only a basic minimum package of health services free of charge, with other services being charged for. In this case, careful consideration should be given to identifying the services to be provided in such a package. As a first step, this would involve the development of a clear set of criteria for ranking health services according to their priority to receive public funding. For example, one criterion might be that a list of priority services should reflect a fair balance of essential services for each age and gender group—not just those targeted to the needs of middle-aged males.¹³ Other possible criteria might involve the cost of the service, the public health risk of the condition treated, and the risk of death in the absence of treatment.¹⁴ A

¹² The authors recognize, however, that in the present economic circumstances, with such a large share of income generated in the informal sector, it would be very difficult to administer means testing.

¹³ An alternative approach to identifying a basic package of health services for public support is described in the World Bank's *World Development Report 1993* (World Bank, 1993). It should be noted, however, that economists generally apply somewhat stricter criteria for public funding of health services, based on the presence of various kinds of market failure.

¹⁴ Once a clear set of criteria has been developed and agreed upon, the authors would favor use of a formal "decision model" to develop the actual ranking of services. This would involve the following steps: (1) weight the various criteria

second consideration is that the prices charged for services not in the basic package should be sufficient to recover the full cost (marginal cost) of such services. Otherwise, relatively high-income consumers, who presumably would consume more of these services, would capture a higher share of any subsidies provided for these services.

Another question which has been raised in connection with such a basic package of services is whether the government should reimburse private providers for providing such basic services. Doing so would stimulate competition among public and private providers, which should increase both quality and efficiency. It would also "level the playing field" for private providers, since they would not have to compete unfairly with free services in the public sector. However, providing such reimbursement to private providers is probably not a good use of public funds until government finances have returned to normal and until there is more reliable information available on the cost of providing basic health services in the public sector, so that appropriate reimbursement levels can be fixed. Having the government make payments to the private sector at this time would be contrary to the short-run goal of mobilizing additional resources for the government health system.

Lastly, with respect to a minimum package of services, the authors would advise L'viv Oblast to proceed cautiously, promising only to provide a very limited number of services initially and committing itself to add more as the system's resources (and efficiency) grow. Alternatively, a list of services eligible for fee-for-service financing might be issued without explicitly committing the oblast to provide the remaining services at no charge. Although this recommendation may appear to be overly cautious, it is important to protect the credibility of the health system during a critical transition to the new per capita system of financing.

5. Privatization is yet a third way to mobilize additional revenues for the health sector. The authors of this report strongly support the establishment of a favorable legal and regulatory environment to promote the private health sector. Restrictions on the private sector provision of health services should be systematically removed. At the same time it is necessary for the public sector, both at the national and at the oblast level, to develop an enhanced capability to regulate the private sector. It is often difficult in practice for governments to achieve the optimal balance of encouraging the growth of private health care while simultaneously regulating it sufficiently to protect the consumer and to promote national health goals. Two general rules are useful in this regard. Governments should refrain from restricting competition, and they should always attempt to increase the flow of information to consumers to help them make informed choices. Conversely, government should resist attempts by the private sector to enlist its aid in restricting competition or the flow of information to consumers. For example, the quality of care provided by private practitioners can and should

by assigning to each one a number of points, such that the total number of points adds up to 100; (2) develop a clear set of scoring rules for each criterion, so that a given service can be awarded a score of from 1 to 10 depending on how well it satisfies the individual criterion; and (3) score each service with respect to each criterion. The overall score of each service would be obtained by adding together its scores on each criterion, appropriately weighted. The maximum possible score would in this case be 1000 (i.e., since the maximum score earned is 10 and the weights add up to 100).

be assessed along with that of public providers—with full and accurate information on findings made widely available to the public through media, such as newspapers and radio.

6. Consumer preference for a small certain payment to remove the risk of incurring a much larger loss is called "risk aversion" and is what creates a market opportunity for all forms of insurance. Tax-based financing of health services is one way for consumers to "pool" (reduce) risks. Health insurance, whether publicly or privately provided, is another effective way to pool risks.

Although it is difficult to generate demand for health insurance when health services are provided free, the gradual introduction of fee-for-service financing should greatly stimulate the demand for health insurance. In L'viv Oblast, the authors recommend that health insurance be provided initially through the public sector (through district-level fundholders), with the function turned over to the private sector as soon as financial markets have stabilized and private financial institutions have matured to the point where they can assume this role. It is also recommended that any public health insurance plan provide for limited reimbursement of private sector health services. This would: (1) stimulate the development of a private health sector; (2) promote effective competition for the public sector; and (3) mobilize additional resources from consumers difficult to reach through taxes.

The authors recommend that all insurance be voluntary initially; they do not favor mandatory health insurance for enterprises at this time. Taxes are already too high for the enterprise sector of the economy.

7. As part of the process of developing the capability to regulate more effectively the entire health sector, the public sector should develop strategic plans at both the national and oblast levels which, among other things, clearly establish: (1) goals and objectives in the health sector; (2) the rationale for government involvement, both as a financer and a provider; and (3) a specific program of action consistent with the policy framework based on items (1) and (2). For example, one hears a good deal about the state's "social contract" to provide free health care for every citizen in Ukraine. Does this imply that it has to be provided by the state, or simply paid for by the state? Can those willing and able to pay for better care than the state can finance at this time be permitted to do so, whether it is provided by the public sector or the private sector? Is the overall objective of state involvement in the health sector to create *equal* access to health care for everyone, or to use its regulatory powers and limited resources to maximize access and quality for the least favored socioeconomic groups in the society? Answers to questions such as these are needed if the health reform process is to be coherent. In the context of the present report—to cite only one example—it is difficult to develop an appropriate formula for allocating public resources between oblasts and districts in the absence of a clear statement of government objectives in the health sector.
8. A household survey should be conducted in L'viv Oblast to determine how much, and where, consumers are currently spending on health care (including preventive care) and their perceptions of the accessibility and quality of alternative providers. A survey of

approximately 2,000 households, about equally divided between rural and urban areas, should be adequate to obtain necessary baseline data. A supplementary survey of hospital inpatients might also be useful to provide a greater quantity of data on relatively rare episodes of serious illness. Information on household expenditures on health care is a notable gap in the information base for effective health planning in L'viv Oblast.

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ANNEX A

The Recent System of Resource Allocation

The recent system used to allocate oblast resources among "districts" (rayons and cities) has evolved somewhat from the old, highly centralized system. Under the old system, each district health administrator prepared a line-item budget which had to be approved and funded directly by higher levels. The district health administrator would not be able to switch funds from one line item to another and would have to return all funds unexpended by the end of the year.

An interesting feature of the old budgeting system was its use of standard norms and planned levels of utilization. For example, the salary and wage line item (Article 1) was budgeted on the basis of the number of authorized hospital beds by specialty, using specialty-specific norms in terms of roubles per bed. Social security and other employment-related benefits (Article 2) were budgeted as a percentage of salaries and wages. Several other line items, including Utilities and maintenance (Article 3), Food and meals (Article 9), Medicines (Article 10), Linens (Article 14), and Other expenses (Article 18) were budgeted by applying norms to the number of "planned bed days" (assuming an occupancy rate of between 320 and 350 days per year, depending on the specialty to which the bed was assigned). Remaining line items, including Travel and conferences (Article 4), Medical equipment and furniture (Article 12), and Capital improvements (Article 16) were budgeted on an ad hoc basis, depending on the availability of funds for construction, renovation, and travel.

Under the old system, the expenditure and revenue sides of the budget were completely separate. Beginning in 1993, however, districts were authorized to retain sufficient tax revenue to finance their approved budgets (on a global basis, not limited to health). Under this new system, all tax revenue is collected at the district level. Each year the district office of the Department of Finance projects the district's revenues from each tax. A different percentage of each tax collected is retained by the district. If the total projected tax revenue to be retained by the district is insufficient to finance its approved budget, the percentage of certain taxes to be retained by the district is increased until the budget is balanced. If district tax revenues are still insufficient to balance the budget, the oblast provides the needed additional funds to the district out of its own budget (at least in principle). Table A.1 reports the percentages of various taxes to be retained by districts from the L'viv Oblast Budget for 1995. The last column of Table A.1 also lists budgeted subsidies to be provided by the Oblast to districts (rayons) whose budgeted expenditures exceed their tax revenues.

Table A.2 provides the major categories of the L'viv Oblast and L'viv City Budgets for 1995. The Oblast budget is not a consolidated budget (it does not include district budgets); it covers only those items administered at the oblast level. The exchange rate in July 1995 was approximately 155,000 kupons = \$1.00. The extent of recent inflation is illustrated by the fact that the L'viv City health budget provided 25 kupons per capita in 1990; 58 kupons per capita in 1991; 1,721 kupons per capita in 1992; 51,926 kupons per capita in 1993; 492,000 kupons per capita in 1994; and 1.2 million kupons per capita in 1995.

Table A.1 Percentages of Revenue from Various Taxes Authorized to be Retained by Districts, and Oblast Subsidies to Districts, 1995					
District	Authorized Percentage of Value-added Tax (VAT) to be Retained by Districts	Authorized Percentage of Enterprise Income Tax to be Retained by Districts	Authorized Percentage of Excise Duties to be Retained by Districts	Authorized Percentage of Personal Income Tax to be Retained by Districts	Oblast Subsidies to Districts (millions of kupons)
RAYONS:					
Brody	93.9	70.0	20.0	50.0	126,788
Busk	89.7	70.0	20.0	50.0	
Gorodok	93.9	70.0	20.0	50.0	29,936
Drohobych	93.9	70.0	20.0	50.0	34,768
Zhydachiv	93.9	70.0	20.0	50.0	78,277
Zolochiv	86.8	70.0	20.0	50.0	
Kamianka-Buska	53.0	70.0	20.0	50.0	
Mykolaiv	21.5	70.0	20.0	50.0	
Mostyska	93.9	70.0	20.0	50.0	242,288
Zhovkva	93.9	70.0	20.0	50.0	11,090
Peremyshlany	93.9	70.0	20.0	50.0	41,075
Pustomyty	93.9	70.0	20.0	50.0	18,395
Radehiv	93.9	70.0	20.0	50.0	156,825
Sambir	93.9	70.0	20.0	50.0	225,965
Skole	93.9	70.0	20.0	50.0	39,630
Sokal	34.6	70.0	20.0	50.0	
Stryi Sambir	93.9	70.0	20.0	50.0	386,977
Stryi	38.6	40.0	20.0	50.0	
Turka	93.9	70.0	20.0	50.0	156,766
Yakoriv	93.9	70.0	20.0	50.0	65,130
CITIES:					
L'viv	43.3	40.0	20.0	40.0	
Boryslav	29.7	50.0	20.0	30.0	
Drohobych	16.1	35.0	20.0	30.0	
Sambir	34.1	50.0	20.0	50.0	
Stryi	37.9	50.0	20.0	50.0	
Truskavets	15.2	20.0	20.0	20.0	
Chervonorad	51.2	60.0	20.0	50.0	

Source: L'viv Oblast Budget for 1995 (approved by the 4th Session of L'viv Oblast Rada on May 5, 1995).

Table A.2
L'viv Oblast and City Budgets, 1995

REVENUES	L'viv Oblast Budget		L'viv City Budget	
	Amount (millions of kupons)	Percent of Subtotal	Amount (millions of kupons)	Percent of Subtotal
VAT	11,419,398	74.3	5,325,842	46.4
Income Tax: Enterprises	2,761,345	18.0	1,500,795	13.1
Excise Duties	193,788	1.3	203,685	1.8
Income Tax: Personal	266,721	1.7	727,921	6.3
Income from Privatization	646,578	4.2	1,857,480	16.2
Dividends from Communal Enterprises	628	0.0	662	0.0
Taxes on Trade		0.0	7,308	0.1
State Duty		0.0	251,200	2.2
Water Charges		0.0	3,713	0.0
Vehicle Taxes		0.0	100,783	0.9
Land Taxes		0.0	818,765	7.1
Other Levies	90,134	0.6	675,234	5.9
SUBTOTAL	15,378,592	100.0	11,473,388	100.0
EXPENDITURES				
Social Security	8,583,077	55.8	305,990	2.6
State Price Regulation			5,589,489	48.4
State Aid to Single Mothers			36,400	0.3
Social Provision			140,566	1.2
Social and Cultural	3,534,207	23.0	3,996,642	34.6
incl. Health Care	2,221,873	14.4	2,204,174	19.1
Capital Investments	260,000	1.7	340,000	2.9
National Economy	827,672	5.4	828,599	7.2
Administrative Support	82,976	0.5	127,585	1.1
Support of Legal Institutions	272,072	1.8	59,032	0.5
Subsidies to Rayon/City Budgets	1,613,909	10.5		0.0
Subsidies to Nearby Village Budgets			10,122	0.1
Other/Miscellaneous	62,298	0.4	2,492	0.0
Contingencies	150,000	1.0	110,000	1.0
SUBTOTAL	15,386,211	100.0	11,546,917	100.0

Source: L'viv Oblast Budget for 1995

Note: Budget figures are only approximate, due to errors in translated document.

ANNEX B

Outline of a National Study to Quantify Adjustment Factors

A multiple regression model explaining "district" (i.e., rayon and city) variation in mortality and morbidity (health) would provide a basis for quantifying the level of expenditures necessary to compensate a given district for characteristics which would adversely affect the health status of its population. Let us suppose, for example, that some measure of health (H) at the district level (e.g., average life expectancy at birth) were a linear function of per capita income (Y) and per capita district-level public health expenditures (X):

$$H = 50 + 0.01Y + 0.5X \quad (1)$$

According to this function, an "average" district with per capita income of \$1,000 and per capita district-level public health expenditures of \$20 would have a life expectancy at birth of 70 years.¹⁵

However, a district with a Y of \$1,200 would need only \$16 of X to attain the same level of H, whereas a district with a Y of only \$800 would need \$24 of X to attain an H of 70 years.

Theoretical Model

The purpose of this note is to discuss how a function such as that above might be developed for Ukraine, given the types of data that the authors believe are available. Based on their understanding of the health literature, the authors believe that district-level variations in mortality and morbidity are likely to be a function of the following factors:

- Y Income per capita. Income is usually positively related to health, the exception being when higher incomes are associated with a less healthy life style (e.g., more fat in the diet). Income per capita is also a good proxy for access to private health services, such as drugs.
- E Environmental factors. These might include levels of industrial pollution, exposure to Chernobyl radiation, and climate.
- D Population density. Greater population density makes it easier to provide health services, other things equal. When population is very dense, however, the incidence of communicable diseases may rise.
- S Schooling. Health is almost always found to be positively related to schooling in empirical studies. In Ukraine, however, there may not be sufficient variation in schooling between districts for the effects of this factor to be measurable.

¹⁵ This is only a hypothetical example, both in terms of the model specification and the parameter values. In a more realistic application, a nonlinear function might be more appropriate.

- A Access to public health services. These include environmental health services (water and sanitation), preventive health services (e.g., immunizations, prenatal care), outpatient and inpatient services, and health education.

Proceeding from the above discussion, which is theoretical, to the development of an "empirical model"—one which can be estimated with the data likely to be available in Ukraine—is a challenge. Another problem is that various measures of "access to health services" in Ukraine are likely to be correlated with some of the unobserved factors determining health status, which will bias standard statistical estimates. This is a problem of "endogenous health inputs." Both of these problems are discussed below.

Empirical Model

It is always difficult to develop an empirical measure of health status, which ideally should reflect both mortality and morbidity. In the case of mortality, the most readily available measure at the district level is the crude death rate (deaths per 1,000 persons). Its major deficiency is that it is related to the age structure of the population, i.e., it is higher in more aged populations. If the crude death rate is used, a variable reflecting the age distribution (e.g., percent of the population aged 65 or over) should be included as an explanatory variable. Another readily available measure is the infant mortality rate (the ratio of deaths in children under one year of age to the number of births). However, infant deaths are relatively rare (as are births) in Ukraine, so this measure varies a lot at the district level due to randomness. Infant deaths are also not a good measure of adult mortality experience, which is much more important quantitatively in Ukraine. The best measure of mortality for empirical analysis would be average life expectancy at birth, for which estimates are not available at the district level.

A wide variety of measures of morbidity are also available for districts in Ukraine (in the annual reports of oblast health administrations), and some of these measures may also be used as empirical measures of health status. However, one of the most readily available and commonly used measures of morbidity, hospital bed days, may not be so meaningful in Ukraine, due to the tendency for bed days to be excessive and not necessarily related to the incidence of acute illness.

Mortality and morbidity estimates can be combined, using the global burden of disease methodology (World Bank, 1993), into an estimate of the number of disability-adjusted life years (DALYs) lost in each district; but this would involve considerably more work.

There are no estimates of income per capita at the district level. Even if they were available, the fact that they would inadequately reflect "informal" private commercial activity would limit their usefulness. Proxies would have to be used. One possibility in Ukraine might be the number of motor vehicle registrations per capita. Another possible income proxy would be residential energy use per capita.

Environmental factors might be measured by such variables as the level of industrial energy use per square kilometer of land area, the per capita number of Chernobyl-related (or radiation-related) deaths in recent years, and mean temperature and precipitation during winter months.

Access to health services is also a difficult variable to specify empirically. For the purposes of developing adjustment factors for a per capita allocation system, the most direct measure might be per capita public health expenditures. Because the effectiveness of health resources is likely to depend in part on population density, additional interaction terms between per capita health expenditures and percent of the population residing in urban areas and/or rural population density (which can be measured crudely as the rural population divided by the total district land area) should also be specified.

The preceding discussion leads to the following empirical specification:

$$\begin{aligned} \text{CDR}_i = & \alpha + \beta_1 A_i + \beta_2 Y_i + \beta_3 E_i + \beta_4 R_i + \beta_5 T_i + \beta_6 P_i + \beta_7 X_i \\ & + \beta_8 X_i U_i + \beta_9 X_i D_i + \varepsilon_i \end{aligned} \quad (2)$$

CDR	crude death rate
i	subscript refers to a given district (rayon or city)
A	proportion of the population aged 65 or over
Y	one or more proxy measures of income per capita (e.g., private motor vehicle registrations per capita, residential energy consumption per capita)
E	level of industrial energy consumption per square kilometer of land area
R	number of radiation-related deaths per capita during the past five years.
T	mean December–January temperature
P	mean December–January precipitation
X	district-level public health expenditures per capita
U	percent of the population residing in urban areas (expected to interact with X)

D	rural population density (expected to interact with X)
ε	random disturbance term

A linear functional form has been specified above. Although the function is theoretically nonlinear (there is a lower limit to mortality), a linear approximation over the range of mortality outcomes observed in Ukraine may work reasonably well for this study. Some experimentation with alternative functional forms (e.g., logistic, log-linear) should probably be done as well.

Endogenous Health Service Inputs

One of the problems which often frustrates the empirical measurement of social programs, such as the effect of government health inputs on health outcomes, is the fact that the allocation of resources between areas may take into consideration factors related to the outcome of interest. For example, disproportionately more health resources may be allocated to areas in which, for some (frequently unknown or unobservable) reason, mortality and/or morbidity are high. To the extent this is the case, there will be a built-in positive relationship between mortality and per capita public health expenditures, which will bias the observed statistical relationship. As another example, it may be that per capita health expenditures are higher in areas which are politically favored—areas which are "closer to the center," as it is said in Ukraine. If such areas are also favored in other (unobservable) ways which affect health outcomes (e.g., unobserved income or wealth is higher in these areas), the relationship between mortality and per capita public health expenditures will also be biased.

The authors know of two alternative approaches to dealing with the problem of endogenous health service inputs. First, if one is willing to assume that the unobservable characteristic which affects the allocation of resources to districts is unchanging over time, it is possible to use longitudinal data in the context of a "fixed-effects model" (estimating relationships based on observed changes over time) to obtain unbiased estimates of the relationship between program inputs and outcomes. This approach was developed by Rosenzweig and Wolpin (1986).¹⁶ The second approach is to identify "instruments" which are correlated with government expenditure allocations but are uncorrelated with the disturbance term in the health outcome equation (ε in equation 2). An example of this approach is provided in a recent unpublished paper by Angeles, Mroz, and Guilkey (1995).

¹⁶ One problem with the fixed effects model is that it is highly susceptible to errors of measurement. Since the rapid inflation experienced in Ukraine during the past several years would make it very difficult to measure district-level **changes** in public health expenditures from one year to another, use of a fixed effects model may not be an attractive option in this context.

ANNEX C

Notes on Data Sources

Table C.1

Health Expenditures, 1992

These data were provided in handwritten form by the L'viv Oblast Health Administration (LOHA). The data included budgeted expenditures for Articles 1, 9, 10, 12, 14, 15, and 16, together with the "Total factual amount" for each district (rayon or city). The data also included expenditures for oblast-level facilities and an overall total, making it possible to check the accuracy of the district-level data by computing column sums. Unfortunately, when the authors did this they found that the original data contained several errors. For example, "total factual expenditure" for Stryi district was listed as 744,390 kupons; whereas the correct column total was obtained using a figure of 474,390 kupons. The 1992 expenditure data in Table 3.1 refer to the corrected "Total factual amount," which the authors understand to refer to actual expenditures for the year (they reflect inflation occurring during the year and exceed the budgeted amounts).

In the case of two districts (Sambir and Stryi), the 1992 expenditure data were provided for the original cities, which were both subdivided in 1993 into separate rayon and city districts. In this case, expenditures were prorated on the basis of their 1994 populations.

The authors were unable to use the budgeted amounts for individual articles because of additional errors in some of their components. In the case of the budgeted Articles 12 and 14, for example, they were unable to reconcile the column totals with the reported oblast total.

Health Expenditures, 1993

These data were also provided in handwritten form, for Articles 1, 2, 9, 10, 12, 16, and 15, together with a total which was assumed to be the "Total factual amount." The Oblast totals for each Article and for the Total included budgeted amounts for Oblast facilities. However, since no budgeted amounts were provided for the Oblast facilities, it was not possible to check the accuracy of the individual components by summing down each column and comparing it to the total. The "Total factual amount" was used as a measure of 1993 health expenditures in Table 3.1.

Number of Hospital Beds, 1992 and 1993

These data were obtained from an Annual Statistical Report of LOHA. The number of beds for pre-1993 Sambir district was allocated between Sambir city and rayon in proportion to their 1994 populations.

Population, 1994

These data were furnished in handwritten form by LOHA and refer to January 1, 1994. They were provided for each district (rayon or city) for males, females, and total for the following standard five-year age groups: 0–4, 5–9, 10–14, 15–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45–49, 50–54, 55–59, 60–64, 65–69, and 70 and over.

The data were missing for three age groups (25–29, 35–39, 45–49) in the case of four rayons (Brody, Busk, Gorodok, Drohobych) and additionally for the age group 70 and over in the case of Brody rayon. It appeared that these missing data were included in the data for adjacent age groups (20–24, 30–34, 40–44). Accordingly, the age distribution of the population in the remaining rayons and cities was used as a basis to redistribute the population among the affected age groups in these four rayons.

A final line in the table containing the original data reported the population for the "L'viv suburb zone" for the age groups 0–4, 5–9, 10–14, 15–19, 20,24, and 25–29. These data were not included in the analysis, with the possibility that the population of L'viv City may be undercounted.

The population estimates used in the report, with adjustments to the age distributions of four rayons as discussed above, are provided in Table C.1.

Age/sex-weighted Population, 1994

The 1994 population for each five-year age/sex cohort was multiplied by a coefficient intended to reflect its relative utilization of health services. These coefficients, which are reproduced below in Table C.2, are used widely for health planning purposes in Ukraine and were obtained from a study conducted in Moscow of health utilization by age and sex based on international data. Because the population data in Table C.1 were not available for all the age groups covered by these coefficients (i.e., 0–1, 2–4, 70–74, 75–79, 80–84, and 85 and above), it was necessary to aggregate some of the coefficients using data on more finely disaggregated age groups available for L'viv City. This was done by weighting the coefficients by the share of the population of the more disaggregated age group in the more aggregated age group.

The age/sex-weighted population estimates were obtained by multiplying each five-year age/sex cohort by the appropriate utilization coefficient and summing. The results were then rescaled proportionately so that the sum of the age/sex-weighted populations across all rayons and cities was equal to that of the original population.

Table 3.4

Percent Rural Population, 1995

These data were obtained from the Annual Statistical Report of the LOHA and refer to the "Resident Population" on January 1, 1995.

Infant Mortality Rate, 1992/1993

Estimates of the infant mortality rate (IMR), based on vital registration data, were obtained from the Annual Statistical Report of LOHA (equal to the sum of the reported neonatal and postneonatal mortality rates). The figures in Table 3.4 refer to the mean of the IMR for 1992 and 1993 (except in a few cases where an estimate was available for only one year). No estimate of the IMR was available for Yakoriv rayon in either year. In the case of Truskavets city, for which no estimate of the neonatal mortality rate was available for either 1992 or 1993, the all-city average rate was assumed to apply.

Crude Death Rate, 1992/93 Estimates of the crude death rate (CDR), based on vital registration data, were obtained from the Annual Statistical Report of the LOHA. The figures in Table 3.4 refer to the mean of the 1992 and 1993 estimates. The estimate for Sambir was assumed to apply to both the city and the rayon.

Table C.1
Population by Age, Sex and District, L'viv Oblast, 1994

MALES	Ages 0-4	Ages 5-9	Ages 10-14	Ages 15-19	Ages 20-24	Ages 25-29	Ages 30-34	Ages 35-39	Ages 40-44	Ages 45-49	Ages 50-54	Ages 55-59	Ages 60-64	Ages 65-69	Ages 70+	Total Male Population
RAYONS:																
Brody	2400	2844	2514	2359	1871	1728	2662	2360	1911	1628	1536	1793	1952	1356	1907	30821
Busk	1874	2183	1876	1725	1650	1523	1998	1772	1333	1136	1182	1501	1548	1026	1568	23895
Gorodok	2734	2244	3067	2915	2715	2506	1703	1510	2192	1867	1769	1957	1940	1366	2029	32514
Drohobych	2529	2958	2784	2718	3252	3002	3031	2687	2094	1784	1569	1930	2160	1452	2360	36310
Zhydachiv	2957	3367	2937	2812	2479	2581	3016	2725	2111	2016	1948	2539	2712	1954	2745	38899
Zolochiv	2741	3023	2939	2739	2900	2441	3011	2648	2046	1783	1701	2141	2192	1455	2268	36028
Kamianka-Buska	2450	2718	2348	1962	2077	2155	2589	2219	1624	1340	1397	1635	1574	976	1645	28709
Mykolaiv	3662	4445	4101	3704	3820	3584	4260	3713	2879	2263	2265	2385	2269	1358	1811	46519
Mostyska	2408	2905	2561	2354	1548	2124	2452	2054	1499	1335	1364	1687	1622	1165	1684	28762
Zhovkva	4218	4740	4370	4023	3957	5131	4570	3693	2315	2705	2431	2859	2703	1776	2729	52220
Peremyshlany	1670	2073	1863	1672	1512	1715	1852	1494	1177	1118	1136	1470	1668	1163	1842	23425
Pustomyty	3474	4391	4514	4218	4043	3616	4220	4264	4304	3210	3250	2656	2406	1722	2807	53095
Radehiv	1958	2338	2278	1938	1445	1583	1982	2023	1629	1286	1331	1462	1567	995	1586	25401
Sambir	2799	3051	2757	2545	3141	2668	2834	2442	1910	1542	1623	1823	2024	1317	2170	34646
Skole	1948	2268	2169	1875	1362	1764	2036	1767	1292	992	1000	1466	1616	988	1206	23749
Sokal	3730	4245	3849	3463	2582	3330	4044	3441	2783	2468	2419	2664	2889	1686	2637	46230
Stryi	3196	3622	3283	3039	3156	3071	3507	2864	2038	1817	1924	2528	2473	1664	2358	40540
Stryi	2098	2581	2422	2135	2716	2043	2601	2361	1784	1427	1422	1604	1708	1234	1661	29797
Turka	2457	2582	2508	2693	2546	2159	2015	1699	1177	1062	1179	1634	1699	1074	1266	27750
Yakoriv	5326	6171	5820	4786	3566	4810	5833	5223	3449	2656	2399	2621	2417	1623	2379	59079

CITIES:																
L`viv	25069	27853	26848	31432	42180	33585	35230	31980	27433	24180	20820	20161	16265	12325	6956	382317
Boryslav	1564	1790	1755	1665	1175	1285	1808	1803	1480	1169	1048	1054	1001	884	1075	20556
Drohobych	3864	4036	3788	3731	4227	4235	4463	4055	3278	3109	2837	2561	2031	1400	1545	49160
Sambir	1426	1791	1762	1634	1409	1408	1889	1747	1385	1096	937	943	868	684	779	19758
Stryi	2564	3250	3095	2970	5011	3228	3378	3323	2611	2051	1798	1734	1502	1157	1208	38880
Truskavets	807	1010	1072	980	574	689	1107	1126	956	778	784	842	630	497	471	12323
Chervonorad	3666	4313	3984	3426	2126	3737	5238	4403	2809	2001	2463	3234	2738	1358	816	46312
TOTALS	95589	108792	103264	101513	109040	101701	113328	101397	81499	69818	65532	70884	66173	45655	53508	1287695

Table C.1 (continued)

FEMALES	Ages 0-4	Ages 5-9	Ages 10-14	Ages 15-19	Ages 20-24	Ages 25-29	Ages 30-34	Ages 35-39	Ages 40-44	Ages 45-49	Ages 50-54	Ages 55-59	Ages 60-64	Ages 65-69	Ages 70+	Total Female Population
RAYONS:																
Brody	2296	2590	2580	2134	2099	2099	2569	2371	1955	1733	2019	2476	2673	2371	4614	36578
Busk	1797	2013	1917	1578	1618	1618	1881	1736	1375	1220	1527	1948	2085	1937	3951	28201
Gorodok	2582	3231	3009	2614	2769	2769	4588	4235	2227	1975	1956	2527	2807	2679	4720	44688
Drohobych	2439	2784	2721	2587	2556	2556	2740	2530	1937	1717	1919	2654	3245	2683	5523	40590
Zhydachiv	2713	3207	2991	2635	2059	2476	2933	2686	2060	2173	2399	3109	3844	3486	6102	44873
Zolochiv	2614	2503	2900	2575	2499	2464	2793	2612	2177	1876	2115	2753	3073	2803	5572	41329
Kamianka-Buska	2284	2580	2325	1949	1966	2053	2558	2169	1655	1529	1789	2065	2137	1909	3923	32891
Mykolaiv	3544	4191	3925	3252	3096	3554	4051	3694	2889	2455	2490	2810	2821	2279	3930	48981
Mostyska	2527	2797	2376	2089	1462	2121	2421	1992	1612	1343	1704	2194	2629	2187	4336	33790
Zhovkva	4013	4654	4207	3613	4375	4397	4408	3687	2570	2828	2971	3679	3906	3398	6574	59280
Peremyshlany	1605	2021	1805	1626	1445	1648	1772	1542	1147	1271	1539	1990	2505	2237	4322	28475
Pustomyty	3371	4213	4383	4207	2931	3705	4363	4469	4460	3349	3388	3426	3312	3155	6173	58905
Radehiv	1891	2235	2043	1865	1522	1635	1928	1829	1470	1360	1539	1846	1903	1711	3623	28400
Sambir	2754	3014	2758	2415	2664	2991	2614	2190	1762	1634	2029	2558	3070	2622	4979	40054
Skole	1922	2194	2038	1761	1362	1483	1740	1577	1168	1048	1282	1869	2224	1571	2511	25750
Sokal	3536	4152	3817	3295	3030	3274	3822	3473	2922	2078	2978	3479	3745	3042	5827	52470
Sary Sambir	3088	3466	3101	2827	2960	2766	3045	2476	2026	1968	2388	3187	3611	2985	5366	45260
Stryi	1942	2502	2378	2045	1876	2023	2415	2103	1729	1502	1741	2091	2404	2009	3644	32404
Turka	2402	2494	2388	2285	1824	1396	1582	1416	1124	1189	1383	2077	2297	1714	2501	28072
Yakoriv	4797	5845	5634	4373	4252	4616	5591	4802	3402	2808	2717	3320	3510	3082	5662	64411

CITIES:																
L'viv	23653	26908	26047	31699	32276	29536	35388	34178	31090	26812	22813	23265	19439	19805	14650	397559
Boryslav	1606	1689	1650	1653	1742	1541	1896	1905	1632	1383	1210	1329	1424	1389	2097	24146
Drohobych	3515	3751	3713	3408	5429	4853	4609	4281	3970	3560	3119	2830	2454	2263	3486	55241
Sambir	1415	1758	1652	1481	3078	1646	2042	1789	1552	1210	1058	1152	1200	1113	1593	23739
Stryi	2321	2955	2851	2732	2707	2420	3464	3452	2947	2294	2009	2167	2053	1908	2560	38840
Truskavets	717	950	1024	935	840	795	1162	1309	1157	992	955	1052	792	713	784	14177
Chervonorad	3261	4000	3797	3043	3207	3633	4785	4090	2823	2639	3196	3726	2757	1802	1728	48487
TOTALS	90605	104697	100030	96676	97643	96067	113160	104593	86838	75946	76233	87579	87920	78853	120751	1417591

Source: L'viv Oblast Health Administration

Table C.2 Coefficients for Relative Health Care Utilization by Age and Sex		
Age Cohort	Male	Female
0-1	10.0	5.0
2-4	7.0	3.5
5-9	3.7	3.0
10-14	3.0	2.5
15-19	2.2	3.0
20-24	2.6	3.5
25-29	2.0	4.0
30-34	2.0	4.0
35-39	2.5	4.5
40-44	3.5	5.0
45-49	4.5	5.5
50-54	5.0	6.5
55-59	6.5	7.0
60-64	7.5	8.5
65-69	8.0	9.5
70-74	10.0	10.5
75-79	10.5	11.0
80-84	12.0	12.0
85+	13.0	13.0

Source: City Hospital Number One, L'viv City

ANNEX D

Persons Contacted

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Drohobych Rayon Health Care System

Dr. Mykhailo Petrick, Administrative Director