

# The First Year of Hyperinflation in the Former Soviet Union: Nutritional Deprivation among Elderly Pensioners, 1992

## ABSTRACT

**Objectives.** Hyperinflation began in early 1992 in the former Soviet Union. This paper describes factors associated with nutritional status that year among elderly pensioners.

**Methods.** Approximately 300 pensioners were selected randomly in each of eight cities. Surveys of diet, weight, health status, and social and economic conditions were done between June and December 1992. This paper reports on 2281 completed questionnaires.

**Results.** Half the pensioners reported that they had lost 5 or more kilograms in the prior 6 months; 57% did not have enough money to buy food, and 39% needed medicines they could not afford. Forty percent consumed less than a half kilogram of meat, 50% consumed less than a half kilogram of fruit, a third consumed less than a liter of milk, and a third consumed less than 2 kg of bread per week. Weight loss was strongly associated with not having enough money to buy food, an inability to afford medication, and consumption of fewer than three meals a day. Concurrent with these conditions, there was a large increase in mortality in Russia.

**Conclusions.** The results of these surveys suggest that many elderly pensioners were experiencing severe nutritional deprivation in the latter half of 1992. (*Am J Public Health.* 1996;86:361-367)

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### Introduction

Momentous social, political, and economic changes have been ongoing in the former Soviet Union since 1985. The transition from autocratic rule to a set of unstable independent states with chaotic mixed (state-controlled and free-market) economies has occurred at a dizzying pace, especially following the disruption of regular trade relationships in the former Soviet orbit in 1988. Food supplies started becoming scarce at the beginning of 1990. This was exacerbated by the political changes after the failed coup of August 1991 and the removal of currency exchange controls in Russia in January 1992.

Beginning in January 1992, prices for 90% of goods were allowed to rise or fall according to market conditions. One immediate effect has been rapidly and continuously rising prices, which have erased savings for a large part of the population and eroded the value of most people's incomes. Inflation was 2600% in 1992. Standards of living have dropped: the World Bank estimate of Russia's per capita income fell by 30% in 1993, from \$3220 to \$2680, ranking it below Venezuela, Argentina, Brazil, and Mexico.<sup>1</sup> According to the State Committee on Statistics, Goskomstat, industrial production also declined dramatically (by 18% in 1992, 16.2% in 1993, and 24% during the first few months of 1994).<sup>2</sup>

According to Goskomstat, the budget deficit in 1993 was 11 trillion rubles, 18 times higher than in 1992.<sup>3</sup> The Finance Ministry envisaged a 1994 deficit of 61.5 trillion rubles (\$36 billion), about 10.2% of the gross domestic product.<sup>4</sup> Thus, the federal and local governments have had fewer resources to help those in need. As conditions worsened in 1992, there was general apprehension about the fate of those least capable of contending with

these conditions. Elderly people whose state pensions were their only or dominant source of income constituted one of the potentially most vulnerable groups.

Thus, in March and April 1992, the US humanitarian relief agency CARE, with financial support from the US Agency for International Development and technical consultation from the US Centers for Disease Control and Prevention (CDC), performed two surveys in 5 of 32 districts in Moscow and in 3 of 7 districts in the city of Ekaterinburg (formerly Sverdlovsk), some 1000 km east of Moscow.<sup>5</sup> These surveys were followed, in late April and May 1992, by one conducted in Yerevan (capital of newly independent Armenia).<sup>6</sup>

From June 1992 through the end of the year, these three cities were resurveyed by CARE (again funded by the US Agency for International Development), and five additional cities were added: St. Petersburg, Irkutsk, and Gagarin in Russia; Almaty in Khazakstan; and Tashkent in Uzbekistan. St. Petersburg is the second largest city in Russia; Irkutsk is one of the largest cities in Siberia, and Gagarin is a smaller city not far from Moscow. Almaty and Tashkent were included as capitals of their republics, and they were meant to represent conditions

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This paper was accepted October 31, 1995.

**Editor's Note.** See related editorial by Toole and Serdula (p 299) in this issue.

outside of Russia but not the siege conditions of Yerevan. In this paper, we present the summarized results of these final eight surveys.

## Methods

The survey instruments developed by the CARE teams and CDC were initially based on the public screening questions of the Nutrition Screening Initiative<sup>7-9</sup> and were supplemented with additional questions about diet, demographic status, income and savings, health habits, international and governmental aid received, and coping strategies. For the last six surveys, quantitative questions on weekly dietary intake of meat, vegetables, fruit, milk, milk products, and bread were added (questionnaires are available from the authors). The questionnaires were translated into the appropriate local languages (and back-translated into English). The questionnaires were given by pairs of interviewers, typically university graduates in the social sciences, and took approximately 45 minutes to 1 hour to complete. A supervisor checked the completeness and consistency of each questionnaire. No physical, biochemical, or hematological measurements were made; weights and heights were reported by respondents. We calculated body mass indexes (height in meters divided by weight in square kilograms) from these reports.

In all cities, the local authorities provided access to official pension lists. While conditions varied somewhat (in three cities, lists were computerized), all pensioners in each city were eligible for inclusion in the study, except those in Moscow and Ekaterinburg. In Moscow, 5 of 32 districts were chosen to balance social status and distance from the center of the city, and, in Ekaterinburg, 3 of 7 districts were surveyed. Within those districts, and throughout the other six cities, all pensioners 70 years of age and older were eligible. An interval was chosen in the lists of pensioners in each city such that by contacting every *n*th pensioner, approximately 350 individuals were identified, aiming at a final sample of approximately 300. In the three cities with computerized lists, the intervals were exact; in the other five cities, a ruler was used to measure the interval by length along card files. The initial subject was chosen randomly by generating a random number with a hand calculator. The distribution by age and gender represents that in the community at the time. Rates of refusal were negligible. The sampling

replacement procedure in the three cities that were resurveyed should not have exaggerated the conditions we describe: we would have expected those lost to follow-up, especially those who died or were in hospitals, to have been among the worst off in the initial sample. Replacing them should have, if anything, minimized observed effects of deprivation. In Moscow, for instance, a list of 250 additional random pensioners, 101 of whom were selected (keeping the number of pensioners in each of the 5 districts in proportion to the number living in that region), was generated. The total sample frame was therefore 353, of whom 13% could not be interviewed because of absence from home, death or illness, or refusal.

In the final two surveys (in Tashkent and Almaty), reasons for noncontact were specified. In Tashkent, of the 38 individuals in the identified sample who were not interviewed, there were no refusals; in Almaty, of the 40 who could not be interviewed, there was one refusal. The reason for most noninterviews was that addresses could not be found or people had moved. There were a few deaths and hospitalizations.

In late 1992, conditions across the former Soviet Union varied greatly. Rates of inflation were different in different republics, food supplies varied, and, in Yerevan, a blockade and previous earthquake exacerbated already difficult conditions. We present aggregated results for the eight sites, but we also present some results separately by site.

For the six cities in which food intake was estimated, we created a summary dietary score, dividing the total population (separately by gender) into low, middle, and high tertiles for each of the food groups (meat, vegetables, fruit, bread, milk, and milk products, primarily various kinds of cheese and yogurt-derived foods). Each individual was given a summary score by adding his or her tertile score (0, 1, 2) for each of the six groups; the score could thus range from 0 to 12. (In Tashkent, there were questions about five, rather than six, food groups. For that city, the summary score was the average individual food group score multiplied by six.) In four of the six cities in which food intake questions were asked, essentially all subjects had valid answers for all fields. In two of the cities, many of the questions were left blank, and there were no "zero" responses. For these two cities (Irkutsk and Moscow), we assumed that if at least four of the six questions were answered, the remaining two, in all likelihood,

**TABLE 1—Sample's Health and Disability Characteristics: Elderly Pensioners in the Former Soviet Union, 1992**

	Sample (n = 2281), %
Gender	
Male	23.9
Female	76.1
Married	
Men	69.7
Women	18.6
Age, y	
70-74	38.5
75-79	28.7
80-84	22.0
85+	10.8
Takes 3+ medicines per day	32.9
Illness affects eating habits	43.9
Can't always shop	61.3
Can't always cook	54.7
Can't always feed self	33.3

signified zero. The frequency of zero responses was then comparable with the four cities in which zeroes were scored. In fact, the magnitude of the regression coefficients was changed only marginally by these assumptions.

We performed several linear multiple regression analyses relating weight loss, food intake, and body mass index to health, social, and economic conditions and diet. Independent variables (other than age and gender) were eliminated by backward elimination if not significant.

## Results

In Table 1, we present the distribution of sample characteristics for the 2281 respondents (site-specific data are available from the authors). Three quarters of the respondents were women, only 19% of whom were married, in contrast to the 70% of men who were still married. Many of these elderly people were constrained in terms of mobility and self-care. Sixty-one percent could not always shop for themselves, 55% could not always cook for themselves because of physical disability, and a third could not always feed themselves. In Table 2, we present some of the site-specific data on the economic stress experienced by these elderly people. Half the respondents reported that they

TABLE 2—Sample's Economic and Demographic Characteristics, by Site

	Russia, %					Armenia	Khazakstan	Uzbekistan	Total
	Ekaterinburg (n = 310)	Gagarin (n = 249)	Irkutsk (n = 289)	Moscow (n = 306)	St. Petersburg (n = 279)	(Yerevan) (n = 280), %	(Almaty) (n = 296), %	(Tashkent) (n = 272), %	
Lives alone									
Men	13.5	29.6	8.6	11.6	25.5	5.0	13.2	9.1	13.4
Women	26.6	53.3	27.4	28.7	32.1	25.0	32.9	28.6	31.6
Not enough money to buy food	41.8	43.4	63.1	45.5	62.5	75.4	74.7	47.4	56.8
Eats < 3 meals per day	6.5	9.1	10.1	17.0	16.9	47.9	16.9	14.7	17.4
Can't afford needed medicine	30.7	44.2	35.3	24.5	25.5	64.6	51.4	31.6	38.5

TABLE 3—Sample's Reported Dietary Intake, by Site

	Russia				Khazakstan	Uzbekistan	Total
	Ekaterinburg (n = 306)	Irkutsk (n = 248)	Moscow (n = 275)	St. Petersburg (n = 279)	(Almaty) (n = 296)	(Tashkent) (n = 272)	
Mean weekly food intake							
Meat, g	715	842	477	420	842	582	647
Vegetables, g	2600	2118	2414	1733	2196	3063	2358
Fruit, g	702	406	1213	410	637	1597	827
Milk, L	1.9	2.3	2.3	1.4	1.6	1.6	1.8
Milk products, g	530	585	569	493	560	918	607
Bread, g	2921	2257	2471	2414	2518	...	2530
Consumption, %							
< 0.5 kg meat per week	37.6	26.6	53.5	61.7	27.4	32.7	40.0
< 1.0 kg vegetables per week	19.3	19.4	14.2	26.5	18.6	12.5	18.4
< 0.5 kg fruit per week	45.4	67.7	24.7	65.2	59.1	23.9	47.6
< 1.0 L milk per week	36.6	16.1	16.7	44.1	43.6	36.8	32.8
< 0.5 kg milk products per week	59.8	48.0	55.3	63.4	64.5	47.1	56.7
< 2.0 kg bread per week	26.1	33.9	32.1	33.7	34.5	...	32.1
Diet score, <sup>a</sup> mean ± SD	6.1 ± 2.6	6.0 ± 2.3	6.4 ± 2.3	4.8 ± 2.4	5.8 ± 2.5	6.8 ± 2.5	6.0 ± 2.5
Diet score <sup>a</sup> < 7, %	68.6	72.6	67.3	87.1	72.3	43.4	68.6

Note. The Ekaterinburg, St. Petersburg, and Tashkent surveys were conducted in September 1992; the Moscow survey was conducted in October 1992; and the Irkutsk and Almaty surveys were conducted in December 1992.

<sup>a</sup>0 = lowest tertile, 1 = middle tertile, 2 = highest tertile (separately by gender) for each of the six food groups.

did not have enough money to buy food (the range was 41.8% [Ekaterinberg] to 75% [Almaty and Yerevan]). Economic stress was also indicated by the 39% of respondents who reported that they needed medicine they could not afford. The highest rate (65%) was in Yerevan. In that blockaded city, 48% of respon-

dents reported that they had fewer than three meals a day, a rate much higher than those in any of the other sites, where the range was 7% to 17%.

We present the results for food intake in Table 3. The mean intake of meat, a diet staple, was only a little more than half a kilogram per week, and half of

the respondents reported that they were eating less than half a kilogram per week. The mean intake of fruit was reported as 828 g per week; 42% of the respondents reported less than half a kilogram per week. Respondents depended on bread and milk, which were typically subsidized, as staples (mean intakes were 1.8 L of

**TABLE 4—Body Mass Indexes (kg/m<sup>2</sup>) and Weight Loss**

	Sample (n = 2281)
BMI, mean ± SD	
Men	24.8 ± 3.5
Women	25.7 ± 4.4
BMI < 22, %	
Men	16.8
Women	18.7
Weight loss ≥ 5 kg in last 6 mo, %	
Men	48.8
Women	51.9
BMI with weight loss, mean ± SD	
Men	23.9 ± 3.3*
Women	25.0 ± 4.2*
BMI without weight loss, mean ± SD	
Men	25.6 ± 3.6*
Women	26.3 ± 4.5*
BMI < 22 with weight loss, %	
Men	23.3*
Women	23.2*
BMI < 22 without weight loss, %	
Men	11.7*
Women	14.5*

Note. BMI = body mass index.  
\*P < .001 (comparing those with weight loss with those not reporting weight loss).

milk and 2.5 kg of bread per week). Even so, almost a third of the population reported drinking less than a liter of milk per week or eating less than 2 kg of bread per week.

Nearly a quarter of respondents with a history of recent weight loss of 5 or more kilograms in the previous 6 months reported body mass indexes under 22, a rate significantly greater than that indicated by respondents who did not report weight loss (Table 4; site-specific data are available from the authors). (A body mass index threshold of 22 was used for this population, rather than the more stringent cutoff of 18, for two reasons: past weights were probably high, and this is the level below which mortality has been observed to rise in studies of adults in relatively affluent societies.<sup>10,11</sup>)

In Table 5, we present, separately for men and women and adjusted for age, the odds ratios of the likelihood of weight loss of 5 or more kilograms given the response to several key questions. While respon-

**TABLE 5—Factors Associated with Reported Weight Loss of 5+ kg in Previous 6 Months**

	Men		Women	
	Odds Ratio <sup>a</sup>	95% Confidence Interval	Odds Ratio <sup>a</sup>	95% Confidence Interval
Not enough money to buy food	1.18	0.82, 1.67	1.66***	1.36, 2.04
< 3 meals per day	1.95**	1.19, 3.20	1.93***	1.47, 2.52
Eats alone	1.03	0.65, 1.65	1.34**	1.10, 1.63
Unable to cook for self	1.71**	1.16, 2.51	1.24*	1.01, 1.52
Unable to shop for self	1.54*	1.06, 2.24	1.44***	1.16, 1.79
Illness affects eating habits	2.17***	1.50, 3.14	1.82***	1.49, 2.23
3+ drugs taken per day	2.13***	1.43, 3.19	1.95***	1.57, 2.43
Tooth/mouth problems	1.35	0.94, 1.93	1.33**	1.09, 1.63
Can't afford needed medication	2.16***	1.43, 3.17	1.45***	1.18, 1.79
Needed medication not available in pharmacy	1.89***	1.31, 2.75	1.49***	1.21, 1.83
n	536		1708	
Diet score ≤ 7	1.55	0.96, 2.49	1.45**	1.14, 1.86
n	352		1198	

<sup>a</sup>From logistic regression controlling for age and body mass index.  
\*P < .05; \*\*P < .01; \*\*\*P < .001.

dents who reported concurrent illness (those with an illness that affected their eating habits or those who were taking three or more medicines daily) and those with impaired functional ability (e.g., those unable to care or shop for themselves) had the greatest risk of recent weight loss, there were also strong and significant relationships between weight loss and economic conditions (not enough money to buy food, eating fewer than three meals a day, unable to afford needed medication). Weight loss was highly significantly related to a report of not enough money to buy food among women; this relationship was not significant among men. However, there were many fewer men than women in the survey, and the relationship was in the same direction among men. For both men and women, there were strong associations (statistically significant among women) between having lost weight and having a low dietary score (<7 out of a possible 12). The relationship of weight loss to eating fewer than three meals a day was highly significant in both men and women and of high magnitude (an odds ratio of nearly 2).

In Table 6, we report the regression analysis relating several variables to dietary score. Given the crudity of the measurement of dietary intake, we found remarkably strong and consistent relationships among several variables and summary dietary score.

There was a highly significant relationship between not enough money to buy food and amount of food intake. Thus, the mean dietary score was one unit lower (P < .0001) given not enough money to buy food. Those who reported recent weight loss indicated, on average, consuming 0.4 units less food than those without weight loss, and those with a history of eating fewer than three meals per day had dietary scores that were, on average, one unit lower. There was no significant relationship between body mass index and dietary intake.

In Table 7, we present two models for reported weight loss of 5 or more kilograms in the previous 6 months. In the first model, we included the response to the question asking whether there was enough money to buy food; in the second, we included the dietary score after control for age, gender, whether there was an illness affecting eating habits, and number of drugs taken. Both lower dietary score and lack of money were strongly and significantly related to weight loss. Those who reported not enough money to buy food were 8.7% (P < .0001) more likely to report recent weight loss, and there was a relationship such that for each decrement in the dietary score of one unit, a respondent was 2% (P < .0001) more likely to report weight loss.

While weight loss was strongly related to short-term economic stress (not enough money, low food intake), body

mass index, of which weight loss is a relatively small component, is more a reflection of longer term conditions and was much less related to recent stress (data are available from the authors). Women had body mass indexes almost two thirds of a unit higher than men, and cigarette smokers had lower body mass indexes by more than one unit relative to those who did not smoke. Those reporting recent weight loss were 1.5 body mass index units lighter than those who did not report recent weight loss ( $P < .0001$ ). For an individual 1.68 m tall, this is equivalent to a 4.2-kg difference in weight; the responses to these different questions were thus highly consistent.

In Table 8, we compare the body mass indexes of respondents in Yerevan and Moscow from surveys completed in the spring of 1992 with those performed later in the year. (The data from the first Ekaterinburg survey were not available to us.) The body mass indexes in August in Yerevan were dramatically lower than in April (by 1.21 units in men [ $P = .06$ ] and 1.80 units in women [ $P = .003$ ]). In Moscow, the difference was 0.72 units in men ( $P = .20$ ) and 0.65 units in women ( $P = .12$ ). Thus, in the very severe conditions in Yerevan, differences were large and, among women, highly significant. The smaller short-term changes in Moscow, while not statistically significant, were consistent with less severe, but still highly stressful, conditions.

## Discussion

These representative urban elderly people in the former Soviet Union reported poor health, nutritional status, diet, and social conditions and described many linked problems: half reported serious recent weight loss and not enough money to buy food, and many indicated that they consumed inadequate amounts of food. The sections to follow address several key questions in contending with the results of this survey.

### Are the Results Credible?

Although the survey instruments were nonstandard, the results had high internal consistency. For instance, those who indicated recent weight loss, after adjustment for the other significant factors associated with body mass index, reported body mass indexes 1.5 units lower than those who did not report weight loss (equivalent to about 4.2 kg for a person 1.68 m tall, consistent with the threshold of 5 or more kilograms lost). (Those who did not report

**TABLE 6—Reported Amounts of Weekly Food Intake (Dietary Score): Linear Multiple Regression Analyses**

	Regression Coefficient	P
Core model (n = 1573)		
Age, y	-0.006	.582
Gender (male = 1, female = 2)	0.392	.010
Often unable to shop for self (no = 0, yes = 1)	-0.545	.000
Not enough money to buy food (no = 0, yes = 1)	-0.935	.000
Core model plus weight loss of $\geq 5$ kg in last 6 mo (no = 0, yes = 1)	-0.403	.002
Core model plus body mass index, kg/m <sup>2</sup>	0.011	.445
Core model plus consumption of $< 3$ meals per day (no = 0, yes = 1)	-1.057	.000

**TABLE 7—Reported Weight Loss of 5 or More Kilograms in Previous 6 Months: Linear Multiple Regression Analyses**

	Regression Coefficient	P
Model including whether respondent did not have enough money to buy food (n = 2098)		
Age, y	0.002	.405
Gender (male = 1, female = 2)	0.024	.336
Illness affecting eating (no = 0, yes = 1)	0.125	.000
No. of drugs per day (0 = 1, 1-2 = 1, 3+ = 2)	0.072	.000
Not enough money to buy food (no = 0, yes = 1)	0.087	.000
Model including dietary score (n = 1490)		
Age, y	0.004	.014
Gender (male = 1, female = 2)	0.011	.709
Illness affecting eating (no = 0, yes = 1)	0.143	.000
No. of drugs per day (0 = 1, 1-2 = 1, 3+ = 2)	0.059	.001
Dietary score	-0.020	.000

**TABLE 8—Change in Body Mass Index (kg/m<sup>2</sup>), Adjusted for Age, between Surveys**

	First Survey		Second Survey		Difference	P
	Mean Body Mass Index	No. <sup>a</sup>	Mean Body Mass Index	No. <sup>a</sup>		
Yerevan						
Men	25.97	54	24.76	100	-1.21	.06
Women	26.15	100	24.35	180	-1.80	.003
Moscow						
Men	25.39	62	24.67	67	-0.72	.20
Women	26.55	182	25.90	231	-0.65	.12

<sup>a</sup>Limited to those 70+ years of age.

5 or more kilograms lost probably did lose on average some weight.) The relationship between weight loss and lower dietary intake score was highly significant ( $P = .002$ ). Also, those who reported not having enough money to buy food were 9% more likely to have reported losing weight ( $P < .0001$ ). Thus, lack of food

seems to be a very important factor in weight loss, and not enough money dictated less food intake. We do not believe that these interrelationships were a result of chance associations, nor is there any reason to believe that they were the product of bias or misreporting. Not only are the data internally consistent, but we

can conceive of no motive for distortion or exaggeration: it was explained to respondents that they would not receive any benefit on the basis of response to the questionnaire. Dr Alexander Deev, in his analysis of the Russian longitudinal monitoring survey, informed us that our reported body mass indexes were essentially identical to the survey's (measured) values for respondents more than 70 years of age (written communication, September 1994). However, in two surveys conducted 1 year apart (in 1992 and 1993), loss of 5 kg or more in weight was observed only among 18% of men and 10.3% of women. Conditions may have eased by 1993, and respondents to our surveys may have referred to basal weights further in the past than 6 months. Even if weight loss was more gradual, the results still raise important questions about the possible impact on health and survival (see later discussion).

#### *Are the Conditions Described Serious?*

The magnitude of problems was great: 57% of this elderly population described not having enough money to buy food; nearly half were eating less than a half kilogram of fruit per week, 40% were eating less than a half kilogram of meat per week, and about a third were consuming less than a liter of milk and 2 kg of bread. Those who reported weight loss of more than 5 kg in the prior 6 months would have been candidates for intense medical evaluation in affluent populations. Even accepting that weight loss may have occurred over a longer period of time, the implications of possible severe health effects are still very real. In addition to evidence of hunger (deprivation of food and weight loss), there were other stresses from insufficient financial resources (e.g., for needed medicines). By any definition, this was a beleaguered population.

#### *Is Weight Loss in an Elderly Population Important?*

The reported body mass indexes were not those associated with famine (as in the war time blockade of Leningrad). On the other hand, it is not clear at what level low weight confers adverse risk in old people. Since there are no scientific studies known to us that are fully parallel with this situation in the former Soviet Union, we must rely on a circumstantial trail of evidence in order to judge the meaning of these results.

#### *What Were the Likely Body Mass Indexes before This Economic Upheaval?*

By far the best data known to us come from the US/USSR lipid research clinics studies.<sup>12</sup> These data were drawn from representative adult Soviet populations in Leningrad and Moscow during the 1970s and 1980s, on subjects up to the age of 69. The differences between that survey and the current data are so dramatic that the relatively small declines associated with age<sup>13</sup> should make little difference to our conclusions. Two hundred seventy-eight men in Leningrad and 231 in Moscow between ages 60 and 69 were reported on. Their mean body mass index was 26.8 compared with this study's 24.8, a difference of 2.0 body mass index units, or over 6 kilos for men 1.75 m tall. The mean body mass index for the 514 women between 60 and 69 in the lipid research clinics was 30.0, 4.3 units greater than that reported by the women in this study, equivalent to an 11-kg difference for women 1.6 m tall. (The mean body mass indexes from the lipid research clinics study are very similar to those reported in the eastern European sites of the recently reported Europe-wide SENeca studies of nutritional status of elderly people 70 to 74 years of age.<sup>14</sup>)

#### *Weight Loss and Mortality*

Yablokov and Demin presented recent age-specific mortality figures for Russia.<sup>15</sup> For those 60 years of age or older, the death rates per thousand were 48.68 in 1990 and 56.15 in 1993 (an increase of 7.47 per thousand, more than a 15% rise). Such a sudden steep increase suggests increasingly precarious social, economic, and health conditions. Although this increase was proportionately lower than the increase in death rates for younger adults, it was, in absolute numbers of deaths, the largest increase across the life cycle.

Might the conditions reported by our respondents be related to the sudden and severe increase in death rates? Andres et al. reviewed the relationship between changes in body weight and mortality.<sup>16</sup> In the studies reviewed, the follow-up period varied from a minimum of 8 years to as long as 25 years. In all studies, there was an attempt made to account for concurrent illness so as to minimize the effect of illness on weight, but this bias remains a concern. Ten of 12 studies reported increased mortality following mild to moderate weight loss among men, and 3

of 7 reported increased mortality following weight loss among women. The review did not include a recent analysis from the National Health and Nutrition Examination Survey I follow-up study.<sup>10</sup> In that study, whatever the initial maximum body mass index, and after elimination of the first 5 years of follow-up (in order to minimize the effect of preexistent disease), stable weight was associated with a much lower relative risk of mortality than was weight loss of 15% or more; typically, death rates were 50% to 150% higher above this level of weight loss. Except for men who were initially obese (body mass index > 29), those with intermediate weight loss (5% to 15% of body weight) had increased mortality as well, at levels between those whose weights were stable and those with more extreme weight loss. The central confounding issue in such studies of the relationship of weight loss to mortality is whether the weight loss was due to preexistent disease, as opposed to weight loss preceding terminal illness. In these necessarily observational studies, this problem can never be entirely resolved.

#### *Conclusions*

Many of the respondents to this survey described themselves as in a desperate situation: half reported that they did not have enough money to buy food, and half reported severe weight loss. Responses to our dietary questions were consistent with responses to questions about weight loss and economic conditions. Furthermore, around the time of these surveys, death rates in this society increased dramatically, probably by about 15% in 1 year among the elderly study respondents. The men in this survey may have lost, on average, about 6 kg and the women twice that (if the lipid research clinics measurements were similar to the former weights of these urban elderly people). We also know with reasonable confidence that death rates rose precipitously, possibly during but certainly soon after the surveys were completed.

The *New York Times* recently reported that economic hardship throughout Russia may be easing.<sup>17</sup> What was not addressed is whether the situation of those on fixed or declining incomes, such as many elderly people, has also improved. The elderly are not typically in a position to take advantage of the new private economy. We believe that the surveys described here need to be made current in order to judge whether condi-

tions have eased for those subjects who have survived and to estimate the strength with which subsequent morbidity and mortality have been associated with the intensity of deprivation the subjects have experienced in the recent past. □

### Acknowledgments

Dmitri Chtchekine, Curt Ford, Jenny Gurahian, Michelle Karolak, Jessica Leonard, Elena Poznykhova, Sneh Reval, Allison Smith, and Andrey Vertikov were field supervisors. Tania Korienco was assistant to the survey team manager. Carol Rubin and Scott McNabb (formerly of the Epidemic Intelligence Service, Centers for Disease Control and Prevention) were instrumental in setting up these surveys. We would like to thank Sandra Laumark (director of CARE activities in Russia during 1992) for her counsel and advice and Rowland Roome (director of CARE Russia from 1992 through 1994) for making the CARE data available for analysis. We are grateful to Brenda Mahnken for help in data management and analysis. Finally, we thank Irwin Rosenberg, Carol Rubin, Nevin Scrimshaw, and Mary Serdula, who reviewed earlier versions of the manuscript and provided helpful comments.

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