Appendix 3

Post - Chernobyl Thyroid Doses in Belarus Based on Measurements of the ^{131}I Activity in the Human Thyroid and on a Factorisation Method

Post-Chernobyl Thyroid Doses in Belarus based on Measurements of the ^{131}I Activity in the Human Thyroid and on a Factorisation Method

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1. Introduction

The objective of the present investigation is to derive from the data on individual estimates of thyroid doses based on measurements of the ^{131}I activity in the human thyroid performed in Belarus in the weeks after the Chernobyl accident age dependent average doses for the birth year cohorts 1968-1985 for the cities of Gomel and Minsk, and for the settlements of rural areas of Belarus with more then 10 measurements of individual ^{131}I activity's.

The determination of the settlement specific age dependent average doses is based on a factorisation approach, in which a generic age dependence and age dependence scaled values are derived from the individual data. Separate determinations are made for the population of rural settlements and for the urban residents of Gomel and Minsk cities.

In the determination of average doses for rural settlements it is accounted for that a part of the measurements were made under conditions of lower reliability. In the determination of average values for rural settlements, weighted averages are made in which the weights are dependent on estimated uncertainties of the measurements and estimates of correlations between individual measurements performed under similar reliability conditions in each settlement. Based on this analysis, also an estimate of the uncertainty of settlement average values is made.

For the cities of Gomel and Minsk an assessment is made to take into account that people which had stayed in highly contaminated areas in the weeks after the accident are overrepresented in the measurements. These people were subjected to considerably higher exposures, and their contribution to average doses for the whole population of the city must be accordingly weighted.

2. Materials and methods

2.1 Data base of individual thyroid dose estimates

In the present investigation, 120402 individual determinations of ^{131}I thyroid doses based on measurements of ^{131}I activity in the human thyroid performed in the period from 2 May to 5 June 1986 are considered. Among them are 5516 residents of Gomel city, 19944 residents of Minsk city and 94942 residents of settlements of rural areas of Gomel and Mogilev oblasts. Figure 1 shows the geographical location of those rural settlements in which more then 10 measurements had been performed. The determination of individual doses has been described in Gavrilin et al. [1,2] and is discussed in Appendix 2, Annex 2. The integrated ^{131}I activity in the thyroid Q, (MBq hour), is expressed as

$$Q = A(t_m) \times B(t_m) \tag{1}$$

where $A(t_m)$, (MBq), is the ^{131}I activity in the thyroid determined by measurement and $B(t_m)$, (hour), is the value of the function describing the kinetics of ^{131}I in the thyroid at the time t_m the measurement was performed. The individual thyroid dose D, (mGy), due to incorporated ^{131}I is given in terms of the integrated ^{131}I activity Q in the thyroid by

$$D = \frac{E}{m} \times Q \tag{2}$$

where E/m , in appropriate units, is the quotient of the average energy of β and γ radiation absorbed in the thyroid per radioactive decay of ^{131}I and the mass of the thyroid; the numerical values appropriate to the respective age of the individual are based on data proposed in the ICRP Publication 56 [4].

As discussed in more detail in Appendix 2, Annex 2, the individual ^{131}I activity in the thyroid $A(t_m)$ at time of measurement is determined from the gamma exposure rate $P_{th}(t_m)$ measured at the neck at the position of the thyroid after subtraction of the appropriate background gamma exposure rate $P_b(t_m)$ by

$$A(t_m) = c(a) \times (P_{th}(t_m) - P_b(t_m)) \tag{3}$$

where c(a) is a calibration coefficient relating ^{131}I activity in the thyroid to the indication of gamma exposure rate by the specific measuring device used, its value depends on the device and on the age a of the measured individual. The background gamma exposure rate is due to the radiation background at the place of measurement, to the contamination of skin and of clothes of the measured person and to radiation from incorporated radionuclides other than ^{131}I. It depends on the conditions under which measurements were made, and was estimated according to the available information. The estimations of background for the individual measurements and the determination of the calibration coefficient are discussed in detail in Appendix 2, Annex 2.

The detection instruments used for the gamma exposure rate measurements were the DP-5, a Geiger-Müller detector (used in about 77% of all measurements) and the SRP-68-01 and DRG3-02, which are NaI(Tl) detectors (used in 21% respectively 2% of measurements). The instruments are non-spectrometric and have analog outputs with 95% confidence intervals not better than 30% for the DP5 and 10% for the other instruments. The detectors were used without collimators. The measurements were classified into four groups, according to the conditions of measurement, as detailed in Appendix 2, Annex 2 (Table 1):

1. Individuals measured with SRP and DRG devices in hospitals of Gomel and Minsk cities, about 4% of the total number of measurements. The individuals had generally been highly exposed, and often measured before at some other place. The background of the measurement was low, as people removed their contaminated clothes and washed themselves prior to he measurements.
2. Individuals measured with SRP devices in medical policlinics of Minsk city, about 19% of the total. Mostly residents of Minsk city. Low background.
3. Individuals measured with DP-5 devices, in hospitals, clinics of raion centres, sanatoria, pioneer camps, etc, about 25% of the total number of measurements. A proper handling of the DP-5 device can generally be expected. Low room background. The background due to contamination of skin and clothes can be expected to be low, as people as a rule removed clothes and washed themselves prior to the measurement.
4. Individuals measured with DP-5 devices directly at their place of residence in rural settlements, about 52% of the total number of measurements. An improper handling of the DP-5 device is expected to have occurred. High background from the contamination of the environment and from surface contamination of skin and clothes.

The total data base of determinations of thyroid doses encompasses data for 125036 individuals. For each individual with measurement of ^{131}I thyroid activity, the following data was used in the framework of the present investigation:

- A residence code, specifying the oblast, raion and settlement of residence at the time of the accident.
- The year of birth.
- The date of measurement.
- The thyroid dose determined for the individual.
- An index, giving information on the place and conditions under which the measurements were made.

Information on conditions and places of measurement are summarized in 292 different indexes. The index allows to assign each individual to the aforementioned four measurement groups. For residents of Gomel city and partially for residents of Minsk city, individuals who had stayed in strongly contaminated territories are aggregated under given indexes. Furthermore, the index gives information on the place where the measurement was made, although this information is not exhaustive, as several similar measurement places may have been assigned to the same index. It can be concluded that individuals with the same index were measured with the same type of device and, to a varying degree, under similar conditions, at a definite place and with the same device. Accordingly, individual measurements aggregated according to the index can be expected to have been performed under conditions as homogeneous as can be determined from the available data.

For the present investigation, the individual data used is restricted to measurements performed in the time span from May 2 to June 5, excluding 1114 individuals, about 0.9% of the total. Earlier measurements are excluded because of increased impact of uncertainty of intake function on the determination of thyroid doses, later measurements because of the larger uncertainty in the contribution of ^{131}I to the total measured gamma exposure. Measurements of residents of the cities of Mozyr and Mogilev were excluded, since it was not recorded which of them had been in the more contaminated territories, so that the sample of measured individuals could not be considered as representative for the residents of these cities. Finally, within these restrictions a total of 120402 individuals are considered, of which 94942 are from rural areas, 5516 residents of the city of Gomel and 19944 residents of the city of Minsk.

Estimates of the uncertainties associated with the determinations of individual ^{131}I activity's in the thyroid were made according to the conditions of measurement. Separate estimations were made for uncertainty's related to the measurement of the gamma exposure, to the subtraction of the estimated background and to the determination of the calibration coefficient relating the gamma dose rate due to ^{131}I at the thyroid to the ^{131}I activity in the thyroid. The estimates were compared for consistency with estimates of uncertainty evaluated empirically by analyzing distributions of ratios of doses determined for the same person by independent measurements.

Furthermore, a rough estimate was made to differentiate between the components of uncertainty uncorrelated and correlated between individuals measured under similar conditions according to the index given in the data base:

- In the measurement of gamma dose rates at the thyroid an uncorrelated uncertainty results from the counting statistics during the measurement and from wrong positioning of the device; a systematic wrong handling of the device and errors in the calibration of the device lead to correlated uncertainties.
- In the determination the gamma exposure at thyroid due to ^{131}I, obtained after subtraction of the background radiation, one has an uncorrelated component, if an individual determination of background (measurement of gamma exposure at liver) was made. However, if the gamma exposure from the contamination of the environment was taken as background, irrespectively of contamination of clothes or skin, or if the background was assumed to be given by the average of the three lowest measured exposure rates in a measurement series (see discussion of background estimation in Appendix 2, Annex 2), then one has a uncorrelated component, related to the deviation of individual background value from the "true" average background, and an correlated component, due to the deviation of the assumed value of the average background from the "true" average background.
- Finally, in the determination of the calibration coefficient one has an uncorrelated component, due to the individual variability of the thickness of the tissue overlapping the thyroid and of the geometrical size of the thyroid, and a correlated component, due to the error in determination of the calibration coefficient, which affects all measured individuals in the same way.

In Table 1 values for the estimated uncertainties are given for the individuals measured with SRP and DRG devices in hospitals and clinics (groups 1 and 2 of the aforementioned classification according to conditions of measurement). Measurement uncertainty with these devices are taken to be small. The background subtraction can lead to larger uncertainties as for many individuals only room background was subtracted, without accounting for contamination of the skin left over after washing or for radiation from other incorporated radionuclides. The magnitude of the uncertainty was determined by an empirical study, in which ^{131}I gamma exposures determined for the same person with background from measurement at liver and from room background were compared. The uncertainty for the calibration factor was taken according to the values for SRP devices given in Appendix 2, Annex 2, Table 2. The overall uncertainty, expressed by a geometric standard deviation of 1.36, is consistent with the empirical analysis of individuals with multiple measurements in hospitals, where a range of 1.3 to 1.4 for the geometric standard deviation was determined.

In Table 2 estimated uncertainties are given for individuals measured with the DP-5 device in hospitals, sanatoria, pioneer camps, etc. The measurement uncertainty with the less precise DP-5 device is larger, even if proper handling is assumed. The background subtraction is assumed to give a large contribution to uncertainty, as mostly the the average of the three lowest measured exposure rates in a measurement series was taken as background. The uncertainty for the calibration factor was taken according to the values for DP-5 devices given in Appendix 2, Annex 2, Table 2. The overall uncertainty given by a GSD of 2.0, is consistent with the empirical analysis of individuals with measurements under the stated conditions and with measurements in hospitals, with a range for the GSD of 1.7 to 2.2.

Finally, in Table 3 estimated uncertainties are given for individuals measured with the DP-5 device at their places of residence. Now the measurement uncertainty is assumed to be larger, reflecting likely errors in the handling of the devices and in the recording of results. Larger uncertainties need to be assumed for background subtraction, as the measurements were made in a contaminated environment and people had contaminated body and clothes. With an overall uncertainty given by a GSD of 2.5, the assumptions are consistent with the result of the empirical analysis of individuals with measurements at their places of residence and at hospitals.

It can be seen from Table 3 that the measurements performed for the rural population at their places of residence are endowed with large uncertainties, and can be considered to be of low reliability. For the purposes of the present investigation, the individual measurements will be grouped into two reliability classes:

- The class of higher reliability measurements (class H) , with uncertainties as detailed in Tables 1 and 2. All measured urban residents of Gomel and Minsk cities belong to this class and, with 31900 individuals (about 50% of them children), one third of the measured rural population.
- The class of lower reliability measurements (class L), with uncertainties as detailed in Table 3. A total of 63042 individuals from rural areas (about 20% of them children) belong to this class

In order to determine for rural settlement averages of integrated ^{131}I activities weighted according to the reliability of individual measurements, and for a rough determination of the uncertainties of the settlement averages, for each rural settlement the measured individuals were aggregated into a group belonging to the class H of higher reliability and a group belonging to the class L of lower reliability measurements. The estimated uncertainties are given in Table 4. It should be noted that now measurements performed by different independent teams are aggregated in the respective reliability classes. This reduces the correlation between individual measurements in this aggregation. Consequently, the estimated correlated uncertainty components are taken to be smaller and the uncorrelated components larger than those given in the respective previous Tables.

The number of individuals with measurements of ^{131}I activity in the thyroid and the number of settlements with measured individuals in rural areas of Gomel and Mogilev oblasts is given in Table 5, for the total rural area, and separately for each oblast and for each raion. The numbers are given for settlements in which more than 10 measurements had been made, and for all settlements with measurements. Furthermore, the number of individuals with higher reliability measurements and with lower reliability measurements are indicated. It can be seen from Table 1 that the number of measured individuals in Gomel oblast is much larger than in Mogilev oblast, with particularly large numbers in Bragin and Khoiniki raions, which are closest to the Chernobyl nuclear power plant. For the Korma, Vetka and Loev raions of Gomel oblast there are only higher reliability measurements. In Mogilev oblast mostly measurements of lower reliability had been made.

In the determination of age dependent average ^{131}I doses for the population of the cities of Gomel and Minsk it needs to be taken into consideration that their populations are not homogeneous with respect to exposure from ^{131}I, since a percentage of the residents had temporarily stayed in highly contaminated areas in the time span after the accident between April 26 and end of May 1986, and were subjected to considerably higher exposures. These individuals are strongly overrepresented among the measured residents of the cities, and it needs to be investigated if the sample of measured individuals is representative for the respective populations.

Among the 5516 measured residents of the city of Gomel considered in the present investigation a group of 1304 individuals known to have stayed for some time in highly contaminated areas after the accident had been identified and labelled accordingly by an corresponding index in the data base of individual thyroid doses. For the other 4212 residents it is assumed that they had not stayed in these areas. For the city of Minsk, among the 19944 measured residents considered there are 2198 individuals known or expected to have been in the highly contaminated areas. These belong to three groups:

- 648 residents measured in hospitals and having records related to their temporary staying in highly contaminated areas.
- 910 residents measured in urban policlinics and having records related to their temporary staying in highly contaminated areas.
- 640 residents measured in urban policlinics for whom no records related to their staying in highly contaminated areas are available, but it is assumed that they had spent a significant time in these areas. This assumption is based on comparing their measured exposure rate due to ^{131}I in thyroid with the average exposure rate of Minsk residents measured at the policlinic on the same day. If the measured exposure rate was larger than 10 times the average exposure rate it is assumed that the respective resident had stayed at highly contaminated areas and is selected to belong to this group. The group is identified in the data base by an additional pointer.

2.2 Factorisation approach

For the determination of age dependent settlement average doses due to incorporated ^{131}I, the individual values in the data base are aggregated according to the settlement of residence of the individual at the time of the accident and to his age group. For each of the birth years 1986 to 1968 an age group (a=0 to a=18) is established; individuals born before 1968 are assigned to one age group corresponding to adults. Accordingly, an individual value Q(i,a,k) of integrated ^{131}I activity is specified for individual k of age group a having had residence in settlement i at the time of the accident. It is not appropriate, however, to take sample averages obtained directly according to this aggregation as estimates for age dependent average integrated ^{131}I activities for the respective settlement. For many rural settlements there are no measured individuals for some of the age groups. For all others, and even for an urban settlement like the city of Gomel, the number of measured individuals in most age groups is small and results are endowed with large statistical uncertainty's. Furthermore, in such a direct approach there is the danger of an uncontrolled mixing of results obtained by measurements performed under different conditions.

It will be assumed that age dependent behaviour factors like average consumption of milk products are approximately homogeneous within the rural population including inhabitants of raion centres, on the one hand, and the urban residents of Gomel city and Minsk city on the other hand. Based on this, the same relative age dependence of average integrated ^{131}I activity is assumed for the population of each rural settlement respectively for the urban population. This assumption can be considered as reasonable, as the relative age dependence does not depend on environment specific factors, like the contamination level of milk in each settlement.

Following the factorisation approach used in Heidenreich et al. [3], the determination of age dependent average integrated ^{131}I activity's for settlements is based on determinations from the individual data of a relative age dependence factor F(a) and a factor G(i) representing a settlement average. The average integrated ^{131}I activity for age group a in settlement i is approximated by the product

$$Q^F(i,a) = G(i) \times F(a) \tag{4}$$

where the factor F(a) describes the relative age dependence common to all settlements and the factor G(i) characterizes the particular settlement. Contrary to the sample average, the factorisation value $Q^F(i,j,a)$ is defined even if there are no measured individuals for an age group in a given settlement. Furthermore, the factorisation approach allows to incorporate in the determination of average settlement doses for the birth years 1985 - 1968 (age groups 1 to 18), the information contained in the individual measurements of adults of the respective settlement. This is of importance, as in many settlements most measured individuals were adults.

Once the relative age dependence F(a) has been determined, the settlement specific factor G(i) is given by the average over all measured individual integrated ^{131}I activities Q(i,a,k) of the settlement scaled to their respective age dependence

$$G(i) = \frac{1}{n(i)} \times \sum_{a,k} \frac{Q(i,a,k)}{F(a)}, \tag{5}$$

with the summation extending over the n(i) individuals in the settlement. The relative age dependence F(a) is normalized so that its average over the age groups 1 to 18, corresponding to the birth years 1985 to 1968, is unity. With this normalization, as can be derived from equations (4) and (5), the factor G(i) is just the average integrated ^{131}I activity for the birth years 1985 to 1968 in the respective settlement.

For the determination of the relative age dependence F(a) of average integrated ^{131}I activities the individual measurements are aggregated into measurement lists, having the same index and the same measurement day. This ensures, as far as possible, that the measurements aggregated in a list had been performed under homogeneous conditions. In a next step, measurements belonging to a definite list performed on individuals with residence in a particular settlement are aggregated into sub-lists. Accordingly, the individual value Q(i,j,a,k) of integrated ^{131}I activity is now specified for the individual k of age group a belonging to sub-list j in the settlement i in which he had residence at the time of the accident. Table 6 shows for measured individuals of rural settlements the number of sub-lists for different ranges of numbers of individuals in each sub-list. About 81% of rural measured individuals belong to sub-lists with 10 or more individuals. Table 7 gives the same information for measured urban residents of Gomel and Minsk cities. Here, about 97% of measurements belong to sub-lists with 10 or more individuals.

Based on the assumption of an homogeneous age dependence of individual integrated ^{131}I activities, the average integrated ^{131}I activity for age group a and sub-list j in settlement i is now approximated by the product

$$Q^F(i,j,a) = G(i,j) \times F(a) \tag{6}$$

where the factor F(a) describes the relative age dependence common to all settlements under consideration, and the factor G(i,j) characterizes the particular sub-list and settlement.

As in equation (5), for a given age dependence F(a), the sub-list specific factor G(i,j) is the average over all measured individual ^{131}I integrated activities Q(i,j,a,k) of the sub-list scaled to the respective age dependence

$$G(i,j) = \frac{1}{n(i,j)} \times \sum_{a,k} \frac{Q(i,j,a,k)}{F(a)} \tag{7}$$

where the summation extends over the n(i,j) individuals in the sub-list. On the other hand, for given sub-list specific factors G(i,j), the age dependence factor F(a) is the average over all measured individual integrated ^{131}I activities belonging to the respective age group scaled to the sub-list specific values G(i,j)

$$F(a) = \frac{1}{n(a)} \times \sum_{i,j,k} \frac{Q(i,j,a,k)}{G(i,j)} \tag{8}$$

where the summation extends over the n(a) individuals of a given age group in all sub-lists and settlements under consideration.

Following the approach introduced in Heidenreich et al. [3], the factors F(a) and G(i,j) are determined by a recursive algorithm. In zero order iteration, one starts with $F^0(a) = 1$ for all age groups, so that according to equation (7) $G^0(i,j)$ is simply the average integrated activity for sub-list i,j. Having determined this average, a first iteration for the age dependence $F^1(a)$ is calculated according to equation (8). This first determination of age dependence is then used to calculate an improved $G^1(i,j)$. After a number n of steps in the recursion, the averages converge to stable values. The iteration converges to the same values irrespectively of the starting values assumed for $F^0(a)$. The procedure determines F(a) and G(i,j) up to a normalization factor, of which the product $Q^F(i,j,a) = G(i,j) \times F(a)$ is independent. As stated before, the normalization is chosen so that the average of F(a) over age groups 1 to 18 is unity.

For each age group the distribution of all sampled individual ^{131}I integrated activities scaled to the sub-list factor values G(i,j) has sample mean F(a) and sample variance given by

$$S^2(a) = \frac{1}{(n(a)-1)} \times \sum_{i,j,k} \left(\frac{Q(i,j,a,k)}{G(i,j)} - F(a) \right)^2 \quad (9)$$

where the summation extends over the n(a) individuals of a given age group in all sub-lists and settlements under consideration. The sample variances give a measure of the average variability of determined values within each sub-list for the respective age group. This variability results from the variability of true values for the sampled individuals and from uncertainties in their determination. Uncertainties correlated between individuals belonging to a given sub-list tend to cancel when considering the quotient Q(i,j,a,k)/G(i,j) of individual value and sub-list average, and mostly uncertainties uncorrelated between individuals are reflected in the variability's estimated by the sample variance.

The inclusion in the summation of individuals belonging to sub-lists with very few individuals will tend to bias the value of the sample variance to lower values, as small samples tend to have lower variability than the population from which they are sampled. In particular, terms corresponding to sub-lists of one individual give zero contribution to the sum. In order to obtain more representative results for the variability of scaled individual integrated ^{131}I activities in each age group and for comparison with results presented in Heidenreich et al. [3] for Ukrainian settlements, the sample variances were calculated including only sub-lists encompassing 10 or more individuals. In order to characterize the distributions of individual values for each age group, their percentiles and coefficient of variation CV(a) = S(a) / F(a) are derived. Since the relative age dependence F(a) is given by the sample mean of the distribution, an estimate of the standard deviation of its uncertainties is given by $\sqrt{1/n(a)} \times S(a)$ in terms of the sample variance for each age group. As the number of individuals in each age group is large, the uncertainty distributions for the F(a) are close to normal according to the central limit theorem.

A measure of the overall average variability of determined values within each sub-list is obtained by considering the global distribution of all sampled individual values of integrated ^{131}I activities scaled to both age dependence and sub-list value. By construction, as can be derived from equations (7) or (8), the sample mean is unity,

$$1 = \frac{1}{n} \times \sum_{i,j,a,k} \frac{Q(i,j,a,k)}{G(i,j) \times F(a)}, \quad (10)$$

where the summation extends over all n individuals considered. Accordingly, the sample variance is given by

$$S^2 = \frac{1}{(n-1)} \times \sum_{i,j,a,k} \left(\frac{Q(i,j,a,k)}{G(i,j) \times F(a)} - 1 \right)^2. \quad (11)$$

The variability of the distribution reflects the variability of true values and the uncertainties uncorrelated between individuals. Also here the sample variance was calculated including only sub-lists encompassing 10 or more individuals in order to obtain a representative measure of variability of the scaled integrated ^{131}I activities. As the sample mean is 1, the coefficient of variation is given by the sample variance. Percentiles of the distribution of scaled individual values were determined. Furthermore, parameters of log-normal distributions with the same arithmetic mean and variance were determined.

2.3 Settlement averages

Having determined the age dependence F(a) for a given aggregation of settlements, the average integrated ^{131}I activity for age group a in settlement i is expressed as the product of the age dependence factor F(a) and a settlement specific factor G(i)

$$Q^{F}(i,a) = G(i) \times F(a) \tag{12}$$

where the settlement specific factor G(i) is determined as the arithmetic mean over all individuals of the settlement of the individual values Q(i,a,k) scaled to the respective age dependence

$$G(i) = \frac{1}{n(i)} \times \sum_{a,k} \frac{Q(i,a,k)}{F(a)}, \tag{13}$$

with the summation extending over the n(i) measured individuals in the settlement. As stated before, with the normalization chosen for F(a) the factor G(i) corresponds to the average integrated ^{131}I activity of birth years 1985 to 1968 in each settlement. Such averages are made for each settlement, and can also be performed for given groups of measured individuals in each settlement, by extending the average over the appropriate group of measured individuals

The sample variance of individual measured integrated ^{131}I activities of each settlement is calculated by

$$S^{2}(i) = \frac{1}{(n(i)-1)} \times \sum_{a,k} \left(\frac{Q(i,a,k)}{F(a)} - G(i) \right)^{2} \tag{14}$$

and the coefficient of variability of the sample is given by CV(i) = S(i)/G(i). It gives a measure of relative variability of the of individual values Q(i,a,k)/F(a) of integrated ^{131}I activity scaled to the respective age dependence in the settlement under consideration, reflecting the individual variability of true integrated ^{131}I activities and individual uncertainties of their determination uncorrelated between individuals at the settlement level.

2.4 Weighted settlement averages for rural settlements

The individual determinations of integrated ^{131}I activities in rural settlements were performed under different conditions of reliability. As discussed in section 2.1, the individual values are aggregated in each settlement into the classes H of higher and L of lower reliability. In order to account for reliability when calculating settlement averages, these will be expressed as weighted averages over both reliability classes, according to the estimated uncertainty for each class in the respective settlement.

The factor G(i,r) specific for reliability group r in settlement i is defined in analogy to (13) by

$$G(i,r) = \frac{1}{n(i,r)} \times \sum_{a,k} \frac{Q(i,r,a,k)}{F(a)} \tag{15}$$

with the summation extending over the n(i,r) individuals belonging to the respective reliability class in the settlement, and with the age dependence F(a) determined for rural settlements. A weighted average $G_W(i)$ is defined as

$$G_W(i) = \sum_{r} w(i,r) \times G(i,r), \tag{16}$$

where the weights w(i,r) are determined for each reliability group in each settlement by

$$w(i,r) = \frac{\frac{1}{\sigma_G^2(i,r)}}{\sum_r \frac{1}{\sigma_G^2(i,r)}} \tag{17}$$

in terms of the uncertainties of the averages G(i,r) expressed by the variances $\sigma_G^2(i,r)$. The weights are unbiased, as $\sum_r w(i,r) = 1$. The uncertainty of the averages G(i,r) depend on the uncertainty of the determination of individual integrated ^{131}I activities, on the correlation structure between the individual determinations and, as the G(i,r) are sample averages, on the number of individuals in the sample and on the variability of true individual values in the population from which the sample is taken.

For the description of individual integrated ^{131}I activities and their uncertainties random variables $\tilde{Q}(i,r,a,k)$ are defined in a simple multiplicative uncertainty model in terms of the individual integrated activities Q(i,r,a,k) by

$$\tilde{Q}(i,r,a,k) = Q(i,r,a,k) \times \tilde{U}(i,r,a,k) \times \tilde{C}(i,r) \tag{18}$$

where the random variable $\tilde{U}(i,r,a,k)$ refers to the component of relative uncertainty uncorrelated between different individuals and $\tilde{C}(i,r)$ is a component correlated between all individuals belonging to reliability class r in settlement i. For the present purpose, and given the very limited information available on the uncertainty structure, the model is formulated under several simplifying assumptions:

- Any age dependency in the assumed uncertainties is neglected, as well as the uncertainty of the age dependence scaling factor F(a).
- The magnitude of the relative uncertainties are taken to depend only on the reliability class to which the individual value belongs, and to be independent of the settlement considered and of the value of the integrated activity Q(i,r,a,k) determined for a given individual.

- A very much simplified correlation structure is assumed, as correlations at the level of sub-lists are not accounted for. Only rough estimates on the magnitude of uncertainty correlated between individual values at the level of reliability group in each settlement are considered.

According to these assumptions, the $\tilde{U}(i,r,a,k)$ are independent equal random variables for all individuals of a reliability group, with expectation value $\mu_U(r)$ and variance $\sigma_U^2(r)$, while for all individuals of a reliability group in a settlement the same random variable $\tilde{C}(i,r)$ with expectation value $\mu_C(r)$ and variance $\sigma_C^2(r)$ is used. In a multiplicative model, lognormal distributions with median 1 are taken to represent the random variables. Values for the estimated geometric standard deviations had been given in Table 4, and are given in Table 8 together with the values of the respective expectation values and variances.

The population variability of true values of integrated ^{131}I activities in each settlement depends on the variability of milk product consumption habits and on the variability of milk contamination over the settlement. The population variability for the high and low reliability classes in each settlement are equal, as these are samples from the same population. It will be assumed that the population variability is the same for all settlements. While it is likely that larger settlements have higher variability than smaller settlements, the assumption is justified for the determination of relative weights separately for each settlement. For the determination of uncertainties for the averages for each settlement, it is a rather rough approximation. A log-normal distribution with a geometric standard deviation of 2 will be assumed as an estimate of the population variability of age dependence scaled integrated ^{131}I activities in each settlement. This assumed value corresponds to a coefficient of variation σ/μ of 0.79 and is in the range given in Gavrilin et al. [2] if the values for the variability of milk consumption and of variability of ^{131}I concentration in milk quoted in this work are combined.

For any settlement and a given reliability class, the variance of G(i,r) is expressed as

$$\sigma_G^2(i,r) = \frac{1}{n(i,r)} \times \sigma^2(i) \times R(i,r) \tag{19}$$

where n(i,r) is the number of individuals of the reliability class in the settlement, $\sigma^2(i)$ is the variance of the population distribution of true values for the settlement and the factor R(i,r) represents the impact of the uncertainty of individual integrated ^{131}I activity assessments. It can be seen that the since the variance $\sigma^2(i)$ is independent of the reliability class, it will cancel in the expression (17) for the weights w(i,r). The factor R(i,r) is expressed by

$$\begin{aligned} R(i,r) = {} & \left(\sigma_C^2(r) + \mu_C^2(r)\right) \times \left(\sigma_U^2(r) + \mu_U^2(r)\right) + \frac{\mu^2}{\sigma^2} \times \left(\sigma_C^2(r) + \mu_C^2(r)\right) \times \sigma_U^2(r) + \\ & n(i,r) \times \frac{\mu^2}{\sigma^2} \times \mu_U^2(r) \times \sigma_C^2(r) \end{aligned} \tag{20}$$

in terms of the expectation values and variances of the individual uncertainties. The dependence on population variability comes in only through the ratio μ^2/σ^2 , the inverse of the square of the coefficient of variability, assumed to be the same for all settlements. While the first two terms are independent of the respective number of measured individuals n(i,r), the third term is proportional to this number, so that the component of uncertainty correlated between individuals, expressed by the variance $\sigma_C^2(r)$, is likely to dominate if this number is large. If the effect of individual uncertainties is not accounted for, R(i,r) =1 and the weights defined in equation (17) become simply w(i,r) = n(i,r)/n(i) and are determined only by the relative amount of individuals for the respective reliability class in the settlement.

The variance $\sigma_G^2(i)$ for the weighted average GW(i) for a given settlement is calculated from the variances of each reliability class in the settlement by

$$\sigma_G^2(i) = \frac{1}{\sum_r \frac{1}{\sigma_G^2(i,r)}} \tag{21}$$

Due to the simplified assumptions for the correlation structure of individual values, the calculated uncertainties are likely to overestimate the uncertainty of the settlement average for settlements with many individual measured values, where the resulting uncertainty will be dominated by the assumed correlated component of the individual uncertainties.

Having determined the weights w(i,r), the weighted average $G_W(i)$ for each settlement can also be calculated directly from the sample of individual integrated ^{131}I activities scaled to the respective age dependence by the weighted average

$$G_W(i) = \sum_{r,a,k} \frac{w(i,r)}{n(i,r)} \times \frac{Q(i,r,a,k)}{F(a)} \tag{22}$$

in which to each individual value the weight w(i,r)/n(i,r) is assigned, according to the reliability class r to which it belongs. The weighted sample variance of the distribution is calculated from

$$S_W^2(i) = \frac{n(i)}{(n(i)-1)} \times \sum_{r,a,k} \frac{w(i,r)}{n(i,r)} \times \left(\frac{Q(i,r,a,k)}{F(a)} - G_W(i) \right)^2 \tag{23}$$

The corresponding coefficient of variability $CV_W(i) = S_W(i) / G_W(i)$ gives a measure of variability of the distribution in a given settlement of individual values Q(i,j,a,k)/F(a) with respect to the weighted average, with the values of the higher reliability class contributing with the larger weights.

The global distribution of all sampled individual values of integrated ^{131}I activities scaled to both age dependence and settlement average gives a measure of the overall average variability of determined values within each settlement. The sample mean is 1

$$1 = \frac{1}{n} \times \sum_{i,a,k} \frac{Q(i,a,k)}{G(i) \times F(a)} \tag{24}$$

and the sample variance is given by

$$S^2 = \frac{1}{(n-1)} \times \sum_{i,a,k} \left(\frac{Q(i,a,k)}{G(i) \times F(a)} - 1 \right)^2 . \tag{25}$$

with the summation extending over all individual values of the settlements under consideration. In contrast to the global averages for integrated activities scaled to sub-list values, the variability of the distribution reflects not only the variability of true values and the uncertainties uncorrelated between individuals, but also uncertainties correlated between individuals in each of the sub-lists in the settlement.

The global distribution of individual integrated ^{131}I activities scaled to age dependence and weighted settlement averages has unit weighted sample mean

$$1 = \sum_{i,r,a,k} \frac{n(i)}{n} \times \frac{w(i,r)}{n(i,r)} \times \frac{Q(i,r,a,k)}{F(a) \times G_W(i)} \tag{26}$$

and weighted sample variance

$$S_W^2 = \frac{n}{(n-1)} \times \sum_{i,r,a,k} \frac{n(i)}{n} \times \frac{w(i,r)}{n(i,r)} \times \left(\frac{Q(i,r,a,k)}{F(a) \times G_W(i)} - 1 \right)^2 \tag{27}$$

2.5 Settlement averages for Gomel and Minsk cities

For both Gomel and Minsk cities, average age dependence scaled ^{131}I integrated activities G are calculated according to equation (13) with the age dependence F(a) derived for urban population. Separate calculations are made to determine for each city the value of averages G_{HC} for the group of residents who had been in highly contaminated areas and G_S for the group of individuals who had not been in these areas. The average age dependence scaled ^{131}I integrated activity G_R weighted according to representativity for the respective city is defined by

$$G_R = w_{HC} \times G_{HC} + w_S \times G_S \tag{28}$$

where the weights are expressed in terms of the percentage P_{HC} of the population of the city who had stayed in the highly contaminated areas by $w_{HC} = P_{HC} / 100$ and $w_S = 1 - P_{HC} / 100$.

There is no direct information available on the percentage of population which had stayed at highly contaminated areas. Given are the numbers n_{HC} of measured individuals of the respective cities which are known or are assumed to have stayed in these areas. Based on this information, and assuming values for the percentage P_{meas} of residents which having stayed in the contaminated areas actually went to an hospital or policlinic to be measured, values for the percentage P_{HC} of population who had stayed at the more contaminated areas can be estimated by

$$P_{HC} = 100 \times \frac{n_{HC}}{n_{pop}} \times \frac{100}{P_{meas}} \tag{29}$$

where n_{pop} is the total population of the city, about 480000 persons for Gomel city and 1500000 for Minsk city. Since this percentage will not be large, the influence of this population group on average doses for the cities may be expected to be small, even though individual doses in this group are high. In order to quantify this preposition, different values of P_{meas} are assumed, and values for the averages G_R are calculated accordingly.

2.6 Age and settlement specific doses

Age and settlement specific doses $D^F(i,a)$, (mGy), are determined from the age and settlement specific integrated activities $Q^F(i,a)$, (MBq hour), derived by the factorisation procedure by

$$D^F(i,a) = D_c(a) \times Q^F(i,a), \qquad (30)$$

where the age dependent dose coefficients $D_c(a)$, (mGy/MBq hour), are given in Table 9 for each age group according to the birth year and for adults.

Dose coefficients are given by the quotient E(a)/m(a) of effective energy E(a) deposition in thyroid and thyroid mass m(a). Effective energy depositions were determined for six ages, corresponding to newborn, for children of ages of 1 ,5, 10 and 15 and for adults, using results of specific absorbed fractions for photons and electrons of given definite energies calculated by Monte Carlo simulations of phantoms from Christy et al. [5] and Ulanovsky et al. [6] and data on yields, emission energies and electron spectra from the electronic version of ICRP 38 data [7] presented in Eckermann et al [8]. The calculated effective energies range between 0.197 MeV per decay for newborns to 0,205 MeV per decay for adults. Masses for the six ages correspond to the values given in Christy et al. [5]

The dose coefficients corresponding to the different birth years as given in Table 9 were obtained by a logarithmic cubic spline interpolation from the dose coefficients determined for the six aforementioned age groups. In the interpolation, the value for adults was taken to correspond to an age of 25 years. The fact that age at the 26 of April 1986 is shifted with respect to the birth year interval was accounted for in the interpolation by averaging over the logarithmic cubic spline function for each birth year between appropriately shifted intervals - for 1986 between 0 and 0.33 years, for 1985 between 0.33 and 1.33 years, etc.

3. Results

3.1 Age dependence of integrated ^{131}I activity's

Relative age dependencies of integrated ^{131}I activity obtained by the factorization procedure are presented in Figs. 2 to 8 for different aggregations of measured individuals. The results are normalized relative to the average of values for age groups 1 to 18. The error bars reflect one standard deviations of the standard error determined for the values F(a) from the sample variance of the distributions of individual integrated ^{131}I activity scaled to sub-list value G(i,j). These distributions reflect the variability of scaled measured integrated activities due to population variability and uncorrelated individual uncertainties.

Separate determinations of relative age dependencies were made for measured individuals of rural settlements and of urban environments (Gomel and Minsk cities). The results are shown in Fig. 2. Both age dependencies have the same general behaviour, with lowest values for the birth year 1986 (for children with ages of a few months), having about half the value determined for adults. The largest values in both cases are for adolescents with ages around 18 years (birth year 1968). Differences between the age dependence of both populations which appear to be significant are visible in the age range between 5 and 7 years (birth years 1981 to 1979), where the values for urban children are up to nearly 20% larger than for rural, and the age range between 10 and 14 years (birth years 1976 to 1972), where the values for rural children are larger. The difference in the first age range could reflect increased milk consumption of urban children in kindergarten and first years in primary school, while for the second age range urban youths are likely to have a relatively decreased milk product consumption. Given these differences, the respective age dependencies are used separately in the determination of average thyroid doses for the rural and urban populations.

In order to investigate whether the aggregation of measured individuals of rural settlements is sufficiently homogeneous with respect to age dependence, separate determinations of age dependence were performed for measured individuals belonging to different sub-groups:

- The relative age dependence for raion centres and the other rural settlements are given in Fig.3.; for comparison, also the result for all rural settlements is included in the figure. Differences in milk product consumption patterns between the more urban raion centres and the other rural settlements could be expected to lead to differences in the relative age dependencies. However, there appear to be no mayor systematic differences, except for newborn children (birth year 1986) where the value for raion centres is somewhat lower.
- In Fig. 4, a comparison is made between the relative age dependencies obtained for rural settlements in Gomel and Mogilev oblasts. For Mogilev oblast the results are endowed with larger uncertainties as there were less measured individuals, and there appear to be statistical fluctuations between the values for adjacent birth years of up to 30%. Given the uncertainties, there appear to be no significant differences in the age dependencies of children in the two oblasts. There is, however, a difference for adults , with the value for Mogilev oblast nearly 20% higher than the value for all rural settlements.
- The age dependency for measured individuals from rural settlements evacuated before May 5 and for those with children relocated around May 10 are compared in Fig. 5 with the results for all measured rural individuals. Uncertainties for these two groups are large, as their number is small. Given the uncertainties, there are no significant differences in the age dependence for children, while for adults the value for evacuated settlements is nearly 20% higher than the value for all rural settlements.
- Finally, Fig. 6 shows a comparison of the age dependence determined for the group of individuals for which measurements of higher reliability at hospitals, clinics, sanatoria or pioneer camps had been performed, (reliability class H), and the group for which measurements with lower reliability were made directly in the settlements. (reliability class L). As can be seen from the figure, there appear no significant systematic differences between the two groups.

Given these results, it appears justified to further employ the age dependence determined from the aggregation of all measured individuals of rural settlements.

Determinations of age dependence performed separately for the cities of Gomel and Minsk are shown in Fig. 7 in comparison with the age dependence determined for the measured individuals of both cities aggregated in one urban group. For Gomel city there were less measured individuals and the results are endowed with larger uncertainties. Also, large statistical fluctuations can be seen between the values for adjacent birth years. Given these uncertainties, the results for both cities appear to be consistent. The age dependence for the measured individuals of Minsk city was also determined without use of the factorisation procedure directly by averaging over the aggregation of individual values in the respective age groups. The results of such determinations are given in Fig 8 for all measured individuals of Minsk city and for those for whom it is assumed that they had not stayed in highly areas after the accident (see discussion in section 3.4). The age dependence obtained by factorisation using the aggregation in sub-lists for all measured individuals of Minsk city is also shown in the figure. It can be seen from the Fig. 8 that it generally agrees within 10% with the age dependence determined for the individuals which had not been in highly contaminated areas, while showing disagreement with the age dependence determined directly for all measured residents of Minsk city.

The numerical values for relative age dependencies of integrated ^{131}I activity to be used for the determination of age dependent average thyroid doses are detailed in Table 10 for population of rural areas and in Table 11 for residents of Gomel and Minsk cities. Also the coefficients of variation of the distribution of individual integrated ^{131}I activities scaled for sub-list value are given for each age group. Furthermore, factors giving thyroid dose per unit integrated ^{131}I activity for each age group are given in the tables.

3.2 Distributions of scaled individual integrated ^{131}I activities

Distributions of measured individual integrated ^{131}I activities scaled to age and sub-list value dependence were determined for the rural settlements and for measured individuals of urban residence. For rural settlements such distributions were also separately determined for higher and lower reliability measurements. The distributions give information on the average variability of individual values of integrated ^{131}I activities when the average dependence on age and on the settlement and particular measurement conditions has been scaled out. They reflect both the individual variability of true values and uncertainties uncorrelated between individuals. Uncertainties correlated between individuals of the same sub-list or the same age group cancel, as the individual values are scaled to the respective sub-list and age group values. Properties of these distributions are given in Table 12. Only distributions of individual values belonging to sub-lists of 10 or more individuals were considered, as the inclusion of individual values grouped in sub-lists with less members would tend to bias the variance of the distributions to smaller values.

As can be seen from Table 12, the distributions for rural and urban measured individuals have coefficients of variation differing by less than 4%. However, the 95% range of values is significantly wider for the individuals of urban residence. The coefficient of variation for the rural individuals with higher reliability measurements is 20% larger than the coefficient of variation for those with lower reliability measurements. This is not expected, as uncertainties for the second group are larger. It could be explained by the fact that more measurements of higher reliability were made for the population of larger settlements, for which individual variability's are larger. Geometric standard deviations and percentiles of log-normal distributions having the same mean values and variances as the original distributions are also given in Table 12. While the medians of these distributions are shifted somewhat to lower values than those calculated directly, the 95% range of values is shifted to higher values for the rural distributions and is less wide for the urban values. In a similar analysis for such distributions of scaled values performed for Ukrainian settlements in Heidenreich et al. [3]

such distributions were found to have a geometric standard deviation of 2.27. This significantly lower value may reflect that measurements in Ukraine were performed with better devices.

3.3 Weighted settlement averages for rural settlements

Settlement averages G(i) of age dependence scaled integrated ^{131}I activities were determined according to equation (13) in section (2.3) for the 487 rural settlements in Belarus with more than 10 measured individuals. In 136 of these settlements only measurements of higher reliability in hospitals, sanatoria and pioneer camps (reliability class H) had been made, while for 73 settlements only results of lower reliability measurements performed directly at the places of residence (reliability class L) are available. For each of the remaining 278 settlements having results of measurements of both reliability classes also separate determinations G(i,r) of averages of individual values of each reliability class r=H and r=L were performed. Based on these results, weighted averages $G_W(i)$ were calculated with weights determined by estimated uncertainties according to the discussion in section (2.4). In Table 13 results of such determinations are presented for a few exemplary settlements.

For the first two settlements in Table 13 about 20% of individual measured values are of higher reliability; for the first settlement their average is 20% higher, for the second about 35% lower than the respective averages for the values of lower reliability. Comparing the weighted averages with the direct averages it is seen that the weighted averages are shifted toward the higher reliability values. This results from the higher weights of around 0.7 for the higher reliability averages; the respective values n(i,H)/n(i) of the direct average being only around 0.2. In the next three settlements 3, 4 and 5 there are only very few measured values of higher reliability. The weights for higher reliability averages are substantially larger for the weighted averages than the respective values for the direct averages. In settlement 3 the higher and lower reliability averages agree within 12%, and so the weighted and direct averages are close. In settlement 4 the high reliability average is a factor of two larger than the low reliability average and, accordingly, the weighted average by 30 % larger than the direct average. In settlement 5 there is only one high reliability value, which is nearly nine times lower than the lower reliability average. While in this extreme case its weight for the weighted average is more than 17 times larger than for the direct average, it has limited influence as the weighted average is only about 6% lower than the direct average. Finally, in the last settlement 6 the number of higher reliability values is larger than the number of those of lower reliability. The respective averages differ by more than a factor of two. However, both weighted and direct averages are dominated by the higher reliability values, with weights around 0.8, and differ only by about 4%.

For the 278 settlements having measurements of both reliability classes Table 14 gives characteristics of the distribution of the ratios for each settlement of the average of higher reliability to the average of lower reliability. The distribution is rather wide, showing that in each settlement there can be large differences between averages of higher and lower reliability. However, the distribution is quite symmetric, with the median shifted from 1 by only about 8%, which indicates that there are, on the average, no major systematic differences between results of both classes of measurements. Also shown in Table 14 are characteristics of the distribution of the ratio for each settlement of the weighted average to the direct average. While 95% of the ratios are in a range extending by a factor of two, the median of the distribution deviates only 1% from 1, showing that on average there is no systematic difference.

The weighted average age dependence scaled integrated ^{131}I activity's Gw determined for each of the 487 rural settlements of Gomel and Mogilev oblasts with more than 10 measured individuals are given in the Tables 1 - 13 of the Annex. Also given in the Tables are, for each settlement, the number of children living in the settlement at the time of the accident, the number of measured individuals (children and adults) and the percentiles of the distribution of individual age dependence scaled integrated ^{131}I activity's. Furthermore, the Tables give the weighted coefficient of variation of the distribution of individual values, and the coefficient of variation of the average derived directly from the coefficient of variation of the distribution by considering only the variability of individual values. Finally, the Tables give for each settlement the coefficient of variation corresponding to the uncertainty of the settlement average Gw derived from estimates of individual uncertainties and of their correlation for each reliability class, according to equation (21) in section (2.4). The range of values for the settlement averages Gw in dependence of their geographical location is indicated in the map shown in Fig. 1. It can be seen from the Tables that the coefficient of variation of the average values derived directly from the distribution of individual values is significantly smaller than the coefficient of variation derived from the estimates of individual uncertainties. This effect is most pronounced for settlements with many measured individuals, as the first approach does not account for correlations between the individual measurements.

The average over all settlements of the coefficient of variability of the uncertainty of G_W derived from estimations of individual uncertainties has a value of about 0.5; the geometric mean of the distribution having a value of 0.48, and the arithmetic mean a value of 0.52. Assuming a lognormal distribution for the average settlement mean uncertainty, this corresponds to GSD's of 1.58 respectively 1.63, which, given the rough assumptions under which the uncertainties were calculated, can be considered as consistent with the GSD of about 1.48 estimated independently by geostatistical methods (Appendix 6).

Distributions of measured individual integrated ^{131}I activities scaled to age and settlement value dependence were determined for rural settlements with more than 10 measured individuals. Separate determinations were made for higher and lower reliability measurements, and for the total set of measured individuals in these settlements according to weighted averages and direct averages. The distributions give information on the average variability of individual values of integrated ^{131}I activities when the average dependence on age and on the settlement has been scaled out. They reflect both the individual variability of true values, of uncertainties uncorrelated between individuals and of uncertainties uncorrelated between sub-lists in a settlement. Uncertainties correlated between individuals of the same settlement or the same age group cancel, as the individual values are scaled to the respective settlement and age group values. Properties of these distributions are given in Table 15.

3.4 Settlement averages for Gomel and Minsk cities

Separate determinations of average age dependence scaled integrated ^{131}I activity G were made for the group (A) of measured residents of Gomel city assumed not to have stayed in highly contaminated areas in the first weeks after the accident, the group (B) of those known to have stayed in these areas and the group (C) in which all measured residents are pooled.

The results are presented in Table 16 which also gives information on the respective distributions of individual age dependence scaled integrated ^{131}I activities. It can be seen that:

- The value of the average G for the group (B) of is more than a factor of six larger than the value for the group (A); the value for the pooled group (C) still a factor of two larger than for group (A). As the fraction of population of Gomel city which had stayed in highly contaminated areas is certainly much smaller than the 26% of measured residents which had stayed in these areas, a substantial error in the determination of age dependent average doses would be made if the pooled value were used, which is not representative for the population.
- The coefficient of variation for the pooled group (C) is much larger than for the other two groups. The respective distributions of individual values are similar at the lower end, having nearly equal 2.5 percentiles. However, the 97.5 percentiles for a group (B) is more than a factor of seven higher than for the group (A).

Results for average age dependence scaled integrated ^{131}I activities G for the city of Minsk and information on the corresponding distributions of individual value are given in Table 17 Separate determinations were made for different groups of measured residents, as indicated in the table. It can be seen that of those known to have stayed in highly contaminated areas, the group (D) measured in policlinics has a factor of 4 and the group (E) measured in hospitals even a factor of more than 20 higher values than the group (C) of residents assumed not to have been in the highly contaminated areas. For the total group of 2198 measured Minsk residents who had stayed in highly contaminated areas, obtained by joining groups (B), (D) and (E) of Table 13 an average value for G of 36.7 MBq hour is obtained.

Assuming different values for the percentage P_{meas} of residents which having stayed in the highly contaminated areas were actually measured, average age dependence scaled integrated ^{131}I activity G_R weighted according to the percentage of population who had stayed in these areas were calculated for cities of Gomel and Minsk according to equation (29), and are given in Table 18. Also indicated in the table are the values of the resulting percentage P_{HC} of the individuals who had been in these territories relative to the total populations of the respective cities. It can be seen that an assumption of values for the percentages P_{meas} within a reasonable, rather wide range affects the value of G_R by less than 10% for Gomel city and not more than 15% for Minsk city.

3.5 Age dependent settlement average thyroid doses

Combining the age dependence determined for rural populations (Table 10) and the average age dependence scaled integrated ^{131}I activities obtained for 487 rural settlements with more than 10 measured individuals (Tables 1-13 of the Annex), age dependent average thyroid doses are determined for the birth years 1986 to 1968 for each of these settlements.

For the population of the cities of Gomel and Minsk the age dependence for urban populations (Table 11) is combined with the scaled averages obtained for each city, given in Table 18. It is assumed that 50% of the population which had stayed in the highly contaminated areas was measured. Then, for Gomel city the value of 7.31 MBq hour is taken as representative, it corresponds to assuming that about 0.5% of its population had been in higher contaminated areas; for Minsk city the value of 2.81 MBq hour is taken, it corresponds to assuming that about 0.3% its population had been in these areas. The resulting age dependent average thyroid doses for the population of the cities are given in Table 19.

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Table 1. Estimated uncertainties for individuals measured with SRP and DRG devices in hospitals and clinics. Given are the contributions to uncertainty due to the gamma exposure measurement at the thyroid, to background subtraction and to the calibration coefficient relating ^{131}I gamma exposure to ^{131}I activity in thyroid, as well as the result of all three contributions. Also given are the components correlated and uncorrelated between individuals measured under the same conditions (see text). The uncertainties are expressed by the geometric standard deviations GSD of assumed log-normal distributions.

Contribution to uncertainty:	Uncertainty (GSD)		
	Total	Correlated	Uncorrelated
Measurement	1.07	1.05	1.05
Background subtraction	1.25	1.10	1.22
Calibration coefficient	1.23	1.10	1.20
All contributions	1.36	1.15	1.32

Table 2. Estimated uncertainties for individuals measured with DP5 devices in hospitals, sanatoria, pioneer camps, etc. Given are the contributions to uncertainty due to the gamma exposure measurement at the thyroid, to background subtraction and to the calibration coefficient relating ^{131}I gamma exposure to ^{131}I activity in thyroid, as well as the result of all three contributions. Also given are the components correlated and uncorrelated between individuals measured under the same conditions (see text). The uncertainties are expressed by the geometric standard deviations GSD of assumed log-normal distributions.

Contribution to uncertainty:	Uncertainty (GSD)		
	Total	Correlated	Uncorrelated
Measurement	1.32	1.10	1.30
Background subtraction	1.78	1.40	1.60
Calibration coefficient	1.32	1.10	1.30
All contributions	2.00	1.44	1.82

Table 3. Estimated uncertainties for individuals measured with DP5 devices directly at the places of residence. Given are the contributions to uncertainty due to the gamma exposure measurement at the thyroid, to background subtraction and to the calibration coefficient relating ^{131}I gamma exposure to ^{131}I activity in thyroid, as well as the result of all three contributions. Also given are the components correlated and uncorrelated between individuals measured under the same conditions (see text). The uncertainties are expressed by the geometric standard deviations GSD of assumed log-normal distributions.

Contribution to uncertainty:	Uncertainty (GSD)		
	Total	Correlated	Uncorrelated
Measurement	1.78	1.40	1.60
Background subtraction	1.95	1.50	1.70
Calibration coefficient	1.32	1.10	1.30
All contributions	2.50	1.70	2.10

Table 4. Estimated uncertainties of higher and lower reliability determinations of ^{131}I activity in thyroid. Also indicated are the assumed components correlated and uncorrelated between individuals belonging to a given reliability group in a settlement. The uncertainties are expressed by the geometric standard deviations GSD of assumed log-normal distributions.

	Uncertainty (GSD)		
	Total	Correlated	Uncorrelated
Higher reliability	1.95	1.20	1.90
Lower reliability	2.50	1.30	2.4

Table 5. Number of individuals with measurements of ^{131}I activity in the thyroid and number of settlements with measured individuals in rural areas of Gomel and Mogilev oblasts. Indicated for the total rural area, for each oblast and for each raion are the number $N_{settl>10}$ of settlements with more than 10 measurements and the number $n_{settl>10}$ of individuals in these settlements. Also given are the total number N_{settl} of settlements with measurements and the number n_{settl} of individuals in these settlements, as well as the number n_{settlH} of individuals with measurements of higher reliability and the number n_{settlL} of individuals with measurements of lower reliability.

Territory	$N_{settl>10}$	$n_{settl>10}$	N_{settl}	n_{settl}	$n_{settl\ H}$	$n_{settl\ L}$
Total rural area	487	93579	870	94942	31900	63042
Gomel Oblast	364	81734	623	82663	31610	51053
Bragin	125	27934	136	27977	5022	22955
Khoiniki	80	24578	90	24624	9894	14730
Narovlya	53	12609	71	12686	6189	6497
Buda-Koshelev	11	652	82	858	2	856
Korma	9	594	45	712	712	0
Vetka	24	2523	61	2676	2676	0
Loev	35	5947	72	6083	6083	0
Rechitsa	27	6897	66	7047	1032	6015
Mogilev Oblast	123	11845	247	12279	290	11989
Chericov	20	2797	27	2834	13	2821
Klimovichi	18	971	37	1025	7	1018
Kostyukovichi	25	3134	50	3216	8	3208
Krasnopolye	41	2896	73	3009	258	2751
Slavgorod	19	2047	60	2194	4	2190

Table 6. Distribution of number of sub-lists for different ranges of numbers of individuals in each sub-list, and number of individuals of sub-lists in each range, for measured individuals from rural settlements.

Sub-lists with number of individuals in range	Number of sub-lists	Number of individuals
1 - 9	8696	18039
10 - 49	947	21121
50 - 99	263	18283
100 - 550	206	37499
All sub-lists	10112	94942

Table 7. Distribution of number of sub-lists for different ranges of numbers of individuals in each sub-list, and number of individuals of sub-lists in each range for measured urban individuals from the cities of Gomel and Mogilev.

Sub-lists with number of individuals in range	Number of sub-lists	Number of individuals
1 - 9	291	807
10 - 49	97	1907
50 - 99	21	1473
100 - 1759	48	21273
All sub-lists	457	25460

Table 8. Geometric standard deviations GSD assumed for correlated and uncorrelated components of individual uncertainties, expressed by log-normal distributions with geometric mean 1, for the classes of higher an lower reliability. Also given are the variances and expectation values of the distributions, and their coefficient of variation CV.

Reliability class		GSD	Expectation value	Variance	CV
High	correlated	1.2	1.017	0.035	0.18
	uncorrelated	1.9	1.23	0.77	0.71
Low	correlated	1.3	1.035	0.076	0.27
	uncorrelated	2.4	1.47	2.48	1.07

Table 9. Dose coefficients D_C for the different age groups as derived from ICRP 56

Age group (Birth year)	D_C (mGy / MBq hour)/
1986	83.0
1985	68.4
1984	53.6
1983	44.8
1982	38.9
1981	34.0
1980	29.2
1979	24.6
1978	20.7
1977	17.4
1976	14.9
1975	13.1
1974	11.8
1973	10.8
1972	10.1
1971	9.48
1970	8.95
1969	8.47
1968	8.03
Adults	5.72

Table 10. Values of the age dependence F(a) of integrated ^{131}I activity relative to the average of age groups with birth years 1985 to 1968 obtained by factorisation for the set of measured individuals of rural settlements. The number of individuals of each age group is indicated. The factor C_{DQ} relating thyroid dose to unit integrated activity for each age group is given. Also given is the coefficient of variation of the distribution of individual integrated ^{131}I activities scaled for sub-list value.

Age group (Birth year)	Number of individuals	F(a)	C_{DQ} (mGy/(MBq hour))	Coefficient of variation
1986	511	0.48	39.8	1.36
1985	1383	0.62	42.4	1.30
1984	1586	0.82	44.0	1.31
1983	1656	0.79	35.4	1.24
1982	1538	0.87	33.8	1.43
1981	1399	0.85	28.9	1.10
1980	1660	0.91	26.6	1.26
1979	1615	0.92	22.7	1.14
1978	1557	0.93	19.2	1.23
1977	1438	0.94	16.4	1.02
1976	1663	0.97	14.5	1.22
1975	1664	1.01	13.2	1.08
1974	1744	1.04	12.3	0.91
1973	1594	1.18	12.8	1.11
1972	1678	1.22	12.3	1.10
1971	1611	1.17	11.1	1.09
1970	1670	1.15	10.3	1.16
1969	1488	1.28	10.8	1.08
1968	908	1.31	10.5	1.74
Adults	66579	1.18	6.8	1.26

Table 11. Values of the age dependence F(a) of integrated ^{131}I activity relative to the average of age groups with birth years 1985 to 1968 obtained by factorisation for the set of urban measured individuals from Gomel city and Minsk city. The number of individuals of each age group is indicated. The factor C_{DQ} relating dose to unit integrated activity for each age group is given. Also given is the percentual coefficient of variation of the distribution of individual integrated activities scaled for sub-list value (see text).

Age group (Birth year)	Number of individuals	F(a)	C_{DQ} (mGy/(MBq hour))	Coefficient of variation
1986	117	0.56	46.5	1.46
1985	766	0.71	48.5	1.30
1984	770	0.81	43.4	1.35
1983	841	0.86	38.5	1.48
1982	790	0.81	31.5	1.27
1981	752	1.07	36.3	1.31
1980	849	1.03	30.1	1.29
1979	690	1.04	25.6	1.42
1978	582	0.94	19.4	1.18
1977	495	0.95	16.5	1.14
1976	489	0.85	12.7	1.16
1975	419	0.95	12.4	1.28
1974	389	0.97	11.4	1.02
1973	339	0.94	10.2	1.10
1972	284	1.06	10.7	1.11
1971	210	1.08	10.2	1.43
1970	236	1.14	10.2	1.14
1969	159	1.36	11.5	1.27
1968	204	1.45	11.6	1.40
Adults	16079	1.10	6.3	1.27

Table 12. Properties of the distribution of individual ^{131}I integrated activities scaled for age dependence F(a) and sub-list value G(i,j) for sub-lists of 10 or more individuals. Results are given for the measured individuals of rural settlements and separately for those with measurements of higher reliability (class H) and of lower reliability (class L), and for measured individuals of urban residence in the cities of Gomel and Minsk. Given are the percentiles of the distributions and their coefficient of variation; their arithmetic mean is 1. Also, the geometric standard deviations and the percentile values which would result from the assumption of log-normal distributions are indicated.

Group of individuals	Number of individuals	Percentiles of distribution			Coefficient of variation	GSD	Percentiles for log-normal distribution		
		2.5	50	97.5			2.5	50	97.5
Rural	76903	0.052	0.70	3.9	1.24	2.62	0.091	0.63	4.3
Rural, class H	21265	0.046	0.69	4.0	1.41	2.85	0.071	0.58	4.7
Rural, class L	55638	0.053	0.70	3.9	1.17	2.53	0.10	0.68	4.2
Urban	24653	0.035	0.69	4.7	1.28	2.67	0.086	0.62	4.4

Table 13. Comparison of average age dependence scaled integrated ^{131}I activities for high and low reliability measurements and of direct and weighted averages for several exemplary rural settlements. For each settlement i the number n(i) of measured individuals, the number n(i,H) of high reliability measurements and the corresponding average G(i,H), the number n_L of low reliability measurements with average G(i,L) and the ratio G(i,H)/G(i,L) of these two quantities is given. Further, the average G(i) calculated directly, the weighted average $G_W(i)$ and their ratio $G_W(i)/G(i)$ is presented. Finally, the weight w(i,H) for the high reliability group of measurements for the weighted averages and the respective weights n(i,H)/n(i) for the direct averages are indicated.

	Settlement	n(i)	n(i,H)	G(i,H) (Bq. hour)	n(i,L)	G(i,L) (Bq. hour)	G(i,H)/ G(i,L)	$G_W(i)$ (Bq. hour)	G(i) (Bq. hour)	$G_W(i)$/ G(i)	$w_H(i)$	n(i,H)/ n(i)
1	Burki	568	116	55.	452	45.	1.22	52.	47.	1.11	0.71	0.26
2	Zalesye	442	72	64.	370	99.	0.65	75.	93.	0.81	0.68	0.16
3	Dvor Savichi	304	6	36.	298	32.	1.12	33.	32.	1.06	0.30	0.02
4	Krug Rudka	81	8	128.	73	64.	2.0	91.	71.	1.29	0.42	0.10
5	Izbyn	233	1	2.8	232	25.	0.11	23.	25.	0.94	0.07	0.004
6	Dubrava	165	127	34.	38	68.	0.49	40.	42.	0.96	0.82	0.77

Table 14. Characteristics of the distributions over rural settlements of ratios G(i,H)/G(i,L) of averages of measured values of integrated ^{131}I activities of higher reliability to those of lower reliability and of ratios $G_W(i)/G(i)$ of weighted averages to direct averages. Given are percentiles and the coefficient of variation. The distributions encompass the 278 settlements for which measurements of both higher and lower reliability had been made.

Distribution of ratios	Percentiles			Coefficient of variation
	2.5	50	97.5	
G(i,H)/G(i,L)	0.20	1.08	4.00	0.83
$G_W(i)/G(i)$	0.76	1.01	1.53	0.18

Table 15. Properties of the distribution of individual ^{131}I integrated activities scaled for age dependence and settlement average value for rural settlements with more than 10 measured individuals. Results are presented for the set of individuals with measurements of higher reliability (class H) and of lower reliability (class L), and for the total set of measured individuals in these settlements according to weighted averages and direct averages. Given are the percentiles of the distributions and their coefficients of variation; their arithmetic mean is 1. Also, the geometric standard deviation and the percentile values which would result from the assumption of a log-normal distribution are indicated.

Group of individuals	Number of individuals	Percentiles of distribution			Coefficient of variation	GSD	Percentiles for log-normal distribution		
		2.5	50	97.5			2.5	50	97.5
Class H	31286	0.043	0.64	4.2	1.40	2.84	0.072	0.58	4.7
Class L	62293	0.054	0.67	4.0	1.26	2.65	0.089	0.62	4.4
Weighted average.	93579	0.048	0.64	3.9	1.29	2.69	0.084	0.61	4.4
Direct average	93579	0.050	0.66	4.1	1.32	2.73	0.081	0.60	4.5

Table 16. Average age dependence scaled integrated ^{131}I activity G for groups of measured individuals resident in the city of Gomel, for (A) measured residents assumed not to have been in highly contaminated areas, (B) measured residents known to have been in highly contaminated areas and (C) all measured residents of Gomel city. The number of measured individuals in the respective groups is indicated. Also given in the table is the coefficient of variation of the distribution of individual age dependence scaled integrated ^{131}I activities and the percentiles of this distribution, as well as the geometric mean GM and the geometric standard deviation GSD which would result assuming a lognormal distribution.

Group of individuals	Number of measurements	G (MBq hour)	Coefficient of variation	Percentiles (MBq hour)			GM (MBq hour)	GSD
				2.5	50	97.5		
A	4212	7.09	1.51	0.43	5.09	33.9	3.91	2.98
B	1304	45.2	1.40	0.46	18.9	250.	26.3	2.83
C	5516	16.1	2.23	0.44	5.09	122.	6.58	3.81

Table 17. Average age dependence scaled integrated ^{131}I activity G for groups of measured individuals resident in the city of Minsk, for (A) measured residents without information on whether they had been in more highly contaminated areas, (B) individuals of group A assumed to have been in more highly contaminated areas, (C) individuals of group A assumed not to have been in more highly contaminated areas, (D) residents known to have been in highly contaminated areas and measured in polyclinics, (E) residents known to have been in more highly contaminated areas and measured in hospitals and (F)all measured residents of Minsk city. The number of measured individuals in the respective groups is indicated. Also given in the table is the coefficient of variation of the distribution of individual age dependence scaled integrated ^{131}I activities and the percentiles of this distribution, as well as the geometric mean GM and the geometric standard deviation GSD which would result assuming a lognormal distribution.

Population group	Number of measurements	G (MBq hour)	Coefficient of variation	Percentiles (MBq hour)			GM (MBq hour)	GSD
				2.5	50	97.5		
A	18386	4.26	3.38	0.08	1.71	24.	1.21	4.89
B	640	47.2	1.29	12.	31.	168.	29.	2.69
C	17746	2.71	1.34	0.06	1.65	14.2	1.62	2.75
D	910	10.9	1.85	0.16	3.9	72.	5.2	3.39
E	648	62.7	1.14	3.9	44.	254.	41.	2.50
F	19944	6.46	3.41	0.08	1.80	49.	1.82	4.92

Table 18. Average age dependence scaled integrated ^{131}I activity weighted according to representativity G_R for the cities of Gomel and Minsk, for different assumed percentages P_{meas} of measured individuals within the population that had been in highly contaminated areas. Also indicated are the values of the resulting percentage P_{HC} of the individuals who had been in these territories relative to the total populations of Gomel and Minsk cities.

	Gomel city		Minsk city	
P_{meas}	P_{HC} (%)	G_R (MBq hour)	P_{HC} (%)	G_R (MBq hour)
70	0.39	7.24	0.20	2.78
50	0.54	7.31	0.29	2.81
30	0.90	7.43	0.50	2.88
10	2.72	8.13	1.45	3.20

Table 19. Average Thyroid Doses for birth years 1986 to 1968 and adults derived for the cities of Gomel and Minsk

Birth Year	Gomel city Dose (mGy)	Minsk city Dose (mGy)
1986	339.8	130.6
1985	354.8	136.4
1984	317.4	122.0
1983	281.8	108.3
1982	230.2	88.5
1981	265.6	102.1
1980	219.7	84.4
1979	187.3	72.0
1978	142.0	54.6
1977	121.0	46.5
1976	92.7	35.6
1975	91.0	35.0
1974	83.7	32.2
1973	74.5	28.6
1972	78.2	30.1
1971	74.9	28.8
1970	74.6	28.7
1969	84.2	32.4
1968	85.1	32.7
Adults	46.0	17.7

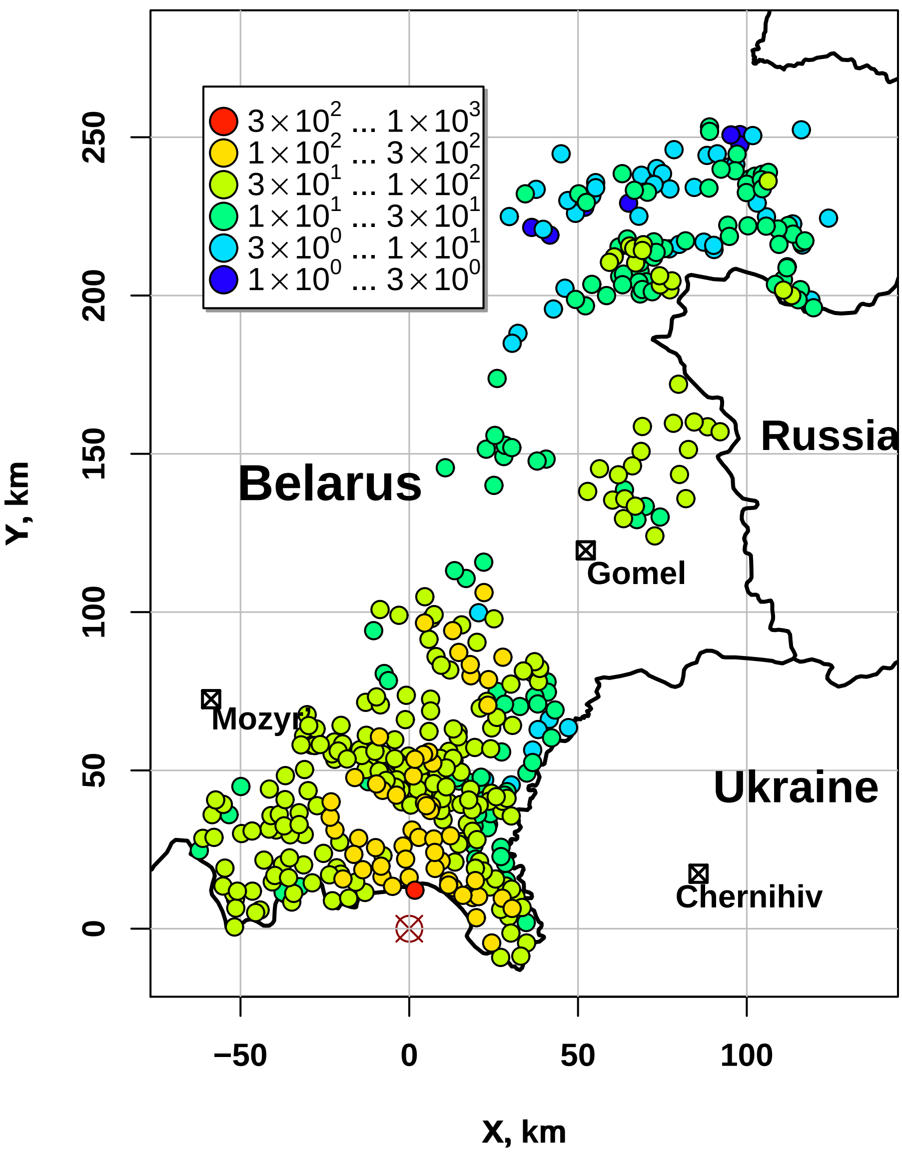

Fig. 1. Map showing rural settlements in Belarus with more than 10 individual measurements of ^{131}I activity in the thyroid. The coloration indicates in which range of values falls the weighted average G_W of age dependence scaled integrated ^{131}I activity's, in MBq hour, for the respective settlement.

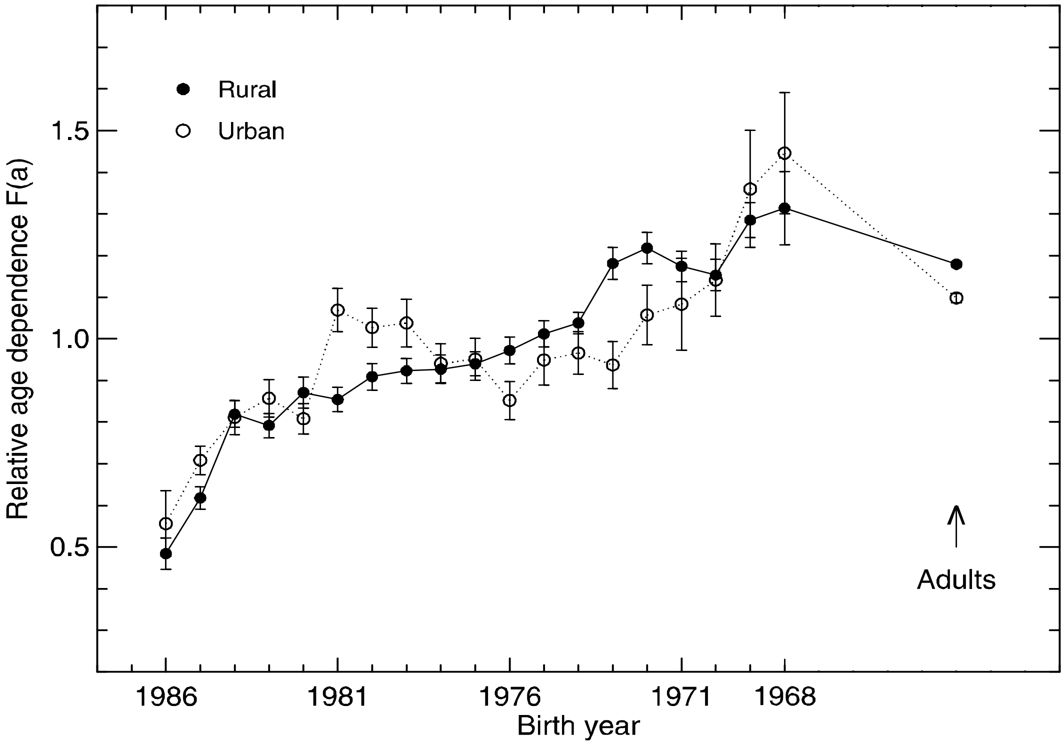

Fig. 2. Relative age dependence F(a) of integrated ^{131}I activity obtained by factorisation for the sets of measured individuals of rural settlements and of urban settlements (Gomel and Minsk cities). The results are normalized relative to the average of values for age groups 1 to 18. The error bars indicate one standard deviation.

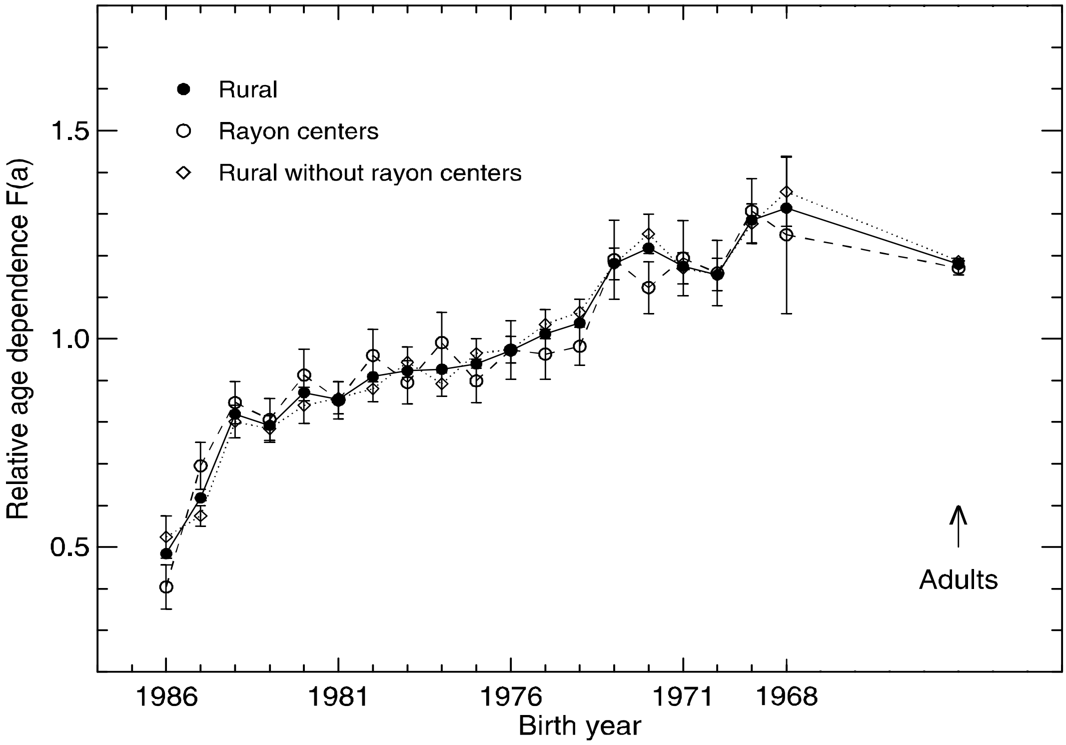

Fig. 3. Relative age dependence F(a) of integrated ^{131}I activity for all rural settlements in comparison with the relative age dependence obtained for raion centres and for rural settlements excluding raion centres. The error bars indicate one standard deviation.

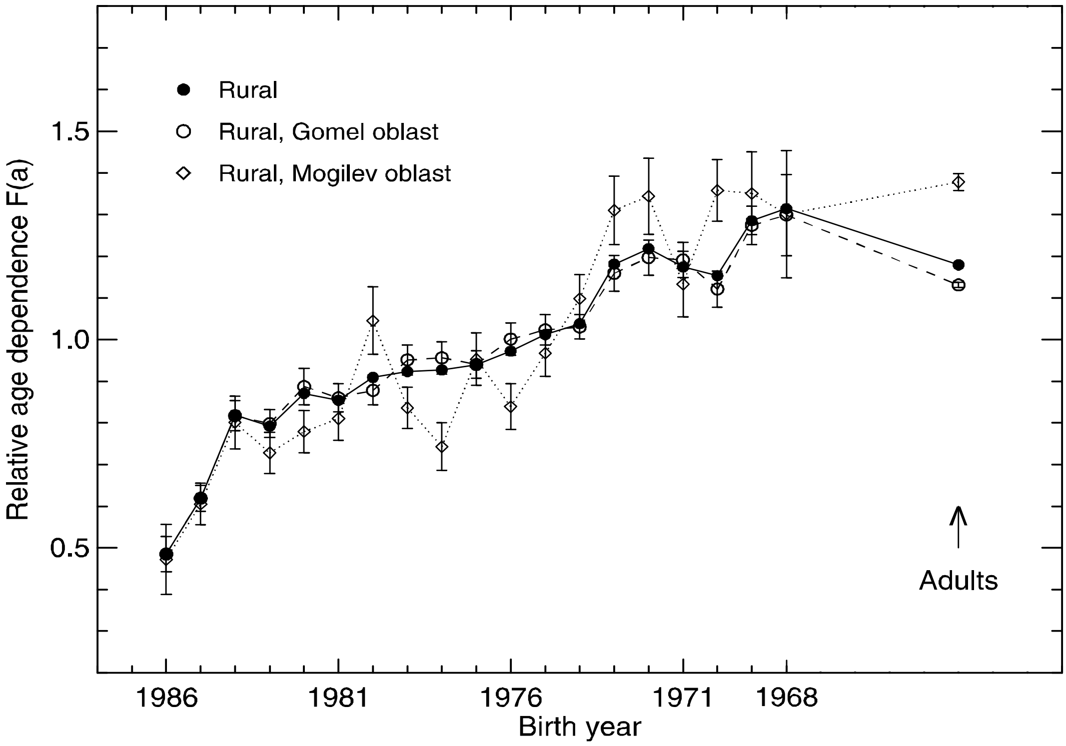

Fig. 4. Relative age dependence F(a) of integrated ^{131}I activity for all rural settlements in comparison with the relative age dependence obtained for rural settlements of Gomel oblast and of Mogilev oblast. The error bars indicate one standard deviation, they are shown only for the two subsets to avoid cluttering.

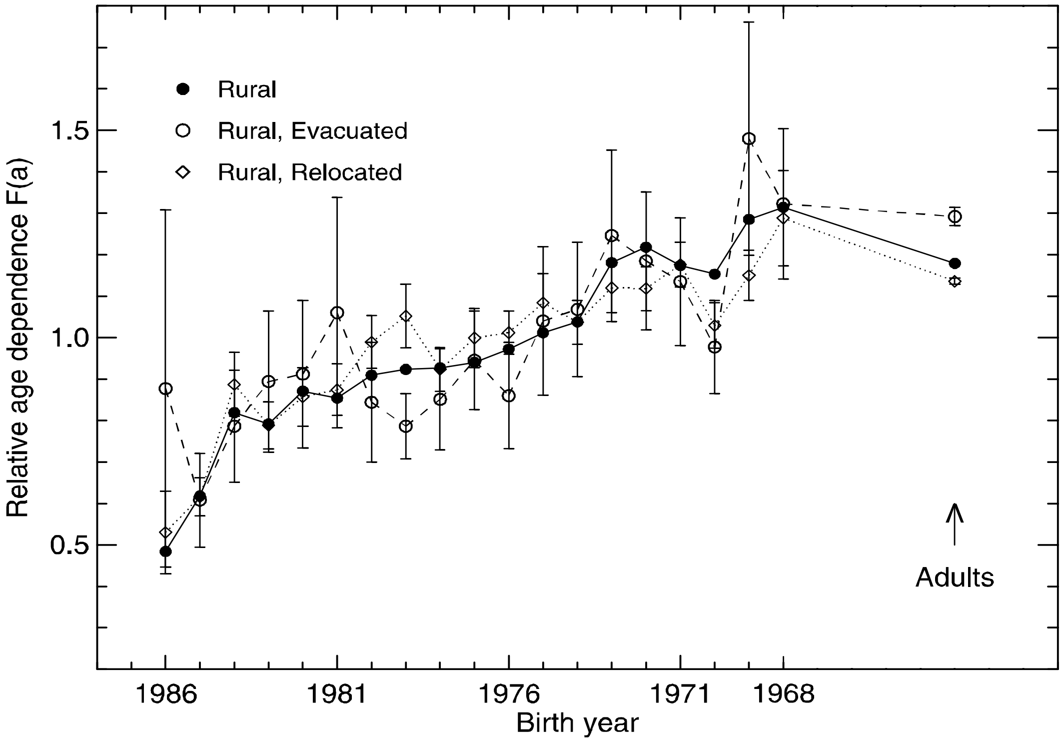

Fig. 5. Relative age dependence F(a) of integrated ^{131}I activity obtained for all measured individuals of rural settlements in comparison with the relative age dependence obtained for evacuated and for relocated individuals of rural settlements. The error bars indicate one standard deviation, they are shown only for the two subsets to avoid cluttering.

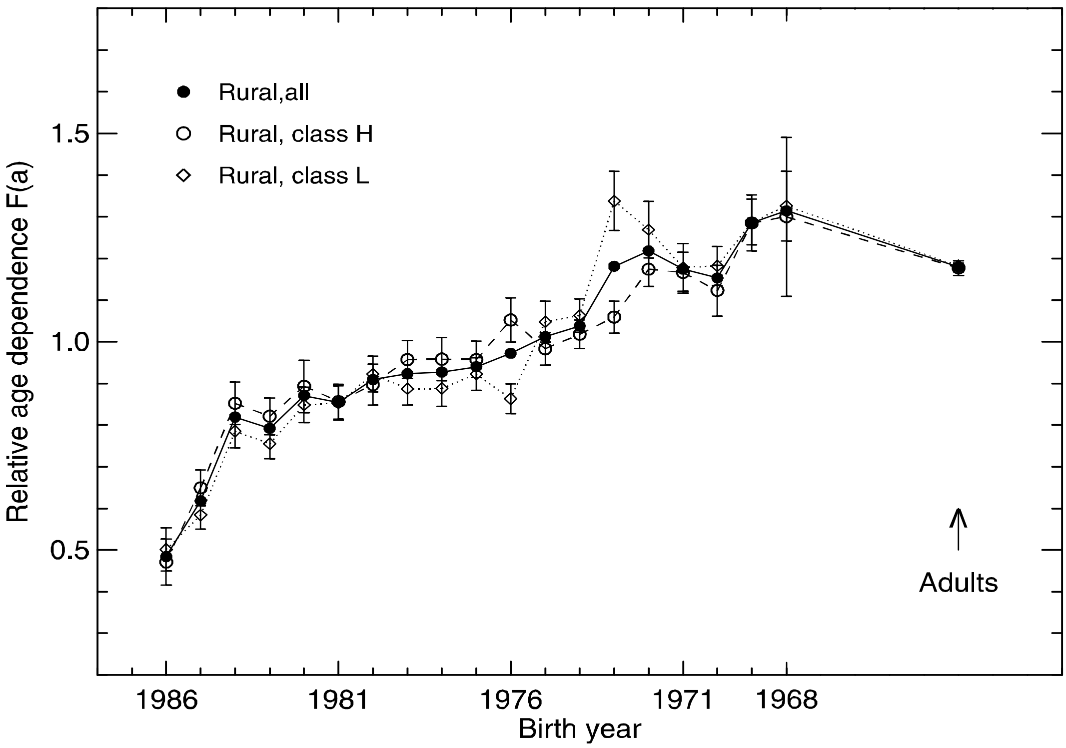

Fig. 6. Relative age dependence F(a) of integrated ^{131}I activity for all measurements in rural settlements in comparison with the relative age dependence obtained for measurements of higher reliability (class H) and of lower reliability (class L). The error bars indicate one standard deviation, they are shown only for the two subsets to avoid cluttering.

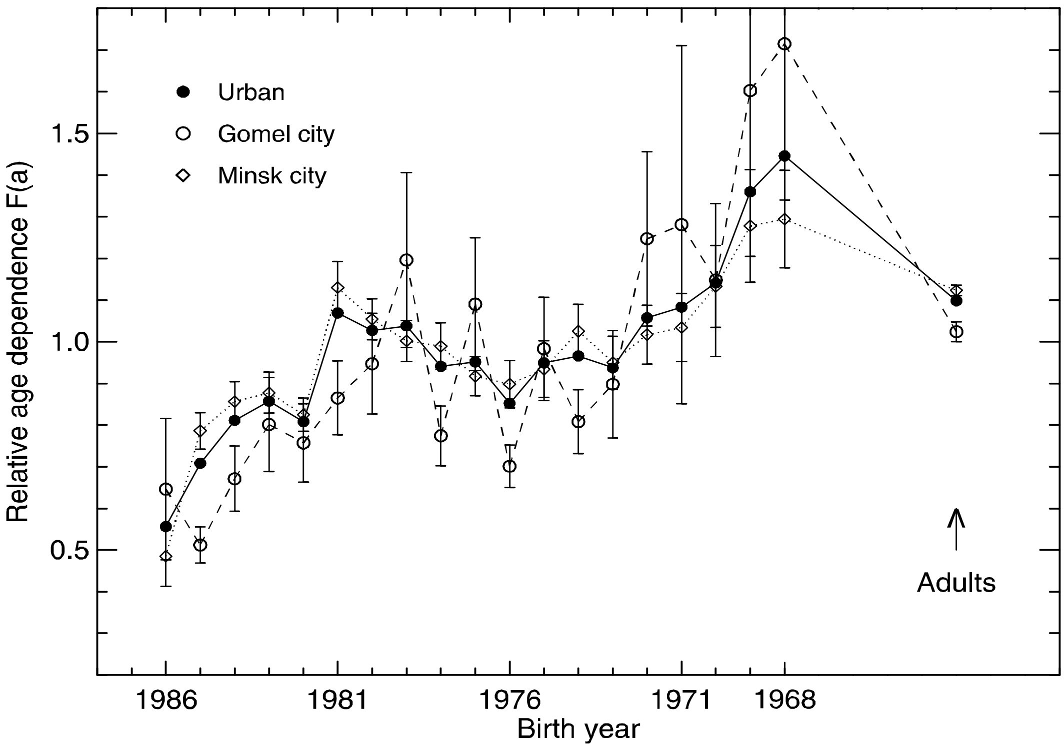

Fig. 7. Relative age dependence F(a) of integrated ^{131}I activity obtained for urban settlements (Gomel and Minsk cities) in comparison with the relative age dependence obtained separately for Gomel city and for Minsk city. The error bars indicate one standard deviation, they are shown only for the two subsets to avoid cluttering.

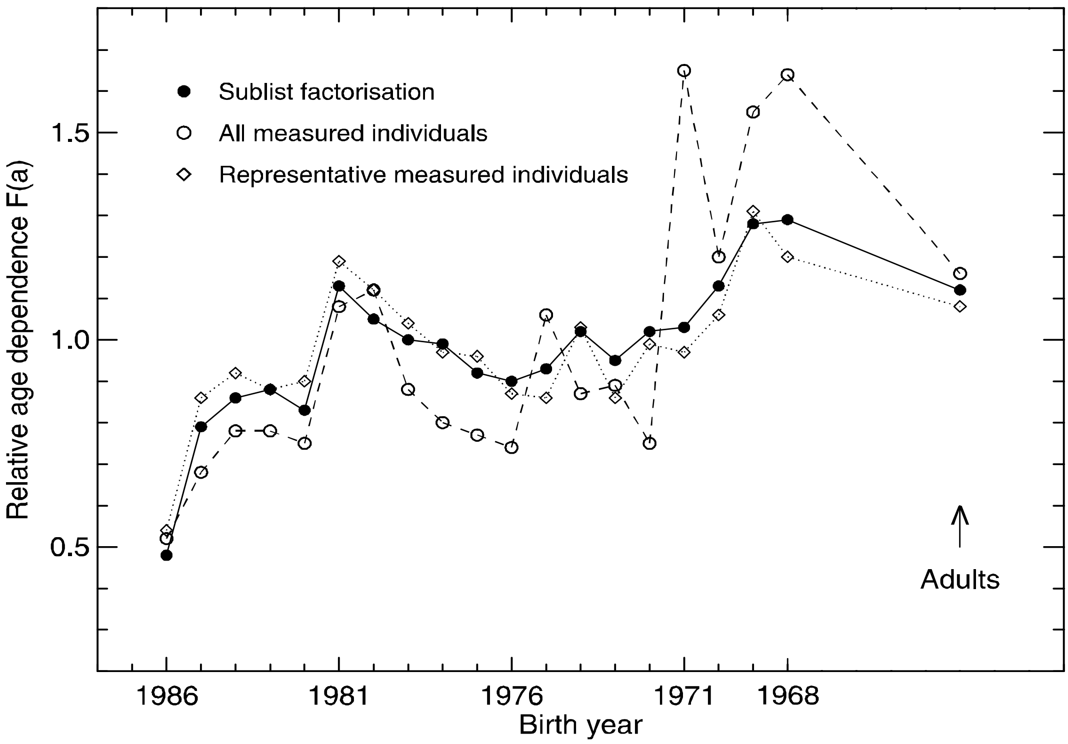

Fig. 8: Relative age dependence of integrated ^{131}I activity determined directly for all measured individuals of Minsk city and for the group of measured individuals assumed not to have stayed in highly contaminated areas, in comparison with the relative age dependence F(a) obtained for the city of Minsk by factorisation.

Annex

Tables of results

for weighted settlement averages of integrated ^{131}I activity in thyroid

and characteristics of distributions of individual values

in rural settlements with more than 10 measured individuals

in Gomel and Mogilev oblasts of Belarus

Table 1. Distributions of age dependence scaled integrated ^{131}I activity's for measured individuals of rural settlements in Bragin raion of Gomel oblast. Indicated are the total number of children N_{chld} and the number of measured individuals n_{meas} in each settlement, the percentiles of the distribution of individual values and the weighted settlement average G_W. Also given are the weighted coefficient of variation CV_W of the distribution of individual values, the CV of the average derived directly from this distribution and the CV of the uncertainty of G_W derived from estimates of individual uncertainties.

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W	CV_W	CV	CV
			2.5	50.	97.5	(MBq hour)	distribution	average	uncertainty
ALEKSEEVKA	94	264	1.6	19.6	83	22.3	0.93	0.057	0.42
ASAREVICHI	141	511	2.3	11.5	46	16.0	1.63	0.072	0.32
BAKUNY	55	236	2.6	30.3	222	62.2	0.98	0.064	0.34
BEREZKI	78	247	4.6	47.5	151	37.2	0.85	0.054	0.42
BERESNEVKA	47	161	1.3	17.9	80	24.9	0.85	0.067	0.31
BOGUSHI	139	314	5.3	44.1	507	94.3	1.30	0.073	0.30
BURKI	135	568	2.6	27.8	193	52.2	0.99	0.041	0.29
VERKHNIE ZHARY	101	337	1.6	19.8	133	30.6	1.91	0.104	0.38
VERKHOVAYA - SLOBODA	22	94	12.5	99.7	629	184.	1.10	0.114	0.48
VOLOKHOVSHCHINA	38	15	5.0	52.1	358	60.8	1.34	0.347	0.71
VYGREBNAYA - SLOBODA	98	227	9.5	130.0	742	198.	0.95	0.063	0.39
VYAZOK	77	314	4.9	41.0	292	96.7	0.95	0.054	0.36
VYALIE	30	130	1.4	17.8	93	25.0	0.98	0.086	0.48
GALKI	55	242	2.3	15.4	92	23.2	1.83	0.118	0.49
GLUKHOVICHI	169	231	6.6	82.7	282	84.4	0.93	0.061	0.31
GOLUBOVKA	60	186	3.7	47.1	287	58.9	1.19	0.088	0.36
GORODISHCHE	33	34	1.5	14.5	108	29.6	1.15	0.198	0.48
GORODOK	0	12	1.1	15.2	35	17.3	0.68	0.197	0.95
GRUSHNOE	76	302	2.2	16.1	92	26.8	1.08	0.062	0.29
DVOR SAVICHI	42	304	2.2	18.6	170	33.3	1.07	0.061	0.46
DOBRAGATSA	8	29	1.8	20.4	210	30.4	0.99	0.184	0.53
DUBLIN	98	324	2.8	44.6	139	47.5	0.86	0.048	0.34
DUBROVA	5	106	2.3	20.4	251	36.3	2.02	0.196	0.53

Table 1 - continued

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W	CV_W	CV	CV
			2.5	50.	97.5	(MBq hour)	distribution	average	uncertainty
DUBROVNOE	71	122	2.5	48.6	378	88.5	1.07	0.097	0.37
ZHERDNOE	39	118	5.6	100.9	656	190.	0.89	0.082	0.38
ZHILICHI	46	198	1.8	29.5	111	38.0	0.68	0.048	0.39
ZARECHYE	88	327	2.5	35.8	179	49.6	0.97	0.053	0.40
ILYICHI	89	261	6.8	73.2	595	136.	1.16	0.072	0.30
KAVAKA	71	293	2.1	29.7	125	41.2	0.67	0.039	0.32
KIROVO	120	336	3.0	20.9	58	22.4	0.81	0.044	0.33
KOVALI	57	218	2.5	35.5	193	45.0	1.00	0.068	0.33
KOZELUZHTSY	36	164	6.2	77.8	450	116.	0.96	0.075	0.32
KOMANOV	36	120	3.3	41.9	270	78.3	0.83	0.075	0.41
KONONOVSHCHINA	72	290	2.6	38.7	228	50.3	1.06	0.062	0.30
KOTLOVITSA	70	240	1.2	13.9	162	24.1	1.81	0.117	0.32
KRASNAYA GORA	66	61	1.2	36.4	413	77.1	1.40	0.179	0.44
KRASNAYA GORKA	14	24	2.3	61.5	297	69.2	0.92	0.188	0.73
KRASNAYA NIVA	27	99	5.0	21.5	151	34.6	0.91	0.091	0.61
KRASNAYA - POLYANA	6	44	1.4	8.2	227	26.9	1.42	0.214	0.59
KRASNOE	116	349	2.4	36.0	262	57.4	1.18	0.063	0.32
KRIVCHA	33	228	1.8	13.8	150	22.7	1.67	0.111	0.34
KRUG RUDKA	22	81	3.7	45.7	293	91.0	0.93	0.103	0.48
LUBENIKI	55	230	2.8	26.0	238	57.4	1.11	0.073	0.33
MALEIKI	142	405	1.8	15.2	155	29.2	1.47	0.073	0.30
MALOZHIN	160	547	2.1	13.4	145	37.4	1.06	0.045	0.29
MARITON	17	86	4.2	45.8	972	182.	1.58	0.170	0.41
MIKULICHI	144	464	3.4	44.0	325	81.7	1.12	0.052	0.29
MIKHNOVKA	25	128	1.0	43.0	421	99.3	1.20	0.106	0.43
MOKRETS	***	21	1.1	2.1	149	23.1	1.89	0.413	0.86
NIZHNIE ZHARY	56	302	5.7	35.6	244	75.7	0.99	0.057	0.43

*** Children population of settlement not identified

Table 1 - continued

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W	CV_W	CV	CV
			2.5	50.	97.5	(MBq hour)	distribution	average	uncertainty
NOVAYA GREBLYA	20	99	1.6	20.5	195	78.7	1.62	0.162	0.54
NOVAYA IOLCHA	72	246	1.7	29.7	150	41.3	1.09	0.070	0.33
NOVYE -KHRAKOVICHI	35	89	0.5	6.2	34	11.4	0.91	0.097	0.47
NOVYI MOKRETS	31	68	0.7	9.7	55	11.9	1.14	0.139	0.61
NOVYI PUTY	35	160	2.9	47.8	229	71.1	1.00	0.079	0.39
OSTROGLYADY	287	554	4.2	35.3	432	77.2	1.66	0.071	0.27
PERENOSY	35	109	2.6	34.0	138	42.2	0.92	0.088	0.42
PETRITSKOE	69	334	1.3	22.2	143	34.1	1.27	0.069	0.44
PETYKOVSHCHINA	22	40	5.3	72.3	283	94.4	0.91	0.143	0.43
PECHI	22	19	24.5	65.6	196	99.7	0.55	0.125	0.73
POZHARKI	24	121	5.7	61.9	433	168.	1.01	0.092	0.42
PROSMYCHI	65	269	2.8	32.5	173	41.0	1.07	0.066	0.36
PRUDOVITSA	***	75	1.6	24.5	79	25.4	0.79	0.092	0.49
PUCHIN	103	340	4.0	69.1	440	133.	0.91	0.050	0.30
RUDNYA ZHURAVLEVA	67	158	4.4	56.8	304	80.5	0.96	0.076	0.39
RYZHOV	74	326	3.4	46.3	338	114.	1.14	0.063	0.30
SAVICHI	268	811	5.0	34.7	260	53.1	1.43	0.050	0.28
SELETS	102	76	3.8	29.4	250	43.6	1.14	0.131	0.39
SLOBODA		179	4.8	80.3	785	186.	1.07	0.080	0.31
SOBOLI	153	512	2.3	27.9	112	44.5	1.02	0.045	0.32
SPERIZHYE	91	159	4.9	69.7	422	92.8	1.00	0.080	0.32
STARAYA IOLCHA	81	46	0.5	12.2	66	16.6	0.95	0.140	0.45
STARYE - KHRAKOVICHI	156	241	1.1	14.8	70	18.8	0.92	0.059	0.37
STARYE URKOVICHI	29	93	2.5	34.0	154	43.1	0.82	0.085	0.53
STARYI MOKRETS	17	47	0.7	1.1	74	9.6	1.82	0.266	0.69
STARYI STEPANOV	22	92	13.8	131.4	1074	221.	1.13	0.118	0.34
STEZHERNOE	87	350	3.1	36.3	190	50.0	0.89	0.048	0.37

*** Children population of settlement not identified

Table 1 - continued

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour) 2.5	50.	97.5	G_W (MBq hour)	CV_W distribution	CV average	CV uncertainty
TEKLINOV	35	112	1.6	20.0	139	25.2	1.03	0.097	0.49
TELYMAN	69	42	0.4	8.7	314	18.0	2.25	0.347	0.42
UGLY	70	298	2.8	28.7	205	47.9	1.17	0.068	0.30
HATUCHA	86	187	5.4	65.6	465	99.5	1.22	0.089	0.33
HRAKOVICHI	***	149	1.0	12.6	53	16.3	1.18	0.097	0.39
TSELUIKI	5	22	5.6	16.9	338	30.1	1.98	0.423	0.70
CHEMERISY	188	589	0.7	7.6	63	14.9	0.92	0.038	0.29
CHERVONOE POLE	8	48	5.2	97.0	372	125.	0.90	0.129	0.54
SHKURATY	57	151	1.8	22.3	131	41.4	0.85	0.069	0.39
SHCHERBINY	42	179	0.6	18.1	104	27.0	1.05	0.079	0.35
YASENI	78	369	3.4	40.6	291	59.6	1.36	0.071	0.34
GROMKII	6	12	4.4	24.5	74	34.9	0.70	0.203	0.82
LENINSKII - (CHAPAEV)	20	204	1.5	18.6	123	28.4	1.02	0.071	0.49
MAISKII	13	65	1.4	23.2	154	45.5	1.04	0.129	0.52
RAFALOV-POSELOK	***	101	3.1	42.0	361	101.	1.06	0.106	0.43
RYTOV	30	118	3.0	29.3	241	39.8	1.16	0.106	0.37
SADOVYI	16	80	1.5	16.9	82	23.3	0.96	0.107	0.60
ALEKSANDROVKA	11	39	8.8	60.9	907	106.	1.43	0.229	0.72
VELYMOV	8	15	20.4	123.1	277	129.	0.58	0.150	0.61
GDENY	170	424	8.5	77.1	459	115.	1.11	0.054	0.30
ZHELIBOR	7	16	13.7	66.9	889	140.	1.53	0.383	0.94
ZALESYE	136	442	6.9	51.8	494	75.4	1.71	0.081	0.31
IVANKI	46	141	6.2	41.4	562	115.	1.35	0.113	0.35
KAPORENKA	49	107	7.7	72.6	286	83.8	0.84	0.081	0.37
KARLOVKA	71	159	6.3	41.2	381	56.7	1.16	0.092	0.41
KATICHEV	22	27	7.4	26.7	157	39.3	0.97	0.186	0.70
KOLYBAN	153	274	6.4	55.5	533	102.	1.20	0.073	0.31

*** Children population of settlement not identified

Table 1 - continued

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour) 2.5	50.	97.5	G_W (MBq hour)	CV_W distribution	CV average	CV uncertainty
KRUKI	119	271	15.9	115.7	533	158.	1.23	0.075	0.32
KULAZHIN	68	119	14.4	111.6	583	142.	1.11	0.102	0.35
LUDVINOVO	22	105	4.4	44.6	217	56.6	1.11	0.108	0.42
LYADY	49	94	4.5	38.0	254	71.9	1.36	0.141	0.40
MIKHALEVKA	58	237	16.2	116.0	708	203.	0.92	0.060	0.41
NEZHIKHOV	30	122	4.1	185.8	568	222.	0.66	0.060	0.40
NOVYI STEPANOV	8	38	7.5	62.3	298	81.2	0.70	0.114	0.51
NUDICHI	88	209	10.6	102.4	569	156.	0.94	0.065	0.31
PASEKA	8	23	16.5	61.6	123	62.0	0.62	0.129	0.73
PERESETINETS	21	80	43.2	181.8	991	265.	0.81	0.090	0.36
PIRKI	342	491	3.7	37.5	224	52.6	1.31	0.059	0.28
POSUDOVO	50	128	2.7	71.4	770	120.	1.49	0.132	0.42
PRISTANSKOE	22	59	4.5	60.5	411	103.	0.92	0.120	0.51
SKORODNOE	8	14	13.8	45.9	153	61.5	0.71	0.191	0.72
SUVIDY	58	125	2.9	14.3	117	22.8	1.15	0.103	0.45
CHERNEV	22	79	5.0	39.8	378	95.3	1.34	0.151	0.60
CHIKALOVICHI	89	320	3.7	75.6	414	119.	1.01	0.056	0.30
YASMENTSY	25	76	7.7	62.8	386	125.	0.91	0.105	0.43
SOLNECHNYI	***	96	1.3	19.3	312	52.2	1.96	0.200	0.34
BRAGIN	1375	2441	1.5	25.0	177	49.1	1.59	0.032	0.27
KOMARIN	613	1880	2.5	19.1	94	36.0	1.09	0.025	0.34

*** Children population of settlement not identified

Table 2. Distributions of age dependence scaled integrated ^{131}I activity's for measured individuals of rural settlements in Khoiniki raion of Gomel oblast. Indicated are the total number of children N_{chld} and the number of measured individuals n_{meas} in each settlement, the percentiles of the distribution of individual values and the weighted settlement average G_W. Also given are the weighted coefficient of variation CV_W of the distribution of individual values, the CV of the average derived directly from this distribution and the CV of the uncertainty of G_W derived from estimates of individual uncertainties.

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W	CV_W	CV	CV
			2.5	50.	97.5	(MBq hour)	distribution	average	uncertainty
KHOINIKI	4699	6787	1.2	22.1	139	33.3	1.39	0.017	0.26
BORSHCHEVKA	86	242	12.2	93.4	616	152	1.12	0.072	0.29
DRONYKI	63	257	18.1	91.2	421	119	0.99	0.062	0.31
KRASNOSELYE	67	94	14.0	263.5	956	277	0.76	0.078	0.34
LESOK	8	73	2.8	62.0	729	95	1.38	0.161	0.56
MASANY	16	27	57.4	147.1	1471	225	0.98	0.188	0.48
MOLOCHKI	34	94	46.3	235.0	1376	282	1.03	0.106	0.35
OREVICHI	153	323	9.0	191.3	897	254	0.98	0.055	0.28
POGONNOE	289	869	21.9	129.5	809	221	1.09	0.037	0.27
RADIN	123	233	14.0	176.5	1077	261	0.97	0.063	0.29
SLOBODA	14	100	20.6	109.1	705	154	0.91	0.091	0.49
ULASY	49	106	41.2	220.7	636	252	0.68	0.066	0.33
CHAMKOV	16	19	95.6	235.4	1471	364	0.90	0.207	0.65
ALEKSICHI	51	64	1.5	51.7	397	85.4	1.04	0.130	0.37
AMELYKOVSHCHINA	72	329	2.6	36.7	201	53.6	0.95	0.052	0.30
BABCHIN	201	505	5.0	54.4	575	102.2	1.35	0.060	0.27
BERESTECHKO	12	41	3.6	37.6	277	55.9	0.94	0.146	0.71
BORISOVSHCHINA	142	262	1.1	24.4	348	52.5	1.62	0.100	0.30
BUDA	25	71	2.0	55.5	528	65.9	1.48	0.175	0.48
BUDOVNIK	20	15	9.3	119.5	225	110.6	0.62	0.160	0.78
VELETIN	165	524	4.1	27.2	338	80.2	1.16	0.051	0.29
VELIKII BOR	322	606	1.4	22.3	190	38.7	1.35	0.055	0.27
VITY	235	83	1.9	40.5	216	63.0	1.04	0.115	0.35

Table 2 - continued

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W	CV_W	CV	CV
			2.5	50.	97.5	(MBq hour)	distribution	average	uncertainty
VOROTETS	96	265	7.3	78.4	537	141.1	0.96	0.059	0.32
VYSOKOE	54	47	1.0	21.1	149	27.9	1.08	0.157	0.42
GLINISHCHE	182	582	4.0	48.4	209	60.2	1.01	0.042	0.28
GOROSHKOV	11	42	2.2	28.7	113	39.1	0.91	0.141	0.67
GUBOREVICHI	98	214	1.3	44.6	289	53.0	1.16	0.079	0.40
DVORISHCHE	283	1085	2.8	21.0	182	38.0	1.23	0.037	0.27
DUBROVA	30	114	0.7	28.9	197	33.6	1.40	0.131	0.35
DUBROVITSA	78	250	1.8	22.5	154	41.3	1.09	0.069	0.34
ZAGALYE	27	93	2.5	38.7	140	39.3	0.71	0.074	0.38
ZAGALYSKAYA SLOBODA	6	30	22.1	44.2	85	45.2	0.40	0.073	0.69
ZVENYATSKOE	85	509	4.1	39.6	261	66.7	1.17	0.052	0.28
IVANOVKA	37	23	3.1	16.2	125	17.3	1.11	0.231	0.51
IZBYN	36	233	1.4	20.5	84	23.1	1.02	0.067	0.53
KAROLIN	13	71	2.3	22.5	117	29.9	0.89	0.106	0.43
KLIVY	91	308	4.3	49.4	364	99.2	1.01	0.058	0.32
KOZHUSHKI	147	334	3.7	45.4	337	103.8	1.24	0.068	0.30
KOZELUZHYE	196	450	2.3	32.8	164	42.0	0.98	0.046	0.28
KORENEVKA	12	40	5.6	86.3	341	88.3	0.86	0.136	0.56
KORCHEVOE	54	435	2.1	15.8	165	35.6	1.11	0.053	0.34
KRASNOE OZERO	37	42	6.8	33.6	314	44.9	0.97	0.149	0.46
LISTVIN	106	230	3.4	50.5	279	84.4	0.96	0.063	0.30
LOMACHI	15	12	5.4	54.8	160	53.7	0.70	0.202	0.88
LOMYSH	97	348	2.8	37.6	188	55.5	0.84	0.045	0.30
LUDVIN	27	58	1.6	24.5	125	46.9	0.92	0.121	0.60
MALESHEV	178	529	2.5	23.4	201	53.8	1.05	0.046	0.28
MARKHLEVSK	35	129	2.6	27.0	165	60.2	0.80	0.070	0.36
MOKISH	78	316	6.8	74.1	496	107.5	1.00	0.057	0.29
MOKLISHCHE	17	61	8.6	40.5	292	81.6	0.86	0.111	0.52
NARIMANOV	9	37	2.8	39.0	119	55.9	0.53	0.088	0.66

Table 2 - continued

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W	CV_W	CV	CV
			2.5	50.	97.5	(MBq hour)	distribution	average	uncertainty
NEBYTOV	93	111	2.5	29.0	231	42.3	1.28	0.122	0.37
NOVOPOKROVSK	20	55	7.1	130.0	357	130.0	0.67	0.091	0.39
NOVOSELKI	217	839	4.0	50.4	318	104.6	1.09	0.038	0.28
OSOV	41	145	2.1	26.4	135	43.3	0.81	0.068	0.35
PALYMIRA	9	29	1.0	3.8	45	12.7	1.03	0.191	0.63
PARTIZANSKAYA	147	674	3.1	21.6	187	51.1	1.54	0.059	0.29
PETRASH	13	57	2.2	24.3	152	38.4	0.95	0.125	0.54
PLOSKOE	45	77	2.0	28.5	287	49.1	117	0.134	0.44
POSELICHI	134	301	4.0	49.0	294	82.2	0.99	0.057	0.29
POTASHNYA	35	104	4.3	60.5	371	83.1	0.96	0.094	0.39
PUDAKOV	71	176	7.9	71.4	590	150.7	0.98	0.074	0.35
RABETS	24	82	2.6	31.3	285	67.7	1.20	0.133	0.44
RASHEV	27	94	2.6	38.4	169	56.3	0.96	0.099	0.41
RUDAKOV	110	144	2.8	43.1	354	77.7	1.26	0.105	0.32
RUDNOE	117	476	1.8	26.0	150	50.3	0.91	0.042	0.33
RUDYE	22	89	1.8	32.9	391	58.3	1.33	0.141	0.41
SLABOZHANKA	147	94	1.3	30.9	230	48.2	1.26	0.130	0.34
SOKOL	7	39	0.9	24.3	155	28.1	0.94	0.150	0.60
STRELICHEVO	416	334	0.7	19.7	217	36.1	1.34	0.073	0.29
SUDKOVO	178	275	2.4	36.7	205	56.1	1.07	0.065	0.29
TULYGOVICHI	159	427	3.8	54.1	382	97.3	1.13	0.055	0.28
TUNEVSHCHINA	49	216	2.5	29.9	192	48.9	1.03	0.070	0.33
HVOINAYA POLYANA	78	302	1.5	23.8	108	28.8	1.08	0.062	0.32
HVOINOE	53	150	5.0	81.2	402	82.6	1.02	0.083	0.36
HVOSHCHEVKA	18	35	5.6	72.1	469	89.2	1.01	0.172	0.59
HRAPKOV	152	480	3.5	33.7	312	75.9	1.19	0.055	0.28
CHEKHI	20	68	3.5	37.3	316	54.2	1.17	0.142	0.46
LENINA	35	94	4.0	52.5	199	61.4	0.87	0.090	0.46

Table 3. Distributions of age dependence scaled integrated ^{131}I activity's for measured individuals of rural settlements in Narovlya raion of Gomel oblast. Indicated are the total number of children N_{chld} and the number of measured individuals n_{meas} in each settlement, the percentiles of the distribution of individual values and the weighted settlement average G_W. Also given are the weighted coefficient of variation CV_W of the distribution of individual values, the CV of the average derived directly from this distribution and the CV of the uncertainty of G_W derived from estimates of individual uncertainties.

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W	CV_W	CV	CV
			2.5	50.	97.5	(MBq hour)	distribution	average	uncertainty
NAROVLYA	3065	5307	1.5	20.0	177	36.5	1.71	0.024	0.26
ANTONOV	88	120	2.7	24.1	205	41.1	1.36	0.124	0.33
ANTONOVKA	8	13	1.5	36.0	167	67.5	0.96	0.267	0.65
BELOBEREZHSKAYA - RUDN	83	252	1.0	16.2	168	30.9	1.38	0.087	0.33
BELYI BEREG	46	89	1.1	25.9	151	40.2	1.14	0.121	0.41
BOROVICHI	31	94	3.5	17.4	254	54.8	1.12	0.115	0.34
BRATSKOE	26	87	3.1	28.8	984	95.5	3.14	0.336	0.57
BUDA	***	11	5.4	37.1	173	46.9	1.20	0.363	0.74
BUDA KRASNOVSKAYA	39	66	2.3	33.7	135	43.8	0.78	0.096	0.65
BUDKI	104	240	4.1	46.6	277	47.9	1.26	0.081	0.39
BUK	64	70	2.9	15.4	336	60.7	1.91	0.229	0.56
VERBOVICHI	200	376	5.1	45.5	299	86.2	0.98	0.051	0.29
VYAZHISHCHA	52	24	4.6	41.2	501	97.2	1.40	0.285	0.52
GABRILEEVKA	21	32	5.4	18.7	198	40.5	0.88	0.156	0.71
GAZHIN	118	433	3.7	46.2	266	55.7	1.15	0.055	0.34
GAMARNYA	1	17	4.0	37.1	173	42.9	1.14	0.276	0.63
BUDA - GOLOVCHITSKAYA	112	140	3.1	33.7	183	37.0	1.12	0.095	0.41
GOLOVCHITSY	224	573	1.4	14.0	123	26.7	1.40	0.059	0.28
GRIDNI	11	69	3.6	58.6	324	88.0	0.99	0.120	0.37
GRUSHEVKA	123	143	1.4	18.0	129	30.6	1.48	0.124	0.32

*** Children population of settlement not identified

Table 3 - continued

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W	CV_W	CV	CV
			2.5	50.	97.5	(MBq hour)	distribution	average	uncertainty
DVORISHCHE	27	80	4.0	61.9	296	92.0	0.95	0.106	0.39
DEMIDOV	99	276	1.5	20.0	177	35.0	1.45	0.088	0.37
DERNOVICHI	204	271	2.7	24.1	205	43.3	1.36	0.083	0.30
DZERZHINSK	71	36	5.4	26.5	238	34.0	1.23	0.206	0.59
DUBRAVA	63	165	2.2	24.8	146	39.9	1.10	0.085	0.31
ZAVOITY	152	198	3.8	19.1	78	23.7	0.87	0.062	0.39
KARPOVICHI	52	110	5.1	23.2	348	52.6	1.51	0.144	0.34
KIROV	279	220	2.2	20.0	395	46.9	1.56	0.105	0.31
KONOTOP	128	212	2.8	25.3	215	61.9	1.37	0.094	0.32
KRASNOVKA	75	167	5.4	18.7	210	37.7	1.24	0.096	0.49
LENPOSELOK	42	109	6.9	54.1	279	90.4	0.86	0.082	0.35
LINOV	50	131	6.8	43.6	141	44.1	0.72	0.063	0.44
LISAVA	8	15	2.5	32.8	111	35.2	0.97	0.250	0.61
LUBEN	56	133	5.1	63.4	342	80.8	1.06	0.092	0.48
MIKHAILOVKA	30	86	1.2	14.9	304	33.2	1.84	0.198	0.35
MOSKALEVKA	37	160	2.5	30.7	188	48.7	1.38	0.110	0.49
OKOPY	31	72	1.7	23.4	269	51.3	1.29	0.152	0.36
RADOMLYA	8	25	3.4	49.5	203	65.7	0.74	0.148	0.50
SVECHA	26	78	5.4	24.8	162	26.8	1.17	0.132	0.52
TESHKOV	115	95	3.8	24.8	146	36.3	1.10	0.113	0.40
TIKHIN	49	108	0.7	9.1	58	13.8	0.97	0.093	0.33
UGLY	221	545	2.9	34.7	211	59.4	1.08	0.046	0.27
HILYCHIKHA	46	92	5.9	36.0	338	69.3	1.13	0.117	0.46
KHOMENKI	32	14	7.1	42.6	193	63.9	0.92	0.246	0.60
YASENOK	37	96	0.7	14.9	100	24.2	0.84	0.086	0.34
BELAYA SOROKA	57	137	2.5	25.0	81	31.9	0.87	0.074	0.43

Table 3 - continued

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W	CV_W	CV	CV
			2.5	50.	97.5	(MBq hour)	distribution	average	uncertainty
VEPRY	57	120	6.8	42.7	292	84.4	1.06	0.097	0.40
DOVLYADY	132	326	4.9	42.7	360	65.9	1.30	0.072	0.29
NADTOCHAEVKA	52	101	3.2	27.2	191	56.2	1.09	0.108	0.35
OSIPOVKA	31	49	1.9	54.4	188	50.0	0.89	0.128	0.56
ROZHAVA	31	53	3.3	101.5	602	136.9	1.07	0.147	0.42
HATKI	52	113	4.8	32.4	366	51.9	1.47	0.138	0.43
HUTOR LES	24	60	4.5	47.7	323	80.6	1.05	0.135	0.46

Table 4. Distributions of age dependence scaled integrated ^{131}I activity's for measured individuals of rural settlements in Buda raion of Gomel oblast. Indicated are the total number of children N_{chld} and the number of measured individuals n_{meas} in each settlement, the percentiles of the distribution of individual values and the weighted settlement average G_W. Also given are the weighted coefficient of variation CV_W of the distribution of individual values, the CV of the average derived directly from this distribution and the CV of the uncertainty of G_W derived from estimates of individual uncertainties.

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W	CV_W	CV	CV
			2.5	50.	97.5	(MBq hour)	distribution	average	uncertainty
BUDA-KOSHELEVO	2279	508	8.2	12	22	13.3	0.46	0.020	0.53
BRYLEVO	45	12	10.3	13	15	12.5	0.12	0.035	1.05
BURLOK	24	11	7.1	14	40	17.1	0.57	0.173	1.08
GLAZOVKA	180	14	10.8	13	14	13.0	0.08	0.021	0.99
GUBICHI	204	11	11.5	14	18	13.8	0.12	0.036	1.08
DURAVICHI	223	21	8.2	14	140	26.3	1.29	0.282	0.86
KOSHELEVO	136	13	8.2	13	18	12.8	0.17	0.048	1.01
NIKOLAEVKA	***	15	11.8	13	14	12.6	0.05	0.012	0.96
POTAPOVKA	344	24	8.8	14	37	15.0	0.35	0.071	0.82
SOVKHOZNOE	142	12	10.3	13	34	15.2	0.43	0.124	1.05
SHARIBOVKA	140	11	11.0	14	18	14.4	0.16	0.049	1.08

*** Children population of settlement not identified

Table 5. Distributions of age dependence scaled integrated ^{131}I activity's for measured individuals of rural settlements in Korma raion of Gomel oblast. Indicated are the total number of children N_{chld} and the number of measured individuals n_{meas} in each settlement, the percentiles of the distribution of individual values and the weighted settlement average G_W. Also given are the weighted coefficient of variation CV_W of the distribution of individual values, the CV of the average derived directly from this distribution and the CV of the uncertainty of G_W derived from assessments of individual uncertainties.

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W	CV_W	CV	CV
			2.5	50.	97.5	(MBq hour)	distribution	average	uncertainty
KORMA	1950	188	2.9	3.8	12	4.60	0.70	0.051	0.32
**	***-	70	2.9	3.5	182	20.1	2.53	0.303	0.37
BOGDANOVICHI	78	13	3.2	3.5	11	4.15	0.53	0.147	0.61
BOROVAYA BUDA	138	93	1.0	2.0	32	5.50	1.33	0.138	0.35
VOLYNTSY	122	54	1.1	4.3	99	12.9	1.60	0.218	0.39
KLYAPIN	58	48	1.3	14.4	75	18.3	0.91	0.132	0.40
LITVINOVICHI	390	25	3.1	4.5	35	6.98	1.11	0.223	0.49
LOZOVITSA	11	15	2.1	13.7	37	18.0	0.65	0.168	0.58
STRUMEN'	115	88	1.7	12.1	49	17.5	0.85	0.091	0.36

** Name of settlement not identified
*** Children population of settlement not identified

Table 6. Distributions of age dependence scaled integrated ^{131}I activity's for measured individuals of rural settlements in Vetka raion of Gomel oblast. Indicated are the total number of children N_{chld} and the number of measured individuals n_{meas} in each settlement, the percentiles of the distribution of individual values and the weighted settlement average G_W. Also given are the weighted coefficient of variation CV_W of the distribution of individual values, the CV of the average derived directly from this distribution and the CV of the uncertainty of G_W derived from estimates of individual uncertainties.

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W	CV_W	CV	CV
			2.5	50.	97.5	(MBq hour)	distribution	average	uncertainty
VETKA	2839	1448	2.8	11.8	110	23.1	1.30	0.034	0.30
AKSHINKA	38	13	20.6	47.1	346	81.3	1.11	0.308	0.61
BARTOLOMEEVKA	211	97	5.4	41.2	382	75.1	1.21	0.123	0.35
GLYBOVKA	35	13	5.6	29.4	108	31.9	0.85	0.236	0.61
GROMYKI	***	27	3.0	13.1	397	42.7	1.99	0.383	0.47
ZOLOTOI ROG	102	28	2.9	18.3	109	33.4	0.93	0.175	0.47
KOLBOVKA	96	24	11.0	49.6	204	62.7	0.71	0.144	0.49
KUNTOROVKA	49	16	7.4	44.9	137	55.6	0.65	0.163	0.57
NEGLUBKA	230	32	2.6	18.4	324	39.4	1.64	0.291	0.45
NOVOSELKI	180	58	1.7	7.2	43	12.4	0.94	0.123	0.39
PRISNO	204	66	4.6	28.0	151	41.8	0.90	0.111	0.38
PYKHAN	103	23	6.3	33.1	133	44.0	0.72	0.151	0.50
RADUGA	174	34	3.5	20.0	144	38.0	0.99	0.170	0.44
RECHKI	141	27	3.1	52.8	250	71.0	0.84	0.162	0.47
RUDNYA SHLYAGINA	40	15	6.6	36.8	208	60.2	1.05	0.272	0.58
SVETILOVICHI	401	262	8.5	87.4	307	94.8	0.75	0.046	0.32
SIVENKA	130	20	6.2	28.4	127	39.3	0.75	0.168	0.52
STAROE SELO	278	54	1.8	13.9	83	18.9	0.89	0.121	0.39
STOLBUN	417	12	3.5	29.1	265	71.4	1.26	0.364	0.63
TARASOVKA	107	31	2.8	15.9	113	26.0	1.00	0.180	0.46
KHALCH	440	162	2.4	13.7	238	32.7	1.62	0.128	0.33
CHISTYE LUZHI	39	13	3.1	35.0	85	40.0	0.73	0.201	0.61
SHERSTIN	175	26	1.8	12.0	460	44.9	2.21	0.434	0.48
POBEDA	73	22	2.6	16.4	162	32.0	1.12	0.239	0.51

*** Children population of settlement not identified

Table 7. Distributions of age dependence scaled integrated ^{131}I activity's for measured individuals of rural settlements in Loev raion of Gomel oblast. Indicated are the total number of children N_{chld} and the number of measured individuals n_{meas} in each settlement, the percentiles of the distribution of individual values and the weighted settlement average G_W. Also given are the weighted coefficient of variation CV_W of the distribution of individual values, the CV of the average derived directly from this distribution and the CV of the uncertainty of G_W derived from estimates of individual uncertainties.

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W	CV_W	CV	CV
			2.5	50.	97.5	(MBq hour)	distribution	average	uncertainty
LOEV	1863	2583	0.42	3.8	41	8.07	2.25	0.044	0.29
ALISHEEVKA	***	105	0.84	19.1	89	25.8	0.91	0.089	0.35
BURITSKOE	***	217	10.45	45.6	220	59.6	0.78	0.053	0.32
VULKAN	37	39	3.95	89.7	393	128.9	0.97	0.155	0.43
GERASIM	***	97	0.84	3.2	39	5.37	1.89	0.192	0.35
GORODOK	***	29	2.80	16.2	139	24.5	1.09	0.203	0.46
GROKHOV	38	97	2.64	30.3	210	46.4	1.05	0.106	0.35
IVANYKOV	15	47	4.40	76.5	274	87.9	0.67	0.098	0.41
ISAKOVICHI	38	93	1.83	30.9	128	45.2	0.84	0.087	0.35
KAZIMIROVKA	32	15	0.64	5.0	41	12.7	1.07	0.277	0.58
KOZEROGI	67	27	0.16	4.0	47	7.91	1.21	0.232	0.47
KOLPENY	148	63	0.13	3.2	39	5.66	1.54	0.194	0.38
KRUPEIKI	192	86	1.48	5.0	58	10.2	1.56	0.169	0.36
LIPNIAKI	72	14	0.71	6.4	96	32.8	1.12	0.300	0.60
MALINOVKA	104	471	5.59	26.5	297	45.1	1.43	0.066	0.31
MARS	10	38	0.87	30.9	191	52.2	0.92	0.150	0.43
MIKHALEVKA	31	30	1.13	20.5	81	24.6	0.85	0.156	0.46
MOKHOV	141	82	0.74	7.8	63	13.9	1.08	0.119	0.36
NOVAYA - BORSHCHEVKA	69	223	6.43	47.4	279	69.6	0.93	0.062	0.32
OSTROVY	51	61	4.79	105.6	281	98.3	0.75	0.096	0.38
PEREDELKA	153	334	1.06	28.4	149	29.7	1.26	0.069	0.31
REKORD	15	59	1.86	39.0	169	46.0	0.86	0.112	0.39
RUCHAEVKA	109	24	3.54	11.1	62	15.9	0.93	0.190	0.49

*** Children population of settlement not identified

Table 7 - continued

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W	CV_W	CV	CV
			2.5	50.	97.5	(MBq hour)	distribution	average	uncertainty
SEVKI	92	28	0.13	5.2	31	6.78	0.96	0.182	0.47
SINSK	35	16	1.67	5.4	14	6.49	0.56	0.141	0.57
STRADUBKA	128	270	2.51	35.3	177	50.6	1.00	0.061	0.32
TESNY	52	18	0.58	8.7	94	20.3	1.20	0.283	0.54
UBORKI	222	370	0.77	14.5	85	19.6	1.24	0.064	0.31
UDALEVKA	9	16	5.88	72.1	250	75.2	0.79	0.198	0.57
CHAPLIN	73	226	2.99	42.7	284	66.8	1.01	0.067	0.32
YASTREBKA	29	49	7.17	22.3	43	23.4	0.33	0.048	0.40
BORETS	20	12	0.61	12.2	71	18.8	1.03	0.298	0.63
BUSHATIN	12	52	6.53	54.4	211	69.4	0.71	0.099	0.40
BYVALYKI	263	42	1.93	8.8	54	12.7	1.01	0.156	0.42
PROGRESS	23	14	6.17	13.8	74	22.4	0.84	0.223	0.60

Table 8. Distributions of age dependence scaled integrated ^{131}I activity's for measured individuals of rural settlements in Rechitsa raion of Gomel oblast. Indicated are the total number of children N_{chld} and the number of measured individuals n_{meas} in each settlement, the percentiles of the distribution of individual values and the weighted settlement average G_W. Also given are the weighted coefficient of variation CV_W of the distribution of individual values, the CV of the average derived directly from this distribution and the CV of the uncertainty of G_W derived from estimates of individual uncertainties.

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W	CV_W	CV	CV
			2.5	50.	97.5	(MBq hour)	distribution	average	uncertainty
RECHITSA	19183	1931	0.7	9.5	126	21.3	1.84	0.042	0.26
ARTUKI	88	12	40.4	139.3	393	151.	0.68	0.196	1.05
BABICHI	385	201	5.6	20.6	538	41.1	2.68	0.189	0.56
BARSUKI	***	28	12.2	107.4	355	139.	0.76	0.144	0.79
BELOE BOLOTO	181	79	3.6	21.0	94	28.4	0.79	0.089	0.63
BUDKA	90	11	3.5	149.8	158	110.	0.54	0.163	1.08
VYSHEMIR	141	270	4.8	71.6	436	114.	1.01	0.061	0.55
GOLOVKI	197	311	5.0	16.6	65	20.9	0.83	0.047	0.55
GONCHAROVKA	19	141	5.0	75.0	399	102.	1.06	0.089	0.58
DEMIKHI	121	517	1.8	23.1	162	35.6	1.14	0.050	0.53
ZHMUROVKA	413	17	2.1	78.4	485	166.	0.82	0.199	0.60
ZASPA	412	357	2.5	23.5	206	44.7	1.22	0.065	0.54
KAPOROVKA	73	229	3.4	41.7	191	58.3	0.91	0.060	0.56
KRASNAYA DUBROVA	107	487	1.7	36.8	221	55.6	1.00	0.046	0.54
KRASNOZEMIE	13	15	0.1	4.1	16	7.78	0.85	0.219	0.96
MALODUSHA	104	217	2.6	29.4	172	56.3	1.04	0.071	0.52
MOLCHANY	36	65	2.3	38.6	128	50.4	0.76	0.094	0.65
NOVYI BARSUK	157	525	6.1	36.8	292	62.6	1.15	0.050	0.53
OZERSHCHINA	1274	36	1.3	11.2	88	17.3	1.05	0.174	0.66
PEREVOLOKA	183	335	2.4	23.5	153	38.6	1.16	0.063	0.54

*** Children population of settlement not identified

Table 8 - continued

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W (MBq hour)	CV_W distribution	CV average	CV uncertainty
			2.5	50.	97.5				
ROVENSKAYA - SLOBODA	237	32	16.9	119.2	250	114.	0.51	0.091	0.45
ROVNOE	47	17	6.3	40.6	146	52.5	0.63	0.153	0.56
SEMENOVKA	60	221	6.5	75.0	436	116.	1.09	0.074	0.54
SMAGORIN	70	31	23.5	161.8	456	130.	0.76	0.136	0.65
STARYI BARSUK	24	25	8.9	36.8	108	37.4	0.59	0.118	0.81
YANOVKA	56	664	3.2	54.4	382	95.0	1.01	0.039	0.43
**	***	123	4.6	15.7	46	17.5	0.63	0.057	0.59

** Name of settlement not identified
*** Children population of settlement not identified

Table 9. Distributions of age dependence scaled integrated ^{131}I activity's for measured individuals of rural settlements in Chericov raion of Mogilev oblast. Indicated are the total number of children N_{chld} and the number of measured individuals n_{meas} in each settlement, the percentiles of the distribution of individual values and the weighted settlement average G_W. Also given are the weighted coefficient of variation CV_W of the distribution of individual values, the CV of the average derived directly from this distribution and the CV of the uncertainty of G_W derived from estimates of individual uncertainties.

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W	CV_W	CV	CV
			2.5	50.	97.5	(MBq hour)	distribution	average	uncertainty
CHERICOV	2131	17	0.51	3.1	13	3.15	1.11	0.269	0.72
BAKOV	33	82	1.86	4.3	16	6.24	0.74	0.082	0.62
BAKUNOVICHI	67	128	1.74	4.6	34	10.0	3.39	0.299	0.56
BOROVAYA BUDA	51	133	0.26	9.4	34	11.2	0.85	0.074	0.58
VEPRIN	228	492	1.67	4.3	22	5.66	0.94	0.042	0.49
GOLOVCHITSY	61	31	0.10	4.5	15	4.73	0.93	0.168	0.77
DUBROBKA	***	49	0.13	6.2	25	7.07	0.90	0.128	0.68
ZHURAVEL	32	75	2.31	8.2	32	9.97	0.71	0.082	0.63
ZYABENY	13	16	0.35	15.9	50	18.0	0.71	0.177	0.94
KAMENKA	***	31	0.13	12.2	81	18.0	1.08	0.194	0.77
LISANY	11	71	2.06	4.6	14	5.79	0.53	0.063	0.64
MALINOVKA	101	99	0.10	5.7	25	6.33	1.10	0.110	0.61
MONASTYREK	15	68	1.35	2.1	18	5.21	1.01	0.122	0.64
NOVOMALINOVKA	12	19	0.45	9.5	29	10.2	0.77	0.176	0.89
PILNYA	19	78	1.77	4.1	19	5.21	0.83	0.094	0.63
RECHITSA	139	576	3.76	8.2	35	11.6	0.78	0.033	0.53
USTYE	98	215	2.35	6.7	56	12.2	1.10	0.075	0.56
USHAKI	103	252	1.67	6.2	26	7.62	0.84	0.053	0.55
HOLMY	***	64	0.13	4.0	25	5.53	1.08	0.135	0.65
CHUDYANY	69	301	0.74	9.0	58	14.2	0.91	0.052	0.48

*** Children population of settlement not identified

Table 10. Distributions of age dependence scaled integrated ^{131}I activity's for measured individuals of rural settlements in Klimovichi raion of Mogilev oblast. Indicated are the total number of children N_{chld} and the number of measured individuals n_{meas} in each settlement, the percentiles of the distribution of individual values and the weighted settlement average G_W. Also given are the weighted coefficient of variation CV_W of the distribution of individual values, the CV of the average derived directly from this distribution and the CV of the uncertainty of G_W derived from estimates of individual uncertainties.

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W	CV_W	CV	CV
			2.5	50.	97.5	(MBq hour)	distribution	average	uncertainty
KLIMOVICHI	4344	16	0.29	3.1	13	3.09	1.12	0.281	0.86
ALEKSANDROVKA	7	15	1.16	35.6	125	39.7	0.84	0.218	0.96
BORISOVICHI	79	279	0.06	2.2	10	2.80	1.14	0.068	0.55
BUDISHCHE	5	20	1.09	12.7	82	21.3	1.03	0.231	0.87
GANNOVKA	***	19	0.03	0.84	3	1.09	0.87	0.200	0.89
GORKI	8	38	0.90	12.6	56	14.9	0.95	0.155	0.73
GORODESHNYA 1	6	32	0.39	6.5	56	10.3	1.10	0.194	0.76
GUTA	31	60	0.06	3.1	34	5.05	1.46	0.189	0.66
DERAZHNYA	5	41	0.35	19.1	65	21.5	0.88	0.137	0.71
DUBROVITSA	26	69	0.03	1.1	9	1.38	1.26	0.152	0.64
ZAMOSHEN'E	0	11	0.87	11.6	32	12.5	0.76	0.228	1.08
IGNATOVKA	8	25	0.06	1.0	9	1.41	1.22	0.244	0.81
KANCHARY	0	12	1.22	14.7	41	14.1	0.91	0.262	1.05
KASHANOVKA	0	21	0.68	13.1	29	12.5	0.60	0.130	0.86
SAVINICHI	98	231	0.23	10.3	62	27.9	1.07	0.070	0.48
SELISHCHE	***	12	0.87	7.9	68	17.6	1.23	0.354	1.05
STUDENETS	27	20	0.19	12.1	47	13.6	0.79	0.176	0.87
TITOVKA	***	50	0.35	20.6	72	23.3	0.75	0.107	0.68

*** Children population of settlement not identified

Table 11. Distributions of age dependence scaled integrated ^{131}I activity's for measured individuals of rural settlements in Kostyukovichi raion of Mogilev oblast. Indicated are the total number of children N_{chld} and the number of measured individuals n_{meas} in each settlement, the percentiles of the distribution of individual values and the weighted settlement average G_W. Also given are the weighted coefficient of variation CV_W of the distribution of individual values, the CV of the average derived directly from this distribution and the CV of the uncertainty of G_W derived from estimates of individual uncertainties.

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W	CV_W	CV	CV
			2.5	50.	97.5	(MBq hour)	distribution	average	uncertainty
KOSTYUKOVICHI	3018	348	0.29	3.4	20	4.79	1.15	0.062	0.54
BRATYKOVICHI	97	49	0.32	6.5	25	8.94	0.80	0.114	0.68
VETUKHNA	137	377	0.96	12.5	51	16.6	1.16	0.060	0.54
VISHNI	48	54	1.22	7.5	50	12.6	0.92	0.125	0.67
VORONOVKA	26	64	0.51	3.4	76	17.0	1.20	0.150	0.65
GAIKOVKA	17	51	3.38	20.6	87	29.9	0.81	0.113	0.68
DERAZHNYA - KRASNITSA	133	512	2.06	16.2	74	22.7	0.80	0.036	0.53
DOLGII LOG	26	72	3.86	9.5	166	21.7	2.72	0.320	0.64
DUBEETS	25	78	2.15	6.9	29	9.00	0.75	0.085	0.63
DUBROBKA	***	81	0.45	6.6	23	8.42	0.70	0.078	0.62
**	***	11	0.39	2.6	14	5.05	0.82	0.248	1.08
ZHARKI	36	104	0.48	10.4	21	8.91	0.59	0.058	0.60
ZELENKOVICHI	***	72	0.61	10.3	56	16.7	0.85	0.100	0.64
KISELEVKA	41	65	4.12	12.3	82	20.9	0.82	0.102	0.65
KOLODEZSKAYA	81	30	0.35	6.1	35	10.2	0.84	0.154	0.77
MELOVKA	8	30	2.51	7.4	25	11.1	0.61	0.111	0.77
MOKROE	47	65	5.98	20.6	99	28.2	0.64	0.080	0.65
PALOSINKI	***	14	2.51	7.4	19	8.01	0.64	0.171	0.99

** Name of settlement not identified
*** Children population of settlement not identified

Table 11 - continued

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W (MBq hour)	CV_W distribution	CV average	CV uncertainty
			2.5	50.	97.5				
PECHENEZH	39	296	2.22	4.6	21	6.66	0.84	0.049	0.55
RVENSK	45	152	2.60	15.7	40	16.2	0.58	0.047	0.58
SAMOTEVICHI	230	419	4.40	11.2	84	19.8	1.06	0.052	0.54
SKALIN	33	12	0.19	3.3	9	4.34	0.64	0.183	1.05
TARASOVKA	5	18	5.14	12.5	52	17.0	0.80	0.188	0.90
UGLY	0	53	9.42	30.9	121	35.6	0.65	0.090	0.67
KHOTIMSK	54	107	5.02	33.7	107	37.6	0.82	0.080	0.60

Table 12. Distributions of age dependence scaled integrated ^{131}I activity's for measured individuals of rural settlements in Krasnopolje raion of Mogilev oblast. Indicated are the total number of children N_{chld} and the number of measured individuals n_{meas} in each settlement, the percentiles of the distribution of individual values and the weighted settlement average G_W. Also given are the weighted coefficient of variation CV_W of the distribution of individual values, the CV of the average derived directly from this distribution and the CV of the uncertainty of G_W derived from estimates of individual uncertainties.

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W	CV_W	CV	CV
			2.5	50.	97.5	(MBq hour)	distribution	average	uncertainty
BOLYSHOI OSOV	30	40	1.32	36.8	113	38.7	0.65	0.104	0.72
BEREZYAKI	34	226	1.32	18.0	86	24.4	0.89	0.059	0.52
BEREZYAKI 1	68	20	0.84	13.4	66	16.2	1.02	0.228	0.87
BOLIN	16	27	1.45	21.1	66	23.3	0.66	0.126	0.80
**	***	25	1.09	8.1	38	10.4	0.89	0.178	0.81
BYSOKI BOROK	98	62	2.57	20.8	67	25.0	0.68	0.086	0.38
GORKI	36	45	1.77	17.7	80	26.8	0.72	0.107	0.44
GOTOVETS	36	98	1.77	30.5	167	68.9	0.79	0.080	0.51
DRAGOTYN	26	60	5.21	36.8	116	38.8	0.56	0.072	0.66
ZHURAVY	***	83	0.77	39.7	102	38.8	0.70	0.077	0.52
**	***	31	0.55	30.9	250	52.6	1.06	0.190	0.46
KORMA PAIKI	63	145	0.55	27.9	76	30.2	0.67	0.055	0.54
KAKOISK	57	30	3.22	7.4	42	10.5	0.96	0.176	0.46
KNYAZEVKA	24	54	1.90	8.2	33	10.6	0.64	0.087	0.67
KOZELYE	***	183	0.74	13.8	43	14.3	0.73	0.054	0.57
KORMA DOLGAYA	11	25	0.96	24.4	90	32.0	0.86	0.173	0.81
KRIVELITSK	28	61	1.25	20.6	66	24.2	0.65	0.084	0.65
MALYI OSOV	25	53	1.45	28.4	132	28.5	0.91	0.125	0.67

** Name of settlement not identified
*** Children population of settlement not identified

Table 12 - continued

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour) 2.5	50.	97.5	G_W (MBq hour)	CV_W distribution	CV average	CV uncertainty
MAMOSHIN	41	75	0.42	6.6	24	8.20	0.72	0.084	0.63
MKHINICHI	60	15	10.29	70.9	108	66.4	0.53	0.136	0.58
NOVAYA ELYNYA	123	306	1.32	20.9	71	24.2	0.74	0.042	0.55
NOVOE ZHITYE	11	14	1.22	19.1	36	18.4	0.64	0.170	0.99
NOVYI SVET	6	19	0.23	3.8	10	3.79	0.72	0.166	0.89
OVCHINETS	43	122	0.64	18.9	51	22.9	0.58	0.053	0.53
OSINOVKA	32	85	1.64	26.5	84	29.4	0.67	0.073	0.59
PETROVICHI	6	20	0.87	22.4	35	21.2	0.37	0.082	0.76
POCHEPY	113	114	0.35	5.0	18	6.85	0.77	0.072	0.59
RADILEVO	14	35	1.41	30.9	66	33.3	0.57	0.096	0.74
REPISHCHE	0	49	1.90	29.5	101	36.6	0.70	0.101	0.68
ROMANOV	5	21	0.26	1.8	14	3.60	1.16	0.252	0.86
SOBOLI	67	168	0.71	19.1	95	25.7	0.91	0.070	0.55
STARAYA BUDA	29	84	0.74	25.0	81	35.0	0.67	0.073	0.57
STARAYA ELYNYA	33	25	0.45	6.6	26	7.39	0.93	0.185	0.81
TOPKOE	6	22	5.30	18.4	29	19.4	0.38	0.080	0.85
TRUBILYNA	27	73	0.29	6.2	21	7.62	0.76	0.088	0.63
TURYA	101	181	1.09	20.6	39	20.1	0.55	0.041	0.57
USTINOVICHI	49	102	0.90	19.1	29	16.8	0.45	0.045	0.60
HATYZHIN	11	16	1.00	22.1	40	19.7	0.59	0.149	0.94
SHIROKOUVEL'E	17	11	7.62	14.7	27	14.5	0.44	0.133	0.65
YAKUSHEVKA	0	16	4.95	37.2	57	31.9	0.58	0.146	0.94
YACHNAYA BUDA	39	55	1.22	12.2	72	20.2	0.90	0.121	0.67

Table 13. Distributions of age dependence scaled integrated ^{131}I activity's for measured individuals of rural settlements in Slavgorod raion of Mogilev oblast. Indicated are the total number of children N_{chld} and the number of measured individuals n_{meas} in each settlement, the percentiles of the distribution of individual values and the weighted settlement average G_W. Also given are the weighted coefficient of variation CV_W of the distribution of individual values, the CV of the average derived directly from this distribution and the CV of the uncertainty of G_W derived from estimates of individual uncertainties.

Settlement	N_{chld}	n_{meas}	Percentiles (MBq hour)			G_W	CV_W	CV	CV
			2.5	50.	97.5	(MBq hour)	distribution	average	uncertainty
SLAVGOROD	2098	1166	0.13	2.5	16	3.99	2.79	0.082	0.49
ALEKSANDROVKA 1	34	86	0.29	6.4	36	10.3	1.05	0.114	0.62
BAKHAN'	128	56	0.16	8.1	21	8.36	0.58	0.078	0.67
VIROVAYA	80	43	0.23	4.4	43	6.78	1.10	0.168	0.67
DOBRYANKA	40	19	0.39	8.4	34	11.6	1.02	0.235	0.89
ZAPOLYANYE	6	30	1.19	16.7	69	21.8	0.88	0.160	0.77
KABINA GORA	99	28	1.35	8.0	294	23.9	2.33	0.439	0.79
KULYSHICHI	101	85	1.00	7.1	26	8.01	0.65	0.071	0.62
KURGANOVKA	41	12	0.87	4.3	211	23.3	2.56	0.739	1.05
LOPATICHI	116	12	0.42	2.2	7.8	3.02	0.79	0.227	1.05
MIKHAILOV	12	13	0.74	1.4	5.6	2.44	0.74	0.205	1.01
NOVAYA SLOBODA	108	95	0.13	3.7	26	5.21	1.27	0.130	0.61
POPOVKA	60	115	0.13	3.3	20	4.66	0.98	0.092	0.59
PRUDOK	91	17	0.03	2.9	7.7	3.38	0.75	0.182	0.92
ROGI	113	16	0.16	2.8	9.1	2.99	0.76	0.191	0.94
SVENSK	149	13	0.42	1.3	7.2	2.54	0.86	0.238	1.01
STARINKA	108	161	0.10	0.7	20	2.31	1.96	0.155	0.57
URECHIE	***	57	6.20	18.3	48	19.9	0.42	0.056	0.66
SHELOMY	58	23	0.48	4.9	34	8.26	0.98	0.204	0.84

*** Children population of settlement not identified