AGE AS A RISK FACTOR FOR COLORECTAL CARCINOMA

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Abstract

Colorectal cancer (CRCA) is one of the most frequent human malignancies, with the highest incidence in males. This paper is summarising the incidence of colorectal carcinoma (CRCA) in the Czech Republic (CR) with an international comparison.

The goal of the study is to compare the age and gender structure in the South Bohemian region in patients with colorectal carcinoma with data from the Czech Republic. The group of patients consisted of patients treated for colorectal carcinoma in the Department of Surgery in the Hospital in České Budějovice, Plc. in the period from 2006 to 2008 (315 subjects, 202 males, 113 women older than 18 years). From the national data were compared comparable data from the period 1997–2005.

Results: Maximal incidence of CRCA in the South Bohemian region was demonstrated in 10 years younger patients in comparison with the national data.

Conclusion: The results may indicate that there is currently a shift in the incidence of CRCA in the South Bohemian region to younger age groups.

Key words: *colorectal carcinoma – incidence – age*

INTRODUCTION

Colorectal carcinoma is one of the most frequent human malignancies. Currently there is still higher occurrence of lung cancer and in women breast cancer but in the worldwide scales unfortunately, our country is in the top place (Ferlay et al. 2004, Parkin et al. 2005). In the population of the Czech males is CRCA in the 1st place in incidence of malignant diseases (IHIS CR 2010).

Some type of tumour occurs in every third inhabitant of the Czech Republic during their life. Each fourth inhabitant of the Czech Republic dies due to a neoplastic disease (Koutecký et al. 2002).

The incidence of neoplastic growth is associated with the life style according to several results of research (Milham 2010).

Definite etiopathogenetic explanation of the increase in prevalence and incidence of CRCA in the Czech Republic is not known yet (Adámková 2010). Currently, there is very intensive oncological research taking place as well as preventive research, when many specialized societies recommend screening examinations for males and females from the age of 50, similarly as the U. S. Multi-Society Task Force on Colorectal Cancer (Lansdorp-Volegaar et al. 2009). The age is undoubtedly one of the important risk factors. It has been found out that most colorectal carcinomas occur at the age above 50 years (Frič et al. 2007, Adámková 2010). In the hereditary forms of CRCA it is even a critical factor (Paraf and Jothy 2000, Lukáš and Donoval 2006, Plevová et al. 2009a, b). Preventive programmes were created based on the

age factor (Frič et al. 2005, Lukáš and Donoval 2006, Schiano di Visconte et al. 2006).

GOAL

1. Comparison of the age structure of patients with colorectal carcinoma in the own file with the age structure in the file from IHIS CR.
2. Demonstration of the difference in incidence of colorectal carcinoma in own file depending on gender.

METHODS AND MATERIAL

We used the results of patients and national data for comparison (IHIS CR 2010). The file consisted of 315 patients (202 men and 113 women) who underwent surgery for colorectal carcinoma in the Department of Surgery in the Hospital in České Budějovice, Plc. during the period 2006–2008. All data were obtained by a secondary analysis of medical documentation. For our work we looked for the number of operated patients, age and gender of patients. For comparison, we used data from IHIS for the whole Czech Republic and for the South Bohemian region from the period 1977–2005. For comparison of the three year period we used data from 2003–2005. For comparision were used absolute counts and calculation of procentual incidence. We selected data related to age, gender and region of incidence (whole Czech Republic and South Bohemian region) (Dušek et al. 2007, IHIS CR 2010).

For statistical processing of results of procentual incidence in age groups was used X^2 – Goodness-of-Fit Test.

Table 1. Number of patients with CRCA in compared files

	IHIS CR	IHIS South Bohemia	Department of Surgery, Hospital in České Budějovice, Plc. (Department of Surgery)
1977–2003	179 263	12 357	
2003–2005	24 048	1 563	
2006–2008			315

RESULTS

In the period from 2006 to 2008, there were totally 315 patients operated for colorectal carcinoma, from which there were 202 men and 113 women (older than 18 years). In the group of patients with colorectal carcinoma definitely predominated men (64.1%). In the observation period from 2003 to 2005 there were, according to IHIS data, reported 65.1% of men with colorectal carcinoma in the South Bohemian region.

Our file included all patients older than 35 years (the youngest male was 36.2 years, youngest woman was 38.9 years). On the other hand, the oldest woman was 87.2 years, man 87.1 years. In the groups up to 50 years there were 6.5% of men and 4.5% of women. Totally there were 5.7% of patients younger than 50 years. In the highest age groups (above 75 years) there were 24.2% of men and 25.7% of women.

The age is very important risk factor, therefore we performed more detailed analysis of our results. Data from our file recalculated to the percentage incidence for each age group after 5 years and data from IHIS CR are provided in Table 1.

Table 2 shows higher incidence of CRCA in younger age categories in the file from the Dept. of Surgery in both genders.

We have statistically compared the IHIS data for the whole Czech Republic and South Bohemian Region with our data (Table 3). For the comparison was used X^2 – Goodness-of-Fit Test. The value, from which is this type of X2 valid for evaluation is X = 3.84 (everything below this level is not significant).

Table 2. Percentage incidence of CRCA according to age (comparison of the file from the Department of Surgery of the hospital with national data)

Age	IHIS CR 2003–05 %	IHIS South Bohemian region 2003–05 %	IHIS South Bohemian region 2003–05 males %	IHIS South Bohemian region 2003–05 women %	File from the Department of Surgery of the Hospital		
					totally %	males %	females %
	n=24 048	**n=1 563**	**n=1 018**	**n=545**	**n=315**	**n=202**	**n=113**
0–4	0	0	0	0	0	0	0
5–9	0	0	0	0	0	0	0
10–14	0.02	0	0	0	0	0	0
15–19	0.02	0	0	0	0	0	0
20–24	0.06	0	0	0	0	0	0
25–29	0.19	0.13	0.11	0.16	0	0	0
30–34	0.39	0.51	0.42	0.65	0	0	0
35–39	0.61	0.45	0.42	0.48	1.59	1.48	1.77
40–44	1.19	0.77	0.42	1.29	0.95	1.48	0
45–49	2.97	3.52	3.82	3.06	3.17	3.47	2.65
50–54	6.43	7.10	7.85	5.97	6.35	5.94	7.08
55–59	10.90	11.64	11.88	11.29	12.38	13.37	10.62
60–64	12.99	12.35	14.10	9.68	20.63	20.30	21.24
65–69	13.96	13.24	14.21	11.77	16.83	15.35	19.47
70–74	19.76	18.94	18.88	19.03	13.34	14.36	11.51
75–79	16.55	16.70	16.76	16.61	13.65	13.86	13.27
80–84	11.48	9.66	8.17	11.94	8.57	7.92	9.74
85+	5.56	4.99	2.97	8.06	2.54	2.47	2.65

Source of data: IHIS CR, file of the Department of Surgery, Hospital in České Budějovice

Table 3. Values of statistical evaluation using X2 (Goodness-to-fit test) in absolute numbers and determination of significance levels

| Age	Frequency (our file)	Expected frequency in South Bohemia	Expected frequency in Czech Republic	X^2 South Bohemia/Czech Republic	Significance level
	n=315	**n=1 563**	**n=24 125**		
35–39	159	45	61	288.8/157.443	***/***
40–44	95	77	119	4.21/4.84	*/*
45–49	317	352	297	3.48/1.346	n. s.
50–54	635	710	643	7.92/0.9	*/n. s.
55–59	1 238	1 164	1 090	4.7/20.095	*/**
60–64	2 063	1 235	1 299	555.13/449.342	***/***
65–69	1 683	1 324	1 396	97.34/59.00	*/*
70–74	1 334	1 894	1 676	165.58/69.78	**/*
75–79	1 365	1 670	1 655	55.7/50.82	**/**
80–84	857	966	1 148	12.3/73.764	*/**
85+	254	499	556	120.29/164.036	***/***

Source of data: IHIS CR, file of the Department of Surgery, Hospital in České Budějovice

**Explanation:** n. s. – not significant; */**/*** – significance levels

We compared the data from IHIS for the whole Czech Republic and South Bohemian region statistically with our data. For the processing was used X^2 – Goodness-of-Fit Test. Table 2 includes the results of statistical processing. The value, from which is this type of X^2 valid for evaluation is $X^2 = 3.84$ (everything below this value is not significant).

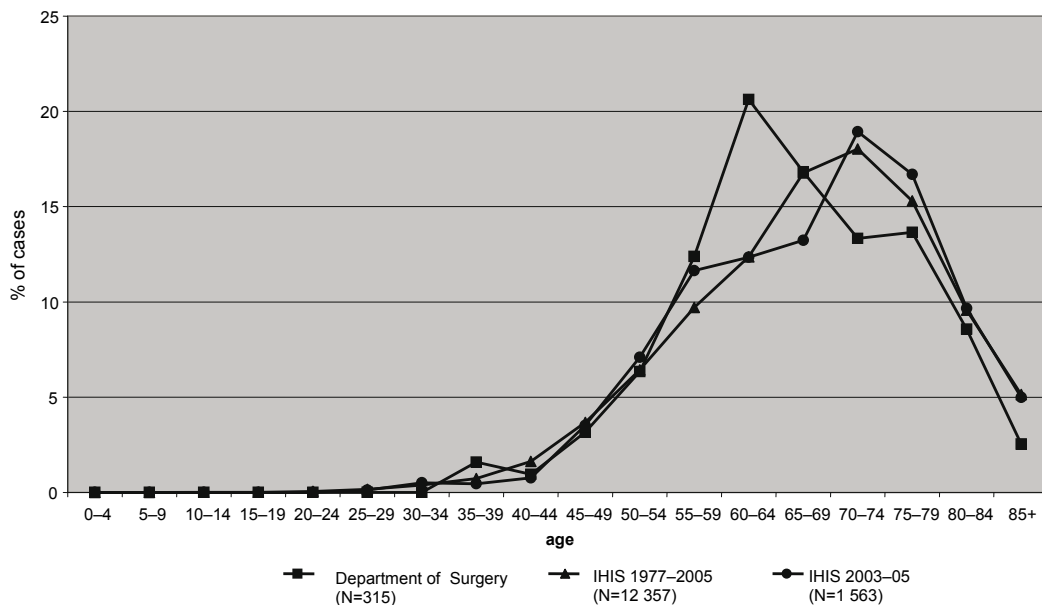Fig. 1 shows the predominance of patients – males with CRCA. The most frequent localisation is rectum (26%).

Fig. 2 shows higher incidence of CRCA in younger age categories in the file from the Dept. of Surgery in both genders in comparison with the national data.
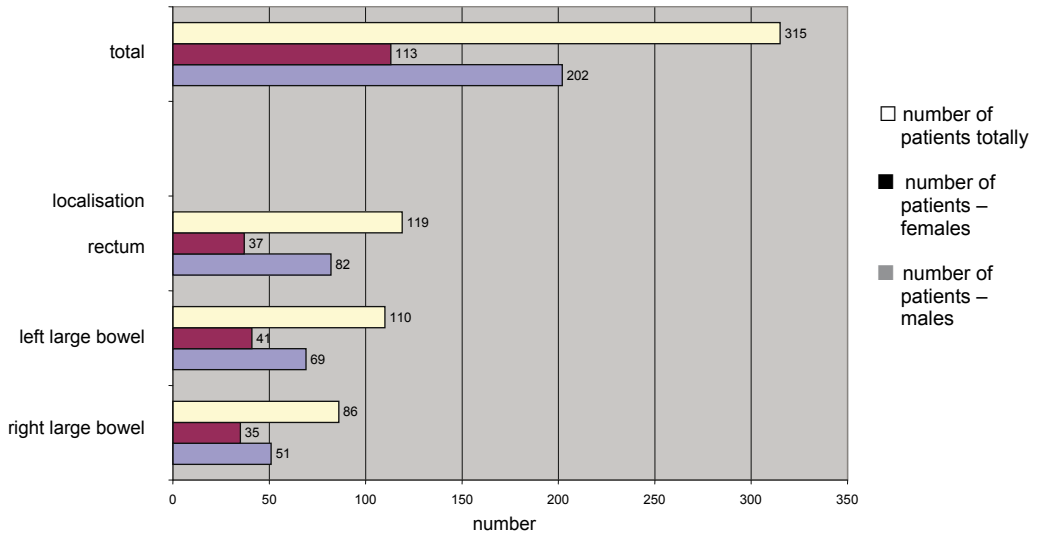
Fig. 1. File of 315 patients from the Department of Surgery, divided according to gender and localisation of the tumour
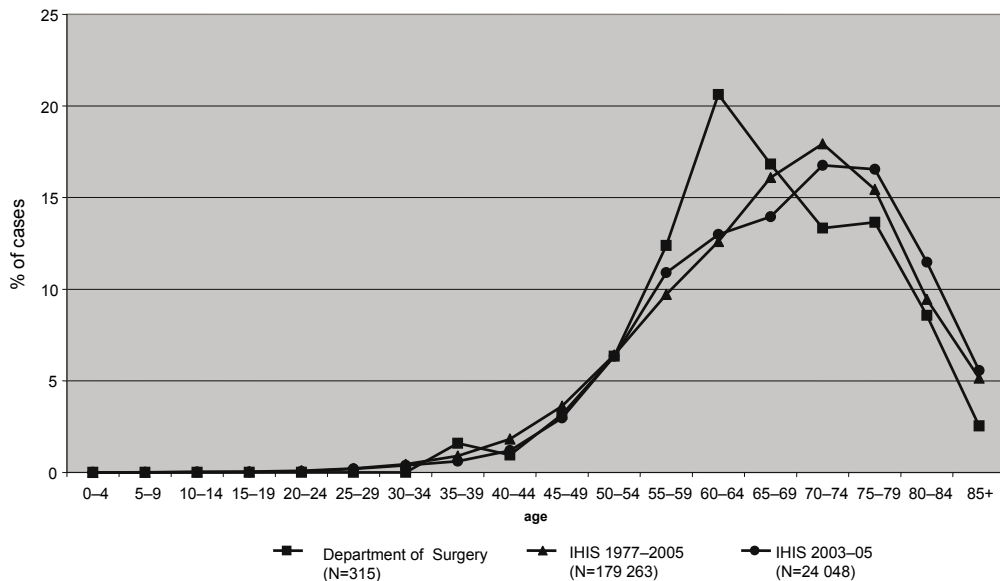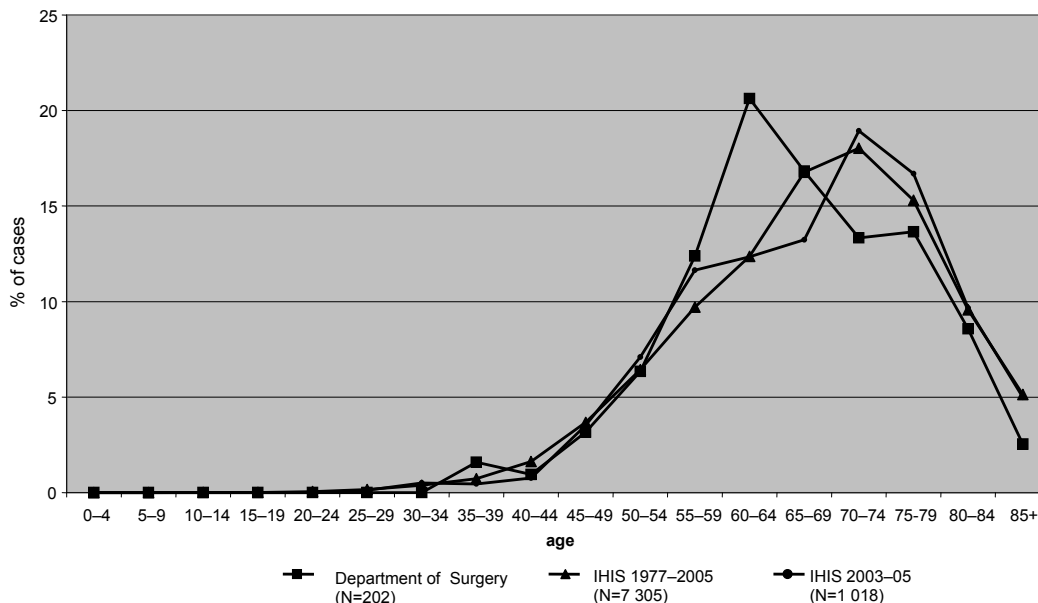

Fig. 2. Age representation of the file of patients with CRCA in the file from the Department of Surgery in comparison with the national data

Fig. 3. Age representation of the file of patients with CRCA in the file from the Department of Surgery in comparison with the data from South Bohemian region

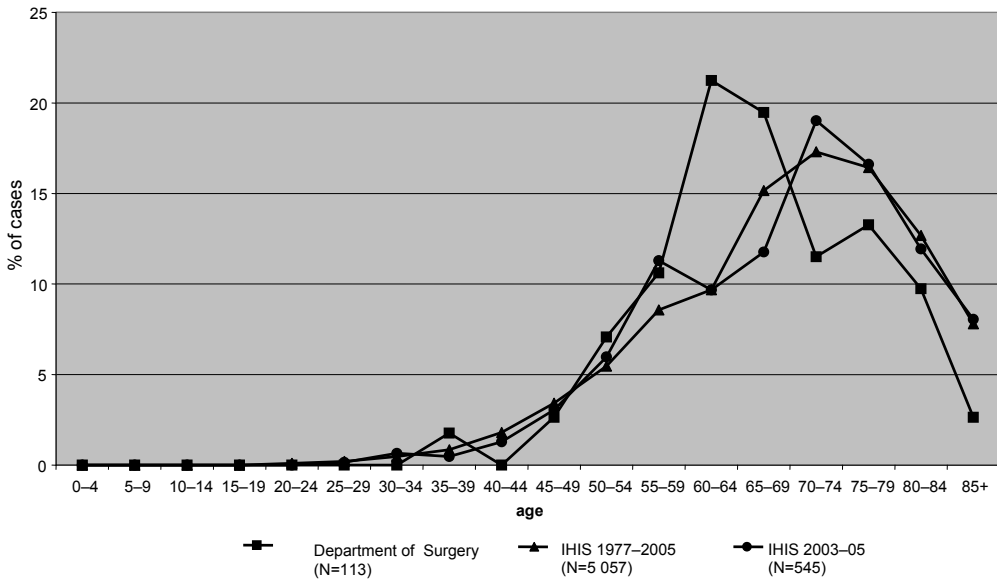Fig. 3 shows higher incidence of CRCA in younger age categories in the file from the Dept. of Surgery in both genders in comparison with the data from the South Bohemian region reported by IHIS.

Fig. 4. Age representation of the file of patients – males with CRCA in the file from the Department of Surgery in comparison with the data from South Bohemian region

Fig. 4 shows higher incidence of CRCA in younger age categories – males in the file from the Department of Surgery in comparison with the data from the South Bohemian region reported by IHIS.

Fig. 5. Age representation of the file of patients – females with CRCA in the file from the Department of Surgery in comparison with the data from South Bohemian region

Fig. 5 shows higher incidence of CRCA in younger age categories – females in the file from the Department of Surgery in comparison with the data from the South Bohemian region reported by IHIS.
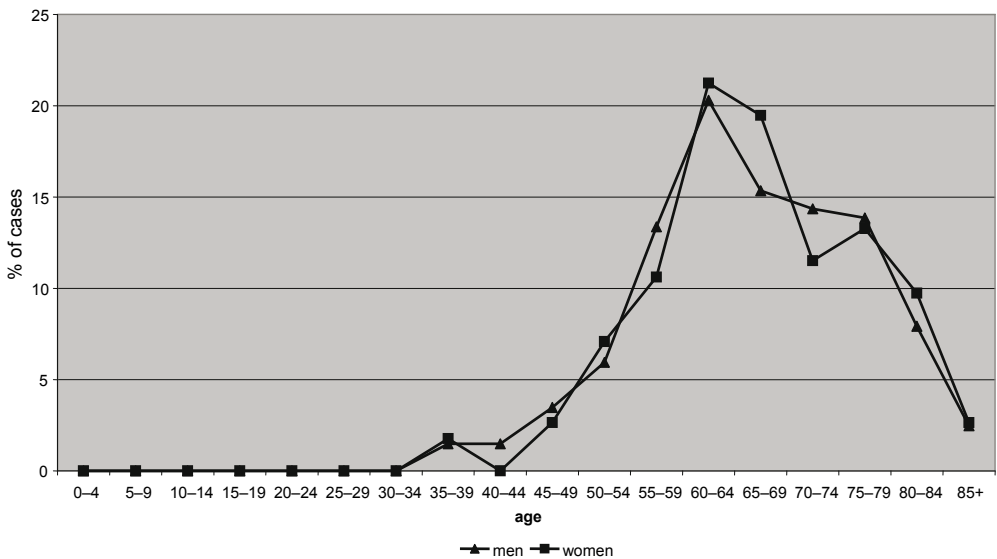
Fig. 6 Comparison of results from the file from the Department of Surgery according to each age group in accordance with gender

The aforementioned results indicate that the curves in the figures are similar, but it is possible to state that:

1. in the file from the Department of Surgery of the hospital in comparison with the national results, as well as with the results for the South Bohemian region, there is maximal incidence in the lower age categories (in the IHIS file in the age category 70–74 years, in the file from the Department of Surgery in the age category 60–64 years, i.e. 10 years earlier);

2. in comparison of results from the file from the Department of Surgery from each age group in accordance with genderwe have not found any differences, the incidence in both genders is approximately the same, the maximal incidence in both genders is in the age category 60–64 years (Fig. 6).

DISCUSSION

In comparison with IHIS data there are no greater difference in the percentage of gender in our observed file.

According to the official national data is the maximal incidence of colorectal carcinoma in the age group 70–74 years (IHIS CR, 2006, 2009). In our file there is the highest incidence obvious in the age group 60–64 years. The reason of more frequent clinical manifestation of CRCA in the South Bohemian region cannot be explained yet. Bibliography reports higher incidence of CRCA in lower age groups in blacks in the USA, where there was the highest mortality reported in males, whereas the lowest was amongst white women (Lansdorp-Volegaar 2009). However, we have demonstrated in our file that there is no difference in incidence according to age between males and females.

It is well known that the relation between smoking and CRCA is very intensively studied and a large cohort study has shown that smoking doubles the risk to manifest CRCA with known precursors of neoplastic growth (Botteri et al. 2008). During the comparison of data for the South Bohemian region, whether together or in males or females, is the maximal incidence in our file in the age group of 60–64 years. This shift is obvious also in comparison of incidence according to the localisation of

the tumour. From the comparison of time consequential data with the files from IHIS we conclude that in the South Bohemian region there is a gradual shift of CRCA incidence in younger age groups. Another cause of this shift could also be the fact that with the current diagnostic and investigational methods there is more frequent and early detection of actual disease. It should not be forgotten that there is a definite effect of preventive measures – screening in persons above 50 years of age and follow up programmes in risky groups (Frič et al. 2005, 2007, Vyzula, Žaloudík et al. 2007). The information reported by Frič, Zavoral and other authors (Lukáš and Donoval 2006, Frič et al. 2007, Zavoral and Závada 2007) that more than 90% of colorectal cancer occurs in individuals above 50 years of age is confirmed in our observation. In our file there were even 94.3% of patients above 50 years old. In comparison with data reported by Čelko (2005) (40% of women and 30% of men with colorectal cancer are older than 75 years) with the results of our own file (25.7% of women and 24.2% of men), there is obvious lower number of both genders in the highest age groups.

The aforementioned findings and very unfavourable situation with CRCA in the Czech Republic demonstrate, that preventive measures are necessary. In 2002, Germany was the first country in the world that introduced colonoscopic screening of CRCA. After 8 years of this programme was reduced the incidence of CRCA in women by 13% in the age category 55–59 years, by 19% in the age category 60–64 years and by 14% in the age category 65–69 years, in males by 11%, 15% and 12% in the same age groups (Brenner et al. 2009). It is obvious that introduction of such programme would be a significant benefit for mortality on CRCA in the Czech Republic with comparable reduction of CRCA incidence.

CONCLUSION

Our investigation clearly demonstrates that the incidence of CRCA in the South Bohemian region is in 10 years younger individuals than in case of the national data. It is necessary to consider important the fact that we found out

that in this region there is no difference in the incidence of CRC between males and females, since some of the studies reported such data. Great problem for the future remains however the aging of the population so according to the estimates of demographic studies it is possible to expect that the incidence of CRCA will continue to rise.

Although there had and have been performed various studies, which investigated and investigate the cost-benefit of preventive measures in our population, it is necessary to support introduction of extensive (population) screening methods, since even in case of greater costs of screening, there is clearly higher success of therapy when the neoplastic process is detected in the early stage. If it is repeatedly demonstrated that the incidence of colorectal carcinoma in the human population slowly shifts to the lower age groups, then the usage of screening method shall concern also younger individuals.

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