Обзорная статья

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Towards the elimination of occupational cancers in the Russian Federation: cancer research for cancer prevention (Part 1)

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Cancer is increasing worldwide. The Russian Federation is no exception in this regard with an increase of the total number of new cases predicted to rise from 529,062 in 2018 to 587,622 in 2040. The present high burden and increase in incident cases at the same time increases the pressure on healthcare infrastructure and related costs. Thus, primary and secondary prevention of cancer becomes essential. Occupational cancers related to exposure at the workplace are among the preventable cancer burden, due to the modifiability of the risk through minimisation of occupational exposures and adequate worker protection. For the Russian Federation, some 20,000 cancers each year may be attributable to occupation, but systematic recording is currently lacking. As information is also lacking on the absolute effect of various occupational carcinogens in the Russian workforce due to lack of large-scale epidemiological studies and because for many suspected occupational carcinogens the evidence may become stronger, the true burden may in fact be higher. The Russian Federation appears particularly suitable for research into occupational cancer given the sizable workforce, the heavy industrialisation as well as the good documentation and workplace surveillance over time, so that results are both informative for the situation in the Russian Federation and on a global scale. Five challenging but not unfeasible steps of nationwide population-based cancer registration, development of a legal framework for record linkage of registries and data collections, recording of occupational cancers, large scale epidemiological occupational cancer research and rigorous implementation of worker protection on known carcinogens, lead the way to a continuously updated cancer control plan that includes the elimination of occupational cancer in the Russian Federation.

Key words: *cancer; occupation, workplace carcinogens; cancer prevention; Russian Federation*

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Шуц Дж., Олссон Э.

На пути к ликвидации профессионального рака в Российской Федерации: исследования, направленные на профилактику онкологических заболеваний (Часть 1)

Международное агентство по изучению рака Всемирной организации здравоохранения (МАИР), Секция окружающей среды и радиации, площадь Альбер Тома, 150, Леон, Франция, F–69372

Количество злокачественных опухолей растет во всем мире, и Российская Федерация не является исключением: ожидаемое число новых случаев составит 587 622 в 2040 г. (529 062 в 2018 г.), что обусловливает актуальность профилактика злокачественных новообразований. Профессиональные злокачественные новообразования, связанные с воздействием канцерогенов на рабочем месте, относятся к числу предотвратимых, поскольку возможна минимизация риска их развития за счет применения соответствующих мер по защите работника.

В Российской Федерации порядка 20 тыс. случаев злокачественных новообразований в год может быть связано с работой, однако из-за недостатка информации о различных профессиональных канцерогенах системный учет не ведется, поэтому истинная распространенность может быть выше.

Российская Федерация выглядит особенно подходящей для изучения распространенности заболеваний профессиональными злокачественными новообразованиями, учитывая значительную численность работающего населения, развитую промышленность и хороший текущий надзор за рабочими местами. Полученные результаты могут быть информативны не только для ситуации в России, но и в глобальном масштабе.

Национальная программы учета злокачественных новообразований должна включать: разработку правовой базы, регистрацию случаев профессиональных злокачественных опухолей, проведение крупномасштабных эпидемиологических исследований профессиональных злокачественных опухолей, разработку эффективных мер по защите работника от известных канцерогенов. Это приведет к созданию постоянно обновляемой системы контроля, направленной на ликвидацию профессиональных злокачественных новообразований в Российской Федерации.

Ключевые слова: *рак; профессия; производственные канцерогены; профилактика рака; Российская Федерация*

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Cancer burden in the Russian Federation. Cancer is increasing worldwide, and the Russian Federation is no exception in this regard. While the estimated total worldwide number of new cancer cases (excluding nonmelanoma skin cancers) was 17.0 million in 2018, it is predicted to rise by 61.4% to 27.5 million in 2040 should this trend not be stopped [1]. For the Russian Federation alone an increase is also predicted, although on smaller scale. It is estimated that the total number of new cases would rise from 529,062 in 2018 to 587,622 in 2040, an increase of 11.3%. The number of cancer deaths in 2018 in the Russian Federation was 312,998. The present high burden and even increase in incident cases and cancer deaths at the same time increases the pressure on healthcare infrastructure and related costs, thus presenting a challenge to health service sustainability [2]. From the spiralling increase in number of patients and costs of cancer care it was concluded that «no country can afford to treat its way out of the cancer problem» [3]. Hence, primary prevention and secondary prevention need to be rigorously strengthened, and for the implementation of successful primary prevention modifiable risk factors need to be scientifically established as cancer-causing agents. For cancer, several of those factors have been identified already, and for example the European Code against Cancer gives cancer prevention recommendations of what the individual can do to reduce their risk of cancer [4].

Cancer control plans are based on the local burden of cancer, as different types of cancer have often different causes. In the Russian Federation, the most common cancers of both sexes combined are cancer of the breast (13.5%; corresponding to 71,426 new cases in 2018), of the colon, rectum and anus (13.5%), of the lung (11.6%), of the prostate (7.6%), and of the stomach (6.7%), together representing more than half of the cancer burden when excluding nonmelanoma skin cancers (Figure 1). Lung cancer is the commonest cause of cancer death (17.4%), followed by colorectal cancer (13.5%) and by stomach cancer (9.4%), in the Russian Federation in 2018. Comparing the cancer burden of the Russian Federation with the whole of Europe (as the 40 UN defined European countries including the Russian Federation) shows a number of marked differences across cancer types (Figure 2; illustrated for all cancer types with an age-adjusted incidence rate of 5 per 100,000 persons per year or larger in Europe). While stomach cancer (by as much as 64.2%), cervical cancer (51.8%), cancer of the uterus (18.4%) and ovarian cancer (16.8%) are more common in the Russian Federation, some other cancers such as kidney cancer or pancreatic cancer are similar and many cancers are in fact less common, in particular testicular cancer (by 69.4%), melanoma (58.0%), Non-Hodgkin lymphoma (49.4%) and bladder cancer (46.0%). For lung cancer however this is highly sex-specific: whereas among men lung cancer in the Russian Federation is more

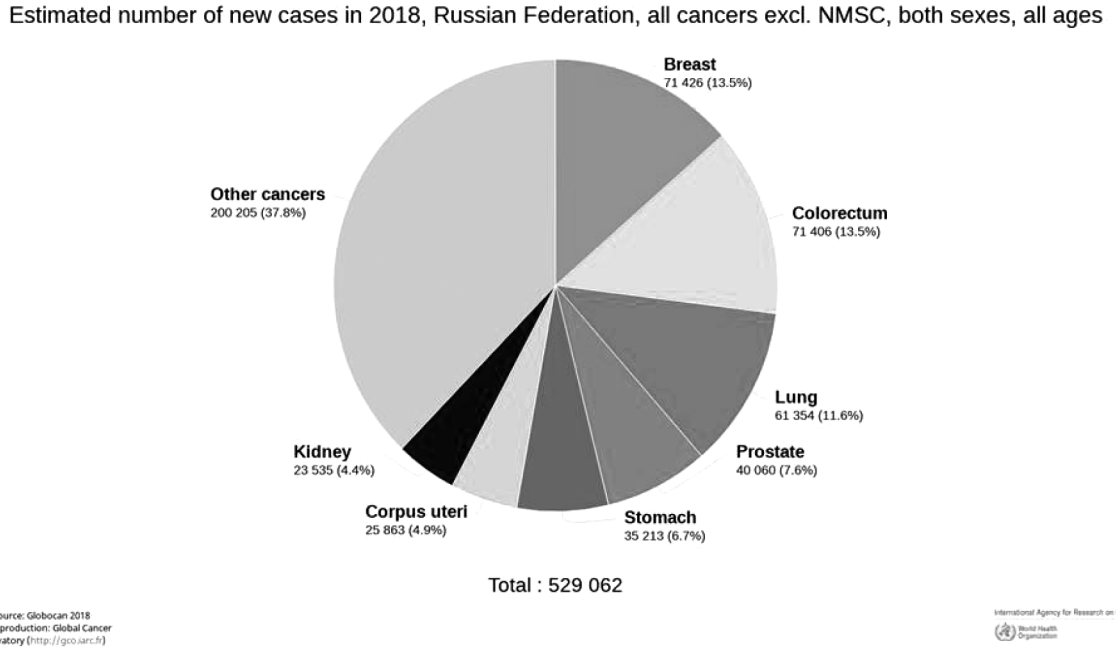

Figure 1. Estimated total number of new cancer cases in 2018 in the Russian Federation (excluding nonmelanoma skin cancers), for all ages and both sexes combined; note these are estimates with some uncertainty in numbers as there is no nationwide population based cancer registration

Рис. 1. Число установленных новых случаев злокачественных новообразований (за исключением немеланомных видов рака кожи) в 2018 г. в России, по всем возрастам и обоим полам

common than in Europe as a whole (by 8.8%), it is much less common in women (by 55.7%). Other cancers with strong differences by men or women are stomach cancer (78.9% more common in men in the Russian Federation but only 63.0% more common in women), liver cancer (25.0% less common in the Russian Federation in men but 7.4% less common in women) and bladder cancer (38.6% less common in men compared to 51.2% less common in women). For mesothelioma, the age-adjusted incidence rate for the Russian Federation in 2018 was estimated to be 0.4/100,000 compared to 0.7/100,000 for Europe.

Numbers have some statistical uncertainty as Europe has no complete cancer registration as well as the Russian Federation has no nationwide population based cancer registration. Only one cancer registry from the Russian Federation was providing information on incidence rates from 2003–2007 to the most recent volume of «Cancer Incidence in Five Continents» published by the International Agency for Research on Cancer (IARC), namely the St Petersburg cancer registry, covering a population of 4.8 million [5]. So for the figures shown above modelling algorithms were used by the IARC that published the worldwide cancer burden within the Global Cancer Observatory [1]. The Global Initiative on Cancer Registration Development (GICR, http://gicr.iarc.fr) aims at improving the level of cancer surveillance worldwide, as cancer registration is an essential tool in developing cancer control plans and in monitoring the success of preventive action. Cancer registries can also play an important role in understanding the causes of cancer. This is particularly so in the field of occupational cancers, when in epidemiological studies occupational cohorts can be linked with the routinely registered cancer burden in the population, as will be further outlined below.

Cancer prevention strategies in general. As explained above, to stop the high cancer burden and the predicted rise in the coming decades, cancer control plans including rigorous implementation of primary prevention need to be developed [2]. This is not only to avoid premature death and reduce the treatment-related high economic burden, but many cancers come with severe suffering of patients during long time periods and several treatment options have severe side effects and late effects resulting in continued suffering even in some patients surviving the initial cancer diagnosis. As most cancers are only curable at early stage, implementation of organized cancer screening programs is also important. Current scientific evidence suggest that organized screening programs reduce the mortality from cervical cancer, colorectal cancer and female breast cancer, while for other cancers the evidence is controversial or premature and programs are at present not recommended such as for prostate, lung or skin cancer [6] or scientific evidence speaks against any population screening, such as for thyroid cancer, even under special circumstances such as after nuclear accidents [7].

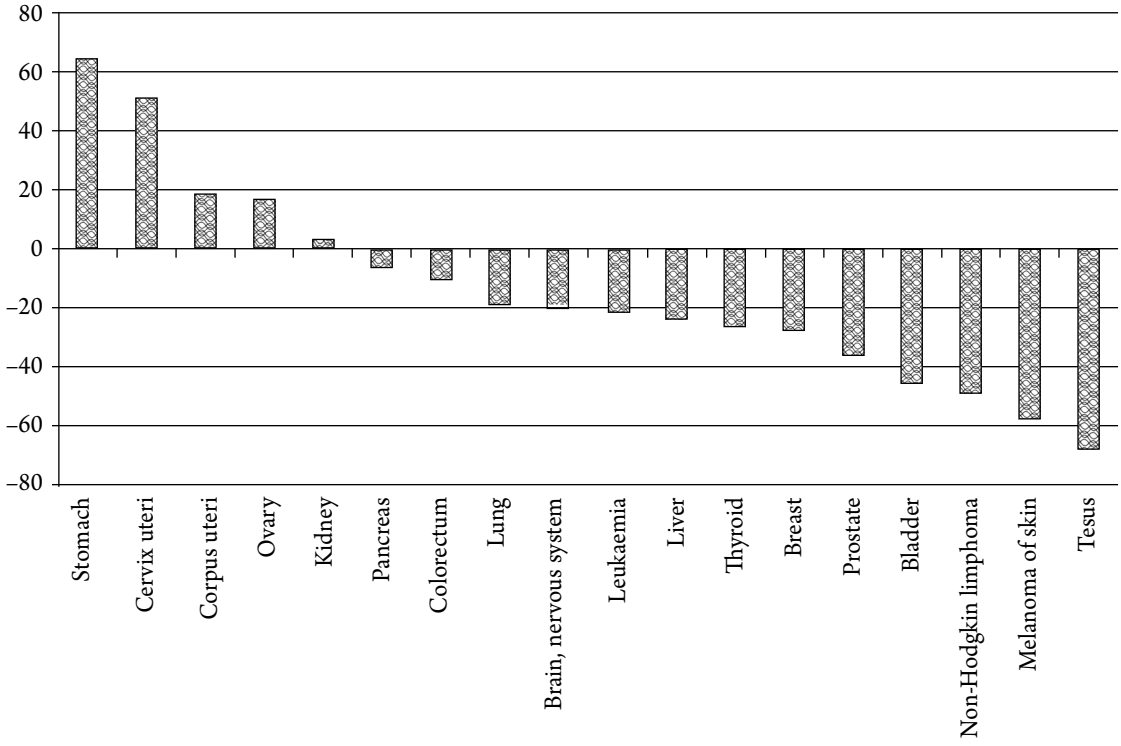

Figure 2. Difference in the age-adjusted incidence rates (expressed in %) between the Russian Federation and the whole of Europe, defined according to the 40 country definition of Europe by the United Nations (which includes the Russian Federation); the Figure shows the difference for all cancer types with age-adjusted incidence rates of 5 per 100,000 persons per year or more (excluding nonmelanoma skin cancers)

Рис. 2. Разница показателей заболеваемости, скорректированных по возрасту (%), между Россией и Европой, определенных в соответствии с европейским стандартом, принятым в 40 странах ООН (включая Россию); на рисунке показана разница для всех типов рака с учетом показателей заболеваемости, скорректированных по возрасту (5 на 100 тыс. человек в год и более), исключая немеланомный рак кожи)

See the 2nd part of the article in the next issue / Продолжение смотрите в следующем выпуске журнала