

**EVALUATION CHANGES IN INDICATORS OF ONCOLOGICAL SERVICE  
IN COLORECTAL CANCER IN KAZAKHSTAN**

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Colorectal cancer is the third most common cancer worldwide: 1.93 million people were diagnosed with it in 2020. The prognosis of colorectal cancer is better with an earlier diagnosis. CRC is the only cancer for which screening has been proven to reduce cancer deaths in medium-risk women and medium-risk men. The diagnosis of precancerous diseases, as well as the detection of cancers in the early stages, is significantly important for reducing the burden of the disease due to early detection, since the prognosis for such patients is much more favorable.

The aim of the study was to evaluate some indicators of the oncological service at the CRC in Kazakhstan for 2010-2019.

The research material was data from the Ministry of Health of the Republic of Kazakhstan – annual form No. 7 and 35 regarding CRC (ICD 10 – C18-21) for 2010-2019 – incidence, mortality, early diagnosis, neglect, morphological verification. A retrospective study using descriptive and analytical methods of biomedical statistics was used as the main method.

For 2010-2019, 28,950 new cases of CRC were registered in the republic for the first time and 15,161 people died from this disease. The average annual crude incidence rate of CRC was  $17.1 \pm 0.3^{0/000}$  (95% CI=16.5-17.8) and increased in dynamics from  $15.7 \pm 0.3^{0/000}$  (2010) to  $18.0 \pm 0.3^{0/000}$  in 2019, the difference was statistically significant ( $t=5.42$  and  $p=0.000$ ). In dynamics, mortality rates from CRC tended to statistically significant ( $t=7.07$  and  $p=0.000$ ) decrease from  $9.5 \pm 0.2^{0/000}$  (2010) to  $7.5 \pm 0.2^{0/000}$  in 2019, and the average annual crude mortality rate from CRC was  $8.7 \pm 0.2^{0/000}$  (95% CI=8.3-9.2). The research of

the study period reveals a trend: early diagnosis indicators (specific weight of patients with I-II stage) improved from 42.2% (2010) to 64.3% in 2019, and accordingly the specific weight of neglected patients significantly decreased with stage III (from 40.4% to 23.1%) and with stage IV (from 17.2% to 12.0%). The morphological verification indicators for CRC improved by almost 10%, from 88.1% and 96.3%, respectively, in 2010 and 2019.

An analysis of the indicators of the oncological service in CRC revealed an improvement in morphological verification and early diagnosis, a decrease in neglect and mortality rates, which is undoubtedly associated with regular anti-cancer activities in Kazakhstan, in particular screening of CRC.

**Key words:** colorectal cancer, incidence, mortality, early diagnosis, neglect, morphological verification, Kazakhstan.

### АНАЛИЗ НЕКОТОРЫХ ПОКАЗАТЕЛЕЙ ОНКОЛОГИЧЕСКОЙ СЛУЖБЫ ПРИ КОЛОРЕКТАЛЬНОМ РАКЕ В КАЗАХСТАНЕ

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Колоректальный рак является третьим по распространенности раком в мире: в 2020 году он был диагностирован у 1,93 миллиона человек. Прогноз колоректального рака лучше при более ранней диагностике. CRC является единственным видом рака, при котором скрининг, как было доказано, снижает смертность от рака у женщин со средним риском и мужчин со средним риском. Диагностика предраковых заболеваний, а также выявление раковых заболеваний на ранних стадиях значительно важны для снижения бремени заболевания за счет раннего выявления, поскольку прогноз для таких пациентов гораздо более благоприятный.

Целью исследования была оценка некоторых показателей онкологической службы при КРР в Казахстане за 2010–2019 гг.

Материалом исследования послужили данные Министерства здравоохранения Республики Казахстан – годовая форма №7 и 35, касающиеся КРР (МКБ 10 – C18-21) за 2010–2019 гг. – заболеваемость, смертность, ранняя диагностика, запущенность, морфологическая верификация. В качестве основного метода использовалось ретроспективное исследование с применением дескриптивных и аналитических методов медико-биологической статистики.

За 2010–2019 гг. в Республике Казахстан было впервые зарегистрировано 29 915 новых случаев КРР и 15 161 смертей от данной патологии. Заболеваемость КРР в динамике имела тенденцию к росту с  $15,7 \pm 0,3^0/0000$  (2010 г.) до  $18,0 \pm 0,3^0/0000$  в 2019 году ( $p=0,000$ ). В динамике показатели смертности от КРР имели тенденцию к снижению с  $9,5 \pm 0,2^0/0000$  (2010 г.) до  $7,5 \pm 0,2^0/0000$  в 2019 году ( $p=0,000$ ). При исследовании изучаемого периода выявляется тенденция: показатели ранней диагностики (удельный вес больных с I–II стадией) улучшились с 42,2% (2010 г.) до 64,3% в 2019 году, и соответственно показатели удельного веса запущенных больных значительно уменьшились с III стадией (с 40,4% до 23,1%) и с IV стадией (с 17,2% до 12,0%). Показатели морфологической верификации при КРР улучшились почти на 10%, с 88,1% и 96,3% соответственно в 2010 и 2019 годах.

В результате анализа показателей онкологической службы при КРР установлено улучшение показателей морфологической верификации и ранней диагностики, снижение запущенности и показателей смертности, что положительно характеризует регулярно проводимые противораковые мероприятия в Казахстане, в частности проводимый скрининг КРР.

**Ключевые слова:** колоректальный рак, заболеваемость, смертность, ранняя диагностика, запущенность, морфологическая верификация, Казахстан.

Colorectal cancer is the third most common cancer worldwide: 1.93 million people were diagnosed with it in 2020 [1]. The prognosis of colorectal cancer is better with an earlier diagnosis [2]. CRC is the only cancer for which screening has been proven to reduce cancer deaths in medium-risk women and medium-risk men [3]. The diagnosis of precancerous diseases, as well as the detection of cancers in the early stages, is significantly important for reducing the burden of the disease due to early detection, since the prognosis for such patients is much more favorable [4]. In terms of morbidity and mortality rates, Asia has the highest burden from CRC. Large-scale organized population screening programs for CRC are widely used in most parts of Asia, which have become an urgent task for this region [5]. Currently, about 60–70% of diagnosed cases in patients with symptoms of CRC are detected at the

advanced stage of the disease [6]. CRC screening should be optimized to achieve the main goal of reducing morbidity and, ultimately, mortality. But more important is achieving high rates of participation and commitment in various screening programs, seeking to correct all confounding factors. In a recent study conducted in Kazakhstan, a trend was found to increase the incidence of CRC in all regions of the country and it was found that this is most likely due to the impact of ongoing anti-cancer measures, including screening [7].

**The purpose of the study** was to evaluate some indicators of the oncological service of Kazakhstan on CRC in 2010–2019.

### **Material and methods**

The research material included the data obtained from the annual forms No. 7 & 35 of the Ministry of Healthcare of the Republic of Kazakhstan on CRC (ICD 10 –

C18-21) for 2010-2019 on incidence, mortality, early detection, neglect, and morphological verification. A retrospective study based on descriptive and analytical methods of biomedical statistics was used as the main method. Extensive and intensive indicators were calculated using the generally accepted methods of biomedical statistics [8, 9]. The annual averages (M), mean error (m), 95% confidence interval (95% CI), and average annual upward/downward rates (T%) were calculated.

**Results**

In 2010-2019, 29,915 new CRC cases and 15,161 deaths from this pathology were

registered in the Republic of Kazakhstan. The average annual crude incidence over the study years was  $17.1 \pm 0.3 / 0000$  (95% CI=16.5-17.8). The crude CRC incidence rate increased from  $15.7 \pm 0.3 / 0000$  in 2010 to  $18.0 \pm 0.3 / 0000$  in 2019, with a statistically significant difference ( $t=5.42, p=0.000$ ). The CRC mortality rate decreased statistically significantly ( $t=7.07, p=0.000$ ), from  $9.5 \pm 0.2 / 0000$  in 2010 to  $7.5 \pm 0.2 / 0000$  in 2019. The average annual crude mortality was  $8.7 \pm 0.2 / 0000$  (95% CI=8.3-9.2).

Figure 1 shows trends in equalized crude incidence and mortality from CRC in Kazakhstan.

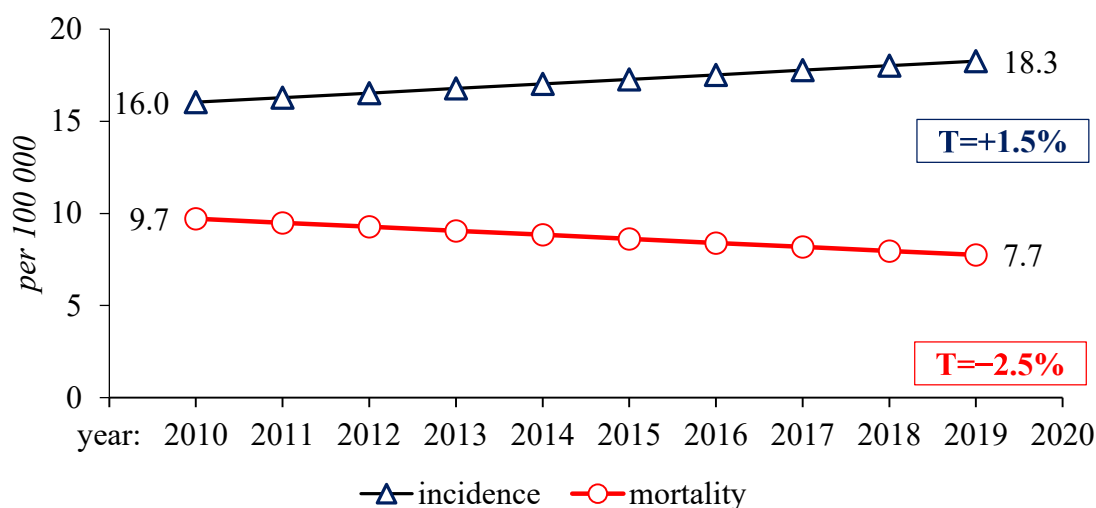


Figure 1. Trends of equalized incidence and mortality rates from CRC in Kazakhstan, 2010-2019.

The average annual equalized CRC incidence increase was equal to  $T=+1.5\%$ , at the average annual mortality decrease of  $T=-2.5\%$  (figure 1).

The trends in equalized incidence rates by stage showed an increase in stage I-II CRC incidence and a decrease in stage III and IV incidence (figure 2).

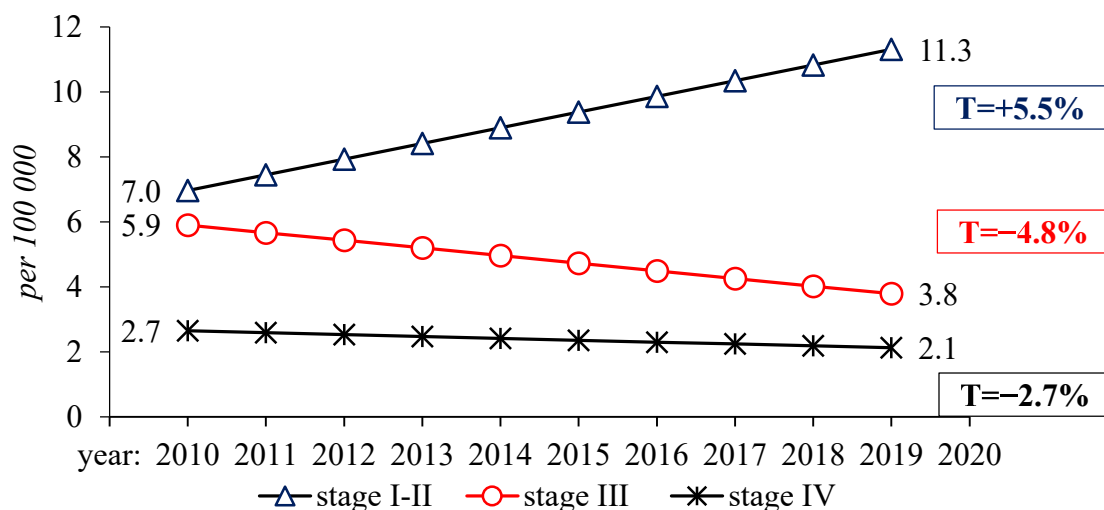


Figure 2. Trends in equalized CRC incidence rates by disease stage in Kazakhstan, 2010-2019.

Over time, the share of patients with stages I-II CRC increased from 42.2% in 2010 to 64.3% in 2019 (figure 3), with an average annual increase in the equalized rate of  $T=+4.4\%$ .

The share of patients with stage III CRC decreased from 40.4% in 2010 to 23.1% in 2019 (figure 3), with an average annual decrease in the equalized rate of  $T=-6.1\%$ . Over time, the share of

patients with stage IV CRC decreased from 17.2 in 2010 to 12.0% in 2019 (figure 3), with an average annual decrease in the equalized rate of  $T=-3.6\%$ .

During the study period, morphological verification in CRC improved, from 88.1% to 96.3% (Figure 4).

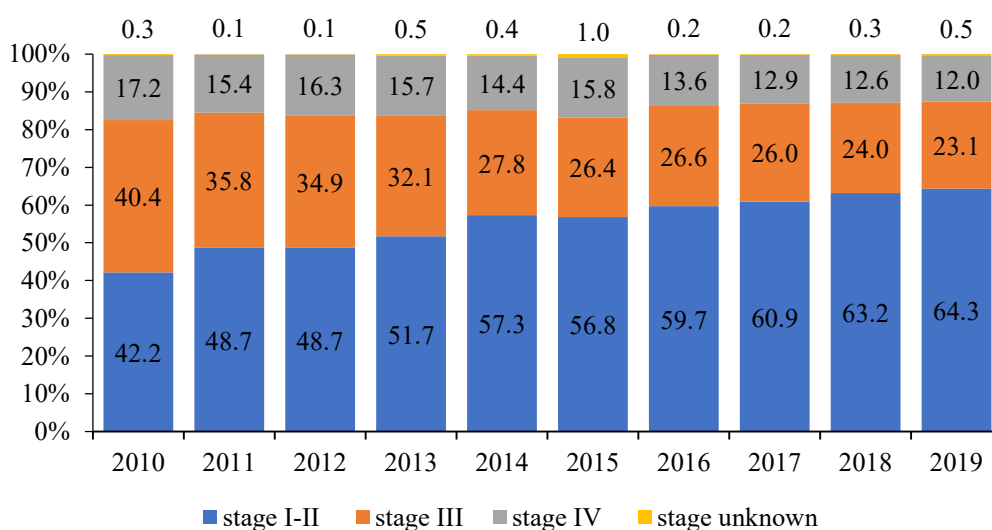


Figure 3. The dynamics of CRC early detection (stage I-II) and neglect (stage III and IV) in Kazakhstan, 2010-2019.

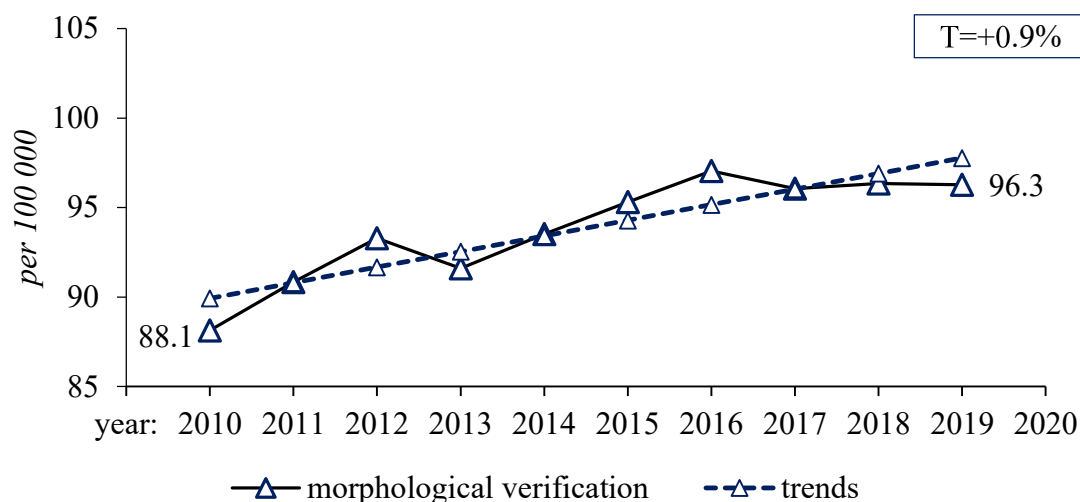


Figure 4. The dynamics of CRC morphological verification in Kazakhstan, 2010-2019.

At that, the equalized morphological verification rates have remained at the same level of  $T=+0.9\%$  (figure 4).

**Conclusions:**

1. In the Republic of Kazakhstan, over the study years, the absolute number of people with newly diagnosed CRC has increased by 29.6%. CRC incidence per 100,000 has increased by 11.7% over the decade. At that, the incidence of stage I CRC was growing, and the incidence of stage III-IV was decreasing.

2. In 2010-2019, the absolute number of deaths from CRC in Kazakhstan decreased by 10.3%. The mortality from CRC per 100,000 has decreased by 20.9% over the decade.

3. In the study period, the number of patients with stages I-II at diagnosis has added 93.3%, with stage III – lost 27.3%, with stage IV – added 11.4%. In general, there was a positive trend in the early detection and reduction of neglect.

**Conclusion**

The obtained data shows that Kazakhstan follows the global trend of growth in CRC incidence. At the same time, we can observe positive changes in the cancer service indicators: a growing share of morphological verification and early detection, reducing share patients with stage III-IV at diagnosis, and reduction in the CRC mortality rate. All this evidences the positive effect of anti-cancer measures taken in the Republic, such as CRC screening.

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