UDC 76.29.62 https://doi.org/10.47526/3080-8715.6440
GRNTI 07.06.10

SIGNIFICANCE OF FLUOROGRAPHY IN PREVENTIVE EXAMINATION OF CITIZENS

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Abstract. The frequency of undergoing screening fluorographic examinations depends on age, employment status, and education level; therefore, these factors should be considered when planning screening programs and increasing regular and active participation of the population.

The relevance of this study stems from the continuing high epidemiological significance of tuberculosis and the key role of fluorographic examinations in its early detection. Failure to comply with the prescribed fluorographic screening schedules leads to late diagnosis, the development of severe and destructive forms of tuberculosis, and an increased epidemiological risk to the population. Therefore, studying the factors influencing the regularity of screening fluorographic examinations is of great practical importance for improving preventive measures and public health education.

Purpose. The aim of the study was to identify factors influencing the regularity of screening fluorography and to identify the subjective reasons for delays.

Materials and methods.The study examined 728 individuals, including 342 patients with newly diagnosed pulmonary tuberculosis and 386 conditionally healthy individuals. It has been established that irregular fluorography screening is more common among unemployed individuals of working age and those with low levels of education. Increasing the interval between screenings by more than one year significantly increases the risk of developing tuberculosis, and exceeding two years doubles the risk. Data were collected and analyzed using a standardized questionnaire and medical records. The timing of screening fluorography examinations, as well as to determine the relative risk of developing pulmonary tuberculosis when screening schedules are not met.

Conclusion. Fluorographic screening adherence was associated with age, employment status, and educational level. Screening delays of more than one year significantly increased the risk of pulmonary tuberculosis, while delays exceeding two years doubled the risk. Enhanced monitoring and targeted interventions are needed for high-risk groups.

Keywords: pulmonary tuberculosis, fluorography, screening, pathology, statistics, epidemic, prevention, diagnostics.

Received: 19.05.2026 / Accepted: 31.07.2026

АЗАМАТТАРҒА ПРОФИЛАКТИКАЛЫҚ ТЕКСЕРІС ЖҮРГІЗУДЕГІ ФЛЮОРОГРАФИЯНЫҢ МАҢЫЗЫ

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Қожа Ахмет Ясауи атындағы Халықаралық қазақ-түрік университеті Жоғары медициналық оқу орнынан кейінгі білім беру факультеті (Шымкент, Қазақстан)

Аңдатпа. Скринингтік флюорографиялық тексерулердің жиілігі жасқа, жұмыспен қамтылуға және білім деңгейіне байланысты болғандықтан, бұл ерекшеліктерді скринингті жоспарлау мен халықтың тұрақты және белсенді қатысуын арттыру болып саналады. Бұл зерттеудің өзектілігі туберкулездің жоғары эпидемиологиялық маңыздылығының сақталуынан және флюорографиялық тексерулердің оны ерте анықтаудағы негізгі рөлінен туындайды. Белгіленген флюорографиялық скрининг кестелерін сақтамау кеш диагноз қоюға, туберкулездің ауыр және деструктивті түрлерінің дамуына және халық үшін эпидемиологиялық қауіптің жоғарылауына әкеледі. Сондықтан, скринингтік флюорографиялық тексерулердің тұрақтылығына әсер ететін факторларды зерттеу алдын алу шараларын және қоғамдық денсаулық сақтау саласындағы білім беруді жақсарту үшін өте маңызды практикалық маңызға ие.

Мақсаты. Зерттеудің мақсаты скринингтік флюорографияның тұрақтылығына әсер ететін факторларды анықтау және кешігулердің субъективті себептерін анықтау болды.

Материалдар мен әдістер. Зерттеуде 728 адам, оның ішінде жаңадан анықталған өкпе туберкулезімен ауыратын 342 науқас және шартты түрде сау 386 адам тексерілді. Тұрақты емес флюорографиялық тексеру жұмыссыз және білім деңгейі төмен адамдар арасында жиі кездесетіні анықталды. Скринингтер арасындағы аралықты бір жылдан астамға ұзарту туберкулездің даму қаупін айтарлықтай арттырады, ал екі жылдан асып кету қауіпті екі есеге арттырады. Деректерді статистикалық өңдеу бізге жастың, білім деңгейінің, әлеуметтік мәртебенің және жұмыспен қамтудың флюорографиялық тексерулердің тұрақтылығына әсерін бағалауға, сондай-ақ скринингтік кестелер орындалмаған кезде өкпе туберкулезінің даму қаупін анықтауға мүмкіндік берді.

Қорытынды. Скринингтік флюорографиялық тексерулердің тұрақтылығы жасқа, жұмыспен қамтылуға және білім деңгейіне байланысты болды. Флюорографияның бір жылдан астам кешіктірілуі өкпе туберкулезінің даму қаупін арттырса, екі жылдан асуы қауіпті екі есеге жоғарылатты. Бұл жоғары қауіпті топтарда скринингті бақылауды күшейту қажеттігін көрсетеді.

Түйін сөздер: өкпе туберкулезі, флюорография, скрининг, патология, статистика, эпидемия, профилактика, диагностика.

Received: 19.05.2026 / Accepted: 31.07.2026

ЗНАЧЕНИЕ ФЛЮОРОГРАФИИ В ПРОФИЛАКТИЧЕСКОМ ОСМОТРЕ ГРАЖДАН

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Аннотация. Регулярность прохождения скрининговых флюорографических обследований зависит от возраста, занятости и уровня образования, поэтому эти факторы необходимо учитывать при планировании скрининга и повышении регулярного и активного участия населения. Актуальность исследования обусловлена сохраняющейся высокой эпидемиологической значимостью туберкулёза и ведущей ролью флюорографического обследования в его раннем выявлении. Нарушение регламентированных сроков прохождения флюорографии приводит к поздней диагностике заболевания, формированию тяжёлых и деструктивных форм туберкулёза и повышению эпидемиологической опасности для населения. В этой связи изучение факторов, влияющих на регулярность прохождения проверочного флюорографического обследования, имеет важное практическое значение для совершенствования профилактических мероприятий и санитарно-просветительной работы.

Цель. Цель исследования - определить факторы, влияющие на регулярность прохождения населением проверочного ФЛГО и вскрыть субъективные причины, приводящие к нарушению его сроков.

Материалы и методы. В ходе исследования было обследовано 728 человек, из которых 342 пациента с впервые выявленным туберкулёзом лёгких и 386 условно здоровых лиц. Установлено, что нерегулярное прохождение флюорографического обследования чаще отмечается среди неработающих лиц трудоспособного возраста и лиц с низким уровнем образования. При увеличении интервала между обследованиями более чем на один год отмечается достоверный рост риска развития туберкулёза, а при превышении двухлетнего интервала риск возрастает в два раза. Статистическая обработка данных позволила оценить влияние возраста, уровня образования, социальной принадлежности и занятости на регулярность прохождения флюорографии, а также определить относительный риск развития туберкулёза лёгких при нарушении регламентированных сроков обследования.

Вывод. Высокая эпидемиологическая значимость туберкулёза и ключевая роль флюорографии в его раннем выявлении определяют необходимость соблюдения сроков проверочного обследования. Их нарушение способствует поздней диагностике и повышает риск развития тяжёлых форм заболевания, что требует изучения факторов, влияющих на регулярность прохождения флюорографии.

Ключевые слова: туберкулез легких, флюорография, скрининг, патология, статистика, эпидемия, профилактика, диагностика.

Received: 19.05.2026 / Accepted: 31.07.2026

Introduction. Respiratory tuberculosis remains a pressing medical and social health problem due to its severe course, high disability rates, and persistent epidemiological significance. Despite improvements in diagnostic and treatment methods, the timely detection of tuberculosis is largely determined by the effectiveness of preventive screening of the population.

In the Republic of Kazakhstan, the primary method for mass detection of tuberculosis in adults remains screening fluorography, which allows for the diagnosis of pathological changes in the respiratory system in the early stages of the disease. However, the diagnostic value of this method directly depends on its regularity. Failure to comply with the prescribed fluorography schedule leads to late detection of tuberculosis, the development of widespread and destructive forms of the disease, and an increased risk of bacterial excretion and further spread of infection.

According to scientific research, a significant proportion of patients with newly diagnosed respiratory tuberculosis have not undergone fluorographic screening for two or more years, indicating a lack of adherence to preventive screening. Therefore, studying the factors and subjective factors influencing the regularity of screening fluorographic screening, as well as assessing their role in determining individual risk of developing tuberculosis, is particularly relevant.

A comprehensive analysis of the socio-demographic characteristics, education level, and employment status of the population allows us to justify the need for a differentiated approach to public health education and the development of effective preventive measures aimed at increasing the coverage of regular fluorographic screening.

Materials and Methods. The study sample included newly diagnosed patients with pulmonary tuberculosis undergoing inpatient treatment at the Regional Tuberculosis Dispensary (342 individuals, including 229 from the outpatient risk group, i.e., those with diabetes, chronic non-specific lung diseases, peptic ulcers, HIV infection, and those receiving long-term corticosteroids) and healthy individuals living in Shymkent and the Turkestan region (386 individuals, including 137 from the outpatient risk group). The study was conducted using a specially developed questionnaire that included data on age, gender, social status, educational level, and the timing of the screening.

FLOG screening was performed: for patients with tuberculosis, the screening period was prior to the diagnosis of the disease, and for healthy individuals, the screening period was prior. Individuals who underwent screening fluorographic examination within the prescribed timeframes constituted Group I (497 people), while those who violated them constituted Group II (231 people).

Depending on these terms, tuberculosis patients and healthy individuals were divided into two groups. Group 1 (those observing the regulated terms of the verification fluorographic examination) included individuals from the outpatient risk group (tuberculosis patients and healthy individuals), with the term of the last fluorographic examination not exceeding 1 year, as well as individuals without a risk group disease (tuberculosis patients and healthy individuals), with the term of the last fluorographic examination not exceeding 2 years; a total of 497 individuals were included in this group. Group 2 (those violating the regulated terms of the verification fluorographic examination) included individuals from the outpatient risk group (tuberculosis patients and healthy individuals), with the term of the last fluorographic

Received: 19.05.2026 / Accepted: 31.07.2026

examination exceeding 1 year, as well as individuals without a risk group disease (tuberculosis patients and healthy individuals), with the term of the last fluorographic examination over 2 years; a total of 231 individuals were included in this group. The Shapiro-Wilk criterion was used to determine whether the terms of the verification fluorographic examination obey the law of normal distribution. At the significance level (p) less than 0. > Ди□□: 05, the hypothesis of normal distribution was rejected. Since the data did not obey the law of normal distribution, they were presented as the median and 95% CI (Me [L; U], where L is the lower limit of CI, U is the upper limit of CI). For proportions, 95% CI was calculated using the Wald-Wolfowitz method. The statistical significance of differences in quantitative indicators was determined using the Mann-Whitney test. Differences between qualitative (nominal) features were assessed using the χ2 criterion (the results are presented as: χ2 is the criterion value, df is the number of degrees of freedom, p is the significance level). To assess the impact of violation of the terms of screening fluorographic examination of the population on the individual risk of developing pulmonary tuberculosis, the relative risk indicator - RR (presented as: RR and 95% CI) was calculated. The null hypothesis of no statistically significant differences was rejected at $p<0.05$. Age Structure of Individuals.

Table 1. ***Complying with and Violating the Timing of Preventive Fluorographic Examination (absolute numbers, %, ±95% CI)***

Age group	1st group	2nd group
18-19 years old	25 80,6±13,92	6 19,4±13,92
20-29 years old	102 65,4±7,46	54 34,6±7,46
30-39 years old	120 69,4±6,87	53 30,6±6,87
40-49 years old	73 55,3±8,48	59 44,7±8,48
50-59 years old	84 67,7±8,23	40 32,3±8,23
60-69 years old	46 76,7±10,69	14 23,3±10,69
More than 70 years	47 90,4±8,01	5 9,6±8,01

The proportion of individuals violating the timing of preventive fluorographic examination did not differ significantly between rural and urban residents (30.5 ± 4.1% versus 34.3 ± 5.8%, respectively; $p = 0.277$).

In the age structure, however, statistically significant differences were identified ($\chi^2 = 30.520$; $df = 6$; $p < 0.001$). Thus, in the age groups of 20–29 years, 60–69 years, and over 70 years, the proportion of individuals in Group I was the highest.

The maximum proportion of individuals in Group II was observed in the 40–49-year age group,

Received: 19.05.2026 / Accepted: 31.07.2026

which was associated with the highest level of employment activity in this age category (38.6 ± 8.3%).

Table 2. Social Structure of Individuals

Complying with and Violating the Timing of Preventive Fluorographic Examination (absolute numbers, %, ‡95% CI)

Social group	1st group	2nd group
Workers	95 66.0±7.73	49 34.0±7.73
Officers	93 75.0±7.62	31 25.0±7.62
Pensioners	94 79.0±7.31	25 21.0±7.31
Disabled	31 73.8±13.29	11 26.2±13.29
Not working, of working age	142 56.8±6.14	108 43.2±6.14
Other categories*	42 73.1±12.4	7 26.9±12.4

As follows from the data presented in Table 2, individuals of working age most frequently violated the established timing of preventive fluorographic examination (43.2 + 6.1%).

Among working professions, every third individual violated the examination schedule, while among students such violations were recorded only in isolated cases. Among pensioners, the proportion of individuals violating the timing of preventive fluorographic examination was 21.0 ‡ 7.3%, which is likely due to the fact that pensioners traditionally demonstrate the highest activity in terms of systematic participation in preventive medical examinations.

It should be noted that 45.1 ‡ 5.0% of individuals included in Group Il who belonged to the clinical risk group for tuberculosis did not undergo preventive fluorographic examination for more than one year.

In this case, responsibility for irregular performance of preventive fluorographic examination lies entirely with the medical personnel of the assigned healthcare network. According to the survey conducted, it was found that one of the main reasons for violation of the timing of preventive fluorographic examination was careless attitude toward one's own health (39.0 + 6.29%). In second place was lack of time (35.9 - 6.18%), and in third place — self-confidence (24.7 + 5.56%).

The inability to undergo preventive fluorographic examination due to limited access was indicated only in isolated cases (0.4 + 0.81%).

Received: 19.05.2026 / Accepted: 31.07.2026

The need to optimize working conditions and the introduction of home-based examination services, as well as insufficient awareness and low value placed on personal health, are barriers to timely access to medical care.

The risk of developing tuberculosis among individuals who did not argo preventive fluorographic examination for more than one year was more than 1.5 times higher than among those who were examined regularly.

Table 3. ***Educational Level of Individuals Complying with and Violating the Timing of Preventive Fluorographic Examination (absolute numbers, %, ‡95% CI)***

Educational Level	**1st group** (n=497)	**2nd group** (n=231)
Basic general	65 62.5±9.30	39 37.5±9.30
Secondary	103 62.8±7.39	61 37.2±7.39
Secondary vocational	85 64.9±8.17	46 35.1±8.17
Secondary special	106 67.9±7.32	50 32.1±7.32
Incomplete higher and higher	138 79.8±5.98	35 20.2±5.98

The structure of the educational level of individuals included in Groups I and Il is presented in Table 3 (x = 16.055; df = 5; p = 0.007). As follows from the data presented in Table 3, adherence to the established timing of preventive fluorographic examination depends on the level of education. Thus, individuals with basic general education violated examination timing in 37.5 ‡ 9.30% of cases, whereas among those with secondary specialized education this figure was 35.1 + 8.17%, and among individuals with higher and incomplete higher education — only 20.2 ‡ 5.98%. The risk of developing pulmonary tuberculosis in individuals who have not undergone screening fluorographic examination for more than one year is more than 1.5 times higher than in individuals who undergo it every year (RR=1.8 [1.50; 2.06]), and in those who have not undergone it for more than two years, the risk is already more than 2 times higher (RR=2.1 [1.83; 2.39]).

In individuals who have not undergone screening fluorographic examination for more than three, four and five years, the risk of developing pulmonary tuberculosis (respectively RR=2.1 [1.87; 2.40]; RR=2.0 [1.77; 2.29] and RR=2.0 [1.81; 2.32]) did not differ significantly from that in those who have not undergone this examination for more than two years. Therefore, when planning and conducting screening FLGO, special attention should be paid to this category of the population. Thus, the factors influencing the regularity of FLGO screening by the population include age, unemployment, and education level. The highest proportion of individuals who comply with the regulated FLGO screening period is among pensioners and

Received: 19.05.2026 / Accepted: 31.07.2026

individuals with incomplete higher education, while those who do not comply are unemployed individuals of working age. According to the survey results, the reasons for irregular FLGO screening were a careless attitude towards one's health, being busy at work, and overconfidence.

The risk of developing tuberculosis in individuals who have not undergone FLGO screening for more than one year is more than 1.5 times higher than in those who undergo it annually; extending the FLGO screening period by more than two years doubles the risk of developing tuberculosis. These data should be taken into account when conducting public health education campaigns to motivate the population to regularly undergo FLGO screening.

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Received: 19.05.2026 / Accepted: 31.07.2026