

ГІГІЄНИЧНІ ПИТАННЯ ВИКОРИСТАННЯ ВИСОКОТЕХНОЛОГІЧНОГО ОБЛАДНАННЯ У МЕДИЧНИХ ЗАКЛАДАХ СТОМАТОЛОГІЧНОГО ПРОФІЛЮ, ВБУДОВАНИХ У ЖИТЛОВІ БУДИНКИ

Махнюк В.М., Очеретяна Г.В., Мишковська А.А., Янко Н.В.

HYGIENIC ISSUES OF THE USE OF HIGH-TECHNOLOGY EQUIPMENT IN MEDICAL STOMATOLOGIC INSTITUTIONS, BUILT INTO RESIDENTIAL BUILDINGS

C

onditions for the location of modern medical stomatologic institutions are differentiated depending on the throughput and the specificity of the location of particular institution. To date the location of medical stomatologic institutions and stomatologic cabinets in the built-in rooms of the residential buildings is widely practised [1, 2, 3].

The latest high-technology medical equipment (cone-ray computer tomographies, X-ray machines (including dental), pantomographs, film and digital orthopantomographs) is used to provide high-quality stomatologic services to the population at the medical stomatologic institutions.

When placing the indicated

medical equipment and its subsequent use at the stomatologic clinics, located in the built-in rooms of the residential buildings, the development of architectural planning, health preventive measures for the minimization of its impact on the adjacent rooms of the internal volume of the residential building is of great importance [4, 5].

To prevent a negative influence of high-technology high-sensitive medical equipment on the health of medical workers, patients and to protect the adjacent rooms of the residential building at the place of location of medical institution, there is a need to develop sanitary-and-hygienic requirements for its location [3]. These issues are extremely

¹MAKHNIUK V.M.,
¹OCHERETIANA G.V.,
²MYSHKOVSKA A.A.,
²YANKO N.V.

¹SI «O.M. Marzieiev Institute for Public Health, NAMSU», Kyiv
²Ministry of Public Health, Kyiv

УДК: 613.5 : 696.146 : 725.5

<https://doi.org/10.32402/dovkil2018.04.025>

Keywords: built-in medical stomatologic institutions, labor conditions of medical personnel, X-ray protection, high-technology medical equipment, sanitary-and-hygienic requirements.

ГІГІЄНИЧНІ ПИТАННЯ ВИКОРИСТАННЯ ВИСОКОТЕХНОЛОГІЧНОГО ОБЛАДНАННЯ У МЕДИЧНИХ ЗАКЛАДАХ СТОМАТОЛОГІЧНОГО ПРОФІЛЮ, ВБУДОВАНИХ У ЖИТЛОВІ БУДИНКИ

¹Махнюк В.М., ¹Очеретяна Г.В.,
²Мишковська А.А., ²Янко Н.В.

¹ДУ «Інститут громадського здоров'я ім. О.М. Марзєєва НАМН України», м. Київ

²Міністерство охорони здоров'я, м. Київ

Мета дослідження – проведення гігієнічної оцінки розміщення високотехнологічного обладнання у сучасних медичних закладах стоматологічного профілю, які розташовані у вбудованих приміщеннях житлових будинків.

Матеріали та методи дослідження. Об'єктом досліджень були медичні заклади стоматологічного профілю, вбудовані у житлові будинки. Використано такі методи: теоретичні, санітарно-епідеміологічної експертизи проектів будівництва і реконструкції.

Результати. У ході дослідження проведено гігієнічну оцінку розташування медичних закладів стоматологічного профілю невеликої пропускної спроможності, які розміщені з боку вуличних фасадів у вбудованих приміщеннях житлових будинків та оснащені високотехнологічним медичним обладнанням. Розроблено санітарно-гігієнічні заходи щодо мінімізації впливу медобладнання на умови праці медпрацівників, умови проживання мешканців житлового будинку та інших факторів.

Висновки. Під час огляду розміщення сучасних медичних закладів стоматологічного профілю, вбудованих у житлові будинки, встановлено: – розміщення медзакладів стоматологічного про-

філю на першому та цокольному поверхах з боку вуличних фасадів та з окремими, ізольованими від житлових секцій вхідними групами, не призводить до погіршення умов проживання мешканців;

– режим роботи медичних закладів стоматологічного профілю, вбудованих у житлові будинки, не впливає на акустичний режим прибудинкової території та житлових квартир будинку і не порушує законодавство щодо захисту населення від впливу шуму;

– оснащення медзакладів стоматологічного профілю виконане сучасним високотехнологічним медичним обладнанням та апаратурою закордонного виробництва (США, Фінляндія, Німеччина, Бразилія), що підвищує безпеку та якість надання стоматологічних послуг населенню і покращує умови праці медичного персоналу;

– розташування медичного обладнання у внутрішньопросторовому об'ємі рентгенівських приміщень медичних закладів стоматологічного профілю розмежоване з іншими приміщеннями відповідно до вимог радіаційної безпеки;

– комплекс заходів з рентгенозахисту забезпечує дотримання санітарно-гігієнічних умов праці медперсоналу, пацієнтів та мешканців житлового будинку.

Таким чином, розміщення високотехнологічного медичного обладнання у медичних закладах стоматологічного профілю, вбудованих у житлові будинки при дотриманні санітарно-гігієнічних вимог не впливатиме на життєдіяльність мешканців та наблизитиме медичні стоматологічні послуги до населення.

Ключові слова: вбудовані медичні заклади стоматологічного профілю, умови праці медперсоналу, рентгенівський захист, високотехнологічне медичне обладнання, санітарно-гігієнічні вимоги.

© Махнюк В.М., Очеретяна Г.В., Мишковська А.А., Янко Н.В. СТАТТЯ, 2018.

topical under conditions of the reformation in town-planning and health care.

Objective. Our goal was to perform a hygienic assessment

of the placement of high-technology equipment in modern medical stomatologic institutions located in the built-in residential houses.

Materials and methods.

The regulatory documents of the national sanitary and town-planning legislation regarding the location, equipment, and

Table 1

Sanitary-and-hygienic and architectural-and-planning characteristics of medical stomatologic institutions

Type of medical institution, work mode	Location and Entrance Group	Characteristic of X-ray equipment	X-ray area	Adjacent rooms with X-ray room
1. Medical center for provision of medical services (including stomatologic ones) to the population. Work mode: from 08.00 to 20.00.	Non-residential rooms of the first and basement floors of the apartment building. There are 2 entrances, separated from the entrances for inhabitants of the apartment residential building.	Universal system AGFA DX-D300 for general radiography (produced in Germany).	The X-ray room is located in the basement of the medical center with a well-shaped window in the pit (2.65 x 2.28 m size) and consists of waiting room, corridor, and two rooms connected with each other: a treatment room with an area of 22.0 ml and a console room with an area of 14.6 ml.	A street is located horizontally on the side of the windows, next is a console room, a corridor of medical institution; the entrance group of non-residential rooms, the lobby of the outpatient clinic is located vertically – the foundation is at the bottom.
2. Medical center for provision of medical services (including stomatologic services) to the population. Work mode: from 08.00 to 20.00.	Non-residential rooms of the 1-st and the basement floors of the 4-storey residential building (street facade). There are two entrances, isolated from the residential part of the building.	Orthopantomograph «Planmeca Pro One» (produced in Finland) and a dental X-ray machine «Planmeca intra» with a visigraphic attachment (produced in Finland).	The treatment room area is 8.4 m ² , Control room area is 4.0 m ² .	Horizontally – public rooms without permanent working places, vertically – non-residential rooms, the foundation of the building is at the bottom.
3. Medical center for provision of medical services (including stomatologic services) to the population. Work mode: from 09.00 to 21.00.	Non-residential rooms of the 1st and the basement floors of a residential building (street facade). Two separate entrance groups, isolated from the residential part of the building, one entrance is an evacuation one.	Tomograph of «PLANMECA Pro Max 3D Mid» type (produced in Finland) and dental X-ray machine of «PLANMECA PgH» type (produced in Finland).	X-ray office area is 10.0 m ² , the area of the control room is 4.9 m ² .	Adjacent rooms to the treatment X-ray office are: horizontally – a waiting hall, a management's room, partly with a dentist's office through the main wall (0.8 m wide); vertically – a roof is over the cabinet (the X-ray office is located in the part of the annex to the residential building), a basement is under the cabinet.
4. Stomatologic office. Work mode: from 10.00 to 19.00.	Non-residential rooms on the 1-st floor of a 9-storey residential building. Separate entrance, isolated from the residential and office parts of the building.	X-ray apparatus PREVA (USA) and PLANMECA OY device (Finland) with anode voltage of 60-70 kV and anode current of an X-ray tube up to 8 mA.	Area of X-ray office is 8.0 m ² , Area of the control room is 4.0 m ² .	It borders on the rooms without permanent work-places (waiting room and compressor room).
5. Stomatologic office. Work mode: from 09.00 to 21.00	Non-residential rooms of the ground floor of 5-storey residential building. A separate entrance group from the street facade.	Dental Diagnostic X-ray Apparatus «Prodental» (produced in Brazil), anode X-ray tube current is 7 mA, voltage is up to 70 kV.	The area of the X-ray office is 7.2 m ² , the area of the control room is 3.3 m ² .	It borders on the rooms of the waiting lobby of medical institution.
6. Stomatologic clinic with a consulting office Work mode: from 09.00 to 20.00.	Non-residential premises of the ground floor of a residential building (street facade). Two entrance groups, separated from the entrance group of the residential building.	Orthopantomograph «PLANMECA PROONE» (produced in Finland); anode current of X-ray tube is 1-10 mA, voltage value is up to 60-90 kV.	Area of X-ray office is 10.0 ml, the area of apparatus room and lobby is 5.1 ml.	It borders with the external concrete wall of the building and with stomatologic clinic from all other sides.

operation of medical stomatologic institutions, built into residential houses, were the materials of the research. We used the following methods in the work: bibliosemantic (for the analysis of the use of regulatory legal regulation), theoretical (retrospective use of the scientific findings), analytical (development of the methodology for the hygienic assessment of the construction projects); sanitary-and-epidemiological examination of the projects of the construction and the reconstruction of built-in medical stomatologic institutions in residential buildings.

Results. The stomatologic institutions of a small throughput, located on the side of the street facades in built-in residential buildings and equipped with the high-technology medical equipment which were a potential source of ionizing radiation and other factors that could affect health negatively, was a sample of the objects for the research.

According to the results of the scientific sanitary-and-epidemiological examination of six projects on the location of the medical stomatologic institutions in built into residential houses, carried out at the Laboratory of Hygiene Planning and Construction of the Settlements for the period from 2009 to 2016, the following was established.

During the study, the stomatologic medical institutions were differentiated according to the following architectural-and-planning and sanitary-hygienic criteria: location from the side of the street facades or from the side of the internal passage; area of X-ray rooms; name and specification of X-ray equipment; conditions of natural lighting; microclimate of the rooms; characteristics of ventilation and air conditioning; introduction of preventive (compensatory) measures from the influence of ionizing radiation from X-ray equipment of the indicated medical institutions that affected medical personnel, patients and inhabitants of adjoining apartments of the building where the institution was located, and others.

According to sanitary-and-hygienic and architectural-and-planning characteristics of medical stomatologic institutions, listed in table 1, the investigated

medical facilities were distributed as follows: 3 medical centers of the complex health care for the provision of medical care to the population, including a stomatologic one, 2 stomatologic offices, and 1 stomatologic clinic.

According to the description of the location and the entrance group, the investigated objects were located on the first and the basement floors in 50% of cases (3 medical institutions, in 33.3% of cases (2 medical institutions) – in the basement, and 1 object (16.7 % of cases) – on the first floor of the residential building.

All medical institutions (in 100% of cases) had separate entrances from the street front of the building. In 67% of cases (4 objects), two entrance groups, isolated from the building entrances for the inhabitants, one of which was the main entrance – from the street facade, the other – for evacuation, were envisaged to arrange. One entrance from each street facade, also isolated from the entrance for the inhabitants of the residential building, was arranged in 33.3% of cases (2 objects). Therefore, the location of all investigated medical institutions with separate entrance groups, isolated from the living sections, did not affect sanitary-and-hygienic living conditions of the inhabitants of the building, hosted the institution, and complied with the requirements of the SBN B.2.2-15-2005 «Buildings and Constructions. Residential Buildings. Substantive Provisions».

The following was established while analyzing the internal volume of X-ray rooms of investigated medical institutions. In the vast majority of cases, investigated rooms of X-ray offices were bordered horizontally: with



ФАКТОРИ ДОВКІЛЛЯ І ЗДОРОВ'Я

an external street wall, a console room, a corridor of the medical institution, an entrance group of non-residential rooms with a lobby of a medical institution, a waiting room, a control room; by vertical (over the room): with public rooms, residential apartments (corridor, kitchen); there was a basement under medical institution intended for maintenance of the building. In the adjacent location of X-ray room and the dentist's office (that took place in one case (16.7%), the main wall of 0.8 m thick was a separation between those rooms.

The above-mentioned architectural-and-planning and engineering-and-technical measures served as a prevention of the influence of ionizing radiation on working medical personnel and inhabitants of the residential buildings where medical institutions were located and were in compliance with the requirements of the State Sanitary Rules and Norms «Hygienic requirements for the installation and use of X-ray rooms and the performance of radiological procedures. State Sanitary Rules and Norms (SSRN) 6.6.3-150-2007», approved by the order of the Ministry of Public Health of Ukraine, June 04, 2007 № 294 (with amendments), registered by the Ministry of Justice of Ukraine, November 07, 2007, № 1256/14523, «State Sanitary Rules and Norms when working with the sources of electromagnetic fields. SSRN 3.3.6-096-2002», NRBU-97 «Radiation Safety Standards of Ukraine» and did not contradict the requirements of the Council Directive 2013/59/Euratom which established the basic safety standards for protection against ionizing radiation. According to the Decree of the

Cabinet of Ministers of Ukraine, 18.02.2015 № 110-p, the said directive was included in the implementation plan of Ukraine [6-8].

The mode of work in all investigated medical institutions was organized in the day and evening time, the beginning of the work, as a rule, began at 08.00 and ended at 21.00 that did not affect the acoustic regime of the adjoining territory and rooms of the apartments and complied with the requirements of the laws of Ukraine «On Amendments to Some Legislative Acts of Ukraine on Protection of the Population from Noise», 03.06.2004 № 1745-IV (as amended in accordance with the Law № 580-VIII, 07.07.2015), «On Ensuring the Sanitary and Epidemiological Well-Being of the Population», 24.02.1994 № 4004-XII (as amended in accordance with the Law № 580-VIII, 02.07.2015), «State Sanitary Rules of Planning and Development of Human Settlements», № 173-96, approved by the order of the Ministry of Public Health of Ukraine, 19.06.1996, № 173, registered in the Ministry of Justice of Ukraine on 24.07.1996, № 379/1404.

According to the characteristics of X-ray in all emanated medical institutions, foreign modern high-technology medical equipment was to be found in 100% of cases: 5 (55%) of 9 devices had stomatologic apparatus produced in Finland, USA, Brazil, 2 (22.2%) of the 9 – orthopantomographs of Finland production, and 1 (11.1%) of the 9 – tomographs, produced in Finland, and the universal system for general radiography – in Germany.

According to the technical characteristics, X-ray tubes had a voltage value of 60-90 kV and anode current within the range

of 1-10 mA that complied with the requirements of SSRN 6.6.3-150-2007.

According to the analysis of the areas of X-ray rooms, the smallest area was to be found in the stomatologic procedure X-ray office – 7.2 ml, the largest – 22 ml. Control rooms (console rooms) had the areas of 4.0 ml to 5.1 m². The indicated areas of X-ray rooms and console rooms complied with the technical characteristics of X-ray equipment and the standards of the area of the room according to SSRN 6.6.3-150-2007, BNU, V.2.2-10-2001 «Health Care Institutions».

In assessing the ventilation parameters, it was found that a mechanical plenum – exhaust ventilation system had been designed in 100% of the studied medical institutions, with two-, three- or four-fold air exchange, and organized emission higher than 0.7 m from the roof of the building where the medical institution was located, that complied with the requirements of BNU V.2.5-67: 2013 «Heating, Ventilation, and Air Conditioning».

By the parameters of illumination, all medical offices of the dentists (in 100% of cases) were provided with natural light with a supplementary artificial electric lighting of the workplaces with the luminescent and incandescent lamps in accordance with the requirements of the BNU.B.2.5-28-2006 «Natural and Artificial Lighting».

Placement of high-technology modern medical equipment in medical stomatologic institutions, built into residential buildings, is possible under conditions of the providing of sanitary-and-epidemiological assessment of its placement in the X-ray room at the sufficiency and effectiveness of the hygienic compensatory measures of X-ray protection in each particular case because the issues of radiation safety of personnel and patients is an integral part of the quality of medical services [3].

Design solutions for X-ray protection from ionizing radiation in the medical stomatologic institutions are given in Table 2.

While evaluating the health-saving (compensatory) measures for the protection of the

workers and patients from ionizing radiation in the six investigated medical stomatologic institutions, the following was established.

Planning compensatory measures provided for the maximum separation of the X-ray office and the room from the adjacent offices and were adjacent to the rooms where there was no long-term staying of the people or they were absent at all. X-ray protection of the rooms of X-ray offices was carried out by the separate projects «X-Ray Protection», developed by specialized design organizations or designers in accordance with the requirements of SSRN 6.6.3-150-2007 [6].

X-ray protection calculations were made for X-ray equipment in each particular case, taking into account its capacity. Thus, when placing the AGFA DX-D300 universal system for general radiography (produced in Germany) at the medical institution, the walls had been designed with a thickness of the protection of the equivalent lead not less than 1.7 mm, the walls between the treatment room and the console room – not less than 1.2 mm thick, the walls between the treatment room and the corridor of medical institution – not less than 2.0 mm thick, equipment of the examination window – with a glass not less than 1,2-2,0 mm thick. In the above-mentioned X-ray room, two walls at the level of X-ray machine were made of steel sheets.

In the medical centers, equipped with a PLANMECA Pro Max 3D Mid tomograph (manufactured in Finland) and PLANMECA PgHH dental X-ray machine (manufactured in Finland), preventive measures were implemented through the use of protective panels and protective layer of the entrance doors and the arrangement of the wall protective barite panels and lead-lined door cover.

The following preventive sanitary-and-technical measures were performed in two stomatologic offices equipped with X-ray machine PREVA (USA), PLANMECA OY device (Finland), Prodental stomatologic X-ray diagnostic apparatus (Brazil): X-ray rooms were constructed of lead plates (sheets) of 1,0 mm thick, solid false walls and false

HYGIENIC ISSUES OF THE USE OF HIGH-TECHNOLOGY EQUIPMENT IN MEDICAL STOMATOLOGIC INSTITUTIONS, BUILT INTO RESIDENTIAL BUILDINGS

¹Makhniuk V.M., ¹Ocheretiana G.V.,

²Myshkovska A.A., ²Yanko N.V.

¹SI «O.M. Marzieiev Institute for Public Health, NAMSU», Kyiv

²Ministry of Public Health, Kyiv

Objective: We performed a hygienic assessment of the placement of high-technology equipment in the modern medical stomatologic institutions, located in the built-in rooms of the residential buildings.

Materials and methods: We investigated medical stomatologic institutions, built into residential buildings. We applied theoretical methods and method of sanitary-and-epidemiological examination of the projects for construction and reconstruction.

Results: In the course of the study, a hygienic assessment of the location of medical stomatologic institutions of a low throughput, placed on the side of street facades in the built-in rooms of residential buildings and equipped with high-technology medical devices, was performed, and sanitary-and-hygienic measures for the minimization of the impact of medical equipment on the conditions of medical workers and living conditions of the residents of the residential building and other factors were developed.

Conclusions: When considering the placement of modern stomatologic clinics, built into residential buildings, we established:

– the placement of the stomatologic clinics on the first and basement floors from the side of street

facades and with separate entrance groups, isolated from the residential sections, does not lead to the deterioration of living conditions of the residents;

– the mode of work of stomatologic clinics, built into residential buildings, does not affect the acoustic regime of the adjoining territory and residential apartments of the building and does not violate the legislation on the protection of the population from noise;

– the medical stomatologic institutions are equipped with modern high-technology medical devices and devices of foreign production (USA, Finland, Germany, Brazil) which enhance safety and quality of the provision of the stomatologic services to the population and improve the working conditions of medical personnel;

– the location of medical equipment in X-ray rooms of medical stomatologic institutions is delimited with other rooms in accordance with the requirements of radiation safety;

– the complex of the measures for X-ray protection ensured a compliance with sanitary-and-hygienic working conditions of medical personnel, patients and residents of the residential building.

Thus, while complying with sanitary-and-hygienic requirements, the placement of high-technology medical equipment in the stomatologic clinics, built into residential buildings will not affect the living conditions of the inhabitants and will approach medical stomatologic services to the population.

Keywords: built-in medical stomatologic institutions, conditions of work, medical personnel, X-ray protection, high-technology medical equipment, sanitary-and-hygienic requirements.

ceilings were made of lead of 0,5-1,25 mm thick (in the lead equivalent), glazing of the outer window of the X-ray rooms was made of three-layer glass with a curtain of special fabric (produced by ONIKA Company) with a protection coefficient of not less than 0.7 mm by total lead equivalent.

At the stomatologic clinic, while placing the orthopantomograph «PLANMECA PRO» (Finland) in isolated room, it was not necessary to perform measures for X-ray protection of the walls of mentioned room. Additional protection was provided for the ceiling of the X-ray diagnostic room by placing of a solid barite concrete plaster of 10.4 mm thick, and the protection of the doors and the inspection windows was carried out by lead plates of 0.17-1.0 mm thick.

Fence constructions of procedure rooms of X-ray diagnostic offices, computer tomography rooms, and X-ray departments had permanent fixed protection from ionizing radiation.

The calculation of X-ray protection for fence constructions of the treatment room and X-ray

office at the placement of high-technology medical equipment was developed by specialized project organization as a separate obligatory section of the project in each particular case. The implementation of sanitary-and-technical measures, proposed by the project, should provide reliable protection of the rooms adjacent to this office and located above and below this office from the operation of the X-ray machine and meet the conditions for its placement in accordance with the «Radiation Safety Standards of Ukraine NRB-97» [8].

According to the results of the consideration of the project materials on the placement of the stomatologic clinics in the built-in residential buildings, it was suggested to perform a sanitary certification of those institutions by the territorial institutions that carried out a state supervision (control) of the compliance with sanitary legislation, including implementation within the competence of the control of the environmental factors of the human's vital functions that have a detrimen-

tal effect on the health of the population [1].

The permission to perform stationary protection against ionizing radiation in correspondence with the calculations of the project and the issuance of a sanitary passport for the source of ionizing radiation and for the right to work with it is performed in accordance with the requirements of the SSRN 6.6.3-150-2007 [6].

Conclusions. As a result of the hygienic assessment of the placement of modern stomatologic institutions, built into residential buildings and equipped with high-technology medical equipment, it was established:

– medical stomatologic institutions are designed in the built-in rooms of residential buildings in order to approach stomatologic health services to the population under conditions of the consolidation of residential and public buildings;

– the location of medical stomatologic institutions on the first and basement floors from the side of street facades and with separate isolated groups from residential sections with

the entrance groups does not lead to the deterioration of living conditions of the inhabitants;

– the work mode of stomatologic institutions, built into resi-

dential buildings, from 08.00 to 21.00 does not affect the acoustic regime of the adjoining territory and residential apartments of the building and does not violate the legislation on the

protection of the population from noise;

– the use of modern high-technology medical equipment and devices of foreign production (USA, Finland, Germany,

Table 2

Sanitary-and-hygienic characteristics of the conditions of medical stomatologic institutions and protection measures against ionizing radiation

Medical Institution	Ventilation of X-ray room	X-ray room lighting	Measures for the protection from ionizing radiation
1. Medical center for provision of medical services (including stomatologic services) to the population.	All rooms of the medical center are equipped with plenum-exhaust ventilation with mechanical inducement. Exhaust air ducts from the rooms are taken out above the roof of the residential building.	All medical rooms are provided with natural lighting and standard level of illumination of work places according to SBN B.2.5-28-2006 «Natural and Artificial Lighting» and p.5.5 SBN B.22-10-2001 «Institutions of Health Care».	Construction with lead-coated sheet : wall № 3 – not less than 1,7 mm thick; walls № 4 between treatment room and console room – not less than 1,2 mm thick; walls № 5 between the procedure room and corridor of the medical institution – not less than 2,0 mm thick; glass of the inspection window of the wall № 4 – not less than 1,2 mm thick; doors in the wall № 4 – not less than 1,2 mm thick; doors in the wall № 5 – not less than 2,0 mm thick In the X-ray office, two walls at the level of X-ray machine are made of steel sheets.
2. Medical center for provision of medical services (including dental services) to the population.	The plenum-exhaust ventilation fans P1, P2, P3, P4, B1, B4, B5, B6, B7 (Korf) are provided for ventilation of the rooms. There are systems P2-B4 in the treatment X-ray room and control room .	Natural lighting, electric lighting is provided according to the requirements of SBN B 2.5-28-2006, SBN B.22-10-2001.	The protection of the protective constructions of the treatment X-ray office from ionizing radiation was performed according to the calculation of permanent protection.
3. Medical center for provision of medical services (including stomatologic services) to the population.	Mechanical plenum-exhaust ventilation. Air conditioning is provided for at the main medical rooms.	Natural and artificial lighting (luminescent lamps)complies with the requirements of SBN B 2.5-28-2006, SBN B.22-10-2001.	Additional protection of the X-ray office from X-ray radiation is provided in accordance with the calculation of protection: protective panels and protective layer of the entrance doors and arrangement of wall protective barite panels and lead-sheeting of the door.
4. Stomatologic office.	Mechanical plenum-exhaust ventilation with the external fans VKO-150 with a productivity of 298 m ³ /h, VentTT-150 with a productivity of 520 m ³ /h, and VentTT-125 with a productivity of 280 m ³ /h.	All work rooms are equipped with windows that protrude above the floor level by 50 cm, additional artificial lighting is used that meets the requirements of SBN V, 2.5-28-2006, SBN, 22.2.2001.	Arrangement of building partitions of the X-ray office with lead plates (sheets) of 1,0 mm thick.
5. Stomatologic office.	Combined system of general plenum-exhaust ventilation (2-4 fold air exchange). The supply of fresh air is provided from the outside of the building at an altitude of 2 m. Ventilation emission from the medical rooms is organized above the crest of the roof of the residential building by 0,7 m.	All work rooms are equipped with windows that protrude above the floor level by 50 cm, additional artificial lighting is used that meets the requirements of SBN V, 2.5-28-2006, SBN, 22.2.2001.	Installation of solid false walls and false-ceiling of lead of 0,5-1,25 mm thick and arrangement of glazing of the outer window of the office with a three-layer glass with a curtain of special fabric (produced by firm «Oniko») with a coefficient of protection for a total lead equivalent of not less than 0.7 mm.
6. Stomatologic clinic with a consulting room.	Combined system of general plenum-exhaust ventilation. The supply of fresh air is provided by the outside wall of the building at an altitude of 2.0 m. Ventilation emission from the medical rooms is organized above the roof crest of the residential building at 0.7 m.	Natural lighting due to the existing windows on the outer walls with the area of 3.2-4.2 m ² , artificial lighting is additionally used that meets the requirements of SBN V, 2.5-28-2006, SBN V.22-10-2001.	When placed X-ray apparatus in an isolated room, the implementation of X-ray protective measures of the walls of mentioned room is not required, but the additional protection of the X-ray diagnostic ceiling by the installation of solid barite plaster of 10.4 mm thick is required, as well as the arrangement of protection of doors and inspection windows with lead plates of 17-1,0 mm thick.

Brazil) at the medical stomatologic institutions increases safety and quality of the stomatologic services to the population and improves the working conditions of medical personnel;

– the placement of medical equipment in the internal volume of X-ray rooms of medical stomatologic institutions with the separation with other medical offices and residential rooms, complied with the requirements of the sanitary legislation of Ukraine regarding radiation safety of personnel, patients and inhabitants;

– the complex of preventive compensatory measures on X-ray protection ensured compliance with the sanitary and hygienic conditions of work of medical staff, patients, and inhabitants of the residential building where the medical institution was located and met the requirements of sanitary legislation of Ukraine and Council Directives 2013/59/Euroatom concerning safety standards for protection against ionizing radiation.

Thus, the placement of high-technology medical equipment in the medical stomatologic institutions, built into residential buildings, while complying with sanitary and hygiene requirements, will not affect the living conditions of the inhabitants and will approach medical stomatologic services to the population.

ЛІТЕРАТУРА

1. Сердюк А.М., Полька Н.С., Махнюк В.М., Савіна Р.В., Могильний С.М. Гігієна планування та забудови населених місць на варті громадського здоров'я (до 85-річного ювілею ДУ «Інститут громадсько-го здоров'я ім. О.М. Марзєєва НАМН України»). К. : Медінформ, 2017. С. 116.

2. Махнюк В.М., Фещенко К.Д., Могильний С.М. Гігієнічні питання запобіжного державного санітарно-епідеміологічного нагляду при розміщенні лікувально-профілактичних закладів з рентгенкабінетами. *Укр. радіол. журн.* 2011. Т. XIX. Вип. 3. С. 348-350.

3. Мишковська А.А. Основні проблемні питання здійснення державного санітарного та епідеміологічного нагляду за використанням джерел іонізуючого випромінювання у медичній практиці. *Укр. радіол. журн.* 2011. Т. XIX. Вип. 3. С. 350-352.

4. Костенецький М.І. Стан радіаційної безпеки пацієнтів при рентгенологічних процедурах та шляхи її удосконалення. *Довкілля та здоров'я.* 2015. №1. С. 35-37.

5. Про внесення змін до Державних санітарних правил і норм «Гігієнічні вимоги до влаштування та експлуатації рентгенівських кабінетів і проведення рентгенологічних процедур». Затв. МОЗ України, наказ № 1126 від 22.09.2017 ; зареєстр. у Мін'юст України, наказ № 1269/31137 від 17.10.2017.

6. Гігієнічні вимоги до влаштування та експлуатації рентгенівських кабінетів і проведення рентгенологічних процедур : ДСанПіН 6.6.3-150-2007. URL : <http://zakon.rada.gov.ua/laws/show/ru/z1256-07>.

7. Директива Ради 2013/59/Євроатом від 5 грудня 2013 року, що встановлює основні норми безпеки для захисту від небезпеки, що виникає від іонізуючого випромінювання. URL : www.kmu.gov.ua/storage/app/media/uploaded-files/radi-201359evratom.pdf

8. Норми радіаційної безпеки України (НРБУ-97). URL : <http://zakon.rada.gov.ua/rada/show/v0062282-97>

REFERENCES

1. Serdiuk A.M., Polka N.S., Makhniuk V.M., Savina R.V. and Mohylnyi S.M. Hiihiena planuvannia ta zabudovy naselenykh mista na varti hromadskoho zdorovia (do 85-richchnoho yuvileiu DU «Instytut hromadskoho zdorovia im. O.M. Marzieieva NAMNU») [Hygiene of Planning and Constructions of Residential Areas on Guard of Public Health (to the 85-th Anniversary of the State Institution «O.M. Marzieiev Institute for Public Health, NAMNU»). Kyiv ; Medinform ; 2017 : 116 (in Ukrainian).

2. Makhniuk V.M., Feshchenko K.D. and Mohylnyi S.M. *Ukrainian Journal of Radiology.* 2011 ; XIX (3) : 348-350 (in Ukrainian).

3. Myshkovska A.A. *Ukrainian Journal of Radiology.* 2011 ; XIX (3) : 350-352 (in Ukrainian).

4. Kostenetskyi M.I. *Dovkillia ta zdorovia.* 2015 ; 1 : 35-37 (in Ukrainian).

5. Pro vnesennia zmin do Derzhavnykh sanitarnykh pravyl i norm «Hiihienichni vymohy do vlashtuvannia ta ekspluatatsii renthenivskykh kabinetiv i provedennia renthenolohichnykh protsedur» [On the Introduction of the Amendments to the State Sanitary Rules and Norms «Hygienic Requirements to Arrangement and Operation of X-Ray Offices and Performance of X-Ray Procedures»]. Kyiv ; 2017. URL : <http://zakon.rada.gov.ua/laws/show/z1269-17> (in Ukrainian).

6. Hiihienichni vymohy do vlashtuvannia ta ekspluatatsii renthenivskykh kabinetiv i provedennia renthenolohichnykh protsedur : DSanPiN 6.6.3-150-2007 [Hygienic Requirements to Arrangement and Operation of X-Ray Offices and Performance of X-Ray Procedures : SSRN 6.6.3-150-2007]. URL : <http://zakon.rada.gov.ua/laws/show/ru/z1256-07> (in Ukrainian).

7. Dyrektyva Rady 2013/59/Euroatom vid 05.12.2013, shcho vstanovliuie osnovni normy bezpeky dlia zakhystu vid nebezpeky, shcho vynykaie vid ionizuiiuchoho vyprominiuvannia [Council Directive 2013/59/Euroatom, 5 December, 2013 Prescribing Basic Safety Standards for Protection from Ionizing Radiation]. URL : www.kmu.gov.ua/storage/app/media/uploaded-files/radi-201359evratom.pdf (in Ukrainian).

8. Normy radiatsiinoi bezpeky Ukrainy (NRBU-97) [Radiation Safety Standards of Ukraine (RSSU-97)]. URL : <http://zakon.rada.gov.ua/rada/show/v0062282-97> (in Ukrainian).

Надійшла до редакції 23.10.2018