

MINISTRY OF HEALTH OF UKRAINE
O.O. BOGOMOLETS NATIONAL MEDICAL UNIVERSITY

“Approved”

at the methodological conference of hygiene
and ecology department

Head of the department

correspondent member of NAMS of Ukraine,
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GUIDELINES
FOR STUDENTS

<i>Subject</i>	Hygiene and ecology
<i>Module № 1</i>	Assessment of the environment and its impact on the population health
<i>Submodule № 2</i>	Municipal hygiene
<i>Topic of the lesson</i>	Peculiarities of hygienic requirements to planning and exploitation of patient care institutions.
<i>Course</i>	6
<i>Faculty</i>	medical
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Kiev

1. Learning objective

1.1. To strengthen the students' knowledge of the hygienic requirements concerning the patient care institutions' location and planning on the basis of assessment and analysis of the study project materials and the normative documents; to teach the students to draw the hygienic conclusions, substantiated resolutions and give the recommendations.

2. Basics

2.1. You should know:

2.1.1. Basic hygienic requirements concerning the planning and regime of exploitation of the patient care institutions, the therapeutic, surgical, infectious diseases and other specialized departments.

2.2. You should have the following skills:

2.2.1. Using the construction drawings of the situational and general layout to determine and assess the project patient care institutions' location and territory zoning, taking into account objects, adjacent to the land parcel, "wind rose", correspondence with the site development, percentage of green area and the constructions' orientation.

2.2.2. Using the constructions' plans and slits to determine and assess the correspondence of the hospital premises' area, cubic capacity and sanitary accomplishment to hygienic standards; their correspondence to the functional purpose.

3. Self-training questions

3.1. Preventive sanitary inspection of the patient care institutions' project and building; its main stages. Constituents of the project.

3.2. Hygienic requirements concerning the location of the hospital within the settlement taking into account the adjacent objects and "wind rose". The situational layout.

3.3. Hygienic requirements concerning the hospital area general layout, the territory functional zoning, accomplishment, density of housing and green area.

3.4. Modern systems of the hospitals site development (centralized, blocked, decentralized-pavilion, mixed), their comparative characteristics, influence on the exploitation and equipment conditions.

3.5. Hygienic significance of the hospital constructions and departments' internal planning for the provision of the personnel labour and patient treatment hygienic conditions.

3.6. Hygienic requirements concerning the planning of the hospital admission departments; its significance for the exploitation regime and the hospital nosocomial infections prevention.

3.7. Hygienic requirements concerning the planning and the work regime of the therapeutic, surgical and infectious diseases departments.

3.8. Hygienic characteristics of the ward sections, the requirements for these sections rooms at different departments.

3.9. Hygienic requirements concerning the planning and equipment of wards and different purpose departments. Peculiarities of infectious diseases and intensive care units' planning and equipment.

3.10. Hygienic requirements concerning the planning, equipment and the exploitation regime of the surgical departments operating blocks.

3.11. Organization of nutrition in hospitals (centralized and decentralized forms of the patients' provision with hot food).

3.12. Hygienic requirements concerning the hospitals' sanitary facilities:

- natural and artificial lighting, heating, ventilation;
- water supply, removal and elimination of the hospital solid and liquid wastes, their peculiarities for infectious and surgical departments.

4. Self-training assignments

4.1. Draw the general layout of the mixed type hospital on 1:1 500 scale model following the territory zoning, norms of site development and green area, requirements of the constructions' purpose. Use materials from topic № 13 "Basics of the preventive sanitary inspection" for preparation.

5. Structure and content of the lesson (duration of the lesson 160 min + 10 min break)

5.1. Preamble – 5-10 min.

5.2. Test control for assessment of students' knowledge datum level – 10-15 min

5.3. Theoretical training – 30-40 min.

5.4. Typical situational tasks "Krok-2" solution – 30-40 min.

5.5. State exams situational tasks solution – 30-40 min.

5.6. Test control for assessment of students' knowledge final level – 10-15 min.

Hygienic requirements for the patient care institutions planning and accomplishment

The patient care institution site development area is selected taking into account several reasons:

- a distance from the farthest settlements of the population service zone: land plot must be connected with population service zone favorably (patient must be taken to the hospital in no more than 30 minutes);

- a distance from the possible air or soil pollution sources; the sources of noise, vibration, EMF, the emission of the industries, airports, railway stations, speed motorways and other, taking into account their sanitary and protection zones and “wind rose”;

- usage of the existing green area (park, wood);

- a flat countryside or a flank of hill towards the Southern points and others.

The site land area depends on the power, specialization and system of the hospital group of buildings site development (table 1).

The most suitable form of the hospital group of buildings land site is a rectangular one – with the sides’ ratio 1:2 or 2:3. The long axis should be oriented from the East to the West or from the North-East to the South-West (it provides the hospital constructions wards’ orientation towards the Southern points, but the operating rooms, delivery rooms, laboratories and X-ray departments – towards the Northern points (to prevent dazzling and overheating by solar rays)). Selecting the area, one should take into consideration the possibility of the hospital constructions joining the existing systems of water, sewerage, electricity, gas and heat supply, passages and drive conveniences.

Table 1

Standards to calculate the site land area for the adults’ in-patient hospital with the accessory buildings and constructions*

<i>Number of beds</i>	<i>Area norm per 1 bed, m²</i>	<i>Number of beds</i>	<i>Area norm per 1 bed, m²</i>
up to 50	300	> 400 to 800	100-80
> 50 to 100	300-200	> 800 to 1 000	80-60
> 100 to 200	200-140	> 1 000	60
>200 to 400	140-100		

Comment: for children’s hospitals the standard of in-patient department is taken with coefficient 1.5, for maternity hospitals = with coefficient 0.7.

Systems of hospital site development are:

- decentralized (pavilion), when each department is situated in the separate building;

- centralized-blocked, when all departments are situated in one (semidetached) building;

- mixed, when the majority of departments are situated in the central building but some separate ones (infectious diseases, children’s, psychiatric departments and so on) – in the isolated buildings.

The positive feature of the decentralized system is the possibility of patients to stay more outdoors; the drawback is the difficulty during the usage of the diagnostic, physiotherapeutic measures or their doubling, which increases the capital expenditure.

* The site land area for the hospitals in the suburbs is increased compared to the data from the table:

- at 15 % - for infectious and oncological hospitals;
- at 25 % - for the departments of the adults' rehabilitation;
- at 40 % - for the departments of the children's rehabilitation.

The possibility to widen or reconstruct the hospital group of buildings should also be taken into account.

The drawback of the centralized system is the difficulty of nosocomial infections prevention, decreased time or impossibility of the patients to stay outdoors.

The mixed system, when the infectious, psychiatric and children's departments are situated in the separate buildings, has none of abovementioned drawbacks, and that's why it is the most suitable.

The site land project of the patient care institution includes the following zones:

- a zone of the patient care buildings for non-infectious patients;
- a zone of the patient care building with infectious diseases;
- a polyclinic zone;
- a zone of morbid anatomical department;
- a household zone;
- a landscape zone.

The infectious, obstetric, children's, tuberculosis and psychiatric departments should have separate landscape zone of their own.

The hospital site housing density depending on the amount of beds should not exceed 10 – 15 %. Up to 60 – 65 % of the area should be occupied by all kinds of green area; 20 – 25 % - a household zone, passages and passageways. The size of the landscape zone should be not less than 25 m² per one bed.

The distances between the hospital buildings should be the following:

- between the walls with wards and doctors' rooms windows – 2.5 of the opposite building height but not less than 25 m;
- between the radiological building and other ones – 25 m;
- the morbid anatomical building and a household one – at the distance of 30 m from other buildings, residential including;
- between the buildings' flanks – not less than 30 m, from the polyclinic, women's consulting center and health centre – not less than 15 m.

The admission department for somatic patients (in the central building) and the rooms for the patients' discharge should be joined together and should include: the examination room, sanitary inspection room, the wards for temporary admitted patients' stay, the resuscitation and intensive care room, sometimes – the X-ray room.

There should be separate admission and discharge departments for the children's, obstetric, infectious, dermatovenerologic, tuberculosis and psychiatric departments.

The admission departments areas depend on the amount of patients supposed to be admitted during 24 hours.

The sanitary inspection room is planned according to the current principle and consists of: the examination room, cloakroom, bath-and-shower room, dressing room.

In the infectious, dermatovenerologic and tuberculosis departments the admitted patient's clothing is referred to the disinfecting department which is situated in the separate building within the household zone.

The laundry, central nutrition unit, boiler-room, garages and other hospital premises are also situated within the household zone.

Hygienic requirements concerning hospital departments

Each hospital department is intended for patients with similar diseases. It should include: ward sections for 25–30 beds, with 6–8 wards for 2–4 beds with the area of 7 m² per bed, not less than 2 wards for 1 bed with the area of 9–12 m² for severe somatic and infectious patients, with the cubic capacity of 20–25 m³ for each patient and the ventilation volume – 40–45 m³/hour. Except the wards in the ward, sector there should be a room for patients' day-time stay (area of 25 m²), glazed verandah (30 m²), and medical accessory premises: the doctor's room (8–9 m²), the procedure and manipulation room (12–15 m²), the medical nurse's station (4 m²), and in the surgical departments sections – dressing rooms (pure and purulent). Besides, there should be a bar with a canteen (for two ward sections with the area of 18 m²), a room for clean and dirty linen (each of 4 m²), a lavatory with a bathroom (10 m²), a lavatory for patients and for personnel, a sanitary room (6–8 m²), and a corridor. There can be two types of the corridor: a side one with windows facing towards the Northern points, or a central – with light gaps (halls).

The optimal ward windows orientation in the Northern hemisphere is the South-East or South. But there should be 1–2 wards with the orientation towards the Northern points for severely ill patients or patients with fever. Beds should be located parallelly to the light conductive wall for a patient to be able to turn back from the dazzling effect of the direct solar radiation. The natural lighting indices (near the internal wall) should be the following: the daylight factor – 1,3–1,5 %, the lighting coefficient – 1:4–1:6, the angle of incidence – not less than 27°, the angle of aperture – not less than 5°, the coefficient of depth of premises – not more than 2. The artificial lighting should be general, 30–60 lux, and the night light – 10–15 lux with lamps in the lower part of the walls.

The wards ventilation should be achieved by means of exhaust ventilation ducts, presence of window leaves and windows which can be opened; the modern hospitals should be equipped with air-conditioners.

In the infectious diseases units the following rooms should be equipped: box wards (with every bed isolation), semi-boxes (the isolated wards with common lavatory and bathroom), and absolute boxes (the isolated wards with lavatory and bathroom).

The operating block of a surgical department should be situated in the blind-ended projection or in the separate outhouse of the hospital. In the operating block there should be following rooms: the operating room – 30 m² (on the basis of 30–50 surgical beds in the department; for the complex operations – 40–45 m²), the pre-operating room – 10–12 m², the sterilizing room (one for two operating ones), the anesthetic room – 15 m², the instrumental room, the surgeon's room (for protocols), the laboratory of the express tests, the plaster dressing room, the room of the mobile diagnostic, resuscitative apparatuses and the anesthetic equipment, the premises for the sterile and used operating linen, the washing and shower room for the operating brigade, the postoperative resuscitative wards, the lavatories for personnel, the operating nurse's room and others depending on the surgical department type.

In the surgical departments there should be pure and purulent dressing rooms.

There are some peculiarities of the children's departments and hospitals, tuberculosis, psychiatric and other specialized patient care institutions' planning; they are explained in the normative documents and can be learned if it's necessary.

Hospital – is the main treatment and prophylactic institution of public medical service.

The main functions of the hospital are

- diagnostics
- rehabilitation
- prevention
- health education
- training of doctors and paramedical personnel

For hundreds patients it is temporary habitation with dinning-hall, bathroom, laundry.

At the same time hospital is a public building.

Here occur physician's and paramedical personnel's work

- carrying on health education
- studying medical students
- carrying out research activities
- introduction of modern treatment mode

Hygienic requirements for the patient care institutions planning and accomplishment

1). a distance from the farthest settlements of the population service zone: land plot must be connected with population service zone favorably (patient must be taken to the hospital in no more than 30 minutes);

2). a distance from the possible air or soil pollution sources; the sources of noise, vibration, EMF, the emission of the industries, airports, railway stations, speed motorways and other, taking into account their sanitary and protection zones and "wind rose";

3). usage of the existing green area (park, wood);

4). a flat countryside or a flank of hill towards the Southern points and others.

5). The site land area depends on the power, specialization and system of the hospital group of buildings site development.

6). The most suitable form of the hospital group of buildings land site is a rectangular one – with the sides' ratio 1:2 or 2:3.

7). The long axis should be oriented from the East to the West or from the North-East to the South-West

8). Selecting the area, one should take into consideration the possibility of the hospital constructions joining the existing systems of water, sewerage, electricity, gas and heat supply, passages and drive conveniences.

Hygienic requirements concerning the planning, sanitary appliance, optimal regime of exploitation of the patient care institution separate departments

1). The optimal air temperature in the wards in winter and during the transitional period should range from 19 to 22°C, the relative humidity should be 40-60 %, the air movement speed within the limits of 0.05-0.1 m/sec.

2). In the nursery, post-operative wards, burns units and in case of fever of the infectious patients the air temperature should be a bit higher – 22 – 25°C, and for patients with thyrotoxicosis – lower – 18 – 22°C.

3). The allowable CO₂ concentration in the hospital premises being an index of air pollution by the vital functions products of the patients and personnel, excreted by skin and during breathing, also with dust and microorganisms, should range within the limits of 0.07 – 0.1 %.

4). Indices of hospital air pollution, such as air oxygenation (20 – 24 mg O₂/m³) and the microbial figure (500 – 1 000 per m³ in the operating room, up to 3 500 per m³ in the wards), also have been calculated and scientifically substantiated.

5). In the operating room the concentration of the anesthetic preparations is also standardized.

6). Insolation and its UV component are of great importance; therefore the majority of windows (more than 50 %) face towards the south-east and south.

7). Natural ward lighting should provide the daylight factor (DF) of not less than 1%, the lighting coefficient (LC) 1:5 – 1:6; in the procedure, manipulating, dressing and operating – DF respectively is 1.5 – 2 %, LC – 1:3 – 1:5.

8). Artificial illumination by the incandescent lamps should be not less than 30 lux in the wards, 100 – 150 lux in the procedure, manipulating and dressing rooms, 200 – 1 000 lux in the operating rooms.

Hygienic characteristics of occupational hazards for different medical personnel

The occupational exercise load and hazards of the surgical specialties doctors include:

- the number of surgical interventions – up to 150 per year in general surgery, 170 – in otorhinolaryngology, 370 – in obstetrics and gynecology. The number and complexity of the operations increase with the raising the level of the surgeon's skill;
- the forced body position with the trunk frontal bending and the prolonged static tension of muscles of the shoulder girdle, back and stretched forward arms;
- the hot microclimate of the operating room with high streams of the radioactive heat from the artificial lighting sources (shadowless lamp);
- the ionizing radiation during the X-ray examinations, especially in traumatology, vascular surgery, neurosurgery;
- the toxic effect of the narcosis agents (nitrous oxide, halothane, chloroform, diethyl ether) and anesthetics;
- high mental and nervous-emotional exertion, connected with the complexity and duration of the surgical intervention, possible post-operative complications and responsibility for patient's life.

Among the diseases afflicting the surgical specialties doctors with temporary disability the most widespread are the diseases of nervous system, cardio-vascular system, digestive system and acute respiratory diseases.

Among chronic diseases of these specialists such diseases, as the diseases of cardio-vascular system, neurasthenias, connected with high psycho-emotional and

physical load should be mentioned. They are: angina pectoris, hypertension, vegeto-vascular dystonia and neurasthenia.

There are frequent diseases due to the prolonged standing at the surgical table: radiculitis, osteochondrosis, dyskinesia, varix dilatation of the lower extremities.

Surgeons' disability or necessity to change their occupation in 60 – 80 % cases can be explained by chronic intoxication with narcotic agents and anesthetics, in 11 – 20 % cases - by the infectious diseases, 9 – 10 % cases - by physical and nervous overexertion.

Hygienic peculiarities of labour conditions and health status of the therapeutic doctors depend on the patient service forms. In case of polyclinic, district service, the leading role belongs to the excess physical load, which depends on the year season (amount of calls), the size of the doctor's district and the type of the buildings (detached houses or many-storey buildings, elevator's presence or absence). These specialists may also suffer from psycho-emotional exertion and different physical factors' unfavourable effect – X-ray, UHF, ultrasound, laser and other diagnostic and physiotherapeutic measures, chemical harmful substances – the pharmacological preparations, from which nurses suffer more frequently.

Occupational diseases of therapeutic doctors, first of all of the phthisiatricians, infectiologists, specialists in skin and venereal diseases, helminthologists, the laboratory assistants at the bacteriological, virological, helminthological laboratories include the corresponding infections; phthisiatricians, X-ray doctors, radiologists suffer from dermatitis, eczemas, toxicodermia, melanomas, leucosis, skin cancer, radiation sickness; psychiatrists – psychoneurosis and others.

One of the main occupational hazards for dental doctors is their forced standing with the bending and turning trunk position which leads to the prolonged static tension of the corresponding muscles groups; noise and vibration due to drilling machine, sight exertion, blinding effect of the photopolymer lamp, penetration of mercury fumes from the mercury amalgam into the respiratory organs, fumes of the polymer materials solvents, danger of infection from the patient with the upper respiratory tract diseases during the incubation or convalescence stage, while performing the manipulations connected with the patient's mucosal membrane or blood contact.

Above mentioned hazards can result in bearing disorder (34-45%), varix dilatation of the lower extremities (19-49%), signs of the vibration diseases (paresthesia, loss of hands' temperature sensibility and perceptibility, Dupuytren's contracture).

The visual analyzer exertion can lead to the accommodation spasm, so-called false myopia, and sore eye.

AIDS, prion diseases, hepatitis B and C can be transmitted through saliva, gum tissue and open wound.

Measures for improvement of the medical personnel labour conditions

One of the main conditions of the medical personnel labour protection and successful patient treatment is planning of architectural solution of the medical institutions, the base of this solution are the building norms and rules (BN&R-II 69–78 “Patient care institutions”). These norms consist of the list of all necessary premises

depending on the hospital specialization, departments, their interposition, the area measures, cubic capacity, and special requirements to the location, area, protective properties of walls and floor and ceiling in the X-ray, radiological, and physiotherapeutic departments' walls and overlap. Special norms and requirements to the buildings of the infectious, tuberculosis etc. departments and hospitals exist.

Sanitary norms and rules (SN&R) and the State Standard № 12.1.005 – 76 “The air of working zone. General sanitary and hygienic requirements” imply the creation of the optimal microclimate conditions in separate functional premises of hospitals, natural and artificial lightning, sanitary appliance etc. The modern operation rooms also are assumed to have the local ventilation (aspirators) in the zone of the anesthesiologist's working place, the systemic laboratory control of the anesthetics concentration in the air. The most effective prophylactic measure against the anesthetics' toxic effect for the operating brigade members is the transition to the intravenous narcosis and spinal anesthesia.

Personal protective equipment of body, eyes and respiratory organs are widely used.

To be protected from the ionizing and non-ionizing electromagnetic radiation, methods based on physical laws of radiation decay, which are stated in the legislative and organization direction are used. They include the protection by means of the radiation sources capacity limitation, distance, time, and shielding.

Thus, the legislation implies limit doses of the ionizing radiation, maximum allowable concentrations of radionuclides in the air of working zone (Norms of radiation safety of Ukraine (NRSU)-97), their maximal allowable activities at the working place and other.

In order to keep health of medical personnel with harmful labour conditions, the legislation establishes the half day:

- 4-hour-day – for medical workers directly connected with the bare radionuclides;
- 5-hour-day – for personnel connected with sealed sources of the ionizing radiation (gamma-, X-ray), also for morbid anatomists, prosectors, forensic medical experts, anatomists;
- 5.5-hour-day – for doctors of the tuberculosis, psycho-neurological centers, physiotherapists, dentists;
- 6-hour-day – at the infectious, tuberculosis, psychiatric, narcological, balneal, radon, laboratory departments.

The leading position in the system of medical personnel health care is occupied by preventive and periodical medical examinations, regulated by the Order of the former USSR Ministry of Public Health (MPH) № 555 from 29.09.1989 and by the Order of Ministry of Public Health of Ukraine № 45 from 31.03.1994. According to these orders, such preventive and periodical medical check-ups are obligatory for the medical personnel with harmful labour conditions as well.

Issues of the medical personnel labour protection are also implied by the “Law on labour protection of Ukraine” (1992), the list of regulations and standards of the Labour Code (LC).

A regional hospital for 510 beds with a polyclinic for 1 000 visitors per shift*
(the project is worked out by the chair)

An explanatory note

A regional hospital group of buildings for 510 beds with a polyclinic for 1 000 visitors per shift is a center of providing population with a high qualified medical assistance; it is obliged to serve the district town and the district itself with a population of up to 100 thousand people taking into account other existing district hospitals.

The group of buildings consists of central building for 450 beds (9-storey one), the infectious one for 60 beds, the polyclinic or out-patient building (2-storey one) and accessory premises (1-storey building).

The polyclinic for 1 000 visitors per shift should provide the medical assistance to the population of up to 40 thousand and to provide them with the medial consultations.

The hospital is an organization, methodical and consulting centre for the patient care institutions of the entire district.

The hospital comprises 10 departments which are listed below.

The treatment and accessory premises of the hospital comprise the central building, the intensive care unit, the rehabilitation, X-ray, admission and administrative departments; there are the operating block and the clinical diagnostic laboratory. This project can be used within the I-B, II and III climatic zones.

To build the hospital group of buildings, a site with area of 7.3 hectares is required.

The hospital territory is divided into the following zones: the in-patient, the out-patient buildings (polyclinic), the infectious diseases unit, the household and accessory premises and landscape area (see fig. 44.1).

The central building departments should occupy the next floors:

1st floor – the obstetric department, the children’s department for 30 beds for the children till 1 year old, the admission department and the central hospital entrance;

2nd floor – the rehabilitation, obstetric and children’s (for 30 beds for children till the age of 6) departments (see fig. 44.1-3);

3rd floor – the rehabilitation, intensive care and children’s (for 30 beds for children after the age of 6) departments;

4th floor – the therapeutic department consisting of 2 sections for 30 beds and rehabilitation (see fig. 44.2-2);

5th floor – the neurological department for 30 beds, the therapeutic section for 30 beds and the X-ray department;

6th floor – the functional diagnostics department, the gynecological department consisting of 2 ward sections for 30 beds;

7th floor – the chemist’s shop, the otolaryngological department for 30 beds and the ophthalmologic one for 30 beds as well;

8th floor – the surgical department consisting of 2 ward sections for 30 beds and the clinical diagnostic laboratory;

9th floor – the trauma unit for 30 beds and the operating block (see fig. 44.2-1).

*The chair can prepare another variant of the study (or real) project of the hospital institution.

The treatment and diagnostic departments are situated on each floor near the in-patient departments and are interconnected with them.

The ward sections have a short main corridor, lighted on each side. At the place where the corridors are crossed there should be projected halls of the day-time stay and the nurses on duty stations (se fig. 44.2-5).

The infectious diseases unit for 60 beds is projected in the U-shaped 1-storey building, where the boxes' section for 30 beds (one flank) and the semi-boxes' section for 30 beds (another flank) are situated.

The morbid anatomical department is projected in the separate isolated building.

The household block is projected as an isolated building and household yard where central heat post, boiler house, garage, workshop, laundry and nutrition unit are located.

The hospital is projected in the skeleton bearing-wall constructions of II-04 series.

The hospital buildings are provided with the central water heating system, the tidal-exhaust mechanical ventilation, hot water supply from the boiler room, the electricity supply from the transformer substation and low current from the district telephone station and internal ATS.

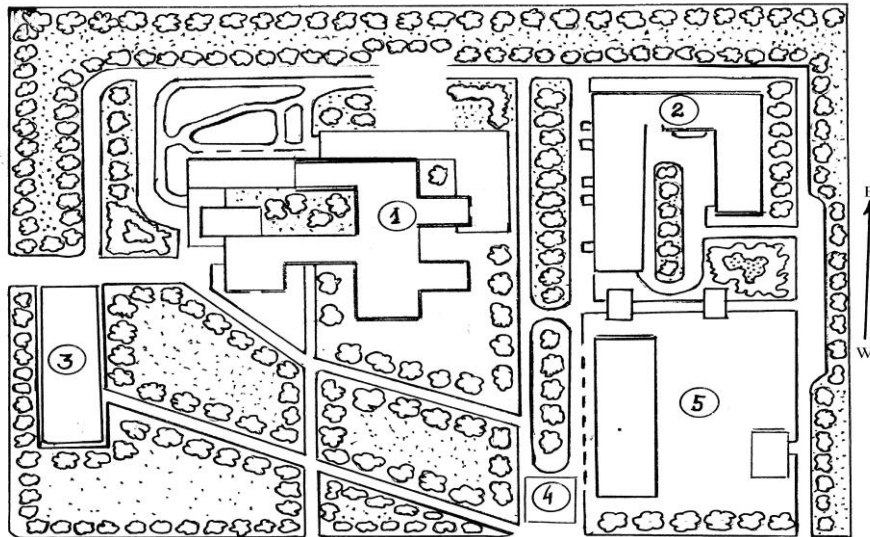


Fig. 44.1 A scheme (the general layout)

The notation conventions:

1. 9-storey central building with the diagnostic and treatment department and the in-patient department for 450 beds.
2. 1-storey infectious diseases unit for 60 beds.
3. 2-storey polyclinic.
4. the morbid anatomical building.
5. the household zone.

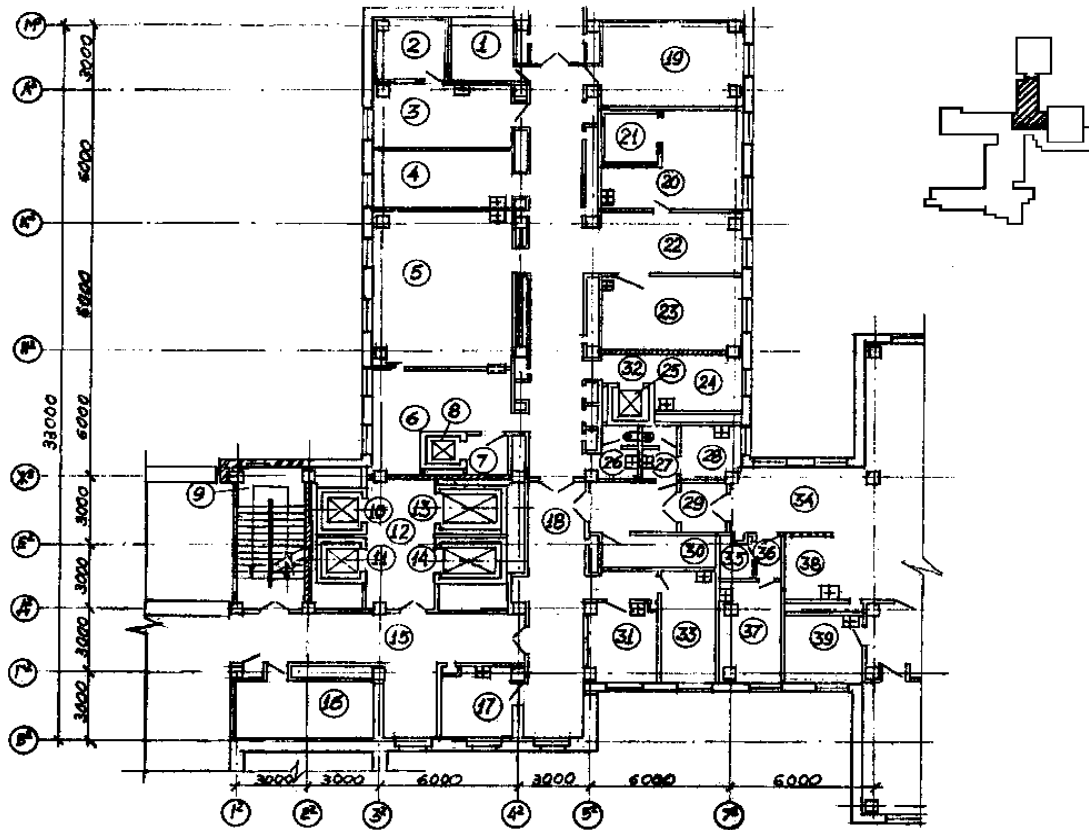


Fig. 44.2-1 The operating block typical plan fragment

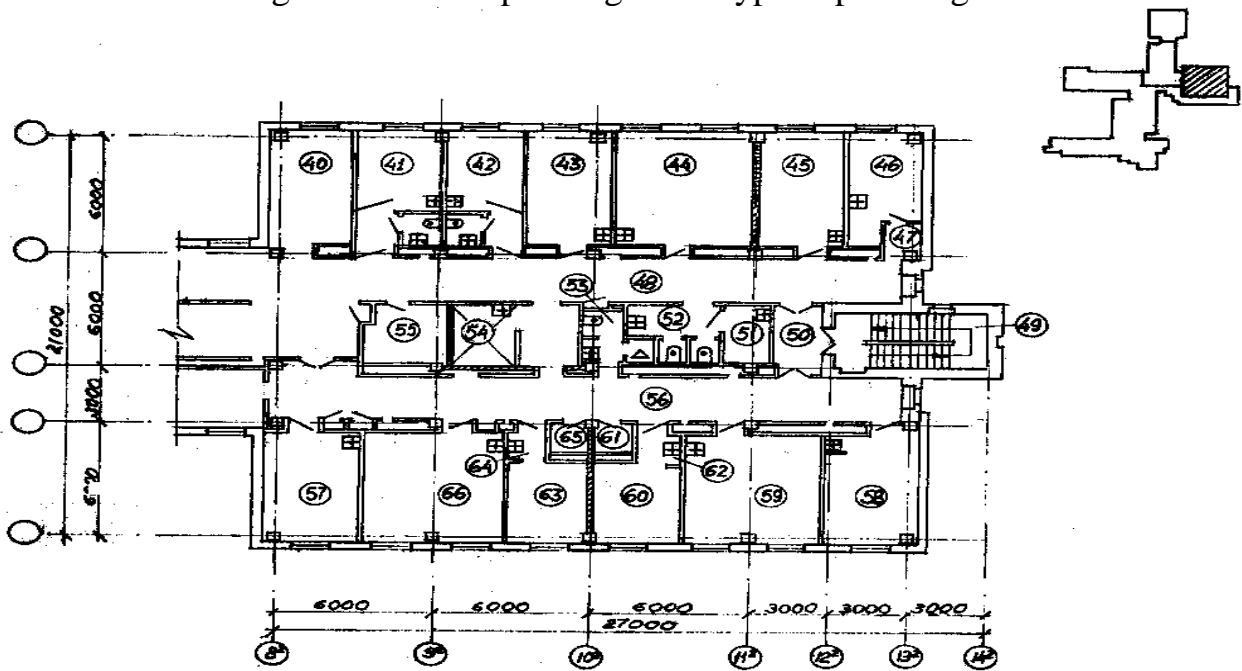


Fig. 44.2-2 The therapeutic department typical plan fragment

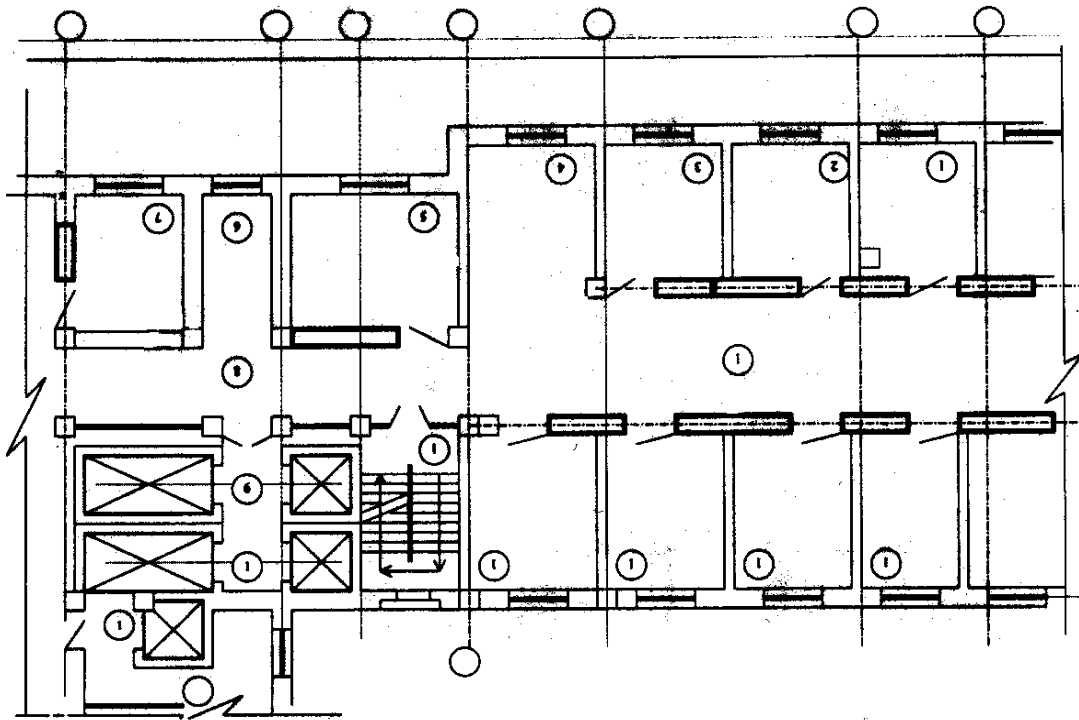


Fig. 44.2-3 The children's department typical ward section

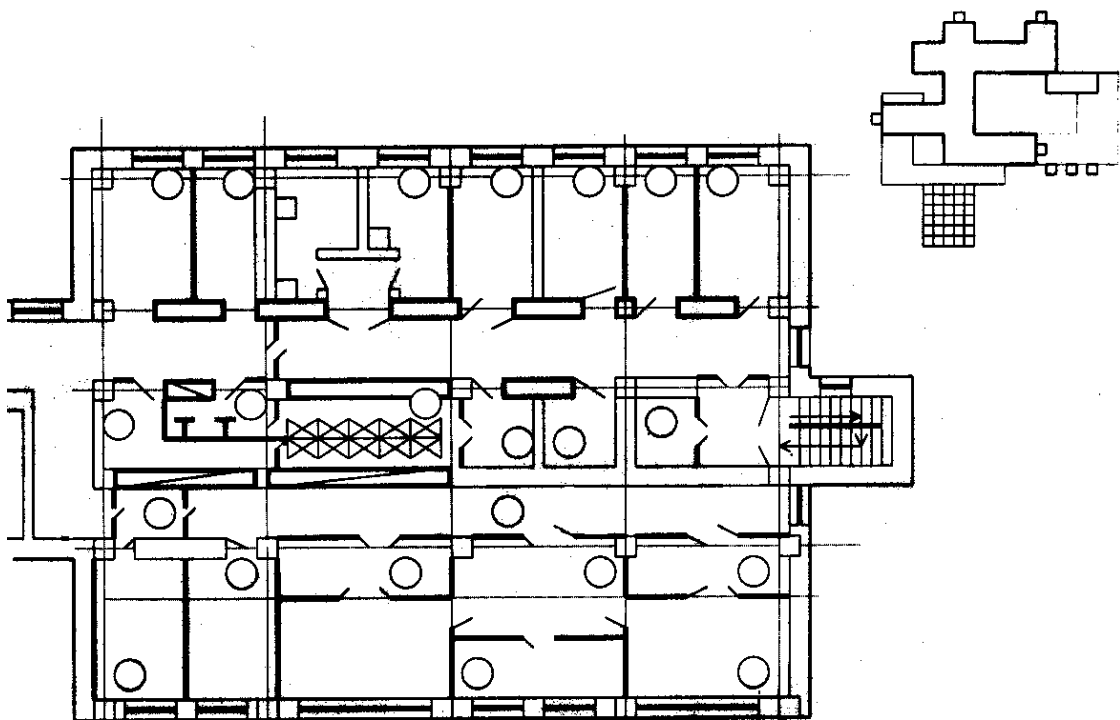


Fig. 44.2-4 The infectious department typical ward section

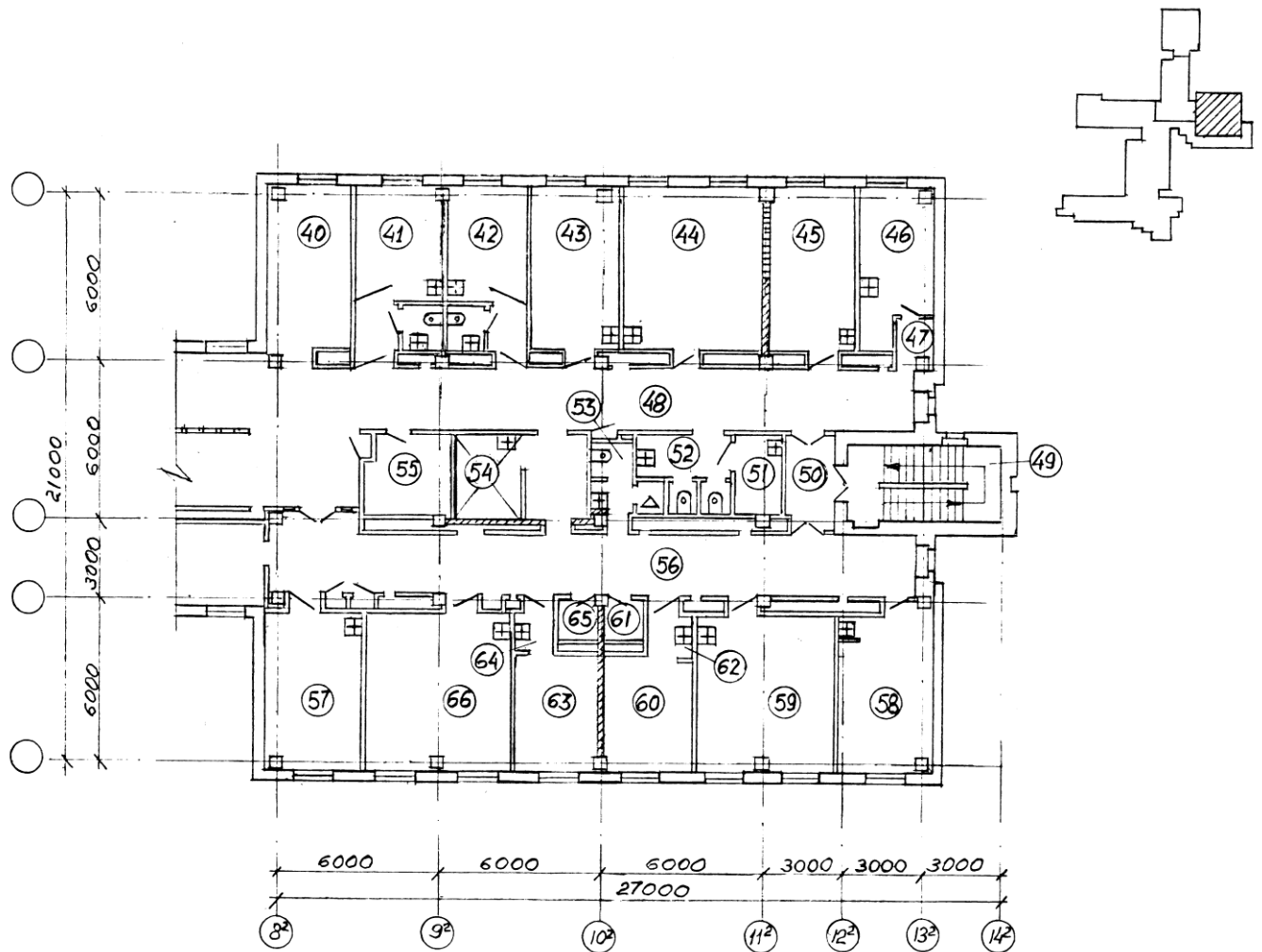


Fig. 44.2-5 The typical ward section fragment

1. Literature

a. Principal:

6.1.1. Гончарук Є.Г., Бардов В.Г., Гаркавий С.І., Яворовський О.П. та ін. Комунальна гігієна/За ред. Є.Г. Гончарука. – К.: Здоров'я, 2003. - С. 615-657.

6.1.2. Габович Р.Д., Познанский С.С., Шахбазян Г.Х. Гигиєна.- Київ. 1983.- С. 277-308.

6.1.3. Даценко І.І., Габович Р.Д. Профілактична медицина. Загальна гігієна з основами екології. Навчальний посібник. К.: Здоров'я, 1999. – С. 466-608.

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6.1.5. Lecture materials.

b. Additional:

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6.2.2 Санитарные правила устройства, оборудования и эксплуатации больниц, родильных домов и других лечебных стационаров. (СанПиН 5279-90). – М., 1990.

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2. Hygiene and ecology / V.A. Korobchanskiy, M.P. Vorontsov, A.A. Musulbas. – Kharkov, 2006. – 207 p.

3. Medicine of emergency situations: textbook for students of higher medical institutions / V.V. Chaplyk, P.V. Oliynyk, S.T. Omelchuk, V.V. Humenyuk. – Vinnytsia: Nova Knyha, 2012. – 344 p.

4. General nutrition: Study guide for the 4th accreditation level Medical School Students / edited by S.T. Omelchuk, O.V. Kuzminska. – Kyiv, 2016. – 146 p.

5. Гигиена и экология: учебник для студентов высших медицинских учебных заведений. – Винница: НОВА КНИГА, 2008ю – 720 с.

7. Equipment required for the lesson

7.1. санитарные правила устройства, оборудования и эксплуатации больниц, родильных домов и других лечебных стационаров СанПиН 5279-90.