

HEALTH, ENVIRONMENT, DEVELOPMENT**HYGIENIC ASPECTS OF ARCHITECTURAL AND PLANNING SOLUTIONS
FOR THE CONSTRUCTION OF MENTAL HEALTH FACILITIES****Valentyna Chorna**

Candidate of Medical Sciences, Associate Professor, Associate Professor at the Department of Disaster Medicine and Military Medicine, National Pirogov Medical University Vinnytsya, Captain of the Reserve Medical Service, Ukraine
e-mail: valentina.chorna65@gmail.com, orcid.org/0000-0002-9525-0613

Valentyna Makhniuk

Doctor of Medical Sciences, Professor, Head of the Laboratory for Hygiene of Planning and Construction of Settlements, State Institution "O. M. Marzиеv Institute For Public Health" National Academy of Medical Science of Ukraine, Doctor of the Highest Qualification Category in the Specialty "General Hygiene", Ukraine
e-mail: smoil@ukr.net, orcid.org/0000-0001-6196-4370

Summary

In order to take into account the hygienic aspects of architectural and planning solutions in the construction of new mental health facilities (general hospitals, crisis units, hospices, psychological care centers, etc.), multidisciplinary groups should be involved – architectural and planning, urban planning units, the public, medical representatives of medical institutions, relatives, patients, to take into account all the necessary in-hospital factors. To conduct a hygienic assessment of architectural and planning solutions for buildings of psychiatric health care institutions in Ukraine that were built in the eighteenth and nineteenth centuries and to provide a comparative description of the hygienic standards of psychiatric health care institutions in different countries. The study was conducted on the basis of the analysis of the DBN B.2.2-10:2022 "Health Care Facilities", scientific sources of domestic and foreign scientists. A survey was conducted among chief physicians of psychiatric hospitals in Ukraine on safe sanitary and hygienic, anti-epidemic conditions of psychiatric health care facilities. There were 55 psychiatric hospitals in Ukraine before the outbreak of full-scale war: 28.6% of them were built in the eighteenth and nineteenth centuries (from 1786 to 1945), 28.6% after the Great Patriotic War (from 1945–1991), and 42.8% during the period of Ukraine's independence (from 1991–2013). Only 25% of psychiatric institutions have playgrounds for outdoor games equipped with tennis tables and volleyball nets (for table tennis and volleyball), 25% of hospitals have playgrounds for quiet recreation (chess, dominoes), and 12.5% have playgrounds for physical education and recreation (sports and play areas). At the same time, 41.6% of these sites are in satisfactory condition.

Ukraine has adopted the State Construction Standards of Ukraine DBN B.2.2-10:2022 "Healthcare Facilities. Basic Provisions". It provides basic provisions for the design of health care facilities (buildings and structures of all types of health care facilities) during

new construction and reconstruction or during major repairs in health care facilities. However, there is currently no formal sanitary legislation containing sanitary, epidemiological and hygienic requirements for the decoration, equipment and operation of health care facilities with inpatient units.

Key words: architectural and planning solutions, construction, mental health care facilities, state building codes.

DOI <https://doi.org/10.23856/5926>

1. Introduction

In order to take into account the hygienic aspects of architectural and planning solutions in the construction of new mental health care facilities (general hospitals, crisis units, hospices, psychological care centers, etc.), multidisciplinary groups should be involved – architectural and planning, urban planning units, the public, medical representatives of medical institutions, relatives, patients, to take into account all the necessary in-hospital factors (Rosen, 2022, Merner, 2023, Chorna, 2022). All these issues should take into account ensuring the effective work of medical staff, which would motivate and satisfy their professional needs, namely: reduce emotional exhaustion; create appropriate conditions for visual supervision of patients during exacerbation of their behavior and to protect them from their aggressive actions; level the manifestations of stigmatization; create comfortable conditions for patients with mental disorders of the "healing architectural environment", that is, safe, private, home stay of patients until their full recovery and return to the (McDerott, 2014, Bach, 2018, Chorna, 2021).

There were 55 psychiatric hospitals in Ukraine before the outbreak of full-scale war: 28.6% of them were built in the eighteenth and nineteenth centuries (from 1786 to 1945), 28.6% after the Great Patriotic War (from 1945–1991), and 42.8% during the period of Ukraine's independence (from 1991–2013). The buildings of psychiatric institutions in Ukraine in the pre-revolutionary period were used for other purposes, such as former barracks for soldiers, royal stables, and religious buildings. The buildings of psychiatric hospitals were constructed according to the "corridor" type and universal sanitary facilities were located at the end of the corridor for all patients (Chorna, 2020, 2021).

Prior to the full-scale invasion of Ukraine, 91 facilities provided psychiatric care under the "Inpatient Psychiatric Care" package and 65 facilities under the "Psychiatric Care Provided by Mobile Multidisciplinary Teams" package. According to the Ministry of Health of Ukraine, one in five people in Ukraine will suffer severe mental trauma due to the consequences of a full-scale war, and one in ten will experience anxiety, depression, moderate to severe psychosomatic disorders that may last from 7 to 10 years while the war continues. About 15 million Ukrainians, including more than 7.7 million internally displaced persons (IDPs), need psychological counseling, and 3–4 million Ukrainians need medication (Chorna, 2022, 2023, WHO, 2021).

According to Moitra M (2022), who conducted a systematic review of 84 countries in the period 2000–2019 on the provision of medical care for patients with depressive disorders, found that in high-income countries, mental health care coverage was 51% (33% received treatment) and in low-income countries up to 20% (8% received treatment). The level of minimum adequate treatment in high-income countries was 23%, and in low-income countries – 3% (Moitra, 2022).

According to Lu J. (2021), the prevalence of depressive disorders in Chinese women is higher among unemployed men than among employed women. And the prevalence of the disease also exceeds the level of treatment and treatment, which was 9.5%, of which 3.6% received specialized psychiatric care, 2.7% received community care, 1.5% received general medical care, 0.3% received social care, and only 0.5% of patients with depressive disorders received adequate treatment. The problem of providing timely medical care is exacerbated by the fact that it is more difficult for people living in rural areas to receive timely specialized care due to problems with the construction of infrastructure between cities and villages, and the lack of institutions providing psychological/psychiatric care at the place of residence. This problem is not solved in many countries of the world, but high-income countries set it as one of the priorities for health care (Lu, 2021, Hu, 2018, Yang, 2020).

2. Materials and methods

To conduct a hygienic assessment of the architectural and planning solutions of buildings of psychiatric health care institutions in Ukraine that were built in the eighteenth and nineteenth centuries and to give a comparative description of the hygienic standards of psychiatric health care institutions in different countries. The study was conducted on the basis of the analysis of the DBN B.2.2-10:2022 "Health Care Facilities", scientific sources of domestic and foreign scientists. A survey of chief physicians of psychiatric hospitals in Ukraine was conducted on safe sanitary and hygienic, anti-epidemic conditions of psychiatric health care facilities (*State Construction Standards of Ukraine B.2.2-10:2022 "Healthcare facilities", 2022*).

3. Results

We have developed and sent to the chief physicians of psychiatric hospitals in Ukraine a "Questionnaire for scientific sanitary and epidemiological assessment of the conditions of psychiatric hospital accommodation". Based on the analysis of a set of questions on sanitary and epidemiological and hygienic parameters characterizing the buildings of domestic psychiatric hospitals, the location of medical buildings and auxiliary units on the land plot, i.e. the design of the buildings, was determined.

In particular, 50% of psychiatric hospitals are located in combined buildings, 25% have a pavilion system (separate buildings), 12.5% each have a centralized system (all in one building) and a block system. The number of floors in psychiatric hospital buildings up to 2 floors is 50%, up to 3 floors – 37.5%, and up to 5 floors, which were built since 1960 – 12.5%.

The service radius of psychiatric hospitals according to the existing urban planning situation is 58.3% up to 1000 meters, 25.0% up to 500 meters and 16.7% up to 300 meters. The location of the land plots of psychiatric hospitals in relation to adjacent industrial enterprises and highways according to the existing urban planning situation is 66.7% – 1000 meters and 33.3% – 300 meters. Plots of psychiatric institutions adjacent to the main street amounted to 33.3% and partially adjacent – 33.3%.

Only 87.5% of hospitals have full fencing, and 12.5% have partial fencing. The height of the fence reaches up to 1.5 m in 12.5% of facilities, up to 2 m in 50%, and over 3 m in 37.5%. In 37.5% of facilities, the fence is concrete, in another 37.5% it is combined (concrete and mesh), in 12.5% it is mesh, and in 12.5% it is made of greenery only.

The pavement of entrances, exits, and pedestrian walkways will be removed in 16.6% of all psychiatric institutions. The territory of psychiatric institutions is provided with outdoor

lighting in 75% of them, while 8.3% and 16.7% do not have any lighting. The distance of ward buildings to the nearest trees with a wide crown is up to 7 meters in 8.3%, 5 meters in 41.7%, and 3 meters in 50.0%.

The average proportion of the hospital's land area per patient is 237.4 m².

Based on the results of the questionnaire analysis, the number of equipped functional areas in psychiatric hospitals, partially equipped and no areas at all in psychiatric facilities for patients with mental disorders was determined (Table 1).

Table 1

Functional zoning plots of psychiatric healthcare institutions of Ukraine, %

Functional areas	Available and equipped zones	Partially equipped	Missing zones
treatment area	75	0	25
occupational therapy area	25	16,7	58,3
physical training area	50	8,3	41,7
recreation area	83,1	0	16,9
area for patients' meetings hospital with relatives	83,4	8,3	8,3
walking courtyards for each department	83,4	8,3	8,3
economic zone	100	0	0

The assessment of the functional zoning of the hospital site shows that 50% of psychiatric hospitals have a physical education area, 8.3% are partially equipped, and 41.7% are missing. Walking courtyards for each ward are available in 83.4% of institutions, partially equipped in 8.3%, and absent in 8.3%. The area of green space in psychiatric hospitals is 83.3%.

The recreation area includes the following areas (Table 2).

Table 2

Main recreation areas for patients with mental disorders in health care facilities, %

Types of sites	Equipment	Absent
a playground for outdoor games for patients	41,6	58,3
a playground for quiet relaxation	41,6	58,3
sports and game zone (stadiums)	33,3	66,7

Only 25% of psychiatric institutions have playgrounds for outdoor games equipped with tennis tables and volleyball nets (for table tennis and volleyball), 25% of hospitals have playgrounds for quiet recreation (chess, dominoes), and 12.5% have playgrounds for physical education and recreation (sports and play areas). At the same time, 41.6% of these sites are in satisfactory condition.

The analysis of the questionnaire's block of questions on the conditions of stay, treatment and rehabilitation of mentally ill patients revealed the possibility of organizing occupational therapy in 25% of psychiatric hospitals, where special workshops are equipped and patients can acquire professional skills, and partially equipped in 16.7% of institutions.

The second block of questions in the questionnaire on sanitary and epidemiological assessment of the conditions of the in-hospital environment of a psychiatric/

psychoneurological hospital concerned the availability of physiotherapy rooms in 66.7% of psychiatric hospitals. These rooms are equipped with old devices: Iskra-1 local dareonvalidation apparatus, Potok-1 galvanizer, ORK-21 irradiator, ultrasound, Radius-01 electrification apparatus, Almaz-014 magnetic therapy apparatus, Solux stationary lamp, GINT-11 physiotherapy apparatus, UHF therapy apparatus, UVO-UHN-1 irradiator. Physiotherapy procedures are auxiliary methods of treatment and rehabilitation. Physiotherapy is prescribed in combination with drug therapy for patients with mental disorders and plays an important role in treatment.

The results of the survey revealed the following: 8.3% of patients have their own desks, 58.4% have their own chairs, 50.0% use their own bedside tables and 25% use wardrobes to store their personal clothes (Table 3).

Table 3

Provision of institutions with furniture, bedding, and alarm systems, %

	Secured	Partially secured	Unsecured
Desk for a patient	8,3	16,7	75
Chair for the patient	58,4	33,3	8,3
Bedside table for patient's belongings	50	33,3	16,7
Wardrobe for patient's personal belongings	25	25	50
Curtains on the windows of the ward	50	16,7	33,3
Bed linen for the patient	100	0	0
Towels for the patient	83,3	16,7	0
Alarm system in the department	33,3	41,6	25,4
Alarm system in the wards	21	8,3	70,7
Alarm in sanitary and hygienic rooms	8,3	0	91,6

The sanitary and technical condition of the premises, ceilings, floors, doors, windows is satisfactory in 75%, partially satisfactory and in need of repair in 25%, according to the results of the questionnaire analysis.

All institutions are 100% provided with carbon dioxide fire extinguishers.

As for the water supply of the premises with cold and hot water.

Water sampling for household and drinking needs was in line with the requirements of Sanitary and Epidemiological Standards 2.2.4-171 and DSTU 7525. Water sampling is carried out on a regular basis in accordance with the monitoring of the Regional Laboratory Centers.

The provision of cold water for various purposes is shown in Table 4.

Availability of centralized hot water supply in 66.7% of psychiatric institutions.

Sanitary and hygienic and sanitary-technical condition of the premises of psychiatric health care facilities according to the questionnaires: personal hygiene cabins for women are equipped in 41.7% of facilities, doors between partitions in the toilet room are available in 50% of psychiatric facilities.

The provision of the necessary sanitary equipment for the premises of the food distribution rooms and technical equipment is satisfactory in all institutions. In 25% of the dining rooms there are no conditions for hand hygiene (no handwashers); patients wash their hands in sanitary rooms.

Table 4

Provision of with cold and hot water for various purposes in psychiatric hospitals, %

Premises	Provided with cold running water	Not provided with cold running water
Resident rooms	50,0	50,0
Sleeping rooms	33,3	66,7
Rooms for occupational therapy	41,7	58,3
Rooms for medical and therapeutic classes	25	75
Art therapy rooms	33,3	66,7
Room for rehabilitation classes	33,3	66,7
Room for storing clothes	16,7	83,3
Room for visits by relatives of patients	41,7	58,3
Observation room	25	75
Isolation room	58,3	41,7

South-facing windows of bedrooms have sun protection devices: curtains and in 8.3 facilities they are equipped with blinds. For the safety of patients, the windows of sleeping rooms are equipped with bars in 75% of facilities. The color spectrum of the walls ranges from beige, white, and olive. The height of the walls reaches from 2.4 meters in institutions built during the period of independence to 3 meters (institutions built before independence).

For physical education in psychiatric facilities, 16.6% of the facilities have rooms for physical education, 50% have partially equipped corners for physical education, and 33.4% of the facilities do not have rooms or corners. Daytime sleep for all patients begins from 15.00 to 16–17.00 hours. The duration of the walks depends on the season, on the equipped walking yard in the ward, and on the patients' condition.

Separate rooms in hospitals where court proceedings are held in cases stipulated by Article 14 of the Law of Ukraine "On Psychiatric Care" are available in 66.7% of the surveyed institutions. 58.3% of institutions have rooms for satisfying patients' religious beliefs and conducting religious rites, and 66.7% have rooms for concerts and other events for patients.

At the end of the questionnaire, we asked the chief physicians of psychiatric institutions the following question: "In your opinion, what do you think about the reform of psychiatric care in accordance with the changes in European countries and changes in the Law of Ukraine "On Amendments to Certain Legislative Acts of Ukraine on Psychiatric Care" of 2017 No. 51–52, and what do you propose regarding the mechanism of financing of health care facilities". The percentage in favor of maintaining state funding is 25%, and the transition to a mixed funding system with the introduction of health insurance is proposed at 75%. To the question: "In your opinion: "To transfer powers in the field of mental health care", the answers were as follows: 91.7% – to the Ministry of Healthcare and 8.3% – using the example of the Republic of Poland: all levels of self-government – to united territorial communities (UTCs) – public healthcare facilities.

4. Discussion

Ukraine has adopted the State Construction Standards of Ukraine DBN V.2.2-10:2022 "Healthcare Facilities. Basic Provisions" (*State Construction Standards of Ukraine B.2.2-10:2022 "Healthcare facilities", 2022*). They provide the basic provisions for the design

of health care facilities (buildings and structures of all types of health care facilities) during new construction and reconstruction or during major repairs in health care facilities.

We have proposed proposals that have been adopted into this document:

Psychiatric wards should be located in such a way as to minimize the movement of patients and visitors from other wards through them. During reconstruction (if technologically possible) and new construction (mandatory), psychiatric wards should be designed according to the capsule principle (long corridors and dead ends are not allowed). Wards for children under 18 years of age should be designed as shared wards, which should be equipped with: storage space (bedside tables / cabinets); a place for eating, a bed, equipment for storing food (refrigerator). For the safety of patients in the wards of the psychiatric department, at least 3 sockets, a system for calling medical workers with an acoustic and light signal are equipped.

The materials used to decorate the premises of the patient care and treatment area should contain provisions in the manufacturer's instructions for use in health care facilities and meet the requirements of state sanitary standards and regulations that establish sanitary and anti-epidemic requirements for newly built, restored and reconstructed health care facilities. The layout of the wards should facilitate the independent movement of patients in the wards and corridors of the wards. Patient care areas should be arranged without through passages. The examination room may be a separate room in the ward or may be absent. In the latter case, the examination is carried out in the patient's room if the ward consists of only single rooms. The nurse's post shall be equipped with technological equipment that provides the possibility of video surveillance of all patients / patient rooms or which is located in the center with visual coverage of all wards of the department and direct access to the storage room for medicines. The height of the protective wall covering should be at least 1.2 m from the floor level, in places of intensive traffic (corridors) equipment should be equipped with shock bumpers at a height of 0.6 m to 0.9 m from the floor level. Departments in which patients stay for a long period of time (e.g., hospice, geriatric wards) should have rooms for the long-term stay of patients. The common long-term patient accommodation is designed as a public space for patients, combined with the function of corridors of ward departments. Such a space may include seating, chairs, equipment for children's games in children's hospitals and other equipment in accordance with the medical task and DBN B.2.2-40. All types of wards should have sanitary facilities with a shower area.

In new construction, reconstruction and restoration of healthcare facilities, wards should be designed for a maximum of 2 beds. The area of the ward should be designed to accommodate a bed with the ability to approach from three sides, a table for eating near the window with chairs (according to the number of beds in the ward), storage space (a built-in wardrobe is recommended), a refrigerator and a TV. In wards with two patients, the space between patient areas should be at least 1 meter. The patient area includes the area around the patient and some surfaces and objects (e.g., the patient's bed, bedside furniture and equipment) that are temporarily and/or exclusively intended for the patient. The size and configuration of a double ward should be chosen so that each bed can be removed from the ward without moving the other. In wards where children and family members share a room, there should be: storage space (bedside tables or cabinets); a table for eating, a bed that is comfortable for sleeping (when unfolded, the bed should not reduce the minimum free space around the patient's bed), a universal sanitary room with a shower ramp, and a place for storing food (refrigerator). Wards should have general and night lighting. Night lighting fixtures should be located in such a way as to ensure safe orientation in the dark.

Each ward should have a recreation area for patients' families, which can be located in close proximity to the ward or in a separate room within the building. The recreation area for

patients' families should have chairs and space for one wheelchair. The premises of the recreation area for patients' families should be designed for 1 person for each intensive care bed and 1 person for every 10 beds in the wards. Recreation areas should be accessible to patients from different wards. Access to telephone, Internet, universal sanitary and hygienic facilities should be provided in each recreation area. Each ward should have a place for a separate wardrobe for storing patients' clothes and a bedside table for patients' personal belongings. Clinical structural units may be equipped with rooms for storing bed linen and other items.

Each building of the institution should provide places/rooms for storing wheelchairs. Wheelchair storage areas/rooms should be located near security points or equipped with video surveillance.

In the new construction and reconstruction of rooms for psychological relief of medical staff, a psychologist's office for every 75 employees (in the psychiatric department) involved in providing care on a work shift providing inpatient care should be located in each clinical structural unit of the health care facility, or may be shared by several structural units / building of the facility. It is recommended to equip a psychologist's office in the immediate vicinity of the psychological relief room for medical staff.

However, there is currently no formal sanitary law document containing sanitary, epidemiological and hygienic requirements for the decoration, equipment and operation of health care facilities with inpatient units. The Soviet regulatory document "Sanitary Rules for the Construction, Equipment and Operation of Hospitals, Maternity Homes and Other Medical Hospitals. SanPiN 5179-90", which was approved by the Chief State Sanitary Doctor of the USSR on 29.06.1990, has been canceled by the Order of the Cabinet of Ministers of Ukraine of 20.01.2016 No. 94-r. In addition to this document, all legal acts (more than 300 documents) issued before the adoption of the Act of Independence of Ukraine, i.e., legal acts of the USSR and the Ukrainian SSR, have been repealed. However, the development of a regulatory document of sanitary legislation of Ukraine for modern inpatient hospitals, which are the basic secondary health care institutions under the health care reform, is extremely important and is currently underway. In addition, highly specialized psychoneurological hospitals are classified as tertiary level according to the healthcare reform in terms of the profile of medical services, on the one hand, and secondary level in terms of inpatient facilities, on the other, and therefore the basic sanitary and hygienic requirements are common to both highly specialized hospitals and general hospitals.

A healing and safe environment for patients in psychiatric institutions is a crucial issue in the European Union and around the world. To create such conditions in EU countries, when designing new or reconstructing old mental health facilities, special attention is paid to the hygienic aspects of design, construction and decoration of medical facilities (*Zhang, 2019, Price, 2018, Johnston, 2022*).

The following principles are recommended for the internal layout of wards for patients with mental disorders: the number of patients in a ward should be no more than 2; the in-hospital environment should be as close to home as possible; safe and secure conditions should be created for both medical staff and patients; the environment should be simple, comfortable and at the same time with adequate visual access (sight lines for medical staff should be along corridors, in recreational and common areas, in courtyards, etc.). Each bedroom should have a separate shower/toilet. As for fixtures, fittings, furniture, showers, beds, flooring, they should be securely fastened and designed to prevent self-harm of patients (*Coburn, 2019*).

The requirements for the design of psychiatric treatment facilities in the European Union and various developed countries are specified in official guidelines for mental health care

facilities, which are constantly updated based on scientific research, but are completely absent in Ukraine (McCuskey, 2016, Hunt, 2015).

5. Conclusions

1. There were 55 psychiatric hospitals in Ukraine before the outbreak of full-scale war: 28.6% of them were built in the eighteenth and nineteenth centuries (from 1786 to 1945), 28.6% after the Great Patriotic War (from 1945–1991), 42.8% during the period of Ukraine's independence (from 1991–2013). Only 25% of psychiatric institutions have playgrounds for outdoor games equipped with tennis tables and volleyball nets (for table tennis and volleyball), 25% of hospitals have playgrounds for quiet recreation (chess, dominoes), and 12.5% have playgrounds for physical education and recreation (sports and play areas). At the same time, 41.6% of these playgrounds are in satisfactory condition.

2. Ukraine has adopted the State Construction Norms of Ukraine DNB B.2.2-10:2022 "Health Care Facilities. Basic Provisions". It provides basic provisions for the design of health care facilities (buildings and structures of all types of health care facilities) during new construction and reconstruction or during major repairs in health care facilities. However, there is currently no formal sanitary legislation containing sanitary, epidemiological and hygienic requirements for the decoration, equipment and operation of healthcare facilities with inpatient units.

Author contributions: conceptualization, V.C., V.M.; methodology, V.C., V.M.; software, V.C., V.M.; for-man analysis, V.C., V.M.; investigation, V.C., V.M.; resources, V.C., V.M.; writing-original draft preperation, V.C., V.M.; writing-review and editing, V.C., V.M.; visualization, V.C., V.M.; supervision, V.C., V.M.; pro-ject administration, V.C., V.M.; funding acquisition, V.C., V.M. All authors have read and agreed to the published version of the manuscript.

Funding: -

Institutional review board statement: *Not applicable.*

Informed consent statement: *Not applicable.*

Data availability statement: *Data available on request. The data presented in this study are available on request from the corresponding author.*

Acknowledgments: -

Conflicts of interest: *The authors declare no conflict of interest.*

Disclaimer/publisher's note: *The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.*

References

1. Rosen, A.; Holmes, D.J. (2022) *Co-Leadership to co-design in mental health-care ecosystems: what does it ment to us? Leadersh Health Serv (Bradf Engl), ahead-of-print (ahead-of-print).* <https://doi.org/10.1108/LHS-06-2022-0065>
2. Merner, B.; Schonfeld, L.; Virgona, A. et al. (2023) *Consumers' and health providers' views and perceptions of partnering to improve health services design, delivery and evaluation: a co-produced qualitative evidence synthesis. Cochrane Database Syst Rev, 3(3):CDO13274.* <https://doi.org/10.1002/14651858.CDO13274.pub2>

3. Chorna V.V. (2022) *Hygienic, epidemiological, psychogenic and urban planning aspects of mental health institutions in comparison with EU countries.* «Wissenschaft für den modernen Menschen '2022 / Science for modern man '2022», Innovative technology, security, medicine, biology, agriculture, art history, Karlsruhe, Germany, (January 30–31, 2022, monographic series «European Science» book8. Part2. Kapitel 6/chapter 6/ P.102-129,161-163. <https://doi.org/10.30890/2709-2313.2022-08-02-033>
4. McDerott, B.E.; Holyda, B.J. (2014) *Assessment of aggression in inpatient settings.* *CNS Spectr*, 19(5), 425-431. <https://doi.org/10.1017/S1092852914000224>
5. Bach, M. (2018) *Violence, research, and non-identity in the psychiatric clinic.* *Theo red Bioetn*, 39(4), 283-299. <https://doi.org/10.1007/s11017-018-9451-2>
6. Chorna, V.V.; Makhniuk, V.M. [et al.] (2021) *The influence of architectural and planning solutions on sanitary and hygienic working conditions of health care workers and patients of psychiatric hospitals in Ukraine and EU countries].* *Young scientist*, 1 (8), 20-27. <https://doi.org/10.32839/2304-5809/2021-1-89-5>
7. Chorna, V.V. (2020) *Reforming health care to strengthen the mental health of the population of Ukraine and the experience of EU countries.* *Bulletin of Vinnytsia National Medical University*. 3, (T.24), 447-456. [https://doi.org/10.31393/reports-vnmedical-2020-24\(3\)-11](https://doi.org/10.31393/reports-vnmedical-2020-24(3)-11)
8. Chorna, V.V.; Makhniuk, V.M.; Chaika, G.V. et al. (2021) *Substantiation of the sanitary and epidemiological component to the new edition of the state building codes of Ukraine "Health care institutions" on the design of psychiatric hospitals taking into account international experience.* *Bulletin of Vinnytsia National Medical University*. 1 (T.25), 118-125. [https://doi.org/10.31393/reports-vnmedical-2021-25\(1\)-22](https://doi.org/10.31393/reports-vnmedical-2021-25(1)-22)
9. Chorna, V.V. (2023) *On the issue of readiness of domestic medical and preventive institutions to protect the mental health of the population of Ukraine affected by military actions.* *Environment and health*. 1 (106), 10-18. <https://doi.org/10.32402/dovkil2023.01.010>
10. Chorna, V.V.; Khliestova, S.S.; Pashkovskiy, S.M. et al. (2022) *Characteristics of the state of mental health of the population of Ukraine as a consequence of prolonged hostilities.* *Acta Balneologica Journal of the Polish Balneology and Physical Medicine Association*. Vol. LXIV, 6(172), 568-573. <https://doi.org/10.36740/ABAL202206114>
11. Chorna V.V.; Boyko V.V.; Begma M.A. (2023) *Mental health of internally displaced persons and factors influencing its changes.* *Materials of the II International Scientific and Practical Conf. (of the 2nd International scientific and practical conference) «Innovations and prospects in modern science»*, 13-15 лютого, Sweden (Stockholm, – SSPG Publish). P. 93-97.
12. *Mental health atlas 2020.* Geneva: World Health Organization; 2021. <https://www.who.int/publications/i/item/9789240036703>
13. Moitra, M.; Santomauro, D.; Collins, P.Y; et al. (2022) *The global gap in treatment coverage for major depressive disorder in 84 countries from 2000–2019: a systematic review and Bayesian metaregression analysis.* *PLoS Med*. 19(2):e1003901. <https://doi.org/10.1371/journal.pmed.1003901>.
14. Lu, J., Huang, Y.; Li T. et al. (2021) *Prevalence of depressive disorders and treatment in China: a cross – sectional epidemiological study.* *Lancet Psychiatri*. 8(11), 981-990. [https://doi.org/10.1016/S2215-0366\(21\)00251-0](https://doi.org/10.1016/S2215-0366(21)00251-0)
15. Hu, H.; Cao Q.; Shi, Z. et al. (2018) *Social support and depressive symptom disparity between urban and rural older adults in China.* *Journal Affect Disord*. 237, 104-111. <https://doi.org/10.1016/j.jad.2018.04.076>

16. Yang, W.; Li, D.; Gao, J. et al. (2020) *Decomposing differents in depressive symptoms between older rural – to – urban migrant workers and their counterparts in mainland China*. *BMC Public Health*. 20(1), 1442. <https://doi.org/10.1186/s12889-020-09374-1>
17. *State Construction Standards of Ukraine B.2.2-10:2022 "Healthcare facilities"*. Kyiv. Ministry of Development of Communities and Territories of Ukraine. 2022. URL: https://dreamdim.ua/wp-content/uploads/2023/03/DBN_V2-2-10_2022.pdf
18. Zhang, Y.; Tzortzopoulos, P.; Kagioglou, M. (2019) *Healing built-environment effects on health outcomes: environment-occupant-health framework*. *Building Research & Information*; 47(6):747-766. <https://doi.org/10.1080/09613218.2017.1411130>
19. Price, O.; Baker, J.,; Bee, P., et al. (2018) *The support-control continuum: an investigation of staff perspectives on factors influencing the success or failure of de-escalation techniques for the management of violence and aggression in mental health settings*. *Int journal Stud*. 77:197-206. <https://doi.org/10.1016/j.ijnurstu.2017.10.002>
20. Johnston, I.; Price, O.; McPherson, P. et al. (2022) *De-escalation of conflict in forensic mental health inpatient settings: a theoretical domains framework-informed qualitative investigation of staff and patient perspectives*. *BMC Psychol*. 10(1):30. <https://doi.org/10.1186/s40359-022-00735-6>
21. Coburn, A.; Kardan, O.; Kotabe H.; Berman, G. (2019) *Psychological responses to natural patterns in architecture*. *Journal of Environmental Psychology*. Vol. 62. P. 133-145.
22. McCuskey Shepley; M., Watson, A.; Pitts F., et al. (2016) *Mental and behavioral health environments: critical considerations for facility design*. *General Hospital Psychiatry*. Vol. 42. P. 15-21.
23. Hunt, J.M.; Sine, D.M. (2015) *Common mistakes in designing psychiatric hospitals*. *Facility guidelines institute*, 24 p.