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### Design of Circulation Hospital Service in The New Normal Era

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#### ABSTRACT

Health care buildings are experiencing extreme challenges due to the COVID-19 pandemic worldwide, the high global death rate due to the pandemic has forced hospitals to make changes and improve health service strategies to minimize the impact of transmission and hospital readiness in dealing with other infectious diseases. The design of this service circulation design is expected to be able to improve the quality of service to the community and users related to the ideal, thorough, thorough, fast, precise and correct service excellence principles. Using analytical methods, data sources were obtained through studies on hospital building planning with a separate circulation system, government regulations related to infectious diseases, and the shortcomings of the previous hospital building circulation system, the conclusion resulted in a building circulation design planning that has 3 zoning (red, yellow, red zones). and green) by providing differentiation in circulation related to the function of each room, the classification of visitors and the flow of patients in and out, to improve hospital services and safety against unpredictable conditions in the future such as the current pandemic era.

**Keywords:** buildings, circulation, covid-19, health, hospital, pandemic.

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#### ABSTRACT

Gedung pelayanan kesehatan mengalami tantangan yang ekstrim akibat pandemi COVID-19 di seluruh dunia, tingginya angka kematian secara global akibat pandemi memaksa rumah sakit melakukan perubahan dan peningkatan strategi pelayanan kesehatan untuk meminimalisir dampak penularan serta kesiapan rumah sakit dalam menangani penyakit menular lainnya. Perancangan desain sirkulasi pelayanan ini diharapkan mampu meningkatkan kualitas pelayanan kepada masyarakat dan pengguna berkaitan dengan prinsip pelayanan prima yang ideal, teliti, cermat, cepat, tepat dan benar. Menggunakan metode analisis, sumber data didapat melalui kajian perencanaan bangunan rumah sakit dengan sistem sirkulasi terpisah, peraturan pemerintah terkait penyakit infeksius, dan kekurangan sistem sirkulasi bangunan rumah sakit terdahulu, kesimpulan menghasilkan bentuk perencanaan desain sirkulasi bangunan yang memiliki 3 zonasi (zona merah, kuning, dan hijau) dengan memberikan pembeda pada sirkulasi terkait dengan fungsi masing-masing ruang, penggolongan pengunjung dan alur keluar masuk pasien, untuk meningkatkan pelayanan dan keamanan rumah sakit akan keadaan yang tidak terprediksi di masa depan seperti era pandemi saat ini.

**Kata Kunci:** bangunan, covid-19, kesehatan, rumah sakit, pandemi, sirkulasi

#### INTRODUCTION

The first COVID-19 case in Surabaya, East Java was detected on April 16, 2020, which then increased until it accumulated to 94,695 people ([lawancovid-19.surabaya.go.id](http://lawancovid-19.surabaya.go.id)). Various preventive measures have been taken but the rate of growth of COVID-19 cases continues to increase[1]. Awareness to check the condition and fear of being a sufferer of this disease are used as one of the reasons for the increased transmission of the virus. People are still embarrassed and hesitant to check the symptoms of the disease they feel at the nearest health service. And due to the

increase in this disease, many Hospital Buildings are used as COVID-19 Referral Hospitals, the hospitals that are the referrals for the COVID-19 disease do not all have the resources and facilities that are able to cope with the pandemic, so most Referral Hospitals are full and unable to fully serve patients with COVID-19 disease[2]. The lack of isolation and treatment rooms has resulted in many patients being forced to stay in rooms that are not treatment rooms, such as corridors and hallways, waiting rooms, and even outside the hospital area. With so many patients scattered in sterile rooms, this disease spreads quickly to visitors.

As an effort to control the spread of this disease, the government has implemented a policy of restricting activities for the community or PSBB (Pembatasan Sosial Berskala Besar) which is supported by Government Regulation no. 21 of 2020 in order to accelerate the handling of COVID-19 disease. In its implementation, this regulation is described in the Minister of Health Regulation No. 9 of 2020 concerning PSBB guidelines, PSBB activities focus on the community to limit their social activities that allow transmission to occur with different application times according to the number of infection cases[3]. The public is also advised not to travel outside and especially to the Health Service Building unless absolutely necessary.

During this PSBB period, the Health Service Building facilities are limited by reducing health services for general patients (non COVID-19) to be able to focus and provide services for COVID-19 sufferers and reduce the increase in transmission in the health facility area[4]. This has an impact on economic activities in people's lives so that the government makes relaxation alternatives to the PSBB to be able to save the community's economy, this activity is better known as the New-Normal or the adaptation period for new habits.

New normal is said to be a change in people's behavior activities to continue to be able to carry out their daily activities, in relation to the COVID-19 pandemic, New Normal is a new habit that allows people to live side by side with the COVID-19 virus, people continue to carry out activities as usual by following the health protocols set by the government, implementing a clean, hygienic, healthy lifestyle, maintaining distance, using masks, and reducing physical contact with other people to minimize the spread of the COVID-19 virus. The indicator of success is the results of good laboratory sample testing and can identify cases in detail. The Health Service Building is the most influential sector in preparing for the pandemic. Hospitals must have started thinking about how to take steps to deal with COVID-19 patients and at the same time continue to provide health services to the general public with minimal risk.

Overcoming the transmission of infectious diseases, health facility units are required and must carry out several methods to manage visitors, including screening, making changes to the circulation of service flows, and providing facilities, namely special service rooms, and managing visitors who are in crowded areas such as patient waiting rooms[6,7].

The most important thing in designing the flow of the circulation system is to regulate the number of perpetrators of activity in the building, limiting the visits of visitors, employees and families of patients who visit. Changing the area to be larger with the aim of facilitating the work area to obtain a private area, by minimizing the amount of furniture in the circulation area or hallways, and providing a minimum number for visits of up to half of the initial amount, in the vehicle parking area or living room area waiting on the outside of the building [4].

Kusumawardani, 2011 also said that architectural design in the new normal era is now required to think about how to deal with the situation by presenting creative space designs and integrating into new patterns[5], also supported by [3] which states that in addition to creative design, it is also necessary emphasis on hygiene awareness. Room health and cleanliness are the most important elements because a healthy space results in occupants who are healthy and have better immunity to be able to ward off the entry of infectious diseases. The research conducted by the author continues the design ideas from previous research and develops designs on circulation flow and their application to hospital designs.

## **METHOD**

The method uses analytical methods by using thinking that involves activities to be able to obtain problems that are resolved in the creative process in design. The design process is thought out thoroughly in a single unit. Information and data obtained from sources of government

regulations and building comfort standards are used as an important element in creating a design solution.

The first thing to do is to find the existing problems, problems that can always be associated with the user, how to deal with these obstacles, consciously or unconsciously. Constraints that are realized by users are problems that exist in a design process. Because only users really understand how the space functions, what is expected and how these problems arise, for obstacles that are not realized by users are the responsibility of planners armed with design knowledge to be able to solve these problems. After identifying the problem, the next step is to collect data, carried out by identifying existing information, area of space, supporting facilities, space capacity, materials, ventilation and air conditioning, lighting systems, visitor behavior, flow of health personnel activities, space requirements, regulations health related to hospital buildings and others.

After the data is collected, the planner performs data analysis, the planner performs information and data processing to further become criteria or concepts in a design. The results of this analysis are then adjusted to standard government regulations related to the New-Normal design in a Hospital Service Building, with an emphasis on circulation, the planner will make design development into design alternatives. The planner formulates the design concept which will later become the appropriate design module. This design schematic will be evaluated before being developed into a final design product by looking back at the possibilities of unresolved problems, after which it is developed into a design product.

## **RESULTS AND DISCUSSION**

The Hospital Service Building is expected to be able to meet the needs of the community regarding health, during the Pandemic period with an erratic increase in the number of patients resulting in hospitals being required to be able to provide maximum health services while prioritizing the health and safety of patients and health workers on duty. Health services during the COVID-19 period underwent changes and adaptations compared to normal times. Strict health procedures must be prepared by hospitals, service procedures, patient circulation flows, administration flows, and even system digitization, all of which are regulated by PPI (Pencegahan dan Pengendalian Infeksi) standards.

In the previous hospital design, there was a problem when entering the pandemic era, is the density of users, which was caused by:

- a. Long waiting times: ED increases over time due to access blocks (delays in obtaining inpatient beds)
- b. Experiencing delays in handling patients on Monday (the number of patients soared on that day).
- c. At night there is a possibility that the patient will go up at certain times and the medical staff's rest hours.
- d. Handling transfers between hospitals that are not well synchronized so that patients experience delays in handling administrative matters,
- e. The number of supporting facilities (ambulances) is delayed so that the patient is in a less favorable condition for medical treatment
- f. Delay in handling patients due to their illness is a new variant, so that patients and visitors become one in the waiting room for hospital services.

.The principles of hospital services during the New-Normal period in order to adjust their routine services are:

1. Provide services to hospital patients (infectious and non-infectious) by always implementing a zoning system, screening procedures, triage and case management according to management.
2. Preventing transmission to health workers and patients by implementing PPI (Infection Prevention and Control Procedure), Application of Occupational Safety and Health (K3) in each work unit and always using Personal Protective Equipment (PPE) in infectious areas.
3. Provide understanding to service users to apply safety protocols, namely: using masks for all building users, maintaining a minimum distance of 1.20m and

diligently washing hands with soap for 40 to 60 seconds or by using hand sanitizer for 20 to 30 seconds

4. Providing special facilities related to infectious diseases in the form of treatment rooms and special isolation and equipped with supporting facilities.
5. Integrated in a digitalization system that makes it easier for hospitals and related parties to be able to track and supervise cases, apply appropriate referrals, and supervise people who are self-isolating and coordinate with the Health Office.
6. Re-run activities and health services, especially outpatients for patients who have been delayed during the COVID-19 pandemic

To be able to apply this principle, the hospital makes changes to the circulation design system of the service flow by screening the flow of patients who come to Hospital

1. The first flow, the patient comes directly to the hospital without an appointment with the hospital and at his own request, if the patient takes this step, the hospital screens the patient, the patient is directed to enter the emergency room and if there is a suspected indication of potential COVID-19, the patient will be directed to an isolation room, on the other hand, if the patient is not indicated for COVID-19, the patient can be directly directed to non-COVID-19 triage or directly to an outpatient facility according to the patient's needs.

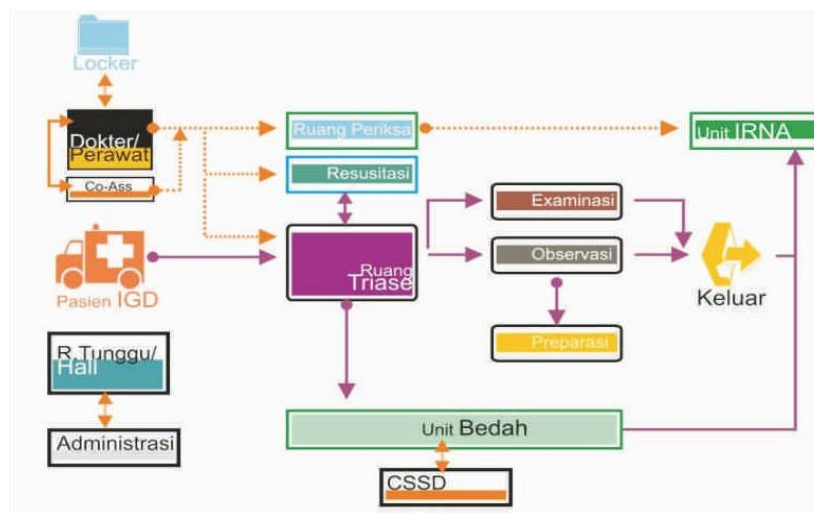


Figure 1. Patient Circulation Diagram in IGD

Source: Personal Sketch, 2022

2. Flow Two, Patients come through referrals from the health department according to their domicile, patients with COVID-19 referral information are directly directed to the COVID-19 Isolation room, while non-COVID-19 referral patients still have to do a COVID screening first even though they have done an on-site test. previously with a negative result
3. Third Path, Patients come by registering online, filling in data related to COVID-19 independently, and if indicated, they can be directed to COVID-19 triage, on the other hand, if the results of the self-assessment are good, they still have to screen for COVID-19 at the Hospital destination.

The screening process is a selection process in which patients will be asked medical-related questions and evaluate their medical history whether the patient is indicated to be COVID-19 or not. The purpose of this screening is to separate COVID-19 and non-COVID patients, reduce the spread of disease to healthy patients and health workers who work in sterile areas, and ensure the use of PPE according to its function. Screening is carried out on all hospital visitors and health workers. Screening on patients, visitors and hospital staff:

1. Mandatory washing hands with soap, wearing masks, checking body temperature and conducting a rapid assessment related to COVID-19 with simple questions in the form of clinical symptoms (fever and respiratory problems).

2. Epidemiological history in the form of: within 14 days before clinical symptoms appeared whether the patient traveled, had contact with people around, or had contact with people who indicated COVID-19, a history of previous COVID-19 tests if any.

The screening area is attempted to be close to the main entrance which functions as the main center for initial hospital activities, the screening location must be wide enough to implement a queue keeping each person at a distance of about 1.2 m, the patient and visitor entry flow must be one-way. The screening room design can be modeled as shown below:

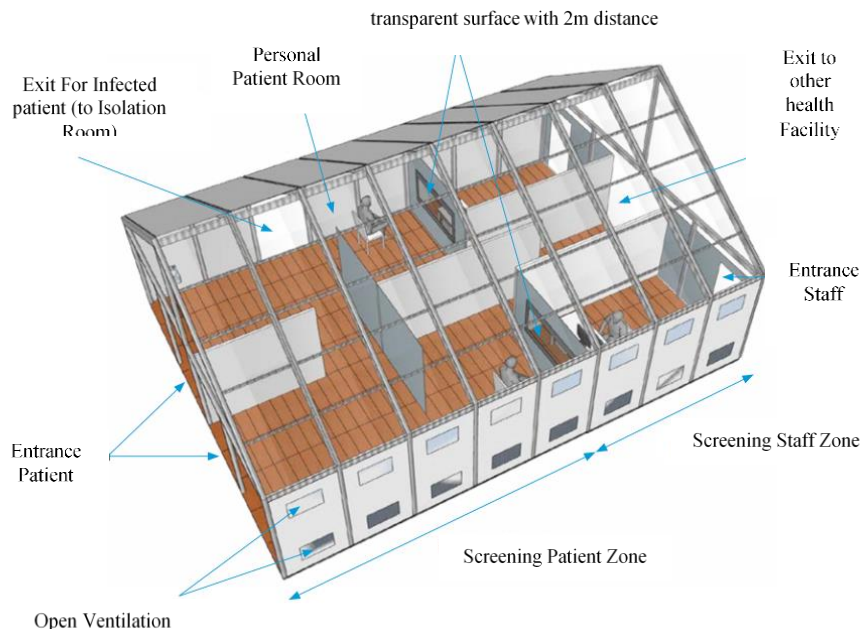


Figure 2. Screening Travel Flow Model

Source: Guidelines for Hospital Services during the COVID-19 Pandemic, 2021.

The Circulation Flow of Hospital Officers also underwent a change where the circulation system was required to pass through the internal circulation area.

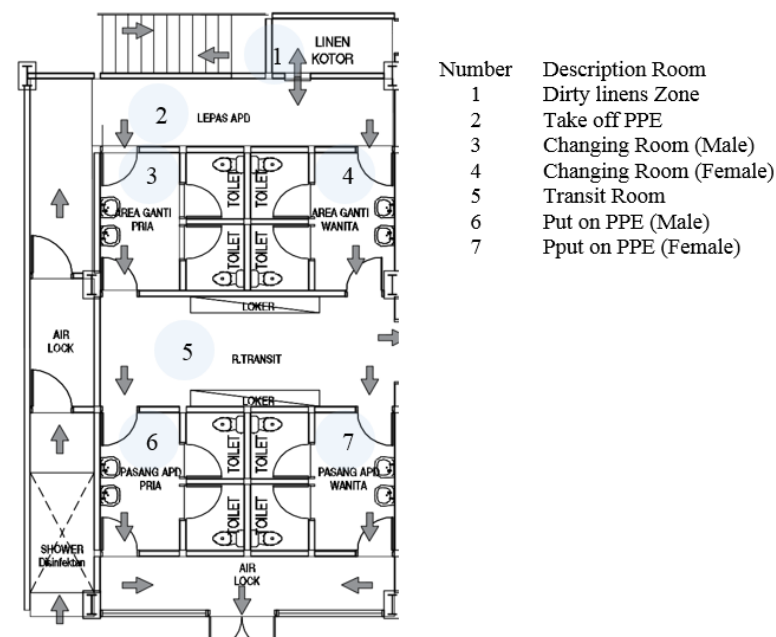


Figure 2. Circulation Flow of health workers

Source: Personal Sketch, 2022.

In the circulation according to the COVID-19 pandemic, access to health workers is divided into 2 zones, namely the PPE installation zone where this area is a clean area equipped with changing rooms, lockers, and hand washing areas, after which health workers can enter the room according to their function. , for the health worker exit area to enter the dirty zone where the activities carried out are personnel sterilization, removing PPE and changing clothes, then they are only allowed to leave the building.

## CONCLUSION

Assessment of hospital services in accordance with the adaptation of new habits (New-Normal) requires the Hospital to always carry out Screening for Patients, Visitors, and Health Workers. This screening is done to be able to sort out patients indicated by infectious diseases or not. The planning architect must be able to ensure that the screening room carries out its service activities by considering the area, division of partitions, queues, in accordance with the Regulation of the Minister of Health, the circulation access which was previously distributed is modified to be separate, the flow of visitors entering and leaving patients must be distinguished. Hospital rooms must be filtered using clean zones and dirty zones, this is intended to minimize the spread of COVID-19 disease outside the building.

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