

Prevention and Emergency Management in Cardiac Intensive Care Units After Effective Control of the COVID-19: A Chinese Tertiary Hospital Experience

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Research

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Abstract

Objective

After effective control of the 2019 Coronavirus Disease (COVID-19) in China, how to reopen the hospital and avoid the outbreak in the hospital is a problem that needs to be carefully considered. The aim of this descriptive study is to share the experience of prevention and emergency management in our hospital and cardiac intensive care units (CCU) when medical services were reopened after COVID-19 was under control.

Methods and Results

We conducted a retrospective, descriptive and single-centre study. Management strategy and data were collected from the Second Xiangya Hospital of Central South University, Hunan and CCU. We have implemented some strategies to prevent the prevalence of covid-19 in hospitals while ensuring that more critical cardiac patients can be admitted to CCU. These measures are summarized as follows: 1. gradually expanding medical services; 2. risk classification and routine strict screening of patients admitted to CCU; 3. strengthening the management of hospitalized patients, accompanying person and medical staffs; 4. strengthening screening and isolation of suspected cases of inpatients; 5. other measures such as strengthening training of medical workers, protective equipment and environmental management, and so on.

Conclusion

We share the experience of prevention and emergency management in our hospital and CCU when medical services were reopened after effective control of the COVID-19 epidemic and hope it will be helpful for cardiologist or critical care physician all around the world to continue to provide critical care in a safe and orderly manner.

Introduction

The global COVID-19 epidemic has become the biggest crisis for mankind since the 21st century. This crisis has produced a test of national epidemic prevention and healthcare system[1]. According to China's earliest experience, the outbreak of COVID-19 in Wuhan destroyed an overwhelming hospital system like a flood breaking through a dam, and hundreds of medical staff will be infected and sacrificed[2, 3]. Therefore, the Chinese government had to support over 40000 medical staffs rushing to frontline to help in Hubei's hospital from other provinces and municipalities. Later, the epidemic broke out in Italy, Spain and the United States, and the phenomenon of medical staffs being infected became more serious[4, 5]. Due to the lack of systematic hospital prevention strategies, preventive training and protection equipment, medical workers were exposed to great risks in their work, which caused a great physical and psychological harm to them, this also caused the subsequent collapse of the hospital system[6].

During the COVID-19 pandemic, many hospitals in China were temporarily closed or reduced non-emergent procedures and hospitalizations to preserve hospital capacity and personal protective equipment. Hunan Province is close to Hubei Province, only 120 kilometers away from Wuhan. On January 23, Wuhan announced lockdown of the city. On the same day, Hunan Province also launched level 1 response to major public health emergencies (4 levels in total, level 1 is the most serious). Hunan was one of the first provinces in China to be affected. As the largest tertiary public hospital in Hunan Province, the Second Xiangya Hospital of Central South University also implemented strict epidemic prevention measures and greatly reduced medical services[7]. Influences and changes in these medical measures also affected the admission rate of cardiovascular critical disease. After more than two months of united and costly anti-epidemic measures, COVID-19 has been effectively controlled in Hunan province. The reopening of medical services is imminent. However, how to reopen the hospital and avoid the outbreak in the hospital is a problem that needs to be carefully considered.

The aim of this descriptive study is to share the experience of prevention and emergency management in our hospital and our CCU when medical services were reopened after effective control of the COVID-19 epidemic.

Materials And Methods

The second Xiangya Hospital of Central South University is a tertiary public teaching hospital with more than 3500 beds. It is the largest general hospital in Hunan Province, with 3.744 million outpatients and emergency visits in 2019. The division of cardiovascular medicine of this hospital is the largest cardiovascular specialist center, which is also the diagnosis and treatment center of cardiovascular critical diseases in Hunan Province. It has the best CCU ward in Hunan Province, with a total of 23 beds (22 conventional beds and one negative pressure isolation ward), a strong medical team and advanced and adequate organ support equipment. The management strategy and data were collected from our hospital and CCU. We have implemented some strategies to prevent the prevalence of COVID-19 in hospitals while ensuring that more critical cardiac patients can be admitted to CCU, as will be discussed in the following text.

Results

Impact of the epidemic on CCU

The impact of COVID-19 on CCU was described in Figure 1. We counted the number of admissions to CCU before and after 9 months with January 23 as the boundary. In the two months after the epidemic outbreak, the number of hospitalized patients in CCU dropped sharply from 50-60 to 20. These data are in line with our expectations and reports from cardiovascular centers in other countries[8, 9]. From the third month of the outbreak, the number of admission patients increased gradually, reaching the peak in June and July (Figure 1.A). Because January 24 this year is the Chinese Lunar New Year, which is the most important holiday in the country, so we chose the same period last year as a comparison according to the

Chinese lunar calendar (February 3 to May 3, 2019). Compared with the same period in 2019, the number of hospitalizations decreased by 19.6% (112 vs 90); in-hospital mortality rate of CCU was decreased (28.57% vs 16.67%); in-hospital emergency percutaneous coronary intervention (PCI) rate in patients with acute coronary syndrome (ACS) decreased significantly. (76.00% vs 39.00%) (Figure 1.B).

Strategies for gradual recovery of medical services

Since Wuhan's lockdown on January 23, the hospital has also implemented a major epidemic emergency response. With the increasing number of confirmed COVID-19 cases in Changsha City, Hunan Province, outpatient clinics were first affected, and general outpatient clinics were urgently closed. Only the emergency department and fever clinics were opened, and due to the shortage of medical protective equipment, the flow of the emergency department has been greatly reduced. In the next two months, the hospital's outpatients and emergency services were almost drastically reduced. Three general wards of our cardiovascular department were also closed, leaving only one general ward and CCU. After COVID-19 was effectively controlled in Hunan, our hospital began a prudent and gradual restoration of medical services. As of mid-September, the number of hospitalized patients has reached 98% of the pre-epidemic period. (more details in Figure 2).

The advantage of gradually opening up medical services is that we have the opportunity to find some shortcomings in the initial epidemic prevention work. The next step is to improve these shortcomings and prepare for opening up more medical services. The gradual expansion of medical services depends on many factors. ①The local epidemic situation(more details in Figure 1 D).The last confirmed patient in Changsha City was discharged from the hospital on March 14. Considering the safety of the local epidemic situation, the hospital expanded the outpatient clinic on April 14②The demand for medical services. The Spring Festival holiday (7 days) ends on February 5, if the hospital closes all outpatient clinics, it will be a piece of huge bad news for patients. Therefore, under strict screening measures, the hospital opened about 20% of outpatient clinics on February 6; ③Medical protective equipment. At the beginning of the outbreak, hospitals were short of protective equipment. N95 masks could only be used by medical workers in emergency departments, fever clinics and isolation wards. As for protective clothing, there was even more shortage; when the national medical protective equipment production expanded in March, expansion of medical services will be considered; ④ The detection capability of COVID-19 nucleic acid reverse transcriptase-polymerase chain reaction (RT-PCR) test. The COVID-19 nucleic acid testing capacity of our hospital ranged from 100 times a day in early February to 2,000 times a day until September. Based on the above considerations, our cardiovascular medicine department also gradually opened the wards according to the inpatient needs and hospital logistic support (more details in Figure 2).

Routine assessment and screening of pre-hospital patients

Although confirmed COVID-19 patients will be sent to special hospitals for treatment, patients requiring hospitalization may still have potential confirmed cases. Therefore, risk assessment for patients before admission is very necessary but also difficult enough. Some studies have designed complex models for

risk assessment, but the operability is more complicated[10]. There are three main sources of inpatients in CCU, emergency department, other general wards, and patients referred from other hospitals. Each patient has a different severity of illness and COVID-19 infection risk, so we need to develop different pre-admission assessment procedures.

For each patient who needs to be admitted to the CCU for treatment, we will have a consultation with a dedicated general resident of cardiovascular medicine to assess whether the patient needs to be admitted to the CCU. The second point is to assess the risk level of COVID-19 infection of the patient. We designed a concise version to classify patients, this score sheet mainly evaluates the patient's clinical symptoms, patient source, and regional risk level and the nucleic acid test report of COVID-19. (specific evaluation criteria as shown in Table 1). Regarding the risk level in epidemic areas, the national epidemiological prevention and control website can obtain real-time updates(<http://bmfw.www.gov.cn/yqfxdjcj/>) or make an assessment based on the Table 2. If the assessment result is low risk, the next admission procedure will be arranged for the patient; if assessed as high risk of COVID-19 infection, we will assess whether the patient's condition must be admitted to CCU. If it is not urgent, admission is not allowed. Then, experts from the infectious disease department will be invited for assessment and the patient must undergo COVID-19 nucleic acid and serum IGG, IGM antibody testing in emergency fever isolation ward, if the results are negative and infectious department experts excluded COVID-19 infection, this patient will be admitted to the CCU. If the patient must enter the CCU urgently for treatment, the patient will also be admitted to the hospital, but must be isolated in a single room and undergo post-admission screening. If assessed as a medium risk, the patient will also be admitted to the hospital, and the bed also will be arranged in a single room (Figure 3).

Epidemiological history questionnaire

Previous studies have also revealed that tracking the epidemiological history of patients and their accompanying persons is equally important for screening patients with COVID-19 infection[11, 12], and we designed an epidemiological history questionnaire to systematically collect this information. This questionnaire will be administered by a dedicated staff who will also evaluate the patients and their accompanying person. The main contents include COVID-19 related clinical symptoms, epidemic history, and essential information and signatures of patients. (more details in Table 3)

Ward transformation and bed arrangement

In order to prevent the epidemic, we have transformed our wards. We transformed our wards to make the entrance and exit management stricter, and replaced all doors and windows that could not be closed. The ventilation system has also been repaired and replaced to ensure that they can work normally. Before, our beds were generally arranged according to the order of admission and the infection of drug-resistant bacteria; but now, we divide the ward into two areas; one is the low risk area, which refers to double beds room or three beds room; the middle risk and high-risk area is the single room. Patients with acute chest pain and heart failure are usually treated in multiple beds room, and infectious patients will be treated in a single room. All high-risk hospitalized patients will be arranged to bed in single room A (Figure 3); if

other patient also was evaluated as high risk level, they will be arranged to single room B; and so on, gradually arrange high-risk patients from A to G. These single rooms, located in a corner of the ward, are far away from the office area and other patients. They are equipped with automatic doors, which can automatically close and also ensure the isolation effect. Of course, patients infected with drug-resistant bacteria will be arranged from single room G to A. (more details in Figure 4)

Routine screening after admission

After admission, all of our patients will be given routine COVID-19 nucleic acid testing by our trained doctors within 24 hours. In addition, covid-19 serum IgG, IgM testing, blood routine testing, and even lung CT examination will be carried out in high-risk patients. Finally, our doctors will evaluate the appeal report.

Control and screening of inpatient buildings and accompanying person

After the gradual expansion of medical services, our hospital has implemented strict flow control. First, all hospitalized patients are allowed to be accompanied by only one person, and no one can be allowed to visit. Accompanying person must also conduct nucleic acid testing and epidemiological history questionnaires in our hospitals. All personnel entering the hospital need to wear medical masks.

Taking the internal medicine building where CCU is located as an example. Only hospital staffs, inpatients and accompanying person that handling certificates can enter the inpatient building. The building only opens one entrance and one exit, and the entrance is used for ID card swiping or health code scanning. The health code is an electronic two-dimensional code showing the physical condition and epidemiological history of an individual. This electronic two-dimensional code invention is a network registration and grading platform for each citizen at the outbreak of an epidemic. Some previous news has reported it. Only when the two-dimensional code is displayed as a green code, the channel will be opened after code scanning recognition. At the same time, the entrance will be subject to electronic temperature detection and personnel face scanning. If the temperature of one person ≥ 37.3 C, this system will alarm, and this person's health information and epidemiological information will appear on the computer screen. Our hospital has special workers to communicate with this person and prohibit from entering the inpatient building.

Previous studies[13] have shown that elevator is a high-risk place for the transmission of the epidemic. We strictly separate the elevators for medical staffs and inpatients, and do not allow medical staff to take the elevators for inpatients. Reduce the contact of medical staff with other unknown personnel.

Before the outbreak, there were many takeaway delivery man who could enter the inpatient building and deliver food to inpatients or medical staffs. To reduce unsafe contact, we installed a takeout locker at the entrance of the hospitalization building, where the takeaway delivery man put the delivery into the locker and sent the message containing the dining code to the consumers. Consumers will then use WeChat code-sweeping to collect delivery at fixed meal times. (more details in Figure 5)

Visit Management of CCU

Inpatients of CCU are not allowed to be visited by their families. We encourage patients and their families to use smartphones for online video visits, which can meet the needs of patients and their families while reducing unsafe contacts. If it is an unconscious patient, our doctor will use a smartphone to make video calls with family members.

Emergency management strategy of suspected and confirmed cases

According to the routine screening report after admission, if the patient is excluded from covid-19 infection, he/she will become an ordinary patient and can be transferred out of the single room. If the patient is highly suspected of infection, we will ask infectious disease experts to consult and continue to isolate this patient in single room. If the patient is confirmed case, this patient will be immediately sent to our negative pressure ward, and reporting to the hospital immediately to coordinate the transfer out of the patient, and the medical staffs who have had direct contact this patient will be quarantined for 14 days. The negative pressure ward is located in the southeast corner of our CCU, and beside the ward there is a small special nursing and doctor's studio. The management of this ward is done in strict accordance with the COVID-19 protection requirements, and relatively fixed medical staffs are designated for diagnosis and treatment operation, so as to minimize unnecessary contact.

If the patient has clinical symptoms of COVID-19 infection such as fever, flu symptoms, and interstitial changes on lung CT during hospitalization, we will classify the patient as a high-risk patient; if the patient still needs to continue treatment in the CCU, this patient will be treated separately at one interval while undergoing routine screening procedures, and if the patient's condition is not necessarily hospitalized in the CCU, he will be sent to the fever isolation ward for further treatment. (The specific flow chart is shown in Figure 4.)

Protective equipment and environmental management

In the early stage of the epidemic, we experienced a period of extreme shortage of anti-epidemic protective equipment. Since then, we have established a protective material management system, which continues to operate even when there is sufficient protective equipment. The consumption of protective equipment is mainly used by the medical staff who give in-hospital patient a routine nucleic acid testing and the medical staff working in the isolation ward. The head nurse is responsible for collecting our protective equipment from the hospital logistics department according to the needs. Every piece of equipment including N95 mask, protective clothing, goggles needs to be registered and signed by the user before use, and then a special person counts the number every day.

As for general protective equipment, disposable medical masks and hats, etc., these are issued to staffs for their own use once a month and can be collected at any time if not enough.

Environmental management of wards is particularly stringent after the outbreak of COVID-19, especially for isolation wards. Ordinary room must be fenestrated twice a day for a minimum of 1 hour each. High-risk suspected isolation wards will turn off air conditioning and open windows for ventilation. The general

wards are disinfected by air disinfectant once a day for at least 2 hours each time. The ground is cleaned twice a day and disinfected twice with 500 mg/L chlorine-containing disinfectant. All areas are strictly partitioned and disinfected with one bed and one towel, and then strictly disinfected. Strengthen disinfection in the office area, clean twice a day, and disinfect twice with 500 mg/L chlorine-containing disinfectant, especially pay attention to the high-frequency contact surfaces such as door handles, computer keyboards, nurses' stations. Corrosion-resistant equipment is wiped and disinfected with 75% alcohol. For the final disposal of the suspected patients, after 30 minutes of window opening and ventilation, air disinfectant is used for disinfection for 2 hours, and 2000 mg/L chlorine-containing disinfectant cloth is used to wipe and disinfect the surface of the ground and objects. After 30 minutes, water is used to wipe, and 75% alcohol is used to wipe the non-corrosion-resistant equipment twice. Transfer stretcher should be sprayed with 1000mg/L chlorine-containing disinfectant and cleaned after 60 minutes. These measures are all effective environmental management measures which is reported in the literature[14].

Medical staffs training

When medical services were gradually expanded, medical staffs were recalled from prolonged holidays. These workers come from various provinces and municipalities in the country (the composition of medical staffs in Figure 1 C). How to get them back also needs reasonable and scientific arrangement. Firstly, according to the risk level of the place where the staff came from, we initially let the staff in the low-risk area come back. All staffs with flu symptoms and other staffs from high-risk areas will be recalled for the second round and will need to be quarantined at their home address in Changsha for 14 days before they can come to work without flu symptoms.

Before entering the work, all staffs will conduct on-line knowledge training on epidemic protection and emergency management; next is off-line practical skills operation on epidemic protection, including formal nucleic acid detection procedures, wearing N95 masks, wearing three-level protective clothing, goggles, etc. Assessments will be arranged after all training, and the staffs will be allowed to work in the hospital after passing the assessment.

Online Reporting System

All medical staffs will have an online reporting system during their work. Our hospital forces every medical staff to report on the system, including the body temperature, cough and other influenza symptoms today, which cities they have visited today, and whether they have contacted high-risk groups. This reporting system will be reported once a day. The department director and head nurse are responsible for supervising other staffs to report in time. The administrator will be set up in each reporting system to review the information reported daily. If a doctor has a fever today, he only needs to report his condition in this reporting system, and then he will be scheduled to enter the fever isolation ward for rest and treatment. If COVID-19 infection is ruled out, he will rest at home until the flu symptoms disappear.

Discussion

The COVID-19 epidemic once suspended the normal work of our CCU ward for 3 months. In these three months, the number of admission patients dropped sharply compared with the same period in 2019, especially the number of in-hospital emergency PCI rate in patients with ACS decreased significantly (76.00% vs 39.00%), this is probably because we have adopted a more conservative treatment approach based on expert consensus in China[15]. Previous a national survey of STEMI in China during the outbreak has been published in *JACC*, which is also reported that the proportion of patients with STEMI in China declined significantly during the epidemic[16], these impacts are difficult to avoid when such a large-scale epidemic with strong transmission capacity prevails nationwide.

By choosing strict isolation and tracking epidemiological history and other measures, Hunan province essentially eliminated transmission at the point. After the epidemic was controlled, we began to recovery medical services, and the number of patients admitted to the CCU gradually increased. From April to now, in addition to imported cases, there was no confirmed case of covid-19 in Hunan Province. Our hospital and CCU ward have formulated the above measures to ensure that the hospital gradually returns to normal operation, while also allowing patients to enjoy safe and orderly medical services. These measures are summarized as follows: 1. gradually expanding medical services; 2. risk classification and routine strict screening of patients admitted to CCU; 3. strengthening the management of hospitalized patients, accompanying person and medical staffs; 4. strengthening screening and isolation of suspected cases of inpatients; 5. other measures such as strengthening training of medical workers, protective equipment and environmental management, etc. According to the current global epidemic situation, it is inevitable that this winter may usher in a rebound of COVID-19, we hope that these measures can effectively prevent the outbreak of COVID-19 in our hospital if the outbreak of epidemic again sweeps Hunan Province, China. At the same time, we have formulated the next improvement plan based on previous experience in CCU and outlined as follows. 1. Guarantee one-month reserve of protective equipment; 2. Strengthen the transformation of negative pressure ward to ensure the use of protective equipment and treatment equipment alone; 3. Strengthen the training and management of non-medical staffs such as technicians and engineers; 4. Strengthen the prevention and treatment of mental health for inpatients. In conclusion, we believe that the pace of human progress will never stop. As long as scientific and effective measures are taken, human beings will overcome the COVID-19 epidemic in the world.

Previous articles[17-20] have reported emergency management measures in hospitals or wards during epidemic periods, including combination of effective patient testing strategies, intelligent work planning, and thoughtful resource management can be optimized treatment capacity, limit healthcare worker exposure, limit unnecessary use of personal protective equipment, and ensure high-quality patient care while avoiding staff overexertion; these measures are effective and adopted by healthcare professionals worldwide. But few studies share the preventive management strategies of hospitals and departments when the outbreak is controlled. Hence, this article relays useful experience for CCU professionals or hospital managers during both the present COVID-19 era and future post-epidemic period.

Conclusion

With the progress of human science, many of us have neglected infectious diseases. After the COVID-19 global epidemic, we finally understand the importance of preventing infectious diseases. Especially in the intensive care unit, no matter how strict the measures of epidemic prevention cannot be too much. We share the experience of prevention and emergency management in our hospital and CCU when medical services were reopened after effective control of the COVID-19 epidemic and hope it will be helpful for cardiologist or critical care physician all around the world to continue to provide critical care in a safe and orderly manner.

Abbreviations

COVID-19: coronavirus disease 2019; CCU: cardiac intensive care units; PCI: percutaneous coronary intervention; ACS: acute coronary syndrome; RT-PCR: reverse transcriptase-polymerase chain reaction

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

All authors have participated in the work and have reviewed and agree with the content of the article.

Availability of data and materials

All data generated or analysed during this study are included in this published article.

Competing interests

The authors have no conflicts of interest to disclose.

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Authors' Contributions

JJ Tang and YQ Chen designed this study, ZJ Wu drafted the manuscript, ZJ Wu, MZ Li, YX Liu, Ilyas, ZJ Peng, NH Qi and QD Hu collected the data, MX Chen, YQ Chen and JJ Tang revised the paper and all authors approved the final version.

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Tables

Table 1. Pre-hospital COVID-19 suspected infection risk assessment form for patients admitted to CCU

Name: Tel: ID number:

Home address:

	2	1	0
Patient source	Patients who come to the hospital for the first time	Patients from other departments of our hospital	Patients from other hospitals
Clinical symptoms	Fever, the temperature ≥ 37.3 °C	cough and other flu symptoms within three days	Asymptomatic
From area	High risk	Medium risk	Low risk
Nucleic acid test report	No report	Negative report within 14 days	Negative report within 7 days

Total score:

0-2 points: low risk 3-4 medium risk 5-8 high risk

Note: For the risk level of epidemic areas, please refer to the national epidemic prevention and control website for real-time updates or the Table 2.

Table 2. Evaluation criteria for the level of epidemic risk areas

There are more than 50 cases in total, and there are clustering outbreaks within 14 days.	High risk area
There are new confirmed cases within 14 days, the cumulative number of confirmed cases is not more than 50; or the cumulative number of confirmed cases is more than 50, and there is no clustering epidemic within 14 days.	Medium risk area
No confirmed cases or no new confirmed cases for 14 consecutive days.	Low risk area

Table 3. Epidemiological history questionnaire when patients were admitted to CCU

The Second Xiangya Hospital of Central South University

Division of Cardiology

Commitment for patients admitted to the Cardiovascular Intensive Care Units (CCU)

1. In order to assist COVID-19 epidemic prevention, please answer the following questions truthfully. If your answer is "yes", fill in the blank with "√". If the answer is "no", fill in the blank with "×". Thank you for your cooperation.

2. I promise that the following medical information provided by me is true:

Clinical symptoms	Have fever or respiratory symptoms within 14 days	Patient	Accompanying person
--------------------------	---	---------	---------------------

Epidemiological history	Have you ever been in contact with a patient with fever and other flu symptoms in the past 14 days?	<input type="checkbox"/>	<input type="checkbox"/>
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	Have you lived in a community with confirmed cases in the past 14 days?	<input type="checkbox"/>	<input type="checkbox"/>
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	In the past 14 days, do you have a history of travel or residence in high-risk areas of covid-19 epidemic?	<input type="checkbox"/>	<input type="checkbox"/>
--	--	--------------------------	--------------------------

	Have you been exposed to suspected or confirmed cases in the past 14 days?	<input type="checkbox"/>	<input type="checkbox"/>
--	--	--------------------------	--------------------------

	Is there any clustering diseases in your family or people you contact regularly?	<input type="checkbox"/>	<input type="checkbox"/>
--	--	--------------------------	--------------------------

3. I promise: if I conceal the above information, I will voluntarily bear the relevant legal responsibility.

4. Essential information:

Patient

Name: Bed:

Tel: ID number:

Home address:

Accompanying person

Name:

Tel: ID number:

Residential address in Changsha:

Signature

Relationship with patient

DATE:

(This questionnaire was translated from Chinese)

Figures

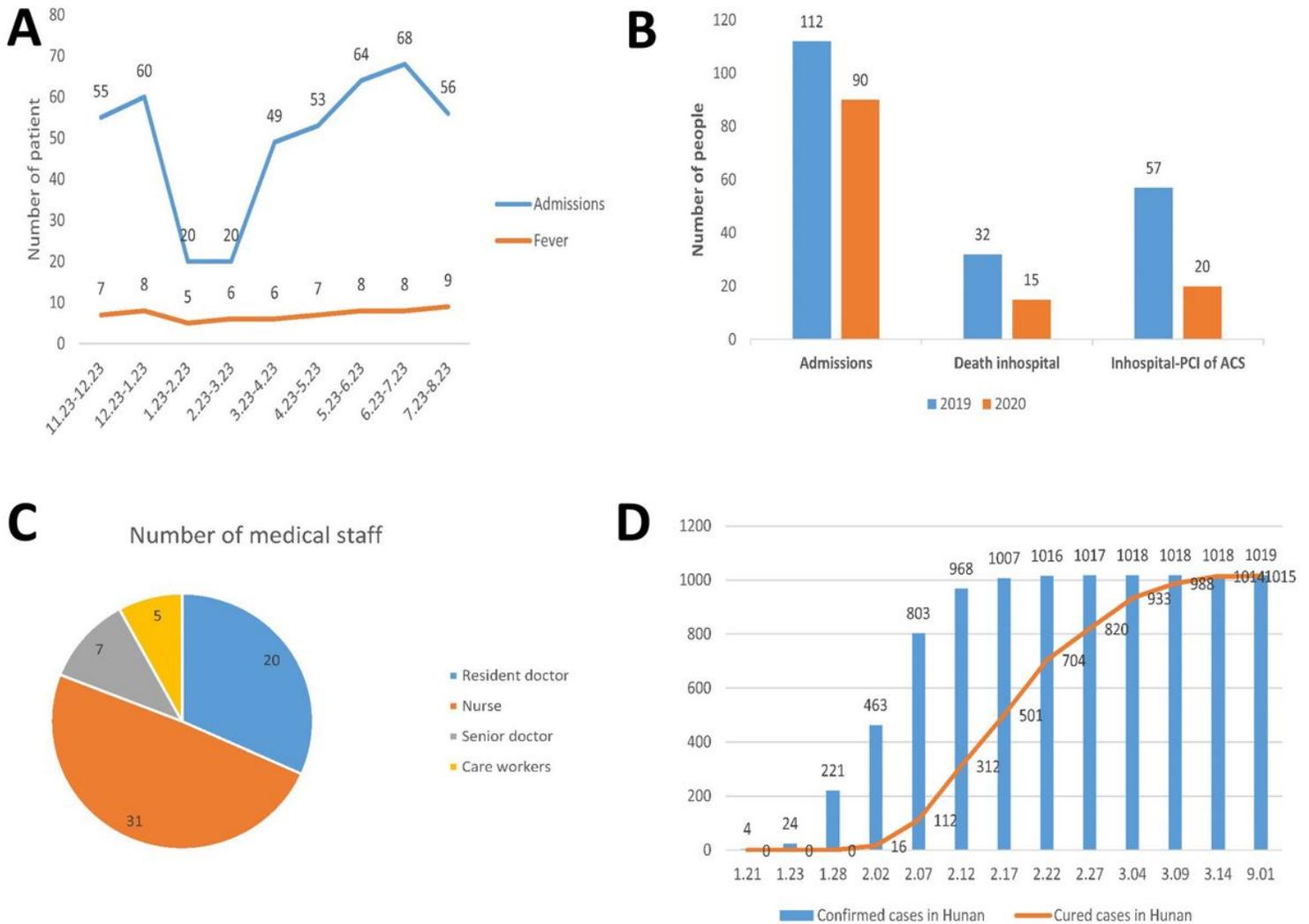


Figure 1

A. The number of hospitalized patients and febrile patients in CCU before and after the outbreak of COVID-19; B. the changes of hospitalized patients in CCU compared with the same period in 2019; C. The composition of medical staffs in CCU; C. The current situation of confirmed cases of covid-19 in Hunan Province.

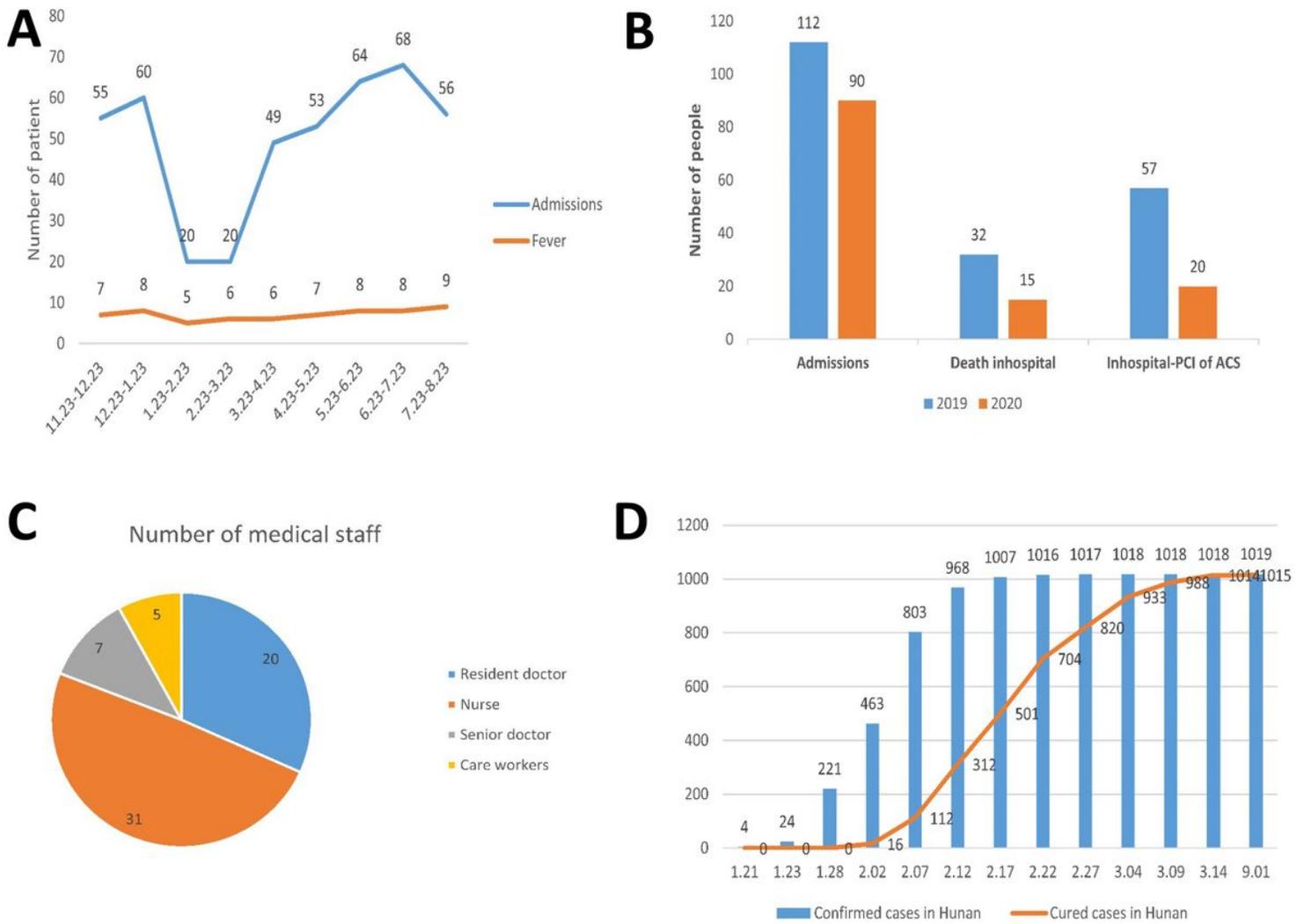


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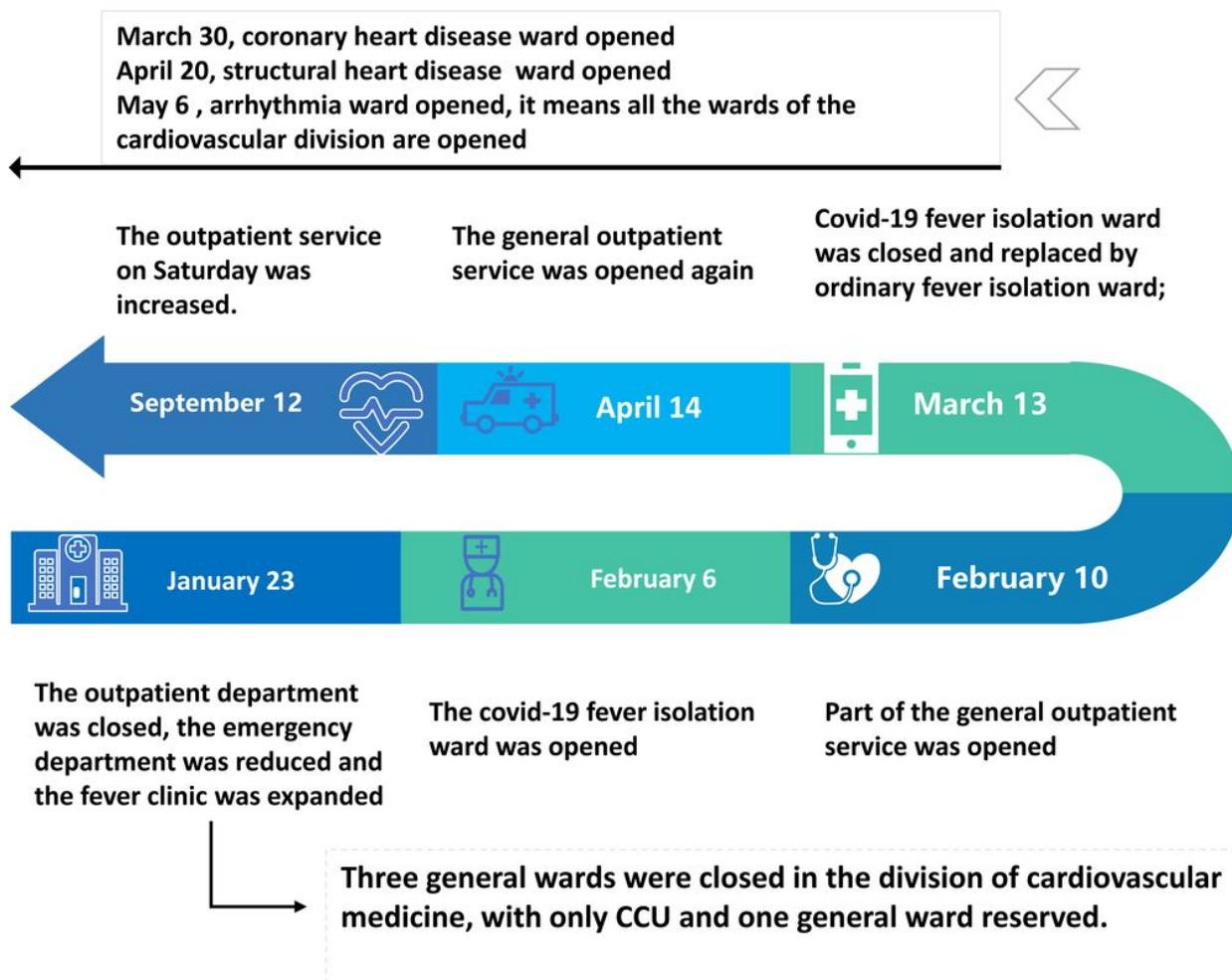


Figure 2

The time line of the gradual expansion of medical services in Xiangya Second Hospital and cardiovascular department.

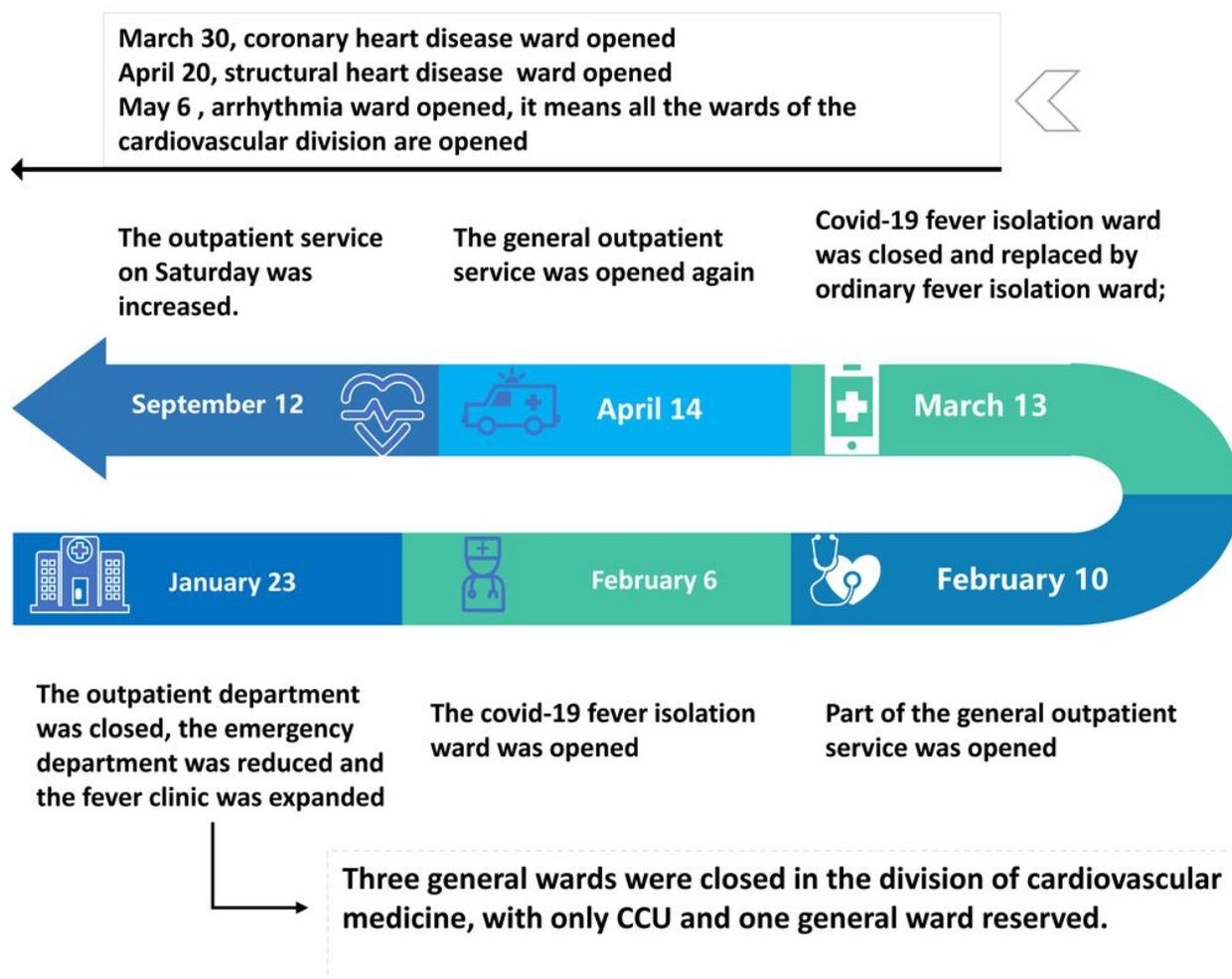


Figure 2

The time line of the gradual expansion of medical services in Xiangya Second Hospital and cardiovascular department.

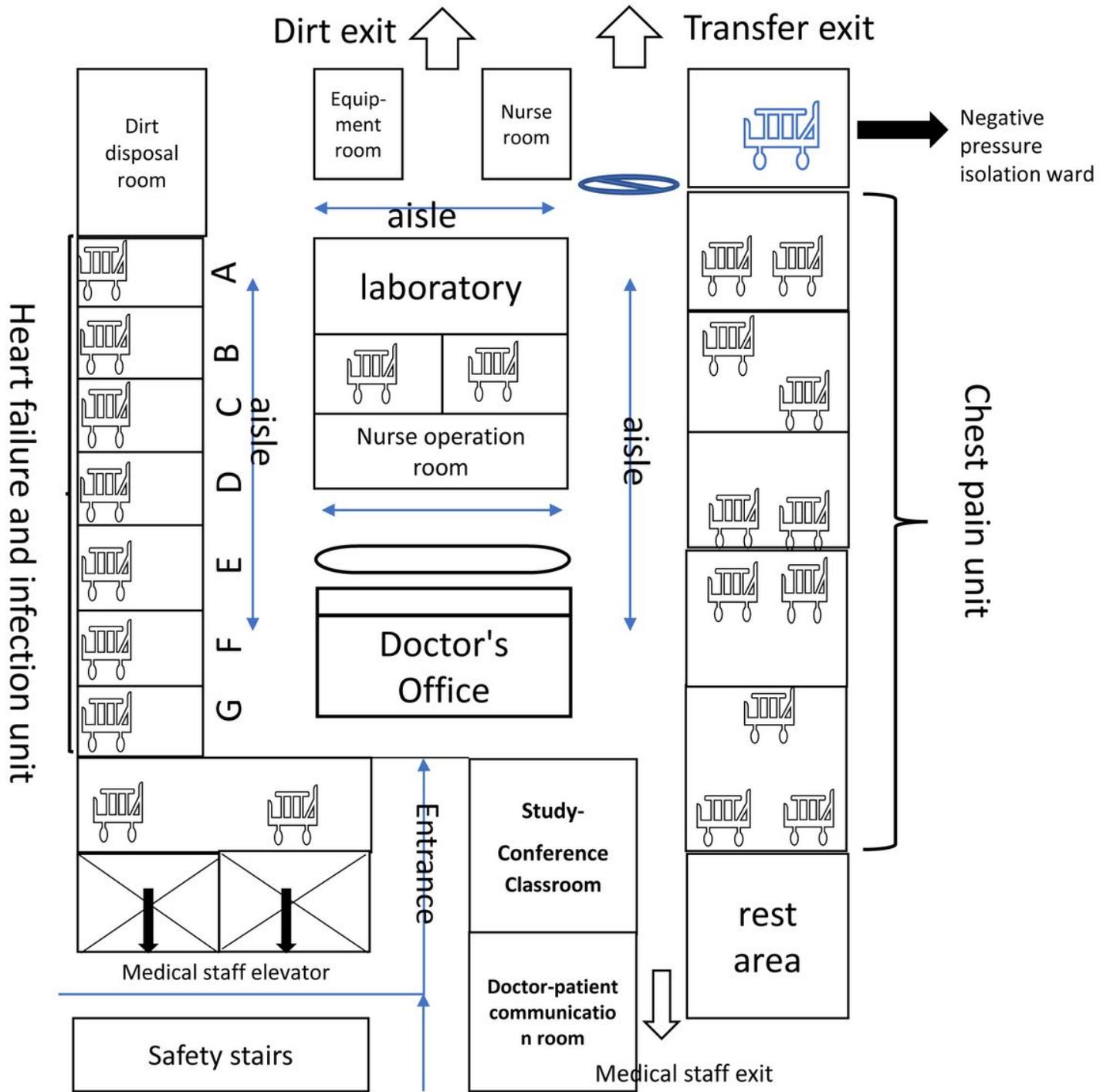


Figure 3

Structural sketch of CCU overlooking.

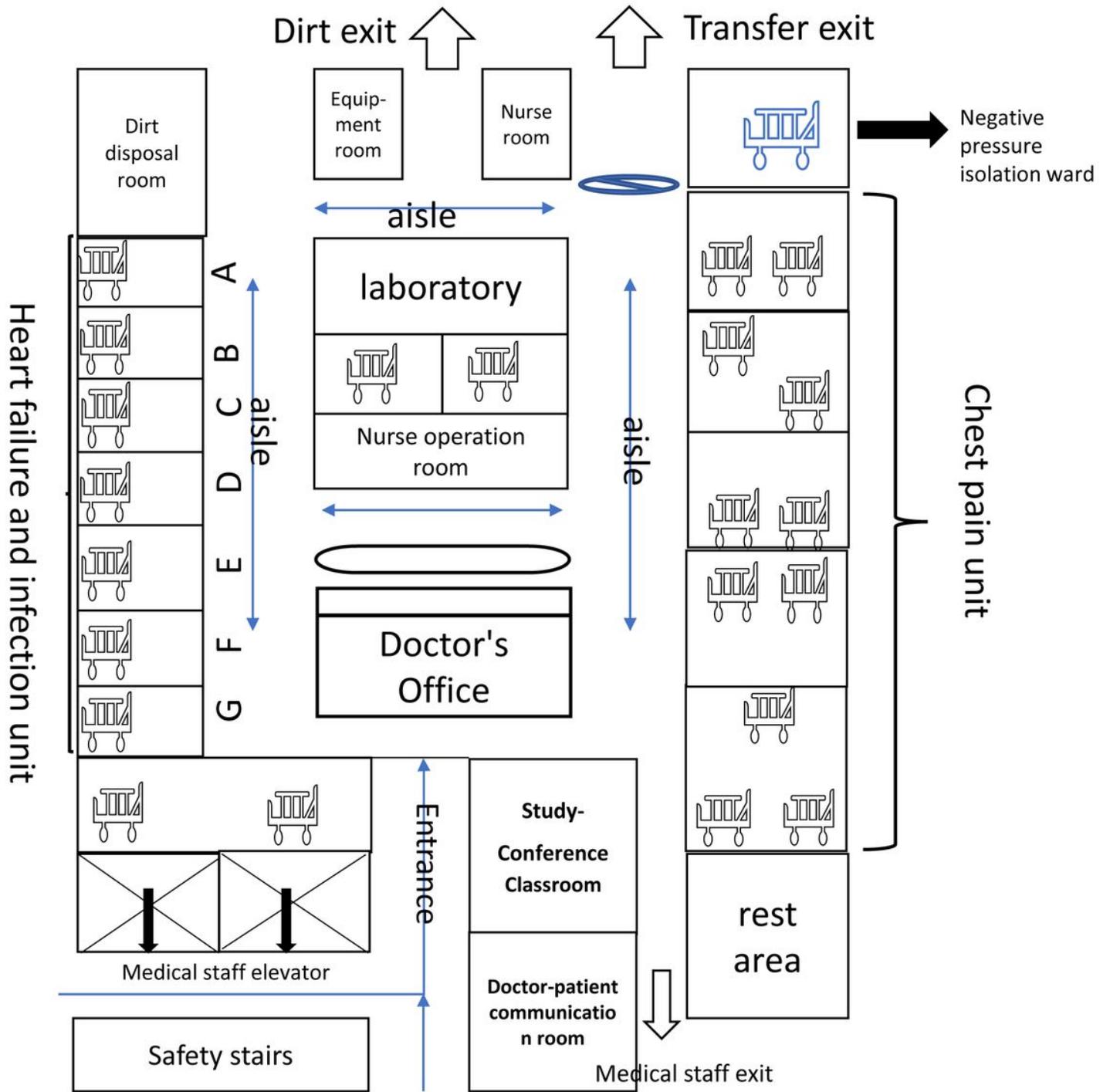


Figure 3

Structural sketch of CCU overlooking.

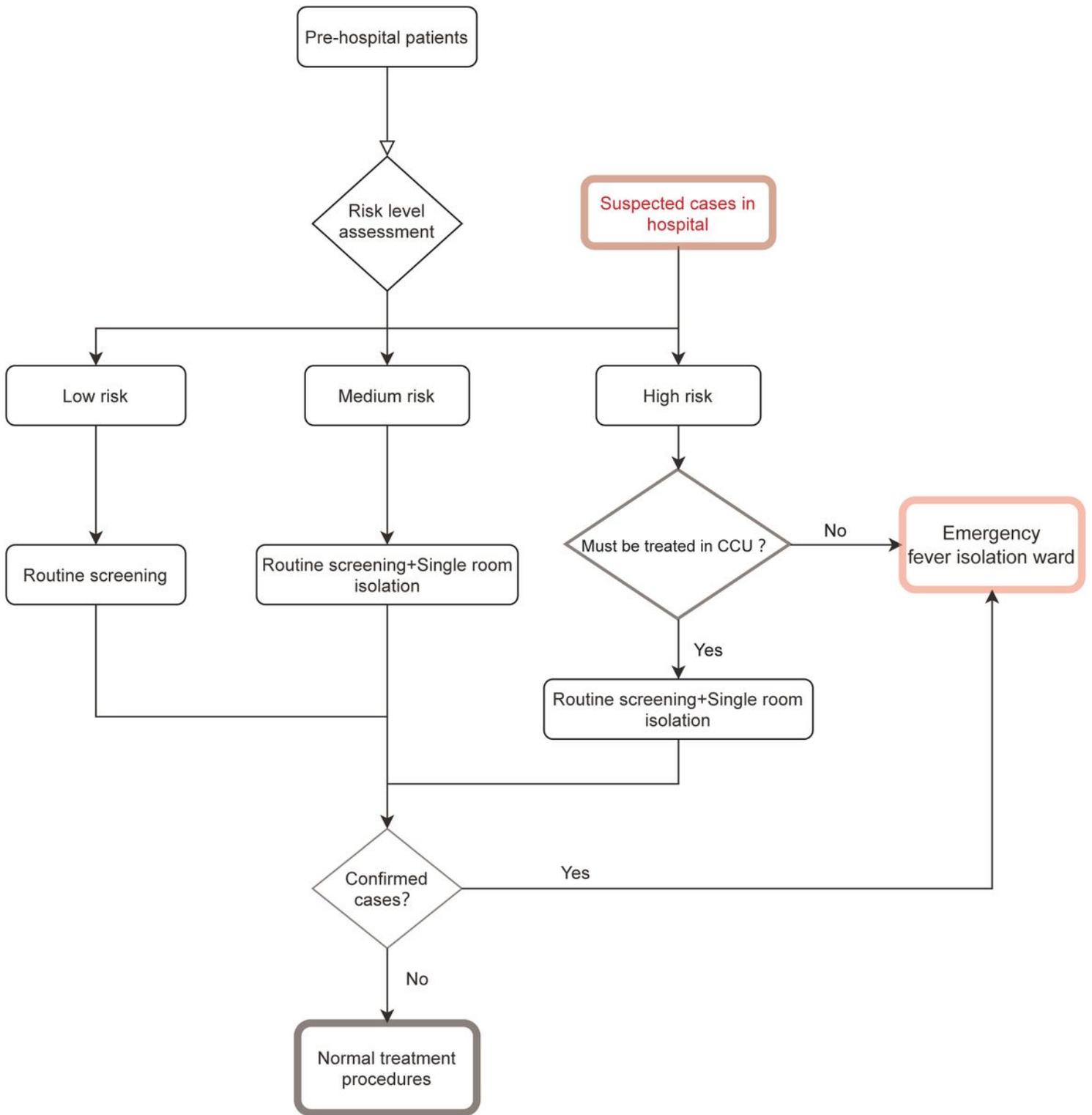


Figure 4

Flow chart of covid-19 routine screening of pre-hospital patient and suspected cases in hospital screening.

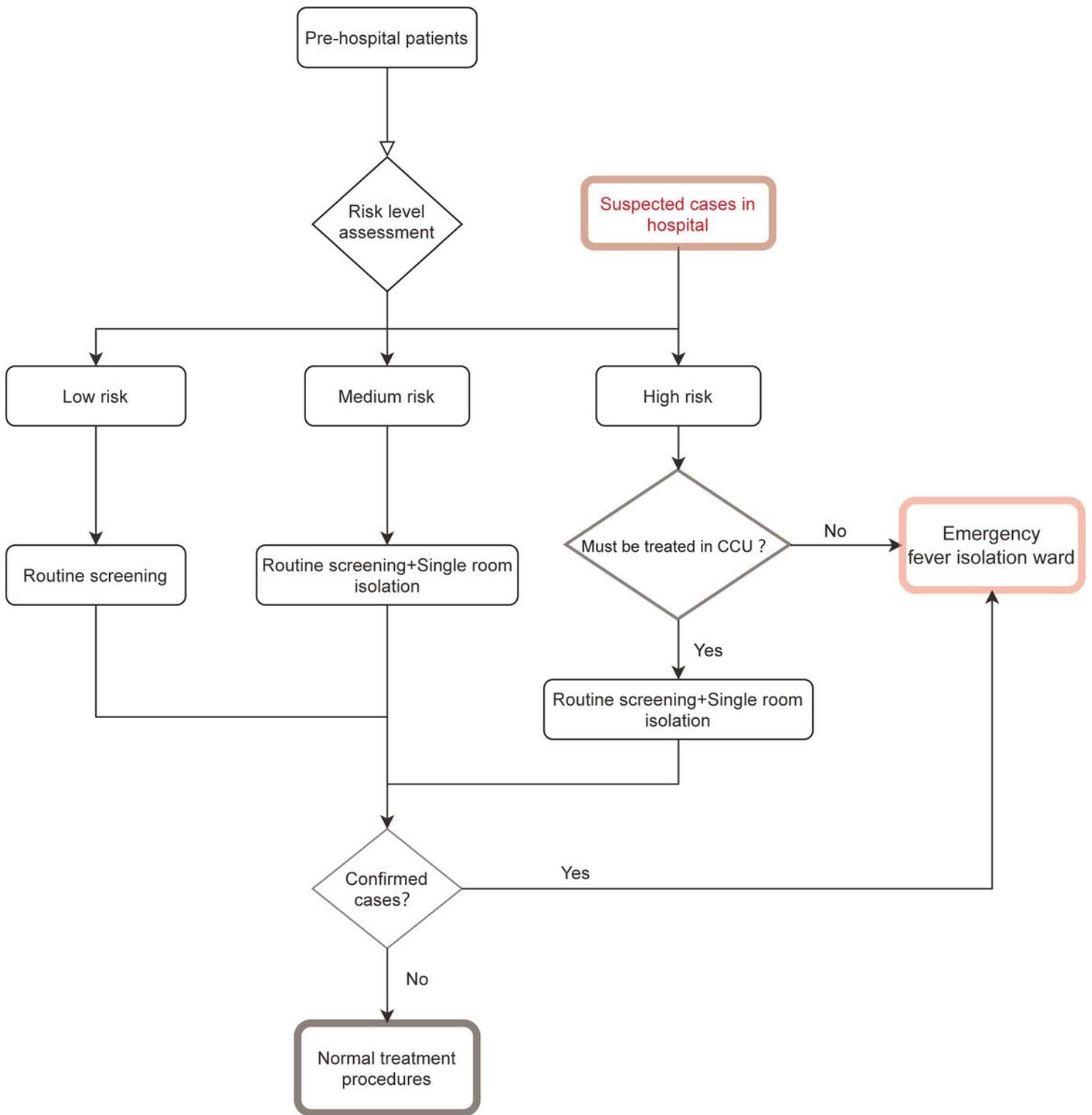
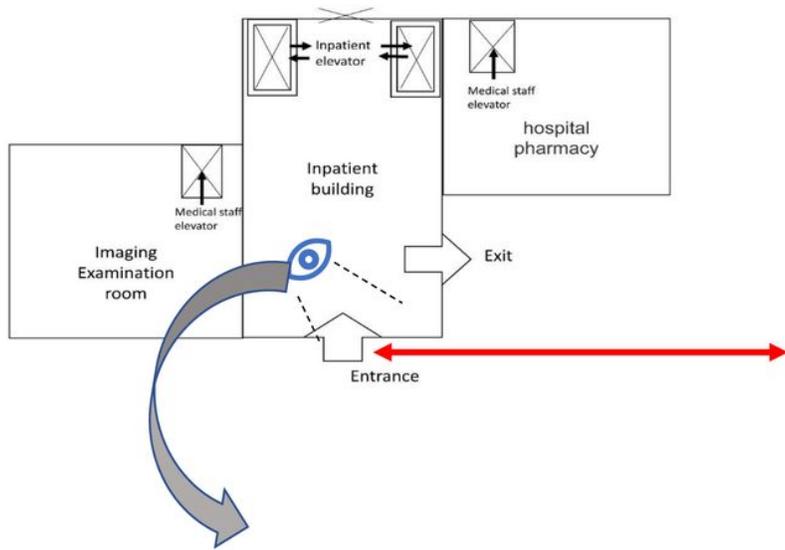


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Takeaway Locker



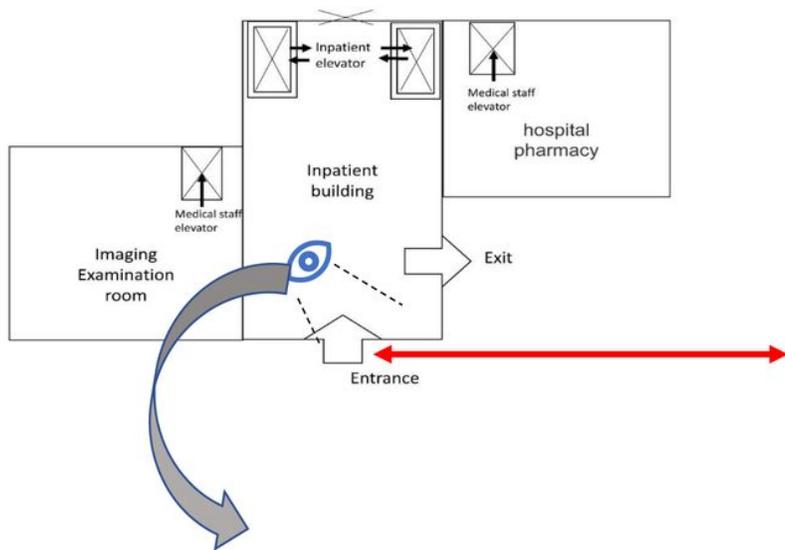
Inpatient building entrance

Body temperature
detection system

Health code or ID card
scanning channel

Figure 5

Structural sketch and some details of the first floor of the internal medicine inpatient building.



Takeaway Locker



Inpatient building entrance

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Structural sketch and some details of the first floor of the internal medicine inpatient building.