

All Hands on Deck



中國醫院協會
CHINESE HOSPITAL ASSOCIATION

Chinese Hospitals' Experiences in Combatting COVID-19

Construction of an emergency management system of large-scale hospitals under the stress of COVID-19

Sichuan Academy of Medical Sciences

Sichuan Provincial People's Hospital

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四川省医学科学院·四川省人民医院
Sichuan Academy of Medical Sciences
Sichuan Provincial People's Hospital

The novel coronavirus disease 2019 (COVID-2019) is a newly discovered class B infectious disease managed as class A infectious disease by China. The disease was highly contagious, which started in Wuhan and rapidly spread throughout the country. It has caused 80904 cases of infection so far, among which over 3000 were health professionals, and 3123 died. It is a severe threat to the health and life of the population. In China, 31 provinces (including municipalities and autonomous regions) have consecutively launched Level I response to public health emergencies.

This is an unprecedented fight against epidemic outbreak.



Introduction of Sichuan Provincial People's Hospital

- Provincial leveled large-scale governmental and comprehensive hospital: **medical services & medical education & scientific research.**
- Over 3000 open beds, 4 million annual clinic visits, 140,000 annual discharges and an annual operation volume of 90,000.
- Relevant experiences: Played an important role in multiple emergencies, including the SARS outbreak in 2013 and 2018 Wenchuan earthquake.



Sichuan Provincial
People's Hospital

Sichuan
Province

Hubei
Province

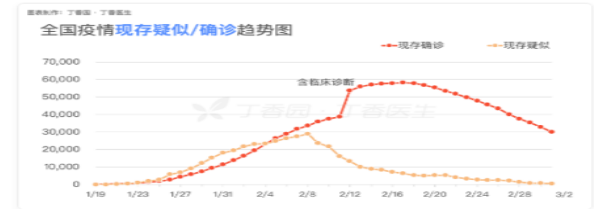
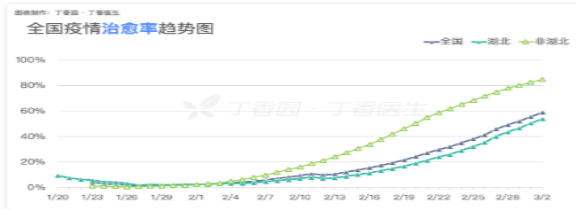
Location of the Hospital



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Challenges faced in combatting COVID-19

- ◆ How to revise the hospital management procedures in limited time?
- ◆ How to achieve the goal of early diversion, early identification, early isolation and early treatment of patients?
- ◆ How to construct an comprehensive prevention and treatment system, to ensure the adequate treatment of COVID-2019 patients and protect health professionals at the same time?
- ◆ How to meet the medical needs of ordinary patients while avoiding cross infection?



A Rapid Management Procedure Revise with Dynamic Update

Established emergency management system

Established:

- Emergent command center
- Three-layer concentric ring strategy
- multiple clinical teams
- Prevention and control system of nosocomial infections
- Logistics support system
- Human resources support and supervision system

COVID-2019 prevention and control manual

Knowledge included:

- Detailed description of all post responsibilities
- Work procedures
- Operation procedures
- Diagnosis and treatment procedures
- Protection scheme

Staff Training & Education

Contents:

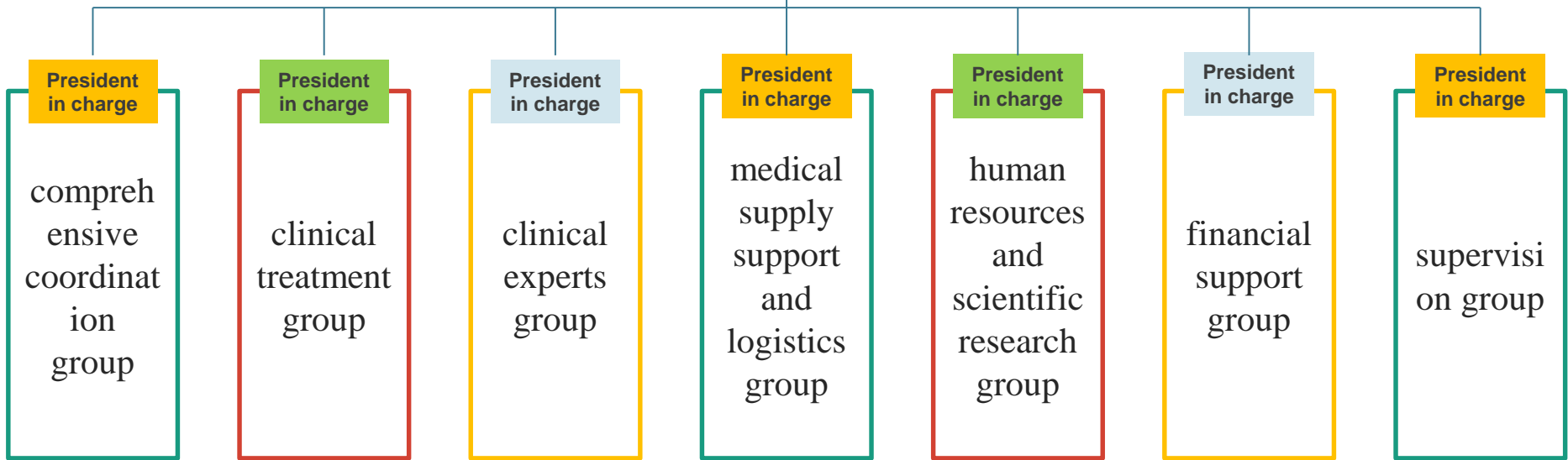
- Treatment guidelines of COVID-2019
- Strategies of nosocomial infections control
- Personal protection measures
- Implementation of the Manual



COVID-2019 Emergency Management System

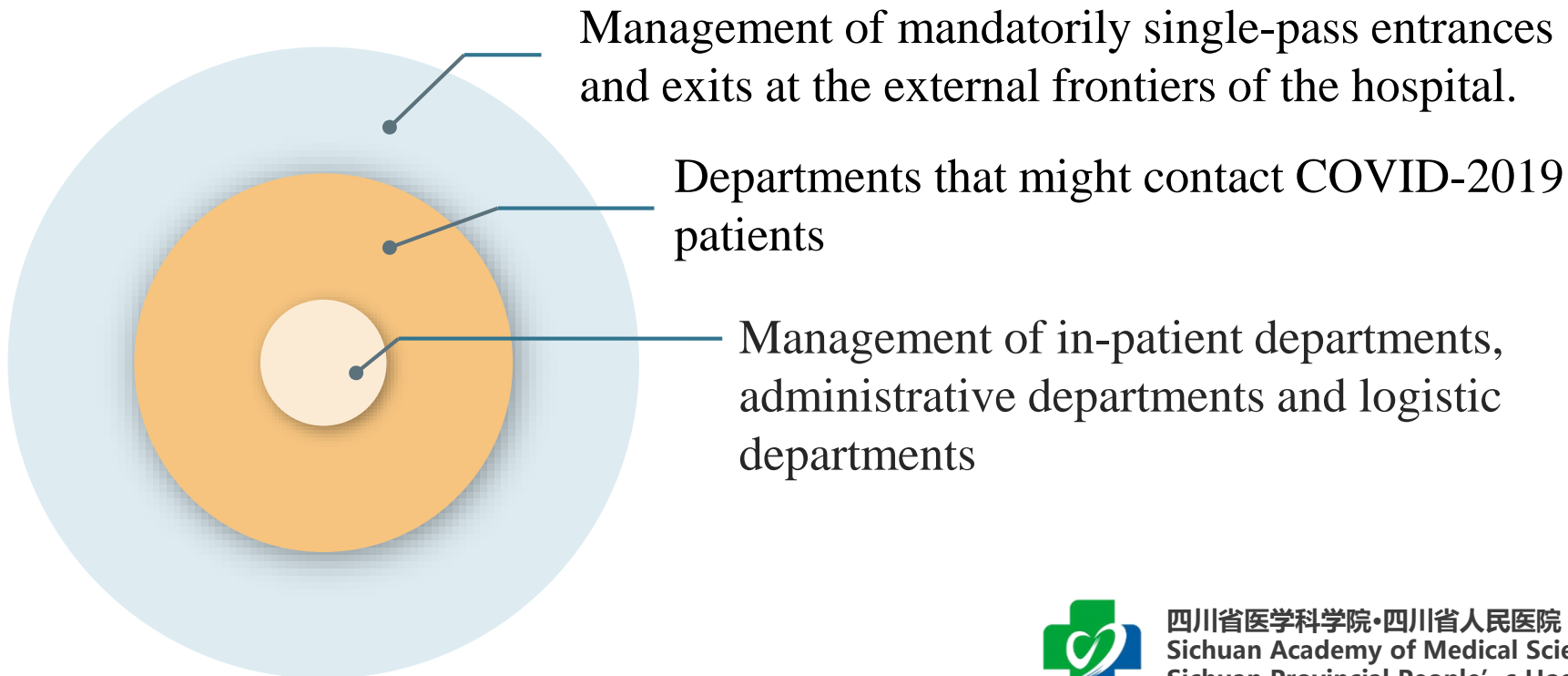


Hospital President & Secretary of the Party committee



COVID-2019 emergency management system

A Three-layer concentric ring strategy



Management of mandatorily single-pass entrances and exits at the external frontiers of the hospital.

Aim: Identify and divert possible infected patients and prevent cross infection

3 pedestrian entrances

Staff

Patient
without
fever

Patient
with
fever

1 pedestrian
exit

2 vehicle entrances

Staff

Non-Staff

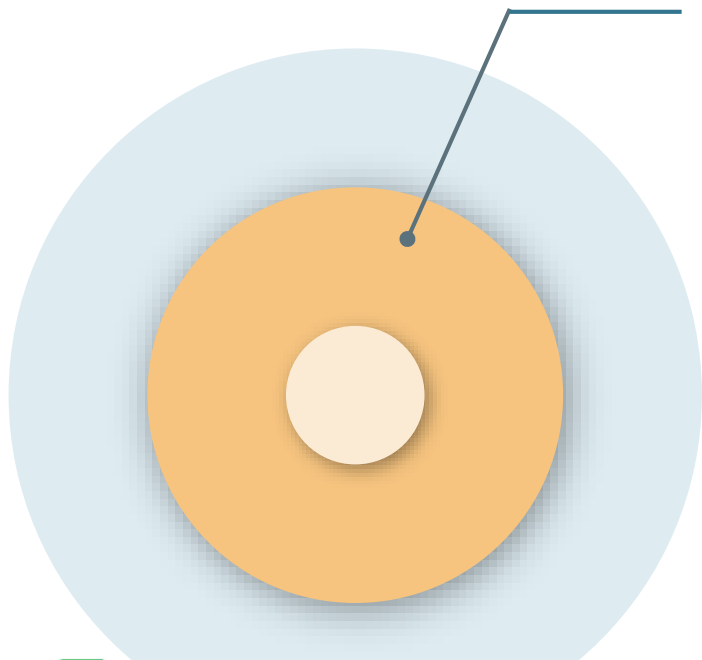
1 vehicle
exit



COVID-2019 emergency management system

A Three-layer concentric ring strategy

Departments that might contact COVID-2019 patients
(area for screening and treating febrile patients, high risk)



- Fever Clinic
- Observation Area
- Temporary Isolation Ward
- Emergency Room
- Clinic Department
- Special Lab Unit
- Special CT Unit

Aim
ensure early diagnosis, early identification, early isolation, early treatment of suspected patients , minimize cross infection

three-stage pre-consultation checking & triage procedure

Stage 1: On-line appointment registration: mandatory questionnaire about epidemiology history

Stage 2: Waiting Area: Nurses take patients' temperature & a double check of epidemiology history

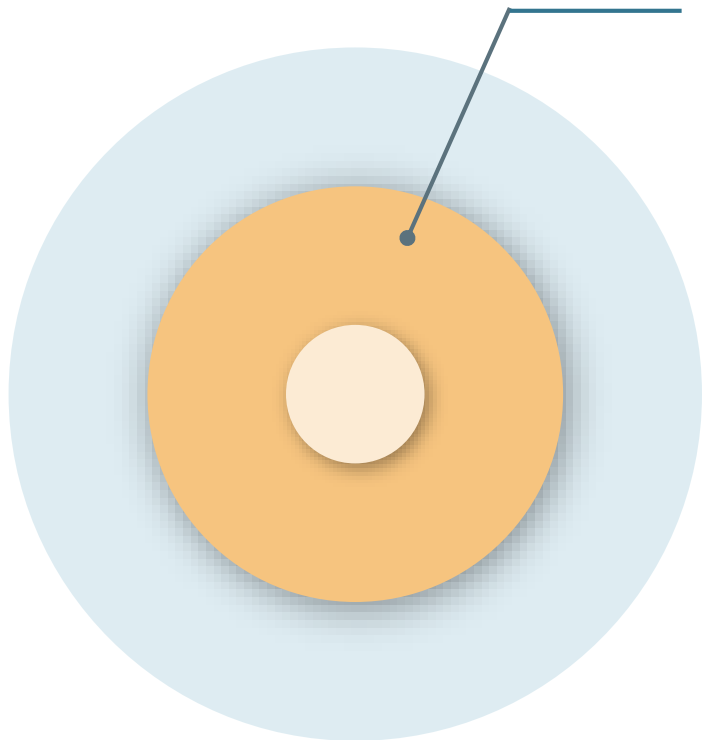
Stage 3: Doctors' inquiries epidemiology history be included



COVID-2019 emergency management system

A Three-layer concentric ring strategy

Departments that might contact COVID-2019 patients
(area for screening and treating febrile patients, high risk)



About the 2 Fever Clinics

an important place for diagnosis and treatment of febrile patients

Equipment

- One diagnosis room
 - One throat swab sampling room
 - One observation room
 - One resuscitation room
- } Per each Fever Clinic



COVID-2019 emergency management system

A Three-layer concentric ring strategy

Management of in-patient departments, administrative departments and logistic departments

Aim

Protect in-patients and healthcare workers from being infected.

Set up a monitoring post at the entrance of each building to strictly control the entries in accordance with the requirements of the hospital's accompanying and visiting specifications.

A procedure for standardized COVID-2019 screening for in-patients and suspected individuals in the in-patient area.

Specified prevention and control scheme of each clinical department, including: education and management of caregivers and visitors & specifications for treatment and surgeries & infection control scheme of working staff & personal protection measures education & manuals of knowledge about COVID-201 & education of the hospital's working procedures



Nosocomial infections control throughout the three-layer concentric ring model

A revised scheme of COVID-2019 control

- Specified nosocomial infections control procedures for COVID-2019 related departments, especially for key departments such as fever clinics, emergency isolation wards, radiology departments, etc.
- Optimized physical isolation procedures. strictly executed partition management, strengthening the behavior standards of different areas and avoiding cross infection.
- Enforced environment cleaning and disinfection
- Enforced management of hospital infectious waste and sewage
- Enforced management of patients, instructing patients and families on proper mask wearing and hand hygiene.
- Suspected COVID-2019 patients from fever clinics will be guided by specially assigned staff to the emergency isolation area through special pathways to stay or receive treatment, so as to reduce the risk of nosocomial infection.

Each department designated a nosocomial infection monitor to ensure the implementation of the these measures



Nosocomial infections control throughout the three-layer concentric ring model

A scheme for the using of protective equipment

- To ensure correct protection and avoid over-protection: Distribute protective supplies according to risk stages of clinical posts
- To ensure personal protection: Require strict implement of sharp injury prevention.

A scheme of COVID-2019 related laboratory examinations and biosafety management of Sichuan province

Purpose: to standardize the procedures of COVID-2019 related tests across the province and protect the lab and work staff.



COVID-2019 emergency management system

Human resource support for the three-layer concentric ring model

- Conducted epidemiological survey of the whole staff : Investigated the situation of 6702 staff & 14208 family members & 6218 close contacts 47 workers with epidemiological history were required self-isolation at home.
- Established health records of employees in high-risk department. Observe clinical symptoms on a daily basis; take record of staff's body temperature; ensure health record being safely preserved for each person.
- Set up technique procedure to deal with medical workers who are suspected infected. Provide free diagnosis and treatment for hospital staff.



COVID-2019 emergency management system



Human resource support for the three-layer concentric ring model

- Integrated/suspended 21 wards to reserve labor & reduce waste of protective supplies
- Mobilize educated administrative and logistics personnel
- Set up a staged reservoir of personnel
- Sent three teams including 190 staff to Hubei (voluntarily)



How to train & educate the staff

Contents

- Treatment guidelines
- On-site training for occupational protection
- Hospital's prevention and control manual*
- Personal protection and special prevention and control procedures
- Other knowledge

Layers

- Doctors
- Nurses
- Medical technicians
- Administrative personnel
- Other staff
- Maintenance workers, transport workers, caregivers
- Patients & families

Key Departments

- Fever clinic
- Isolation ward
- Observation ward
- Medical aid team for Hubei Province

* See next page.



Human resource support for the three-layer concentric ring model

The Hospital Prevention & Control & Treatment Manual



How to use

Training hospital staff with the Manual together with the COVID-19 treatment guidelines, nosocomial infection control measures, individual protection measures, to ensure the precise treatment and strict cross infection prevention

- Position responsibilities
- Work flows
- Operation specifications
- Treatment procedures
- Prevention schemes





How to train & educate the staff

On-site Training

Key personnel, key departments
Occupational protection related knowledge

On-line Training

Whole Staff
All related knowledge

Retraining

Each Department
Manual, special procedures, etc.



Efficient Revisions of the Hospital's Procedures

National Principle Gather patients for centralized treatment with centralized supplies

Achievement

- ❑ Efficiently complete physical space and process reengineering, including the expansion of fever clinic, establishment of isolation ward, set up of isolation channels, rebuilding of negative pressure wards and negative pressure laboratories.
- ❑ Transformed the east district, which had 500 open beds, to a specialized referral center for critical COVID-2019 patients in only 8 days.



Reserve Materials and Use Them Coordinately

Purchase

Control

|
A strict system

Urgently needed materials

Check — All inventory articles

↓
Register — Organize, identify and classify purchased & donated protective articles

↓
Use — Real-time monitor

The overall management of reserve materials

Purchase

Urgently needed materials

Sort & Count

Liquidating Old and Surplus Inventory
Recall the overstocked protective items from clinical departments

Management

A strict scheme for reserve materials management

Check — All inventory articles

↓
Register — Organize, identify and classify purchased & donated protective articles

↓
Use — Real-time monitor





Reasonable distribution by category

A scheme for using protective equipment

- Assess risk stage of all clinical posts
- Deliver protective equipment accordingly
- Avoid over-protection

A scheme for delivering protective materials

- deliver supplies to all departments early in the morning according to their needs planned one day before
- announce the use of materials to be subjected to supervision

**Daily report
for supervision**





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COVID-2019 Clinical Treatment Strategy

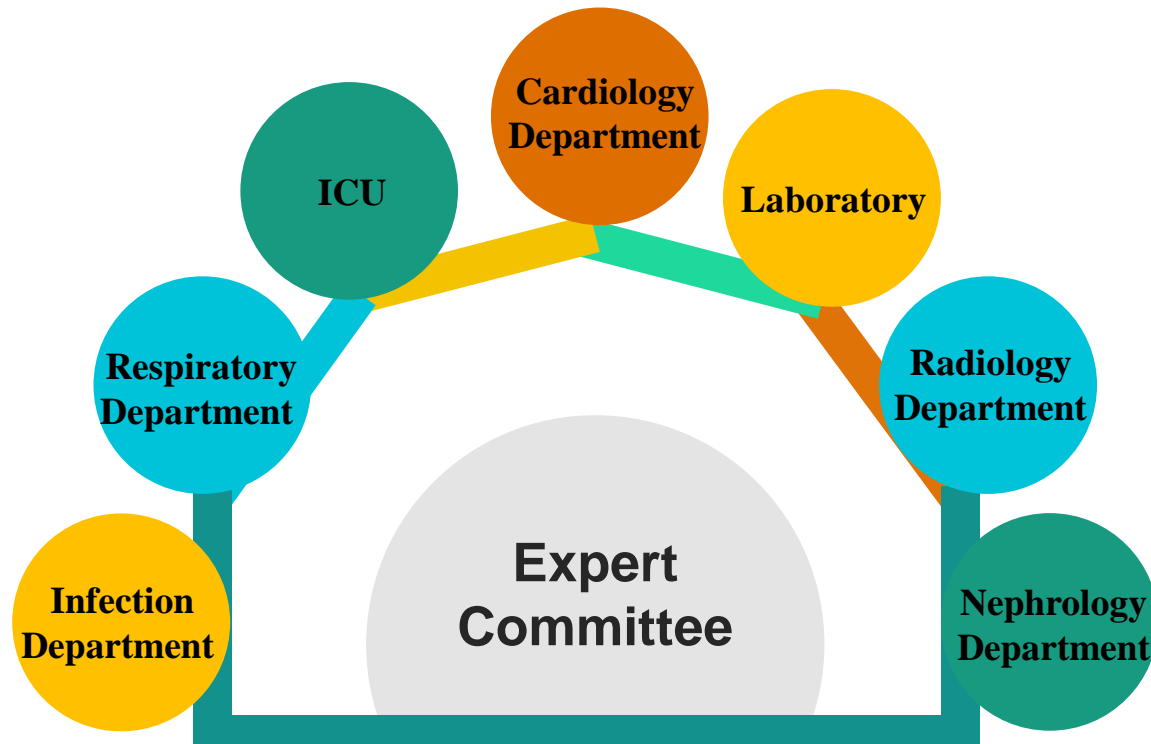
Our Efforts

COVID-2019 Clinical Treatment Strategy

Expert Committee



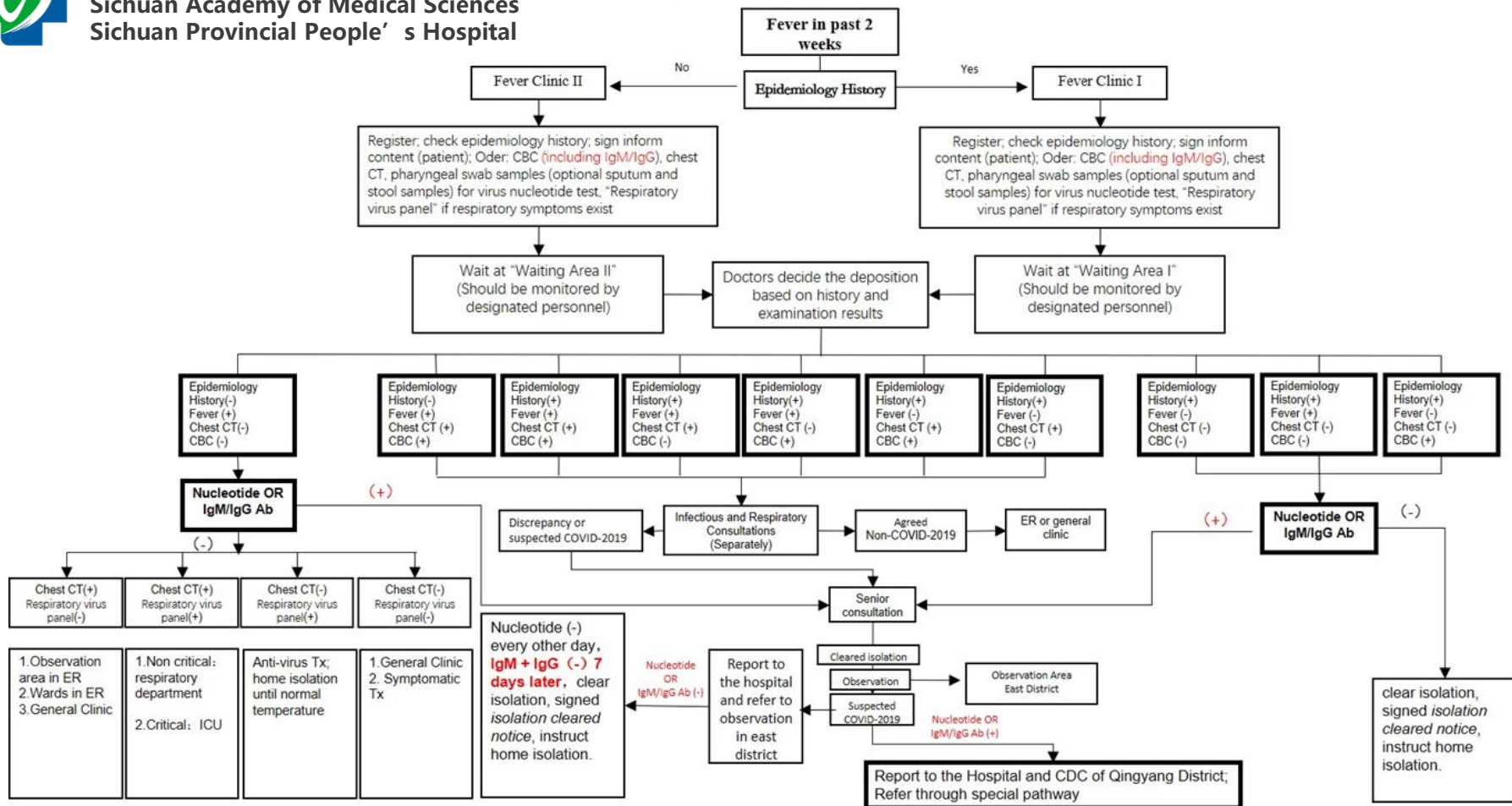
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Responsibilities

- ❑ Instruct the clinical treatment of COVID-2019
- ❑ Assess suspected and confirmed COVID-2019 patients
- ❑ Analyze the epidemic situation within the hospital
- ❑ Assist accurate treatment
- ❑ Establish and update hospital's specific procedure for fever clinics according to the actual situation and relevant specifications*
- ❑ Organize MDT for COVID-19 treatment on a daily basis
- ❑ Remote consultation and remote education.



Improve the work of COVID-2019-related departments

Strengthen the management of the
2 fever clinics and the emergency isolation wards

Arrange shifts of fever clinics uniformly

Implement a three-level consultation system for suspected patients

Developed a template of concise medical record, embed into the doctor's online station

Sound patient communication and strict patient management





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Scientific Research Support for COVID-2019 Epidemic Control

- Do SARS-CoV-2 nucleotide tests for samples from throat swab, blood, urine, and stool. Proposed and explored **possible false negative of pharyngeal swabs samples**, which guided a **multi-sampling procedure** to assist clinical diagnosis.
- Successfully developed a **SARS-CoV-2 nucleotide detection kit** (fluorescence PCR method), which had been approved by the CFDA and obtained the medical device registration certificate.



- Developed an antigen-antibody **rapid detection system** for SARS-CoV-2
- Established **colloidal gold and chemiluminescence methods** to check antibodies against SARS-CoV-2 in serum
- Positive result of coronavirus IgM and IgG, combined with clinical diagnosis can help confirm the COVID-19. Hence the hospital used both for admission screening.

Quality Control and Supervision Schemes

Important measure to prevent external import and
strengthen internal management



**Supervision
Team**

The diagram shows a yellow circle labeled 'Supervision Team' on the left, with three horizontal bars extending to the right. The top bar is red and labeled 'Department of Medical Affairs'. The middle bar is orange and labeled 'Department of Nosocomial Infection'. The bottom bar is teal and labeled 'Department of Nursing'.

Department of Medical Affairs

Department of Nosocomial Infection

Department of Nursing

**Set up Assessment
Criteria in each Department**

- Investigate any time in need
- Detect drawbacks
- Rapid feedback
- Supervise the rectification



Supervision on leading cadres and health professional

Issued a notice on strict implementing specification on prevention and control of COVID-2019

Supervision on the implementation of prevention and control measures

Supervision on the management of donated supplies

Formulated the Scheme for auditing and monitoring the use of financial fund and donations for epidemic prevention and control

Double signatures are required during the flow of materials, to strengthen the reception, management, specific supervision, tracking monitoring and post hoc audit



Supervision on the use of protective medical supplies

Released the *Notice on implementation of the strict discipline in the distribution and use of protective equipment*

Key Requirement: establish a strict registry & tracking system of the use of important medical protective supplies.





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Internet Medical Services in the Epidemic Control

Categories

On-line Clinic for Ordinary Patients

Special on-line Clinic for COVID-19 Patients

Free online psychological assistance

Online patient education

Online internal information platform

Online staff training program

Telemedicine based on 5G technology

Service Contents

Telemedicine

On-line prescription and on-line audit, together with on-line medical insurance settlement and drug delivery service. (probably the first hospital in China that has been able to provide this whole chain service)

Staff Training & Education

Psychological Consultations

Public oriented lectures



Achievements

As of March 8, we have held **159** on-line consultations using our 5G remote consultation platform and received positive feedback, including **97** COVID-2019 cases. On-line clinic service saw **14491** patients, including **8418** COVID-2019 related cases.





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Maintenance of Common Medical Services during the Epidemic Control

Keep a patent green channel in **emergency department**

Compulsory online/telephone consultation & reservation

helped keep general outpatient service open, to guarantee basic needs of patients

Suspended high-risk clinics such as stomatology, otolaryngology, children's health care, etc..

Pay focus on patients that need long-term treatment, such as cancer, chronic renal failure, maternity, and pediatrics patients.



Step-by-step Procedure

Make weekly work plan according to actual needs

Gradually open the outpatient and inpatients services according to risk levels of different departments

Strengthen the three-stage pre-consultation and triage procedure

Strengthen screening of inpatients

Enforce management of patients, visitors and caregivers in the inpatient departments

Adhere to the protection of medical personnel and logistics personnel





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Step into the Future

Our Considerations

From the aspect of individual hospital:

- Emergency preparedness system, including the clinical service centered nosocomial infection control system, emergency material management system and human resource support system, should be improved
- Hardware & software, including clinical specialties, talent pipeline, fever clinics, negative pressure wards, laboratory of etiology, etc., in large scale public hospitals should be furthered enhances.
- Idea transformation is essential : physicians should pay more focus on disease prevention, and participate in public health affairs.



Our Considerations

From the aspect of public health:

- How can large scale hospitals or district medical centers play a leading role in public health event?
- A national infectious disease prevention & control system covering primary care institutions should be established. The capability of monitoring & preventing & controlling the spread of infectious diseases should be further enhanced in primary healthcare organizations.
- To avoid affecting the normal medical treatment order, the construction of more infectious disease special hospitals, human resource related plans that could meet the needs of both peacetime and epidemic, etc., should be taken into consideration.



Up-to-date Information



WHO: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>

China National Health Commission: <http://en.nhc.gov.cn/antivirusfight.html>

China CDC: <http://weekly.chinacdc.cn/index.htm>

Xinhua News: <http://www.xinhuanet.com/english/special/2020coronavirus/index.htm>

China Daily: https://www.chinadaily.com.cn/china/special_coverage/2020novelcoronavirus

Contact:

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