UNIVERSITI SAINS MALAYSIA

Response and Readiness Plan for COVID-19 Pandemic and Other Infectious Diseases Outbreaks

Version 1

1st April 2020

USM COVID-19 Pandemic Taskforce 2020

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PREFACE

The USM Response and Readiness Plan for COVID-19 and Other Infectious Disease Outbreaks provide a general guidance for preparedness, response and communication that are urgently needed against COVID-19 Pandemic and other infectious disease outbreak of public health emergencies.

This document provides the framework of action plan and recommendation, which are subject to change, to best minimize the impact of infectious disease epidemic to USM since the first priority is to protect the health and safety of the campus community.

This document, presented in two sections, outlines plan of coordination, procedure and policies on monitoring illness among students and staff members, particularly on the coordination of various departments/units on the case management, preventive, control and mitigation aspects of ongoing and future disease outbreaks.

Insha Allah, we hope that this document will be of practical use. Through the same spirit of cooperation and collaboration, future infectious disease outbreaks will be overcome in a more coordinated and well-organized manner.

Taskkforce Team
March 2020

ABBREVIATIONS

- CAM-CRC Campus COVID-19 Response Committee
- CEN-CRC Central COVID-19 Response Committee
- COVID-19 new Corona Virus Disease 2019
- CPRC Crisis Preparedness and Response Centre
- HE Health Education
- HEP *Hal Ehwal Pelajar* (Student Affair)
- HCW Healthcare Worker
- ID Infectious disease
- ILI Influenza-like Illness
- MOH Ministry of Health
- MCO Movement Control Order
- OSH Occupational And Safety And Health
- OCT/OMT Outbreak Control/Management Team
- PKD *Pejabat Kesihatan Daerah* (District Health Office)
- PUI Person Under Investigation
- PPE Personal Protective Equipment
- RRT Rapid Response Teams
- SARI Severe Acute Respiratory Infection
- SOP Standard Operating Procedure
- TOR Term Of References
- URTI Upper Respiratory Tract Infection
- USM Universiti Sains Malaysia
- WHO World Health Organization

OPERATIONAL DEFINITION

Endemic	Constant presence and/or usual prevalence of a disease or infectious agent in a population within a geographic area
Epidemic	An increase prevalence of a disease or infectious agent in a population within a geographic area.
Outbreak	An increase prevalence of a disease or infectious agent in a population within a less limited geographic area than epidemic. Occasionally used as the same definition of epidemic, but is often for a more limited geographic area
Pandemic	An epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people.
Clusters	A disease cluster or infection cluster is a group of similar health events that have occurred in the same area around the same time.
Public Health Surveillance	An ongoing, systematic collection, analysis and interpretation of health-related data essential to the planning, implementation, and evaluation of public health practice.
Risk communication	A two-way exchange of information between interested parties about the nature, significance and/or control of a risk.
Quarantine	The separation of a person or group of people reasonably believed to have been exposed to a communicable disease but not yet symptomatic, from others who have not been so exposed, to prevent the possible spread of the communicable disease.
Social distancing	Various measures to reduce physical contact between people approximately 1 meter apart from others when possible

SECTION A

USM GUIDELINES AND ACTION PLANS ON COVID-19 PANDEMIC

1. INTRODUCTION

1.1 COVID-19 PANDEMIC

On 30 January 2020, the World Health Organization (WHO) declared that CoVID-19 is a "public-health emergency of international concern". All countries were preparing to tackle the pandemic. WHO had reported that the number of cases had reached about 200,000 globally, including more than 8,000 deaths. More than 80 percent of these cases and deaths are occurred in Europe and the Western Pacific, including China.

COVID-19 was first reported in Malaysia on 2nd January 2020. The first wave ends on the 17th February with only 22 cases. However, Malaysia started to record new cases starting on the 27th February 2020 and escalated day by day. As of 18th March 2020, the total number of confirmed cases in Malaysia was 790 including two deaths. On 16th of March, the Prime Minister announced movement control order (MCO) from 18th until 31st March 2020. However, poor dissemination of instruction had led to mass mobilization of general public including university students. On 26th March, the government announced an extension of the MOC to 14th April, 2020.

In view of COVID-19 pandemic, Malaysia is moving from containment to mitigation phase. Higher institutions including USM are in urgent need to prepare for the escalating pandemic and recommend actions to minimize the health and social impacts to USM students and staff. It also demonstrates clearly the need for preparedness plan for future infectious diseases outbreaks within the university as well.

1.2 RATIONALE

Public health priority is high for outbreaks in 'closed' facilities or high-risk settings such as health care facilities and institutions of higher learning with large numbers of students and staff where clusters of outbreaks may readily or potentially to occur. Institutions' data can be analysed to predict the clusters. At the onset of a cluster outbreak, university/campus authorities will need to analyse the severity of the outbreak and recommend public health actions to protect the health of students and residents in the campus.

In view of no available SOP/guidelines for the campus authorities on the management of infectious disease outbreaks other than COVID-19, this framework of action plans is urgently needed in facing possible disease within the campus.

1.3 USM TASKFORCE ON COVID-19

As directed by the Vice Chancellor of USM, a taskforce team will propose current and long-term strategies that to be coordinated and implemented by various USM stakeholders in response to COVID-19 pandemic and future infectious disease outbreaks.

Tasks:

To propose action plans and recommendations on

1. prevention, control and mitigating the risk and reduce the impact of COVID-19 within the USM campus community
2. response and readiness plan of future infectious disease outbreaks in the university

1.4 SCOPES

- The major scopes of these SOPs/guidelines are towards minimizing the impact of COVID-19 on the health and social wellbeing of students and staff, with emphasis on public health aspects of USM community, and not focusing on academic, administrative and economic impacts to USM.
- Guidelines on clinical case management of COVID-19 are under the authority of Hospital USM and relevant health care facilities, and are thus out of the scope of this document.
- Development of this framework of guidelines and action plans is largely based on the settings, capacity, policies and existing expertise within Health Campus, as well as its past experiences in dealing with infectious disease outbreaks. However, best assumptions on structures and facilities in other campuses have been considered in order to make them appropriate and doable.
- Recommendations are based on the current information on the COVID-19 and its modes of transmission as well as available existing/reported strategies local and globally. Thus, it may need to be updated as more information becomes available.

2. CASE DEFINITIONS

The case definitions are designed for the purpose of surveillance and reporting, and it may change from time to time based on the new clusters of infection identified.

The following case definitions are for the purpose of surveillance and reporting; person under investigation (PUI) and confirmed cases of COVID-19 virus infection. This is based on Guidelines COVID-19 Management No.5/2020 updated on 24 March 2020 by the Ministry of Health Malaysia.

2.1 PERSON UNDER INVESTIGATION (PUI)

Acute respiratory infection (sudden onset of respiratory infection with at least one of: shortness of breath, cough or sore throat) with or without Fever

AND Travelled to / resided in foreign country within 14 days before the onset of illness

OR Close contact in 14 days before illness onset with a confirmed case of COVID-19

OR Attended an event associated with known COVID-19 outbreak

2.2 CONFIRMED CASE

A person with laboratory confirmation of infection with the COVID-19

2.3 CLOSE CONTACTS

- Health care associated exposure, without appropriate PPE (including providing direct care for COVID-19 patients, working with health care workers infected with COVID-19, visiting patients or staying in the same close environment of COVID-19 patient
- Working together in close proximity or sharing the same classroom environment with a confirmed COVID-19 patient*

  **Face-to-face contact of more than 15 minutes with the distance of less than 2 meters (6 feet)*

- Travelling together COVID-19 patient in any kind of conveyance
  (The distance in the vehicle is less than 2 seats away)
- Living in the same household as a COVID-19 patient

**specific definition of close contact is described by the USM Infectious Disease Specialist*

3. OBJECTIVES

General Objective

To provide general guidelines and recommend action plans for prevention and control of COVID-19 especially during containment and mitigation phases in order to minimize the spread and reduce its impacts among USM campus community.

Specific Objectives

- To reduce transmission risk of COVID-19 in USM campuses
- To provide guidelines and SOPs for effective case and contact management.
- To strengthen public health measures and surveillance of COVID-19
- To enhance effective health education and risk communication on the outbreaks

4. ORGANIZATION AND COMMITTEES

4.1 CENTRAL COVID-19 RESPONSE COMMITTEE (CEN-CRC)

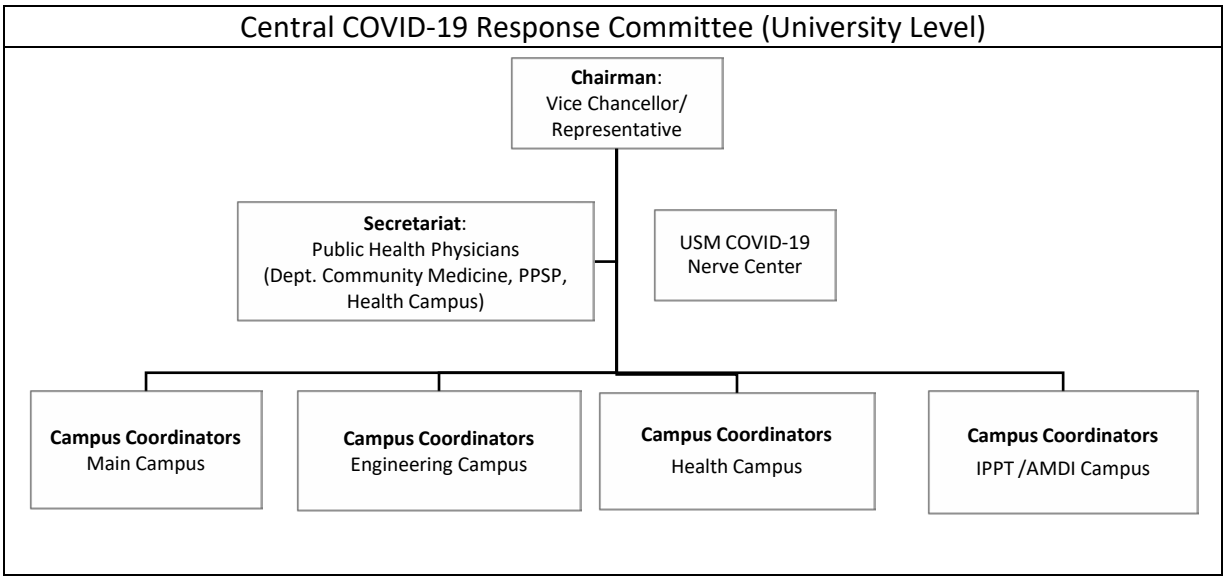


Figure 1: Organization chart for Central COVID-19 Response Committee (CEN-CRC)

This central response committee for COVID-19 is chaired by Vice Chancellor of USM or representative. The secretariat consist of Public Health physicians, based at Department of Committee Medicine, Health Campus.

TOR of CEN-CRC committee

- Plan and coordinate university response based on pandemic/outbreak phases
- Advice university academic and administrative policy based on outbreak level
- Disseminate clear guidance to staff and students for outbreaks
- Review criteria for declaring when the outbreak is considered over
- As a liaison centre with national CPRC of MOH
- Collaborate with external agencies
- Communicate action plan to relevant stakeholders and possibly to media

TOR of CEN-CRC secretariat

- Keep central information and data of all activities associated with the outbreak investigation and management
- Merge and analyse data from all campuses response team to detect early warning sign, predict campus cluster outbreak and further action plan
- Prepare and disseminate the final outbreak report to university and stakeholders
- Evaluate the response to the outbreak and implement changes in Outbreak Control Team (OCT) procedures based upon lessons

4.2 CAMPUS COVID-19 RESPONSE COMMITTEE (CAM-CRC)

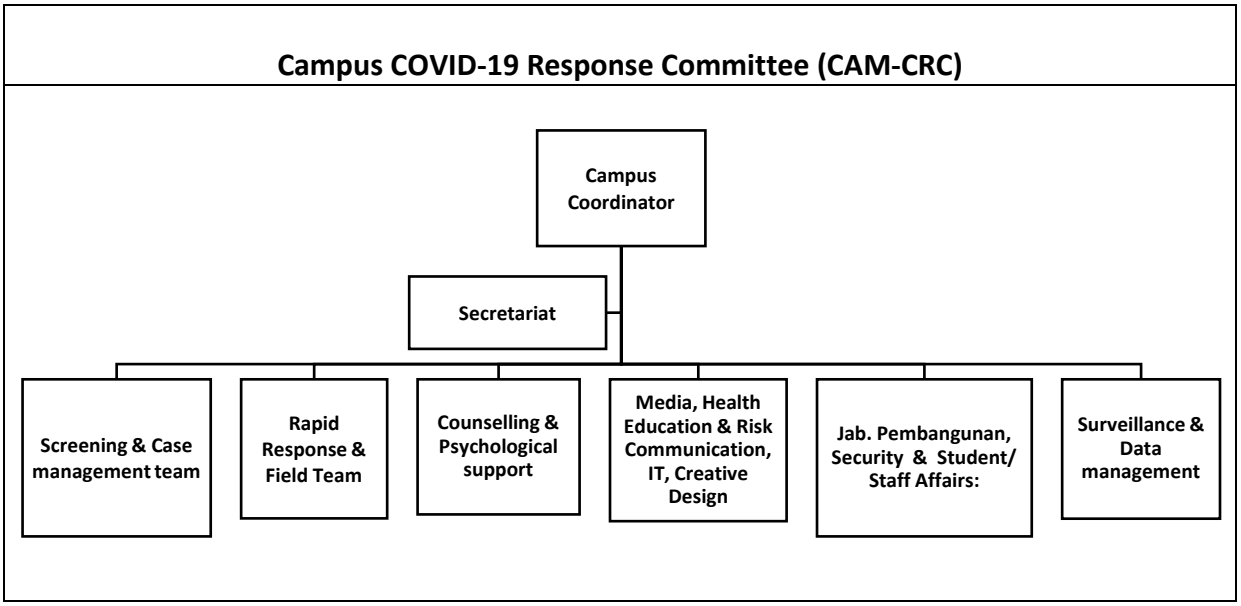


Figure 2: Organization Chart of Campus COVID-19 Response Committee

TOR of CAM-CRC:

- Plan and coordinate campus level response for the outbreak
- Collect data and send to CEN-CRC on a regular basis
- Strategize campus academic and administrative policy based on outbreak level
- Plan and propose resource for outbreak control including human resource
- Provide support, advice and guidance to all individuals and organizations directly involved in dealing with the outbreak
- As a liaison centre with local state CPRC

4.3 ROLES & RESPONSIBILITY

4.3.1 Campus Coordinator

- Elect a secretary for documentation of meetings/actions as well as report dissemination
- As a liaison centre with local state CPRC
- Conduct regular meetings with sub-teams representatives
- Coordinate team plan and execution of actions
- Communicate with other units, health professionals and facilities
- Identify and manage operational and coordination problems

4.3.2 Screening and Case Management Team

- Team members:
  - Health Campus – Infectious Disease specialist, Microbiologist, Emergency Physician, Family Medicine Specialist, Hospital Epidemiology & Control Unit coordinator
  - Other campuses – *Pusat Sejahtera*/*Unit Kesihatan*/Clinic doctors and team
- Support from laboratory for provision of screening test kits
- Isolate, screen and manage cases and contacts according to updated university and MOH guidelines and SOP
- Coordinate services such as laboratory and resources
- Ensure timely submission of data to CEN-CRC

4.3.3 Rapid Response & Field Team

- Conduct campus risk assessment
- Facilitate, conduct and document contact tracing
- Assess the need on environmental decontamination

4.3.4 Surveillance & Data Management Team

- Coordinate campus outbreak operation room
- Collect data on demographics, movement and clinical info of cases and contacts
- Notify local district health office of possible campus cluster
- Conduct communication surveillance to identify and manage rumours and misinformation

4.3.5 *Jabatan Pembangunan*, Security & Student/ Staff Affairs:

- Identify and conduct environmental decontamination as necessary
- Monitor in campus-students
- Ensure students' welfare – basic needs and safety
- Plan and manage rooms for self-quarantine
- Monitor students in the self-quarantine rooms – health and welfare

4.3.6 Media, Health Education & Risk Communication, IT, Creative Design

- Prepare and disseminate printed and e-education material
- Manage misinformation and false rumours including in social media
- Prepare information dissemination to hospital clients on service modification such as cancellation of clinic appointment, visiting time etc. (Health campus and AMDI)
- Provide and facilitate hotline for any enquiry (should be different than the hotline for staff & students of USM and public clients)
- Provide IT support for all team activities

4.3.7 Counselling & Psychological Support

- Offer service to the needed students and health care workers (HCW)
- Monitor counselling progress
- Refer psychiatrist for further therapeutic intervention when indicated
- Preserve privacy & confidentiality of client as stated by the counsellor decree
- Provide data to academic and administrative office for administrative intervention if necessary

5. FRAMEWORK OF OUTBREAK MANAGEMENT

The World Health Organization (WHO) had defined pandemic phases for influenza pandemic in year 1999 (revised in 2005) as framework for pandemic preparedness and response planning. This framework was adapted in preparing this USM outbreak management for COVID-19 and subsequent preparedness (Table 1). Phase 1-3 correlate with preparedness, including capacity development and response planning activities, while Phases 4-7 clearly signal the need for strengthened response, mitigation and post pandemic efforts.

Table 1: USM Outbreak Phases (Adapted from WHO Influenza Pandemic Action Plan, 1999; 2005)

Phase	Name	Description
Phase 1	Prevention	An outbreak is declared around the campus geographical location (at state/national level) BUT NO confirmed cases within the campus, either among staff or students.
Phase 2	Control	At least one confirmed case among staff or student, indicating the presence of disease on campus, with possibility of spread within the campus community.
Phase 3	Early Containment	Aggregated epidemiologically-linked cases are present on campus within one incubation period, which indicate the presence of campus community transmission of the disease. This phase can be changed into phase 2 once contacts are confirmed-negative and no new primer case detected.
Phase 4	Late Containment	Spread of disease within the campus is profusely widespread, indicated by an increasing number of new cases.
Phase 5	Mitigation	Verified campus level transmission which is able to sustain within campus.
Phase 6	Post peak phase	Reducing number of cases below peak level but has the possibility of recurrent spread.
Phase 7	Post epidemic/ Pandemic	Disease activity that reaching endemicity or when national declaration of termination of the epidemic.

Table 2: USM OUTBREAK MANAGEMENT FRAMEWORK BY PHASE

Phase	Main action				
	Planning & Coordination	**Situation monitoring & assessment**	**Communications**	**Reducing disease spread**	**Continuity of health care provision**
Phase 1 -3 • **Prevention** • **Control** • **Early Containment**	**Development, implementation** and periodic **revision** of response action plan • Development of committee and TOR • Activate response action plans • Update existing SOP/CPG	**Develop surveillance system** to collect and collate data within campuses & collaborate with MOH	**Complete communication** plan and **Initiate risk communication** activities to communicate real and potential risks	**Movement control** of campus community **Promote beneficial behaviour** for self-protection Collaborate with relevant PTJs on **PPE and decontamination**	**Prepare to scale up** campus system (health care, academic, welfare, support system)
Phase 4 • **Late Containment**	Direct and coordinate rapid **containment** activities; collaboration with state/district health offices to limit or delay spread of infection	**Increase** surveillance to monitor containment operation Share containment findings with MOH (state/district health offices)	Promote and communicate recommended **interventions** to prevent and reduce population and individual risk	Implement rapid **containment** operations and other activities; collaboration with state/district health offices, as necessary	Activate **contingency** plan
Phase 5 • **Mitigation**	Provide **leadership** and **coordination** to **multi-sectoral resources** to mitigate the societal and	**Actively monitor and assess** the evolving pandemic and its impacts and mitigation	Continue to **provide updates** to campus staff & students and all stakeholders on	**Implement** individual, societal and PTJs measures	**Implement** contingency plan for all health care system and PTJs at

	economic impacts	measures	the state of pandemic and measures to mitigate risks		all level
Phase 6 • **Post peak phase**	Plan and coordinate for **additional resources** and **capacities** during future waves	**Continue** surveillance to detect subsequent waves	**Regular update** the public and the other stakeholders in any changes to the status of the pandemic	**Evaluate** the effectiveness of the measures used to updates guidelines, protocols and algorithm	**Rest, restock** resources, **revise** plan and **rebuild** essential services
Phase 7 • **Post epidemic**	**Review** lesson learned and share experiences with local and international communities. **Replenish** resources	**Evaluate** the pandemic characteristics & situation monitoring and assessment for the next pandemic and other public health emergencies	Publicly **acknowledge** the contributions of all campus PTJs and communities; **incorporate** lesson learned into communication activities and planning for the next major public health crisis	Conduct a **thorough evaluation** of all interventions implemented	**Evaluate** the response of health and relevant campus system to the pandemic and **share** the lesson learned

6. FRAMEWORK OF COVID-19 ACTION PLANS BY PHASE

6.1 PREVENTION, CONTROL and CONTAINMENT PHASE

As of 18 March 2020, the situational analysis indicated that USM was at Phase 2 for Health Campus and phase 3 for Main and Engineering Campuses. However, as Hospital USM was in collaboration with the admitting hospital, Hospital Raja Perempuan Zainab II, in handling the COVID-19 outbreak in Kelantan, thus it is best to classify the Health Campus as phase 3. Nonetheless, WHO recommends similar action plans for phases 1 to 3.

Therefore, for the current COVID-19 pandemic situation, recommendation action plans for USM will be focussed on phase 1-3, while at the same time setting plans on preparedness and responses for mitigation phases onward.

No.	Components	Action plans
6.1	**Planning and Coordination**	• Development and activate response committees - Development of Central COVID Response Committee – suggested to be based at Health Campus where epidemiologist and ID physician are available. - Development of Campus COVID Response Committee at each campus • Strengthening COVID-19 screening and case management for USM community based on updated guidelines o *Refer appendices (Hosp. USM and Pusat Sejahtera*) • Ensuring social distancing and reduce number of attended at health premise • Provide hotline information based on COVID-19 situation • Provide hotline for USM community enquiries which include updated information of risk stratification screening • Activate health education team for effective risk communication
6.2.	**Situation monitoring and assessment**	• Develop campus surveillance system • Case information filing and data reporting • Daily reporting from all CAM-CRC on screened, influenza-like-illness (ILI), severe acute respiratory illness (SARI), lab findings, contact tracing and quarantine centre • Collaborate and collate data with local CPRC for update and plan in term of contact tracing and preparedness • Risk assessment and management for campus cluster. Specific SOPs may need to follow the specific hospital or clinic case and hospital management plan • Identification and prediction of red zone and campus cluster from data analyses • Monitor preventive measures compliance and effectiveness

		• Activate HCW surveillance and monitoring
6.3	**Risk communication**	• Manage false rumours and misinformation including social media • Prepare digital material to inform the relevant group based on audience mapping strategy for risk communication • Send information to public digital media • Coordinate hotline operators information
6.4	**Reducing disease spread**	• Implement movement control for influx and out flux of campus community including when MCO is lifted and among students returning from risk countries • *Pusat Perumahan dan Penginapan Universiti (P3U) and the Bahagian Hal Ehwal Pelajar & Alumni (BHEPA)* to ensure welfare and safety of staying in-campus students • Work from home practice for other non-essential staff • Online teaching for students and reserve face to face essential training later • Facilitate department/unit/laboratory/clinical settings to o provide and innovate PPE, hand sanitizer, chemicals for decontamination etc o identify and decontaminate area of contact whenever necessary (refer MOH guidelines). • Security personnel to ensure safety and control movement order compliance while maintaining social distancing
6.5	**Continuity of health care provision**	• Training non-essential staff to be able to o help non-medical related works such as registration, online risk screening before attending clinic, data collection and reporting to central OMT o help decontamination exercise when necessary o help and facilitate management of welfare of the stay-in students • Stockpiling laboratory equipment and consumables • Staff training on sample collection, PPE and case management

6.2 LATE CONTAINMENT PHASE

This phase is activated when campus surveillance data indicate that the spread of disease within campus are profusely widespread, indicated by increasing number of new cases, widely spread across people category (staff and students) as well as places of stay such as desasiswa/hostels. The coordinated outbreak management team must be able to monitor campus data and able to have situational awareness to identify that the campus is now in this phase.

No.	Components	Action plans
6.1	**Planning and Coordination**	• Rapid containment activities which include o Revise case definition, risk stratification strategies and algorithm o Update list of admitting hospital, quarantine centre and COVID-19 test centre. o Stockpiling deployment and monitoring of laboratory, pharmaceutical and hospital/clinic stockpile to handle the increased number of cases and contacts • Conduct training updates for staff • Update of information, situational awareness and coordination of multidepartment such as P3P, BHEPA, security, academic, administration. • Revised TOR of each team
6.2.	**Situation monitoring and assessment**	• Strengthening of surveillance loop at each campus to provide adequate data • Strengthened contact tracing and early referral for diagnosis • Prediction of campus cluster • Enhanced isolation and quarantine SOPs
6.3	**Risk communication**	• Communicate timely updates, uncertainties, action plan to USM community and stakeholders via all available media to avoid panic • Communicate timely updates on individual risk and preventive actions • Monitor and manage fake rumours and misinformation • Identify enabler of behaviour change and community influencer to encourage community engagement • Monitor and remind USM community especially those handling with involved in case management and OMT on privacy and confidentiality and ethics in OMT

6.4	**Reducing disease spread**	• Control of community mobilization.
		  o Students who had gone back home will not be allowed to come back to campus. Academic administrative must implement alternative teaching and learning delivery methods and assessment.
		  o Students who are already in campus, international or local will not be allowed to go back home. Name listing and hostel stay must be updated and monitored
		  o Non-essential staff will continue to work from home
		• Strengthened management and monitoring of hostel quarantine
		• Early detection of cases and fastened case management, which helps in delay or limit spread of infection within the campus
		• Enhance contact tracing with collaboration with local health authorities

6.5	**Continuity of health care provision**	Activate contingency plan include: • Review the use of potential pharmaceutical measures to manage case based on the clinical management updates. • With proper scaling up of health system in USM, during the first action phase, AMDI and INFORMM should be able to lead and offer COVID test kit to be used by all health care premises in all campus. • Upgrade Hosp. USM with negative flow isolation room with adequate PPE and human resources • HCW welfare and psychological support to ensure continuity of care • Deploy relevant staff that may help in case management and OMT such as nurse educators and lecturers, final year medical and dental students.

6.3 MITIGATION PHASE

This is when the surveillance data indicate a sustained infection within a campus. Data may show a daily basis new cases but of milder form and morbidity.

No.	Components	Action plans
6.1	**Planning and Coordination**	• Plan to resume academic and community activities. This need leadership to coordinate all sectors involved in handling the influx of students in stages based on their study priorities. • Coordinate influx of students in stages based on situational analyses of the disease • Coordinate staff resume office work in stages based on the job scope
6.2.	**Situation monitoring and assessment**	• Monitoring of new cases and disease spread at every stage of students influx to detect re-emergence of cluster epidemic • revise and implement risk stratification for student and staff as well as other stakeholder influx based on situational risk assessment • contact tracing and case management for new cluster epidemic if presence
6.3	**Risk communication**	• Communicate timely updates, uncertainties, action plan to USM community and stakeholders via all available media to avoid panic • Communicate timely updates on individual risk and preventive actions • Monitor and manage fake rumours and misinformation • Identify enabler of behaviour change and community influencer to encourage community engagement
6.4	**Reducing disease spread**	• continue promoting individual risk preventive measure such as cough ethics and early symptomatic treatment • provision of vaccination if available to community • control and limit influx mobilization of high risk group such as pregnant ladies, people with chronic disease and immunosuppressive person. These group may need to extend work from home or reschedule face to face academic activities • Implement specific campus / hostel / locality preventive measure of new re-emergence of cluster epidemic

6.5	**Continuity of health care provision**	a) case management to include updated case management regime of antiviral and other clinical support b) clinics to be able to manage all category of respiratory infection including risk stratification, investigation and medical intervention c) Psychological support to HCW and USM Community

6.4 POST PEAK PHASE

This is the phase were data had indicate reducing number of cases below peak level but has possibility of recurrent spread.

No.	Components	Action plans
6.1	**Planning and Coordination**	• Review T&L action plan during outbreak and plan for scaling up T&L activities to be more flexible • Review control and preventive measures and strengthened preparedness at campus level • publish OMT experience to be shared to academia for lesson learned
6.2.	**Situation monitoring and assessment**	• Revise surveillance loop implementation for improvement for the next pandemic and other public health emergencies • Analyse surveillance data to evaluate effectiveness of OMT • Revise OMT action for SOP and algorithm improvement
6.3	**Risk communication**	• Communicate the lesson learned to USM community and stakeholders via all available media to avoid panic • Publicly acknowledge the contributions of all campus communities and sectors • incorporate lesson learned into communication activities and planning for the next major public health crisis
6.4	**Reducing disease spread**	• Evaluate the effectiveness of OMT interventions and activities implemented to update guidelines, protocols and algorithm
6.5	**Continuity of health care provision**	• Evaluate the response of health and relevant campus system to the pandemic • Published and share the lesson learned • continue psychological support to HCW and USM community

6.5 POST EPIDEMIC/PANDEMIC PHASE

This is the phase where the disease activity arrived at seasonal level (reaching endemicity) or when national declaration of termination of epidemic.

No.	Components	Action plans
6.1	**Planning and Coordination**	• Resume academic and community activities. • Enhanced T&L capacities and training based on experienced and new development • Coordinate influx of students based on situational analyses at national and specific geographical area of stay. • Coordinate staff resume office work in stages based on the job scope and situational analyses of the disease at national and specific geographical area of stay. Staff training to enhanced use of alternative online and work from home including file management • Quarantine places may be reduced but sustained and improved
6.2.	**Situation monitoring and assessment**	• Monitoring of new cases and disease spread at every stage of students influx and thereafter to detect re-emergence of cluster epidemic • revise and implement risk stratification for student and staff as well as other stakeholder based on situational risk assessment • revise, improve contact tracing SOP in preparation for possible new cluster epidemic
6.3	**Risk communication**	• Communicate timely situation updates to USM community and stakeholders via all available media to avoid panic • Communicate timely updates on individual risk and preventive actions • Monitor and manage fake rumours and misinformation • Facilitate and support community influencer to encourage community engagement and behaviour change
6.4	**Reducing disease spread**	• continue promoting individual risk preventive measure such as cough ethics and early symptomatic treatment • provision of vaccination if available to community • Evaluate the effectiveness of the measures used to updates guidelines, protocols and algorithm • Implement specific campus / hostel / locality preventive measure of new re-emergence of cluster epidemic

6.5	**Continuity of health care provision**	• case management to include updated case management regime of antiviral and other clinical support • restock resources, revise plan and rebuild essential services- clinics to be able to manage all category of respiratory infection including risk stratification, investigation and medical intervention • Psychological support to HCW and USM Community

7. OUTBREAK OPERATION ROOM

7.1 When to set up an Operations Room during COVID-19

1) Outbreak is at pandemic level or occurring in more than one states (national level)
2) Infectious disease outbreak causing lost of life
3) When ordered by a higher authority

In current situation, we had fulfil criteria 1, 2 and 4

7.2 Term of Reference (TOR) of COVID-19 Operations Room

1) To compile and monitor all information on activities concerning the COVID-19 outbreak done at each campus level.
2) To coordinate all activities involving inter-agency co-operation and collaboration. e.g. academic, administrative, human resource, health unit, security and student's affair and societies etc.
   - Updating of information concerning the COVID-19 outbreak
   - Number of cases reported (case listing)
   - Control activities
   - Health education activities
   - Current situation of the outbreak.
3) To manage and provide information to the hotline
4) To prepare the daily report.
5) To prepare press release if require.

8. LABORATORY RESPONSE

Laboratory response is one of the most important components of an outbreak management. It is vital in establishing and confirming the clinical diagnosis, instructing immediate isolation, prompt contact tracing and initiate early therapy. COVID-19 pandemic has shown that a widespread and accessible laboratory testing facility would enhance control measures and may contribute to a reduce mortality.

Establishment of fully equipped laboratory for diagnosis of COVID-19

The aims are to provide COVID-19 test AND to safely handle samples from COVID-19 patients/suspected COVID-19 patients. These samples are from Hospital USM, Advance Medical and Dental Institute and Pusat Sejahtera patients; healthcare workers and USM staff; with potential to expend the COVID-19 test service to cater MOH/private patients.

Testing of samples at the Health Campus, comprising sample processing and assay runs, are performed in designated laboratories, i.e., at the Department of Medical Microbiology and Parasitology, PPSP, with assistance of facilities and personnel from INFORMM and other PTJs. The Advanced Medical and Dental Institute (AMDI) or other PTJs can follow similar preparedness plan when dealing with potential COVID-19 specimens.

Phase 1:

1. Personal protective equipment (PPE) training- include gloves, gowns, masks, goggles or face shields, and/or respirators (N95).
2. Safe work practices according to established standards including PPE, Eye and Face Protection, Hand Protection and Respiratory Protection.
3. Laboratories should ensure that their facilities and precautions meet the appropriate Biosafety Level (BSL) for the type of work conducted (including the specific biological agents – in this case, COVID-19) in the lab.
4. Choose the laboratory that not freely accessible to the public for the COVD-19 test
5. The laboratory should have shower facility and changing room to the technical staff. There is also washing machine as the staff's recyclable cloths need to be washed at the test facility.

Phase 2: Laboratory facility: equipment, testing kits and consumables for COVID-19

1. Equipment for sample preparation and molecular testing
    a. RNA/DNA extraction system
    b. Heating block
    c. Real time PCR system
    d. Microcentrifuge
    e. PCR workstation
    f. Freezers
2. Testing kits for continues sample testing and be able to cater for higher number of samples

    a. RNA extraction kit
    b. RT PCR kit
3. Consumables:
    a. Tubes
    b. Pipette
    c. Filter tips
    d. Tube rack

Phase 3: Capability to cater for increasing number of samples

1. PPE: should have enough stock in the store and able to get continuous supply from suppliers.
2. Equipment – increase the number of equipment by relocating from other laboratories in USM
3. Testing kits: continuous supply
    a. Number of testing kits in the laboratory
    b. Number of ex-stock testing kit in company warehouse (distributors and/or suppliers)
    c. Ready to have other alternative testing kits, after proper optimizations and validation
4. Laboratory staff:
    a. Identify and select suitable medical laboratory technologists/science officers/research officers from any PTJ. Ideally they have background of basic molecular technical works. These staff will undergo safety training provided by MOH or in house.
    b. Increase the number of technically-competent staff by scheduling specific/focused training using a comprehensive module
        i. Proper PPE
        ii. Handling sample preparation and testing
5. Readiness to perform other assays based on recommendations from the Ministry of Health (MOH) Malaysia. With new diagnostic methods and kits entering the market, MOH may recommend other tests for various reasons. Thus laboratories at USM should be prepared to perform more than one type of assay or change the type of assay.
6. Safety precaution when dealing with potential COVID-19 samples for any laboratory test

    a. Reduce workload of the laboratory by reducing elective testing and medical examination screening test

    b. Delay the submission of non critical test of potential COVID-19 patients until the result of COVID-19 test is available

    c. For the COVID-19 samples or in case if the tests are critical and need to be done before COVID-19 result, the specimens must be sent in triple layers and the laboratory must be noted of potential infectious materials.

    d. Technologist to wear PPE when opening the box of potential COVID-19 materials.

SECTION B

USM READINESS PLAN FOR INFECTIOUS DISEASE OUTBREAKS

9. INTRODUCTION TO USM OUTBREAK READINESS PLAN

The ongoing COVID-19 pandemic which has affected not only the health and social well-being of Malaysian community, but also directly and indirectly has caused disruption of academic and administrative aspects in the university communities including USM. During such public health emergency, possibility is high for outbreaks to happen in 'closed' facilities such as higher learning institutions that have large number of students and staff whereby clusters of outbreaks may readily or have potential to occur.

From USM experience, we have witnessed the occurrence of several infectious diseases outbreaks, for example such as typhoid in 2008, tuberculosis in 2007/2008 and Influenza A(H1N1) in 2009 within USM Health Campus. Moreover, in the wake of many outbreaks since the beginning of the 21st century, there is a clear need for preparedness plan for future infectious diseases outbreaks within the university.

Thus, there is an urgent need to address the following issues at the university:

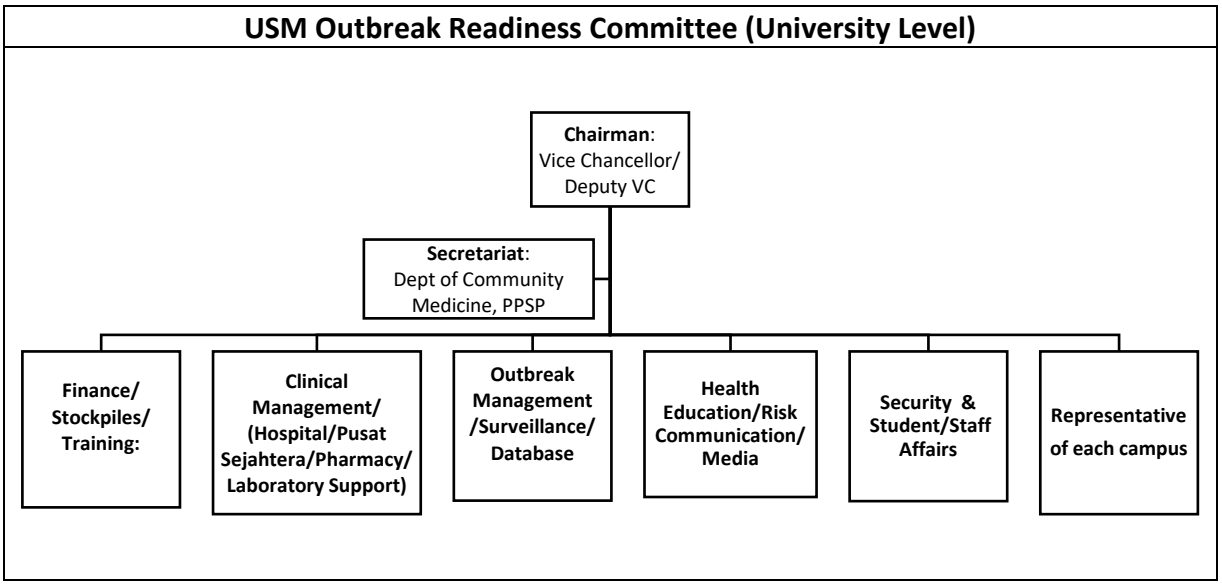
- to provide guidelines for the management of infectious disease outbreaks
- to identify possible disease outbreaks by strengthening the surveillance system
- to define the roles and develop linkages and lines of communication of the various relevant units/departments in the management of outbreaks
- to determine the resources necessary to manage the outbreaks in terms of the expertise, drugs, vaccines, laboratory services, equipment and other facilities.
- to prepare uniform and standard operating procedures for the activation of Rapid Response Teams (RRT) in outbreak management.
- to undertake training and capacity building to enhance the university capability in managing future outbreaks.

10. OUTBREAK READINESS COMMITTEE & SECRETARIAT

USM Outbreak Preparedness Committees will be set up at the university level and at each campus. It will involve all relevant units and departments, and coordinated by the Department of Community Medicine, School of Medical Sciences USM. The department will act as USM Outbreak Preparedness Secretariat.

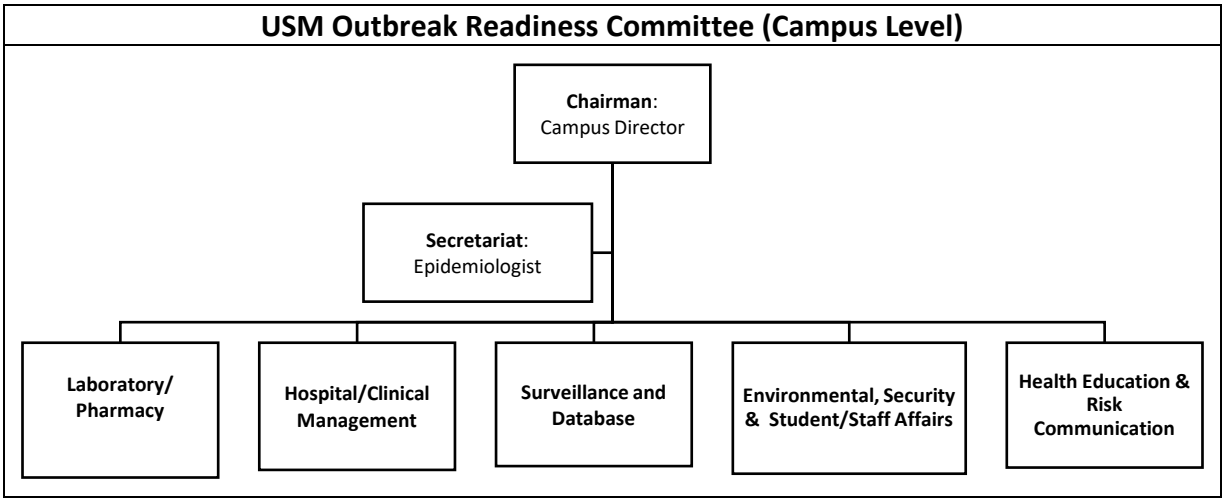
TOR of USM Outbreak Readiness Committee - University Level

- Chaired by Vice Chancellor or representative
- Responsible for the approval and implementation of all decision related to prevention and control of outbreaks for USM campuses
- Make decision on all actions needed to ensure effective surveillance, prevention and control of the outbreak and associated research activities
- Determine the role and scope of activities and coordinate all activities of the various department and units relevant to the prevention and control of outbreaks
- Review and recommend rules and legislation needed to handle an outbreak in USM
- Meetings to monitor and evaluate the effectiveness of the measures
- Communicate with the general public and the media



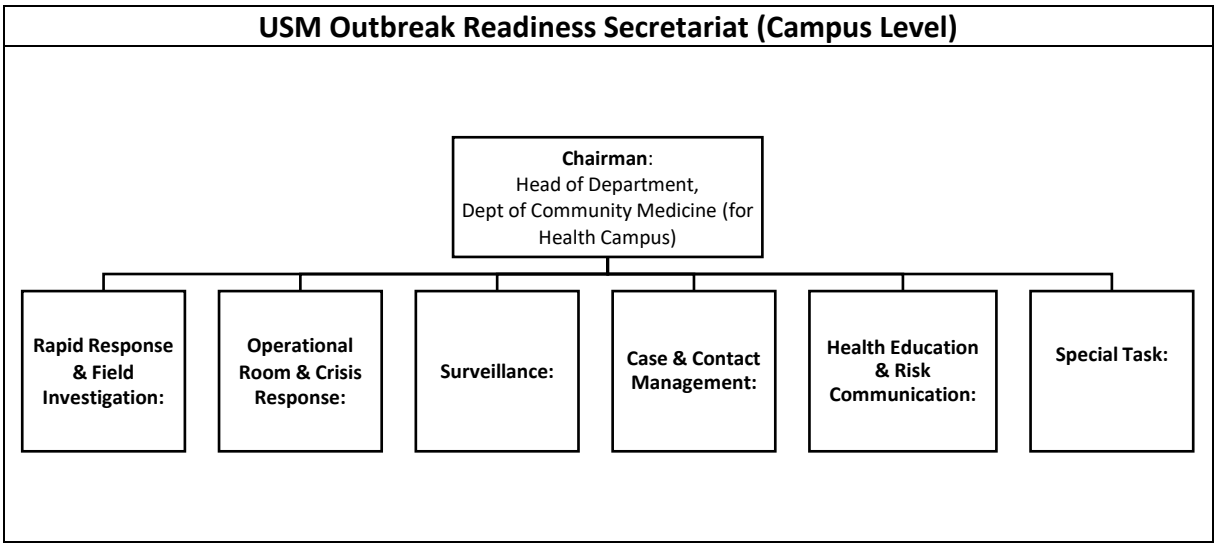
TOR of USM Outbreak Readiness Secretariat - University Level

- Draft standard operating procedures (SOPs) on infectious disease outbreak management, preparedness & response plans
- Strengthen the infectious disease surveillance and relevant data management system
- Develop appropriate guidelines based on the MOH, WHO, CDC or other professional bodies on the clinical case management
- Develop health educational and risk communication materials and deliver them effectively to create for awareness, advice and preventive guidelines
- Communicate effectively with public, health care providers, health professionals, stakeholders, community leaders and the media



TOR of USM Outbreak Readiness Committee (Campus Level)

- Chaired by the Campus Director (e.g at Health Campus i.e Campus Director or Head of Community Medicine Department)
- Responsible for the approval and implementation of all decision related to prevention and control of outbreak at the campus
- Make decisions on all actions needed to ensure effective surveillance, prevention and control of the outbreak and associated research activities pertaining to it
- Determine the roles and scope of activities and coordinate all activities of the various department and units in the campus relevant to the outbreak management
- Review and recommend rules/legislation needed to handle an outbreak in the campus
- Meetings to monitor and evaluate the measures effectiveness



TOR of USM Outbreak Readiness Secretariat (Campus Level)

- Draft standard operating procedure on infectious disease outbreak management, preparedness and response plans in the campus
- Be at the frontline in the outbreak response through the Rapid Response Team
- Strengthen of infectious disease surveillance and relevant data management system
- Develop appropriate guidelines based on the MOH, WHO, CDC or other professional bodies on the clinical case management
- Develop health educational and risk communication material and deliver for awareness, advice and preventive guidelines.
- Communicate effectively with public, health care providers, health professionals, stakeholders, community leaders and the media

11. PUBLIC HEALTH SURVEILLANCE SYSTEM

- Public Health Surveillance systems are parts of health information systems with direct application to epidemiological investigation, disease prevention and control.
- For infectious disease, the surveillance systems must support and achieve the following objectives:
    - identifying cases of infectious disease that require immediate public health control
    - monitoring infectious disease incidence and distribution
    - identifying infectious disease outbreaks and support their effective management
    - assessing infectious disease impact and set priorities for prevention and control
    - identifying risk factors for infectious disease to support development of effective prevention measures

11.1 ALERT MECHANISM

Surveillance system may use Alert Mechanism to act as early warning system for Outbreak Preparedness Committee and Rapid Response Team. It consists of:

- Indicator-based Surveillance
    - Mandatory Notification
    - Laboratory-based Surveillance
    - Syndromic Surveillance
    - Rumours Surveillance
- Event-based Surveillance

For each outbreak there should be a case definition.

- For known diseases: Refer to Disease Control Division, MOH Case Definition for Infection disease in Malaysia.
- For unknown diseases, consider epidemiological linkages (time, place, person, clinical presentation)

Laboratory-Based Surveillance

- To be reviewed the applicability in each campus

Syndromic Surveillance

- Based on list of syndromes in "Syndromic Notification and Laboratory Investigation Manual, MOH, 2007)
    - Acute Neurological Syndrome
    - Acute Respiratory Syndrome
    - Acute Dermatological Syndrome
    - Acute Haemorrhagic Syndrome
    - Acute Jaundice Syndrome
    - Acute Diarrhoeal Syndrome
- Surge of similar syndromes detected in health facility in USM must be notified to Rapid Response Team.
- Rapid Response Team thus then decide and to inform nearest District Health Office if necessary

Rumours Surveillance

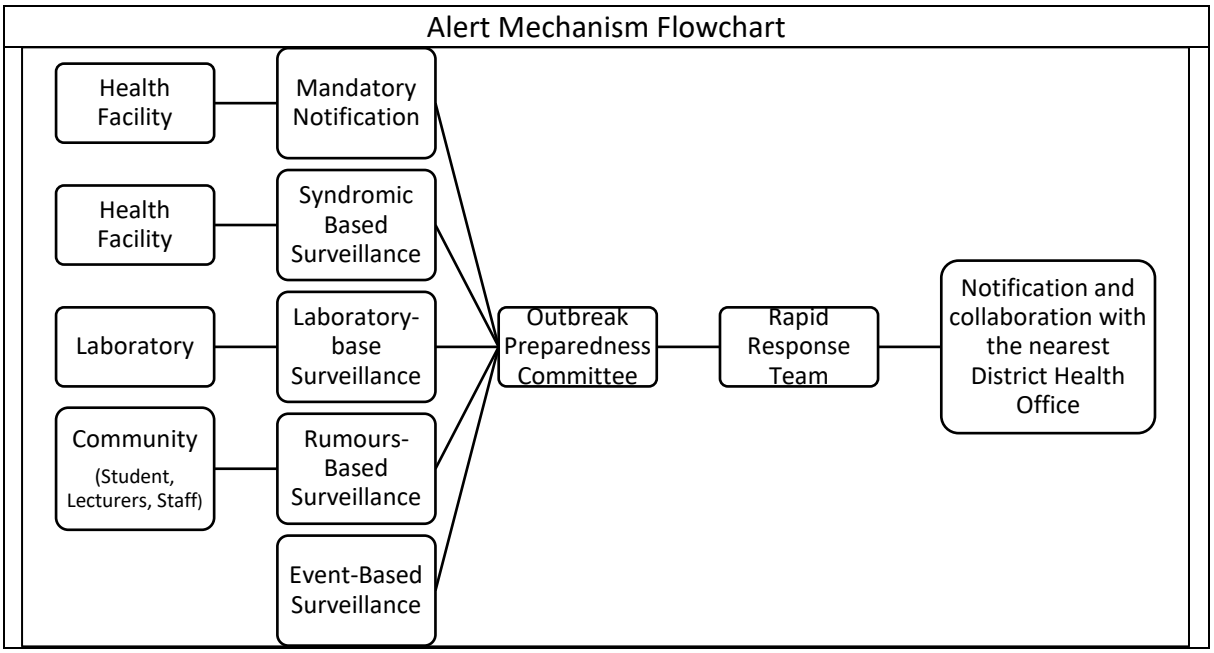
- Relies information gather from many sources, for example
    - Students/Student Representative Bodies
    - Lecturers
    - Administrative Staff
    - Outside USM (internet, television, radio, newspaper, social media)
- Objective
    - Provide early warning sign in detecting potential outbreak within USM
- Based on rumours, Outbreak Preparedness Team will activate Rapid Response Team to verify the rumours on possible outbreak
- Notify nearest District Health Office if necessary

Event-based Surveillance

- Any event that may have health impact, for example
    - Cluster of Acute Respiratory Infection
    - Event with unusual disease pattern, or arising outside their usual pattern of occurrence
- Objective
    - Rapidly detect and appropriately respond to acute public health events of any origin
    - Ensuring timely implementation of effective control measure
    - Complement indicator-based surveillance and other surveillance system

11.2 MANDATORY NOTIFICATION

- Based on the list of notifiable diseases in "Prevention and Control of Infectious Disease Act 1988 (Act 342)"
- Cases detected in USM campuses/health facilities must be notified to nearest District Health Office
- Apart from notifying to MOH, a copy of the notification should be compiled by Outbreak Preparedness Committee as a surveillance system



11.3 RAPID RESPONSE TEAM

The team provide rapid response in managing disease outbreaks effectively and should be formed at each campus.

General Roles & Function

- Outbreak Preparedness
  - Analyse and act on surveillance information concerning infectious diseases
  - Plan and control response strategies for managing outbreaks
  - Identify additional resources needed for rapid response
  - Investigate and manage the outbreak
  - Collaborate and coordinate with other relevant agencies
  - Evaluate the effectiveness of the response and intervention measures
  - Produce report on the outbreak management and activities including recommendations
  - Predict and plan for the management of future outbreaks
- Outbreak Rapid Assessment
  - Formation of Rapid Assessment Team
  - Verify occurrence of outbreak
  - Risk analysis and need assessment, if necessary

- Outbreak Investigation
    - Field Investigation
- Control Activities
    - Implement prevention and control measures
    - Risk communication
- Reports and Recommendation
    - Produce report of the outbreak
    - Evaluate response or intervention measures taken during the outbreak
    - Disseminate report to the relevant parties
    - Maintaining an archive of outbreak management reports

- **Team Members:** Medical Officer of Health / Epidemiologist (Team Leader), Health Inspectors, Health Matron/Sister, Health Education Officer

Activation process and responsibility

No	Activities	Responsibility
1.	Receive information from - Pusat Sejahtera/Students/Staff	Outbreak Preparedness Committee
2.	Mobilise Rapid Action Team	Rapid Response Team
3.	Verify Outbreak	Rapid Response Team
4.	Field Investigation Control Measure Inform nearest District Health Office	Rapid Response Team
5.	Report and recommendation	Rapid Response Team Outbreak Preparedness Committee

12. OUTBREAK MANAGEMENT ACTIVITIES

12.1 MULTIDISCIPLINARY OUTBREAK CONTROL TEAM (OCT)

The criteria for convening a multidisciplinary outbreak control team (OCT) will vary according to the seriousness of the illness, its geographical spread, local circumstances and the available resources in USM. An OCT may be considered when:

- The outbreak poses an immediate health hazard to staff and students at USM
- There are numerous cases
- The disease is important in terms of its severity or its propensity to spread
- Cases have occurred over a widespread area involving USM without an obvious point source
- Cases have occurred in high-risk establishments (ICU, NICU, OT, HDU etc).

The role of the OCT is to coordinate all the activities involved in the investigation and control of a difficult outbreak. This may involve:

- ensuring that all collaborators use a complementary methodology
- agreeing and implementing control measures to prevent further spread of outbreak
- organizing ongoing communications among OCT members about the outbreak
- requesting external assistance, e.g. secondment of a state/national investigation team.

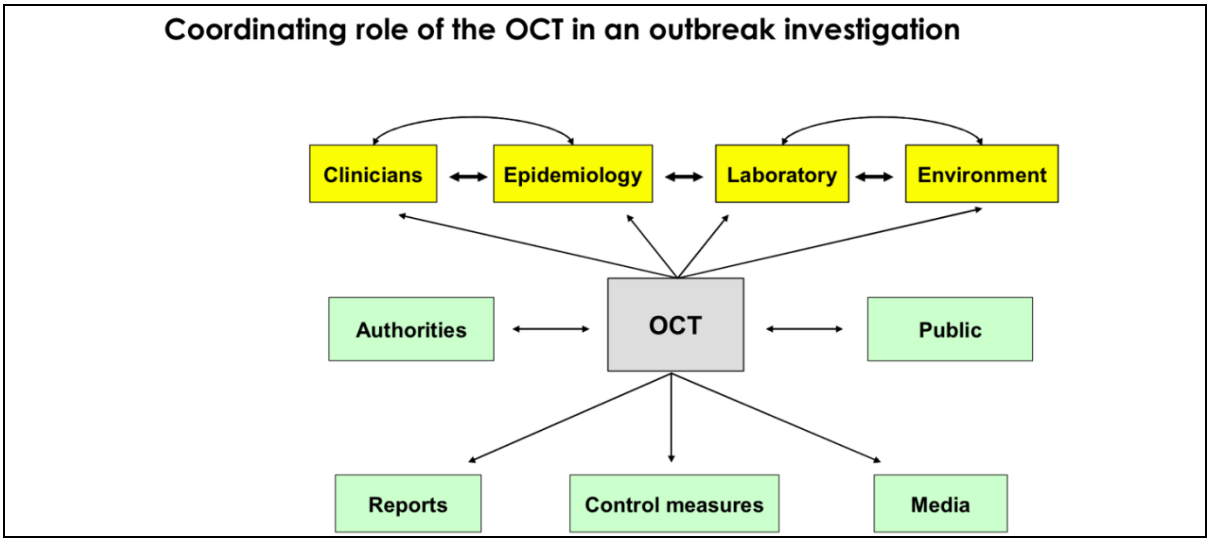


Figure :

Similar committees including the term of references (TOR) for outbreak management team at campus level as described in the response and action plans for COVID-19 can be applied and adapted to respective infectious diseases.

12.2 SCREENING AND TRIAGING

- A Hotline is set-up to facilitate patients and public (Staff and student) for accurate and appropriate advice regarding seeking help to minimize unnecessary exposure to public and health care workers.
- A specially designated area should be set up at emergency unit and outpatient clinic for screening and triaging patients with fever OR specific symptoms AND specific exposure as outlined in the case definition.
- Patients who come to the health facilities are screened for suspected cases at designated triaging counter, separated from general triaging counters.
- The suspected cases should be managed by a dedicated team if required
- Suspected cases shall be applying the infection prevention control measures especially for highly contagious outbreak. The example as below:
- Keep a safe distance between patients or health care worker.
    - Prepare an isolation room for patient.
    - Ensure strict hand hygiene
    - Provide surgical mask if not contraindicated
    - PPE should be worn adequately
    - After encounter, ensure proper disposal of all PPE that have been used.
    - Decontamination of isolation area and equipment used should be done.

12.3 CASE MANAGEMENT

- All infectious diseases should be treated based on CPG/MOH guidelines.
- A designated isolation ward should be prepared to isolate cases from other patients to prevent nosocomial transmission.
- Any outpatient cases must have clear instruction regarding social distancing and sign/symptoms which require them to seek early treatment at hospital.
- Integrated and multidiscipline clinical teams are required to treat complicated cases
- The number of visitors should be limited for cases admitted in ward.
- The minimum requirement for isolation facilities are the following
    - Single room with an anteroom with hand washing facilities
    - Attached bathroom
    - Inlet/outlet pass
    - Negative pressure (airborne transmission case)
    - Air lock
- The minimum requirements of the hospital decontamination facility are the following
    - Have separate doors (entrance / exit)
    - Be away from crowded areas
    - Have separate ventilation system (preferably negative pressure)
    - Have a system where the wastewater should be self-contained and to be disposed properly
    - Have separate shower for patient and personnel

12.4 QUARANTINE AND HOME SURVEILLANCE

- Clear information and instruction for patient to monitor their health at home.
- Provide a self-monitor health assessment card to be filled by patient requiring quarantine.
- For those who are required to be quarantined at hostel/special place in USM, their welfare and basic daily needs should be provided during this period by relevant managing team (USM to assign designated places).
- Telephone numbers of persons in charge must be clearly written on home assessment card and contactable if any assistance is required by the patient.

12.5 CONTACT TRACING

- Laboratory result should be efficient to initiate contact tracing
- Case and contact interviews should be conducted in a safe and conducive environment to establish trust and rapport among the team, case, family and community.
- The Investigation Team should have adequate training and knowledge to conduct it.
- Probing questions should depend on the culture and local customs/activities.
- Questions should be designed tailored to specific infectious disease likes :
- People with direct physical contact
- People who live with the cases since the symptom onset
- People who visit the cases since the symptom onset
- All place visited by the cases visit since symptom onset
- All healthcare facilities visited by the case and all HCWs who cared for the case
- In the event that the case has died, all persons who had contact with the deceased person, including those who attended burial ceremonies
- During initial contact tracing, it may be helpful to split the Investigation Team so that one group focuses on healthcare contacts and the other group focuses on community contacts. However, it is important to maintain strong communications between teams, and to remember that there may be overlap between community and healthcare contacts.

12.6 DATA MANAGEMENT

- Electronics database is considered an effective and efficient way to manage case and contact in large scale, which also will facilitate the quick reporting of data and trends, and thus, quick decisions about the contact tracing process.
- Electronic data collection and artificial intelligence (AI) in the field should be considered when there are adequate resources and funding.
- Criteria for efficient and effective database are:
    - Able to produce daily report and export data for analysis
    - Geographically map contacts
    - Able to visually represent the chain of transmission

- If an electronic database cannot be used it is essential that standardized forms are created and strictly enforced, so that data is uniform and complete.
- Training may be required for those personnel (Contact Follow-up Teams, Supervisors, Investigation Teams, etc.) to ensure the forms are filled out appropriately.
- Data and information related to the outbreak is very important, highly sensitive and potentially dangerous. It has to be managed not only efficiently, but must be secured and following a specific chain of command.
- Emphasis must be made on data security, integrity and consequences of disseminating unauthorized information and fake news.

13. ENHANCING PRIMARY PREVENTION ACTIONS

Optimise hygiene practice among USM community

- All standard precautions should always be followed appropriately.
- Cough etiquette and effective hand hygiene practice
- keep the environment clean and disinfect frequently as indicated

Appropriate use of PPE

- Depends on the settings, procedures and severity of the individuals.
- It must be worn appropriately according to the SOP for infection control.
- Used PPE should be treated as contaminated & disposed it properly.
- Carefully remove/changing of PPE is crucial to avoid contamination especially when moving from high to a low risk area.

Risk characterization assessment

Risk	Categories	Action
Low	1. Asymptomatic and 2. No history for contact with confirmed cases	Health monitoring
High	1. Symptomatic (refer to case definition of diseases) or 2. History of close contact with confirm cases or 3. Vulnerable groups	Health Monitoring Seek early treatment Do line listing Reporting to superior

Specific preventive measures in the institutions

Airborne Disease: Promote natural air ventilation

- Adequate ventilation can reduce the transmission in health-care settings.
- Avoid large gathering especially within an enclosed environment.

Droplet transmittable disease: Social distancing & strict hand hygiene

- Avoid large gathering
- Maintain at least 1m(3 feet) apart from each other
- Avoid touching the in-door environment unnecessarily (glass door, railings table surface)
- Perform hand hygiene regularly.

Faecal Oral Route: Food safety principle

- Emphasize to students to identify early spoil food
- Choose trained food handler

Vector-borne Disease

- Monitoring PEST control and empowering behaviour change and actions
- Kept surrounding clean and no breading sites

14. RISK COMMUNICATION

PRINCIPLES AND ELEMENTS

The fundamental goal is to provide timely, meaningful, relevant and accurate information in clear and understandable terms targeted to a specific audience.

RISK COMMUNICATION ACTION PLAN

Risk communication is the main responsibility of the USM Outbreak Preparedness Secretariat. Each task will be assigned according to the unit.

Phases	**Activity**	**Responsibility**
Planning and preparation	Develop and produce health education materials Training program for risk communication: Handling public Operation room SOP for handling hotline Dissemination of information to create awareness: Social media Website	Health Education & Risk communication Unit
Response	Opening and maintenance of operational room	Operational Room & Crisis Response Unit
	Cautioning and advising potentially exposed group and use of PPE/prophylaxis/vaccination	Case & Contact Management Unit
	Producing Health Alert Card and Health Declaration Form Intensify the dissemination of information Monitoring and analysing information needs of the public through queries received	Health Education & Risk communication Unit
Recovery	Documentation and assessment of risk communication activities: All health education materials Media activities (electronic and print media) Hotline services	USM Outbreak Preparedness Secretariat

15.COORDINATING ACTIVITIES

USM is an integral part of district, state and national-level infectious disease emergency plan. Preparedness and response plan should be in accordance with respective authority.

SECRETARIAT and CAMPUS LIAISON/FOCAL POINT OFFICER

USM level: Community Medicine Department, School of Medical Sciences

Campus level: Main campus: INFORMM and Pusat Sejahtera

Health campus: PPSP, PPSK, INFORMM and Hospital USM

Engineering campus: Unit Kesihatan

Advanced Medical & Dental Institute (AMDI)

COORDINATION WITH KEY AGENCIES

- Penang State Health Department (with respective district health offices)
- Kelantan State Health Department (with Kota Bharu district health offices)
- Malaysian Civil Defence Force
- Fire and Rescue Department Malaysia

Activities	Participants	Content/objectives	Intervals
Coordination meeting	Top management	To review and implement existing preparedness plan	Once a year
Table-top simulation	Top management	To review and improve existing preparedness plan	Once/twice a year
Field outbreak drills	Front liners: healthcare professionals, students' representatives	Training of front liners	Twice a year
Research and development	Academic and postgraduate's student		As per needed

COORDINATION WITHIN USM

Collaboration involves different schools, department and centres within USM campuses.

Activities	Participants	Content/objectives	Intervals
Coordination meeting	Top management	To review and implement existing preparedness plan	Once a year
Table-top simulation	Top management	To review and improve existing preparedness plan	Once/twice a year
Field outbreak drills	Front liners: healthcare professionals, students' representatives	Training of front liners	Twice a year
Research and development	Academic and postgraduate's student		As per needed

COORDINATION WITH OTHER UNIVERSITIES

USM aspire to be leading universities in infectious disease emergency preparedness. The experiences and research findings will be shared with other universities.

Activities	**Participants**	**Content/objectives**	**Intervals**
Field outbreak drills	Front liners: healthcare professionals, students' representatives	Training of front liners	Twice a year
Research and development	Academic and postgraduate's student		As per needed

16.TRAINING AND CAPACITY BUILDING

TYPES OF TRAINING

- Capacity building
    - Involving higher management and front liners
    - Awareness among student and staff

- Table-top simulation
    - Involving top management and middle manager

- Field outbreak drills
    - Involving front liners and supervised by top management

MODULES of TRAINING

- Epidemic Intelligence Programme (EIP)
- Use of PPE and decontamination procedure
- Contact tracing and quarantine
- Risk communication
- Isolation, barrier nursing, disinfection and sterilisation procedures
- Psychological management and counselling
- Molecular biology techniques in sample testing, interpretation/analysis of results

TRAINING METHODS

- Online resources
- Face-to-face simulations and seminars
- Hands-on training in laboratories

TARGETS

- Once or twice a year
- All front liners and officers including public health physicians, clinicians, microbiologists, public health inspectors, nurses and other relevant health care practitioners.
- Medical lab technologists and science officers

17. INVENTORY AND STOCK MANAGEMENT

Example of inventory and stock management

No	Item	Quantity	Price
1.	Personal Protective Equipment (PPE)	Depends on the quantity needed	
	a) Hand gloves		
	b) Surgical masks		
	c) N95 masks		
	d) Gown		
	e) Body apron		
	f) Head cover		
	g) Shoe cover		
	h) Eye shield		
	i) Face shield		
	j) Yellow plastic bag		
	k) Tissue		
	l) Hand sanitizer		
	m) Coverall/Jump-suit		
2.	Screening test kits		
3.	Drug & Medications		
4.	Vaccines & Antibiotics		
5.	Transportations		

18. LABORATORY PREPAREDNESS

Laboratory preparation of COVID-19 or similar outbreak in future will be based on our experience in handling current outbreaks with cutting edge technology.

1. Learn from current outbreak with good data collection and specimen storage

    a. Specimen collection (in RNA and/or cDNA) with appropriate labels
    b. Proper storage system
    c. Comprehensive database system for positive and negative covid-19 specimen with demographic data

2. Strengthening the diagnostic and surveillance capacity to detect unusual pathogens including Bio Safety Level 3 organisms
    a. Preparation of suitable laboratory for research
    b. Regular surveillance of unusual clinic presentation or organisms
    c. Regular genome sequencing, variant analysis and mapping to identify genetic mutation of the infectious agents

3. Future research areas
    a. Development of diagnostic test in different platforms that can overcome the limited resource during outbreak
    b. Development of rapid test kit with high specificity and sensitivity to reduce potential transmission of organism during window period
    c. Strengthening the communicable disease mapping using GIS

Sample collection with complete inventory in database system

Aim: lab surveillance and specimen collections for future priority research areas

Phase 1: Specimen collection and storage

1. Specimen collection (in RNA and/or DNA) with appropriate labels
2. Proper storage system
3. Comprehensive database system for positive and negative covid-19 specimen with demographic data

Phase 2: Future research areas

1. Forming a team of lab experts from PPSP and INFORMM to perform evaluations on relevant diagnostic tests.
2. Development of diagnostic test in different platforms by
3. Whole genome sequencing, variant analysis and mapping

APPENDICES

APPENDIX 1: LIST OF SCREENING CENTRES

Health Campus, Kubang Kerian Clinic & Emergency Service

- MOH District Health Office: Pej. Kesihatan Daerah Kota Bharu
- Admitting Hospital: Hospital Raja Perempuan Zainab II and Hospital Tumpat
- Other nearby health care centres e.g KK Kota Jembal
- Hotline: 09 7673520 (Office Hour) & 09 7673239 (After Office Hour)

Pusat Sejahtera Main USM Campus

- MOH District Health Office: Pej. Kesihatan Timur Laut Pulau Pinang (Tel: 04-2818900)
- Admitting Hospital: Hospital Pulau Pinang (Tel: 04-2225333)
- Other nearby health care centres
    - Pej Kesihatan Daerah Barat Daya (Tel: 04-8661194)
    - Hospital Balik Pulau (Tel: 04-8669333)

Health Unit (Unit Kesihatan), Engineering Campus

- MOH District Health Office: Pej Kesihatan Daerah Seberang Perai Selatan
- Admitting Hospital: Hospital Pulau Pinang (Tel: 04-2225333)
- Hosp Bukit Mertajam 04- 549 7333
- Hosp Seberang Jaya 04- 382 7333
- Other nearby health care centre:
    - Hospital Parit Buntar, Perak (2.5km) – 05- 716 3333
    - Pejabat Kesihatan Kerian, Perak (2.5km) 05- 716 2355
    - Klinik Kesihatan Bukit Panchor (2.5km) 04- 593 1679
    - Klinik Kesihatan Nibong Tebal, Penang (3km) 04- 593 1355
    - Klinik Kesihatan Bandar Baharu Kedah (4.5km) 04- 716 4343

Clinical Service, IPPT (AMDI) Campus

- MOH District Health Office: Pej. Kesihatan Seberang Perai Utara (Tel: 04-5751833)
- Admitting Hospital: Hospital Kepala Batas (Tel: 04-5793333)& Hospital Pulau Pinang
- Other nearby health care centre
- Hotline no: 04-5622610

APPENDIX 2: ROLES & RESPONSIBILITY

Public Health Physician/Epidemiologist

- Develop organizational goals, objectives and strategic plan for outbreak management
- Manage surveillance system to identify, collect, analyse and interpret data using information technology to
    - assess campus risk and outbreak status within and outside campus
    - plan for immediate and long-term control and preventive action
- Manage outbreak team including rapid response team
- Plan and advocate evidence-based decision making in outbreak management
- Ensure community health literacy by communicating public health information to influence behaviour and improve health (risk communication)

Infectious disease (ID), Family Medicine & Emergency Physicians

- Plan technical medical resources and SOP for case management
- Coordinate medical services across discipline including laboratory services
- Ensure laboratory investigations are promptly undertaken
- Ensure timely submission of daily report to OCT operation center
- Ensure implementation of guidelines for Biomedical Waste Management
- Collaborate with CPRC and other relevant agencies
- Managing suspected case, symptomatic PUIs and admitted confirmed cases.
- Educating and training staffs, co-workers and public regarding disease process and clinical management.

Microbiologist

- Plan and coordinate technical laboratory resources (e/g testing kits)
- Ensure laboratory investigations are promptly undertaken
- Ensure timely submission of daily report to OCT operation center
- Ensure implementation of guidelines for Biomedical Waste Management
- Participate in epidemic investigations as member of Rapid Response Team
- Collaborate with national laboratory diagnostic centre and other agencies

Hospital Epidemiology & Control Unit or other Clinical Services

- Collate data from all managing wards and units
- Ensure standard precaution and PPE resources
- Coordinate human resource – medical & paramedics as well as pharmacy

Respective personnel at Pusat Sejahtera (Campus Minden, IPPT, Engineering)

- Plan technical medical resources and SOP for screening and contact management
- Coordinate medical services across discipline including laboratory services
- Ensure laboratory investigations are promptly undertaken
- Ensure timely submission of daily report to OCT operation center
- Ensure implementation of guidelines for Biomedical Waste Management
- Collaborate with CPRC and other relevant agencies

APPENDIX 3: OVERVIEW OF COVID-19

SARS-COV-2 (the virus)

COVID-19 is a disease caused by the infection with Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV2), from the family of Coronavirus. Coronaviruses are a large family of viruses that are common in people and many different species of animals, including camels, cattle, cats, and bats. Rarely, animal coronaviruses can infect people and then spread among people such as with MERS-CoV, SARS-CoV, and now with this new virus (named SARS-CoV-2).

The SARS-CoV-2 virus is a betacoronavirus, like MERS-CoV and SARS-CoV. All three of these viruses have their origins in bats. The sequences from U.S. patients are similar to the one that China initially posted, suggesting a likely single, recent emergence of this virus from an animal reservoir.

Mode of transmission

Definitive information regarding the exact mode of transmission of COVID-19 is evolving, however, it seems likely that it shares the same transmission dynamics as seasonal influenza, i.e. it is most commonly spread from person-to-person by inhalation of infectious droplets produced while talking, coughing and sneezing. Presence of fever and also respiratory symptoms are correlated with viral shedding and the ability to transmit infection.

Incubation and Infectious period

The maximum incubation period could be 7 days but this may change as more information concerning this virus becomes available. Patients may shed influenza virus for up to 24 hours (1 day) before and until 7 days after the onset of symptoms. Viral shedding is reduced to very low levels by 5 days.

Anti-influenza medicines will reduce the amount of virus shed by the patient within 1 to 3 days. Patients are considered no longer infectious 24 hours after resolution of the fever, provided either they have received 72 hours of anti-influenza medicine or 7 days have elapsed since onset of respiratory symptoms.

Clinical presentation

Covid-19 has a wide spectrum of clinical presentation. It may present as a very mild acute respiratory infection (ARI) in the form of sore throat and cough to a very severe respiratory illness (SARI) in the form of pneumonias with fatal ARDS.

Studies of confirmed cases of COVID-19 infection suggest a similar profile of a seasonal influenza which typically commences with symptoms of fever, cough, fatigue, sore throat, headache, myalgia, arthralgia and rigors or chills, with diarrhoea and/or vomiting also being reported. In one series, 95% of confirmed COVID-19 cases reported fever, plus cough and/or

sore throat. Pneumonia may develop directly from SARS-CoV2 infection or from secondary bacterial infection. The symptoms may include breathing difficulty, productive cough, bloody sputum, and pain when breathing. Chest X-rays may show pneumonia. Acute respiratory distress syndrome (ARDS) may develop several days after the disease onset.

High risk groups

Our community is thought to be generally susceptible to infection by COVID-19 as it has not been seen in human populations before. Some groups appear to be at increased risk of severe disease i.e those with chronic respiratory conditions (asthma, COPD), morbid obesity, adults > 65 years of age (esp. those with other chronic diseases), and also those with other possible predisposing conditions, such as chronic cardiac disease and chronic illnesses including diabetes mellitus, renal failure, haemoglobinopathies, immunosuppressed (e.g cancer, HIV/AIDS, chemotherapy, long term steroids).

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