

APRU Workshop on Building Disaster Resistant Universities

2 – 4 Feb 2016

Disaster Preparedness Case Study

Crisis and Emergency Management Framework in NUS &
Experience Sharing in the Management of H1N1 Pandemic

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Office of Safety, Health and Environment



Introduction

The National University of Singapore



NUS Vision

A leading global university centred in Asia, influencing the future



NUS today

A COMPREHENSIVE, RESEARCH-INTENSIVE UNIVERSITY



* 4th Research Centre of Excellence shared with Nanyang Technological University

Profile of Students and Staff

Profile of Students

PROFILE OF STUDENTS

Academic Year 2013/2014
(as at Feb 2014)



TOTAL 33,613

Profile of Faculty and Staff

PROFILE OF FACULTY AND STAFF (as at June 2014)



TOTAL 10,582

Introduction

- **What is Disaster Management?**

- All aspects of planning for and responding to disaster and post disaster activities

- Ibrahim (2008), DPM, pp 120)

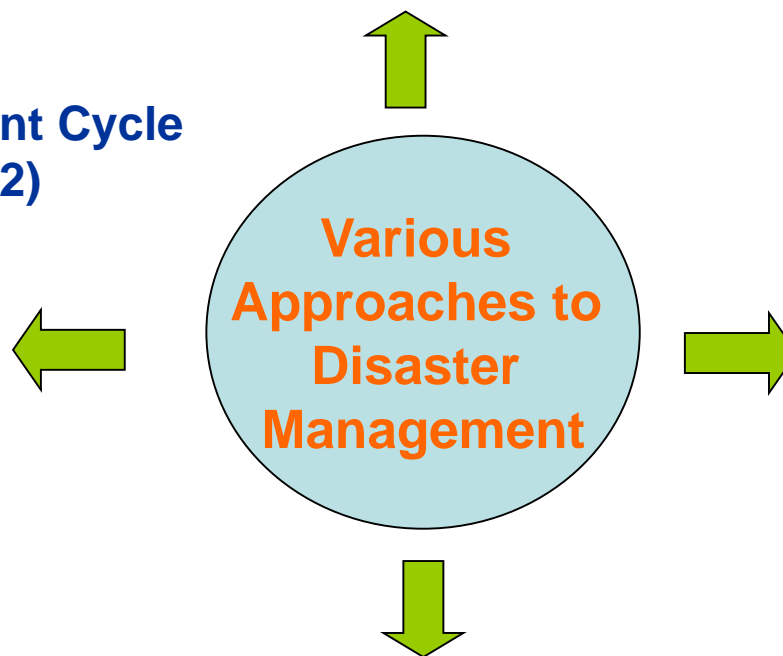
- 3 stages: Before, During & After

- (Richardson (1994), DPM, pp 41-69)

- **Khan & Ali (2001)**
 - Prevention
 - Mitigation
 - Preparedness
 - Response & relief
 - Rehabilitation
 - Reconstruction

- **The Disaster Management Cycle (Powell and Rayner, 1952)**

- Warning
- Threat
- Impact
- Inventory
- Rescue
- Remedy
- Recovery



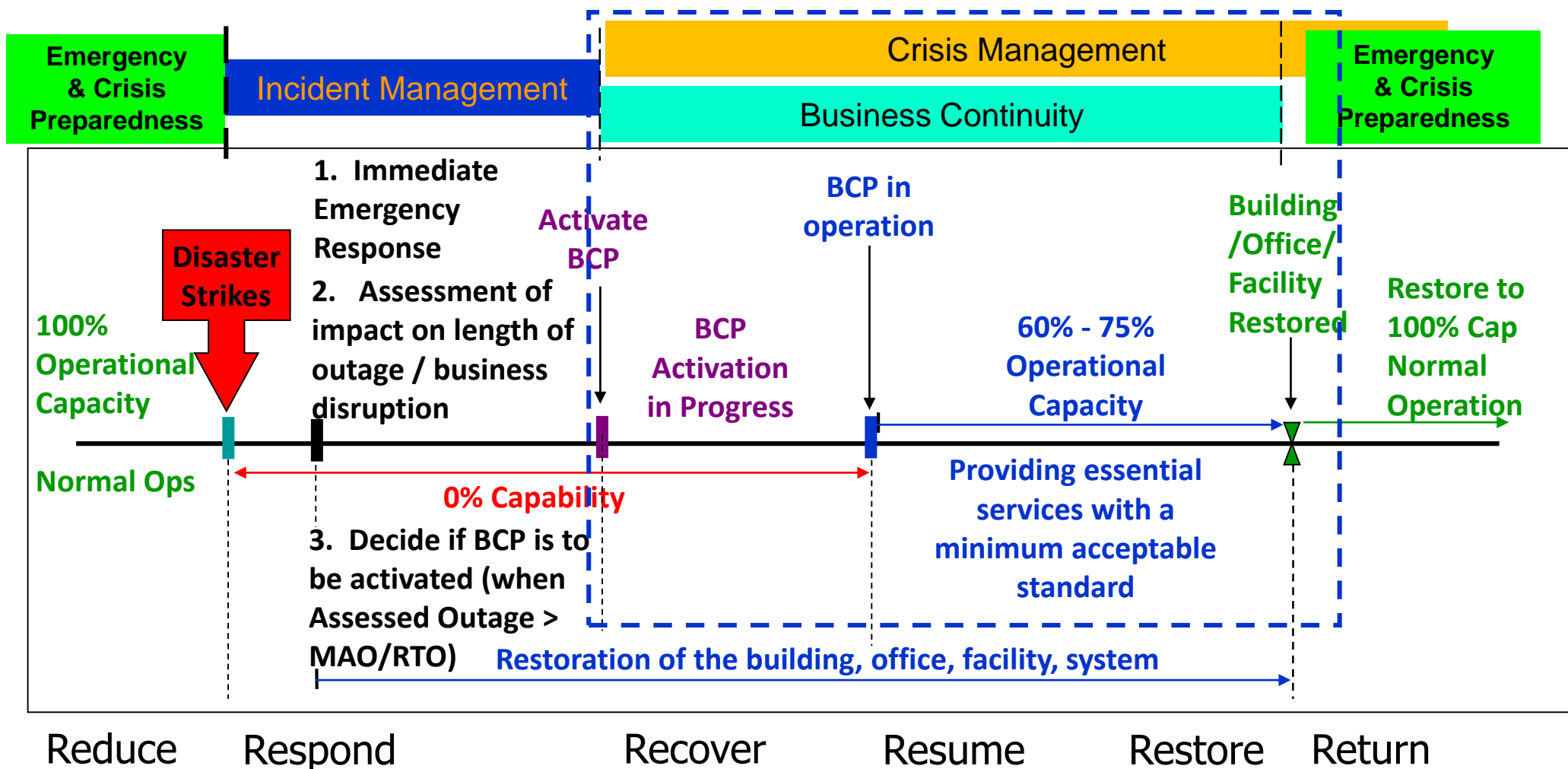
- **CERO (2003)**
 - Alert
 - Preparedness
 - Response
 - Prevention
 - Mitigation
 - Rehabilitation

- **Levin & Granot (2002)**
 - Warning
 - Impact
 - Emergency
 - Recovery

Schematic Concept of Crisis Management / Business Resilience / Business Continuity Management

BCM - To continue to provide essential services with a minimum acceptable standard when normal business operation is severely disrupted after a disaster.

Not 100%
Capability.
≈ 60-75% Cap Only



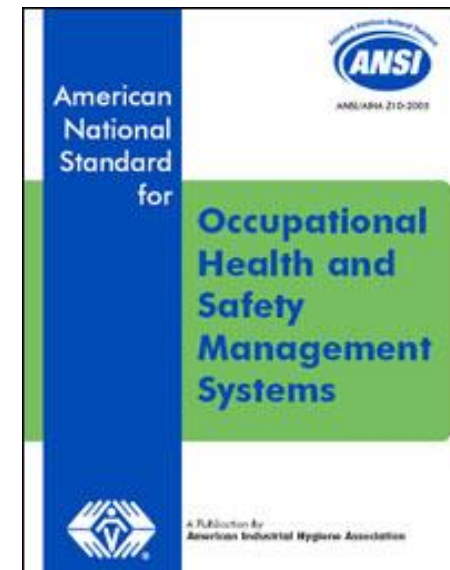
Management System Approach to Crisis Management & BCM

- **Management Systems**

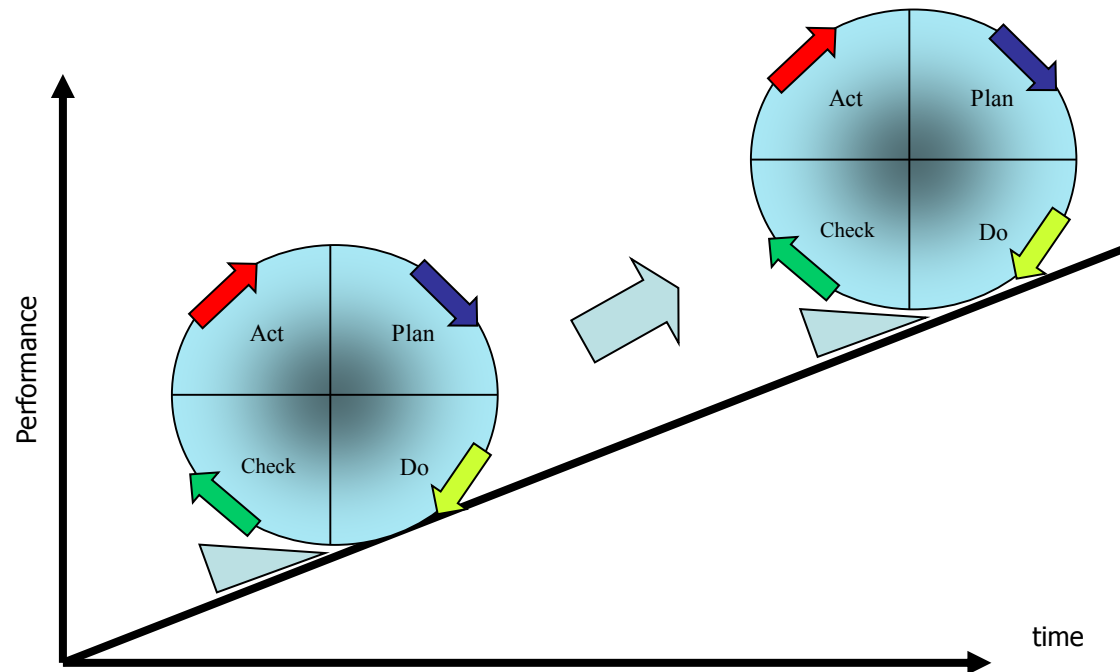
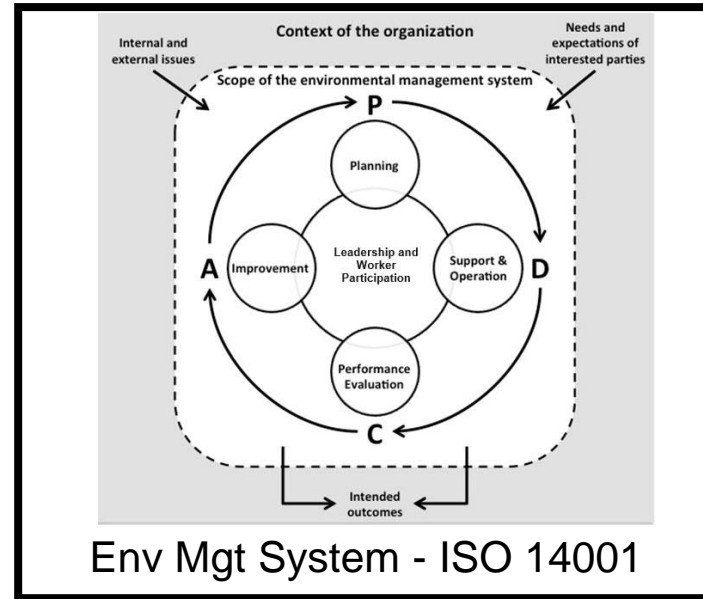
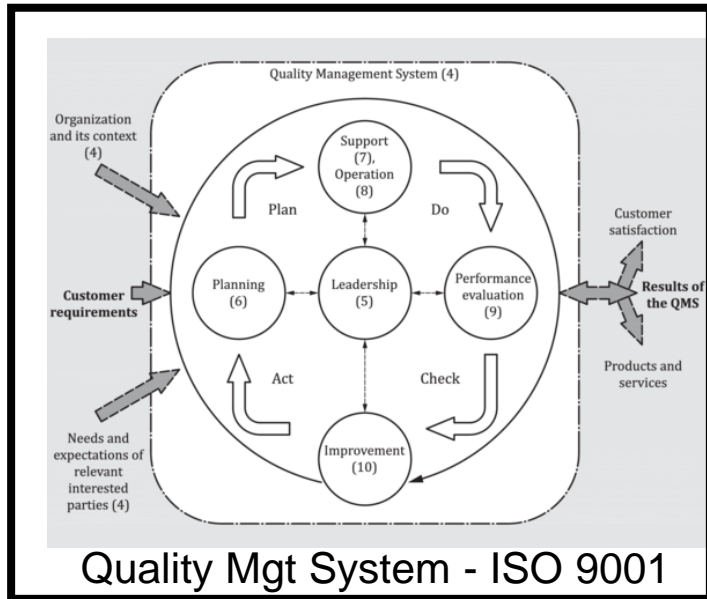
 - ISO 9001, ISO 14001, OHSAS 18001 & ANSI-Z10

- **Deming's PDCA cycle of management**

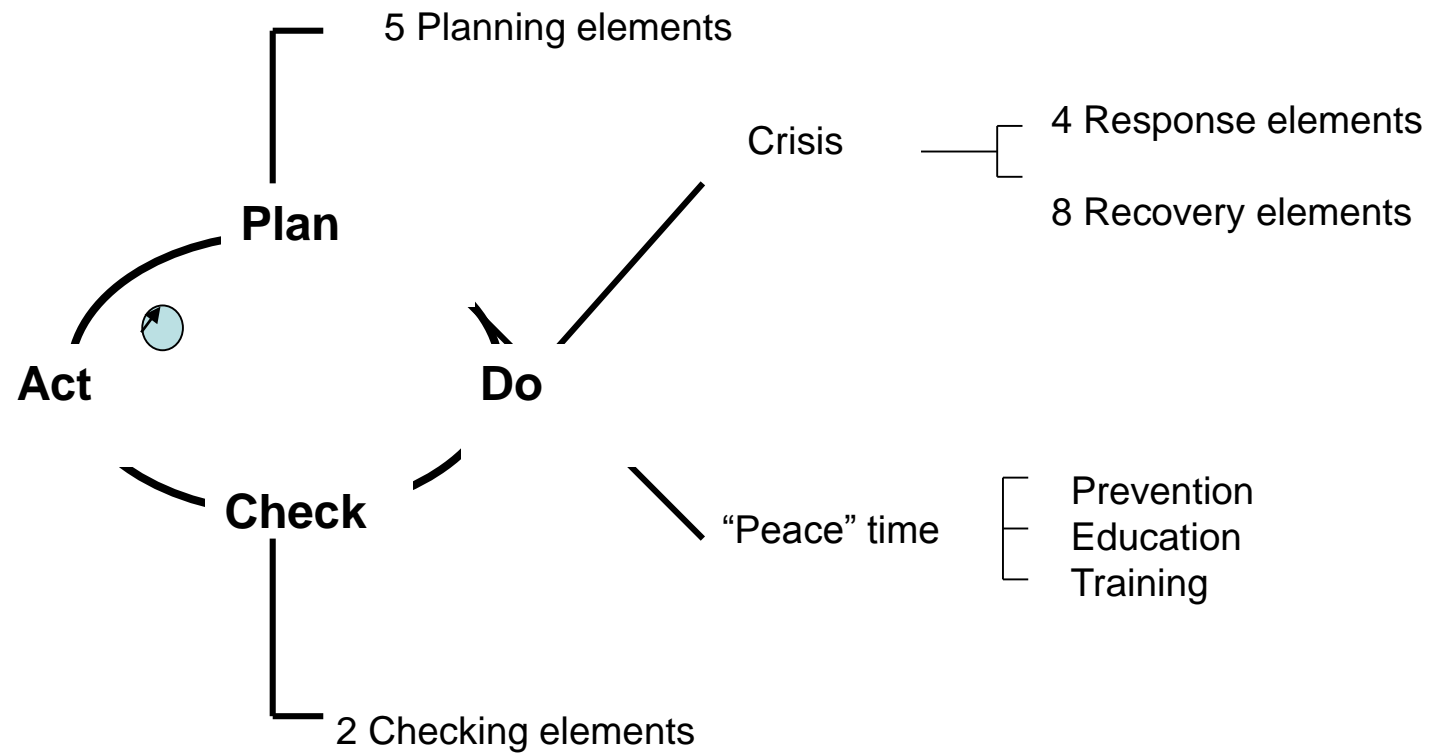
- **Application of PDCA in Crisis Management**



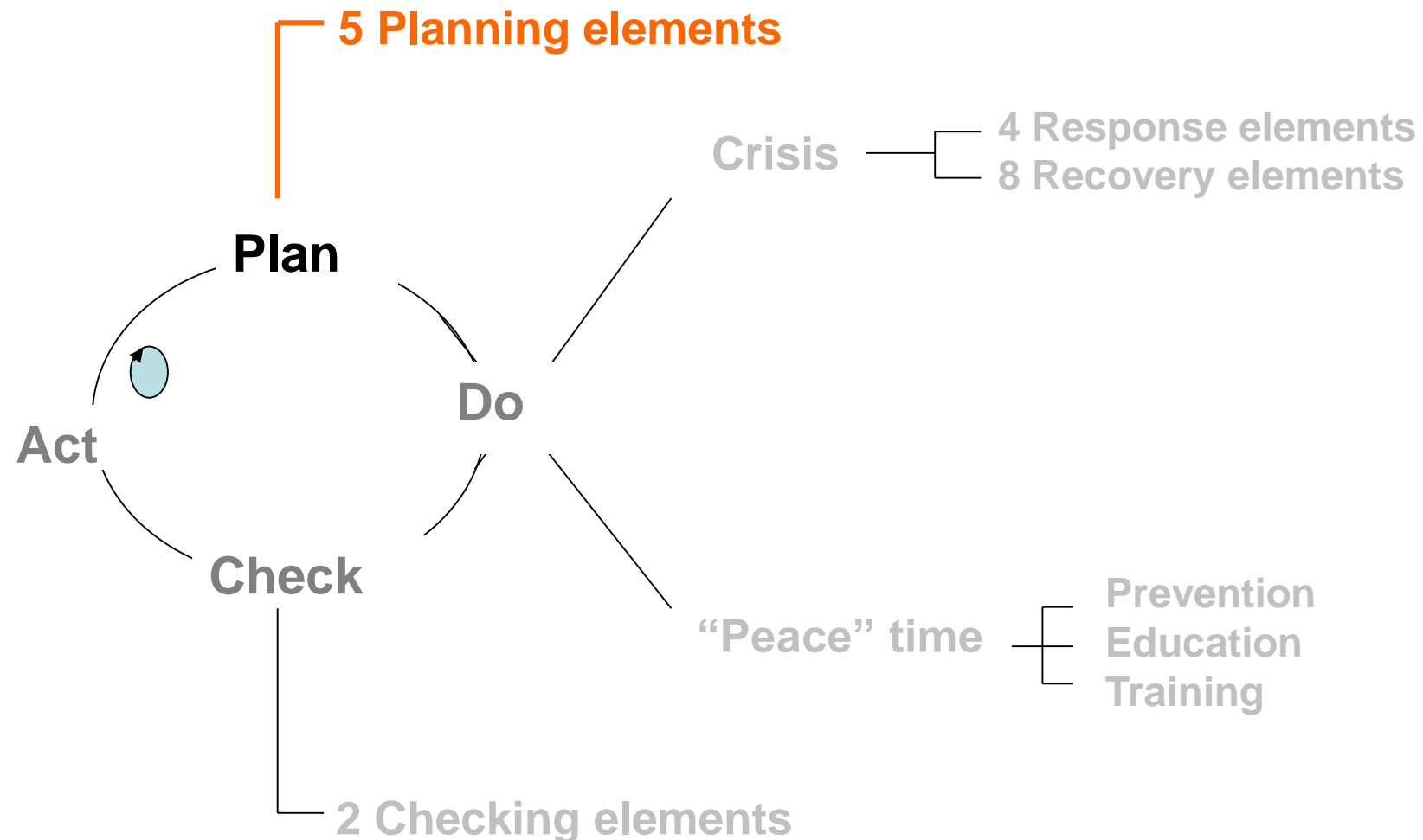
Examples of Management System Models



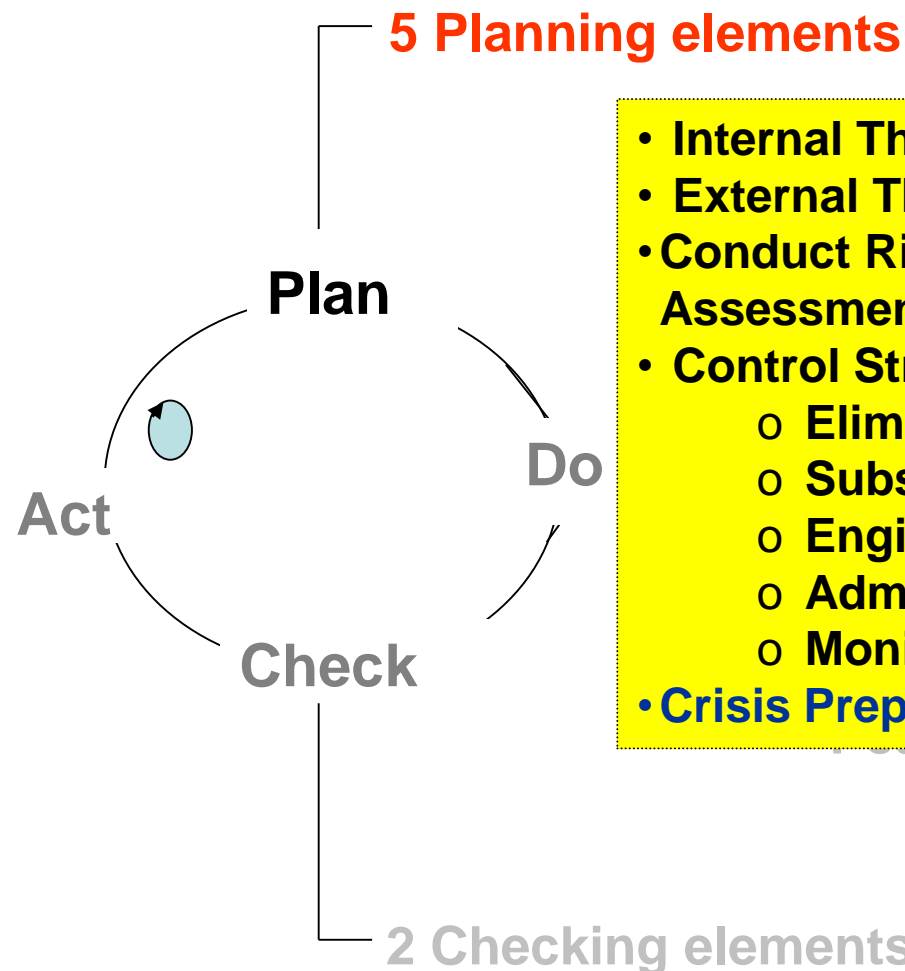
Introduction



The “Fish” Crisis Management System Model



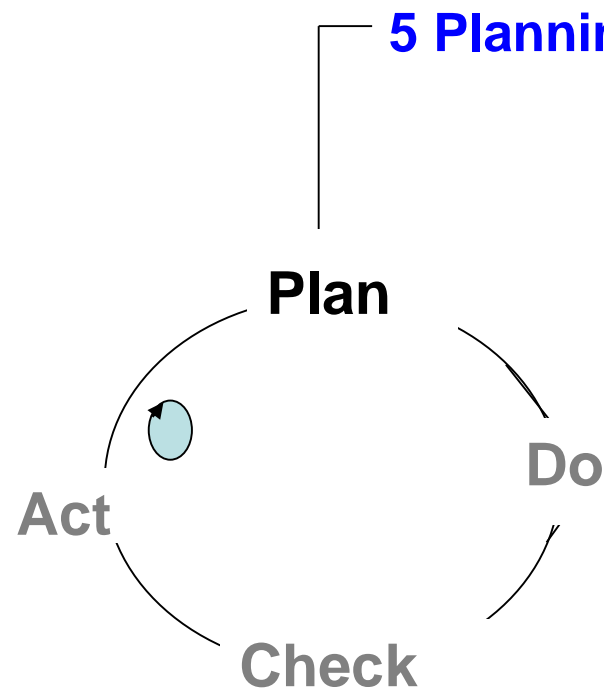
“Plan” Phase



- **Internal Threats: Identify Key processes (SIPOC)**
- **External Threats: Scenario & Modelling**
- **Conduct Risk Assessment & Business Impact Assessment**
- **Control Strategy**
 - Elimination
 - Substitution
 - Engineering control
 - Administrative control
 - Monitoring
- **Crisis Preparation**

Education
Training

“Plan” Phase



5 Planning elements

- Internal Threats: Identify Key processes (SIPOC)
- External Threats: Scenario & Modelling
- Conduct Risk Assessment & Business Impact Assessment
- Control Strategies
- **Crisis Preparation**
 - Policy
 - Event Classification
 - Roles & Responsibilities
 - Communication Procedure
 - Aim
 - Objectives
 - Stakeholder Analysis
 - Obstacles & countermeasures
 - Message

2 Checkin

Examples of Credible Threats

Weather-related

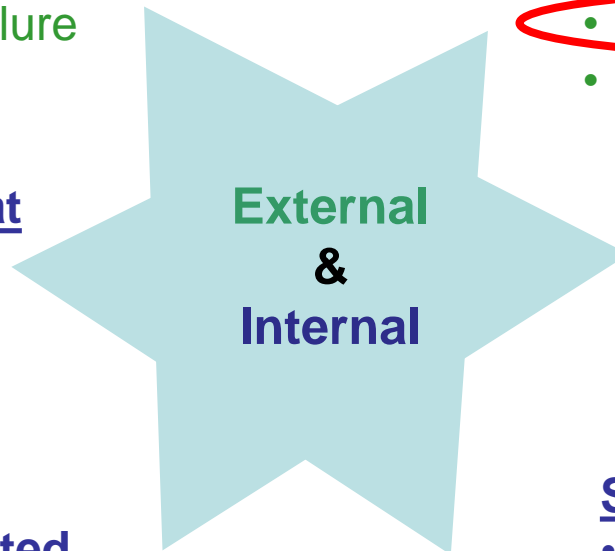
- Bush fire
- Slope failure
- Haze

Outbreak of infectious diseases

- HFMD outbreak
- Flu Pandemic (H1N1 etc)
- Dengue outbreak

Security related issues at major events

- Commencement
- Open House
- Other major events



Laboratory related incidents

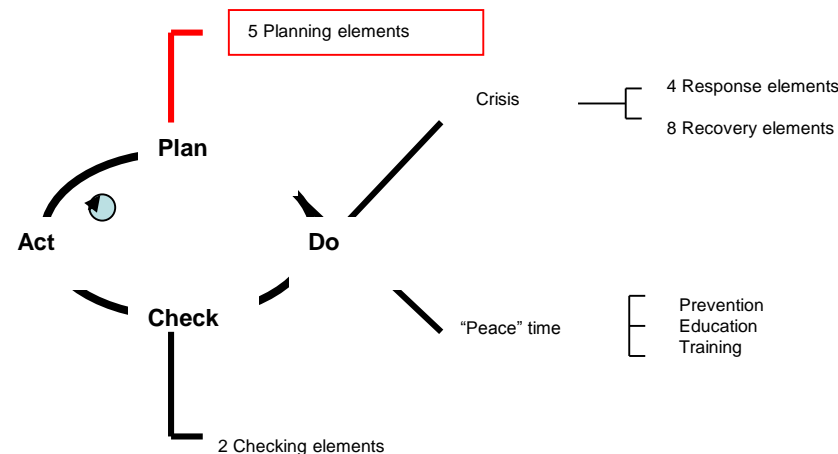
- Chemical spills
- Accidental release of agents

Infrastructure/facility-related

- Construction-related accidents
- Fire

Staff & student related incidents

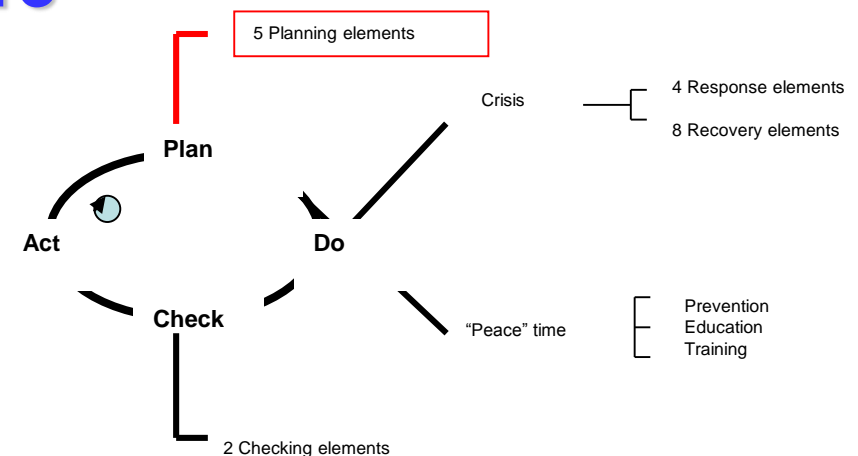
- Death & injury
- Mental health issues



NUS Crisis Management Framework

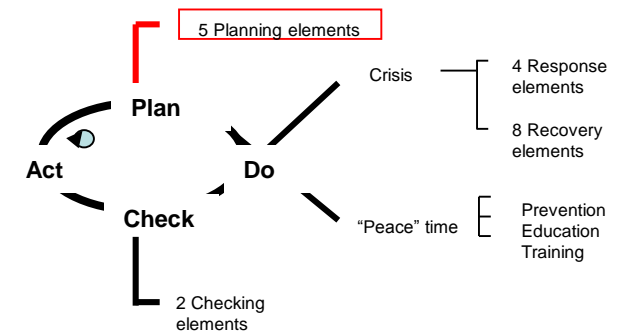
Crisis Management Framework

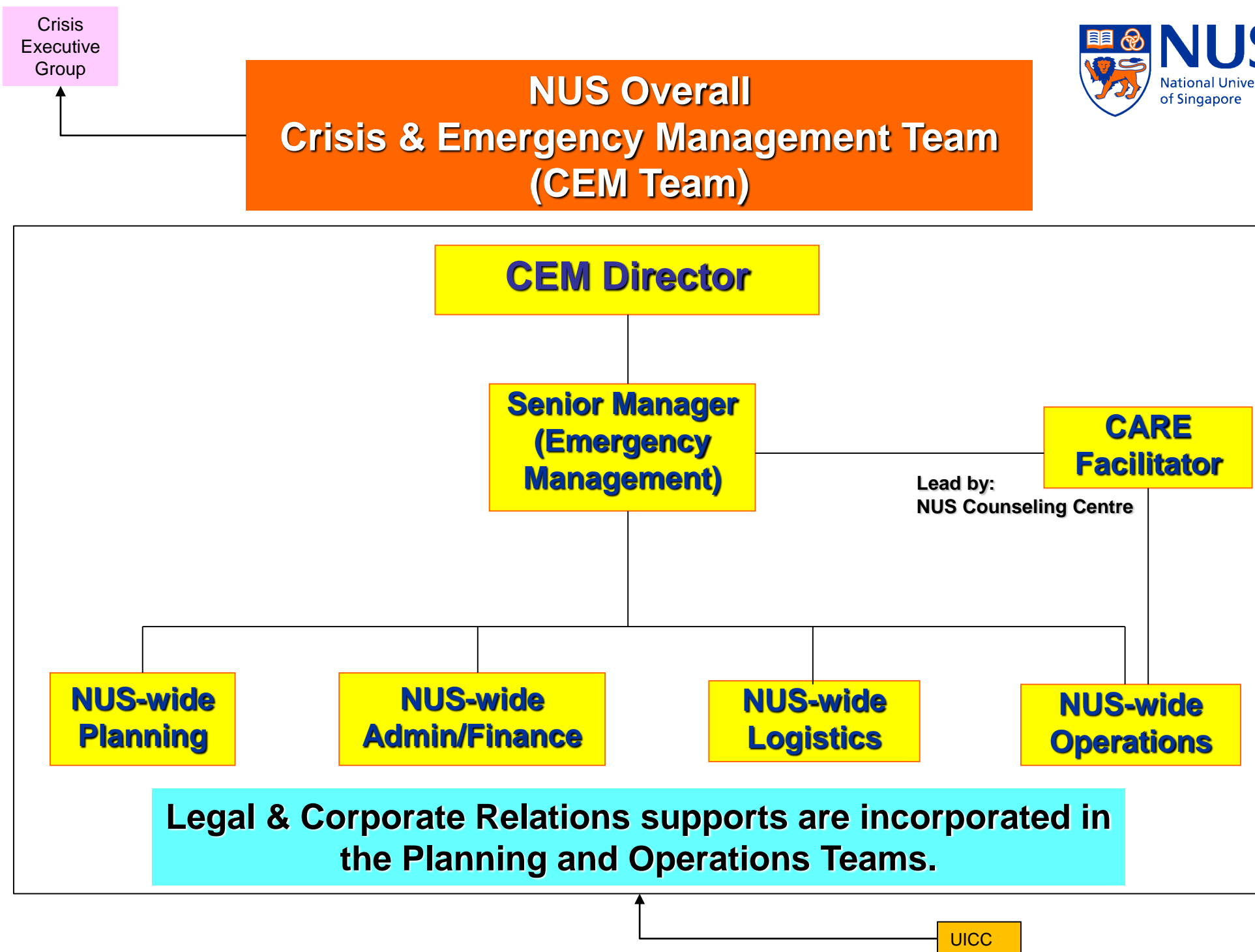
- Policy
- Event Classification
 - Definition of Levels & Types of Crisis
- Roles & Responsibilities
 - Command & Control Structure
 - Activation Procedure
 - Reporting Procedure
- Communication Procedure

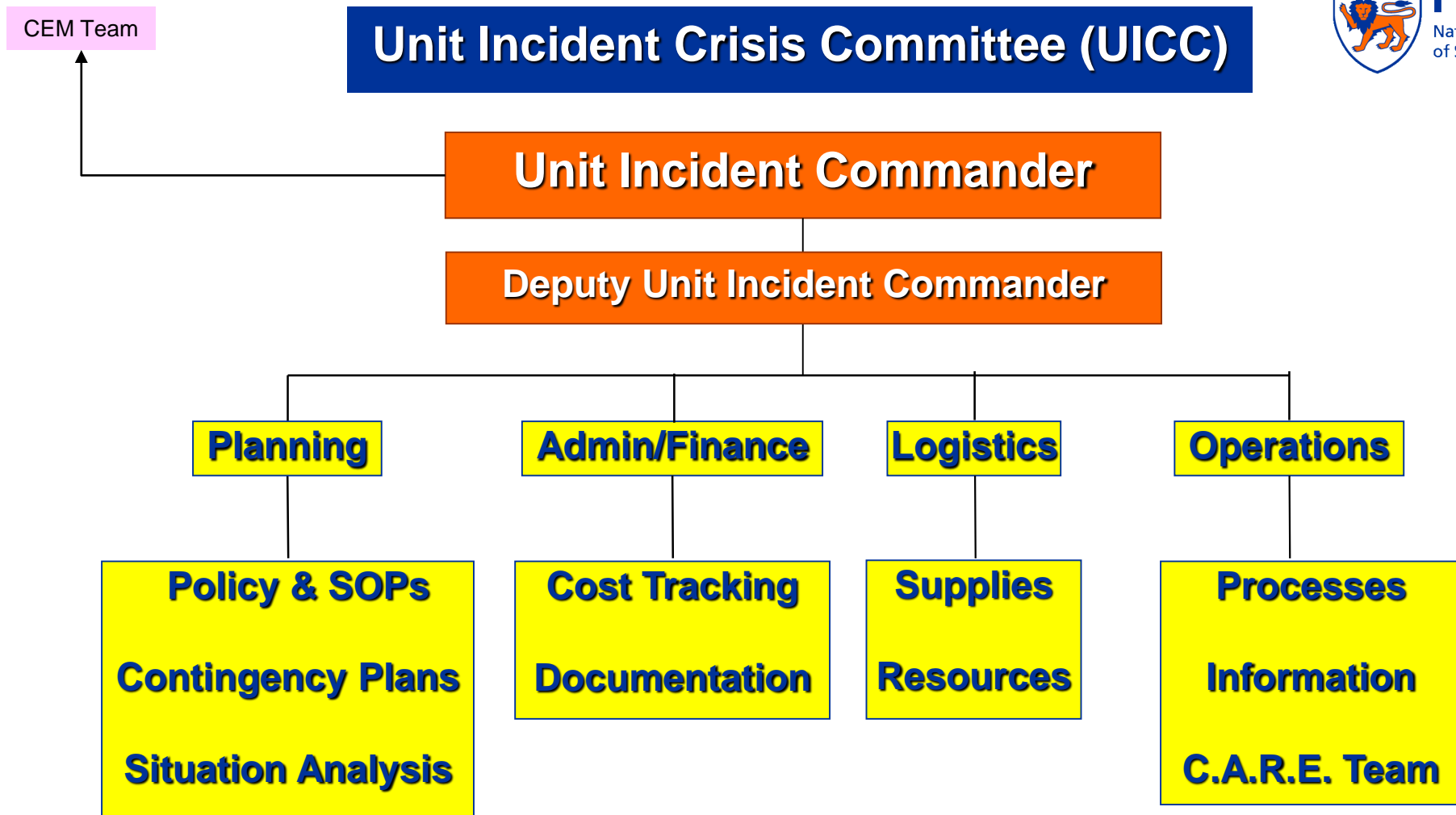


Crisis Policy – Policy Statements

- Unit's Emergency Response Plan
- Ownership of Incident
- Incident Command Structure
- Unit's Emergency Fund
- NUS Crisis Fund
- Covering of Duties
- Release from Normal Duties
- NUS Emergency Housing and Shelter
- Transportation
- Release of Personal and Academic Data
- Media Relations
- Mandatory Medical Assessment
- Mandatory Leave of Absence
- Return to Work or Studies
- Actions Taken during Emergencies

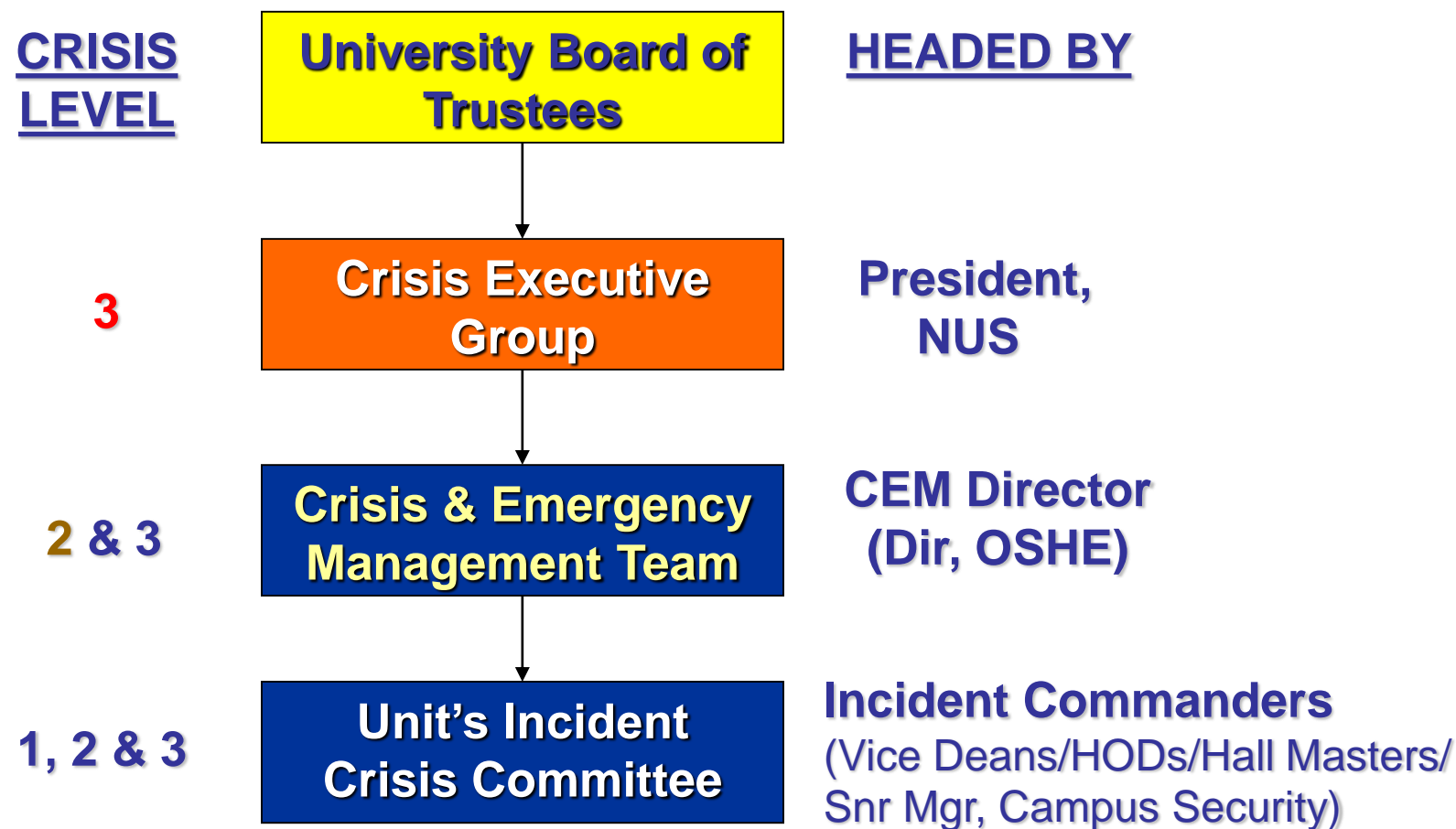






**Unit Incident Commander may assign one or more
Deputy Incident Commander**

NUS CHAIN OF COMMAND



NUS Crisis Management Framework

ALERT LEVELS

Level 1 : Minor Incident

(Example: *Localized chemical spill / fire in the lab / power failure, trips and falls, or minor injuries, etc...*)

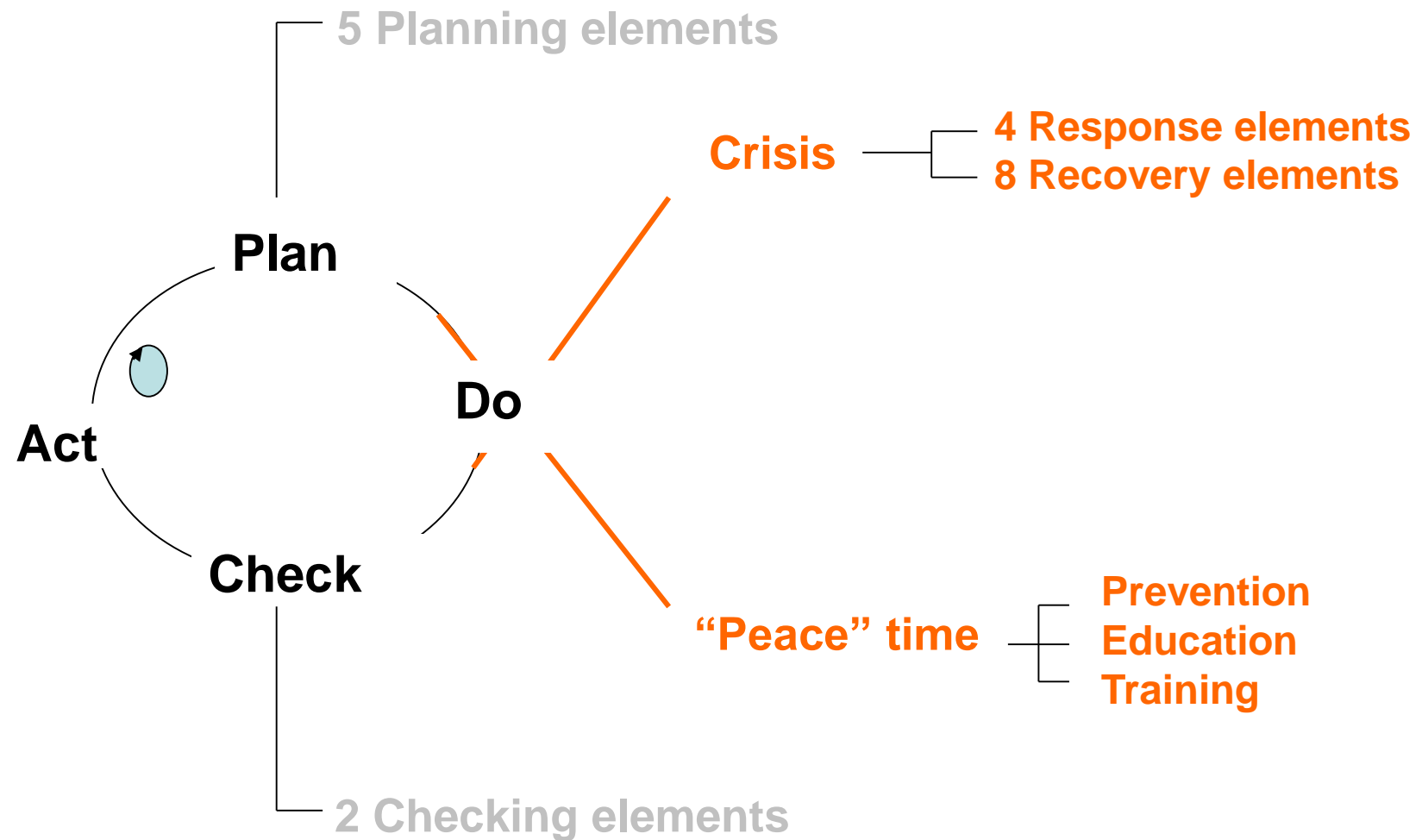
Level 2 : Emergency

(Example: *Structural fire, accidents resulting in serious injuries, major chemical spills or attempted suicide or any incident that may pose a threat to the reputation of the university*)

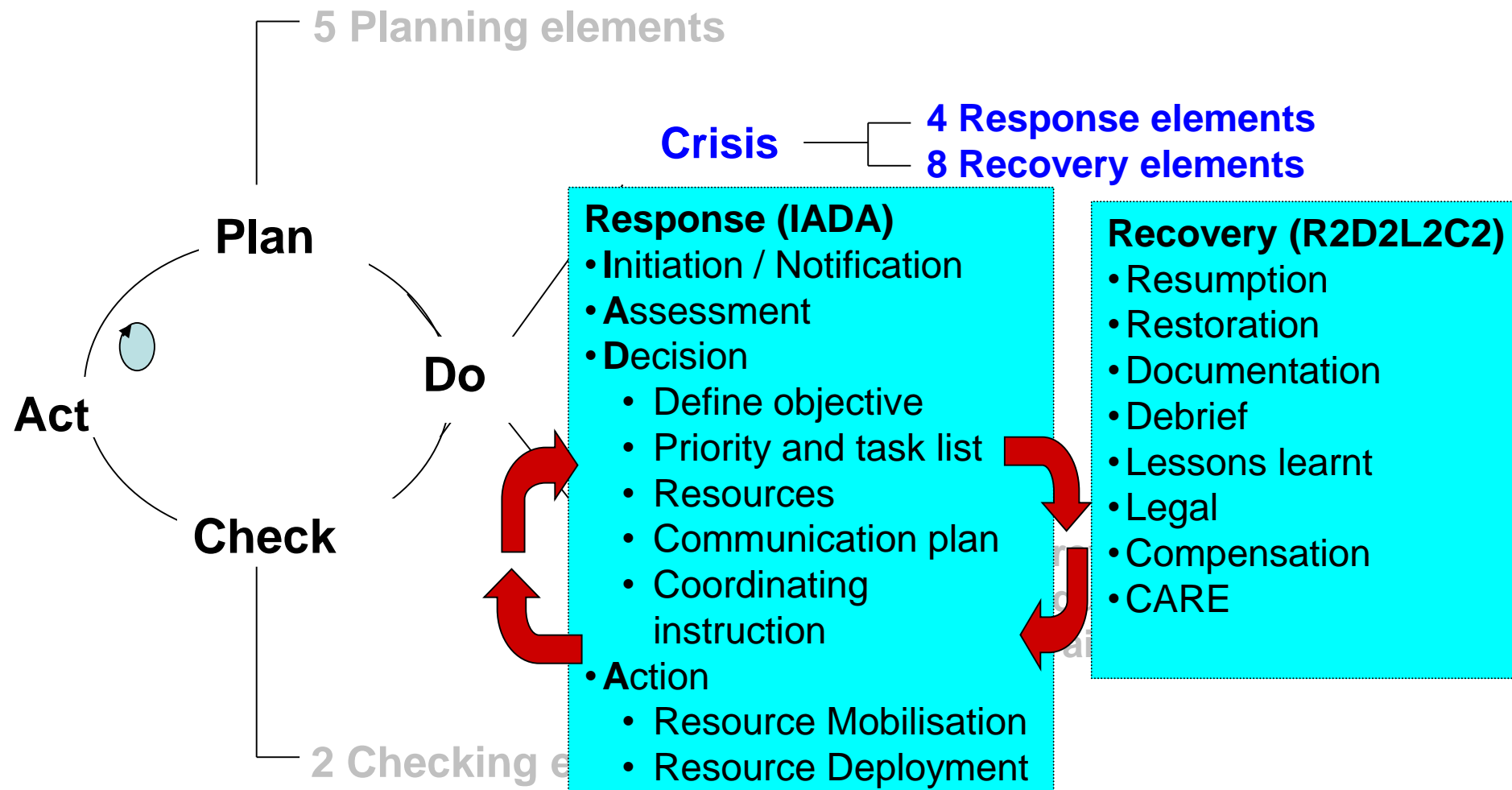
Level 3 : Crisis

(Example: *Multi-structural fire, explosion, hazardous material release, multiple deaths or injuries involving staff or students, terrorism incident, disease/epidemics, any national level disasters etc...*)

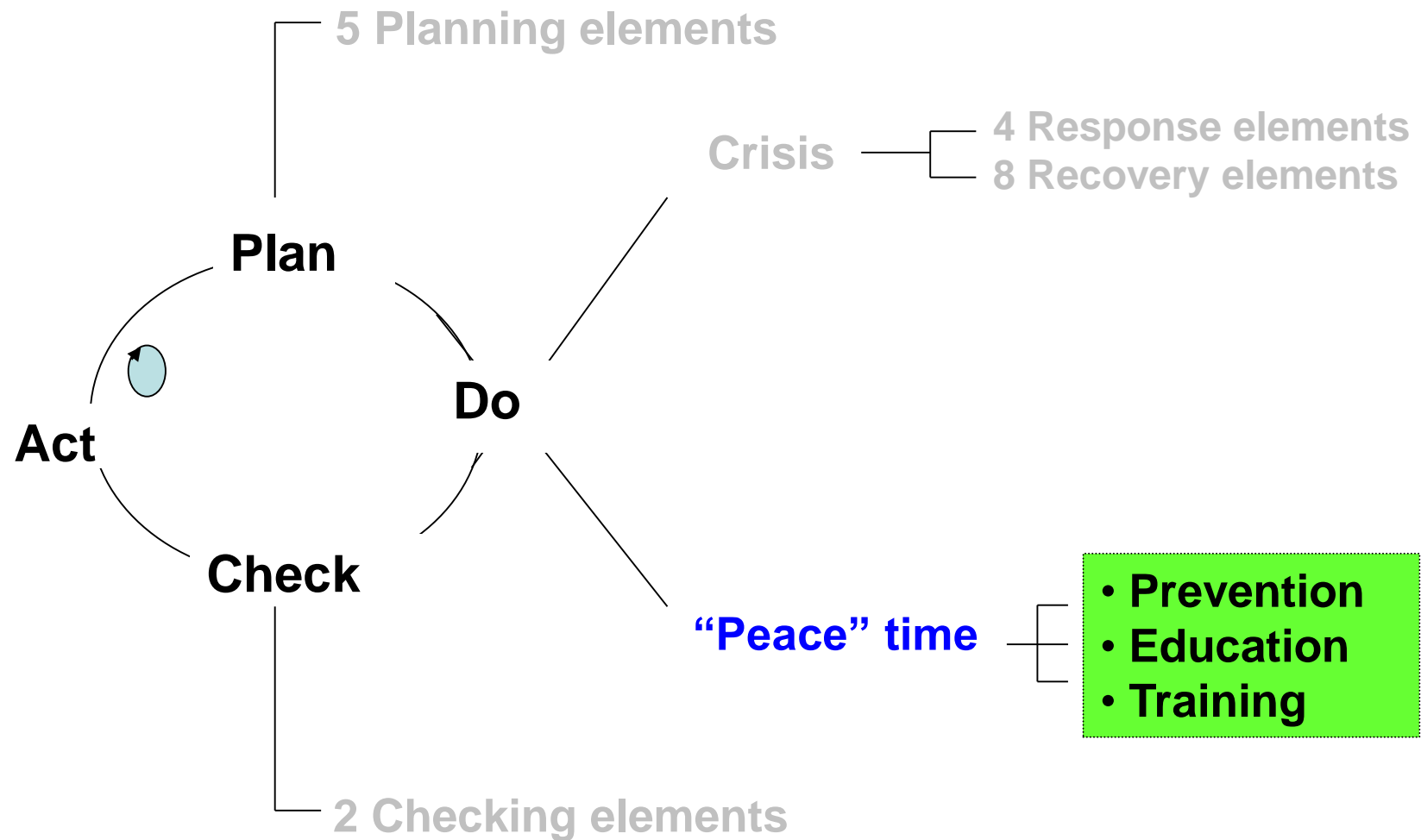
"Do" Phase



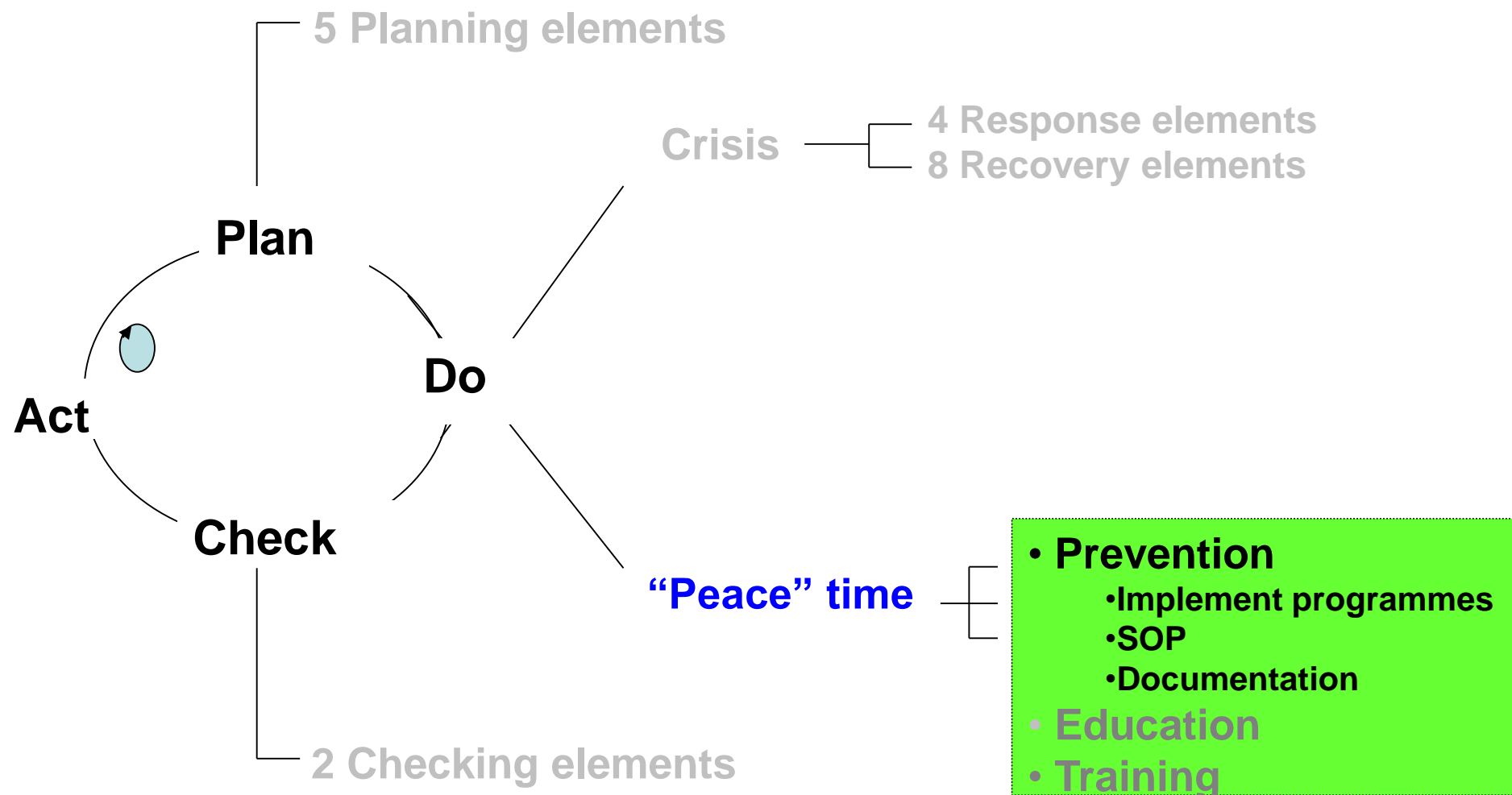
"Do" Phase



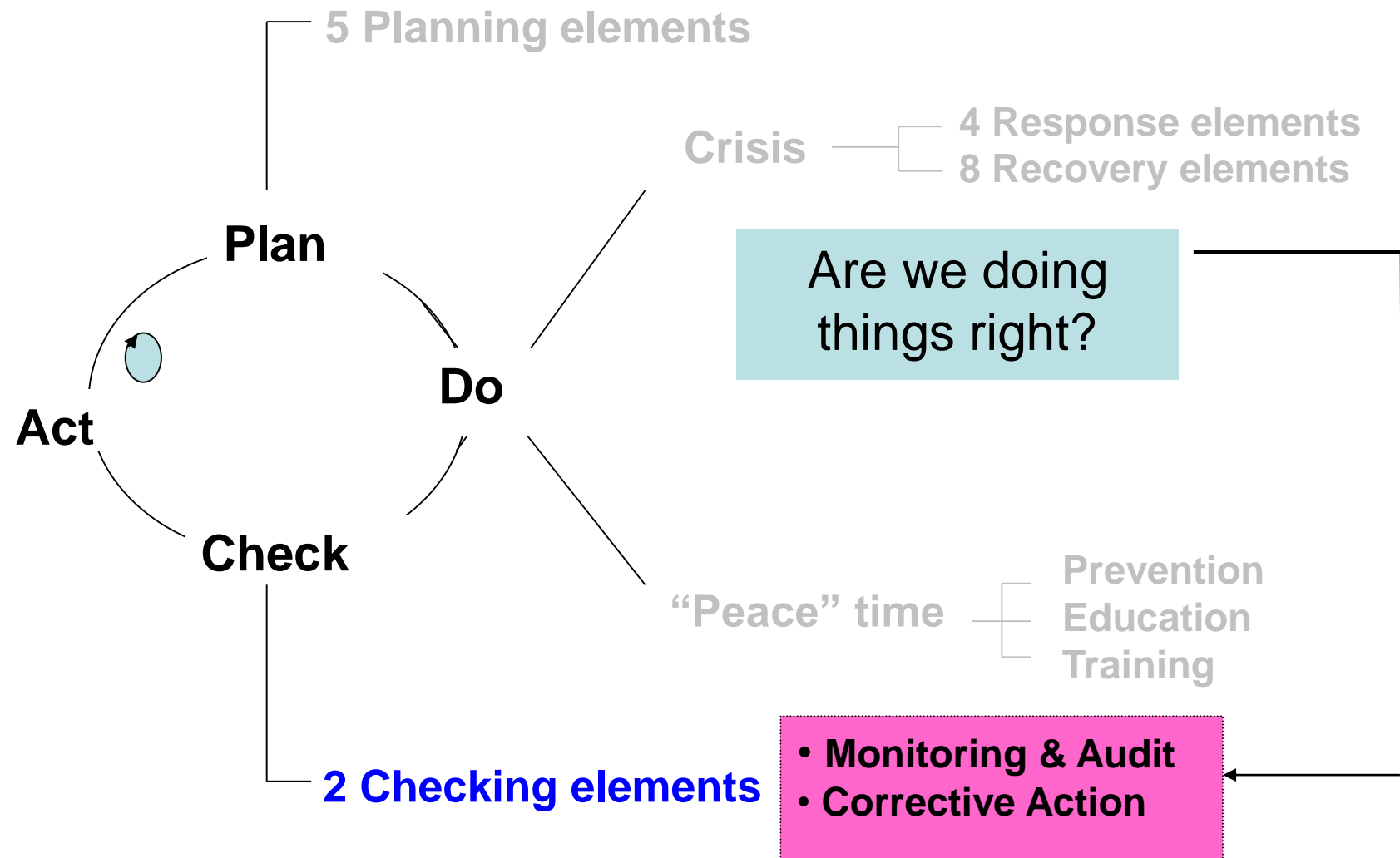
"Do" Phase



The “Fish” Crisis Management System Model



The “Fish” Crisis Management System Model

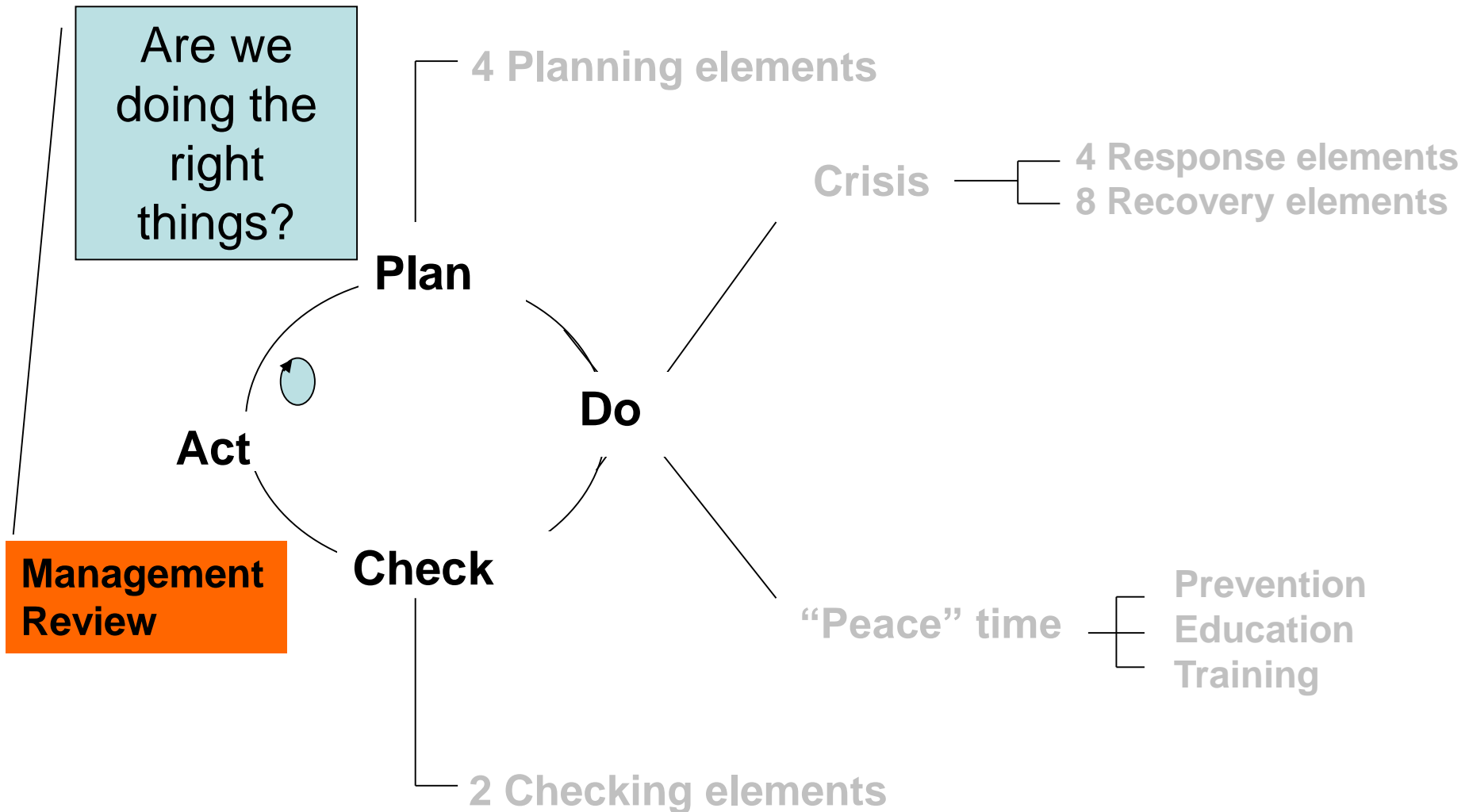


Flu Pandemic Emergency Exercise at NUS Central Library

Deployment of
thermal scanning
station



“Act” Phase

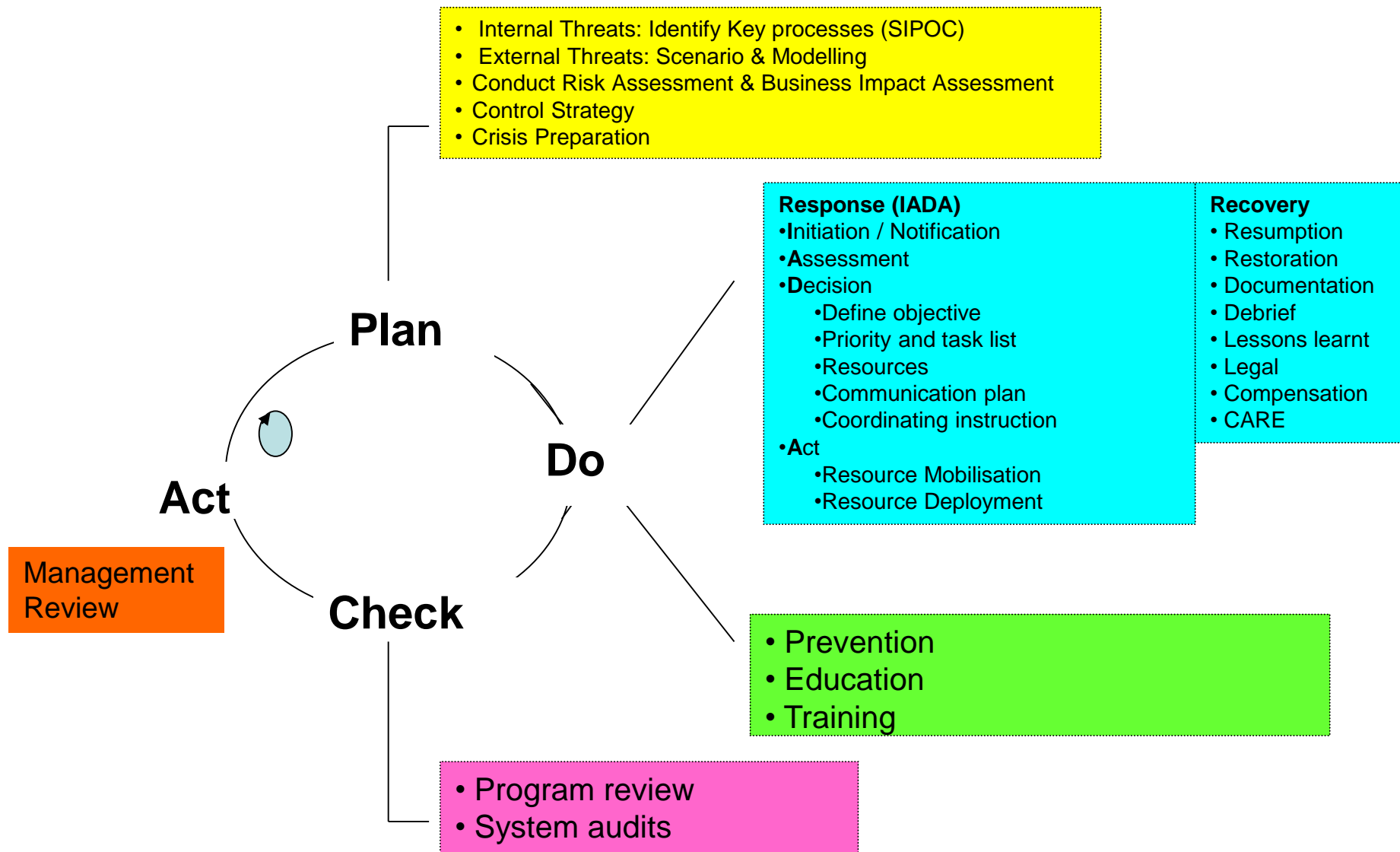


“Act” Phase

- **Review of policy, processes & programmes**
- **Reviews output and outcome**
- **Recommendations on new strategic directions**

Summary

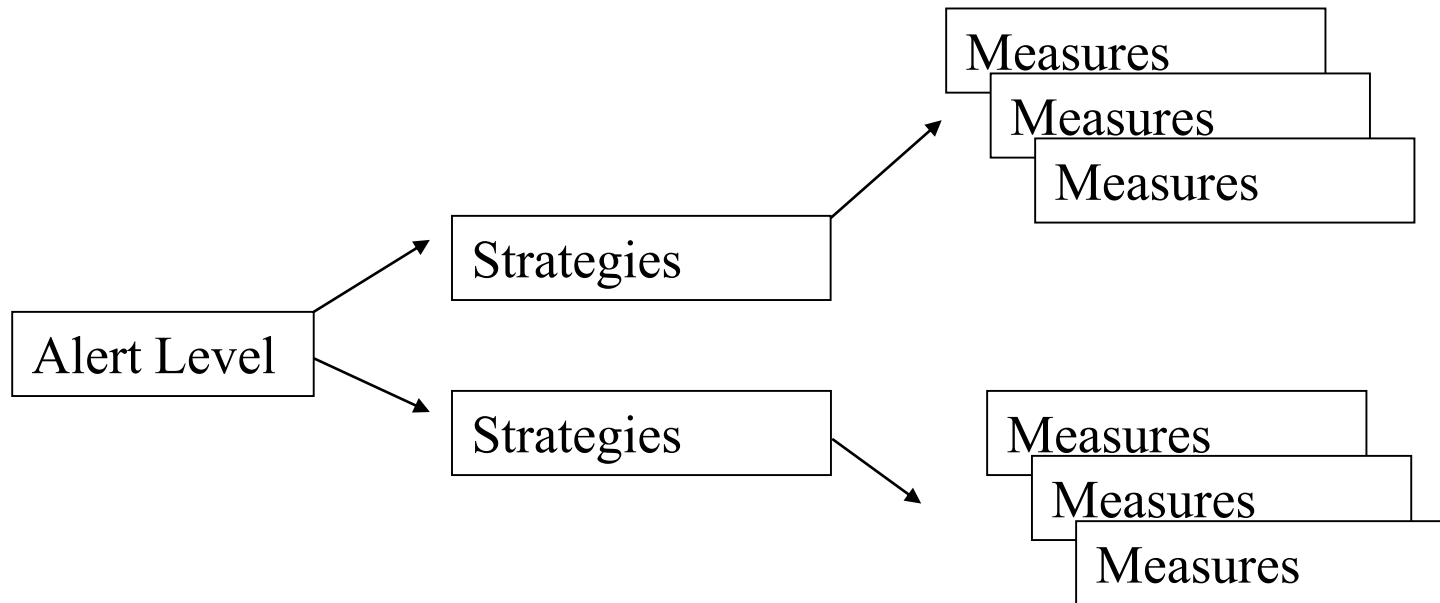
The “Fish” Crisis Management System Model



Case Study : NUS' response to H1N1 flu pandemic (April to Jul 2009)

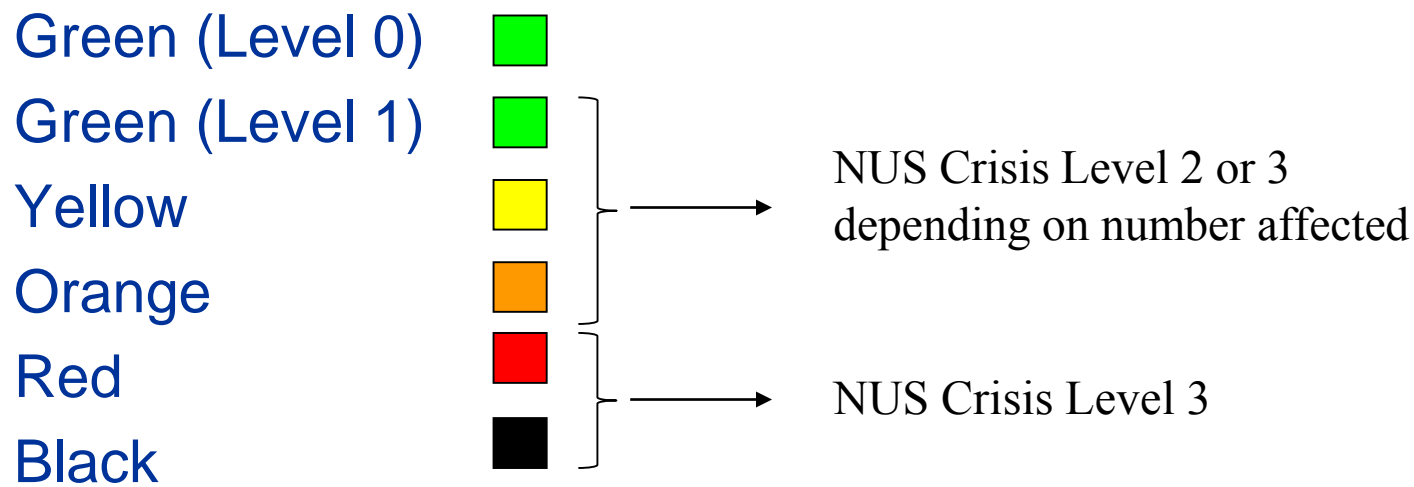
Control Strategies & Crisis Preparation (Plans)

- **National Alert System**
- **Strategies and Measures**



Preparation for Flu Pandemic

5 colour coded alert levels adopted by Singapore's Ministry of Health



STRATEGIES & PLANS

Strategies & Plans

1. **Education, awareness & communication**
2. **Monitoring & surveillance**
3. **Temperature screening at workplaces**
4. **Temperature screening for visitors**
5. **Contact tracing & isolation**
6. **Case management**
7. **Containment**
8. **Ambulance Service**
9. **Travel Advisory**
10. **Travellers from affected countries**
11. **Decanting operations & alternative housing**
12. **Cleaning & disinfection**
13. **Business Continuity**

Sequence of Events

	<ul style="list-style-type: none"> April 	
<ul style="list-style-type: none"> 24 April (Fri) 	<ul style="list-style-type: none"> Tracking indicates an outbreak in Mexico. IRO was alerted as a group of students leaving for Mexico in late May. 	
<ul style="list-style-type: none"> 26 April (Sun) 	<ul style="list-style-type: none"> President appoints Provost to head Influenza Taskforce (CEG) Requests IRO to compile info of students in Mexico and USA MOH advised postponement of non essential travel UHC alerted; asked to look out for suspect cases Temperature logging IT application activated 	<p>Initiation</p> <p>Activation</p>
<ul style="list-style-type: none"> 27 April (Mon) 	<ul style="list-style-type: none"> Updated by NUHS at 8.30 am CEM meeting at 1 pm Update from Dean SOM at 4 pm Issue 1st circular to staff and student advising them to exercise caution Flu webpage activated List of tenants and off campus facilities provided by OED Received MOE alert Order additional PPEs Obtained list of students and staff who were in Mexico recently. 	<p>Decision</p> <p>Action</p> <p>Education Monitoring</p>
<ul style="list-style-type: none"> 28 April (Tue) 	<ul style="list-style-type: none"> Influenza taskforce members identified Provost's circular to Deans on updating of student particulars and other relevant info Preparation for contact tracing: Instructions by Provost to confirm students' contact particulars during exam Travel to Mexico suspended by Provost Preparation for PPE training started Flu webpage goes "live" WHO raises pandemic level from Phase 3 to 4. Template for overseas travel tracking issued by OSHE to UICs Taskforce's first meeting OED checked PPE stock & purchased more PPEs 	

Sequence of Events

April

29 April (Wed)

- Briefing to UIC at 11 am
- Crisis Fund approved.
- Exam arrangements for febrile students
- Preparation for contact tracing:
 - OED's Vendor list to be updated
 - List of RI/RCs and contact persons to be updated
 - Circular by OHR on updating of personal particulars
- List of students arriving from overseas provided by IRO
- DORSCON raised to YELLOW.
- Preparation for temperature screening & PPE training
- Streamlining communications from one source - PVO
-

Decision }
Temperature
Screening
Action }
Contact
Tracing

30 April (Thur)

- Meeting at 3 pm at MOE
- PPE training commenced
- Flu taskforce meeting at 6 pm
- CEM notified of Biz School staff who departed from Mexico / NY and arriving in Singapore on 27 April. Checked and cleared by CDC.
- OSHE granted modification rights to flu website. flucomms@nus.edu.sg set up
- WHO Raised alert to Level 5 and MOH preparing for DORSCON Orange
- Temperature reporting IT application set up.
- Note to incident commander on impending Orange status and on PPE training
- 1st batch of N95 masks arrived.
- Stocktake in preparation for temperatures screening on Monday
- Receive news of student returning from Mexico
- Received news that 993 has been reactivated and relayed message to UICs.
- Trip tracking /declaration started
- Suspension of all official overseas travel & imposed 7 days LOA for those arriving from affected countries; circular issued; temperature taking not mandatory
- Attended MOE's meeting – message: be prepared, but don't overreact.
- Temperature taking not compulsory; but use this opportunity to test the system
- Alert raised to Orange at 6 pm

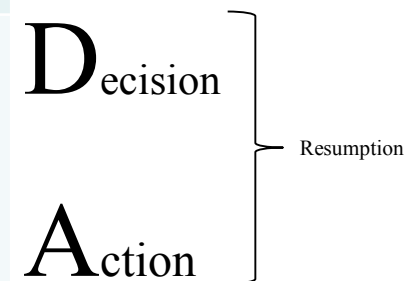
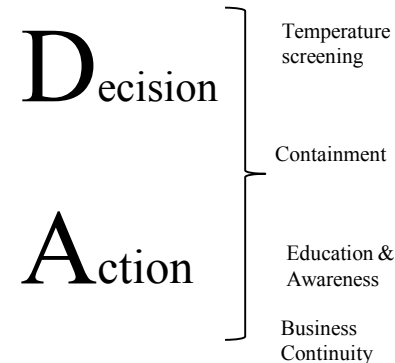
Decision }
Case
management
Action }
Containment
Travel
Advisory

Sequence of Events

May		
1 May 09 (Fri)	<ul style="list-style-type: none"> MOE requires tracking of students returning from affected countries Medical and nursing students banned from hospital BCP for exams raised for discussion Received MOE's directives: <ol style="list-style-type: none"> To begin daily temperature taking from Monday 4 May 09. Temperature screening of visitors starting Monday. MOH will issue Home Quarantine Orders to those returning from Mexico. All institutions to know who these are (i.e. staff and students), and to show care and concern (e.g. call up ask how they are etc.) Those returning from affected areas* other than Mexico will not receive HQO from MOH. However, all institutions to implement Leave of Absence for them to stay at home for 7 days. Cancel trips to Mexico, and discourage visitors from Mexico because of mandatory HQO Set aside rooms etc for quarantine situation To update MOE on list of people on LOA and currently overseas. Decision taken to mass SMS students informing them about temperature screening before entering exam hall on Monday. Ask them to come 1 hour before start of exam. PGPR R2 identified as quarantine facility 	<div> <div>Decision</div> <div>Action</div> <div> Case management Containment Travel Advisory Business Continuity </div> </div>
2 May (Sat)	<ul style="list-style-type: none"> Meeting with Provost and Senior management at 10 am Quarantine arrangements were made – R2 of PGPR was identified as the quarantine site Preparation of temperature taking for exams on Monday underway Circulars were prepared MOE requires daily reporting of staff and students returning from affected countries PPE Training for front line staff carried by Occupational Health Clinic doctor and nurse 	<div> <div>Decision</div> <div>Action</div> <div> Temperature screening Containment Education & Awareness Business Continuity </div> </div>
3 May (Sun)	<ul style="list-style-type: none"> PPE Training for front line staff carried by Occupational Health Clinic doctor and nurse 	

Sequence of Events

	<ul style="list-style-type: none"> • May
<ul style="list-style-type: none"> • 4 May (Mon) 	<ul style="list-style-type: none"> • MOE requires institutional-wide temperature taking of students and staff and updating MOE on a daily basis. This includes staff and students sent to CDC. MOE also requires temperature screening of visitors • All trips to Mexico are to be cancelled. Trips to other affected countries are strongly discouraged. All other overseas trips have to be reviewed. Approval for all overseas trips to be obtained from the Provost. • If possible all mass gatherings are to be postponed. Special approval from President needed if such gatherings could not be postponed. • Temperature screening at exam venues carried out smoothly. However, received reports of shortage of thermometer sleeves and alleged unhygienic practices of swapping the thermometers with alcohol.
<ul style="list-style-type: none"> • 6 May (Wed) 	<ul style="list-style-type: none"> • Discussion on lifting of travel ban to non-affected countries • Instruction from MOE: Suspension of temperature screening for visitors with effect from 7 May 09. However, all visitors details should be recorded for contact tracing purposes should the need arise. <p>MOH indicates that DORSCON alert to be lowered from Orange to Yellow on Monday</p>



Sequence of Events

May	
7 May	<p><u>Lifting of LOA</u></p> <ol style="list-style-type: none"> 1. All LOAs are to be lifted tomorrow 8 May 09. 2. No new LOAs are to be served to those returning from affected areas (excluding Mexico) or those who have been in close contact with suspect/probable/confirmed cases. However, they are to take temperature at least once a day for the next 7 days. The IHLs are to keep a record of the daily temperatures taken. If unwell, febrile and/or cough they are to seek to call 993. 3. Staff and students who are currently serving their LOAs should return back to work or to classes. However, they are also required to take temperature at least once a day for the balance of the 7 days. The IHLs are to keep a record of the daily temperatures taken. If unwell, febrile and/or cough they are to call 993. <p><u>Mass Gatherings</u></p> <ol style="list-style-type: none"> 4. The advisory for mass gathering is to be lifted tomorrow 8 May 09. The IHLs need not record the particulars of visitors, beyond what is required for security clearance or attendance taking. However, it remains prudent for the IHLs to review all mass gatherings. <p><u>Temperature Taking Exercise</u></p> <ol style="list-style-type: none"> 5. All IHLs are required to conduct institution-wide temperature taking exercises on 12 May 09, and tentatively on 18 May 09. During the temperature taking exercises, the IHLs are follow existing SOPs including data recording and the submission of situation reports to MOE.
8 May	<p>MOE no longer requires for the coming weekend.</p> <p>MOE however required temperature screening exercise on 12 May. Exercise on 18 May is subject to confirmation.</p>
14 May	MOE confirms temperature taking exercise on 18 May.
20 May	MOE confirms temperature taking exercise on 25 May.
21 May	CEM informed of Biz School Freshman Orientation Camp. Advised them to conduct daily temperature taking. Summer program to Mexico reactivated.
22 May	Meeting at MOE

Resumption

Sequence of Events



	May
27 May	Singapore's 1st H1N1 case confirmed!
29 May	MOE confirms temperature taking exercise on 2 June.
2 June	Contact tracing conducted for NUS staff in the same flight as confirmed cases
4 June	MOE confirms temperature taking exercise on 8 Jun
6 June	Contact tracing conducted for student (Biz) on same flight as confirmed cases
19 June	A group students tested positive and quarantined
25 June	Another group of students tested positive SDE cluster from orientation camp
28 June	<p><u>New Trigger Temperature</u></p> <p>1. In view of recent research findings on the H1N1 virus, MOH has advised that 37.6°C is the trigger temperature for Influenza A (H1N1). SOPs revised to reflect this new trigger temperature. The revised trigger temperature with effect from Monday 29 June.</p> <p><u>Exchange Students and Staff</u></p> <p>2. Exchange students and staff will be subject to prevailing H1N1 SOPs as per IHL's own students and staff. This means that the current 7-Day LOA is applicable to all exchange students and staff.</p> <p><u>Short-Term Visitors</u></p> <p>3. Short-term visitors to IHLs will not be subject to current LOA procedures. However, the IHLs are to take extra precautionary measures for hosting these visitors. Should there be a confirmed case among the participants of the visits, the IHLs should cancel/postpone the affected programme and isolate affected visitors, students and staff, and send them for medical attention if necessary.</p>
29 June	Cluster at Sports camp
30 June	Discussion on whether temp screening needed for commencement

Control Measures reinstated!

Sequence of Events

April	
1 July	Confirmed cases – pharmacy student intern at a retail pharmacy outlet Cluster at Pharmacy Orientation Camp
2 July	<u>Temperature Taking</u> 1. To implement twice daily temperature taking for all staff and students with effect from 03 July. This applies to weekends, holidays and vacation time as long as there are staff and students who are in the campus for study, work or organised activities. <u>Mitigation Measures</u> 2. In addition to the existing mitigation measures universities are advised to develop and put in place segregation and social distancing measures that would minimise unnecessary mingling among staff and students such as physical zoning or time zoning.

Sequence of Events

April	
24 July	<p><u>Leave of Absence (LOA)</u></p> <ol style="list-style-type: none">1. To stop the issuance of LOA to close contacts of confirmed cases with effect from Monday 27 July. All existing LOA issued will cease on Monday 27 July. Staff and students who are currently serving LOA should therefore return to work and classes on Monday 27 July, provided that they are well.2. Hence, there is no need to conduct contact tracing of close contacts of confirmed cases. <p><u>Temperature Taking</u></p> <ol style="list-style-type: none">3. With effect from Monday 27 July, IHLs are to step down on temperature taking from twice a day to once a day. This applies to all staff and students as long as they are in the campus for work and studies/activities.4. With effect from Monday 03 August, temperature taking will be carried out only on the first and last working day of the week, e.g. on Monday and Friday. <p><u>Social Distancing Measures</u></p> <ol style="list-style-type: none">5. IHLs are advised to step down on the segregation and social distancing measures that may have been put in place in the previous weeks. <p><u>Prevention of H1N1 Cluster</u></p> <ol style="list-style-type: none">6. To monitor the number of students and staff on MC due to ILI (Influenza Like Illnesses). Should there be a high number of staff or students on ILI MCs who have been congregating together in a class or an activity group, the IHLs are to close that particular class or activity group for a week. The recommended trigger for such closure is 5 cases of ILI MCs or 3 confirmed cases within a 5-day period.

Recovery Phase

Lessons learnt

- 1. Uncertainty in dealing with the unknown “enemy”**
- 2. Worst case situation is not Alert Red or Black**
 - Worst case situation is when others are operating normally while the institution is expected to implement relevant control measures
- 3. Instructions from Ministry**
 - Time lag in instructions from Ministry of Health → Ministry of Education → Universities
 - Not always relevant to universities because of the open nature and porous boundaries
- 4. Clear communication is key in effective crisis management**

Lessons learnt (cont'd)

5. Training and assurance to staff on crisis duties

- Policies on insurance coverage of staff on crisis duties
- Use of PPEs

6. Adequate logistic support

- Staff manning temperature screening stations
- Cleaning and disinfection
- Isolation procedures
- PPEs

Thank you

