INTEGRATED CONTINGENCY PLAN
PUBLIC HEALTH RESPONSE
Development of POE CORE CAPABILITY (IHR2005)
MACAO AND PEARL DELTA RIVER REGION
Key points:

- Points of Entry in Macau
- Introduction of Macao > China
- IHR Core capacity requirements At All Times (Time frame, process): PoE in Macau_ Airport/Ports and Ground-Crossings

Sanitary Surveillance Program in Airport :
- Identification of Risk Factors
- Hazards Analysis (HACCP)
- Water surveillance program (WSP)
- Entomologic / reservoirs Surveillance and Control
- Waste Control and surveillance (Safety Plan)

  - Construct information system for port health,
  - Raise the disease surveillance capability at PoEs

- RISK COMMUNICATION/COOPERATION with neighbouring Pearl River Region ( Hong Kong, Zhuhai, Shenzen , Xiamen)
MACAO a former portuguese territory in South China, became a Special Administrative Region of the People’s Republic of China on 20 December 1999.

Having gone through the process of a demographic and epidemiological transition, the population of Macao enjoys a fairly low mortality rate (in 2011: 3.4‰) and a long life expectancy at birth. They also enjoy a high standard of health, as reflected in the general decline in the incidence of communicable diseases and the increase in life expectancy (84 years), as well as the improvement in health indices.

2011 (Gross domestic Product) expanded by 20.7% and Per-capita GDP amounted to USD $66,311. GDP in Principal driving forces of the economic expansion are exports of gaming services surged by 34.6%.

Population on 31/12/12: ~557400 inhabitants (>2% 2007)
Visitors: ~28 millions
Points of entry in Macau, SAR

- 1 Airport
- 4 Harbors/seaports
- 3 Ground crossings
Macau is a tourist destination, with 7 PoE and an international airport constituting one of its most important gateways to huge flows of arriving and departing passengers from various countries and regions with direct flight linkage to Macau from China, Taiwan and Asian cities of Indonesia, Thailand, Vietnam...

In spite of its being a travel destination, Macau is a densely populated community (20,000 person/km², 3 times more that of Hong Kong’s 6000 person/km² and Macao City around 60,000 person/Km²), plus a huge flow of migrant population.

The risks of the introduction of the disease to Macau from other affected regions are relatively high.
MACAO Population/Visitors:

- Visitors Arrivals: 28 million in 2011 (surpass 30 million in 2007)
  - Chinese Mainland (17.5 Million), Hong Kong And Taiwan &
  - International Visitors: Mainly From Asia-Arrivals From Thailand, Singapore, Philippines, South Korea, Malaysia Japan, And Australia, Vietnam, Indonesia... And From Eur Us, Can/Afr Through Hk...
PoE: Macau
Flights to/from Macau ?...

- Air Macau (Beijing, Chengdu, Guilin, Haikou, Kaohsiung, Kunming, Manila, Nanjing, Seoul Incheon, Shanghai Pudong, Shenzhen, Singapore, Taipei, Xiame...)
- China Eastern Airlines (Kunming, Xian)
- East Asia Airlines (Hong Kong, Shenzhen)
- EVA Air (Kaohsiung, Taipei)
- Shandong Airlines (Qingdao)
- Shanghai Airlines (Shanghai, Pudong)
- Silk Air (Singapore)
- Singapore Airlines Cargo (Singapore)
- Transasia Airways (Kaohsiung, Taipei)
- Xiamen Airlines (Fuzhou, Hangzhou, Xiamen)
- Air Asia (Bangkok, Kuala Lumpur..)
- Air Koryo (Bangkok, Pyongyang) ...
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- Cooperation with neighbouring Pearl River Region (Hong Kong, Zhuhai, Shenzen, Xiamen)
PHE Program in MIA

- **Legal Measures**
  (Airport and borders-Health Authority_DL 1998 , Macau Communicable Diseases Regulation_Law 2004, IHR (2008)), Port Health Committee Atributions by law, Contingency Plan for Ports and Airport (intersectoral)

- **Core capacity** on surveillance determining measures to assure protection, prevention and security against communicable diseases (Health Bureau communication: multi-sector/ interdisciplinary program, Fire Fight corporation in Airport, ADA, airlines, airlines operators, other intervenient)

- **Capacity requirements at all times** (ensure save environment, water, catering facilities, wash rooms, disposal services response in transport for Public Health Emergencies (PHE) & ensure trained health professionals for inspection and assessment of conveyances, for vector control, water quality control, auditing HACCP in catering)

- Preparedness and alertness to a **pandemic situation**

  MIA Integrated Contingency plan in Macau, Health & Sanitary Surveillance program at all times.

- Epidemiologic investigation on occurrences of outbreak, epidemic/pandemic situation & mandatory isolation or quarantine.
Environmental Surveillance
Airport & Aircraft in MIA

• Criteria and inspection protocols on:

  - WSP: (Drinking Water & Ice)
  - HACCP: Food Catering & Servicing*
  - Environmental: Pest control/Waste Conveyances & facilities
  - Macau Regulation

Preventing Emergencies by Spreading of Communicable Diseases
The surveillance cycle

- Collection of data
- Action to control & prevention
- Consolidation & interpretation
- Dissemination
- Prevention
- Control
- Monitoring & Surveillance
- Cycle on Environmental Factors

- AIR
- FOOD
- WATER
- WASTE
- PEST

Response
SANITARY SURVEILLANCE PLAN
AirPort/ Ports/Ground Crossing

Control of Risks: Hazard Analysis and CCP (HACCP)
- microbiological, Chemical & physical hazards/

Control/Safety of Environmental Factors (WQC-WSP/PSR/PSER)

Sanitation practices

Environmental Factors (by Analysis of source/ risky areas /Premises/Systems
- questionnaire/audit/ surveys laboratory tests/ inspections/ monitoring)

Periodic External Surveillance/
Auditing Internal Control

- Food (HACCP)
  - Source: Ingredients
  - Storage/distribution
  - Production
  - Service...

- Water (WQC-WSP)
  - Source in airport
  - Distribution
  - Service...

- Solid Waste, Residual water (PSR)
  - Collection/Storage
  - Treatment
  - Discharge

- Other controlled areas (PSER)
  - Control of Rats
  - Entomologic Monitoring (Aedes)

Medical services/Outros
- Equipment & Resources for rapid responses (Disaster and PHResponse)
  - Basic needs
SANITARY CERTIFICATION/ OBJECTIVES:

• **Annual audit:** food (HACCP) and water safety (WSP) control is ensured. *Staff TRAINING* to take action in emergency’s situation.

1. **FOOD AND DRINKING-WATER safety plans** on premises or in-board must be safe along the critical points of food circuit in such a manner to ensure their protection against contamination.

2. **PEST CONTROL** for preventing rodents proliferation and for the importation of malaria and other diseases of epidemiological significance in international traffic is a program maintained by a private company and submitted to the surveillance of health authority.

3. Surveillance of the *system to provide the removal of WASTE water*, condemned food, refuse and other matter dangerous to health in airport.

4. Periodic **INSPECTION of equipment, installations and premises** and the assurance of adequate facilities provided with medical equipment ready to be used;

5. **Core capacity requirements:** *PH emergencies.*
Surveillance Program in PoE

- **Vector and reservoir control PLAN**

Integrated vector control program in place, including special arrangements or agreement/contract covering the following areas:

- Passenger terminals
- Cargo and containers terminals
- Infrastructure and courtyards
- Service providers facilities at terminal and for conveyance ground support operation
- Surrounding areas of Point of entry (minimum 400 meters)

**Monitoring of vectors in the points of entry facility and in the surrounding area of at least 400 meters from terminal**

- Monitoring is maintained updated in place: vectors and reservoirs are detected, identified, tested for pathogen and controlled. Results of the latest audit of services and facilities are available and accessible.
Pest Surveillance/ Identification/ Evaluation

RODENTS&MOSQUITO: *Aedes* Dengue Vector

- Ovitrap surveillance
- Household larva surveillance
  - Breteaux index
  - Container index
  - House index
- Adult mosquito surveillance

Measuring the trapped rodents (strains differentiation)

Pest surveillance on ports is brought into practice

Fabricate the flies cage

Checking the mosquito ovum
Surveillance Program

Water (WSP)

A documented, tested and updated water safety program, conducted or under supervision of health authority, records and testing results are documented, including:

- **1.1.1 Treatment**: Adequate treatment to control public health risks.
- **1.1.2 Source**: Potable water source, under surveillance and supervision, approved by the relevant health authority and quality considered satisfactory under standards.
- **1.1.3 Water quality monitoring programme**: Water quality is regularly monitored: potential public health risks from water supply are detected, assessed and recommended control measures are implemented, results of testing and inspection covering:
  - Public distribution within **Point of entry boundary**
  - Passenger terminals, Cargo and containers terminals
  - Infrastructure and courtyards, Transport and water service providers for conveyances and Water supply services for food production
In-flight Water Control

• Water samples for bacteriological examination from airport water supply systems, servicing vehicles and aircraft water systems were collected under health authority responsibility and monitored at a monthly periodicity.

• We collected 92 samples from 24 aircrafts, 12 from water supply station (A14) and 12 from water-tank vehicles supplying aircrafts. Microbiological examination reveal the detection of TBC but systematically negative presence of pathogenic bacteria in water (according the International guideline standards –WHO Guides & Macau Law).

<table>
<thead>
<tr>
<th>Year</th>
<th>TBC-Under Standard</th>
<th>TBC-Over Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>43.2%</td>
<td>56.9%</td>
</tr>
<tr>
<td>2007</td>
<td>10.8%</td>
<td>89.3%</td>
</tr>
<tr>
<td>2008</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>2009</td>
<td>8.3%</td>
<td>91.7%</td>
</tr>
<tr>
<td>2010</td>
<td>32.8%</td>
<td>67.3%</td>
</tr>
<tr>
<td>2011</td>
<td>30.5%</td>
<td>69.5%</td>
</tr>
</tbody>
</table>

TBC + Coliform faecalis, E.Coli, Streptococcus faecalis
Water Quality Surveillance 2010

Monitoring all airline Co.:

- **Total Plate Count of Bacteria (TPC)** \(35-37^0\text{C}\) 2 days
- E. Coli
- Total coliform
- Faecal Streptococcus
- *Pseudomona aeruginosa* for investigation
- and other parameters for tap water control quality

At this survey 2010:

- 32.8% of samples in 92 were out-standard for TBC,
- These samples contained thermophile Bacteria (TBC at 35 degrees, two days),
- 22 (30.1%) contained *Pseudomona aeruginosa* (Random sample study)
- Pathogen Negative
Water Quality Surveillance

- Tap water source
  (from Public Water-A14 sub-station)
- Menzies’ water servicing
- Aircraft supplying hoses
- In-flight tap water at arrival/After Supply)
  (drinking water from cold/hot tap & water from lavatory faucets).

Potable Water Distribution in an aircraft: Airbus

The periodic rotation of water and disinfection at aircraft water piping system (H2O full discharge) in aircraft.
LPGV water supply system

Check the water stand indicator (outdoor)

Green: suitable for filling

Red:
1) Not enough chlorine in water, need to add salt or citrus acid
2) The chorine pump switch may shut down automatically

Some defined CCP (WSP)

WATER TANK REFILLING

• Prepare disposable sterilized towel
• Drain the water at least 1 minute from the water stand.
• Disinfect the connector both the water hose and the water truck
Analysing the Situation:

Water surveillance program (laboratory Tests) to proportionate response measures:

• Water supplying circuit: Define targeted CCP;
• Pattern of contamination: TBC/ Coliforms / *Escherichia Coli* / other pathogens
• Susceptible hypothesis: ways of contamination
• Risk evaluation: vulnerable passengers to infection
• Corrective Measures: MIA water source/tanks/aircraft
• Social Impact: Assurance of water quality in Macau
Surveillance Program

Food Safety

Food safety of meals and food ingredients from eating establishment in Ports/airports: Prevention of potential public health risks from food are monitored and under surveillance and recommended control measures are implemented, maintenance of records and testing results are documented- HACCP.

Food safety of meals and food ingredients from food suppliers/production stores approved by competent authority

Self-monitoring and Surveillance of catering facilities, conveyances- Provenance flights, and regularly Control by Lab Analysis (6 samples/month). We
HACCP: FOOD SAFETY: RISK Assessment
ISO & HACCP CERTIFICATION

FLIGHT CATERING
Air Conditioning System

- Entire cabin air volume exchanged in 3 minutes
- Airflow is delivered in downward direction from top of the cabin ceiling to floor level only
- There is no longitudinal air movement
Hazard Analysis
Corrective Measures

Aircraft/
Conveyances/Facilities

Vehicle

Source
CERTIFICATE OF SANITARY CONTROL
(Ships√/ Aircrafts?/Airports√)

• INSPECTED AREAS,
  [SYSTEMS & SERVICES]
  (Structures/
  • Air / hygiene/ Pest Control/
  • In-flight water and food)

• Structures to support aviation
  ✓ Airport Building
  ✓ Restauration
    - Central Kitchen
    - Storage areas
    - Other premises
  ✓ Cargo area
  ✓ Zona aeroportuária
    (Aedes/ rats /flies...)
  ✓ Support areas
  ✓ Medical premises
  ✓ Other

✓ Aircraft
  ✓ Cabin-Air Ventilation
  ✓ Aircraft declaration
  Suspected cases:
    ✓ Crew
    ✓ Passangers
  ✓ Drinking water
  ✓ In-flight meals
  ✓ Wastes
  ✓ Water vehicle tanks

SURVEILLANCE/
PERIODIC EVALUATION/ALERTNESS
RESPONSE TO CRITICAL EMERGENCIES:

a) Infection or contamination proof, including:
   – Vectors;
   – Reservoirs; rodents (rats)
   – Other disease vehicle,
   – Microbiologic, chemical risk for human health;
   – Suspection of contacts/cases of expected diseases/ or emergent diseases

b) Inadequate sanitary and hygiene measures. Information of epidemics from provenance flight
   or environment risks of contamination (related to temperature/ventilation, vectors/ rats/ Waste Safety
   Control....)

c) Water / food contamination (laboratory samples results).

d) Food Ingredients: Meals-Drinking Water, Ice...
Prevent _ Air/Waste contamination Environment Health Protection

1. Biohazard care

2. Self protection

3. Avoid Cross Contamination

4. Different bags for each purposing
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  - Construct information system for port health,
  - Raise the disease surveillance capability at PoEs
    - Rapid detection of PH Risks
    - Assessment of PH Risks
    - Risk Communication (Assessment>notification>Response>Report)

- RISK COMMUNICATION/COOPERATION with neighbouring Pearl River Region (Hong Kong, Zhuhai, Shenzhen, Xiamen)
PoE Contingency Plan for Health Emergency Response: Integrated Prevention, Surveillance & Response

Capacity requirements for responding to PHE

- Provide PH assessment & care for affected traveller and animals, goods by establishing arrangements with medical services and veterinary facilities for isolation, treatment & other services
- To apply entry/exit control for departing & arriving passengers
- To apply recommended measures, disinsect, disinfect, decontaminate, cargo, containers, conveyances, goods
- Provide access to PPE: required equipment, personnel with protection gear for transfer of travellers with infection/contamination
- Provide for assessment, quarantine of suspect or affected persons
- Provide appropriate space for travellers: contacts, suspect or affected persons

At all Times

Communication by Coordinated Response at PoE: identified key persons for contact points-PH & other agencies

Environment Surveillance Plan: Potential Risk areas

Source: WHO, CAPSCA Meeting
LESSONS LEARNT
Risk of Spread of CD by Air Travel

- In Macau the PHEP is implemented focused on Alertness and preparedness
- In past for SARS cases importation and
- Risk of Avian Flu transmission
- and Pandemic Preparedness Plan for Flu A (H1N1) .... Now Coronavirus???
- passengers and/or crew embarking on an international voyage from a place with occurrence of human infection/cluster of cases>
- Potential SEVERITY > RISK ASSESSMENT???
Pandemic preparedness

- Disease Surveillance—in human & animals
- Stockpiling and logistics

Core Capacities at all times:
- Emergency responses
  - Public health
  - Community
- Public communication
- Coordination and command

- Influenza surveillance strengthened
- Medical Response equipment training
- WSP/HACCP/Food CQ

- Case management guidelines revised
- Training & supervision underway
- Isolation / health workers visit

- Master operation plan prepared
- Pandemic preparedness plan integrated: ports/airport and ground crossing preparedness plan
- To exercise on PPP
Pandemic Influenza Phases

- **Phases 1-3**: Predominantly animal infections; few human infections
- **Phase 4**: Sustained human to human transmission
- **Phases 5-6 / Pandemic**: Widespread human infection
- **Post Peak**: Possibility of recurrent events
- **Post Pandemic**: Disease activity at seasonal levels
Epidemic Curve
SARS Outbreak in 2003 (HK)

Date of onset of Severe Acute Respiratory Syndrome Cases

Peak of Amoy Gardens Cluster

Cumulative no. of cases = 1,755
No. of discharged = 1,451
No. of deaths due to SARS = 299

Source: HK Port Health office
Epidemiology – Epidemic Curves

Human Avian Influenza A/H5N1 Cases by Onset Date and Country (8 March 2006)

- As of 8 March 2006, total of 175 cases were reported officially to WHO.
- The 2 cases with asymptomatic in Viet Nam were not included.
- The 12 cases in Turkey & 2 case in Iraq were not included.
General Elements of Contingency Plan During Pandemic’s

- Surveillance > PREVENTIVE MEASURES
- Response & Impact Mitigation
- PROTECTIVE MEASURES: Vaccination?? IF...
Influenza A HA and NA Subtypes

H1
H2
H3
H4
H5
H6
H7
H8
H9
H10
H11
H12
H13
H14
H15
H16

N1
N2
N3
N4
N5
N6
N7
N8
N9

Other Animals
Other Animals
Other Animals
Other Animals
Other Animals
Other Animals
Other Animals
Other Animals
Other Animals

Forecasting a Pandemic RESPONSE:

- Surveillance
- Early detection of cases and alertness of cases
- Isolation and infection control
- Contact tracing
- Resource mobilization
- Guiding and Training
- International and Regional Collaboration
- Dealing with Media
CASE RISK ASSESSMENT

Risk of Flu transmission in Aircraft

Management of Flights with Suspected Flu Cases

• **Before the flight arrives,**
  - acquire essential information from pilot
  - provide medical advice to pilot

• **When flight arrives,**
  - designated parking space
  - refer case(s) to designated hospitals
  - designated space for handling contacts
  - aircraft disinfection (after handling all cases)
Facing a pandemic
(Phase 4-5>6 …)
PHE Response in
MIA: Preparedness
EXERCISE (MAY 2009)
HEALTH PROTECTIVE MEASURES
(Integrated in pandemic Plan in Macau)

Vaccination Strategies

ALLWAYS
Health education

• Single-use overalls
• Protective glasses?
• Ffp3-masks...
• Industrial latex gloves?

We concentrate on education about disinfection and other measures... going on television, holding seminars, distributing cassettes and even going to... schools.
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- COORDINATION/COOPERATION, INTEGRATIVE PLAN
  - Macao RISK COMMUNICATION (ALL AVIATION/Maritime/PoE SECTOR PLAYERS/AGENTs/Authorities)
  - WITH NEIGHBOURING PEARL RIVER REGION (HONG KONG, ZHUHAI, SHENZEN, XIAMEN...)
Fig. 1 – Procedural flowchart of public health emergency at MIA

**Airport Information System on PHER**

Assessment and analysis of information

- No
  - No need to respond
- Yes
  - Risk

Categorizing risk

- Risk category I
  - Sanitary authority initiating action
    - Action Program I
      - Response conclusion: Review, report, news release, risk communication
- Risk category II
  - Sanitary authority initiating action
    - Action Program II
- Risk category III
  - Sanitary authority initiating action
    - Action Program III
Fig. 2 – Public health emergency response structure at MIA

The Chief Executive

PoE Health Committee (Port/Borders Health)

Airport Working Group (Emergency Operation Center)

Health Bureau - C. Bombeir - Policia SP - CAA

C. Hospitalar

Subsistema de cuidados de saúde generalizados Sub-

Public Health Laboratory

CDC / Sanitary Authority

Vector-control unit/agency

Custom

Government Information Bureau (on invitation)

Airline company

Control Tower

Airport management company

Airport security company

SEMAC
Fig. 3 – Action initiation process

- Report from en-route aircraft
  - Control tower or Airline Company

- Notify from port health authority of city with aviation link to Macau

- WHO notification
  - Information from Health Information System

- Health Quarantine Department

- Risk? (No)
  - No need to response

- Risk? (Yes)
  - Inform control tower to set up EOC; Initiate Infectious Disease Emergency Action at MIA
Coordination mechanism on health quarantine

WHO
Department of Health, HKSAR
Health Bureau, Macao SAR
Custom
Immigration
MSA
MOH
CDC
CHINA Shenzen Zhouhai

......
Responsibility
Airport/Harbors/Land frontier Management

Intersectoral actions
Environment Responsibilities
Formal education
Harmonization

Responsibility
Continuity
Health education
Behavioral change
Compromise

Operation Staff
Active training

Airport/Harbors/Land frontier Management
PHEP In AVIATION ASPECTS...
Preventing the Spread of Communicable Diseases
SUSTAINIBILITY?CONTINUITY PLAN

THANK YOU
Obrigada
Gracias
Tuo Tché

2012 Macau

Organized by Health Bureau _ Macao Centre for Control and Prevention of Disease