EXPERT MEDICAL GROUP of COMNAP

WORKSHOP

Planning for Infectious Disease in Antarctica

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Background.

The threatened influenza pandemic over the last two years and particularly in the later months of 2009 has highlighted the difficulties, both medical and managerial, of managing an unusual disease outbreak in the Antarctic. While the severity of this wave of the pandemic was less severe than anticipated by the World Health Organization (WHO), the virus is still prevalent in some areas and the risk of genetic mutation affecting the virulence or transmissibility of the virus remains a significant concern. Further waves of pandemic have not been ruled out and indeed it is increasing in incidence again in New Zealand at time of writing (August 2010).
The possibilities of other infectious diseases causing outbreaks in the Antarctic must not be forgotten. Antarctic bases and ships are closed communities which provide ideal conditions for disease spread. Although there are no endemic infectious diseases in the continent, with increasing air travel it is more likely that someone who has an infectious condition could travel during the incubation phase before symptoms became apparent
There is also some evidence of immunosuppression in Antarctic winters in particular. The relief period after winter is particularly hazardous.
COMNAP has tasked the medical group, through this workshop is to try to provide generic advice for all conditions rather than any single specific infection.
Difficulties arise from:

- Prediction and identification of outbreaks.
- Individual severity of disease and complications.
- Risk of infection to others.
    - Spread into the Antarctic (intercontinental)
    - Spread between individuals
    - Spread between bases (intracontinental)
- Large numbers of people sick simultaneously
    - Maintaining business continuity
    - Providing nursing and medical care with limited personnel
    - Specific medications
    - Shortage of medical equipment
- Medical facilities overwhelmed
    - Need for specific prophylaxis and treatment
    - Doctor becomes a victim
    - Providing nursing care for colleagues
    - Intensive care
    - Aeromedevac of infective patients
- Personnel welfare considerations
- Communication with other programs.

Christian Otto gave a presentation on the influenza outbreak at Scott Amundsen Station at South Pole in 2004/5 season, when he was the base medical officer. This highlighted many of the problems and the significant impact of an outbreak despite this particular outbreak being of relatively low virulence, and with a low strike rate.

The workshop then considered various aspects of infectious disease management and reached the following conclusions and recommendations.

Outbreak identification, notification and alerting.

Good communication will be essential in reducing the spread of infectious disease. Other stations need to be aware, and any possible early warning system should be instituted. Therefore it is recommended that:

- Field Medical staff need to have mechanisms to alert other stations that an infectious disease outbreak has occurred. This should be done through the usual chain of command.
    - Base MO to NAP MO
    - Base MO to BC
    - BC to NAP
    - Communication between NAPs and NAP Medical Officers
- A defined list of reportable diseases and mechanism of reporting should be agreed by COMNAP.
- Shared information should include
    - Suspected disease
    - Level of confirmation of diagnosis
    - number of cases
    - transmissibility
    - severity.
    - actions taken
    - actions requested of others

The medical expert group should be tasked to produce this documentation.

- Station Doctors should with consent of NAP MO, immediately contact colleagues on other Stations within their region that such an outbreak has occurred. This is particularly important in areas of higher population density e.g. King George Island.
- NAPs require a mechanism to spread the information to other nations, through the network of medical providers and programmed managers. An alert centre within COMNAP using the website to post outbreaks and monitor the situation should be considered.
- NAPs need to consider if they need to inform their own national Centre for disease control.

Vaccination.

Vaccines are not available for all infectious diseases. However where these are available guidance on use is available from National Health Services and the WHO. Essentially vaccines fall into two broad groups, those which are used to provide long term immunity, and usually administered in childhood, (e.g. Polio) and those which are specific for an identified strain of a particular disease prevalent at a particular time (e.g. seasonal influenza).

For the Antarctic:

- It is strongly recommended that every expeditioner and programme ships crews are vaccinated in accordance with national health policy. National programmes should consider the special situation in Antarctica and expand the availability of vaccines such as:
    - Diphtheria/Tetanus/Pertussis
    - Polio
    - Meningococcal Meningitis Types A and C (possibly other types)
    - Hepatitis A and B for selected workers

    - Seasonal Influenza in accordance with national recommended policy. The special circumstances of life on an Antarctic base are recognized by several government health departments as high risk.
- A special vaccination programme may need to be established for high risk groups such as post wintering staff or field staff at the time of an outbreak, either a pandemic or a local outbreak in the Antarctic.
- National Programmes need to have sources in place to acquire the type and volume of vaccines. This can often be difficult, particularly acquiring seasonal influenza vaccine for the Southern Hemisphere in the North. Therefore it is suggested that COMNAP approaches the Australian Dept Health vaccination programme in an attempt to agree a Memorandum of Understanding to source a supply of southern hemisphere seasonal influenza vaccine for COMNAP members.

Containment: The prevention of spread from the rest of the world to the Antarctic.

The geography and nature of the Antarctic is beneficial in that there is probably minimal risk from a global pandemic during the Antarctic winter. During summer it is probably impossible to completely prevent the introduction of a pandemic infection without total disruption of all activity (bases remaining closed in summer).
Nevertheless it is possible to limit the risks to some extent and National Programmes should consider:

- Extending ship passage time from leaving a port where infection is prevalent so that the vessel remains at sea during the incubation period of the disease. There would then be clear knowledge as to whether anyone on board is infected.
- Where an infected person is known to be on a ship or aircraft then they should be isolated on arrival on station.
- Personnel must be encouraged to report symptoms to the MO at an early stage.
- Stations must be prepared to instigate a high level of infection prevention, have the necessary equipment and supplies and be trained in appropriate usage.
- Stations must have plans in place to provide isolation facilities so that the spread of infection is minimized.
- In the event of an incident National Programme managers will need to react quickly to reduce spread. This needs to be coordinated by a high level crisis group as it will impact on ship, aircraft and people movements, and on business continuity on base.
- In the event of an epidemic in Antarctica, this may need to be escalated internationally. There is a role for a COMNAP coordinated crisis management group to coordinate a response to a whole continent pandemic.

Isolation and Infection Control on base and within the Antarctic Continent

The key factor in preventing spread and reducing the numbers of infected people is adequate infection control. This does not necessarily need to be complicated, simple hand hygiene is of extreme importance. This falls into two areas:

i. **Stopping the spread of infectious disease within an Antarctic base:**

- With a single patient, isolate in single bed space if available.
- With more than one patient consider designating an area of the base as isolation sick ward. Corral, control entry and exit from the area, and barrier nurse.
- Adopt proven recommendations for control of infectious outbreaks
    - Stock adequate anti-viral and other infectious disease medication to cover ALL base personnel. Offer appropriate prophylaxis.
    - Educate base personnel about onsite responsibilities in the event of an infectious disease outbreak particularly hand washing and control of fomite spread.
    - Educate people on contact precautions during an infectious disease outbreak.
    - Provide handwash and alcohol gel stations
    - Provide bags and bins with lids and disposal methods for infective material.
- Long term nursing duties have to be shared. Pre education in barrier nursing techniques is valuable.
- National Programmes to consider "point of care" testing for various infectious diseases such as influenza / norovirus.
- National Programmes should provide flu vaccination to base personnel prior to deployment
- Incorporate infectious disease training module for all base medical officers
- List of infectious disease specific equipment to be prepared by medical expert group.

ii. **Stopping the spread of infectious disease between Antarctic bases:**

- Education & free flow of information is critical in descending order:
    - National Health Organizations
    - National Antarctic Programs Medical Directors
    - Antarctic Base Leaders & Medical Officers
    - Base Personnel
- Keep information non-sensationalized. Try to control individual communication where possible. Education demystifies rumour
- Geographical situation of Antarctic bases helps to prevent outbreaks, however, once an infectious agent arrives it exacerbates an outbreak.
- Develop an Infectious Disease Reporting and Alerting system among bases. This has two benefits:
    - Early identification of outbreaks

    - Early warning for non infected bases
- Consider conducting periodic teleconferences between base doctors to allow dissemination of information between bases. This helps to counteract professional isolation of doctors, but should probably be coordinated by the expert group so that National Program Medical Officers are aware of the discussions.
- National Antarctic Programmes to consider impacts of closing an Antarctic base due to an infectious disease outbreak, as this may become necessary to prevent spread.
- Develop mechanisms for coordinating efforts between stations,
    - equipment, medications, supplies
    - There already is a medical facilities database. It needs to be populated by national programs, and available to all COMNAP members
    - Loan of medical officers for support and /or escort of transferred patients
    - Develop medical component of regional networks based around intercontinental hubs:
        - Hobart/Christchurch
        - Cape Town/ Dromland
        - Punta Arenas/Falklands/Ushaia / Peninsula

Impact on Station Management

There is no doubt that an outbreak of infectious disease impacts well beyond the strictly medical component. Managers need to be aware of and consider:

- Pre deployment education of workforce to ensure all aware of the issues and no surprises.
- Station Leaders fully involved with detailed knowledge of the problem at hand.
- Close working relationship between Station leader and Doctor required for efficiency and support.
- Field Operations will need to monitor the situation as the risk and threat levels change.
- Security of supplies as rationing may be an issue.
- Storage of supplies may be a problem re bulk disposable items e.g. gloves, gowns, bins etc.
- Clarity of information as to who gets what and why.
- The impact of long term nursing rotas.
- The impact on normal work rotas and which activities will be cancelled first.
- Support for critical pathways e.g., cooking, power and shelter.
- Re organization of rooms to provide nursing and isolation facilities.
- Awareness of impact of external media.
- Possible need to cut communications temporarily to gain control of accurate dissemination and receipt of information.
- Awareness of impact of internal communications to next of kin.
- Awareness of impact of large scale illness within families back home (possible high mortality rate)
- Awareness of the effects of a world pandemic on people in the Antarctic. (concerns for families and friends)
- Single or multiple deaths on Station …impact, storage, legal requirements.

Medical Evacuation

Routine and emergency medical evacuation by air is nor widely available from several locations on the Antarctic continent. It is recommended that:

- Each programme should be encouraged to establish a management system for medical evacuations on a regional basis, and establish a formal connection to the receiving hospital. It would be advantageous if the same hospital in each evacuation chain could be used by everyone so that the staff there can develop an understanding of the unique problems of Antarctica.
- A standardized medical evacuation form has been developed and should be made available to all National Programmes. It should be used in all medical evacuations to ensure adequacy of information transfer and medical handover.
- There should be a willingness to share staff and equipment to complete an efficient medical evacuation.

In the evacuation of someone who is infective, other considerations are necessary:

- The evacuation crew will need to know the risks they are dealing with.
- In some cases special equipment may be needed on board the aircraft to reduce risks to crew, although this would be unusual.
- The receiving ambulance service and hospital need to be aware of the possible infectious nature of the medevac patient. Direct communication doctor to doctor is the best way of achieving this.

Role of COMNAP

While an outbreak of infectious disease on a single station is largely a matter for the National Programme involved to manage, COMNAP can still have a valuable role in:

- Providing a platform for the dissemination of information to managers and medical network.
- The production of a common frame work to allow the production of national and regional plans that will encourage co operation and support between nations.
- Provide IT support for the building of a disease surveillance and alert system to rapidly identify problems.
- Complete and make available to all National Programmes the partially constructed and populated Medical Facilities Database which indicates supplies and equipment held on each station that may be called on regionally.
- In the event of an Antarctic outbreak or epidemic, the provision of an updated situation report that may be accessed by all nation to assist management of local response.
- Liaison with other groups such as IAATO, NGOs and Private Expeditions to distribute appropriate information and agree actions required to control a widespread epidemic or pandemic.
- Encourage widest possible national participation in the Medical Network as the frontline work fighting such an outbreak will require close working relationships in a fast moving scenario.

In the event of an Antarctic Epidemic with several stations affected, there will be a need for an international response which could be coordinated through COMNAP.

Recommendations

The workshop and expert group members recommend to COMNAP that:

1. This report is made available to all National programmes with encouragement to take necessary steps to be able to manage an infectious disease outbreak.
2. That COMNAP provides a platform for necessary information to allow ready access by all National Antarctic Programmes.
3. That COMNAP completes the work already done on the medical facilities database and ensures that this is available.
4. That COMNAP tasks the medical expert group to:
    a. Provide a list of notifiable diseases
    b. Provide a list of equipment recommended for infection control
    c. Work with COMNAP to create a disease surveillance system
5. That COMNAP considers a framework for international cooperation in the event of an Antarctic epidemic.
6. That COMNAP considers the agreement of an MoU to facilitate influenza vaccine supply for member nations.

The workshop and expert group members recommend to National Programmes that:

1. All NAPs consider the implications of this report and undertake appropriate planning for the events discussed.
2. That infectious disease education is undertaken for all medical officers, and healthcare staff
3. That all other staff are made aware of infection control procedures.
4. That medical equipment requirements are reviewed with infectious disease in mind.
5. That a vaccination policy is prepared.
6. That consideration is given to how best to work together in the event of an infectious disease outbreak.