COVID-19

Outbreak response and investigation in Health Care Facilities

Kerrigan McCarthy

Consultant Pathologist
National Institute for Communicable Diseases
25 June 2020
COVID-19 Outbreak investigation manual

A practical guide and manual for healthcare facilities
(including care homes for the elderly, infirm or mental health care users)

in two parts:
Part A: Practical guide
Part B: Manual and appendices

DRAFT not signed off

Version 1.
25 June 2020
COVID-19 outbreaks in health care facilities

• Broad principles and definitions
• Steps in outbreak investigation and response
• Leadership, co-ordination and communication and management of psychological responses
• Initial responses
  – Determination of the infectious period
  – Identification of contacts
  – Quarantine and isolation
• Working up complex outbreaks
• Prevention

Electron micrographs of SARS-CoV-2, grown in the NICD BSL-4 and photographed by Dr Monica Birkhead, NICD
Broad principles and definitions

COVID-19 is an undesirable organism in a health care facility

**COVID-19 infections in vulnerable persons can lead to excess morbidity and mortality**

Outbreaks cause immense disruption to health care services

It may not be possible to prevent COVID-19 from entering a facility, but we can

- Detect cases early
- Ensure that it is very difficult to transmit COVID-19 amongst staff and patients

All health care facilities (HCF) will be at risk of undetected COVID-19 infections (symptomatic and asymptomatic) during the COVID-19 pandemic
Broad principles and definitions

- **Health care facility**
  - A hospital, day ward, general practice, home for aged, indigent or mental health care users

- **Health care worker**
  - Any person who works on the premises of a health care facility

- **An Index case/s**
  - A HCW or patient who test positive for COVID-19

- **A Health-care associated outbreak**
  - Detection of a single or multiple laboratory-confirmed case/s in a HCW or patient where the diagnosis was not suspected on admission

- **A contact of a confirmed case**
  - A health care worker contact: any HCW in direct contact with a COVID-19 patient, within 1 meter for 15 minutes or longer, without appropriate PPE (mask and eye protection) and/or experienced failure of PPE.
  - A contact who is a patient (or visitor) exposed during hospitalisation: any patient hospitalised in the same room or sharing the same bathroom as a COVID-19 patient, visitors to the patient, or other patient in the same waiting area or outpatient examination room who spent 15 minutes or longer within 1 meter with the index case;
  - A contact who is a patient (or visitor) exposed during an outpatient visit: Anyone in a closed environment at the same time as a person with a confirmed diagnosis of COVID-19; or anyone within 1m of the COVID-19 patient in any part of the hospital for >15 minutes.
Steps in outbreak investigation and response

- A roadmap
  - What is required
  - Where are we going?
Steps in outbreak investigation and response

- A roadmap
  - What is required
  - Where are we going?
Steps in outbreak investigation and response

• How do we co-ordinate and arrange outbreak responses?
  – There are three major components to co-ordinate
    • Epidemiology and clinical management
      – Investigating the extent of cases
      – Quarantine and isolation
      – Putting the epidemiology together
    • Co-ordination and management
      – Leadership, communication, decision-making, staffing
    • Infection prevention and control
      – Assessment of IPC practices
      – Identification of gaps in IPC
      – Strengthening IPC practice
Leadership, co-ordination and communication

• Leaders need to remember the aims of the investigation
  – To identify source of outbreak so as to
  – To contain and prevent further transmission,
  – To identify gaps in and strengthen the IPC measures which facilitate early detection and response to a case of COVID in a health care facility

• Leaders need to set the tone of the investigation
  – Non-retributive – it’s not ‘someone’s fault’
  – Co-operation is the name of the game ‘we can all work to keep everyone safe’
  – Learn from our mistakes – ‘Let’s do it better next time’
  – Empathetic – ‘this is very stressful for us all, here is how we can look after ourselves
Leadership, co-ordination and communication

- Communication is key
  - WHO principles of communication in outbreaks
- Identify stakeholders who need to know
  - Especially staff, organised labour, and patients
- First message to the institution within 12-24hrs
  - What is known
  - What is not known
  - What authorities are doing
  - What we can do to prevent infection and keep calm

<table>
<thead>
<tr>
<th>PRINCIPLE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRUST</td>
<td>Communicate in ways that build, maintain or restore trust between health care workers, patients, and key stakeholders.</td>
</tr>
<tr>
<td>ANNOUNCING EARLY</td>
<td>Proactive communication is necessary even if information is complete so that affected persons may be alerted, and the threat of disease may be minimised. Early announcement prevents distribution of inaccurate or false information that would erode trust and increase fear.</td>
</tr>
<tr>
<td>TRANSPARENCY</td>
<td>Transparency supports the development of trust. The acknowledgement that information is incomplete can be supplemented by details on what authorities are doing to obtain additional data.</td>
</tr>
<tr>
<td>REGULAR COMMUNICATION</td>
<td>Frequent communication at appropriate intervals builds trust. Intervals may be determined by the nature of the outbreak, the speed with which the disease is transmitted and the implications for life and livelihood. For example, statements can be release of statements at specific times of day, or emails distributed daily to specific stakeholders.</td>
</tr>
<tr>
<td>LISTENING</td>
<td>Listening is an essential component of outbreak investigation. Authorities need to understand how their messages are being heard and interpreted. Authorities need to understand the ‘mood’ and disposition of their stakeholders so that communication can adequately address their fears and concerns.</td>
</tr>
<tr>
<td>PLANNING</td>
<td>A generic outbreak communication plan should be drawn up as part of IPC preparedness. This plan should be tailored to the context at the outset of an outbreak, and adapted as the needs require. The plan should include identification of stakeholders, appropriate communication media, key messages and desired behaviours.</td>
</tr>
</tbody>
</table>
Initial responses: Convene the outbreak investigation committee and investigate the case

- Convene the outbreak investigation committee
  - Head of the facility (CEO/CMO)
  - IPC specialist
  - Senior matron
  - A senior clinician/medical/infectious disease specialist
  - Housekeeping/cleaning services
  - Data manager
  - Human resources
  - Organised labour

- Arrange to meet asap (within 12 hrs)
  - Use a checklist for outbreak investigation as an agenda for the meeting
  - Appendix 1 of NICD COVID outbreak guidelines

- Arrange for the index case/s to be investigated
  - Dates of symptom onset, COVID-19 testing, admission, procedures
  - Locations in the health facility on these dates

Use Case investigation form from ‘NICD COVID outbreak guidelines’, Appendix 2
Initial response: Determine the infectious period

- A person is deemed infectious for 48 hrs before symptom onset (or test date if asymptomatic), until 14 days post symptom onset
- Determine the
  - dates that the person was in the facility whilst infectious
  - Where the person was on those dates
- Use these dates to determine who the contacts are
Initial response: Implications of the infectious period

- Critical
  - Was index case in the facility for less than 3 days whilst infectious?
  - If yes....
    - Less complicated scenario as there has been no time for onward transmission
  - If no....onward transmission is likely
Initial response: Identification and management of contacts

• Identification of all persons in contact with the case whilst infectious

• Conduct a risk assessment for each using WHO tool
  – Close contact – not using PPE correctly AND within 1m for 15 minutes, OR direct touch of patient
  – ‘Low-risk contact’ – using PPE correctly with any kind of contact, or not meeting the above definition

• Assessment of symptoms in contact
  – All symptomatic contacts must be tested asap, and put into isolation
  – Asymptomatic contacts need to be tested ONLY if the infectious period is >2 days

Initial response: Identification and management of contacts

[Diagram showing scenarios for handling COVID-19 contacts]
Initial response: Conducting an Infection Prevention and Control audit

• Visit the affected wards with IPC coordinator
  – Review the following components of IPC
    • Administrative
    • Environmental
    • PPE
• Identify gaps
• Propose immediate short-term recommendations

Appendix 6 in NICD COVID-19 Outbreak guidelines on NICD website from tomorrow.
Initial response: Conducting an Infection Prevention and Control audit

- Cohorting and moving patients and HCW
  - COVID-19 positive patients
    - Isolate all patients who are COVID-positive and infectious
    - If >1 patient is COVID-19 positive, these can be co-horted
  - Exposed patients (i.e. who are contacts)
    - Isolate for 14 days, issue with masks
    - Monitor for symptoms
    - Cohorting NOT advised

- Environmental decontamination
  - Wipe down frequently touched surfaces.
  - Defogging not necessary

<table>
<thead>
<tr>
<th>Product</th>
<th>Chlorine available</th>
<th>How to dilute to 0.1% (1:1000ppm) (for COVID cleaning)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium hypochlorite – liquid bleach</td>
<td>3.5%</td>
<td>1 part bleach to 32 parts water (e.g. 30ml bleach in 970ml water)</td>
</tr>
<tr>
<td>Sodium hypochlorite – liquid bleach</td>
<td>5%</td>
<td>1 part bleach to 47 parts water (e.g. 20ml bleach in 980ml water)</td>
</tr>
<tr>
<td>NaDCC (sodium dichloro-isocyanurate) – powder</td>
<td>60%</td>
<td>1.7 grams to 1 litre water</td>
</tr>
<tr>
<td>NaDCC (1.5g/tablet) – tablets</td>
<td>60%</td>
<td>1 tablet to 1 litre water</td>
</tr>
<tr>
<td>Chloramne – powder</td>
<td>25%</td>
<td>4 grams to 1 litre water</td>
</tr>
</tbody>
</table>
Working up complex outbreaks

- If index patient/s have been infections and in the health care facility for >2 days, onward transmission may have occurred
- All CLOSE contacts should be swabbed for COVID-19
- A line list should be made
- An epidemiological curve should be created
- Generate hypotheses regarding possible sites of infection and ask more questions
Working up complex outbreaks

• Put these together with IPC audit findings to generate hypotheses to identify where the breach in IPC took place
Working up complex outbreaks: ward, unit or facility closure?

• Ward/unit closure and definitely facility closure is an extreme measure
• Consider the following before closure: (2 or more ‘yes’ answers would make closure a consideration)

<table>
<thead>
<tr>
<th>FACTOR UNDER CONSIDERATION</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are there multiple COVID-19 cases in patients or amongst HCW in the ward/unit?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Were there two or more undetected and infectious COVID-19 cases in the ward or unit simultaneously?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there sufficient staff trained in IPC who are able to work in the ward?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there sufficient clinical staff to support ward/unit activities?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there sufficient administrative and general assistance to support ward activities?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do audit findings indicate that IPC practices including hand hygiene, environmental cleaning and use of personal protective equipment are satisfactory in all respects?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Reporting and declaring the outbreak closed

- An outbreak may be ‘closed’ when 2 successive incubation periods have passed without a new case being detected
  - Assuming adequate surveillance and detection methodology in place
- BUT
  - During the pandemic, no facility is essentially ‘free of risk’ as cases may continually be brought into the facility from the community

- Daily, interim and final outbreak reports
  - Daily summaries from the Outbreak Response team lead
  - Interim report once the outbreak is declared over
  - Final report once all data is in, and hypotheses are closed

<table>
<thead>
<tr>
<th>SECTION</th>
<th>A GUIDE TO CONTENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EPIDEMIOLOGY AND SURVEILLANCE</strong></td>
<td>Update and interpretations of</td>
</tr>
<tr>
<td></td>
<td>• Line lists</td>
</tr>
<tr>
<td></td>
<td>• Epidemiological curves</td>
</tr>
<tr>
<td></td>
<td>• Transmission diagrams</td>
</tr>
<tr>
<td></td>
<td>Further investigations required to identify source</td>
</tr>
<tr>
<td><strong>LABORATORY TESTING AND RESULTS</strong></td>
<td>Laboratory results from cases and contacts</td>
</tr>
<tr>
<td><strong>INFECTION PREVENTION AND CONTROL</strong></td>
<td>Findings from IPC assessments</td>
</tr>
<tr>
<td></td>
<td>New processes and procedures to prevent transmission of additional cases</td>
</tr>
<tr>
<td></td>
<td>Training and refresher activities</td>
</tr>
<tr>
<td><strong>HEALTH WORKFORCE MANAGEMENT</strong></td>
<td>Update regarding persons in quarantine or in isolation</td>
</tr>
<tr>
<td></td>
<td>Staffing arrangements to support continuity of service</td>
</tr>
<tr>
<td><strong>COMMUNICATION</strong></td>
<td>Media reports</td>
</tr>
<tr>
<td></td>
<td>Engagement with organised labour</td>
</tr>
<tr>
<td></td>
<td>Engagement with local and provincial authorities</td>
</tr>
</tbody>
</table>
Prevention is key

Administrative controls
- Understanding risks to your facility
- The decision where to screen your patients?
- How to screen patients
- Who will screen patients
- Procedures for management of persons who meet case definitions for testing
- Is testing for COVID-19 in this facility necessary or shall I refer clients to a lab?

Environmental controls
- Ensuring adequate ventilation
- Cleaning the environment

Personal protective equipment and risk reduction
- Provision of appropriate equipment and tools
- When to wear what masks
- Encouraging handwashing
- Procedures for IPC when collecting specimens.

The two-fold aims of prevention

- Early detection of cases
  - Symptom screening for all staff on entry
  - Consider random staff testing esp in high risk areas
  - Pre-screening of elective admissions

- Making transmission in the facility difficult
  - Social distancing
  - Universal masking
  - Hand sanitising
  - Engineering interventions
What are we learning?

Outbreaks and public health events have shown us

- The people that service our health care system
  - ARE responsive, and
  - DO have capacity to change and adapt
  - CAN do what is required if the motivation is sufficient
- Preventive health services need major emphasis and investment.
- Health promotion and wellness messaging is critical
- Community engagement and ownership are essential to achieve co-operation with social distancing
Acknowledgements: Lesley Bamford, Rebecca Berhanu, Lucille Blumberg, Angela Dramowski, Anchen Laubscher, Caroline Maslo, Elizabeth Mayne, Kerrigan McCarthy, Shaheen Mehtar, Tash Meredith Jeremy Nel, Nilesh Patel, Olga Perovic, Mande Taubkin, Juno Thomas, Anne von Gottberg

THANK YOU