Western Cape Government

Department of Health
Emergency and Clinical Services Support

Directorate: Service Priorities Coordination
Enquiries: **Ms C Lawrence**
Charlene.Lawrence@westerncape.gov.za | Tel: 021 483 9964/3156

TO: **DDG: Chief of Operations**

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Circular H 019/2022

RABIES: UPDATED DRAFT NATIONAL HUMAN RABIES PROPHYLAXIS GUIDELINE AND THE PREVENTION OF HUMAN RABIES CASES

This circular is an update of Circular H73/2016, issued on the 5th of May 2016.

1. BACKGROUND

1.1 Rabies in South Africa is addressed through a "One Health Approach" by the National Department of Health (NDoH), Department of Agriculture, Land Reform and Rural Development (DALRRD), National Institute for Communicable Diseases (NICD), as well as many other stakeholders. Locally there is close collaboration between the Department of Agriculture, Department of Health and the NICD around the prevention of human rabies.

1.2 Rabies is endemic in South Africa (SA), with an average of 10 laboratory-confirmed cases of human rabies
confirmed annually. **Rabies is fatal; but a preventable infection, a human case of rabies is a failure of the health care system.** It is preventable in humans with prompt and complete post-exposure prophylaxis (PEP). All animal exposures must be assessed for potential rabies virus exposure and whether rabies PEP is required. Rabies PEP consists of a course of rabies vaccine and rabies immunoglobulin (RIG), if indicated. All wounds must be immediately washed and flushed for approximately 5 -10 minutes using water, or preferably soap and water.

1.3 On the 24th of August 2021, The Western Cape Department of Agriculture, Veterinary Services confirmed two confirmed cases of rabies in dogs from Khayelitsha. Investigations were undertaken to trace the source of the outbreak and animal rabies vaccination campaigns were conducted in response to the above-mentioned animal cases in the affected area.

1.4 **In response to an outbreak of animal rabies in the country (specifically the Eastern Cape and KwaZulu Natal – and focal/localised animal rabies cases in the Eastern sub-district of the Cape Town Metro), we recommend the following actions to prevent human animal rabies cases in the province:**

1.4.1 Clinicians must strictly adhere to the updated human rabies prophylaxis guidelines and determine the need for rabies post-exposure prophylaxis (PEP). Healthcare workers (e.g., Emergency Centre staff at hospitals and community health centres, Emergency Medical Services officials, and even general practitioners) need to acquaint themselves with the content of the circular and the national draft guidelines and training should be provided to healthcare workers where there is a need.

1.4.2 Infectious Disease Specialists should provide the first port of call for advice to attending clinicians on rabies PEP, and the indications for rabies vaccine and RIG. The NICD Hotline number (0800-212-552) can be utilised when clinical advice is needed but is not the first port of call.

1.4.3 Provincial Pharmacy Services must monitor available stock of rabies vaccine and RIG and inform District Pharmacy Managers of the provincial stockholding at facility. In facilities where rabies immunoglobulin is not available, the facility manager should communicate with the district/facility pharmacist to acquire it if required.

1.5 **All animal exposures (such as bites, scratches, nicks, and licks) must be assessed for potential rabies virus exposure and whether rabies PEP is required. See the following documents/annexures:**

- Annexure 1: Guidance for Healthcare Workers on Rabies Prophylaxis and Human Rabies Case Detection and Reporting.
- Circular H176/2021: Availability of rabies vaccine and immunoglobulin was issued indicating the strategic sites where the stock is stored or available.
- National Guidelines for the prevention of Rabies in South Africa, September 2021
- Rabies Clinical and Laboratory Diagnosis Advisory: An update for Physicians, Accident & Emergency Practitioners and Laboratorians, 26 January 2022
- Prevention of Rabies in Humans (poster, updated September 2021)

1.6 **Suspected and confirmed rabies disease in humans is a notifiable medical condition, Category 1.**

1.6.1 **Complete the Suspected Human Rabies Case History Form and the NMC form** (see the human rabies NMC case definitions for suspected, probable, and confirmed cases, in the attached NMC Case Definitions Flipchart) where appropriate.

1.7 **In the event of any death in humans due to suspected rabies disease,** the Provincial Forensic Pathology Services (FPS) procedures will be followed including post-mortem investigation (post-mortem sample collection guidance and transport). Refer to the related FPS Provincial Circular H144 of 2020 and H146 of 2020.

1.8 **A rabies prevention advisory for veterinary and para-veterinary services, animal welfare and animal special interest groups was issued that addresses pre-exposure prophylaxis.**

KEY NOTES ON RABIES PROPHYLAXIS

1. Rabies post-exposure prophylaxis is considered a life-saving emergency intervention following possible rabies virus exposure.
2. When possible, exposures in humans do occur (for example through bites or scratches inflicted by a suspected rabid animal), all wounds must be washed thoroughly with soap and water. It is then crucial that rabies post-exposure prophylaxis is sought immediately at a healthcare facility to prevent the infection.
3. Rabies post-exposure prophylaxis entails thorough cleaning of the wound site/s followed by rabies vaccination and rabies immunoglobulin therapy Rabies post-exposure prophylaxis entails thorough cleaning of the wound site/s followed by rabies vaccination, rabies immunoglobulin therapy and notification of veterinary services to investigate the potentially infected animal. More details on rabies post-exposure prophylaxis are available from the NICD website.
4. The Infectious Disease Specialist / Consultant on call for Infectious Diseases: Tygerberg Hospital, 021- 938-4911; Groote Schuur Hospital, 021-404-9111 and the NICD Hotline 0800-212-552 (Health professional ONLY) can be contacted for further advice on management of animal bites and/or suspected rabies cases.

Find attached the following resource documents for your convenience:

1. National Guidelines for the prevention of Rabies in South Africa (draft), September 2021
2. Prevention of Rabies in Humans (poster, updated September 2021)
3. NMC Rabies (human) Case definition, August 2021; and Notifiable Medical Conditions Form
4. Rabies Frequently Asked Questions, August 2021
5. Suspected Human Rabies Case History Form / Case Investigation Form
6. Human Rabies: Ante-mortem and post-mortem specimen collection guide
7. Rabies Prevention Advisory: An update for veterinary and para-veterinary services, animal welfare and animal special interest groups, 26 January 2022
8. Rabies Clinical and Laboratory Diagnosis Advisory: An update for Physicians, Accident & Emergency Practitioners and Laboratorians, 26 January 2022
9. Rabies-2020 pamphlet, What-you-need-to-know
10. Circular H176/2021: Availability of rabies vaccine and immunoglobulin was issued indicating the strategic sites where the stock is stored or available.
11. Circular H144 of 2020: Issuing of Death Notification Forms in Natural Deaths

12. Circular H146 of 2020: Requirements for admission of decedents that died of unnatural causes from healthcare facilities to Forensic Pathology Services

All the above-mentioned documents may be accessed via the NICD website https://www.nicd.ac.za/diseases-a-z-index/rabies/

We trust on your continued support in the control of communicable diseases in the province.

Yours sincerely,

JO ARENDSE
CD: ECSS
DATE:

ANNEXURE 1: GUIDANCE FOR HEALTHCARE WORKERS ON RABIES PROPHYLAXIS AND HUMAN RABIES CASE DETECTION AND REPORTING

Please read the information sheet in conjunction with the updated DRAFT National Guidelines for the prevention of Rabies in South Africa (with 1 pager quick reference), the Prevention of Rabies in Human poster (algorithm), September 2021, and the Rabies clinical and laboratory diagnosis advisory for healthcare workers (26 January 2022)

1. What is rabies?

1.1 Rabies is a fatal but entirely preventable viral disease which is primarily spread through the bite from an infected animal.

1.2 The rabies virus infects the central nervous system (brain and spinal cord) and causes disease in the brain.

1.3 Once symptoms begin, there is no effective treatment and death is inevitable. However, infection can be prevented through vaccination of animals and effective management of animal bites in humans.

1.4 Animals, mainly dogs and mongoose are the major reservoirs for rabies in South Africa, but cats, cattle, foxes, and bats can be affected.

1.5 Children are commonly at highest risk of rabies, due to their inquisitive nature and are less likely to report bites or scratches.

1.6 Most human rabies cases in South Africa are associated with domestic dog exposures. Although a fatal infection, rabies can be controlled through vaccination of domestic dogs (and cats) and the use of rabies post-exposure prophylaxis in exposed human cases.

1.7 Western Cape is known to be endemic for animal rabies (bat-eared foxes) in the Central Karoo (Beaufort West) and West Coast districts, thus healthcare workers should be aware of the risk of transmission from these animals, and the possibility that other species of mammals may become infected (including other wildlife spp., livestock, and domestic animals).

2. Clinical presentation in animals

2.1 Understanding the clinical presentation of rabies in animals may aid to assess the risk of rabies virus transmission in animal bite cases. Apart from behavioural changes, there are no definitive clinical signs of rabies specific to a species.

- Rabid animals behave abnormally.
- Domestic animals show aggression, disorientation, and paralysis. They may foam at the mouth and bite people and other animals without provocation.
- Wild animals, on the other hand, may show unusually 'tame' behaviour.

2.2 Animals are infectious approximately a day before they develop any signs of unusual behaviour.

2.3 All infected animals will die from rabies, usually within several days, but occasionally up to 14 days from the first signs of the disease.

2.4 Animals displaying signs of neurological disease (for example animals that have unusual behaviour, hyper-salivation or signs of paralysis), and all stray and wild animals suspected of exposing humans to rabies infection should be euthanised for laboratory investigation. The local or state veterinarian should be contacted for the animal to be investigated.

3. Transmission to humans

3.1 The rabies virus is present in the saliva of infected animals and transmitted by:

- a bite or scratch from infected animal
- a lick on broken skin
- a lick on mucous membranes (eyes or mouth)

3.2 The virus cannot be transmitted through a lick on intact skin. The size of a bite may vary, however even a small bite, scratch, or tooth mark with a drop of blood poses a risk of infection.

4. Management of patient exposed to potential rabid animal

4.1 Rabies PEP is an effective preventive measure for rabies when provided promptly following exposure and in accordance with the national updated Rabies PEP guidelines and the Rabies Quick Reference Guide. Rabies PEP has no preventive or curative effect when provided to patients on presentation with clinical rabies disease.

4.2 General wound management is critical in all patients.

4.3 Flush well with soap and water for at least 5 10 minutes, then clean with chlorhexidine solution (0.05%). Disinfect with iodine solution/ointment.

4.4 Avoid or delay suturing (where possible) and use of local anesthetic agents (may potentially spread the virus locally).

4.5 Provide antibiotics (e.g., amoxicillin clavulanate) and/or tetanus vaccination as required.

4.6 Rabies prophylaxis (vaccine and immunoglobulin) administration for patients/clients must be documented on their files and/or recorded on a facility-specific form/card.

4.7 The health facility or practice (public/private) must inform the client/patient of the importance of completing the full course of prophylaxis, especially if there will be movement between facilities/provinces. The client should be issued with a letter / document to inform other health professionals on prophylaxis received and the dates.

5. Perform an exposure risk assessment

Rabies PEP is considered whenever a patient has been potentially exposed to the rabies virus. A risk assessment should be made based on the health status of the animal and its behaviour in the specific incident, the animal species, the animal vaccination status, the local and provincial rates of rabies, and the bite wound category.

5.1 Rabies exposure risk assessment

- All animal exposure must be assessed for potential rabies virus exposure and whether rabies PEP is required.
- The assessment is based on behavior and health status (including rabies vaccination) of the animal, animal species and geographical location where the animal is from/exposure occurred.
    - Bat-eared fox bites should be considered a significant risk for rabies in the Central Karoo (Beaufort West) and West Coast districts.
    - Rabies is not transmitted by birds or reptiles. Low risk species in South Africa (RSA) include mice, rats, squirrels, monkeys and baboons.
    - Other animal exposures should be assessed according to the type of animal plus the behaviour and state of health of the animal as well as the ability to assess the animal.
- High risk incidents may include:
    - Unprovoked animal attack
    - Animal with unusual behavior e.g., domestic animals becoming aggressive or wild animals appearing "tame"
    - Sick animals e.g., drooling, wobbling/unsteady gait, snapping at imaginary objects
    - Animal having died within 2 weeks after the human attack.
- It is critical to contact the local State Veterinarian (see contact list below) to report, investigate, conduct animal assessments, and assess for potential human rabies exposure. Alternatively, contact Dr Lesley Van Helden (021-808-5017, email: lesleyhv@elsenburg.com) or Dr Laura Roberts (021-808-5058, email: laurar@elsenburg.com) during office hours; as first contact for Veterinary Services, who will be able to task the relevant local State Veterinarian to investigate.

5.2 Exposure Category (please see algorithm)

- **Category 1 exposure:**
  No direct contact with animal (for example, being in the presence of a rabid animal or petting an animal) – **requires washing of exposed skin surface.**

- **Category 2 exposure:**
  Direct contact with animal but NO BREACH OF SKIN, NO BLEEDING (for example bruising or superficial scratch), **requires wound management + provide full course of rabies vaccine**

- **Category 3 exposure:**
  Direct contact with animal with BREACH OF SKIN, ANY AMOUNT OF BLEEDING, CONTACT WITH MUCOSAL MEMBRANES (for example lick on/in eyes or nose), CONTACT WITH BROKEN SKIN (for example licks on existing scratches), ANY CONTACT WITH A BAT; **requires Wound Management +Rabies Immunoglobulin + Full course of rabies vaccine**

5.3 Rabies vaccine and RIG administration

- **Rabies Vaccine**
    - Vaccination schedule requires FOUR doses.
    - Course: days 0, 3, 7 and any day between day 14 and 28 (Day 0 = day of first vaccination).
    - Intramuscular injection in deltoid muscle in adults, anterolateral thigh in small children (< 2 years of age). INEFFECTIVE IF GIVEN IN GLUTEUS MAXIMUS (buttocks).
    - Vaccine dose: Doses are product specific. Usually one vial equals one dose (regardless of vial size) for adults/children.
    - "Changes in rabies vaccine product during the same PEP course are acceptable, if unavoidable, to ensure complete PEP treatment (page 22 of draft national guidelines).

- **Rabies Immunoglobulin (RIG)**
  - Dose of RIG: 20 IU (human derived RIG products) or 40 IU (equine derived RIG products) per kilogram of body weight (i.e., calculate for each case). Infiltrate RIG in and around wounds, giving as much as anatomically possible without compromising blood supply (especially for extremities).
  - Evidence has shown that maximum infiltration of RIG in and around the wound is effective and that there are no benefits from additional intramuscular administration of any remaining RIG at a site distant to the wound.
  - RIG should be administered in a different syringe to the vaccine and NOT at the same body site as vaccine since RIG may inactivate the vaccine. No more than the recommended dose should be administered in order to avoid immune suppression.
  - If multiple wounds, dilute RIG in equal volumes of saline and infiltrate all wounds.
  - Different strengths/preparations for the RIG products are available. Check the package insert of all RIG products to ensure that the right dosage and volume is administered.
  - RIG provides immediate immunity and is administrated as soon as possible but not beyond 7 days after administration of first dose of vaccine (for example, if not available at clinic, needs to be urgently sourced).
  - Please take note of special consideration groups i.e., for the immunocompromised individuals, pregnant women and children, and individuals at high risk of rabies exposure (veterinarians)
  - Due to the potential for anaphylactic reactions with the administration of ERIG (equine rabies Immunoglobulin), it is recommended that ERIG be used only in facilities where anaphylaxis or adverse reactions can be managed. However, the incidence of anaphylaxis following administration of ERIG is low. Skin testing is not required before the use of ERIG."
  - **NB: The same RIG should be used to make up a dose.** Pharmaceutical Services will make sure that enough stock of the same RIG is available to make up a dose. The Cape Medical Depot (CMD) keeps only one brand of RIG and may only get the other if stock runs out.
  - **If immunoglobulin is not immediately available, continue with the rabies vaccine course** and the Immunoglobulin can still be given up to 7 days after the first dose of rabies vaccine

- **Previous rabies vaccination**
  - If an exposed person has a reliable history of previous rabies vaccination, they do not require rabies immunoglobulin (RIG) after a category 2 or 3 exposure but should receive booster doses of rabies vaccine into their arm on days 0 and 3 after exposure (irrespective of pre-exposure vaccination antibody titer).

5.4. Availability of rabies vaccine and RIG

- For availability of rabies vaccine and immunoglobulin (see Circular 176/2021). The following public health facilities (hospitals) should have vaccine and immunoglobulin available: Groote Schuur, Tygerberg, Swartland, Paarl, Vredenburg, Vredendal, Stellenbosch, Caledon, Worcester, Beaufort West, George Hospital, Khayelitsha District Hospital, Mitchells Plain District Hospital, New Somerset Hospital.
- Provincial Pharmacy Services has information on rabies vaccine and immunoglobulin stockholding at facility level available.

6. Symptoms of rabies in humans

6.1 The incubation period may vary from a week to a year after the initial exposure. The closer the bite is to the brain, the shorter the incubation period.

6.2 The first symptoms of rabies are flu-like symptoms, such as fever, headache, fatigue, along with abnormal sensations or hyperparasthesia at the bite site.

6.3 There may be signs of hallucinations or hyperactivity ('furious' rabies) or paralysis ('dumb' rabies). Spasms affecting the muscles involved in swallowing result in the classical 'hydrophobia' ('fear of water').

6.4 In the early stages, patients will be awake and fully aware between spasms, progression of the disease results in convulsions, coma and death. Rabies should always be suspected in presentations of encephalitis; even where a history of an animal bite may not be forthcoming.

7. Diagnosis of rabies in humans

7.1 There are several tests to confirm rabies disease in humans once a person becomes ill, but there is no diagnostic test to determine if someone has been exposed to rabies from an animal bite.

7.2 Do not delay performing a risk assessment and providing preventive treatment following an animal bite/exposure to rabid or suspected rabies-infected animal.

7.3 For rabies testing, please see the following documents:

- Rabies Clinical and Laboratory Diagnosis Advisory: An update for Physicians, Accident & Emergency Practitioners and Laboratorians, 26 January 2022
- Rabies: Ante-mortem and Post-mortem Specimen Collection Guide
- Suspected Human Rabies Case History Form and Notification Form (see human rabies case definitions)

8. Treatment of rabies in humans

- There is no effective treatment for rabies once symptoms develop, and death is inevitable.

9. Reporting of suspected human rabies cases and rabies prophylaxis for cases with potential rabies exposure

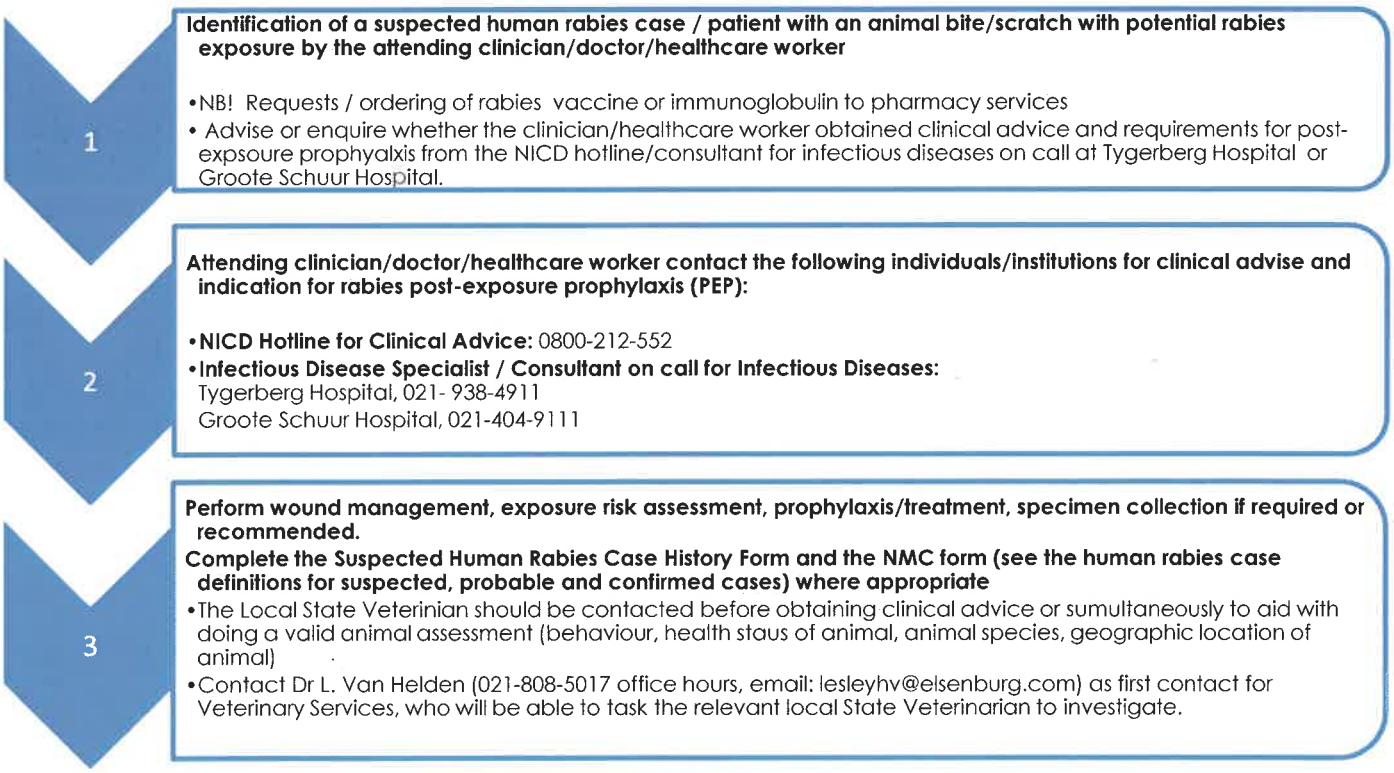
9.1 The clinician who suspects the diagnosis should notify the case as soon as it meets the clinical case definition (below). Laboratory confirmation is not required before notification of the case. Complete the Suspected Human Rabies Case History Form and the NMC form.

	Human Rabies NMC Case Definitions	
1.	**Suspected case definition**	A person presenting with an acute neurological syndrome (encephalitis) dominated by forms of hyperactivity (furious rabies) or paralytic syndromes (dumb rabies) progressing towards coma and death, usually by respiratory failure, within 7-10 days after the first symptom if no intensive care is instituted.
2.	**Probable case definition**	A probable case is a suspected case WITH a likely exposure to a suspected rabid animal.
3.	**Confirmed case definition**	A confirmed case is a person with laboratory evidence of rabies infection by detection of a. Rabies virus nucleic acid by RT-PCR on saliva, skin biopsy or cerebrospinal fluid (CSF) OR b. Anti-rabies antibodies in CSF (ante-mortem); OR c. Rabies virus antigen in brain tissue by fluorescent antibody testing or rabies virus nucleic acid in skin biopsy (post-mortem).

9.2 **In the event of any death in humans due to suspected rabies disease**, the South African Police Service (SAPS) should be contacted by the Provincial Forensic Pathology Services (FPS) to open an inquest docket for their involvement in the investigation. The FPS will then be contacted by SAPS, and they will perform the post-mortem investigation. FPS should contact the NICD hotline (and the Provincial CDC Office, Infectious Disease Specialists) with regards to risk assessment, clinical advice, and post-mortem sample collection guidance and transport as needed. This information is also available from the NICD website, www.nicd.ac.za/rabies

- Circular H144 of 2020: Issuing of Death Notification Forms in Natural Deaths, and H146 of 2020: Requirements for admission of decedents that died of unnatural causes from healthcare facilities to Forensic Pathology Services; provides guidance when dealing with possible referral of cases and whether a specific case should be classified as an "unnatural death".

Please follow the diagramme below to ensure suspected rabies cases are detected, reported and potential rabies exposed individuals receive the appropriate post exposure prophylaxis.



10. Resources

For further information about rabies, please refer to:

1. National Guidelines for the prevention of Rabies in South Africa, September 2021
2. Prevention of Rabies in Humans (poster, updated September 2021)
3. NMC Rabies (human) Case definition, August 2021; and Notifiable Medical Conditions Form
4. Rabies Frequently Asked Questions, August 2021
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12. Circular H146 of 2020: Requirements for admission of decedents that died of unnatural causes from healthcare facilities to Forensic Pathology Services

11. Contact details

Department of Agriculture

	NAME	TITLE/DESIGNATION	TEL/CELL	FAX NUMBER	E-MAIL
1.	Msiza, G. Dr	Chief Director: Veterinary Services	021-808-5002 084-604-6705	021-808-7619	ginindam@elsenburg.com
2.	Mabunda, M. Dr	Director: Animal Health	021-808-5052 082-450-9436	021-808-5126	mosesm@elsenburg.com
3.	Roberts, L. Dr	State Veterinarian: Epidemiology	021-808-5058 072-184-8642	086-542-1101	laurar@elsenburg.com
4.	Van Helden, L. Dr	State Veterinarian: Epidemiology	021-808-5017 072-460-1984	021-808-5126	lesleyvh@elsenburg.com
5.	Cloete, A. Dr	State Veterinarian: Training	021-808-5254 082-901-1710	021-808-5126	anneliec@elsenburg.com
6.	Janse van Rensburg, L. Dr	State Veterinarian: George	044-873-5527 082-228-9076	044-873-3342	leanajvr@elsenburg.com
7.	Buhrmann, G. Dr	State Veterinarian: Boland	021-808-5026 083-642-0602	021-808-5125	garyb@elsenburg.com
8.	Malan, V. Dr	State Veterinarian: Boland	021-808-5028 082-228-9076	021-808-5125	vivienm@elsenburg.com
9.	Kloppers, C. Dr	State Veterinarian: Swellendam	021-808-5059 082-641-5163	028-514-2679	christik@elsenburg.com
10.	Pienaar. J. Dr	State Veterinarian: Beaufort West	023-414- 9220 082-907-1140	023-414-3980	jacop@elsenburg.com
11.	Lombard, C. Dr	State Veterinian: Vredendal	027-213-3106 073-465-3860	027-213-3109	chanell@elsenberg.com
12.	Swart, M. Dr	State Veterinarian: Malmesbury	022-433-8910/15 083-469-2404	022-487-1924	michaels@elsenburg.com
13.	Fox, C. Dr	State Veterinarian: Oudtshoorn	044-203-9445 082-699-6043	044-873-3342	cathyf@elsenburg.com
14.	Kloppers, C. Dr (Vacant - acting)	State Veterinarian: Worcester	021-808-5059 083-641-5163		christik@elsenburg.com
15.	Visser, D. Dr	Technical Manager: Animal Health	021-808-5057 082-907-1141	021-808-5126	dawidv@elsenburg.com

Department of Health

	NAME	CDC/EH/PHARMACY SERVICE FOCAL PERSON	TEL/CELL	FAX NUMBER	E-MAIL
1.	Lawrence, C.A. Ms	Provincial CDC Coordinator	021-483-9964 072-356-5146	021-483-2682 086-6111-092	Charlene.lawrence@westerncape.gov.za
2.	Isaacs, W. Ms	Provincial NICD NMC Surveillance Manager	021-483-3737 072-310-6881	021-483-2682	Washiefa.Isaacs@westerncape.gov.za washiefai@nicd.ac.za
3.	Ndlovu, B. Ms	Provincial NICD Epidemiologist	021-483-6878 082-327-0394	021-483-2682	babongile.ndlovu@westerncape.gov.za; babongilen@nicd.ac.za
4.	Daniels, F. Ms	CDC Administrative Clerk	021-483-3156	021-483-2682	Felencia.daniels@westerncape.gov.za
5.	Hayes, H. Ms	Pharmaceutical Services, Province	021-483-4567; 072-909-2838	021-483-3886	Helen.hayes@westerncape.gov.za
6.	Thomas, A. Mr.	EH, Province	021-918-1233 076-165-4220	021-918-1605	Adam.Thomas@westerncape.gov.za
7.	Isaacs, M. W. Mr.	Pharmaceutical Services, Tygerberg Hospital	021-938-5225 071-180-1796	021-938-4736	Mogamat.Isaacs2@westerncape.gov.za
8.	Naicker, V. Ms	Pharmaceutical Services, Groote Schuur Hospital	021-404-3216 073-149-1161	021-404-3452	Vanishree.naicker@westerncape.gov.za
9.	Jooste A. Ms	CDC, Central Karoo	023-414-3590	086-574-4610	Annalette.Jooste@westerncape.gov.za
10.	Van Zyl, G. Mr.	Environmental Health (EH), Central Karoo	023-449-1000 083-654-9688	023-415-1253	gerrit@skdm.co.za
11.	Theron, A. Ms	Pharmaceutical Services, Central Karoo	023-414-8200 082-334-3450		Annatjie.Theron@westerncape.gov.za
12.	Neethling, S. Ms	CDC, Cape Winelands	023-348-8120 072-227-6058	023-342-8501	Surina.neethling@westerncape.gov.za
13.	Olivier, G. Mr.	EH, Cape Winelands	023-348-8806 082-928-8467	086-613-7156	Guillaume.olivier@westerncape.gov.za
14.	Williams, C. Mr.	Pharmaceutical Services, Cape Winelands	023-348 8115 076-540-6656	023-342 8501	Charles.williams@westerncape.gov.za
15.	Engle, E. Mr.	CDC, Garden Route	044-803-2700 083-441-8555		Eugene.Engle@westerncape.gov.za
16.	Compion, J. Mr.	EH, Garden Route	044-803-1525 082-803-5161		jcompion@edendm.gov.za
17.	Hattingh, J. Mr.	Pharmaceutical Services, Garden Route	044-803-2700 / 2756 073-303-1574	044-874-0124	Jochemus.hattingh@westerncape.gov.za
18.	Groenewald, B. Ms	CDC, Overberg	028-214-5852 082-969-9297	086-631-7077	Beatrice.Groenewald@westerncape.gov.za
19.	Dreyer, N. Mr.	EH, Overberg	028-050-0892/ 028-313-1243 082-892-3341		ndreyer@odm.org.za
20.	Brits, H. Ms	Pharmaceutical Services, Overberg	028-214-5828 082-899-2472	028-212-1524	Hanlie.brits@westerncape.gov.za
21.	Van Rhyn H. Ms	CDC, West Coast	022-487-9292 083-871-9709		Hildegard.Vanrhyn@westerncape.gov.za
22.	De Jongh, N. Mr.	EH, West Coast	022-433-8422 082-567-6654	086-623-7636	ndejongh@wcdm.co.za
23.	Kloppers, L. Mr.	Pharmaceutical Services, West Coast	022-487-9209 082-885-5778	086-545-7254	Lourens.Kloppers@westerncape.gov.za
24.	Berkowitz, N. Dr.	CDC, City of Cape Town: Epidemiologist	021-400-6864 083-406-6755	021-400-6864	Natacha.Berkowitz@capetown.gov.za
25.	Malgraff, V. Mr.	EH, City of Cape Town	021-444-6643 083-365-8340	021-637-5452	Vivian.malgraff@capetown.gov.za

26.	Barday, M. Mr.	Head: Pharmaceutical Services, City of Cape Town	021-444-5885 082-702-2200		Mohamed.Barday@capetown.gov.za
27.	Coetzee, J. Ms	CDC Programmes, City of Cape Town	021-400-3917 082-465-3339	021-980-1292	Jennifer.Coetzee@capetown.gov.za
28.	Mohamed, H. Prof.	CDC, Metro District Health (MDHS)	021-815-8697 082-334-5763		Hassan.mahomed@westerncape.gov.za
29.	Hudsonberg, P. Ms	CDC, Southern Western Substructure	021-202-0970 082-321-5594	021-202-0948	Portia.Hudsonberg@westerncape.gov.za
30.	Moeng H. Ms	Pharmaceutical Services, MDHS, Southern Western SS	021-202-0989 076-112-6294		Heli.Moeng@westerncape.gov.za
31.	Vallie, R. Ms	CDC, Eastern Khayelitsha Substructure	076-375-1945		Razia.Vallie@westerncape.gov.za
32.	Van Niekerk, J. Mr.	Pharmaceutical Services, MDHS, Eastern Khayelitsha SS	021-360-4641 078-631-5125	086-560-9264	Johan.vanniekerk@westerncape.gov.za
33.	Van Niekerk, P. Ms	CDC, Klipfontein Mitchells Plain Substructure	021-370-5000 078-409-0030		Pearl.Vanniekerk@westerncape.gov.za
34.	Roomany M. Mr.	Pharmaceutical Services, MDHS, Klipfontein Mitchells Plain SS	021-370-5000 082-847-0334	021-370-5036	Mahboob.roomanay@westerncape.gov.za
35.	Williams, M. Ms	CDC, Northern Tygerberg Substructure	021-815-8882 083-235-1155	086-457-0112	Michelle.Williams@westerncape.gov.za
36.	Parker, T. Ms	Pharmaceutical Services, MDHS, Northern Tygerberg SS	021-815-8876		Tasneem.Parker2@westerncape.gov.za