

COVID-19 Occupational Health Surveillance System for South African Workplaces

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Version 7



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Abbreviations

API	Application Programming Interface
B4SA	Business for South Africa
CDC	Centre for Disease Control
CIPC	Companies and Intellectual Property Commission
COGTA	Co-operative Governance and Traditional Affairs
COIDA	Compensation for Occupational Injuries and Diseases Act
CSIR	Council for Scientific and Industrial Research
DEL	Employment and Labour
DMA	Disaster Management Act
DMRE	Mineral Resources and Energy
FNB	First National Bank
GP	General Practitioners
HR	Human Resources
ICU	Intensive Care Unit
ID	Identity Number
NDOH	National Department of Health
NHLS	National Health Laboratory Services
NICD	National Institute for Communicable Diseases
NIOH	National Institute for Occupational Health
NMC	Notifiable Medical Conditions
OH	Occupational Health
OHSS	Occupational Health Surveillance System
OMP	Occupational Medical Practitioner
PCR	Polymerase Chain Reaction
SC	Scientific Committee
StatsSA	Statistics South Africa
UUID	Universally unique identifiers
UCT	University of Cape Town
UKZN	University of KwaZulu-Natal
UP	University of Pretoria
Wits	University of Witwatersrand
WHO	World Health Organization

1. Introduction

Historically, in South Africa, health data has been collected for a variety of reasons, by stakeholders in the public sector (various government departments at all levels of government), the private sector (for example, private healthcare, industry), and academia. The basis for this collection ranges from legally notifiable and compensable medical conditions and health services planning and delivery (government departments), through to ensuring a return on investment (private sector) and for research (academia, statutory research bodies). Within this diversity, there exist legal and ethical mandates.

Occupational Health and Safety (OHS) reporting directives in line with the current Disaster Management Act (DMA) were published in May, June and September 2020 by the Ministers of Co-operative Governance and Traditional Affairs (COGTA), Employment and Labour (DEL), Mineral Resources and Energy (DMRE) and Public Service and Administration (DPSA). These directives were enhanced with various safety and health protocols for different sectors (e.g. mining, call centres, personal health care etc.). Employers are required by law to provide administrative support to the government in responding to the COVID-19 pandemic through the following (amongst others):

- Daily symptom screening of employees and any other person entering their workplaces,
- Awareness and Identification of vulnerable employees (e.g. identifying employees with underlying medical conditions (co-morbidities) and age above 60 years that may be at high risk of COVID-19 complications,
- Testing of employees with COVID-19 symptoms and submitting the results to the relevant governmental departments,
- Tracing of contacts of a positive case in line with NICD guidelines, and
- Provision of isolation and/or quarantine facilities for suspected and confirmed cases of COVID-19.

The directives (Annexure A and B) further required that employers submit screening and testing data to the Director-General: Health. In as much as there are various efforts and initiatives by the private and public sectors to support the government to achieve the prescripts set-out in the directives, the data collection and reporting process is currently not fully implemented nor co-ordinated. This creates a gap in terms of using this data to monitor the current and future trends, and subsequently manage the spread of COVID-19 through effective interventions across and within the different sectors.

The National Department of Health initiated a strategic project to support the business sector with digital platforms and processes for COVID-19 surveillance. This will enable the National Institute for Occupational Health (NIOH) to collaborate with employers (private and public sectors) to collect, transfer, process and store COVID-19 screening, vulnerabilities, testing, contact tracing and return to work data for analysis and interpretation. This could consequently support employers, labour and government to respond to the spread of COVID-19 in a targeted manner through the systematic understanding of evolving trends and risk factors for the disease.

This document provides a framework for governance and technical specifications of the surveillance platforms and data process flows from workplaces to the NIOH's secure data lake environment.

The data is intended to be collected from workplaces employing greater than 50 employees as per the directives from NDOH, COGTA, DEL and DMRE (Appendix A)

This technical document deals with the following elements:

- Governance structure
- Project description, objectives and scope
- Data requirements
- Data collection and flow process (data sharing protocol)
- Solution and data architecture
- Data privacy and security
- Data analytics and visualization
- Maintenance and support

This document is intended for technical and non-technical audiences and represents the most recent update of the requirements and solution architecture. The solution architecture and concepts may change over time as requirements evolve and resources are made available for implementation.

2. Stakeholders

This initiative is led and sponsored by the National Department of Health (NDOH), National Institute for Occupational Health (NIOH) and the National Institute for Communicable Diseases (NICD). The Council for Scientific and Industrial Research (CSIR) is supporting the project with technical advisory, technical specifications, data collection, information security, customized digital platforms and tools, including supporting the implementation of the data lake. In addition, academic occupational medicine experts from the University of Kwa-Zulu Natal and the University of Cape Town are providing an advisory role in this initiative.

The private and public sector is also supporting this initiative and currently, the following entities are involved, providing COVID-19 data and existing tools, resources, and expertise for an integrated implementation. The following institutions are involved, or could play useful roles:

- First National Bank
- Sasol
- Ford Motor Company of Southern Africa (Manufacturing) (Pty) Ltd (FMCSA)
- Business for South Africa (B4SA).
- Private healthcare providers
- Webber Wentzel
- Academic higher education institutions as employers
- Department of Employment and Labour

-
- Compensation Fund

Through the National Department of Health (OHS work stream), additional companies are being enlisted and this document is essential for those engagements in order for parties to also understand what is involved in the project including data provision and sharing requirements.

An important stakeholder in this initiative will be Labour, as per the social partners represented on NEDLAC.

2.1 Roles and Responsibilities of Stakeholders

The National Department of Health – Cluster of Occupational Health under the global mandate of its political principle, “To improve (the) health status (of all South Africans) through the prevention of illnesses and the promotion of healthy lifestyles and to consistently improve the healthcare delivery system by focusing on access, equity, efficiency, quality and sustainability.” The Cluster is specifically tasked with extending this mandate to protect the health of workers. Within the governance of the OH Data and Surveillance System, the NDoH-Occupational Health (OH) will be responsible for ensuring that the processes involved in the acquiring, storage and use of the data meets all political, legal and ethical obligations, and is of sole benefit to the workers in South Africa.

The National Health Laboratory Services – National Institute for Occupational Health and the National Institute for Communicable Diseases

The National Institute for Occupational Health under its principal’s mandate as a national and regional hub of expertise on occupational health plays a very important advisory role to government, trade unions, employers and health care professionals in the field. In addition, NIOH provides services and support to provincial and national Departments of Health in the delivery of healthcare, through laboratory, training and research and extends this mandate to the protection of workers’ health. In the context of governance of the OH Data and Surveillance System, the NIOH prioritizes the protection of all workers. Part of this process involves using occupational health surveillance data to evaluate the occupational health experiences of workers nationally and to produce meaningful analyses to support planning and future preparedness. Thus, the NIOH will access all relevant data to produce descriptive reports as well as validate external reports prior to being published by the NDOH.

The National Institute for Communicable Diseases is a national public health institute of South Africa supporting the government’s response to communicable disease threats such as COVID-19. The Notifiable Medical Conditions (NMC) national surveillance system acquires information from national, regional and local levels as part of their legal mandate to timeously detect and respond to public health threats to prevent disease outbreaks; estimates burden of COVID-19 and identifies populations

at risk; monitors place (hot spots) and directs public health interventions and informs policy decisions.

Occupational Medicine Experts specifically from the Universities of Cape Town, Pretoria, KwaZulu-Natal and Wits are responsible for ensuring that the instruments developed are based on the most updated scientific medical and epidemiological information, with content having been validated by national and international experts, and based on current tools relevant to the current point in time in the context of the epidemic. These scientific experts will be responsible for reviewing the data on an ongoing basis to better understand the impact of the epidemic among workers generally, and health workers in particular during the current phases of the epidemic to provide input into national decisions that may impact on decisions to impact on the course of the pandemic. In subsequent phases, they will be responsible for more in-depth research of the data, to address unanswered questions that will allow the NDoH-OH and its principal to appropriately intervene to reduce its impact on health generally.

Council for Scientific and Industrial Research will support the technical aspects of this initiative. Their technical advisory role includes the technical specifications, data collection, information security, development of customized digital platforms and tools and the development of the NIOH data lake.

Private Sector Employer stakeholders supports the initiative and will assist in obtaining the buy-in from the employers.

Labour stakeholders specifically from registered trade unions, as represented on statutory structures, such as NEDLAC. Recognising the need for the representation of all social partners within this process, and given that the data being collected will be used to better understand the impact on workers; it is important that this social partner is engaged in the discussions within this structure.

3. Governance

3.1 The Legal Framework Guiding Data Acquisition, Management and Access

Within the context of the COVID-19 epidemic, data systems are governed by the Disaster Management Act Regulations, broadly, and the subsequent Directives that have been issued by different government departments. These, together with the relevant sections are listed below. In addition, several other Acts exist which provide guidance for data collection and protection for the general population, which are also listed. A summary table on specific data requirements and the legal framework governing the submission of de-identifiable and identifiable data is presented in Table 10.

Legislation related to the COVID-19 epidemic

- Department of Co-operative Governance and Traditional Affairs. Disaster Management Act (57/2002): Determination of Alert Levels and Hotspots. G43364. 28 May 2020. (Sections 46(6)(d))
- Department of Co-operative Governance and Traditional Affairs. Disaster Management Act (57/2002): Amendment of Regulations issued in terms of Section 27 (2). G43476. 25 June 2020 – (Section 2)
- Department of Co-operative Governance and Traditional Affairs. Disaster Management Act (57/2002): Amendment of Regulations issued in terms of Section 27 (2). G43476. 17 September 2020 – (Section 78)
- Department of Employment and Labour. Consolidated COVID -19 Direction on Health and Safety in the Workplace. R639 28 September 2020- (Sections 4.1k and 4.2)
- Department of Employment and Labour. Compensation for Occupational Injuries and Diseases Act: Compensation for occupationally-acquired Novel Coronavirus Disease (COVID-19) – Notice 193 of 2020, 23 March 2020 – (Section 6)
- Department of Mineral Resources and Energy. Mine Health and Safety Act (29/1996): Guidelines for a Mandatory Code of Practice on the Mitigation and Management of COVID-19 Outbreak – G43335. 18 May 2020 – (Section 8.4)

General Legislation relating to collection of information

- Department of Health. Regulations relating to the surveillance and the control of notifiable medical conditions. 15 December 2017.
- Department of Justice. Promotion of Access to Information Act. G 20852 3 February 2000
- The Presidency. Protection of Personal Information Act. G37067 26 November 2013.

3.2 Types of data considered

Only occupational health data related to workers and workplace exposures in general and in health workers, related to the SARS-CoV-2 epidemic is considered here. These will include, among others:

- Data obtained from private and public sector workplaces;
- All data collected from workplaces relating to occupational exposure to SARS-CoV-2 and attempts at controlling the hazard to reduce exposure to workers, including risk assessments and personal protective equipment;
- All data collected that relate to affected workers, including screening, workplace contact and transmitted infections, severe disease, mortality, return to work, and compensation.

For the purposes of this document and governance, data will be classified into:

- Pooled data that is obtained from several sources under specific agreements and Memoranda of Understanding.
- Additional data collected that is obtained by individual companies or stakeholders such as NICD and made available to the OH Data Surveillance System.

3.3 Governance Structures

Steering committee

The steering committee will comprise:

- Representatives from the key social partners: government, (as represented by NDoH, CSIR, NIOH and NICD); Business (as represented by B4SA) and Labour representatives.
- Two representatives from the scientific committee.
- Two representatives from the Data Management and Processing Technical committee.
- A representative from the Department of Employment and Labour.
- A representative from the Compensation Fund.

This structure will have oversight over other Committees listed below. It will be the primary accounting structure ensuring adherence to the legal mandate and the legislation stated above. As such, it will be responsible for reporting to the government principals as per the mandate. It will also have a fiduciary responsibility, in the event of financial resources being made available to the structure. It will be chaired by the NDOH as per the mandate given by the Director-general: Health.

Data Management and Processing Technical Committee

The Data Management and Processing Committee will comprise:

- NIOH Head of Epidemiology
- CSIR technical experts
- NIOH/NICD IT department
- Business technical experts contributing to the data lake

The responsibility of this committee is to provide and implement a framework for the collation, processing and storage of data and to ensure data security, management and access as decided by the steering committee. It will ensure the reporting of routine data on a regular basis as determined by the steering committee. It will work closely with the scientific committee to analyse data in order to answer scientific questions that may be identified by the scientific committee for further investigation.

Scientific committee

The Scientific Committee (SC) is tasked with the responsibility of ensuring the scientific validity of the data being collected, the data quality, its routine reporting, formulating research

questions, implementing research and reviewing requests for research related to the collected data. This Scientific Committee will exercise this role specifically for the pooled data and will have no jurisdiction over additional data collected by employer bodies or individual private sector organisations, as described above.

This committee will consist of the following representatives and scientific experts:

- Prof Mohamed Jeebhay
- Dr Spo Kgalamono
- Dr Natalie Mayet
- Prof Rajen Naidoo
- Dr Nisha Naicker
- Dr Nonhlanhla Tlotleng

The SC will develop policies and procedures for decision-making about the conduct of any research and the dissemination of results as it applies to the OHS data generated through the instruments developed during COVID-19 epidemic. This will include addressing requests for data to conduct studies by other stakeholders, which use the data as a primary platform. Dissemination activities might be in the form of papers, presentations, news releases, newsletters, or through other resources. Presentations might be to academics, to funding agencies or potential funding agencies, or community members. The parties are committed to upholding mutual respect and trust such that all ethical principles are respected.

4. OHSS: Project Description

4.1 Aim

The **Goal** of this Initiative is to ensure that occupational health data related to COVID-19 collected during the State of Disaster is appropriately governed in terms of the use of scientifically and technically sound instruments, collected ethically, housed at secure servers within mandated agencies, scientifically analysed and appropriately reported and the access managed for research purposes in order to advance broader OHS goals generally, and address interventions to reduce the impact of the epidemic.

This project **aims** to design and implement COVID-19 surveillance digital platforms and/or tap into existing platforms (e.g. those already used by private sector employers) to collect screening, vulnerability, testing, contact tracing and return to work data for the surveillance system from the private and public working sector.

The **objectives** of data collection are to:

- Provide strategic insights through data analytics and visualization into all phases (i.e. screening, testing, contact tracing within the workplace, vulnerable employees, return to work including health outcomes) of the COVID-19 infection spectrum in the South African workforce.
- Early identification of industries/companies and occupational groups at high risk of infection so as to inform appropriate interventions (e.g. policy, programmatic, resources).
- Understand the impact of the COVID-19 interventions in the workplaces.
- Develop a framework for a COVID-19 surveillance model for monitoring workers in general (and health workers in particular), that includes both public and private sectors.
- Determine the human resource and economic impact of COVID-19 on the various industrial sectors.
- Identification of key scientific questions requiring in-depth investigations.

4.2 Scope

The scope has been agreed on jointly by the project stakeholders. It is an evolving project as the government directives evolve. Currently, the scope focuses on the following:

- Data collection from workplaces that employ over 50 employees.
- Data requirements have been defined as per Section 5. Data Requirements.
- Existing employer screening tools to be exploited (e.g. organizations where there are no digital platforms).
- Data lake to be implemented at NIOH for hosting of all data points collected from employers

4.3 User profiles and responsibilities

The users of the surveillance tools including their responsibilities are:

- **Health workers:** for screening, testing and medical data collection and submission to NIOH data lake (both business tools and CMORE platform can be used)
- **Employers, contractors, 3rd party employers:** for self-screening data collection and submission to the NIOH data lake (custom screening business tools to be used and businesses responsible for user management; where manual processes are in place, digital spreadsheets to be submitted to the NIOH data lake)
- **NIOH:** for the analysis and visualization of the screening, testing and co-morbidities data with the help of external data scientists.
- **CSIR:** to support the NIOH with data collection, storage, analysis, security and monitoring

- **NICD:** to support NIOH with epidemiological data from sub-district / district level: data from the Notifiable Medical Conditions (NMC) system and laboratory test results.
- **UCT, UKZN, UP and Wits:** to provide input on the science of the health aspects, and to conduct epidemiological analyses to better understand the workplace risk factors and interventions for transmission and severe outcomes of the infection and its impact on the health of workers in various contexts.

5. Data Requirements

For the project to be effective, standardized data points are required from the stakeholders (businesses in the private and public sectors). The core data points that the OHS surveillance tools need to, at a minimum, accommodate the following:

5.1 Business registration

The following business data points are required for **once-off registration** of the business. The business registers on an online platform (<https://ohss.nioh.ac.za/>).

Table 1: Business registration data requirements

Business Data (on registration)		
Business ID	INT	System-generated
Business Name	TEXT	NOT NULL
Business Industry/Sector	TEXT	NOT NULL
Business Address	TEXT	NOT NULL
Business Province	TEXT	NOT NULL
Business District	TEXT	NOT NULL
Total number of Employees	NUMBER	NOT NULL
Total number of female employees	NUMBER	NOT NULL
Total number of Male employees	NUMBER	NOT NULL
Total number of employees per job category	NUMBER	NOT NULL
Business contact name	TEXT	NOT NULL
Business contact email	TEXT	NOT NULL
Business contact telephone number	NUMBER	NOT NULL
Date of registration	TEXT	NOT NULL

Some of the information will be generated by the system, such as a unique business ID and date of registration. The business CIPC registration number may be used as well. All data points labelled (NOT NULL) are compulsory to provide. This business information will also be used to create a username and password for the business for data sharing to the NIOH data lake. The Business Industry variable will be based on the International Classification of Occupations (ISCO-88) or a similar equivalent from Statistics South Africa (StatsSA).

5.2 Symptom screening

Daily screening of employees occurs at workplaces prior to entry into the workplace. This is done as per the NDOH Guidelines for symptom monitoring and management of essential workers for COVID-19 related infection [<https://www.nioh.ac.za/wp-content/uploads/2020/04/Guidance-for-symptom-monitoring-and-management-of-essential-staff-with-COVID-19-related-illness-final.pdf>].

The data points shown in Table 2 are required for workplace surveillance initiative only once within a 24hr reporting period. In order to link the screening to an employee who has tested positive, it is recommended that employers generated a unique *employee id* that can be used later on to link the test results.

A possible recommendation would be to generate a list of universally unique identifiers (UUIDs) that can be linked internally to the employee's personnel number or identity number. However, only the UUID can then be shared with NIOH in order to preserve employees' privacy. Tools such as the online UUID generate can be used: <https://www.uuidgenerator.net/> This will ensure that only anonymised data is entered into the NIOH data lake.

Table 2: Employee symptoms screening data requirements*

Symptom Screening		
Business ID	INT	System Generated
Consent obtained	BOOLEAN	NOT NULL
Employee ID	INT	(Employer Generated or SA National ID) NOT NULL
Screening date	DATETIME	NOT NULL
Employee Age	NUMBER	NOT NULL
Employee sex	TEXT	NOT NULL
Job Category*	TEXT	NOT NULL
Province	TEXT	NOT NULL
District	TEXT	NOT NULL
Symptoms Present (yes/ no)	BOOLEAN	NOT NULL
Specific Symptoms Detected	ARRAY	OPTIONAL
Screening Outcome	TEXT	OPTIONAL

*Job category in the CMORE app will be a drop-down box
DATA SOURCE: Employers

For third-party employers such as contractors, the same UUID could be used. However, it is accepted that this may be difficult to link back to tests at a later stage.

The list of provinces and districts used by NIOH is provided. These are however generic for the whole country from StatsSA. The JobCategory field will be based on the ISCO-88 classification, using the first and second level categories. The following list of symptoms could be considered during screening:

Although data is collected daily, it may be submitted to OHSS only once a week.

Table 3: List of COVID-19 current new-onset (past 24 hours) symptoms

Symptom List
Fever >38°c
Chills
Dry cough
Sore throat
Shortness of breath
Tiredness
Lack of taste or smell
Conjunctivitis (red eyes)
Diarrhoea
Muscle pains
Nausea or vomiting
Dizziness
Headache

DATA SOURCE: Employers

This list will be shared in an array format via the NIOH API, CSV file, CMORE app or another secure channel, as agreed upon.

The screening outcome could be provided using the following options:

Table 4: Screening outcome options

Symptoms Outcome Options
No action required
Referred for medical consultation
Referred for self-isolation
Referred for a test and isolation
Hospitalisation

DATA SOURCE: Employers

In the CMORE app, all the options are provided for in the dropdown list making it easier to select and share. This information is provided by the person conducting the screening on the employee. It is expected that the person conducting the screening, if not a medical practitioner, has been trained on how to manage an employee that is symptom positive.

5.3 COVID-19 positive test data

As per the legal directives, employees are required to share their testing results (positive) with the employer. The employer is also required to share testing results of positive employees with the NDOH.

Thus, the following data points are required for sharing (**only for employees that have tested positive and shared once**). At this stage, the Employees' South African Identification (ID) number is required as per CoGTA, NDoH and DMRE legal directives. This will enable linking of employee data to NICD/ National Health Laboratory Service (NHLS) test results, NMC,

DMRE, DEL, Compensation Fund and other data sources. Employers are encouraged to inform employees of this requirement. The following data points will be completed by the Employer (employee ID; business ID, test date, test type, presence of symptoms, test result, post-test result action, reporting action). Employer to submit comorbidity reports as well i.e. specific vulnerability details are not mandatory. The identifiable comorbidity and other risk factor information to be obtained from the treating Medical Practitioner and/or NICD NMC reports.

Table 5: Positive test data requirements

Positive test		
Business ID	INT	NOT NULL
Employee Business Generated ID	INT	NOT NULL
Employee SA National ID	INT	NOT NULL
Province	TEXT	NOT NULL
District	TEXT	NOT NULL
Sex	TEXT	NOT NULL
Age	NUMBER	NOT NULL
Job category	TEXT	NOT NULL
Test Date	DATETIME	NOT NULL
Test Result	TEXT	NOT NULL
Test type	TEXT	NOT NULL
Symptoms Present	BOOLEAN	NOT NULL
Number of high-risk workplace contacts	NUMBER	NOT NULL
Vulnerability Present	BOOLEAN	NOT NULL
Post-test result action	ARRAY	NOT NULL
Exposure Contact type	ARRAY	NOT NULL
Reporting Action	ARRAY	NOT NULL

The Test type includes options such as PCR, Antigen, and Antibody. The actions that were taken after the positive test result was reported to the employer could be one or more of the following: 1) self-isolation at home, 2) isolation at public facility 3) isolation at employer’s facility and 4) hospitalization.

In terms of reporting done, the following are the possible options:

*Table 6: Reporting list**

Reporting Action List	
Reported to Department of Employment and Labour	Optional
Reported to COIDA	Optional
Reported to DMRE (if applicable)	Optional

*COIDA: Compensation for Occupational Injuries and Diseases Act

Exposure contact types are classified as follows:

- Unknown
- Work contacts
- Community contacts
- Family contacts
- Large events contacts

- Travel history from a designated hotspot
- Public transport
- Other: provide information

5.4 Vulnerability data

The vulnerability of the employee will be assessed using the recommended list of comorbidities and risk factors (Appendix C). The list of underlying health conditions for the positive case could be in line with the following data points:

Table 7: Comorbidities and risks list

Business ID	NOT NULL
Employee ID	NOT NULL
Vulnerability present	NOT NULL
Age ≥60 years	OPTIONAL
Pregnancy ≥28 weeks	OPTIONAL
Smoking current	OPTIONAL
Asthma	OPTIONAL
Chronic Lung Disease	OPTIONAL
Diabetes	OPTIONAL
Hypertension	OPTIONAL
Serious heart conditions	OPTIONAL
Chronic Kidney Disease	OPTIONAL
Chronic Liver Disease	OPTIONAL
Immunocompromised	OPTIONAL
Tuberculosis previous	OPTIONAL
Tuberculosis current	OPTIONAL
HIV	OPTIONAL
Obesity (<i>measured by obtaining Height and Weight of employee</i>)	OPTIONAL
Received flu vaccine	OPTIONAL

The identifiable comorbidity and risk factor data should be reported if available.

In addition, mine workers and health care workers require additional data points as required by the DMRE and WHO respectively. Annexure D and E.

Ideally, there should be a link between the screening history results of the employee over a period of 14 days and the testing results. If the ID number may not be shared, the use of the UUID is recommended for all the data sharing transactions. However, to link with external governmental data sources an ID number is essential.

5.5 Return to work data

In the event of a positive result and/or hospitalization, the clinical outcome and return to work information of COVID-19 positive employee is required. The information is **provided once-off** and will be used to understand the patterns regarding positive cases in the workplaces, hospitalization trends, including the *outcome status* of positive cases (e.g. full recovery, partial recovery, or death) and the impact on the company and industry.

The data points in Table 8 are required for sharing clinical management data of COVID-19 positive employee for OHS surveillance purposes. The information required is only what is accessible to the employer. The employee ID provided will be linked to the NMC (Appendix B) database and hospital records for further information.

Table 8: Return to work (positive cases only)

Clinical Management and Outcomes		
EmployeeID	INT	NOT NULL
BusinessID	INT	NOT NULL
Hospitalized	BOOLEAN	NOT NULL
Hospital Type (Private/Public)	TEXT	NOT NULL
Date of admission	DateTime	NOT NULL
Outcome (Discharge or Death)	Array	NOT NULL
Outcome date	BOOLEAN	NOT NULL
Return to work date	TEXT	NOT NULL
Return to work fitness level	TEXT	NOT NULL
Compensation claim	ARRAY	NOT NULL
Percentage disablement	NUMBER	OPTIONAL
COVID Claim reference number	NUMBER	OPTIONAL

5.6 Contact Tracing

For cases with symptoms and referred to testing and isolation, the following data points are required for contact tracing purposes. (Appendix A: Directives). These data points need to be shared **once per suspected and/or confirmed cases**.

Table 9: Contact tracing data requirements

Contact Tracing		
EmployeeID	INT	NOT NULL
BusinessID	INT	NOT NULL
ContactKnown	BOOLEAN	NOT NULL
Number of workplace contacts	NUMBER	NOT NULL

The above data points would then need to be submitted to the NIOH data lake in line with the Data Sharing Process, considering privacy and security.

Table 10: Legal mandatory reporting of Data

	Type of information collected	Regulatory position
1	Symptom screening (Table 2 & 3 in Framework)	Mandatory reporting: Construction, manufacturing, business and financial services firms with more than 500 employees- <ul style="list-style-type: none"> • CoGTA regulation 46(6)(c) & (d) • Revised CoGTA regulation 17th September section 78 Mining sector- <ul style="list-style-type: none"> • DMRE regulation 8.4.1, 8.4.2, 8.4.3 & 8.4.4 All employers who employ more than 50 employees- <ul style="list-style-type: none"> • DoEL Directive 28 September 2020, section 4(2)(a)(ii)
2	Positive status (Table 5 in Framework)	Mandatory reporting <ul style="list-style-type: none"> • CoGTA regulation 46 (6); • DoEL Directive 28 September 2020, section 4(k); • Paragraph 2(a) of the positive employee guideline; and • DMRE regulation 8.4.1, 8.4.2, 8.4.3 & 8.4.4 Employers who employ more than 50 employees- <ul style="list-style-type: none"> • DoE & L Directive 28 September 2020, section 4(2)(a)(iii)
3	Screening outcomes (e.g. refer to isolation or testing, etc. Table 4 in Framework)	Not specifically regulated but arguable that this data sufficiently links to the positive status data and can be reported, to extent employer actually collects such data.
4	Vulnerability information (Table 7 in Framework)	Voluntary / opt-in (guideline actually recommends that the underlying co-morbidity is kept confidential between patient and doctor and only the fact that there is a co-morbidity present is shared with the employer) <ul style="list-style-type: none"> • CoGTA regulation 5(5) and 46(5); Employers who employ more than 50 employees- <ul style="list-style-type: none"> • DoE & L Directive 28 September 2020 section (4)(2)(i)
5	Clinical management (eg hospitalization) and return to work, etc.) (Table 8 in Framework)	Voluntary / opt in
6	Contact tracing (Table 9 in Framework)	The employer must provide NDoH with administrative assistance. <ul style="list-style-type: none"> • CoGTA regulation 8(6); (21) and (22) and • Paragraph 2(a) – (c) of the positive employee guideline • DMRE regulation 8.4.1, 8.4.2, 8.4.3 & 8.4.4 • DoEL Directive 28 September 2020, section 4(1)(k)

5.7 Data sources

There are a number of data sources that will be relied upon for the OHS COVID-19 surveillance system.

Table 11: Data sources

Data Source	Data Provided
Private and Public Sector Employers (over 500 employees)	Symptom screening, positive tests, reporting actioned, contact tracing, return to work, compensation data
NICD	Epidemiological data, NMC and sentinel hospital admissions database (DATCOV)
NHLS and Private Testing Labs	COVID-19 testing data
Compensation Fund	Compensation Claims data
National Department of Health	Health Care Worker Data
Department of Mineral Resources and Energy	Mine Worker Data
Department of Employment Labour	Business administrative, environmental and PPE controls after employee tests positive
StatSA	Provincial and District Data
Public and Private sector Health Facilities	Patient admission data (positive cases only)

6. Data Flow Process

The data sharing process can be quite complex when many parties are involved and a myriad of digital systems are used. It is, therefore, important that various considerations be made when designing the data flow process.

The ultimate aim is that all data will reside in the NIOH data lake. However, it is accepted that various mechanisms would need to be considered when the data is shared, and these approaches must be done in a secure and privacy-preserving manner.

For the data collection and transfer to commence, the business or organisation would need to be registered using the Occupational Health Surveillance Systems Web Portal (available through this link: <https://ohss.nioh.ac.za/>) so that a Unique Business ID is allocated to the business. This unique business identity would need to be provided in every data submission transaction to the NIOH.

6.1 Overall OHS surveillance system data flow

The data flow includes processes that are related to the data that is required by NIOH. These processes are: 1) Vulnerability data 2) Symptom screening process 3) Positive testing data including contact tracing and 4) Return to work data (after hospitalization or positive case).

The employer provides the screening data as per the data point requirements into the OHS system. The business would on registration choose one of the available options for data submissions. This could be the semi-manual cloud system, API integration or CMORE web/mobile application. The data is stored in the organisation or via the CMORE platform before being submitted to NIOH using the various channels as discussed in this document.

With the clinical data after a positive case, the employer would be required to provide information such as the *hospitalisationDate*, *OutcomeStatus* and others as well as the *ReturntoWork date and assessment*, including if a compensation claim has been submitted to the Compensation Fund.

For the positive testing data, NICD may confirm the results of an employee. However, for this to happen, it would be important for the employer to share personal information (ID number) of the positive employee in addition to the UUID that is shared with the screening data.

The employer should also submit the contact tracing information as per the template provided in the data requirements. The contact tracing information could then be stored in the organisation and thereafter submitted to NIOH via the chosen method during registration.

6.2 Vulnerability data flow

For all the employees in the workplace, the employer on behalf of the employee would submit the data via CSV file (formatted accordingly) or secure API or CMORE mobile/web app to the NIOH Data Lake

6.3 Symptom screening data flow

The symptoms screening data flow protocol is summarized as per Figure 1. The screening data is packaged in either JSON or CSV format and submitted to NIOH Data Lake as described in the Solution Architecture in Section 6.

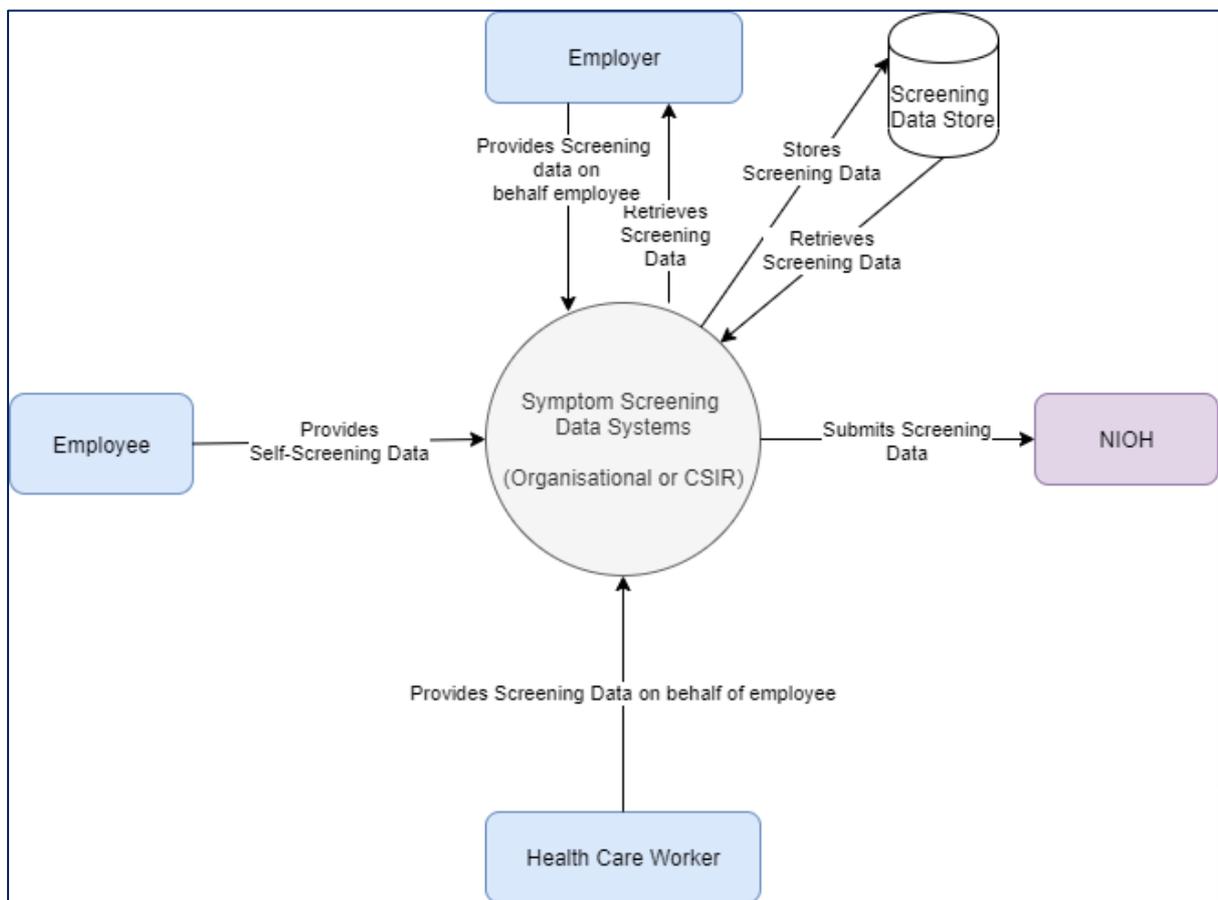


Figure 1: Screening data flow protocol

The symptom screening data in a JSON format could be represented as follows:

```

1 {
2   "screen-data": {
3     "employee": [
4       {
5         "employeeid": "ad0bf83a-306d-4f6a-8b93
6           -1346a1447a3f",
7         "consent": "y",
8         "businessid": "b9b6eafe-b996-11ea-b3de
9           -0242ac130004",
10        "screeningdate": "29-06-2020 08:00",
11        "employeeage": "43",
12        "employeegender": "Male",
13        "jobcategory": "Security",
14        "province": "Gauteng",
15        "district": "City of Tshwane",
16        "symptomsstatus": "No",
17        "symptomsdetected": {},
18        "screeningoutcome": "not action required"
19      }
20    ]
21  }
22 }

```

Figure 2: JSON formatted screening sample data (when using API)

6.4 Positive testing data flow

For all the employees in the workplace that test positive, the following data flow process is recommended (Figure 3). The employer on behalf of the employee would submit the data via CSV file (formatted accordingly) or secure API or CMORE mobile/web app to the NIOH Data Lake

For verification of the positive test results with NICD, an employer may be required to provide a South African ID no. as NICD may not have the unique employee id generated for screening data submission to the NIOH.

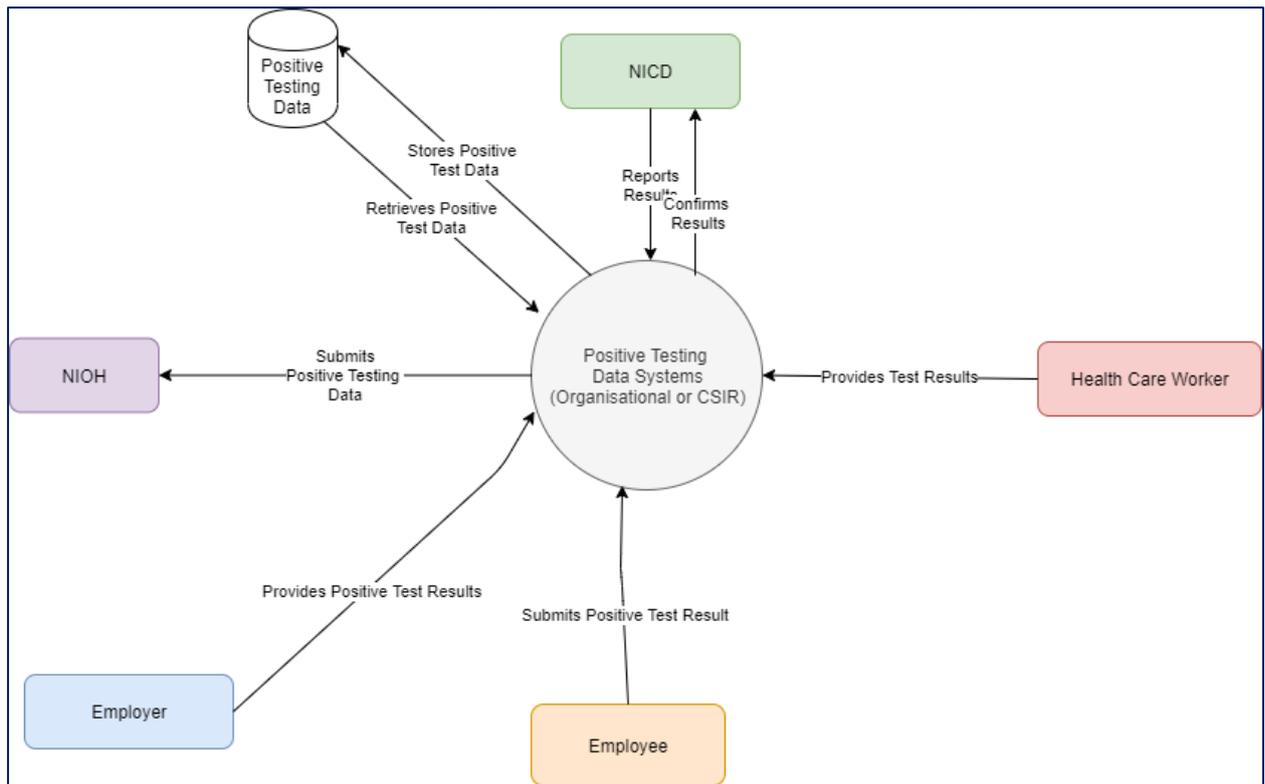


Figure 3: Positive testing data

6.5 Return to work case data flow

Figure 4 indicates the data flow process for collecting and submitting the return to work and health outcome data to NIOH. This would be required when an employee has tested positive and/or has been hospitalized (Figure 5). Critical data points in this process are interventions taken to deal with the positive case, outcome status and assessments taken for the positive case to return to work, including support for a compensation fund claim.

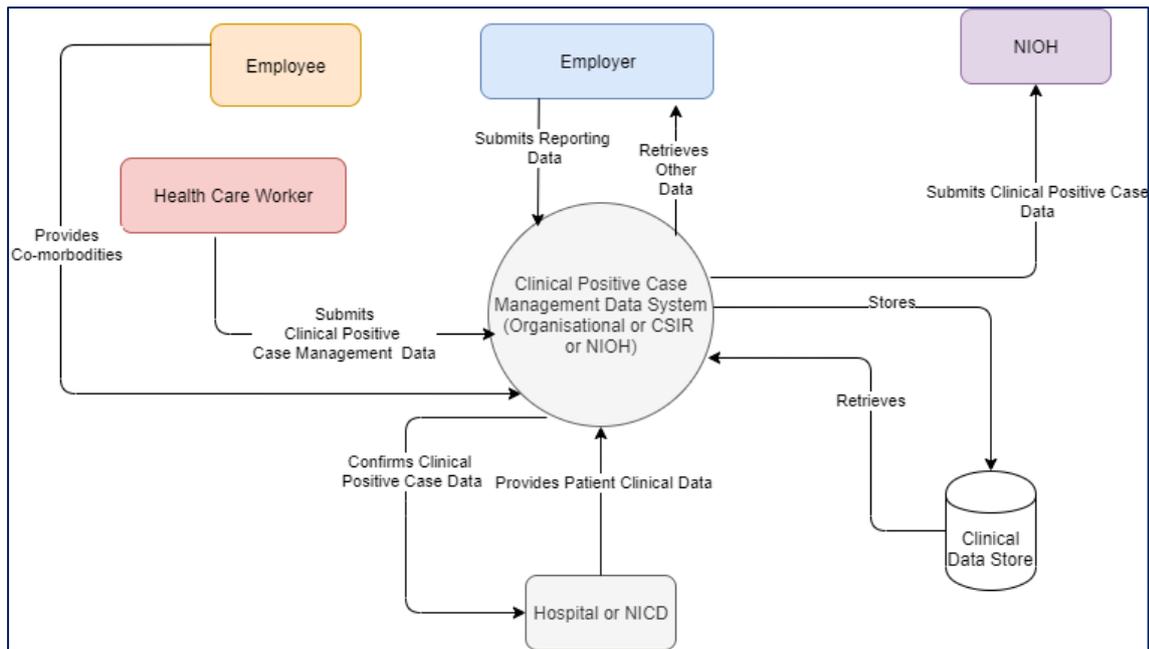


Figure 4: Return to work data management

6.6 Supported data format

The data transfer formats that could be supported by the NIOH Data Lake are:

- JSON data format
- CSV data format

7. Solution Architecture

The COVID-19 OHSS platform will use both existing and new solutions. Existing solutions will be repurposed where possible. Open source platforms should be the first option unless proprietary alternatives already exist with licenses in place.

7.1 Solution architecture

The proposed high-level technical infrastructure (see: Figure 5) accommodates various data collection modalities. It accommodates both organisations with existing tools and those with no digital tools.

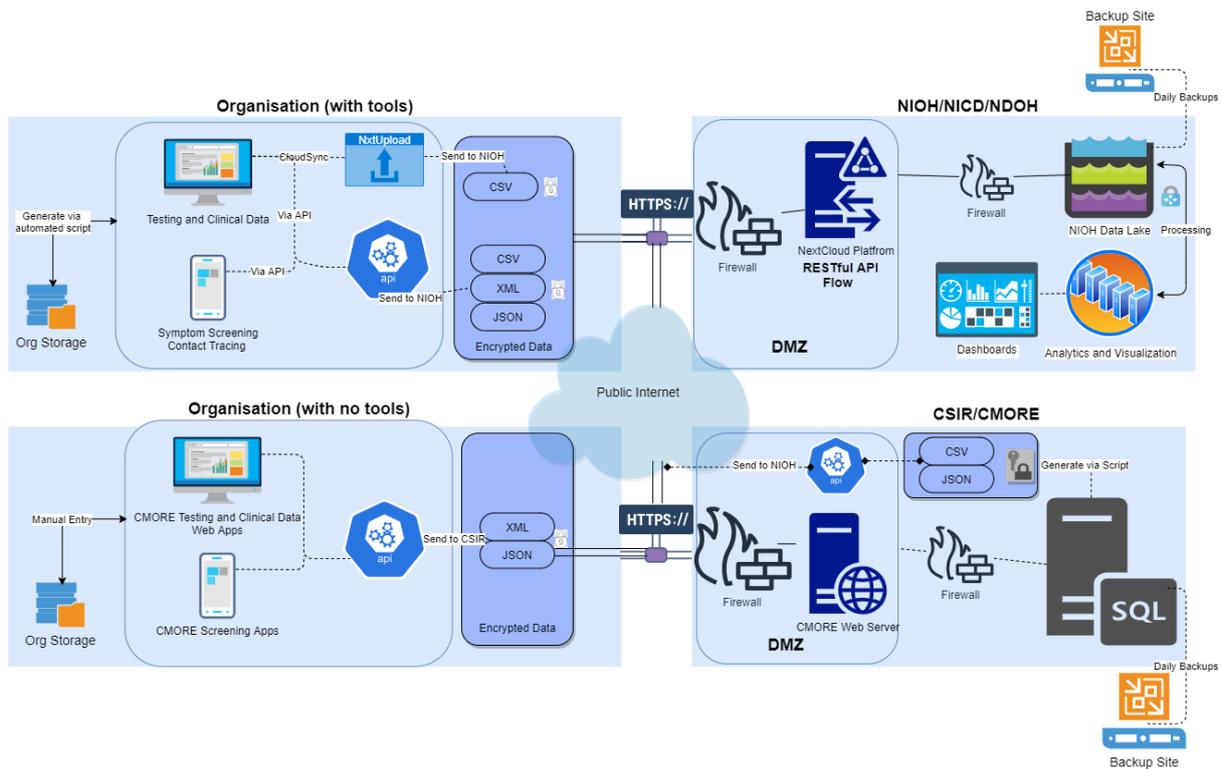


Figure 5: OHS surveillance high-level architecture

Organisations with existing digital tools can submit the data to the NIOH data lake either through encrypted CSV data file and/or secure API transfer. The technical details of the API will be shared with the organisation once registration has been approved and login credentials shared. However, the API will accommodate the different data point requirements and consider all the security requirements as detailed in Section 7.

7.2 Organisations with tools

Organisations with their existing screening and clinical data management tools can submit the data to the NIOH in the following ways:

- **Data in a pre-packaged CSV format** to the specific Next Cloud server that will be automatically processed at the NIOH and stored in the Data Lake.
- **Secure API:** package the screening and other required data in the JSON file structure with the necessary data points. The JSON structure will be shared with the organisation that has opted for this option for data submission once the registration is confirmed and credentials shared with the organisation's technical team.

7.3 Organisations with no digital tools

Organisations that do not have existing screening and clinical data management tools can submit the data to the NIOH in the following ways:

- **CMORE platform:** organisations can use the CMORE mobile and/or web platform to collect screening, testing, and clinical data from the employees. When using CMORE the data is submitted directly to the CSIR data server in a secure manner.
- **Next Cloud Platform:** organisation can package the screening and/or other required data points as per the OHSS templates and upload into their cloud workspace (i.e. Next Cloud platform) using the credentials that will be shared upon final approval of the business registration.

7.4 Proxy service

The NIOH will set up a reverse proxy within a demilitarized zone (DMZ) to expose NIOH data collector to the organisation in order to receive OHS surveillance data. This is done for security reasons so that external organisations do not interact directly with the NIOH data lake. In the reverse proxy, a secure cloud (e.g. Next Cloud platform) has been set up for receiving the data in line with the data structures agreed upon and represented in a CSV format.

7.5 Data lake technology stack

The NIOH has set up a Data Lake for the storage of the various data sources related to the COVID-19 surveillance. The Data Lake utilizes the following technologies:

- Windows 2019 or Ubuntu 20.04 LTS Linux Server Operating System
- Virtualization Server (e.g. VMWare or any other available one)
- SQL Server database
- FastAPI: a web framework for building APIs with Python
- Web Load Balancer: for balancing resources in the reverse proxy, especially when many write requests from organisations are made.
- Next Cloud Platform – for file transfer from the organisation into the reverse proxy service.

7.6 Technical infrastructure requirements

The current technical requirements for the reverse proxy and the data lake implementation at NIOH are as follows (*please note these may change as requirements evolve*):

System	Requirements
1x Windows Server (Data Lake)	1x 20 CPU Cores, 512 GB RAM, 2TB HDD
1 x Linux Server (reverse proxy)	1x10 CPU cores, 2TB HDD, 100 GB RAM
MS SQL Server	4 vCPU Cores, 64 GB RAM, 1 TB HDD
Apache Nifi	2 vCPU Cores, 16 GB RAM, 100 GB HDD
Fast API	2 vCPU Cores, 8 GB, 200 GB HDD
Next Cloud	2 vCPU Cores, 16 GB, 500 GB HDD
Grafana	2 vCPU cores, 8 GB RAM, 120 GB HDD
Network Connection	1Gbps or more
Security	Physical Firewall, SSL Certificates, AVs, Web Firewall, (others to be specified upon finalization of the requirements)

7.7 Bandwidth Considerations

For the efficient operation of the data transfer from the organisational tools and CMORE web and mobile platforms to the NIOH data lake and proxy service, several bandwidth estimations need to be taken. Thus, it is important that data transfers via the reverse proxy be scheduled in a distributed fashion. Moreover, a web load balancer should be considered for the reverse proxy service.

It is expected that data from businesses will be scheduled systematically with either daily API submissions and/or weekly cloud and CMORE data submissions.

8. Data Privacy and Security

Data protection by design and default is crucial, especially when dealing with sensitive data, such as medical data. In this initiative, we are strictly observing the principles of the Protection of Personal Information Act (POPIA) and General Data Protection Regulation (GDPR) to ensure data privacy that is being collected from different organisations.

The OHS surveillance tools are meant to collect and process required data exclusively for the purposes of Symptom Screening and Management, Occupational Health and Safety, Clinical Management and Contact Tracing.

8.1 Confidentiality

Symptom screening data will have no identifying information. Testing and contact tracing data as per legal requirements will have the employee ID number. Data with identity numbers, GPS coordinates, business details and other potentially identifying information will be anonymised at the NIOH before any information is distributed. The identifying data will only be seen by the authorized personnel at the business and principal investigators at the NIOH.

8.2 Privacy considerations

To ensure user's privacy, all data collected needs to be accompanied by a data-sharing agreement signed between the parties.

In addition, evidence of employee's consent to the privacy statement of the organisation concerning the screening, testing, contact tracing, and clinical data collection needs to be shared with the NIOH.

The privacy statement needs to cover the following elements:

- Employees' personal data that is being collected
- How and where it is stored and for how long
- How it is shared and processed
- Who it is shared with and why

For the purposes of this project, the data controller of the OHS surveillance data once shared by the organisations is the NIOH. NIOH will only be responsible for the privacy of the data when it is stored and processed in their premises and systems. Each organisation would still be responsible for their employees' privacy.

During the vulnerability, screening, testing and return to work data collection processes, employee's confidentiality will be maintained and no data that directly links the employee with COVID-19 data, trends or patterns will be shared.

8.3 Information security considerations

All OHSS data collected by NIOH will be securely stored and processed in the NIOH data centre. The following measures will be in place:

- All systems used for data collection, storage, and processes will be **assessed on regular basis** (every month) for any security vulnerabilities.
- All systems used for data collection, storage, and processing will be **updated and patched on regular basis**.
- All data transfers between the organisation and NIOH will be through **secured and encrypted channels**
- Encryption mechanisms such as HTTP over TLS (HTTPS) and PGP recommended ensuring that messages are not readable for outside viewers.
- API data sharing to follow appropriate security measures to be implemented by NIOH including **authentication, authorization, logging, and rate-limiting for any API** calls into the NIOH proxy service
- To ensure the authenticity of the data being shared, all files for data transfer (whether via email or API) **need to be digitally signed** (according to the specifications agreed upon).
- **Two factor-authentication** is recommended on the OHS surveillance data servers
- **Certificate pinning** recommended to ensure that trusted communication or data transfer only happens between the OHS surveillance tools in the organisations and the NIOH Data lake
- **IP Whitelisting** is recommended to explicitly allow data transfer from registered businesses
- The NIOH Data Lake **will not be publicly accessible** and data shared will be via a **proxy service** such as the Next Cloud.
- Each organisation to have its own username and password for sharing the data via the NIOH proxy service
- Each organisation to **encrypt the data for transfer to NIOH using the agreed-upon public key**
- Only NIOH to have the **private key** for decrypting shared data via the proxy
- Data to be deleted from the proxy service once decrypted and stored into the Data lake
- Only a **limited number of system administrators and developers** will have access to the raw data from the NIOH for processing, analysis and interpretation.
- System administrators and developers will all have their **own usernames and passwords for auditing purposes**. Passwords change policy will be every 30 days.
- **Only authorised health authorities** at NIOH, NICD, and NDOH will have access to the processed data in a secure manner

-
- **Continuous monitoring of security events and incidents** including logging of access to the data for auditability and traceability will be implemented
 - **Separation of concerns** will be implemented and no organisation will be able to see or access data of other organisations

8.4 Data minimization

Data collection in this project is limited to the minimum data required for NIOH. As much as most of the data to be collected for this project would be anonymised, there are instances where personal identifiable information (PII) will be collected, such as ID numbers, names, surnames, job category, phone number or work address. This is important for useful analysis and trends, including contacts in cases of clinical data management.

Employees' location data is not collected by the tools provided by NIOH, and PII data will be stored only for a limited period, whilst anonymized may be kept for longer for R&D purposes as prescribed in the various Disaster Management Directives and the Occupational Safety and Health Act, 95 of 1993.

8.5 Data Retention

The OHS surveillance data will be kept as per the following guidelines

- Personal data: only for 14 days.
- Anonymised data: to be kept as long as required for research and development purposes in line with the employers' data sharing agreements
- Processed data and reports to be kept as long as required

8.6 Disaster recovery

In order to accommodate unforeseen data losses, it is critical that a disaster recovery plan is in place for the NIOH data lake. This means a data backup needs to be in place and regular backups be done off-site on daily basis. The back-site needs to be secured and data need to be stored in an encrypted format to ensure security.

9. Data Analytics and Visualization

In order to draw out patterns and trends from the OHS surveillance data, various dashboards and formal reports will be created by NIOH, NICD, NDOH and the CSIR supported by the private stakeholders.

The various dashboards will provide up-to-date information on COVID-19 screening, testing and clinical management of employees by industry for local monitoring and informing decisions on the work-related spread and potential outbreaks.

Google Studio platform has been chosen as an interim solution to support the data analytics and visualization requirements. Google Studio¹ is an open to use platform to analyse, report, and visualize myriad of data sources, including CSV formats.

Different data sources can be connected using the platform and that means GS can connect directly to the NIOH Data Lake to visualize statistics and analytics of interest pertaining to the OHSS.

Different charts and scorecards could be used to visualize trends and patterns. The platform also allows for the data to be embedded into the external web portal or even exported into other formats such as PDF. Data could be filtered according to different parameters such as data and regions. The dashboard would easily update on the fly as the data is also updated.

Data analytics dashboards and reports that will be produced as follows:

- **Weekly updated COVID-19 core indicators per industry (private and public)**
 - Number of employees with symptom screening tests
 - Proportion who screened positive
 - Proportion who screened positive and with what symptoms
 - Proportion who screened positive and referred for medical consult
 - Proportion who screened positive who were referred for testing
 - Number of employees tested
 - Proportion tested positive
 - Outcomes of positive tests
 - Number/proportion recovered and returned to work
 - Number/proportion died
 - Correlation with provincial and/or district COVID-19 cases
 - Proportion of employees with prevalent co-morbidities
 - Proportion of employees and types of co-morbidities if information is available
 - Prevalent symptoms
 - Identification of high-risk employees (sex, age-group and co-morbidity)
 - Identification of high-risk areas (province, municipality/district based on business address data)
 - Identification of high-risk industries and occupations

¹ <https://datastudio.google.com/>

- Identification or probability of work-related outbreaks (based on the increased number of cases per work area)
- Link to hotspots determined by NICD
- **Monthly COVID-19 cases**
 - Trends of COVID-19 core indicators (screening, testing and clinical management)
 - Rates (once we have employee numbers from each company)
 - Summary of high-risk employees, areas and industries and potential outbreaks
 - Case fatality rates (CFR)
 - Economic and human resource indicators- possible indicators include:
 - Trends in days lost at work per industrial sector
 - Loss of productivity – determined by days absent from work per company and/or per industry

10. Limitations

The key limitations in successfully implementing the project are lack of resources and/or funding. Almost everyone in the project is contributing pro-bono at this stage.

11. Conclusion

This COVID 19 OH surveillance system (OHSS) has the potential to create an updated, accurate picture of SARS-COV-2 spread in workplaces and its impact on South African workers and workplaces, providing important data to inform the sectoral, national, and local occupational health and public health responses to COVID-19, and inform strategies to develop and monitor workplace interventions (policy, technical, programmatic) in responding to the pandemic

12. Contact Details

For data reporting, the OHSS support desk can be contacted via email: OHSworkplace@nioh.ac.za.

For technical queries, the IT support desk can be contacted via email: ohssupport@nioh.ac.za

12. Annexures

Annexure A: Directives

1. COGTA Notice: 28 May 2020

16 No. 43364

GOVERNMENT GAZETTE, 28 MAY 2020

- (a) provide, or arrange transport to their employees coming to site, or, where this is not possible, consider staggered working time arrangements to reduce congestion in public transport;
- (b) stagger the return to work of employees to ensure workplace readiness and avoid traffic congestion during peak travel times as a result of the return to work;
- (c) screen employees daily for symptoms of COVID-19 and refer the employees who display symptoms for medical examination and testing where necessary; and
- (d) submit data collected during the screening and testing process to the Director-General: Health.

(7) (a) The relevant sector or industry body, if such a body exists, must, in the event of high health risks, develop sector-specific health protocols which must include provisions to limit the spread of COVID-19 in the sector concerned and provide for those circumstances where a firm cannot operate staggered working hours or provide transport to its employees.

(b) The sector-specific health protocols referred to in paragraph (a) must be developed in consultation with the Department of Health.

2. Department of Mineral Resources and Energy Notice – 18 May 2020

8.4 MONITORING AND REPORTING

The employer must establish a steering committee for COVID-19 to address the following:

- 8.4.1 Record and report to the relevant authority (NICD) and relevant mine's health and safety structure as per available guidelines (confidentiality must be adhered to), using forms provided by NICD.

-
- 8.4.2 Investigate all confirmed Covid-19 positive cases at the mine, in terms of section 11(5)(a)(ii) and (iii) and report within 24hours to the Principal Inspector of Mines using the NICD form.
 - 8.4.3 Consolidate the NICD reports into a monthly report and that must be reported to the Principal Inspector of Mines as determined by the DMRE.
 - 8.4.4 Keep the COVID-19 data (data for monitoring and investigation reports) at the mine as required by the NDOH and NICD.
 - 8.4.5 Appoint a COVID-19 Compliance Officer in line with the DMA with the necessary powers to provide oversight on the implementation of this guideline.

3. Department of Employment and Labour Notice – 28 September 2020

http://www.labour.gov.za/DocumentCenter/Regulations%20and%20Notices/Regulations/Occupational%20Health%20and%20Safety/OHS%20workplace%20Directive_%2028%20Sept%202020.pdf

http://www.labour.gov.za/DocumentCenter/Regulations%20and%20Notices/Regulations/Occupational%20Health%20and%20Safety/OHS%20workplace%20Directive_%2028%20Sept%202020.pdf

- 4. (1) Every employer must establish the following administrative measures:
 - (k) if a worker has been diagnosed with Covid-19, it must-
 - (i) inform the National Institute for Occupational Health² in accordance with the National Department of Health Guidelines³ either directly or through an employers' association;
 - (ii) inform the Compensation Commissioner in accordance with the Directive on Compensation for Workplace-acquired Novel Corona Virus Disease (COVID-19)⁴;

² At the following email address: OHSworkplace@nioh.ac.za or via the online platform at <http://ohss.nioh.ac.za/>

³ National Department of Health Guideline: **Guideline on the submission of COVID-19 related health data from workplaces to the National Department of Health** - see link in Annexure A.

⁴ GN 387, 23 July 2020, GG 4350.

-
- (iii) investigate the mode of exposure, including any control failure, and review its risk assessment to ensure that the necessary control and PPE requirements are in place;
 - (iv) determine the need to temporarily close the affected work area for decontamination using an incident-based risk assessment with due regard to the Department of Health's Guidelines⁵ after consultation with the health and safety committee, if there is one, or with a health and safety representative; and
 - (v) give administrative support to any contact-tracing measures implemented by the Department of Health.

(2) In addition to the duties listed in subdirection (1), an employer who employs more than 50 employees in a workplace -

- (a) must submit the following categories of data to the National Institute for Occupational Health⁶ in a manner set out in the National Department of Health Guidelines⁷:
 - (i) Each employee's vulnerability status for serious outcomes of a COVID-19 infection;
 - (ii) details of the COVID-19 screening of employees who are symptomatic;
 - (iii) details of employees who test positive in terms of a positive laboratory test for the COVID-19 virus⁸;
 - (iv) the number of employees identified as high risk contacts within the workplace if a worker has been confirmed as positive;
 - (v) details on the post-infection outcomes of those testing positive, including the return to work assessment outcome;
- (b) must submit the data referred to in para (a)-
 - (i) once in respect of each employee's status contemplated in sub-para (i);
 - (ii) as soon as possible before Tuesday of each week in respect of the data referred to in sub-paras (ii) to (v) for the previous calendar week commencing on Sunday;

⁵ *Guidance note for workplaces in the event of identification of a COVID-19 positive employee* - see link in Annexure A.

⁶ At the following email address: OHSworkplace@nioh.ac.za

⁷ *National Department of Health Guideline: Guideline on the submission of COVID-19 related health data from workplaces to the National Department of Health* – see link in Annexure A.

⁸ Namely an antigen or antibody test conducted by a laboratory. The type of test must be specified in the submission.

- (c) must inform its employees of the submission made in terms of sub-direction (a) and advise them of its adherence to the Protection of Personal Information Act, 2013 (Act No.4 of 2013);
- (d) must submit that data to an employer association if the association has-
 - (i) entered into an agreement with the National Institute for Occupational Health to receive, process and submit the data to the Institute; and
 - (ii) undertaken to submit the data on behalf of the employer.

4. COGTA Notice: 25 June 2020

2. Regulation 8 of the Regulations is hereby amended by—
- (a) the substitution for the heading of '**Contact tracing**' of the heading "**COVID-19 Database**";
 - (b) the substitution for the phrase "COVID-19 Tracing Database" wherever it appears for the phrase "COVID-19 Database";
 - (c) the substitution for subregulation (2) of the following subregulation:

"(2) The National Department of Health shall develop and maintain a national database in order to guide appropriate responses in addressing,

preventing or combatting the spread of COVID-19, including contact tracing and geospatial hotspot mapping.";

- (d) the substitution for subregulation (3) of the following subregulation:

(3) The COVID-19 Database may include all information considered necessary for the National Department of Health to guide appropriate responses in addressing, preventing or combatting the spread of COVID-19, including but not limited to:

- (a) the first name and surname, identity or passport numbers, residential address and other address where such person could be located, and cellular phone numbers of all persons who have been tested for COVID-19;
- (b) the COVID-19 test results of all such persons; and
- (c) the details of the known or suspected contacts of any person who tested positive for COVID-19.";

- (e) the substitution for paragraph (b) of subregulation (11) of the following paragraph:

"(b) may only be obtained, used or disclosed by authorised persons and may only be obtained, used and disclosed when necessary for the purposes of addressing, preventing or combatting the spread of COVID-19 through the contact tracing process or geospatial hotspot mapping.";

5. Compensation for Occupational Injuries and Diseases Act: Compensation for occupationally-acquired Novel Coronavirus Disease (COVID-19)

Department of Labour –Notice 193 of 2020, 23 March 2020

https://www.gov.za/sites/default/files/gcis_document/202003/43126gen193.pdf

Occupationally-acquired COVID-19 is a disease contracted by an employee as defined in the COID Act arising out of and in the course of his or her employment. This notice deals with occupationally-acquired COVID-19 resulting from single or multiple exposures to confirmed case(s) of COVID-19 in the workplace or after an official trip to high-risk countries or areas in a previously COVID-19-free individual.

A claim for occupationally-acquired COVID-19 shall clearly be set out as contemplated in and provided for in sections 65 and 66 of the COID Act.

Annexure B: Notifiable Medical Conditions

Department of Health: Regulations relating to the surveillance and the control of notifiable medical conditions. 15 December 2017. https://www.nicd.ac.za/wp-content/uploads/2017/12/41330_15-12_Health-compressed.pdf



WHAT IS A NOTIFIABLE MEDICAL CONDITION (NMC)?

Notifiable Medical Conditions are diseases that are of public health importance because they pose significant public health risks that can result in disease outbreaks or epidemics with high case fatality rates both nationally and internationally.

WHY IS IT A LEGAL REQUIREMENT TO TIMEOUSLY REPORT ALL NMC?

The only way we can control spread of infectious diseases within the population is through identification of diseased persons and implementation of necessary public health actions to ensure that the disease is not spread to other people. Real-time efficient surveillance and reporting of such diseases provides an early warning signal and provides a window of opportunity to interrupt the disease transmission cycle.

The International Health Regulations, 2005 (IHR) and the National Health Act, 61 Of 2003 in South Africa require the rapid detection of NMC, as well as the prompt risk assessment, notification, verification and implementation of timely interventions.

FOR ANY NMC RELATED QUESTIONS/QUERIES/CONCERNS?
NMC helpline: 072 621 3805
Email: NMCsurveillanceReport@nicd.ac.za
Fax: 086 639 1638
Website: www.nicd.ac.za

WHO IS RESPONSIBLE FOR REPORTING NMC?

Every doctor or nurse (health care provider) in both the public and private health sector who diagnoses a patient with any one of the NMC must report the case. **Failure to report a NMC is a criminal offense.**

IN SOUTH AFRICA WHICH CONDITIONS ARE NOTIFIABLE?

Category 1 NMC

Must be reported immediately using the most rapid means upon clinical or laboratory diagnosis followed by a written or electronic notification within 24 hours of diagnosis.

Category 2 NMC

Must be reported through a written or electronic notification, within 7 days of clinical or laboratory diagnosis but preferably as soon as possible following diagnosis.

Category 3 NMC

Must be reported weekly by all public and private laboratories.

Category 4 NMC

Must be reported monthly by private and public health laboratories

Enhanced COVID-19 Notifiable Medical Conditions (NMC) Notification Form

(Section 90 (1) (i), (k) and (w) of National Health Act, 2003 (Act no. 61 of 2003))
 This form must be **completed immediately** by the health care provider who diagnosed the condition. **Please mark applicable areas with an X**

Health facility name (with provincial prefix)		Health facility contact number		Health district	
Patient file/folder number		Patient HPRS-PRN		Date of notification	
Patient demographics		Patient residential address			
First name		Street/dwelling unit/building/ERF number			
Surname		Street name, building, location description			
RSA ID/Passport number		Sub-place, suburb, village, postal area			
Citizenship		Town/city		Post code:	
Ethnic group		Employer/educational institution address			
Date of birth		Institution name			
Age		Street name, building, location description			
Gender		Sub-place, suburb, village, postal area			
Contact number		Town/city		Post code:	
Next of kin		Contact number			
Name		Occupation			
Surname		Unemployed Student Healthcare worker			
Relationship to the patient		Health laboratory worker Other (specify)			
Contact number		Hospitalisation			
Medical condition details		Admission status		Outpatient Inpatient	
Medical condition		Clinically required hospitalisation		Yes No	
Was the patient previously tested for COVID-19?		Date of admission		y y y y - m m - d d	
Yes (if repeat test) No (if first test) Unknown		Level of care		General ward High Care ICU	
Date of symptom onset		If High Care/ICU			
Symptoms		Date entered High Care /ICU			
Fever Sore Cough Shortness of breath		y y y y - m m - d d			
Myalgia/body aches Diarrhea Other		Date exited High Care/ICU			
Case severity		Oxygen requirements during hospitalisation			
Asymptomatic Mild ¹ Moderate ² Severe ³		Room air Nasal cannula oxygen			
Date of diagnosis		Mechanical ventilation			
Clinical signs and symptoms ONLY Laboratory confirmed		Start date			
Rapid test X-Ray Other		y y y y - m m - d d End y y y y - m m - d d			
Method of diagnosis		ECMO ⁵			
Source of PUI ⁴		Start date			
Field testing Health facility Healthcare professional		y y y y - m m - d d End y y y y - m m - d d			
Name of source of PUI		Patient received systemic antimicrobial treatment during hospital admission for a probable or confirmed healthcare-associated infection			
		Yes No Unknown			

¹Mild - not requiring hospitalization for clinical reasons
²Moderate - requiring hospitalization
³Severe - requiring high care/ICU
⁴PUI - Person under investigation
⁵ECMO – Extracorporeal membrane oxygenation

Enhanced COVID-19 Notifiable Medical Conditions (NMC) Notification Form

(Section 90 (1) (i), (k) and (w) of National Health Act, 2003 (Act no. 61 of 2003))
 This form must be **completed immediately** by the health care provider who diagnosed the condition. **Please mark applicable areas with an X**

Underlying factors/comorbid conditions				Hospital outcome				
HIV	Yes	No	Unknown	Status	Discharged	In hospital	Transferred	Died
TB	Yes	No	Unknown	If discharged, date	y y y y - m m - d d			
COPD ⁶	Yes	No	Unknown	If died, date	y y y y - m m - d d			
Hypertension	Yes	No	Unknown	Outcome of patient cared for at home after 14 days of symptom onset/test date				
Diabetes	Yes	No	Unknown	Alive, asymptomatic	Alive, symptomatic	Died		
Asthma	Yes	No	Unknown	Specimen details				
Obesity	Yes	No	Unknown	Was the specimen collected	Yes	No		
Pregnancy	Yes	No	Unknown	Date of collection	y y y y - m m - d d			
Cancer	Yes	No	Unknown	Specimen barcode/lab number				
Other	Yes	No		Travel history in the last 14 days				
If other,				Did patient travel outside of usual place of residence?				
If TB, is patient on TB treatment	Yes	No	Unknown	Place travelled from	Place travelled to	Date left usual place of residence	Yes	No
If yes, TB treatment start date	y y y y - m m - d d					Date returned to usual place of residence		
If living with HIV, is patient on ART?	Yes	No	Unknown	(Country/City/ Town)	(Country/City/ Town)			
If yes, is there viral suppression?	Yes	No	Unknown	(Country/City/ Town)	(Country/City/ Town)			
History of close physical contact with confirmed COVID-19 case in past 14 days								
Close physical contact with a known COVID-19 case				Yes	No	Unknown		
If yes, please indicate the contact setting								
Quarantine Centre	Healthcare setting	Family setting	Workplace					
Other, specify								
Notifying health care provider's details								
First name				Mobile number				
Surname				Email address				
Notifier's signature				SANC/HPCSA number				

Send to NMCsurveillanceReport@nicd.ac.za or fax to 086 639 1636, or NMC hotline 072 621 3805, and to the sub-district/district office

⁶ COPD - Chronic obstructive pulmonary disease

Annexure C: Vulnerable Employees

https://www.nioh.ac.za/wp-content/uploads/2020/05/20_2020-V4.-Guidance-on-vulnerable-employees-and-workplace-accommodation....pdf



Guidance on vulnerable employees and workplace accommodation in relation to COVID-19 (V4: 25 May 2020)

The major categories include:

1. 60 years and older
2. One or more of the underlying commonly encountered *chronic medical conditions* (of any age) particularly if not well controlled:
 - chronic lung disease: moderate to severe asthma, chronic obstructive pulmonary disease (COPD), bronchiectasis, idiopathic pulmonary fibrosis, active TB and post-tuberculous lung disease (PTLD)
 - diabetes (poorly controlled) or with late complications
 - moderate/severe hypertension (poorly controlled) or with target organ damage
 - serious heart conditions: heart failure, coronary artery disease, cardiomyopathies, pulmonary hypertension; congenital heart disease
 - chronic kidney disease being treated with dialysis
 - chronic liver disease including cirrhosis
3. Severe obesity (body mass index [BMI] of 40 or higher)
4. Immunocompromised as a result of cancer treatment, bone marrow or organ transplantation, immune deficiencies, poorly controlled HIV or AIDS, prolonged use of corticosteroids and other immune weakening medications
5. >28 weeks pregnant (and especially with any of co-morbidities listed above)

Annexure D. DMRE data points for mines and mine workers

South African Mining Industry COVID-19 Data Reporting																	
Date of report:																	
Part A: Mine details																	
Mine name		Mining House		SAMRASS Mine Code	Main commodity			Type of mine	Telephone	District			Region				
Part B: Covid-19 Data (Provide totals numbers)																	
Total number of employees including contractors (Normal compliment)	Total number of employees returned to work	Total number of screening tests done on employees upon return to work	Variance	Total number of employees referred for COVID-19 testing	Total number of employees tested for COVID-19	Variance	Total number of positive cases identified		Total number of negative cases identified	Pending	Total number of employees quarantined	Isolated			Total number of employees recovered and back at work	Total number of deaths	Total number of active cases
							Total number of symptomatic cases	Total number of asymptomatic cases				Home	Isolation center	Hospital			
			0			0				0							0
Part C: Appointed Occupational Medical Practitioner																	
Full names		Surname	HPCSA number	Qualifications	Appointment status	Contact number	Email address				E-signature/Initials		Date				
Part D: Appointed Covid-19 Compliance Officer																	
Full names		Surname	Contact number			Email address				E-signature/Initials		Date					
Part E: Employer / Mine Manager																	
Full names		Surname	Contact number			Email address				E-signature/Initials		Date					

Information on employees diagnosed with COVID-19												
COVID-19 Mine Case number	Sex	Age	Occupation	Area of work	Place of Residence	History of travel				Status	Date	Number of contacts traced
						Yes/No	RSA	SADC	Other			
1												
2												
3												
4												
5												

Annexure E: Health Care Worker additional risk factors

Adapted from the WHO Health workers' exposure risk assessment and management in the context of COVID-19 virus tool

Which facility	<p>Please Tick (X)</p> <ul style="list-style-type: none"> • Clinic • Clinic Private • CHC • District • Regional Hospital • Academic • Central Hospital • District Office • Central Office • Hospital private <ul style="list-style-type: none"> • Netcare • Life • Mediclinic • Clinix • Lenmed • Other
Job Title	<ul style="list-style-type: none"> • Medical doctor • Physician assistant • Registered nurse (or equivalent) • Assistant nurse, nurse technician (or equivalent) • Radiology /x-ray technician • Phlebotomist • Ophthalmologist • Physical therapist • Respiratory therapist • Nutritionist/dietitian • Midwife • Pharmacist • Pharmacy technician or dispenser • Laboratory personnel • Admission/reception clerk • Patient transporter • Catering staff • Cleaner • Other (specify):
Ward or type of unit	<ul style="list-style-type: none"> • Outpatient • Emergency • Medical unit • Intensive care unit • Cleaning services • Laboratory • Pharmacy • Other, specify:
Task or work procedure normally conducted	Text Box
Did you provide direct care to a confirmed COVID-19 patient?	Yes or No
Did you have face-to-face contact (within 1 meter) with a confirmed COVID-19 patient in a health care facility?	Yes or No
Use of PPE when in contact with the COVID-19 Patient	Yes or No
Type of PPE used	Text Box Free text