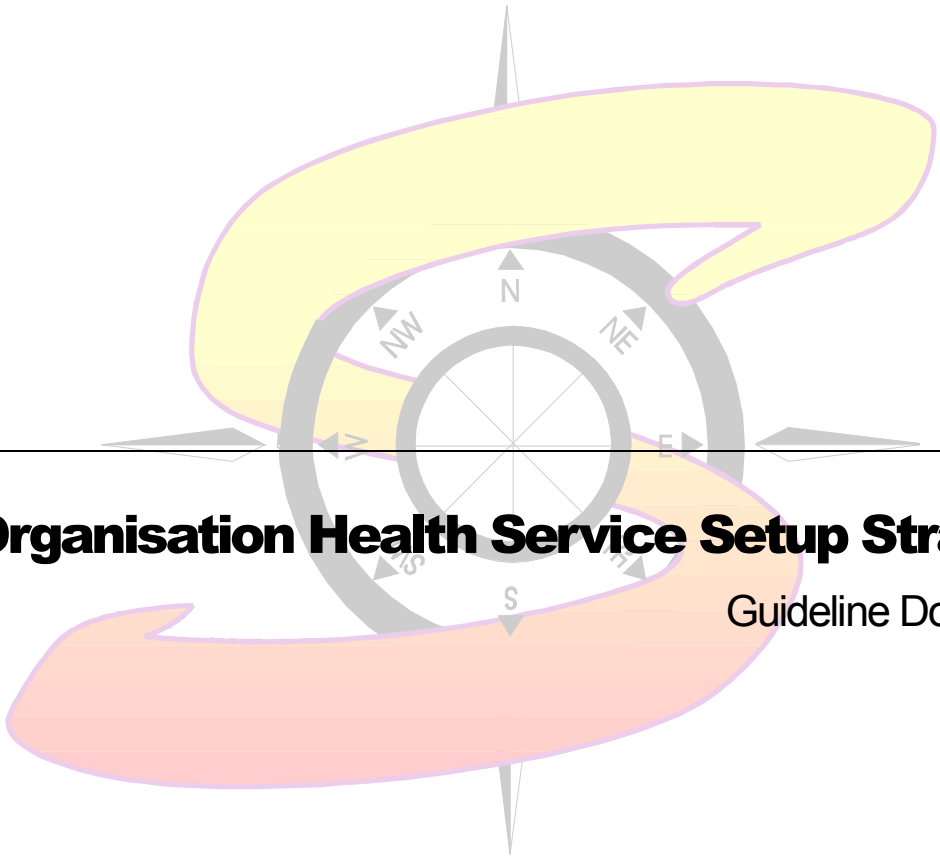


Organisation Health Service Setup Strategy

Guideline Document

Table of Contents

1 INTRODUCTION

Organisational Health Services comprise a large diversity of activities, with many inter-dependencies & cross-referral. These relationships are complex, and can be bewildering to those new to the field, including business leaders tasked with responsibility of managing the service. This guideline will describe the key aspects of Organisational Health, with specific reference to setting up and implementation.

There are five main components:

- Occupational Health
- Primary Health Care
- Employee Wellbeing
- Employee Benefits
- Program Management Elements

The relationships amongst these components are illustrated in appendix 1.

The Occupational Health component is different to the others, as it has a very definite sequence of co-dependent sub-elements (sometimes known as the “OH value chain”). This is illustrated in appendix 2.

2 OVERVIEW

The implementation of the occupational health programme comprises two phases:

- Set-up Phase
- Operational Phase

The objectives of the set-up phase comprise the following:

1. Needs / Gap analysis (Scope of Service).
2. Organisational Structures
3. Budgeting, resourcing, equipping and installation.
4. Policy development and standard setting
5. Training
6. Standardisation of data collection, analysis and reporting strategy

The objectives of the operational phase are simply performing the tasks of the key organisational health service elements. These are described in the specific guidelines of each of these elements.

3 IMPLEMENTATION STRATEGY: PROGRAM SETUP

Once management approves of the process, a small Project Team ("Implementation Committee") should be formed, comprising a group of people with appropriate competencies and influence (Human Resources, Risk Management, Medical and Operations). Ideally, a senior manager, whose accountability should be to the CEO, should head the team. The responsibility of the team is to unlock the required resources and drive the process to completion.

The company should then establish a clear implementation strategy that addresses all the elements required, and which is signed by the CEO, or a senior manager.

The strategy document should include:

- The scope of the service (which program components are included, and which are not)
- Clear objectives for the overall service, and each component
- Allocation of required company resources (time, people and money)
- Time-lines
- Provision for the development of written standards and procedures.
- Provision for Training
- Clear roles and responsibilities
- On-going project management and progress tracking
- Planning for continuous improvement (OHSAS 18000)

The steps involved in setting up a programme, as per the OBJECTIVES above, are as follows:

3.1 Needs analysis & scope of service

The company has to consider which components are to be implemented (Occupational Health, Primary Health Care, Employee Wellbeing and Employee Benefits). The component involving "Program Management Elements" will always be applicable.

The degree of relevance of each of these components depends on:

- Setting: corporate / office, or a factory / manufacturing environment.
- Workforce demographics: ages, gender, access to private healthcare.
- Enforcement framework: legal requirements to be met; corporate standards to be met.

- Resources of the company: its size and financial resources available
- Negotiable issues: expectations from employee representative bodies.

These permutations all need to be considered. Information can be assembled by means of interviews, walk through assessments and a careful evaluation of the legal requirements.

3.2 Organisational Structure

Assign managers to their legal appointments, and get them to start formulating action plans. They will require training in order to do this.

These managers should be responsible for the progress and completion of the rest of the set-up processes, namely:

- Budgeting, resourcing, equipping and installation.
- Policy development and standard setting
- Training
- Standardisation of data collection, analysis and reporting strategy

Specific individuals should be held accountable for these processes.

Other structural elements to consider include:

- Health & Safety structures (elect and train Health and Safety representatives, and initiate Health and Safety committees / structures).
- Emergency Preparedness (first aiders, emergency medical equipment, call-out procedures)
- Incident management (investigation, analysis, corrective action and reporting (statutory & company))
- Development of a referral network of Service Providers, such as;
    - Local Hospitals, Clinics, doctors, and other relevant services (substance abuse centres, EAP, etc.)
    - Fire & Emergency Services
    - Suppliers: Pharmaceutical, PPE, etc.

3.3 Resourcing & Budgeting

Once the needs have been considered, consideration will need to be given to the resources required. These include six “M’s” (**m**oney, **m**ethods, **m**aterials, **m**achinery, **m**anpower, **m**anagement systems):

Money

- Capex (Capital Expenditure)

  Consider: equipment (occupational & primary health), facility costs, extra training if relevant (advanced life support, dispensing licence, etc.),

- Opex (Operational Expenditure)

  Consider: salaries, pharmaceuticals, consumables

Methods (Operating procedures)

- Consider operating procedures that cover:
  - Administration issues (staff & facility),
  - Program delivery (all the programs that fall within the scope of the service)
  - Emergency preparedness (especially with regard to emergency equipment - where to find it, how to use it, and who maintains its state of readiness).
  - Compliance & continuous improvement.

Materials (Operating assets)

- Consider: pharmaceuticals, medical & clinic consumables, office consumables.

Manpower (Human Resource assets)

- For the purposes of this document, only occupational health related resources are considered.
- Consider:
  - Nursing staff (occupational health qualified, primary health care qualified)
  - Emergency responders, including BAA's, Emergency Technicians (& training for company First Aiders)
  - Contracted doctors (occupational health qualified and not).
  - Remember to budget for an occupational hygiene survey by an approved inspection authority!
  - Others, such as social workers, EAP practitioners, HIV peer educators, etc.

- Guidelines for the numbers of OH nurses & doctors, per worker:
  - Coetzee publication (combined PHC & OH)
    - 50 workers = 1 hr (Nurse) / day + 1hr / week (doctor)

- SASOM
  - 100 workers = 1 hr (Nurse) / day + 1hr / week (doctor)

- SASOHN:
  - 500 workers = 8 hr (Nurse) / day

- ILO
  - 30 workers = 2hr (Nurse) / day + 1hr / week (doctor)

- SA National Centre for Occupational Health.
  - A part-time nurse should be available at any facility with more than 20 employees for an hour per day.
  - Increments beyond 20 employees:
    - nurse: 1 hour per day per 50 employees or part thereof.
    - doctor:1 hour per week per 50 employees or part thereof.

- When considering the amount of time that should be allocated to these resources, consider the following(should be linked to Service Level Agreement):
  - Volume & nature (complexity) of the Medicals
  - PHC obligations
  - Disability assessments
  - Management / admin time (including data capture time)
  - Meetings
  - Risk assessments / profiling
  - Training support
  - Role in standard setting

Machinery (Capital equipment assets)

- Office

  Consider:
  - Furnishings (offices, waiting area)
  - Computers & printing facilities
  - Communication (telephone, internet access, radio, intercom)
  - Supportive (refrigerator, staff catering, etc.)

- Medical Screening equipment

Consider:

- Examination Couch & examination equipment (Diagnostic Kit, torch, stethoscope, etc.)
- Eye testing equipment
- Pulmonary function testing equipment
- Audiometry testing equipment.
- Radiology equipment (digital / analogue)
- Radiograph reading equipment

- Other related equipment

  This is just for completeness sake – consider other aspects of occupational health:

  - Companies may wish to purchase their own monitoring equipment, including noise dosimeter, lux meter, gravimetric samplers, etc. These require an extensive supportive infrastructure, including training, equipment maintenance programs, etc.

- Primary Health Care facilities

  When medicines are to be dispensed, a number of additional items are to be considered, including:

  - Lockable cupboards
  - Floor surfaces and worktop surfaces that meet the requirements of Good Pharmacy Practice
  - Two wash basins
  - Refrigerator

  A complete list of factors to consider is provided in appendix 3.

Management Systems

Consider:

- IT system – various options are available, including:
  - "ERM" (Enterprise Risk Management) programs
  - Networked
  - Stand-alone

These should cover all the components of the organisational health service, so as to provide an integrated solution.

- Delivery format – various options are available, including:
  - OHSAS 18000 management system
  - Corporate–specific proprietary programs
  - Others, such as NOSA, IRCA, etc.

3.4 Policy & procedure development and standard setting

This step is important in that it establishes roles, accountabilities, and time-lines. As mentioned in the section above, standards documents should consider:

- Administration issues (staff & facility),
- Program delivery (all the programs that fall within the scope of the service)
- Emergency preparedness (especially with regard to emergency equipment - where to find it, how to use it, and who maintains its state of readiness).
- Compliance & continuous improvement.

A standardised format should be followed, and a careful document management system be utilised, to ensure version control.

3.5 Training

This training refers to training in subjects specific to the service or facility, not professional training (which is covered in the section above). This specific training includes:

- Security & Access Control issues
- Safety & Risk Control issues
- HR & Disciplinary Processes
- How to use the Information System

3.6 Standardisation of data collection, analysis and reporting strategy

This is a critical part of program set up. It is explained in more detail in the “Management Guideline - Health Information System”.

For the purposes of this document, considered the following key set-up issues:

The Enterprise Risk Management strategy

For the organisation to be effective in its Enterprise Risk Management program, it needs to ensure that all the relevant datasets are configured such that they produce comparable outcomes. This includes the scoring matrix for consequence, probability (exposure) and risk. All

outcomes, including risk assessments, inspections, audits, and incident investigations should use the same matrix.

The Medical Surveillance strategy

The manner in which the program's progress and key outcomes are reported needs to be established. These outcomes include, as a minimum, the following:

- Adverse effects of exposure (the presence of occupational disease) & potential trends
- Fitness adjudication (fitness to work)

The Primary Health Care strategy

The manner in which the program's progress and key outcomes are reported needs to be established. These outcomes include, as a minimum, the following:

- Service utilisation
- Disease trends

The Employee Wellbeing strategy

The manner in which the program's progress and key outcomes are reported needs to be established. These outcomes include, as a minimum, the following:

- Service utilisation / uptake (ie. VCT, referrals for support)
- Disease trends
- Program effectiveness (improvements in the markers of employee distress)

3.7 Time Lines and Project Planning

A year planner is a useful tool for scheduling the wide variety of activities that comprise the various programmes for which the Occupational Health team is accountable.

This is a good time to prepare the employee health record documents. These are copied and kept in easily accessible places in the clinic, so that they can be used as employees arrive for their annual medicals. Every employee will require certain documents, such as the Medical Surveillance Summary (Holding) Sheets and the Initial Medical Evaluation sheets - casual (temporary) assistants can insert these into every folder in advance.

Suspicions regarding confidentiality and job security should be overcome by open discussion. A standard letter to the employees introducing the objectives and intent of the programme could be posted for public viewing.

4 LICENCING & COMPLIANCE ISSUES TO BE CONSIDERED AT SETUP

It is critically important, at set up, to ensure that all the statutory licensing issues are addressed. These are primarily in two components of the organisational health service – the occupational health program and the primary health care program.

4.1 Licensing issues regarding the Occupational Health program

Medical Surveillance

Ensure that the qualifications of the occupational health team (nurse and doctor) meet the requirements of the relevant statutes & regulations, and that they are registered with the appropriate statutory bodies. This is spelled out in the "Management Guide on the roles & responsibilities of the OH Team".

Occupational Hygiene

Ensure that the occupational hygienist that provides the quantitative monitoring is an approved inspection authority, and is registered with the department of labour.

Emergency support services

Ensure that the qualifications of the emergency responders (ie. Basic Ambulance Assistant, or Emergency Medical Technician) meet the requirements of the relevant statutes & regulations, and that they are registered with the appropriate statutory bodies. This is spelled out in the "Management Guide on the roles & responsibilities of the OH Team".

4.2 Licensing issues and Environmental Law

Medical waste is a very sensitive issue, and forms a prominent part of the clinics legal compliance program. With regard to program setup, note that some local authorities have promulgated a bylaw that requires the clinic to register as a "medical waste generator". Details regarding the appropriate forms are to be obtained from the offices of the local authority.

4.3 Licensing issues regarding the Primary Health Care program

For a clinic to be legally allowed to procure, store and issue medicines, it is a legal requirement that the medical professionals involved acquire a licence to dispense. The legal background to this is as follows:

There is no provision within the scope of practice of a registered nurse, to *diagnose* illness & *prescribe* medicines. However, it was realised that there are special circumstances in which there is a need for health service but a doctor is not available (such as in the occupational health setting), for which a nurse needs to be authorised to legally perform these functions, under the supervision of a doctor. Hence a special section (section 38A) was added to the Nursing Act in 1981 to enable a nurse to diagnose & treat patients in the clinic, the proviso being that the responsible doctor has to sign a special form authorising her to do so on his/her behalf (see appendix 1). This is now all contained in section 56(6), in the new Nursing Act (Act 33 of 2005).

Note that scheduled medicines cannot be dispensed by the nurse unless she has been authorised under section 56(6). This is because medicines can only be legally dispensed for a *prescription*, and a prescription can only be legally issued against a *diagnosis*; hence the nurse who *dispenses* medicines has to have made a diagnosis, which requires the section 56(6) authorisation.

In order to be in a position to sign off a Section 56(6) authorization form, the Department of Health (Directorate: Pharmaceutical Affairs) issued a document in which certain responsibilities were prescribed for the doctor. Note that the legal prescriptions listed in this document are provided by Synergee.

In order for the section 56(6) authorisation to be issued, the doctor is required to compile a set of protocols ("standing orders") by which the nurse is to be guided in her treatment of patients. These are written protocols that should be signed off by the responsible doctor (the one who signs the section 38A authorisation).

The regulations under the Medicines Act (101 of 1965) requires that a number of standard operating procedures be established for the management of medicines in the clinic, including the procurement, storage, issuing, recalling and disposal of obsolete stocks. Special attention is to be given to thermolabile medicines that require cold chain control.

The nurse has to acquire the appropriate qualification in dispensing, from an approved training facility. There is some argument about whether or not the doctor is required to obtain this qualification, too. The argument for this is that the prescriptions issued by the doctor cannot be dispensed by the nurse. The regulations require the prescriber to dispense his/her own prescription. If the prescriber is not legally entitled to do so (dispensing licence), it is a problem.

Once the Nurse has the appropriate qualification in dispensing, she may apply to the Department of Health (DOH) for a Dispensing Licence. Forms are available from the DOH, and a prescribed fee is payable. It is permissible for the application forms to be filled in whilst the applicant is still attempting to acquire the qualification in dispensing; the DOH will initiate the application procedure, and hold the case open until the confirmation of having passed the dispensing course is received. The application procedure will require the application provide the following:

- Proof of primary qualification (professional nurse, medical doctor)
- Proof of dispensing qualification.
- Certified ID document.
- Proof of having advertised, in a local newspaper, the intention to establish a dispensing facility.

Periodic renewal of the dispensing licence is required. There are application forms similar to the forms required for initial application, and a renewal fee. Note that the professional is not required to re-advertise his/her intentions to dispense, as is required in the initial application procedure.

Other important considerations:

The National Health Act No 61 of 2003 requires:

- Proof that confidentiality and security of the health records is maintained at all times

- The clinic is covered by a "Certificate of Need". Note that this requirement of the NHA is on hold.
- Staff members are to be adequately covered by medical indemnity cover.
- Users are to be given verbal or written discharge reports after having been attended to.

The General Regulations under the Medicines Act (101 of 1965) require:

- The clinic to have Patient Information leaflets for the medicines they issue.
- Medicines of schedule 2 and higher to be recorded in a Prescription Book, in which stocks are controlled.
- Medicines of schedule 5 and higher to be recorded in a Purchasing Register, in which further stock controls are maintained.
- The responsible professional should ensure that the dispensary and any premises where medicines are kept are suitable for dispensing or compounding and dispensing in accordance with Good Pharmacy Practice (see appendix).

More about the Dispensing Licence:

- Doctors no longer are required to list all the clinics at which they provide dispensing services. As long as they have a dispensing licence for one accredited facility, this can be used at other facilities at which they also work, as long as these other facilities are also authorised to dispense under a licence holder for those applicable facilities.
- There is no requirement, at present, for clinics to limit their medicines formularies to a given list, unless a list in included as part of the licence issued by the DOH. Instead, the limitation of the formulary is determined by the medicines contained in the Standard Operating Procedures signed off by the responsible doctor.
- There is no written requirement for clinics to limit their medicines to agents comprising single active ingredients, although this is recommended. This is particularly applicable to medicines for colds & flu. Medicines for certain conditions such as hypertension, or combination antibiotics, where multiple active pharmaceutical ingredients may be combined for improved synergistic effect, are not included in this recommendation.

4.3.1 Important references to be available in a clinic providing a PHC program include:

- The Essential Drug List and Prescribing Guidelines (Dept of Health).
- The Manual of Good Pharmacy Practice, published by the Pharmacy Council.
- Prescribing Guides, such as MIMS (less than 1 year old) or equivalent eg. Daily Drug Use, SA Medicines Formulary.

4.3.2 Forms required for acquiring and maintaining a statutory license

- Application Form for a Dispensing Licence
- Application Form for a renewal of a dispensing licence
- Section 38A authorisation form by responsible doctor

5 APPROACH TO IMPLEMENTATION THE PROGRAM

The steps involved in operationalising the programme are described in the appropriate Management Guides.

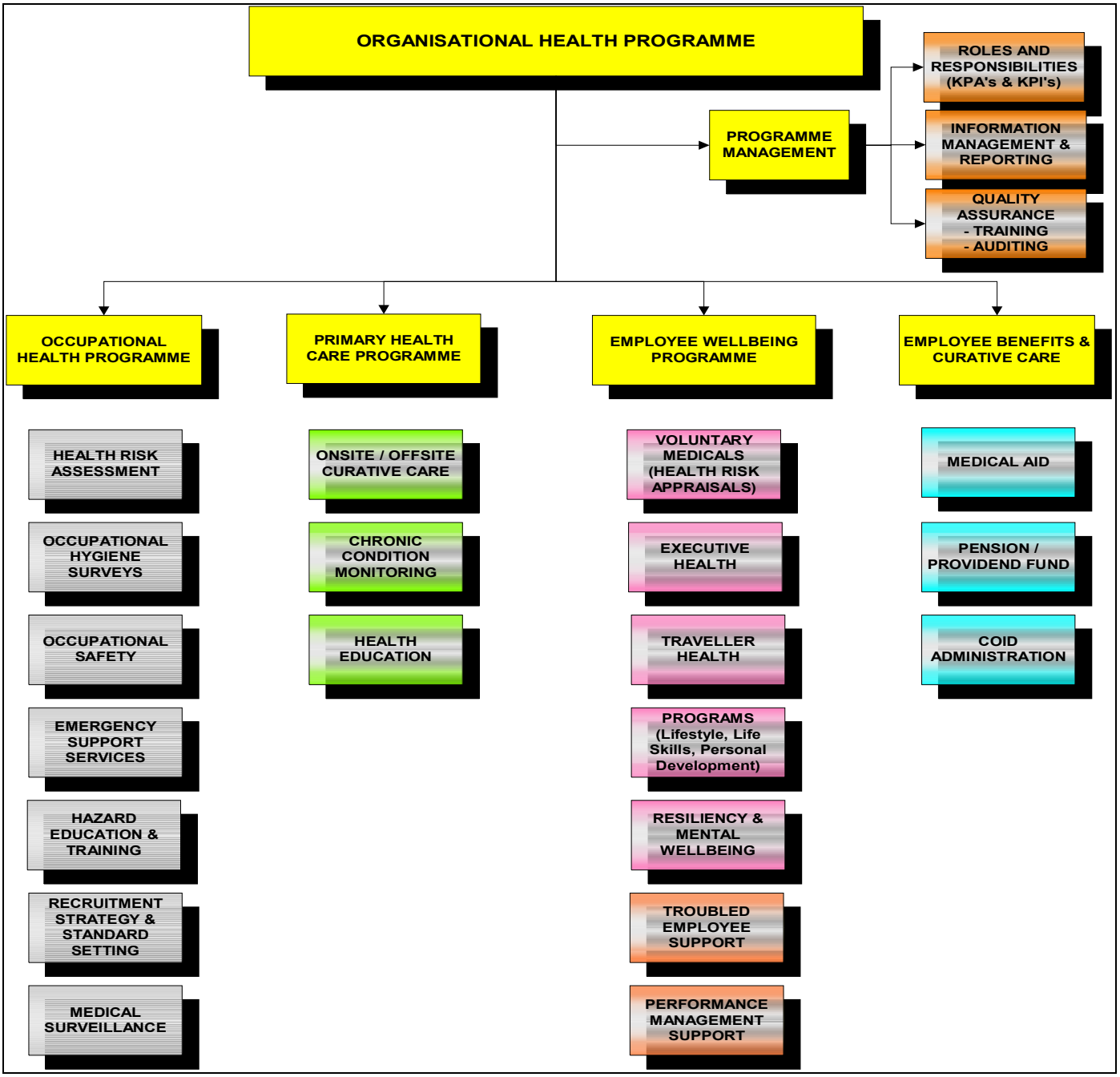
6 RESPONSIBILITIES

These are described in the Guideline on the Roles and responsibilities of the OHNP and OMP. Roles of the Risk Officer and Occupational Hygienist are described in the Occupational Health Program Guideline.

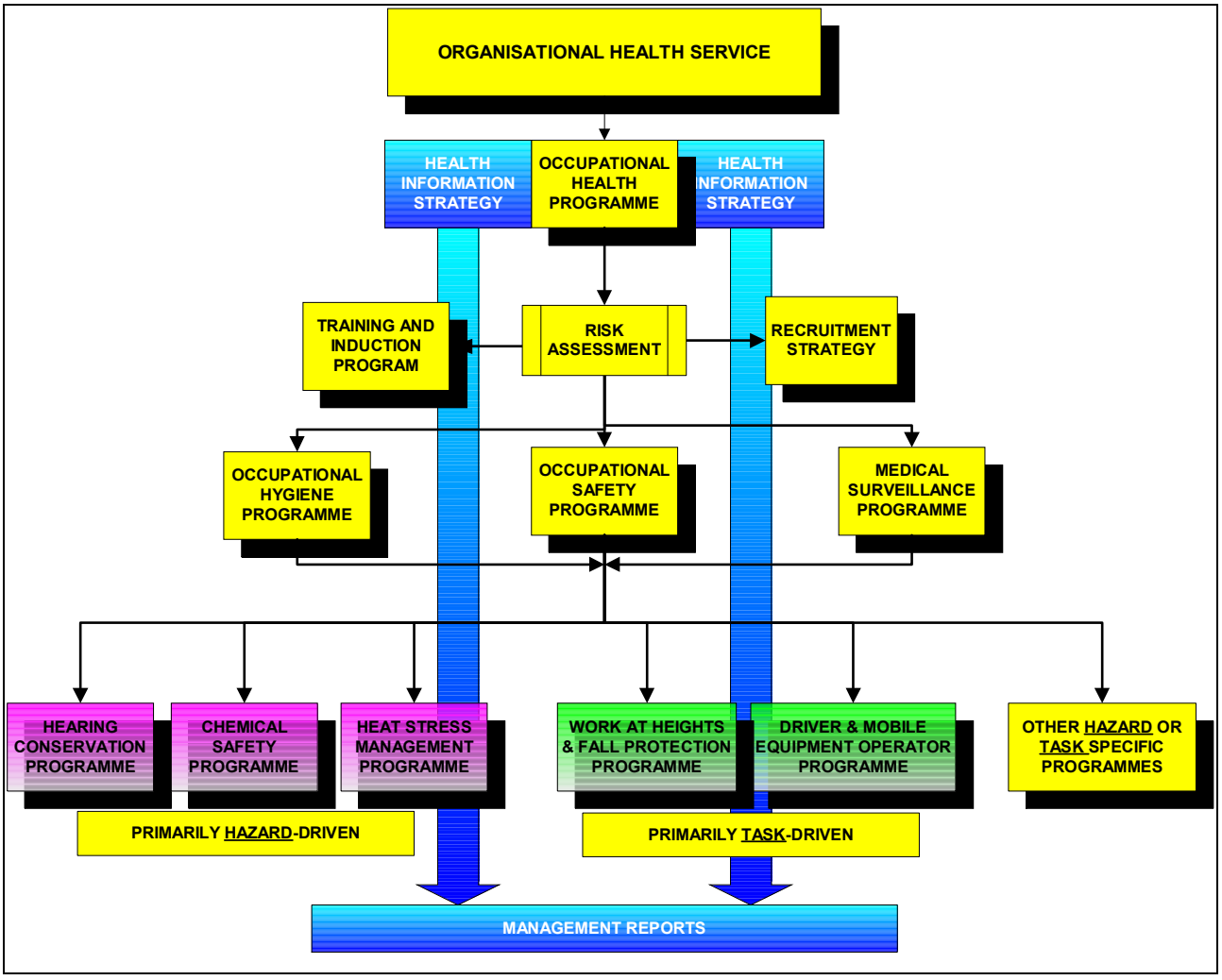
7 APPENDICES

- Appendix 1: Overview of the Organisational Health Service
- Appendix 2: The Occupational Health “value chain” – the key elements of the OH Program
- Appendix 3: Considerations under the requirements for Good Pharmacy Practice
- Appendix 4: Minimum requirements for a Spirometer (from SANS 0451)
- Appendix 5: Minimum requirements for an Audiometer (from SANS 10083-2004)
- Appendix 6: Considerations when selecting a device for eye testing
- Appendix 7: Considerations when selecting a device for testing blood pressure

7.1 Appendix 1: Overview of the Organisational Health Service



7.2 Appendix 2: The Occupational Health "value chain" – the key elements of the OH Program



7.3 Appendix 3: Considerations under the requirements for Good Pharmacy Practice

Good Pharmacy Practice	Sections
Is the size of the Clinic Pharmacy adequate?	GPhP3.11
Is the dispensing area, its fittings and equipment, adequate and suitable for the purpose of dispensing?	GPhP3.12(a)
Is the temperature of the dispensing area below 25^0C?	GPhP3.13('c)
Is the water supply satisfactory?	GPhP3.13
Is there a satisfactory procedure for waste management?	GPhP3.14
Is there a suitable means of counting tablets and capsules? This equipment must be cleaned regularly so that cross contamination between products is avoided.	GPhP3.15(a)
Is there a refrigerator equipped with a maximum/minimum thermometer and capable of storing products at temperatures between 2°C and 8°C?	GPhP3.15(d)
Is there a suitable range of dispensing containers for medicinal products? The use of child resistant closures is to be encouraged.	GPhP3.15(e)
Is there a suitable range of reference materials available?	GPhP3.16
Is adequate care taken regarding safety in the dispensary area?	GPhP3.17
The consultation area should have sufficient space (at least 15 square meters) to enable appropriate consultation on the correct and safe use of specific medicines/appliances and the performance of screening/monitoring tests.	GPhP4.3.1(b)
The working surface in the area must be of impermeable washable material.	GPhP4.3.1('c)
The area must at least have the following:	GPhP4.3.1(d)
An examination couch with spare clean sheets;	GPhP4.3.1(d)
A suitable trolley and/or cabinet for the necessary equipment;	GPhP4.3.1(d)
An emergency tray;	GPhP4.3.1(d)
Applicable facilities for the taking and analysis of urine and/or blood samples where necessary;	GPhP4.3.1(d)
A wash basin with hot and cold running water;	GPhP4.3.1(d)
A closable rubbish bin with a lid and disposable plastic liners;	GPhP4.3.1(d)
Effective equipment for record keeping; and	GPhP4.3.1(d)
A biohazardous materials bin and sharps container.	GPhP4.3.1(d)

Good Pharmacy Practice	Sections
It is advisable to have a refrigerator with a freezing compartment in the consulting area, especially when immunisation services are provided.	GPhP4.3.1(e)
A toilet in the vicinity of the consultation area is strongly recommended.	GPhP4.3.1(f)
A comfortable waiting area for patients situated, if possible, near the consultation area is a necessity.	GPhP4.3.1(g)
Procedures must be in place to ensure that medicines and working areas are not contaminated by infected materials and/or instruments.	GPhP4.3.1(h)
Is temperature maintenance of the inside of the fridge adequate?	GPhP5.2.1(a)-('c)
Is the cleanliness of the refrigerator adequate?	GPhP5.2.1(d)-(f)
Are vaccines stored and handled correctly?	GPhP5.2.2(a)-(j)
Is medicines labelling legally acceptable?	GPhP8.3.6
Is the storage of medicines acceptable?	GPhP8.3.10
Is there a mechanism for handling product recalls?	GPhP8.3.11
Are the personal hygiene standards acceptable?	GPhP8.3.12
Is there a mechanism for ensuring products that are dispensed will not expire during the prescription period?	GPhP8.3.13
Is record keeping adequate? Schedule 1 medicines.	GPhP10.3
Is record keeping adequate? Schedule 2-4 medicines.	GPhP10.4
Is record keeping adequate? Schedule 5-6 medicines.	GR30(1)-(5)

7.4 Appendix 4: Minimum requirements for a Spirometer (from SANS 0451)

7.4.1 General Criteria

The spirometer shall include a facility:

- able to convert the volume of gas exhaled, measured at ATPS to BTPS, to reflect conditions inside the lung. Without this facility, mathematical correction of volumes can be done manually using the formula given in annex B,
- whereby the appropriate predicted reference values for children, Caucasians or non-Caucasian, can be selected and entered
- able to generate real-time spirograms in order to recognize test performance errors,
- with a monitor large enough to display numerical values and all spirograms clearly,
- able to provide a summary of the quality of the manoeuvres performed,
- able to alert the spirometer operator when pre-selected performance criteria have not been met,
- able to select the best test either automatically or manually,
- able to enter the ambient temperature, barometric pressure and humidity readings. Without this facility, data shall be recorded manually (see 5.2.1.1(a)),
- able to save adequate data points in order to access curves electronically in the future,
- able to download data generated by the spirometer to computer software, and
- with adequate storage capacity for large numbers of test results and all associated data for occupational and medical surveillance and record keeping purposes.

NOTE It is recommended that a spirometer should have a facility whereby the spirometer operator can manually delete unacceptable test results, and an animation program that can assist with coaching the subject in performing manoeuvres.

The spirometer shall be provided with a printing facility that produces:

- the test results of at least three acceptable manoeuvres;
- values and the predicted values for at least FVC, FEV1, FEV1/FVC %, FEF25 %, FEF50 %, FEF75 %, FEF(25 % to 75 %), and PEF at BTPS;
- values and the predicted values for VC and FEV1/VC % when the VC manoeuvre is performed;
- the dated references for the acceptability and repeatability criteria applied;
- the predicted reference values used;
- the date and time of calibration checks of the spirometer; and

- a report listing all the subject information entered (see 6.3.2).

7.4.2 Performance criteria

The spirometer shall be capable of:

- having calibration checks performed on the spirometer daily in the workplace or in the field;
- operating within a flow range of (0 to 14) L/s;
- measuring volumes of 0,5 L to at least 8 L at BTPS, with such an accuracy as specified in column 2 of table 1;
- accumulating volume for at least the time interval for each manoeuvre as specified in column 3 of table 1; and
- achieving a precision for PEF measurements of ± 5 % of the reading or ± 0,150 L/s, whichever is greater.

Table 1 — Performance criteria for spirometers

1	2	3
Manoeuvre	**Accuracy at BTPS**	**Time** **s** min.
VC	± 3 % of reading or ± 0,050 L (whichever is greater)	30
FVC	± 3 % of reading or ± 0,050 L (whichever is greater)	15
FEV_1	± 3 % of reading or ± 0,050 L (whichever is greater)	1
PEF	± 10 % of reading or ± 0,30 L/s (whichever is greater)	–

The total resistance to airflow measured with any components that might be inserted between the subject and the spirometer during a manoeuvre, shall be:

< 1,5 kPa /L/s at an airflow of 14,0 L/s for the measurement of FVC and FEV1; and

< 2,5 kPa/L/s at an airflow of 3,3 L/s, 6,7 L/s and 10 L/s for the measurement of PEF.

7.4.3 Graphical output

- The recording chart of a volume displacement spirometer shall move at a chart speed of ≥ 20 mm/s.
- Before there is any change in volume with exhalation, the volume-time curve should include an interval of (0,25 to 1) s to determine the back extrapolated volume (EV) and to evaluate effort during the initial part of the manoeuvre (see 9.2.1).

  NOTE For computerized systems, time zero is determined by back extrapolation or a method that will provide equivalent results.
- The recorder of the flow-sensing spirometer shall be capable of generating flow-volume loops and volume-time curves during the entire forced expiratory manoeuvre.
- The exhaled flow of the flow-volume loop shall be plotted in increasing magnitude along the vertical axis and the exhaled volume in increasing magnitude along the horizontal axis in a ratio of 2:1.
- The instrument display of the spirometer shall comply with the requirements in columns 2 and 3 of table 2.
- The graphical output of the spirometer shall comply with the requirements in columns 4 and 5 of table 2.

Table 2 — Requirements for the graphical output

1	2	3	4	5
Parameter	**Instrument display**		**Graphical output**	
	Resolution	**Scale factor**	**Resolution**	**Scale factor**
Volume	0,050 L	5 mm/L	0,025 L	10 mm/L
Flow	0,200 L/s	2,5 mm/L/s	0,100 L/s	5 mm/L/s
Time	0,2 s	10 mm/s	0,2 s	2 mm/s
NOTE 1 The resolution is the smallest detectable change in measurement. NOTE 2 Larger time scales (≥30 mm/s) are preferred when manual measurements are to be made. NOTE 3 The time scale may be reduced to 5 mm/s for display of the slow VC manoeuvre.				

7.5 Appendix 5: Minimum requirements for an Audiometer (from SANS 10083-2004)

7.5.1 Measuring equipment for baseline, periodic screening and exit audiometry

Use an audiometer

- that complies with at least the requirements for a type 4 audiometer specified in IEC 60645-1, and is provided with an additional frequency of 8 000 Hz for which a value of hearing level of at least 70 dB applies,
- and in respect of which the calibration laboratory/organization has issued a certificate of compliance that contains at least the information required in the relevant parts of SANS 10154.

7.5.2 Test frequencies for pure tone audiometric tests

Use measuring frequencies of at least 500 Hz, 1 kHz, 2 kHz, 3 kHz, 4 kHz, 6 kHz and 8 kHz for the

pure tone audiometric tests.

7.5.3 Test environment

- Conduct the audiometric investigation in a booth or a room or a mobile unit that complies with the provisions of SANS 10182 for screening or diagnostic audiometry, as relevant.
- The suitability of the test environment should be assessed before initial use and thereafter at intervals not exceeding one year by a laboratory/organization that complies with the requirements given in 16.3. (of the SANS code).

NOTE 1 In the event of using mobile test facilities such as caravans or booths, ensure that the external environmental noise does not exceed the insulation capabilities of the booth. After certification of the test facility, it should not be moved to an uncertified location.

NOTE 2 For speech audiometry, a test booth is essential seeing that the test operator and the test subject should not be together in the same room (see 15.2.1(c)(2) of the SANS code).

7.6 Appendix 6: Considerations when selecting a device for eye testing

The topic is explored further in the SOP for vision testing in industry.

7.6.1 Measuring equipment for testing visual acuity (near & far)

The following devices are to be considered:

- An electronic visual acuity tester (ie. Keystone Orthoscope; Bausch & Lomb Orthorator; Titmus Vision Tester; OPTEC 2000 Vision Tester)
- A hand-held lens device, with a set of standardised reading cards (ie. the “Bioptor”)
- A wall-mounted reading card, with standardised images. (ie. a Snellen chart). Note that the Snellen chart was primarily designed for far vision, although it can be adapted for near vision.

Applications:

- All occupations in which acuity is important (ie. drivers, pilots, operators of mobile equipment, quality control personnel).

Best device:

- The Snellen Chart provides the best value for money, without compromising on the required legal standard. Its main disadvantage is that it cannot measure near vision.
- Note that the Traffic Authorities use the orthorator at their testing centres, so this tends to set a standard – even though this equipment standard is NOT recorded in law.
- Note that the Code of Practice for the Training of Operators of Lifting Equipment (under the Driven Machinery regulations of the OH&SA) mentions the Purdue University test, which is part of the test battery built into the orthorator. This, too, does NOT prescribe the orthorator as a minimum standard, but the suggestion often leads people to think this way.

7.6.2 Measuring equipment for testing visual fields

The following devices are to be considered:

- An electronic peripheral vision tester (ie. the “Orthorator”, Keystone vision screener)

Applications:

- All occupations in which peripheral vision is important (ie. drivers, operators of mobile equipment, those who work close to dangerous moving equipment, etc).

Best device:

- The use of simple clinical tests (ie. moving fingers) are effective and provide efficiency and zero cost.
- Note that the Traffic Authorities use the orthorator at their testing centres, so this tends to set a standard – even though this equipment standard is NOT recorded in law.

7.6.3 Measuring equipment for testing colour vision

The following devices are to be considered:

- A hand-held booklet, with standardised colour images of various hues, contrasts and saturation. (ie. Ishihara)
- A hand-held lens device, with a set of standardised reading cards (ie. the “Bioptor”)
- A wall-mounted reading card, with standardised colour images. (ie. a Snellen chart)

Applications:

- All occupations in which colour vision is important (ie. electricians, quality control personnel).

Best device:

- The best device is the one which best matches the real-life circumstances for which the test is being applied. Hence, for electricians use coloured wires. Note: the minimum requirements for the set of wires will be specified in the SOP for vision testing.
- Where hues, contrasts and saturation are important (ie lab technicians and certain quality control personnel), use the Ishihara test.

7.6.4 Measuring equipment for testing depth perception

The following devices are to be considered:

- An electronic depth perception tester (ie. the Keystone Orthoscope; Bausch & Lomb Orthorator; Titmus Vision Tester; OPTEC 2000 Vision Tester)
- A hand-held lens device, with a set of standardised reading cards (ie. the “Bioptor”)

Applications:

- All occupations in which depth perception is important (ie. electricians, drivers, operators of mobile equipment).

Best device:

- The best device is the one which best matches the real-life circumstances for which the test is being applied. Hence, either construct simulated work circumstances and see how the applicant performs, or do on-the-job testing.

7.6.5 Measuring equipment for testing “night vision”

The following devices are to be considered:

- An electronic night vision tester (ie. the “AAA Driver Vision screener”, Keystone Orthoscope)

Applications:

- All occupations in which “night vision” is important (ie. night drivers & operators of mobile equipment at night).

Best device:

- There is no scientifically validated test for “night vision”.
- Note that the Code of Practice for the Training of Operators of Lifting Equipment (under the Driven Machinery regulations of the OH&SA) mentions night vision testing. There is no explanation with the code as to how this should be tested or what standard is required to pass.
- Again, the best device may be the one which best matches the real-life circumstances for which the test is being applied. Hence, either construct simulated work circumstances (tasks in a darkened room) and see how the applicant performs, or do on-the-job testing.

7.7 Appendix 7: Considerations when selecting a device for testing blood pressure

The following devices are to be considered:

- An electronic blood pressure tester
- A mercury sphygmomanometer.
- A hand-held aneroid device.

Applications:

- All occupations in which blood pressure is important (ie.drivers, operators of mobile equipment).

Best device:

- Consider the electronic devices for basic screening.
- The mercury device should be used as a gold standard when the results of the electroniv device are doubtful.