# National audit of critical care resources in South Africa – research methodology

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This article provides an in-depth description of the methodology that was followed and the quality control measures that were implemented during the audit of national critical care resources in South Africa.

In 2003 and 2004, a project was initiated under the auspices of the Critical Care Society of Southern Africa. The purpose of the project was to identify available critical care and high dependency resources in South Africa. For the purposes of this study 'critical care' equals 'intensive care' and 'high dependency' equals 'high care'. The success of the project depended on careful attention to methodology. This article describes the methodology that was followed.

## Methodology

A descriptive, non-interventive, observational study method was used. The study was conducted in two phases. In phase I a structured telephone interview was used and in phase II a survey was done by means of an 11-page questionnaire.

A descriptive study method was chosen as a study design, the primary purpose of which is to develop a body of knowledge and to gain more information about characteristics within a special field. The purpose of this study method is to provide a picture of situations as they naturally happen. No manipulation of variables is involved; however there is control over extraneous variables. The setting for a descriptive study is therefore natural but conducting the study involves a high degree of control.[1,2]

### Approval

Approval to conduct the study was obtained from the ethics committees of the following universities: Cape Town, Free State, Medunsa, KwaZulu-Natal, Pretoria, Stellenbosch, Transkei, and Witwatersrand.

Approval to conduct the study was also obtained from the appropriate health authorities including the Department of National Health, the Surgeon-General of the National Defence Force, respective provincial health departments and private hospital groups. Approval was obtained from the respective hospital managements before proceeding with the study.

### Study population and study sample

The study population consisted of: (*i*) public sector hospitals without critical care and high dependency units; (*ii*) public and private sector hospitals with critical care units and high dependency units in South Africa; and (*iii*) doctors and nurses working in these critical care and high dependency units in June 2003.

The Department of National Health provided a comprehensive list of all public hospitals countrywide. The private sector list of hospitals was established using information with the permission of the Hospital Association of South Africa.

For the results of this study to be representative of the current situation in South Africa, the goal was to recruit as many hospitals as possible in the study sample. A response rate of 70-80% for questionnaires is regarded as 'good return' and can be considered a representative sample.[1,2] In this study the researchers managed to achieve a 100% sample in both phase I and phase II of the study.

### Phase I

This phase of the audit was to establish the efficacy of the current system of referral of critical care patients from public sector hospitals with no critical care or high dependency units to hospitals with appropriate critical care facilities.

#### Methodology

Management of all public sector hospitals in South Africa was contacted telephonically to establish whether the hospital had an operational critical care and/or high dependency unit.

- If the hospital did not have any such facilities, the hospital manager was asked to verbally consent to a structured telephonic interview.
- If the hospital had operational critical care or high dependency facilities then the hospital was included in phase II of the study.

The structured interview (Table I) was conducted immediately or an arrangement was made to conduct the interview at the hospital manager's convenience. Information was obtained either from the hospital CEO or the nursing manager by one of two researchers. The two researchers entered the data onto a predefined data sheet.



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**Table I. Summary of data collected in phase I**

| |
|---|
| Approximate distance that the patient will be referred |
| Mode of transport, e.g. critical care ambulance, ambulance, air transport, private vehicles |
| Is the mode of transport private, public or both? |
| Where is the transport stationed? |
| On average, how long does it take for the transport to collect a patient? |
| Comments |

Strict anonymity was ensured at all times and International Conference on Harmonisation (ICH) guidelines for good clinical research practice were adhered to.

### Quality assurance

Data were sourced from the CEO or senior hospital representative. A structured interview was used.

The data were collected by only two researchers, both with an in-depth knowledge of the study.

### Limitations

Some of the data were estimated by the respondents as objective data are not always available.

## Phase II

In this phase an audit of all critical care and high dependency resources (facilities, medical and nursing staff) in the public and private sector in South Africa was conducted, using an 11-page questionnaire.

### Methodology

An 11-page draft questionnaire based on published literature and the researchers' expertise was developed. The draft questionnaire was presented to the Critical Care Council for debate. Meetings were held in Cape Town, Durban and Stellenbosch where doctors and nurses working in critical care and high dependency units were invited to attend. A meeting was also held in Johannesburg for national representatives of the private hospital groups. At these meetings the draft questionnaire was presented and attendees could give feedback. Feedback from these meetings was then incorporated into the final version of the questionnaire (Table II).

The researchers forwarded a letter via electronic mail or facsimile to the CEO of every public and private sector hospital with critical care and/or high dependency facilities, containing the following:

1. An explanation of the audit.
2. A section for the CEO to give written consent that the audit could be performed in the hospital. This section had to be returned to the researchers for filing.
3. The CEO was asked to supply the following information:
   a. the number of critical care/high dependency units in the hospital; and
   b. contact details of the contact person(s) that could assist with the completion of the questionnaire.
4. The appropriate approvals were attached including those obtained from the Department of National Health, the respective Provincial MEC of Health and/or respective university.

**Table II. Structured interview used in phase II**

| |
|---|
| Hospital |
| Private |
| Public |
| • Level |
| • Academic /non-academic |
| Has an emergency department |
| Number of hospital beds |
| Unit |
| Type of unit |
| • ICU |
| • ICU/HCU combined |
| • HCU |
| • HCU combined |
| Open/closed unit |
| Number of unit beds |
| Unit classification, e.g. medical, surgical, etc. |
| Number of patients admitted in 2002 |
| Availability of clinical rounds |
| Role of external consultants |
| Admission/discharge policies |
| Specialty hospital staff availability |
| Referral to another ICU |
| Available equipment |
| Medical director profile |
| Medical profile |
| Nursing manager profile |
| Nursing profile |
| Nursing agency profile |

Once the CEO returned the signed consent, the questionnaire was sent to the contact person(s) in each critical care or high dependency unit in that hospital via electronic mail or facsimile. The questionnaire incorporated a detailed guideline, but the researchers were also available in person (where practical) or telephonically if assistance was required in completing the questionnaire.

The returned completed questionnaires were reviewed by one of two researchers. If any discrepancies were found, the appropriate contact person was contacted to confirm or correct the data in question.

The data were then entered onto a data sheet by two researchers.

Strict anonymity was ensured at all times and ICH guidelines for good clinical research practice were adhered to.

### Quality assurance

The questionnaire was developed by critical care experts and was based on practical expertise and current literature. The content of the questionnaire was validated by critical care experts (CCSSA Council members and other critical care medical and nursing experts) at meetings in Cape Town, Durban, Johannesburg and Stellenbosch.

The questionnaire incorporated a guideline to explain the questions. The two researchers were available if assistance was required for completion of the questionnaire.

The questionnaire was completed by: a nurse unit manager; and/or a medical director; and/or a critical care nursing service manager.

The data collection was standardised to reflect resources available in June 2003.

The completed questionnaires were reviewed by one of two researchers who verified any discrepancies with the contact person(s).

An electronic data entry system was designed with multiple data integrity checks.

### Limitations in phase II

In South Africa there is no generally accepted definition for critical care or high dependency units. The study therefore had to rely on what each hospital defined as a critical care or high dependency unit. Also, a descriptive study design was chosen to access the critical care situation as it naturally occurs in South Africa.

There were restrictions to the amount of data that could be collected. The questionnaire was 11 pages long, so the researchers had to be selective in the information obtained. The data focused on critical care resources, with no attempt to address the patients admitted to these units (e.g. severity of illness). No data on pre-admission factors and post critical care outcome were collected. The researchers were of the opinion that patient data were of such great importance that a separate prospective study should be designed for this purpose.

A large number of combined critical care and high dependency units were identified. These units did not have patient statistics that separated critical care and high dependency patients. Critical care and high dependency beds in these units are used interchangeably, so the exact number of critical care and high dependency beds could not be determined.

High dependency units situated in wards kept very poor patient statistics; no differentiation was made in admission data if the patient was a high care or ward patient. No profile of staff (medical or nursing) allocated to these patients was available.

## Communication

Although some respondents commented that completing the questionnaire was time consuming, the majority of the respondents unexpectedly had a very positive response. The respondents were encouraged by the interest in their units and were very willing to participate. Respondents also indicated that they would definitely take part in future studies.

At the end of the audit each participating hospital (public and private) in phase II was contacted via facsimile. The hospital was thanked for their participation in the study and was invited to a feedback meeting that was held in Johannesburg on 28 July 2005. Representatives of the Department of National Health and the MECs of each of the nine provinces were also invited.

The results of the audit have also subsequently been presented to:

1. The Minister of National Health and various committees within the Department of National Health.
2. Private hospital groups.
3. Critical Care Society of Southern Africa National Congresses 2003, 2004 and 2005.
4. 13th World Congress of Anaesthesiologists, Paris, 2004.
5. 9th Congress of the World Federation of Societies of Intensive and Critical Care Medicine, Buenos Aires, Argentina, 2005.

## Conclusion

This study has provided a crucial step toward understanding existing critical care services in South Africa which would guide future planning of this scarce resource. It was crucial that an effective sample should be obtained with reliable data. The study design ensured rigour and quality control with minimal observer bias and data validation processes. Such steps ensure the reliability of the data that were collected.

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