

# Part 3

## The Mechanics of Developing and Using Human Resource Indicators

### ASSESSING THE MANAGEMENT SITUATION

As local managers are given more responsibility to ensure that the provision of local health service uses the resources available to best effect, they need good quality information. They need this information to know how well they are using their resources in comparison to other similar institutions. Typically, managers will want to know whether:

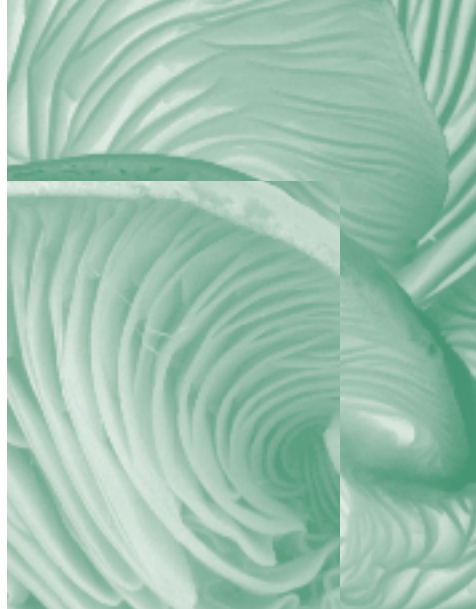
- \_\_\_\_\_ their management objectives are being achieved
- \_\_\_\_\_ the service provided is effective and efficiently delivered
- \_\_\_\_\_ service delivery is improving (or not) over time
- \_\_\_\_\_ how their part of the health service compares in its efficiency and effectiveness with others.

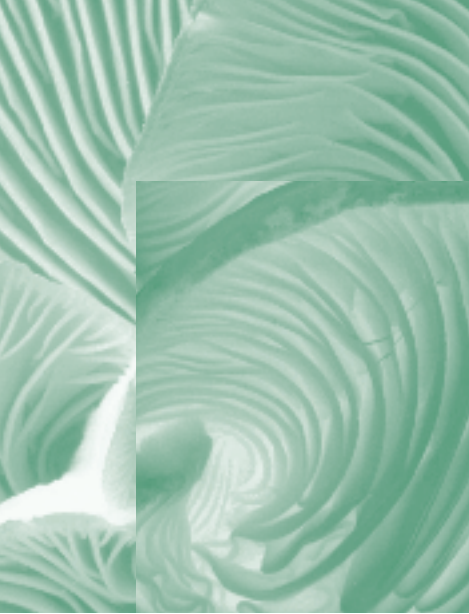
To start with, they need an initial 'baseline' measure of their current organizational performance in order to know how the organization is progressing over time and an information system to help them track progress and evaluate the factors that are influencing that progress. Indicators can form an important element of that information system - particularly for enabling comparisons between different parts of the health system - and to highlight areas of good and poor efficiency and effectiveness.

Staff characteristics, their skills, shared values and the way in which they are organized are four critical HR elements which can be expected to play a significant role in changing organizational performance. The impact of these related elements on organizational performance is usually described in terms of 'efficiency', 'effectiveness' and 'quality'. The workforce needed to maximize this impact, must be:

- \_\_\_\_\_ well-managed and properly trained
- \_\_\_\_\_ motivated and well-supported in its working conditions
- \_\_\_\_\_ appropriately skilled and large enough to undertake the work required
- \_\_\_\_\_ ready to undertake work appropriate to the needs of the population served.

Understanding and quantifying these workforce characteristics provides a way of measuring the quality of human resources management. The implications in terms of involvement and decision making clearly extend beyond the realm of local health districts or hospital managers, even in a devolved health system. Management processes for HRH must involve those responsible for health policy setting, staff training, deployment and career development, across all health institutions. This requires measures that are meaningful and useful both to local managers and to those operating at higher levels of the health system (eg central Ministries).





General measures of performance will not suffice to show the exact nature of the reasons for problems or successes in managing human resources; more detailed investigations may be required initially to determine these reasons. However, as staff members become more skilled in the analysis of performance indicators, they are often able to predict from indicator information the causal factors that influence organizational performance .

The full range of performance indicators must also include some measures of health impact. Some possible indicators of this are:

- reductions in population morbidity
- lower levels of preventable mortality
- reductions in recurrent illnesses
- increased levels of general health awareness.

There is some difficulty in using these 'impact' indicators for management purposes. This is in part because of the variety of external factors influencing changes such as education and in part because measures are slow to show measurable change. It is therefore more common to use 'output' indicators such as the ratio of major to minor operations, patients per unit of staff, bed use per consultant and so on.

Many possible indicators can be constructed. The initial assessment of performance baselines must therefore be developed around the major political, social and operational issues that the health system is perceived to be facing.

## DETERMINING WHAT INDICATORS TO USE

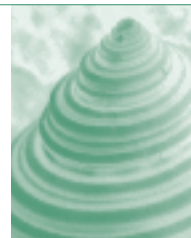
The concepts behind the creation of indicators have been discussed in Part I of this document. One outcome of these concepts is the specification of a broad management focus in order to determine what indicators to develop.

Two principal management areas were adopted.:

- 1 The HR condition; and
- 2 The connection between HRH and the product of the health system.

Other possible frameworks to structure the indicators are discussed later in this section.

Starting with this orientation, 12 broad categories (or groupings) for indicators provide a means of assessing HR performance in these two management areas:



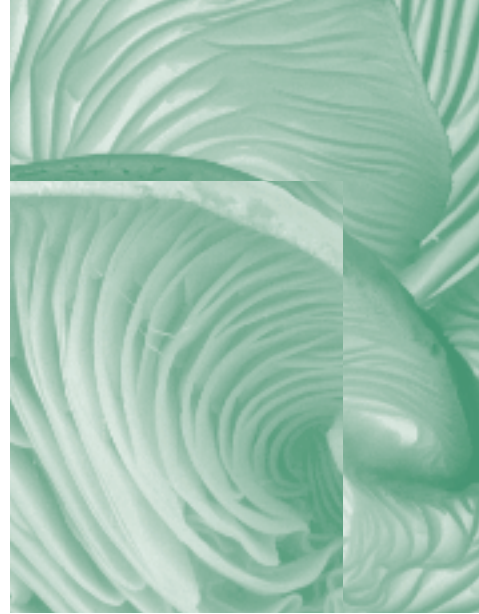


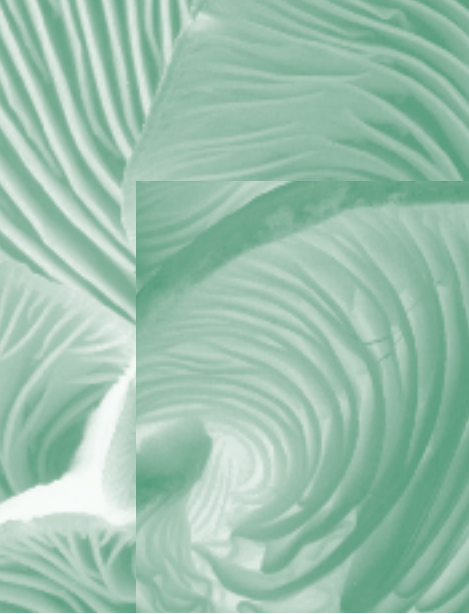
Table 3 MAIN INDICATOR CATEGORIES

Category	Predominant HR-related characteristic measured
A	Degree to which the workforce is 'well-managed'
B	Training levels of the workforce
C	Motivation
D	Matching of skills with tasks
E	Matching of staff with workload
F	Working conditions
G	Morbidity in local population
H	Preventable mortality in population
I	Increased health awareness levels in population
J	Appropriate skills available
K	Appropriate ratio of staff to caseload
L	Appropriate ratio of staff to population

Because indicators do not seek to measure these HR characteristics directly but rather to provide some indication of the state of the characteristic measured, it is possible to consider a wide range of possible measures. One possible array of indicators is shown in Appendix I as the basic 'basket' of indicators.

This table was developed through discussions in an inter-country workshop held at WHO, Geneva in December 1997. Discussions showed that different countries favoured the use of different indicators, reflecting the orientation and values within specific Ministries of Health. However, a common set of indicators was seen to be appropriate by all the participants to this workshop.

Not all of these indicators will be used in any given HR indicator development. This will depend on local circumstances. The number of indicators must be reduced to a minimum in order to facilitate both data collection and collation/analysis thereof. This basic basket of indicators is not intended to be restrictive: other indicators may be used if they appear more appropriate in the context of the health system operations. One country, for instance, has used



the percentage of deliveries by Caesarean section as a measure of the quality of the obstetric services provided by district hospitals.

The indicators apply to the whole array of twelve HR characteristics listed earlier. They apply to the two main management areas as shown in Table 4.

Table 4 RELATIONSHIP BETWEEN THE BASIC BASKET OF INDICATORS AND HR MANAGEMENT

I Human resource condition	II Connection between HR and product of health system
All indicators in groups A-D	E1-2
E3	F2
F1	All indicators in groups G - J
F3-F5	K1, K3-4
K2	L3
L2	

The purpose of relating these indicator groups to the principal management areas identified earlier is to provide a rationale for the selection of indicators and their analysis. Other approaches can provide a rationale for the way in which indicators are selected and grouped. One such alternative suggests four principal management areas in which to locate the groups of indicators, as follows:

Availability of staff ————— Indicator groups - A, D, K, L

Staff quality and training ————— Indicator groups - B, J

Working conditions and prospects ————— Indicator groups - C, F

Productivity in relation to population served ————— Indicator groups - E, G, H, I, J

Other forms of classification can and must emerge; it will be particularly important in national implementation schemes to ensure that indicators and their application make sense in the particular circumstances of a country situation.

## DATA REQUIREMENTS

The data required to support these indicators are shown in Table 5. It is likely that most of these data will already be collected regularly, although not necessarily collated in the form required for the indicators or with the required frequency.

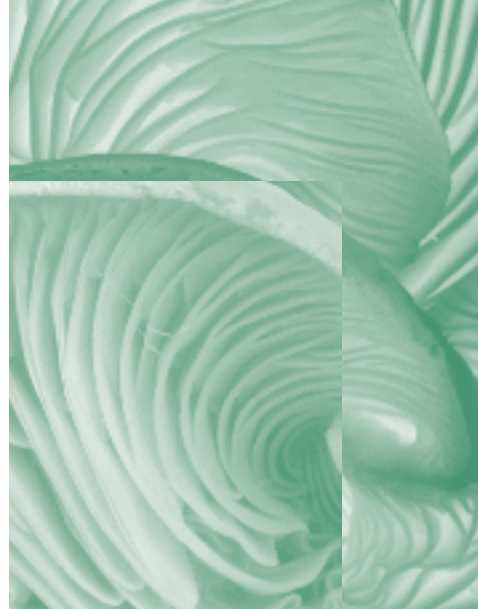
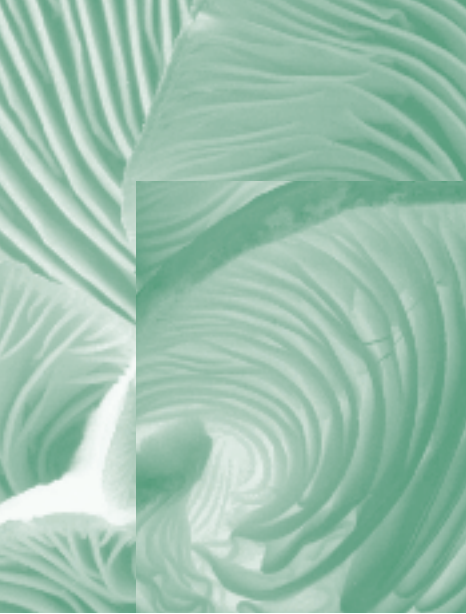


Table 5 DATA REQUIREMENTS FOR CORE 'BASKET' OF INDICATORS

Description	Indicator
Daily attendance record and whether absence is approved (certified) or not: for each member of staff	A1 A3 A6 C10
Total number of staff currently registered as 'on the staff complement' (by main staff grouping: doctor, nurse, midwife)	A1 B2 B4 B6 B7 B8, C1 C2 C4 C5 C6 C7 C8 C9 D1 E1 E2 F1 G1 G2 H1 H4 I1 I3 J2 K1 K2 K3 L3
No. of full-time staff	B7
No. of vacant posts (each month)	A2 A3 B4
Budgeted number of staff (by main staff grouping)	A2 A3
Annual staff budget	A4 L2
Total annual health budget	A4
Staff reviews completed	A5 A6
Total no. of staff to be reviewed	A5
No. of days each vacancy is vacant	A3 B4
No. of training days for each member of staff	B1
No. of staff eligible for training	B2
No. of doctors, nurses, etc. for whom training is planned	B2 B3
Updated job description: for each eligible staff member	B5
No. of people who have received training	B1 B3
Days spent in training: for each staff member:	B1 B6
No. of established staff leaving	C8
No. of 'outside' training visits undertaken: for each staff member	C9
No. of patient contacts	E1 E2
Record of overtime payments: for each staff member	E3
Record of basic wage point: for each staff member	C3 E3
Record of payment received: for each staff member	F3



Total number of pay days in recording period	F3
No. of staff with district-provided housing	F4
For each member of staff: average journey to work time	F5
Nominal working hours: for each staff member	B6 B8 F3
Total hours worked (by main staff grouping)	B8 F2 F5
No. of children <1 immunised	G1
No. of attended births	G2
Total number of births	G2
No. of Caesarean deliveries	H6
Total number of live births	H1 H2
No. of deaths of children <1	H2
No. of deaths (all ages)	H3
No. of cross infections	H5
Total population	H3 J2 L3
Domiciliary contacts	C9 I1 J2
No. of staff providing health education	I3
Total number of patients	J1 K3
Total clinic attendances	I1 K1 L2
No. of major operations	K5
No. of minor operations	K5
Occupied bed days in hospital	K4
Available bed days	K4

As a general principle, indicators must be constructed as much as possible by making use of current data sources. A first step in establishing the production of indicators is deciding where the responsibilities for collecting the data required will lie, whether the data will be additional data or simply collated data from current sources, and the frequency with which the information will be required. To help operational level staff undertake this task it is important

to have the definition of the data items as tightly defined as possible in order that all reporting units use a common measurement; this will permit direct comparisons among units.

The frequency of use of management information will vary according to the requirements of different management levels in the organization and this is also true for the related indicators. Some examples are shown in Table 6.

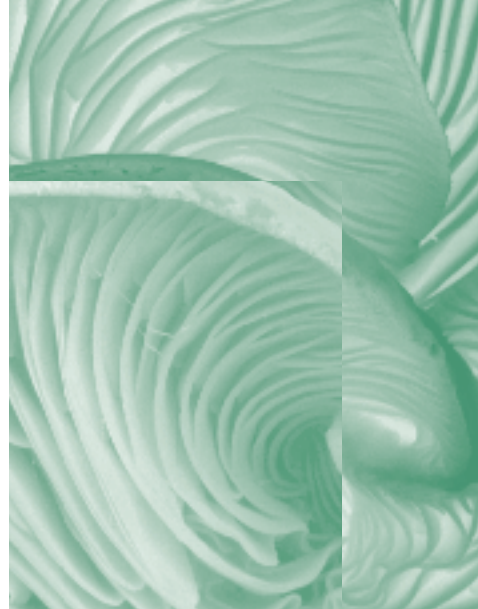


Table 6 EXAMPLES OF TYPE AND FREQUENCY OF USE OF MANAGEMENT INFORMATION

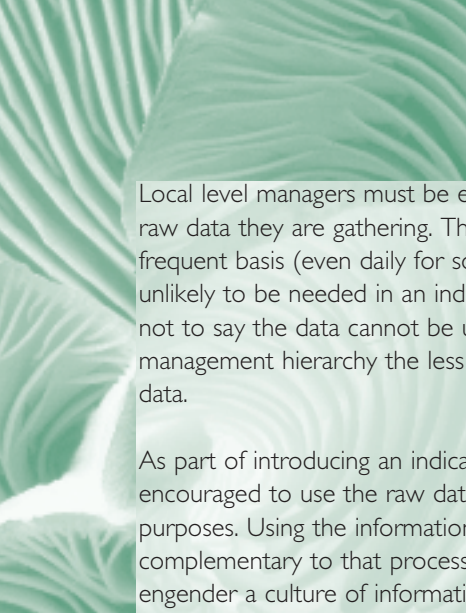
Management Level	Potential Frequency of Use of Information
Local/District	Monthly for absenteeism or staff budget monitoring Quarterly for training reviews or vacancy rates Annual for actual to planned ratio of staff or for staff review monitoring
Regional	Quarterly for staff vacancy rates across region, number of professional staff in post or budget monitoring
National	Annual for review purposes and manpower planning across the country

In practice there will be constraints on the ability of the health system as a whole to provide raw management data. This will hinder the production of indicators at short intervals of time (because of the logistics of data collection, transmission to the processing centre, data checking, preparation of indicators and distribution to districts).

It must be possible to prepare a reasonably small set of indicators routinely on a six-monthly or quarterly basis. Given the time required to send the data to the processing centre and that needed by the production and distribution of indicator summary reports, it would most likely be three months at the earliest before managers across the health systems can begin to use the information. Inter-district comparisons may thus be restricted to quarterly or half-yearly sets of indicators.

This return rate will not apply to the pilot study, which is likely to use a small subset of national institutions and to proceed more rapidly. Nevertheless, the nature of the problem of 'turn round' time is well evidenced by the example given earlier in Figure 3.

Since operational situations tend to change relatively slowly over time, a quarterly, half-yearly or even annual comparison across all districts or hospitals will usually be sufficient.



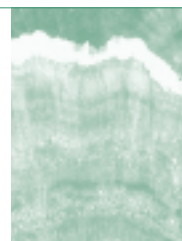
Local level managers must be encouraged to make more immediate and frequent use of the raw data they are gathering. This data gathering will already be underway on a regular and frequent basis (even daily for some items). For immediate operational issues the data are unlikely to be needed in an indicator format (unless local managers feel it desirable). That is not to say the data cannot be used in their 'raw' state. Generally, the further up the management hierarchy the less immediate the requirement for action and up-to-the-minute data.

As part of introducing an indicator system generally, local level managers must therefore be encouraged to use the raw data for their own short-term (weekly/ monthly) management purposes. Using the information in this way would not be 'instead of' using indicators, but complementary to that process. It would maximize the use of the data gathered, and help engender a culture of information use throughout the system.

## DATA COLLECTION

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Most data will be recorded manually; to assist this process and ensure standardization, the development of proforma data recording sheets is essential (see example in Appendix 2). This includes precise descriptions of what is to be recorded and when; of any summarizing that has to be done (eg a monthly summary from a daily record); and of where, when and to whom the data needs to be sent.



Ideally, local managers must be responsible for deciding who should record particular data items, and who should be involved in undertaking any special data collection that may not be routinely recorded. Simple checklists to support managers in this activity are also of use in quality control (see section on Monitoring Data Accuracy). As noted above, managers must be encouraged to review raw data as these become available, in order to monitor trends and take immediate management action as necessary and appropriate.

While local managers may be able to construct local versions of the indicators, it is probably not productive for them to do so for short-term operational management requirements. The main value of indicators for local management comes in making comparisons with other districts or hospitals and, over different time periods, for their own districts or hospitals.

Data must be collated at some central point prior to preparation of the indicator set. The most straightforward way this can be done is through the physical transfer of a paper copy of any completed proformas from the district or hospital. If computers are available locally, it may be possible to submit data in an electronic format (eg on a disk); this will save time at the collation centre. It may even be possible to transmit the data electronically. The actual method chosen will be entirely dependent on the local communications network and must be designed with that (and any current data collection procedures) in mind. Local circumstances may render it advantageous for staff from the central indicator production centre to collect data or to make occasional on-site quality check visits at district level.

## MONITORING DATA ACCURACY

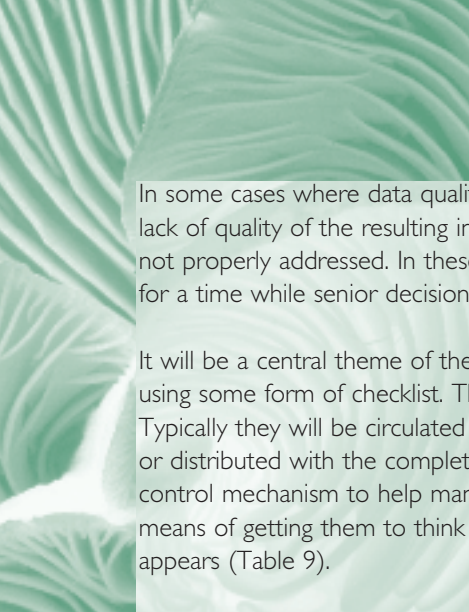
However carefully the system is organized, there will be inaccuracies in the data set and these will manifest themselves in a variety of ways. Sometimes they can be picked up at an early stage in processing; at other times they only show up when comparisons are made with the indicators, providing unusual or exceptional values. Table 7 shows some typical causes and remedies for data inaccuracies.



Table 7 POSSIBLE SOURCES OF DATA INACCURACIES

Type of Inaccuracy	Possible Cause	Possible Remedy
Indicator value at an extreme end of the range when it is not expected to be	Denominator or numerator data wrongly recorded  Definition of data items not sufficiently precise	Check procedures for data accuracy at each stage of the process  Check that managers understand those data items to be collected
Indicator value is missing or unavailable	Definition of data items not sufficiently precise  Data unobtainable  Breakdown in data transmission process	High-level management support  Establish and monitor data-handling standards
Consistent data errors	Poor management of data collection or poor understanding of role of indicators	Additional management support and training

The pilot study is intended in part to test the ability of data producers and processors to produce accurate information. While the team responsible for processing will make mistakes, the problem generally lies with the local data producers; this may occur because those responsible for collecting the information are inadequately trained or uncommitted and/or because no mechanisms are in place to check the quality of the data. Nevertheless, the central collation team will rapidly learn to identify erroneous data. This, together with a combination of rapid follow up with the institutions providing the data and the publication of results incorporating the inaccurate data can lead to rapid improvement in the quality of data provided, although the process will never be error-free.



In some cases where data quality is uniformly poor (eg where there is no planned training), the lack of quality of the resulting indicator reflects a health system-wide management area that is not properly addressed. In these circumstances, it may be necessary to set that indicator aside for a time while senior decision makers reflect on what action to take.

It will be a central theme of the pilot/field trials phase to develop the quality of data returns using some form of checklist. These checklists supplement and support the indicator set. Typically they will be circulated together with the request to gather the data for the indicators, or distributed with the completed set of indicator results. They can be used both as a quality control mechanism to help managers in collecting and preparing data (Table 8), and also as a means of getting them to think about how they may actively use the indicator set when it appears (Table 9).

Table 8 AN HR INDICATOR 'QUALITY CONTROL' CHECKLIST

Possible Questions	Target Management Task
Have you performed (specified) checks on data? Have you compiled all relevant data required for the indicators?	Improve data accuracy Data accuracy/completeness of indicators
When did you receive the previous indicator set? Whom did you speak to locally about the previous indicator set? What did this set contain?	Efficiency of indicator set distribution Encourage local use of indicators

Table 9 CHECKLIST TO PROMPT USE OF HR INDICATORS AND INDICATORS IN GENERAL MANAGEMENT PRACTICE

Possible Prompts	Target Management Intention
List what actions you have taken as a result of the last indicator data List locally emerging that you feel the current set of indicators does not cover adequately Have you considered developing additional indicators for local use only (human resources or other management task areas)? List the people you show and discuss the indicators with List donor/ NGOs/ other agencies you are in connectivity to contact with	Encourage local use of indicators  Encourage review of current indicator set Encourage management process  Encourage local use of indicators  Management influence/ other health funding/ programmes

## PROCESSING THE DATA

Indicator data may be collected quarterly, half-yearly or annually. In the pilot field trials they are likely to be collected monthly in order to provide sufficient processing cycles in a one-year period to test the collection and processing systems.

The data will come to the processing centre as individual items of data (raw data), for example 'the number of staff in post on the recording day' or 'the number of major operations performed during the recording period'.

In the first stage of processing, the data on a particular item for all the units scheduled to report are entered into a table. It is normal to use a computer 'spreadsheet' program such as Excel to create this and subsequent tables.

In each monthly period data must be recorded for two days; the first and the last day of the month (eg for January, data collection day 1 will be 1st of January and day 2 will be 30th of January). For quarterly or annual collection process, there must be two reporting days for each period as well. However, it is only for the first period that two sets of raw data have to be collected. For subsequent periods, the data recorded for the end of the previous period serves as the opening data for the next period.

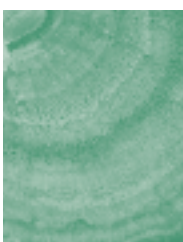
There are three possible tables for data collection and processing for each period:

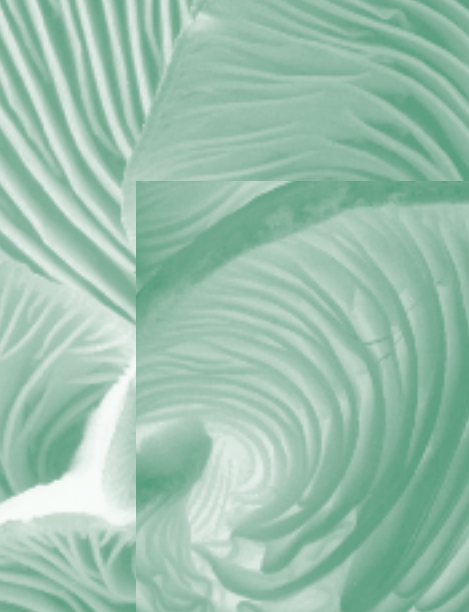
- 1 Raw data tables (reporting raw data for day 1 and day 2)
- 2 Reporting period table (reporting average values of two reporting days for the given period)
- 3 Summary indicator table (reporting resulting indicator values).

### Developing Raw Data Tables

Prepare an Excel workbook including different sheets for each period for the process (eg to monitor annual performance using monthly data, you must have 13 different sheets, one for each monthly period, except for the first period which needs two data sheets).

It is a good idea to first create a 'dummy' table where the values are not indicated, but listing all the raw data items required for the indicator you have previously determined. Provide code numbers for each organizational unit to be monitored (eg hospital codes, district or province codes, etc.).





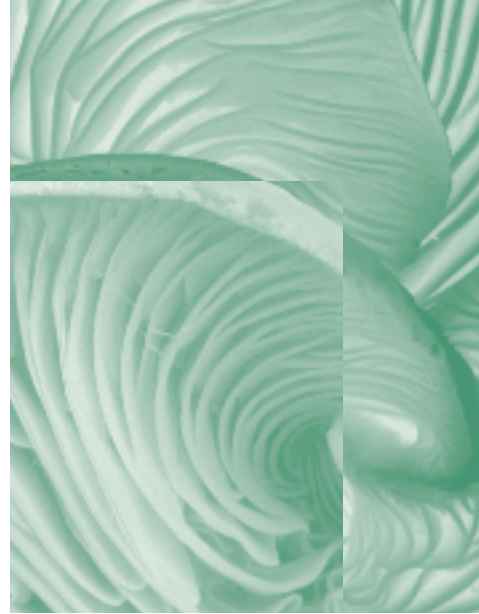
Performance Indicator Raw Data - Reporting day #1

Indicator Raw Data		Participating District Number									
	#										
Total reg staff nurses present	1										
Total reg. specialist present	2										
Total reg. non-specialist present	3										
Total reg. paramedic staff present	4										
Total reg. admin staff present	5										
Total other non-casual staff present	6										
Total staff present	7	0		0	0	0	0	0	0	0	0

For period 1, reporting day 1, create an Excel table listing all the raw data items required for the indicator you have previously determine. Provide code numbers for each organizational unit to be monitored (eg hospital codes, district or province codes, etc.). Create your first effective table, with a title indicating name of the period (eg period 1), reporting day and the date.

Performance Indicator Raw Data - Reporting day #1

Indicator Raw Data		Participating District Number										
	#	107	108	111	215	309	303	413	412	504	602	714
Total reg staff nurses present	1	121	74	80	71	45	59	101	82	229		33
Total reg. specialist present	2	5	3	4	6	3	3	4	5	8		10
Total reg. non-specialist present	3	57	26	42	47	27	24	41	63	45		2
Total reg. paramedic staff present	4	60	15	35	40	28	31	25	25	55		6
Total reg. admin staff present	5	11	5	8	6	4	6	13	12	26		3
Total other non-casual staff present	6	150	61	74	104	92	125	19	66	198		6
Total staff present	7	404	110	243	274	199	243	204	253	561	0	60



For reporting day 2, copy this table in the same sheet and change the title of the table as appropriate before entering the corresponding values.

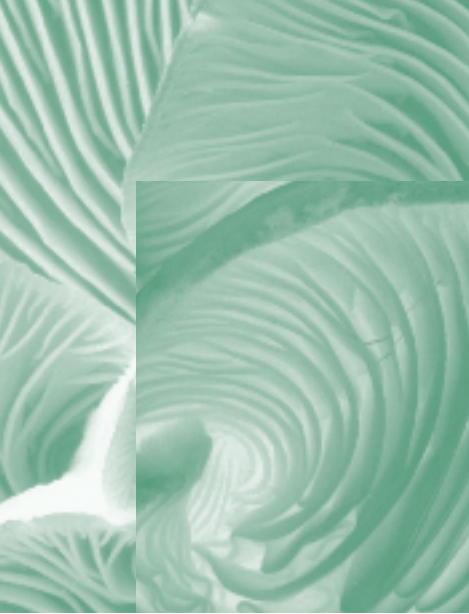
Performance Indicator Raw Data - Reporting day #2

Indicator Raw Data		Participating District Number										
	#	107	108	111	215	309	303	413	412	504	602	714
Total reg staff nurses present	1	122			84	81	50	101	93	183		37
Total reg. specialist present	2	5			6	3	3	4	5	10		2
Total reg. non-specialist present	3	57			48	27	30	48	64	45		15
Total reg. paramedic staff present	4	58			38	28	21	24	36	52		12
Total reg. admin staff present	5	12			6	4	8	10	10	25		2
Total other non-casual staff present	6	145			108	93	116	71	71	185		6
Total staff present	7	394	0	0	290	236	228	279	279	500	0	74

### Developing Tables for Reporting Period

Prepare another table in the same sheet in order to take the average values for each indicator, for each organizational unit for reporting day 1 and day 2. This table will be very similar to raw data sheets. The only difference is that there will be an additional column to take the overall average values for all the units. Give a title to the table with date indicating the reporting period.

Then write the appropriate formula to each cell to take the average value for reporting day 1 and 2, referring the appropriate cell numbers for raw data values for each reporting day. Write a different formula to take overall averages for all the units and for each raw data item. The examples given here, using actual data, are drawn to show non-reporting has to be addressed in writing the formulae.



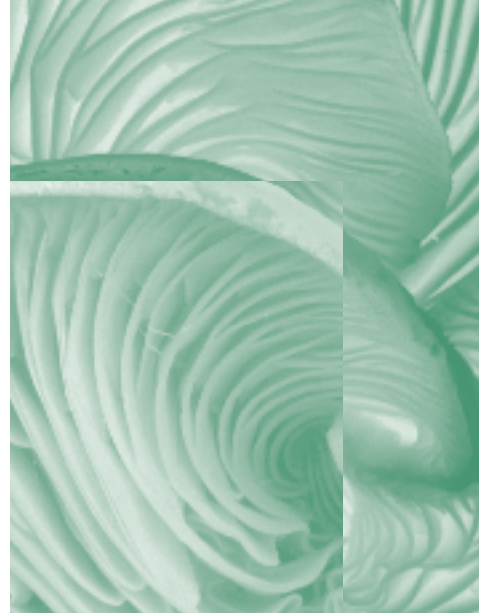
Performance Indicator Raw Data

Average Values- Reporting day #1

Indicator Raw Data	Participating District Hospital Number											
	#	107	108	111	215	309	303	413	412	504	602	714
Total reg staff nurses present	1	122	74	80	78	63	55	101	88	206	0	35
Total reg. specialist present	2	5	3	4	6	3	3	4	5	9	0	6
Total reg. non-specialist present	3	57	26	42	48	27	27	45	64	45	0	9
Total reg. paramedic staff present	4	57	15	35	39	28	26	25	31	54	0	9
Total reg. admin staff present	5	12	5	8	6	4	7	12	11	26	0	3
Total other non-casual staff present	6	148	61	74	106	93	121	49	69	192	0	6
Total staff present	7	399	110	243	282	218	238	235	266	531	0	67

### Developing a Summary Indicator Table

This will be the last table of the sheet. The table will be the same in style as reporting period table but it will include a list of indicators (written text) in an appropriate format with indicator codes for each indicator (four digit number, eg 0000, 0010, 0020) referring to each indicator group, as well as code numbers for each organizational unit to be monitored (eg hospital codes, district or province codes, etc.) and an overall average column) with an appropriate title. Write the appropriate formula to each cell to calculate the required indicator value and to take the average. The indicators are now ready to be used in analysis.



Performance Indicators - All Districts

Period I

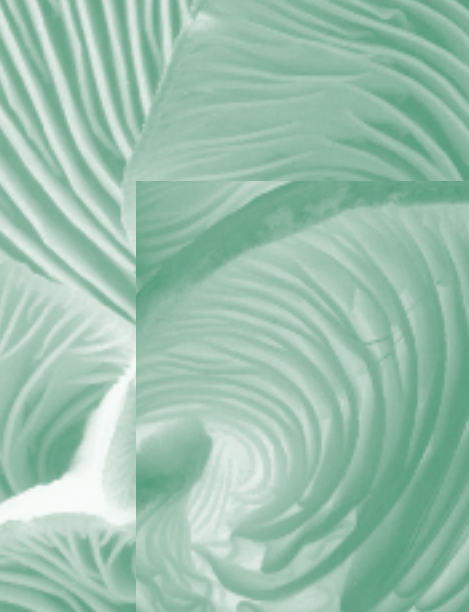
	CODE	District										
	Indicator	107	108	111	215	309	303	413	412	504	602	714
Absenteeism Rate % (staff days absent/No of staff)* 100/30	0000	6.1	10.3	8.7	4.5	0.8	8.4	27.6	15.2	16.9	XX	2.6
Admission per staff Rate % (total admissions/No of staff)* 100/30	4010	7.9	6.3	8.2	6.8	5.3	7.8	9.1	3.6	10.5	XX	15.3

There will be two reporting days for one period. The second reporting day of the previous period will be the first reporting day of second period (eg period one-January constitutes the data for 1st and 30th of January, as reporting day 1 and 2. The first reporting day of period 2-February will be 30th January and second reporting day will be 28/29th of February). Therefore to prepare the raw data for next period reporting day one, copy existing raw data from the previous period.

Repeat the process for each period and complete the workbook including all the sheets for all periods.

The compiling of the data as ratios of performance indicator is conceptually simple and can be done manually or using any computer spreadsheet program (eg Excel). It is likely that most will use computers. This will require various formulae to be put in place in the spreadsheet to produce an array of performance indicators from the data of different reporting units in the health system.

The difficulty that arises in doing this is the need to put further operational instructions (macros) into the spreadsheet program to correct for non-returns of data and to eliminate



erroneous data. Standard macros that come with spreadsheet programs are sufficient to address these difficulties and it should be possible for any competent spreadsheet user to do this work.

## PRODUCTION CYCLE FOR HR INDICATORS

At the stage of actually constructing and distributing the indicators, their definition and data collection processes will have been established. This means attention can be focused on preparing the indicators and the local managers for their use. The following pages propose 5 stages in a typical indicator production cycle, the timing of the cycle of stages being set at whatever is regarded as appropriate in that country (note that this should occur at least once a year).

### Stage 1

Local managers in health districts and hospitals receive initial training on the concept of HR indicators and detailed guidance on how they are expected to be used locally. The guidance includes:

- Definitions of indicators and data
- Data collection proformas
- Details of assistance available
- Timetable for data collection and submission to the indicator-processing centre
- Training on the use of the raw data in local management
- Training on the use of indicators in local management.

Data are then collected and recorded over a specific and limited time period.

### Stage 2

Data from districts and regions are forwarded to the indicator-processing unit (which is most likely to be located in the Ministry, Department of Health or other institution such as a university). At this centre, the raw data are first transcribed onto a computer. Simple data checks at this stage must indicate some of the more obvious gaps or discrepancies in the data - these can then be cross-checked with the local managers. Once the data have been 'cleaned' as far as practicable, the data base is used to construct the indicators themselves and to produce them in appropriate presentation formats, ready for distribution to local districts.

### Stage 3

Once the indicators have been constructed, an analysis at national level gives a first general perspective from the data collected on national 'norms' and ranges of indicator values. This can be compared to recommended national/ international norms, or current best practice and a discussion can be held as to potential steps that may be taken at a national level in order to address any divergence from the desired situation. This analysis may identify common issues to be tackled across the country, or highlight localities with particular problems. The analysis can be supplemented by additional information arising from the quality checklist process.


#### Stage 4

A second stage of analysis by the processing centre can be applied to the performance of individual districts by comparison with 'recommended norms/ best practice'. This can be supplemented by specific comparisons with districts sharing similar characteristics. The level of detail in these analyses will partly depend on how much assistance is expected and required for local managers and to what degree they are directly accountable to the national level for performance, but some comment for inclusion with the indicator displays would be helpful.

#### Stage 5

The indicator set and commentaries are then circulated to local managers for action. Any further data anomalies discovered at this stage must be corrected and the next step is to have review meetings with local managers and to draw up an appropriate HR action plan.

### THE PRESENTATION OF HR INDICATORS

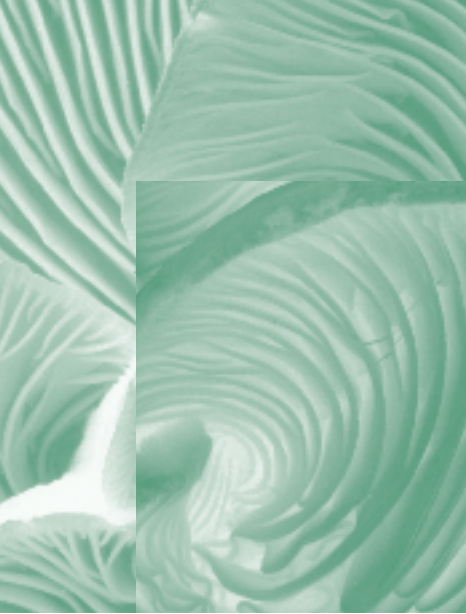


The main value of the indicators lies in the fact that managers are able to make comparisons between different localities. This means that the indicators must be presented in a format which makes these comparisons easy - locating the value of a particular district in relation to others and displaying the range of values across the country.

'Presentation' in this context means the way in which indicators are physically presented to users. The most basic presentations are simple tables of numerical values. However, experience has shown that this is not a particularly useful or easy way of undertaking complex comparisons. Diagrammatic presentation formats show the range of values across similar organizational entities and, at the same time, show the relative position of a particular entity, are preferable. Exactly which formats are chosen will depend on factors such as:

- Managers' skill in interpreting indicators: The more users are familiar with indicators and the management concepts behind them, the easier it is for them to view indicators in a relatively 'basic' state. Less familiar users generally require a more sophisticated, 'directed' presentation of indicators to assist them in their interpretation.
- Available techniques: In many countries, indicator presentation has gone very quickly from being produced solely as tables and comments in a printed format to the use of computers to provide visual displays. One reason for this was the large number of indicators - it was easier to provide different presentation formats for the same set of indicators with a computer than in book form. However, computer-based systems for local managers are not necessary where the number of indicators is relatively small (or if the local availability of PC technology is limited). As long as the processing centre has sufficient computer equipment and skills, a variety of appropriate paper-based formats can be produced for local circulation.

Possible display formats that may be used in a HR indicator system are discussed hereafter. The illustrations are from data collected during a pilot project using modified software originally developed by the WHO European Regional Office.

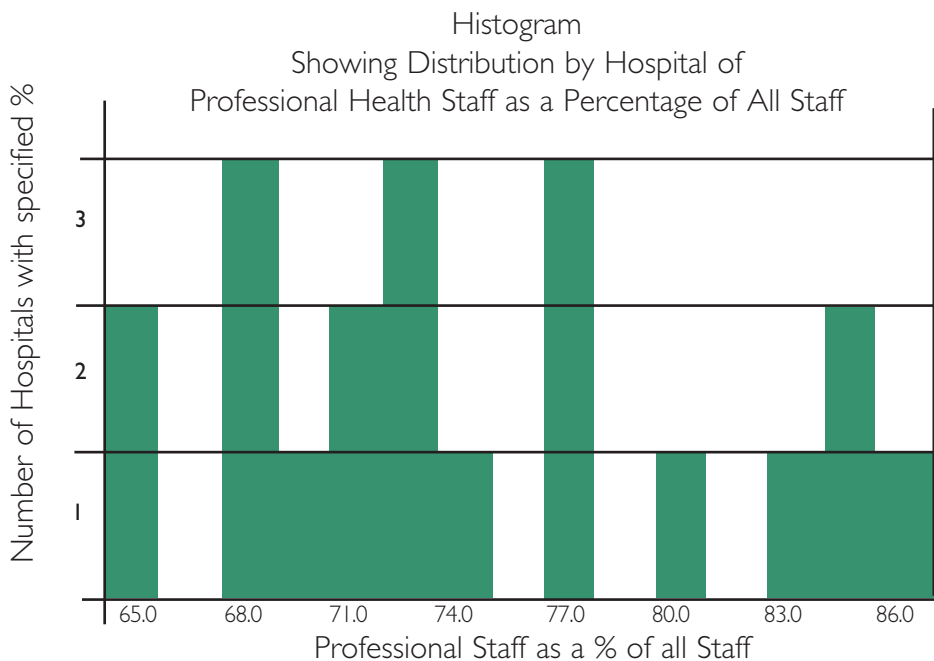


## HISTOGRAMS

**Purpose-** to indicate the spread of values and the relative position for a particular district of interest compared to all other districts.

**Construction-** For any given indicator the histogram plots the number of districts having a particular range of values. Within this an individual district value can be highlighted.

**Comments-** Histograms are relatively easy to construct and interpret for individual indicators, but less suited for comparisons with other related indicators. It would be possible to produce histograms that focus on particular groups of entities (such as all districts in one region, or all hospitals with a particular number of beds).

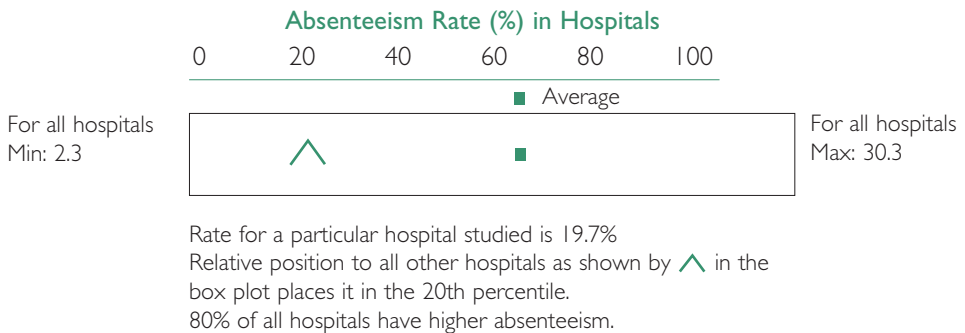
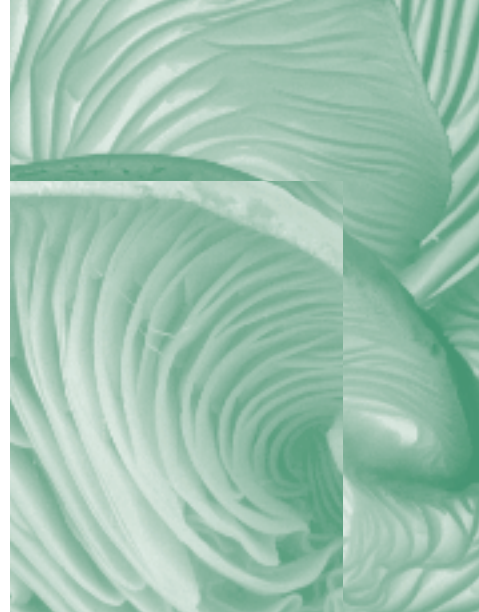


## BOX PLOT

**Purpose-** as for histogram; to indicate the spread of values and the relative position of a particular district of interest compared to all other districts.

**Construction-** A box-plot is a rectangular bar the area of which encompasses the values of all the districts. Within the box-plot, the position of an individual entity is marked together with angular brackets < > identifying the range within which 80% of the values of the other districts or hospitals lie. If the individual entity plotted lies outside these brackets (i.e. in the top or bottom 10% of the values for all entities) this indicates an 'outlier' value and merits closer attention as to why its value for this indicator is particularly high or low (see the section on interpretation of indicators below).

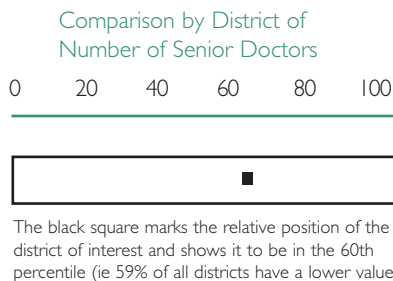
**Comments-** Since the box-plot takes up less space on the page than a histogram, it is much easier to present a related grouping of indicators. This makes indicators much easier to compare and provides some interpretation of possible underlying reasons for particular indicator values. It also provides a concise view of the national range of the indicator value, its average value, and distribution of the range of values for all districts or hospitals.

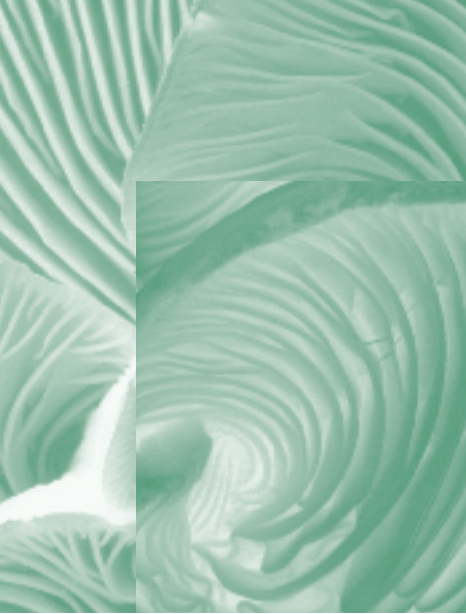


### PERCENTILE BAR

**Purpose-** This shows the rank of the entity compared to all the others (rather than the distribution of the majority of districts as in a box-plot).

**Construction-** A bar, similar to the box-plot, and representing all districts or hospitals. However, here an individual entity (the value of the indicator) is plotted according to the number of districts with lower or higher values than its own (expressed as a percentage). This places an individual district in relation to the other districts more accurately than does the box-plot.



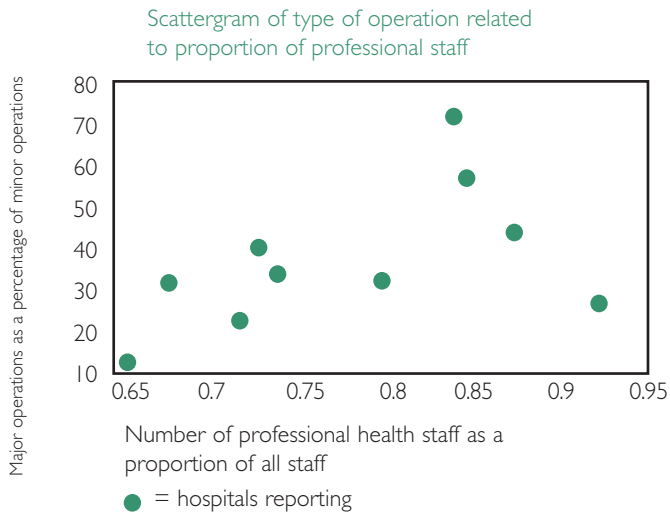


**Comments-** As with the box plot, the percentile bar focuses attention at the extremes of the range. Typically users may be interested in cases where the values lie in the top or bottom 10-20% of districts (depending on what the indicator is measuring). For example, looking at staff per head of population we may be most interested in districts at the bottom end of the scale and less bothered about those at the top end of the range.

### SCATTERGRAMS

**Purpose-** Illustrates potential relationships between the values of two sets of indicators.

**Construction-** Each data point is a unique plot for an entity of the values for the two indicators being plotted.



**Comments-** This can be used to identify a possible relationship between two indicators. However, care must be taken not to establish a relationship between variables where this is spurious (i.e. where the two data sets appear visually related on the graph but where it is not logical to relate them to each other in the first place); for instance, attempting a correlation between staff on duty and the number of outpatients. For this reason the scattergram may be better regarded as a tool to be used by the indicator-processing centre rather than distributed widely.

## MAPS

**Purpose-** To show the geographical distribution of indicator values across a country or region. **Construction:** Outline map of country with district boundaries is required. Each district can be shaded according to the range in which the value of the indicator falls. A maximum of five variations in shading per map is recommended.

**Comments-** Good for visual impact, but can be misleading if it means that significant variations occurring within districts are overlooked.

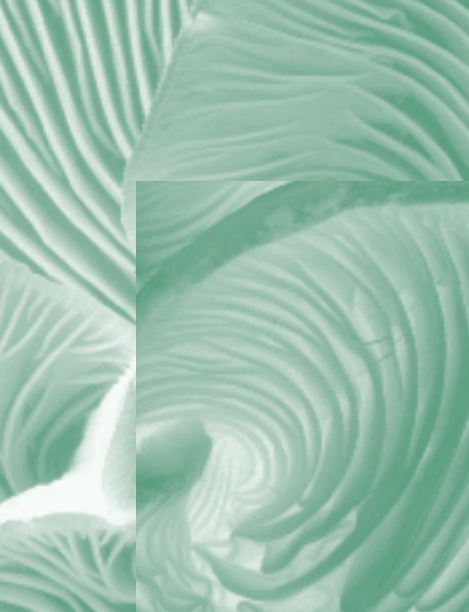
## CHOOSING PRESENTATION FORMATS

This will be determined by a country's particular preferences, available data and techniques and by abilities to construct and interpret formats. Of the formats outlined above, those likely to be of most use at the local level are the histogram, box plot and percentile bar, because they present the most concise 'packaging' of information relevant to the local level. Histograms and box-plots represent the simplest ways of doing this, with users subsequently generating interpretations from this material. Slightly more sophisticated is the idea of grouping similar districts together as a basis for comparison.

The ability to produce clear and straightforward displays of indicator results simply is crucial. There are two technical issues involved. The first is the mechanism for compiling the data and transforming them into performance indicators, as discussed in the section on processing data. The second is the conversion of the performance indicators into a visual form that is easy to understand. This poses more complex problems for which professional computer programming skills may be required. The WHO EURO Performance Indicators display package was adapted for use in a pilot study of indicators. It was shown to be useful for displays of local data but proved quite complicated to use and not suitable as a 'universal' system in its present shape unless expert IT support is available.

Many countries have some version of data display software. An important next step, therefore, is the specification and programming of a simple and robust performance indicator display system. Such a system does not need to be sophisticated - or even primarily HR-focused - but it does need to be straightforward and reliable for people to understand and operate. It also needs to be flexible enough to enable country-specific conditions to be taken into account (eg in terms of the number and types of indicators to be used).

The development of methods for the analysis and interpretation of indicator data is an allied concern. Some standard inferences may be drawn from a given set of indicators in any country over time and some form of 'expert system' may be developed in a way that would facilitate a wider understanding of these interpretations.



## INTERPRETATION OF INDICATORS

The value of HR indicators lies in their interpretation and subsequent application to management issues. A single indicator is not in itself very useful; it is only by comparing a range of indicator values for indicators that their worth becomes apparent.

A common starting point for the interpretation of indicator values is to focus attention on 'outlier' values where values are at the top or the bottom of the regional or national range. This performance may be 'good' or 'poor' (depending on exactly what the indicator is measuring) but, rather than considering them as 'absolute' positions, it is helpful to take a constructive view and

focus attention on the possible underlying causes for such performance. Using national averages as a benchmark can also be misleading as it could be the case that the 'national average' itself represents an unacceptable level of performance.

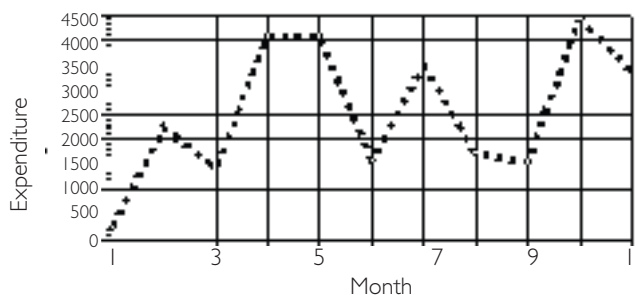
The main reason for looking at districts or hospitals with outlying indicators is not to criticize managers, but rather to establish what is occurring locally and results in these 'exceptional' figures. Investigations into the underlying causes for the indicator value will uncover practices which may be emulated (or avoided) elsewhere and thus improve the management of human resources in general. There are many reasons why indicators may be at the extreme ends of a range; careful, detailed analysis is always required to help establish why such is the case. For example:

- incorrect/ missing data/ simple clerical input errors to the indicator system
- poor local management of resources
- underlying structural causes outside the immediate control of local managers.

It is important not to be 'categorical' in interpreting indicators for these reasons and attributing 'blame' for the performance of a district. Indicators cannot measure every single aspect of what is occurring within a location; they can only provide an indication of circumstances and possible conclusions that will inevitably require more detailed investigation.

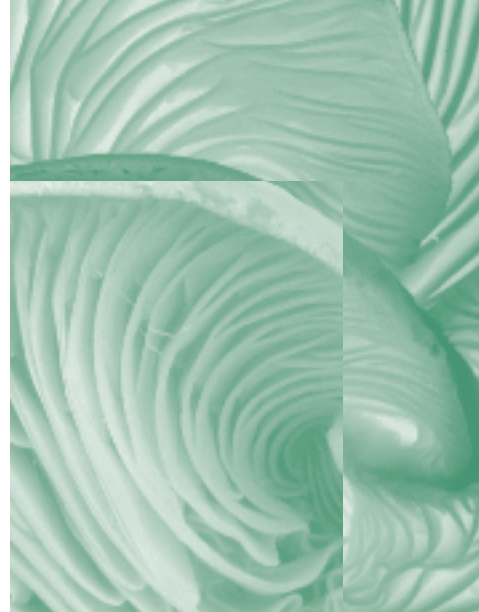
Two examples of making interpretations from indicators are given as follows. The first employs a time series, i.e. the same indicator is presented over a period of time.

Average local purchase drug expenditure/specialist (Rp)

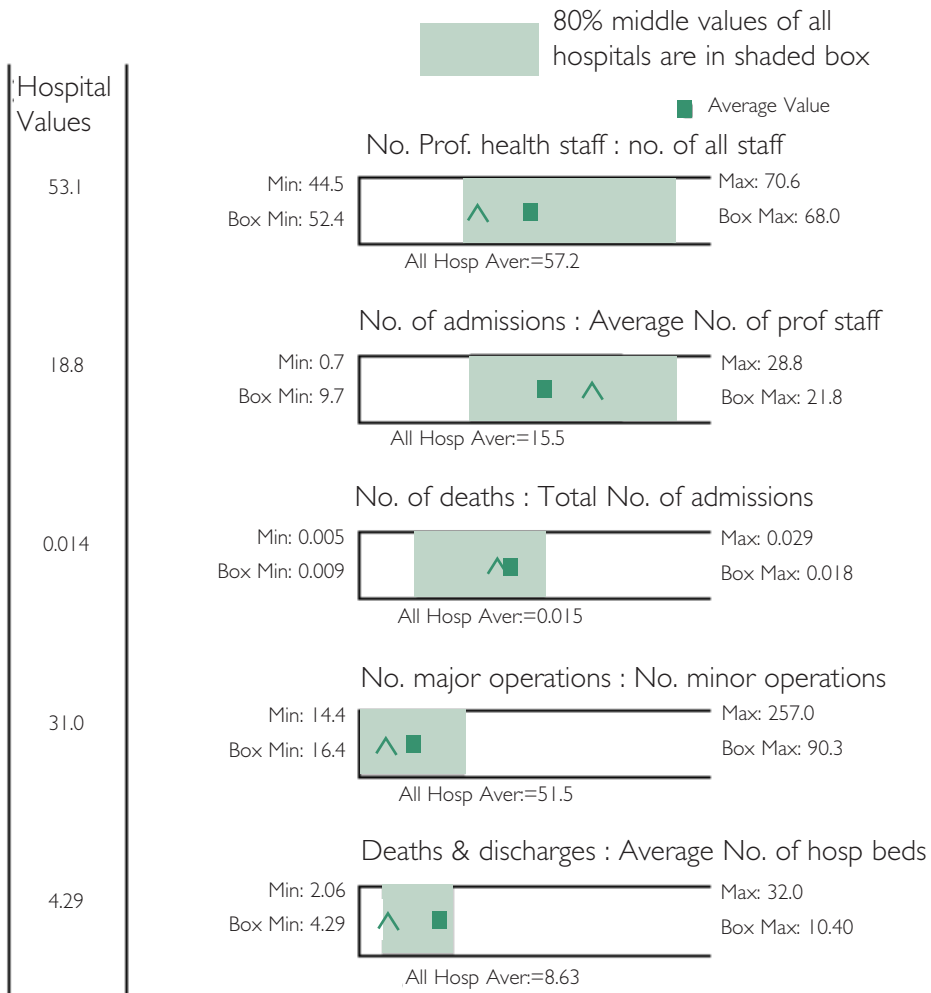


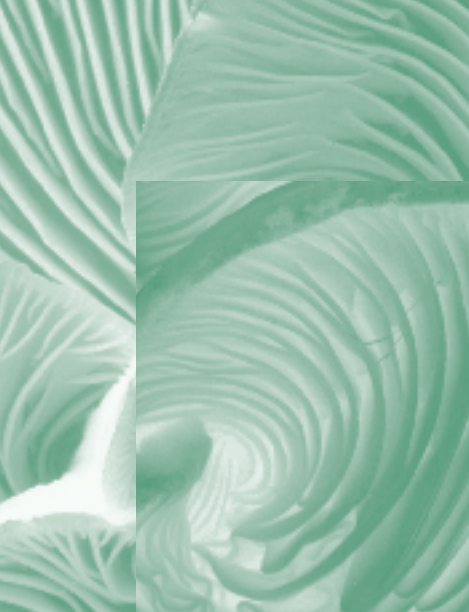
The indicator monitors local expenditure on drugs by medical specialists in one hospital. Local expenditure is allowed when the health supply service cannot provide the drugs required. What is happening is that, while local purchase varies from month to month, there is an overall increasing trend in the level of local expenditure. As local purchase is more expensive than the national or regional supply service, further investigation is warranted in order to check whether the problem lies in the supply system or in the fact that specialists do not follow Ministry or Department of Health policy.

A second example uses multiple indicators to explore a hospital situation.



### Hospital Profile (boxplot)





The hospital appears to be under-performing in the following key areas: the ratio of major to minor operations and patient turnover per bed (ratio of deaths and discharges to number of hospital beds). There can be several reasons for this, such as operating theatres being out of action. However, the values for other indicators in the profile suggest that the problem may lie in a shortage of professional health staff - this could explain both the low number of major operations and the low discharge rate. Clearly, more investigation is needed but there is a possibility that this under-use of hospital capital resources can be remedied relatively simply and cheaply.

These two examples are intended to demonstrate how indicators provide 'indications' that, through comparisons either with previous performance or with other similar institutions, can highlight areas of management activity that must be strengthened to improve efficiency and effectiveness. There is no formula for interpreting indicators. It requires experience, judgement and practice.

These two examples are intended to demonstrate how indicators, through comparisons either with previous performance or other similar institutions, can highlight areas of management activity that might be strengthened to improve efficiency and effectiveness.

However, it should be noted that there is no 'standard formula' for interpreting specific indicator values. Performance indicators themselves can only indicate - they are not 'absolute' measures of management action. They need to be viewed and interpreted within a local context. This means making any judgement about potential management actions not only on specific sets of indicator values, but also on the basis of other relevant data and information. This may not be numerically recorded: for example, local knowledge of the particular health service function in question, its area of coverage and its current operating conditions. All of this may help to explain particular indicator values and, importantly, suggest some of the potential management actions which may need to be taken.