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Methodology to validate the hospital information

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EDITORIAL

Validation of district hospital data is the focus of this publication. It is the third phase in a programme of work looking at hospital data. The phased approach thus far has been:

- Phase1: An Analysis of the disease profile review all provincial hospitals in KwaZulu Natal using a retrospective patient record review
- Phase2: An Analysis of hospital performance using the Pabon Lasson methodology, which revealed inconsistencies in data received from hospitals
- Phase3: Interrogation of the routine data submitted by district hospital to the central level

This is a progressive process to identify issues of data quality and completeness at source, to allow for the enumeration of the problems identified at a fundamental level. This will allow for solutions to be put in place to ensure a functional and credible data collection system. The quality assurance of the data collection and submission system will support further analysis of valid data upon which key policy questions can be posed.

The importance of the hospital sector within a public sector health system cannot be overlooked as it consumes the most amount of resources in terms of finances and skilled personnel. The remaining resources are then shared between primary health care and preventative programmes. This statement must not be misconstrued as advocating a dramatic overnight shift in resources within the health sector, but rather a careful analysis of internal efficiency indicators within hospitals. The crux of this analysis lies in a few routine data elements that must be collected and reported accurately and consistently. This bulletin expands on this statement and goes a step further to prioritizing a few variables within the hospital data set that have maximum impact on the calculation of indicators. One such variable is the number of usable beds. The graph (Fig 20) showing the large monthly fluctuation in the number of usable beds in a hospital renders all subsequent calculation of indicators such as Bed Turnover and Bed Occupancy unreliable.

The challenge is for the public health service delivery system to be more responsive and answerable to the needs of the community and the judicious use of moneys from the taxpayer. A further catalyst is the cost-efficiency demands being made on all government departments to show a tangible return on investment.

In the public health system efficiency gains in the hospital sector will result in the better use of limited resources and more resources being made available to primary health care and preventative programmes without compromising the functioning of the hospital sector. This could possibly lead to better integration of services and coherent referral patterns. However, these potential decisions are only possible in the light of good data that lends itself to economic analysis to inform policy decisions. This brings one a full circle to the issue of the periphery and the center working together to improve the data from hospitals. It must be seen as a partnership between the hospital management team and the health information resources in the province for mutual benefit.

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ACRONYMS & DEFINITION OF TERMS

<i>Consistent</i>	A measurement is consistent if it provides the same value when it is repeated under identical conditions. Consistency allows stability in the measurement of a certain variable and it is obtained by reducing intra and inter-observer variation. An example of a valid and consistent reporting is that of a hospital with a stable number of 300 usable beds, which correctly and consistently reports 300 usable beds every month. If the same hospital were reporting 250 usable beds every month, the reporting would be invalid because it would be lower than the real value, but at least it would consistently report the same lower number. If the same hospital were reporting different values across months, it would be both invalid and inconsistent.
<i>DOH</i>	Department of Health.
<i>Efficiency</i>	Efficiency is used to indicate the optimal use of hospital resources in terms of high occupancy and high turnover. This is not to be confused with quality of care because a hospital that is fully occupied does not necessarily provide high quality care. Similarly, efficiency should not be confused with performance, which is related to the overall effectiveness of the service. For example, a hospital may be fully occupied but it may also have higher than average mortality when compared with hospitals admitting similar type of patients.
<i>FIO</i>	Facility Information Officer.
<i>FY</i>	Financial Year.
<i>KZN</i>	KwaZulu-Natal.
<i>Indicator</i>	A composite measure formed by the combination of variables at the numerator and the denominator. In this issue, the indicators of efficiency are occupancy and turnover.
<i>Occupancy</i>	The proportion of occupied beds for the month that was validated by the survey.
<i>PTSS</i>	Patient Throughput Statistical System.
<i>Turnover</i>	In this issue, the bed turnover is the average number of patients per bed for the month that was validated by the survey.
<i>Variable</i>	Any entity which can be quantified through different values.

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ABSTRACT

This issue describes a methodology that was tested to validate the data reported by 23 district hospitals. The Patient Throughput Statistical System (PTSS) collects information to monitor the utilization of hospital resources. Misreporting affects the reliability of the indicators of occupancy and turnover, not allowing to identify corrective actions to improve utilization. This causes waste of resources because hospitals consume a sizable proportion of the budget of the DOH and they need to be fully utilized. Checking the quality of the data must precede any interpretation of the information coming from the hospitals.

This issue describes the methodology, which was tested in 23 district hospitals to check the reliability of the hospital statistics. The raw data recorded in the hospital registers were used to validate the data reported by the PTSS. The results show that the quality of the reporting varies and some variables are more important in influencing the reliability of the indicators. For example, the number of beds was found to be the most critical variable influencing the estimation of occupancy and turnover. Therefore, any attempt to improve the information system should start from the standardization of the reporting of the number of usable beds. Possible causes affecting the quality of reporting and what could be done to improve it are discussed. The methodology, which has been tested in this initial phase in about two thirds of the district hospitals, will be finalized and will be applied in the next few months to all the provincial hospitals.

Introduction

The Patient Throughput Statistical System (PTSS) collects data from the hospitals to monitor and improve hospital efficiency. In this context, efficiency is synonymous with optimal utilization, while performance is a more comprehensive concept related to overall outcome, such as low levels of mortality. Data on the number of discharges, deaths, inpatient days, beds and other variables are transformed into indicators of efficiency such as bed occupancy and turnover, and into indicators of performance, such as mortality. These indicators are used to describe hospital profiles, identify the causes for the low utilization and poor performance, generate and test hypotheses on how to improve efficiency, find solutions, transform these into action and monitor their outcome. However, before any interpretation of the data is carried out, the reliability of the reporting system needs to be checked. The Department of Informatics has done a commendable job in compiling the data published in the Health Statistical Information, but more efforts are needed to evaluate the consistency and validity of the data.

To achieve its managerial objectives, the DOH should ensure that the PTSS provides consistent and valid information. **Consistency** allows stability in the measurement of a certain variable, reducing the intra and inter-observer variation to a minimum. **Validity** allows to ensure that a reported high or low occupancy is real and it is not the result of misreporting of one or more variables (i.e. number of beds). An example of a consistent and valid reporting is that of a hospital with a stable number of 300 usable beds, which consistently and correctly reports 300 usable beds every month. If the same hospital were reporting 250 usable beds every month, the reporting would be consistent but not valid because it would consistently report a wrong value. If the same hospital were reporting different values across months, the reporting would be both inconsistent and not valid.

The above characteristics are critical to ensure the comparability between and within hospitals. Consistency ensures that the reported changes in a given hospital across different periods of time are real and they are not the result of variation in the measurement of the same phenomenon. An example of inconsistency is the reporting of a high monthly variation in the number of beds, because they are counted differently while the real number does not change. Inconsistency in reporting will cause a change in occupancy and turnover, which is not due to changes in utilization but to vagary in reporting the number of beds such as when incubators are included or excluded in different reporting periods. Validity is important to ensure comparability across hospitals at a given point in time to rank them according to different levels of efficiency so that actions are taken to improve the situation in the least efficient hospitals. Therefore, monitoring changes across months and years within the same hospital requires a high degree of consistency, while comparing efficiency across hospitals at a certain point in time requires a high degree of validity. Standardizing the reporting criteria to minimize the intra and inter observer variation can ensure consistency and validity of the information system.

However, the resources required in terms of staff, training and supervision to improve the reporting competes with other priorities. Production of statistics is rarely given the importance it deserves and its priority is low compared with more urgent matters.

Managers should improve the statistics produced by their hospitals because inconsistent changes on single variables affect bed occupancy and turnover, which are used to judge hospital efficiency. However, because such awareness takes time to develop, the DOH remains the first guarantor of the correct interpretation of the reported data.

The DOH should treat any unlikely monthly variation in the reported variables as suspect unless proven otherwise. For example, the DOH should treat with caution the trends of the hospital indicators recorded in the past few years. According to the latest statistics from the PTSS, occupancy has declined between FY00/01-FY01/02 and FY02/03 – FY03/04. However, the raw data reveal that many variables had inconsistent and unlikely variations in opposite direction across months and years. Furthermore, the data are suggestive of a different pattern of reporting between FY00/01-FY01/02 and FY02/03-FY03/04. Because the decline in occupancy in the last two years might be an artefact resulting from changes in reporting, it is not possible to conclude that utilization has indeed declined in the last two years. Managers should be aware that accepting such changes as real would imply that hospitals have become less efficient. Very few managers appear to take notice that poor reporting can be associated with negative consequences, including a reallocation of resources to other hospitals when occupancy is underestimated.

To improve the data reporting, the DOH should set up an in-built validation system on the data reported by the hospitals. The methodology described in this issue was tested in two thirds of the district hospitals and was based on a comparison between the number recorded in the wards' and matrons' registers and the number reported by the PTSS. The variables which were validated include admissions, discharges, inpatient days, deaths, usable beds, deliveries, live births, still births, operations, day patients, outpatients and transfers. This methodology will be refined and extended to all the provincial hospitals in the next few months and will hopefully become integrated into the PTSS. The results of this initial test of the methodology show how this technique can be applied at the central and peripheral level to improve the information produced by the PTSS.

Methodology

The survey team visited the district hospitals listed in Annex I. After meeting with the hospital managers to explain the objective of the survey, the survey team in collaboration with the facility information officer (FIO) and other relevant staff collected the data recorded in the ward and matron registers. Having selected one month at random from January 2003 onwards, the registers related to that month were used to validate the information produced by the PTSS. Starting with the first day of the selected month (i.e. January 2003), the enumerators counted the daily number of admissions, discharges, deaths, day patients, transfers, deliveries, live births and stillbirths for the month that was selected at random for the validation. The registers from the operating theatres provided the basis to validate the number of operations reported by the PTSS. The outpatients' registers provided the basis to validate the number of reported outpatients' headcount. The registers of the mortuaries were included to cross validate the number of deaths recorded in the wards.

For each variable, the numbers reported by the PTSS were validated against the numbers counted during the survey. The data was entered into SPSS 12 and the consistency between the values reported by the PTSS and by the survey was graphically represented. In each graph representing a given variable, the hospitals were plotted according to the values reported by the PTSS (X axis) and by the survey (Y axis) for the month that was taken at random for the validation. Figures 1 and 2 show two extreme scenarios in which the values of a hypothetical variable reported by the PTSS are on the X-axis and the values reported by the survey are on the Y-axis. In Figure 1, there is perfect correlation between the values reported by the PTSS and by the survey. This is shown by the position of the points, representing each hospital, on a straight line crossing the graph at the intersection of identical values of X and Y (Figure 1). Figure 2 shows the opposite situation in which the values reported by the PTSS are not correlated with the values of the survey. The quality of reporting decreases when it gradually approaches the patterns shown in Figure 2, where the points representing the hospitals are located at the right and at the left of the straight line. The hospitals falling on the right are characterized by over-reporting because the PTSS reported higher values than the survey and vice versa.

Figure 1 Hypothetical case of consistent reporting

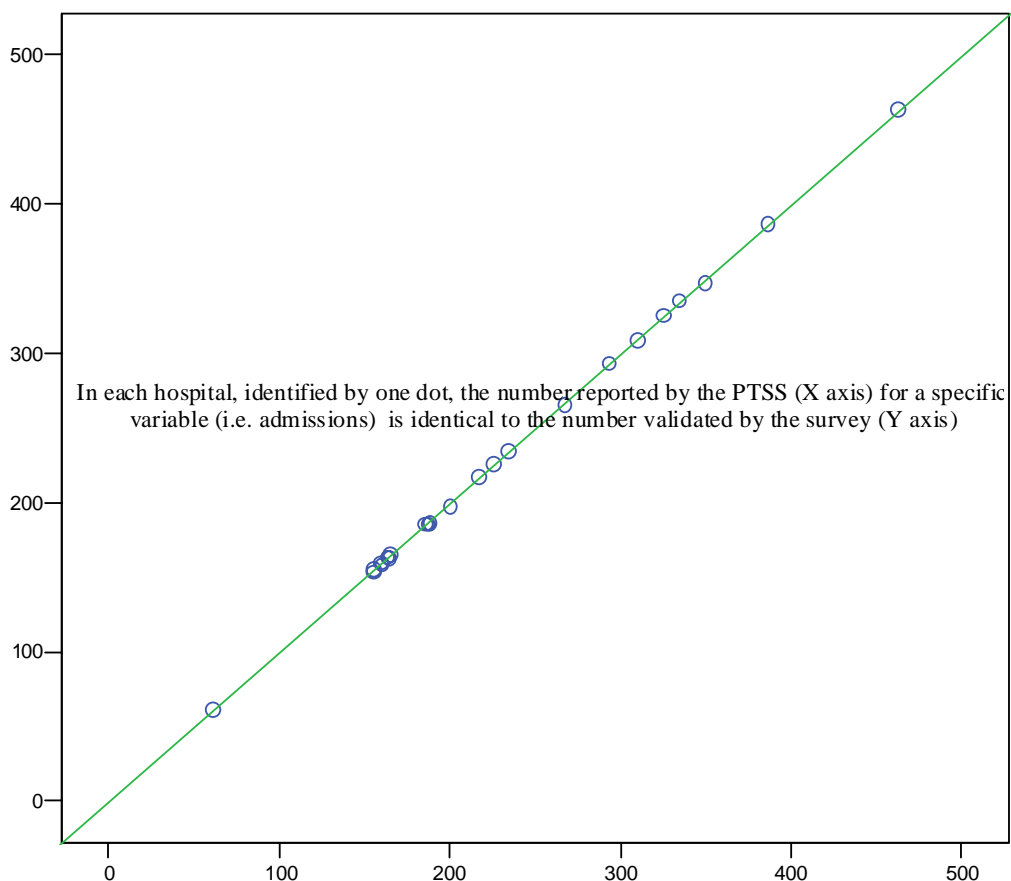
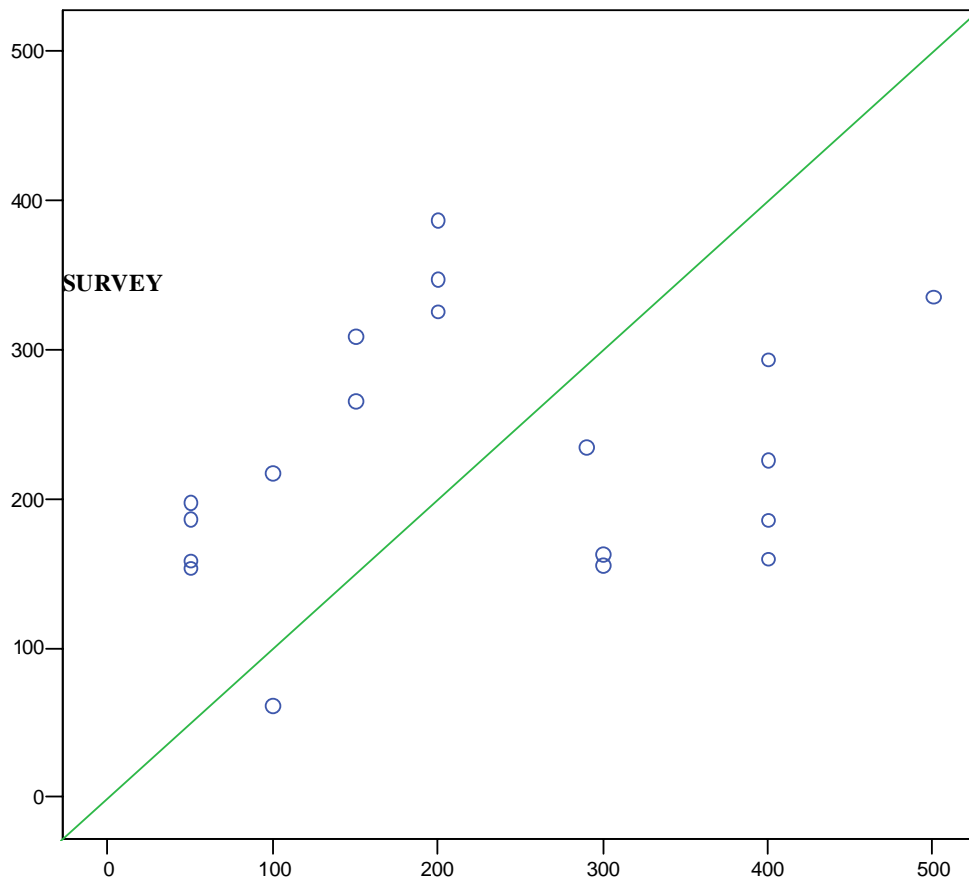


Figure 2 Hypothetical case of inconsistent reporting



Results

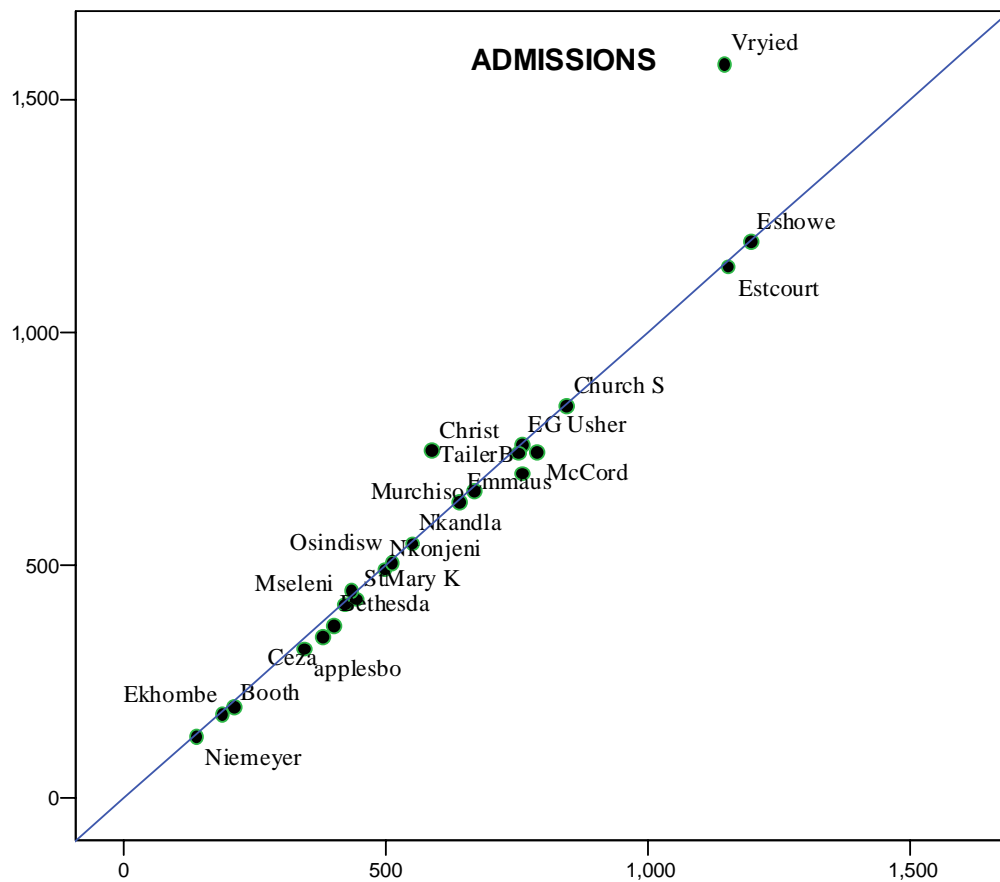
Figures 3 through 15 provide a visual representation of the undercounting and over counting of the PTSS versus the survey. Each Figure represents a variable and each dot represents a hospital, which is positioned according to the values reported by the PTSS (X axis) and by the survey (Y axis) for the validated month. The degree of correlation between the values of the PTSS and the values measured by the survey is higher for the variables represented in figures 3-5, it declines for the variables represented in Figures 6-9 and is low for the other variables.

Hospital admissions

Figure 3 shows a high correlation between the number of admissions reported by the PTSS and by the survey. Most of the hospitals are very close to the straight line crossing the graph at the intersection of identical values of X and Y. For example, the first dot nearest to the origin where the two axes meet represents Niemeyer, and its position is on the straight line because the 134 admissions counted during the survey are almost the same as the 138 admissions reported by the PTSS for the validated month.

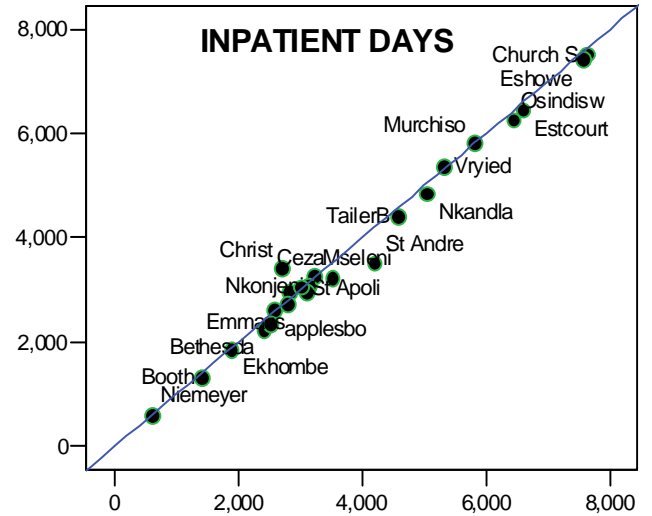
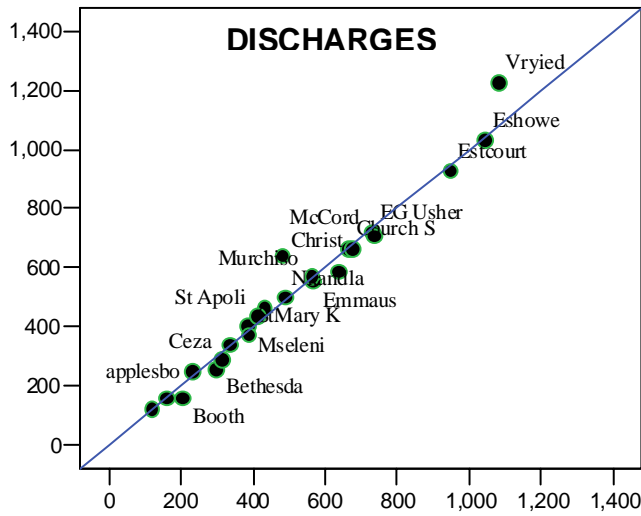
There were very few hospitals falling on the left and on the right of the straight line. For example, Vryied was located on the left of the straight line because, for the month selected at random by the survey, the number of admissions reported by the PTSS (1143) was lower than the number counted during the survey (1576). Because the PTSS under-reported compared with the survey, the dot representing Vryied falls on the left of the straight-line. Emmaus and McCords were leaning slightly towards the right hand side of the straight line because the PTSS over-reported the number of admissions for these hospitals compared with the survey.

Figure 3 Validation of the reported number of admissions



The other figures show that the correlation between the values of the PTSS and the values of the survey varies across variables. As with the number of admissions, the values reported by the PTSS on the discharges (Figure 4) and the inpatient days (Figure 5) were correlated with the values measured by the survey, suggesting that these variables were reasonably well reported by most hospitals. Figures 6-9 show that the correlation declined for the number of deaths, beds, deliveries and live births. Figures 10-15 show even lower levels of correlation for the stillbirths, operations, day patients, outpatients and the transfers, for which the scattered dots indicate problematic reporting.

Figures 4-5 Validation of the reported number of discharges and inpatient days



Figures 6-7 Validation of the reported number of deaths and beds

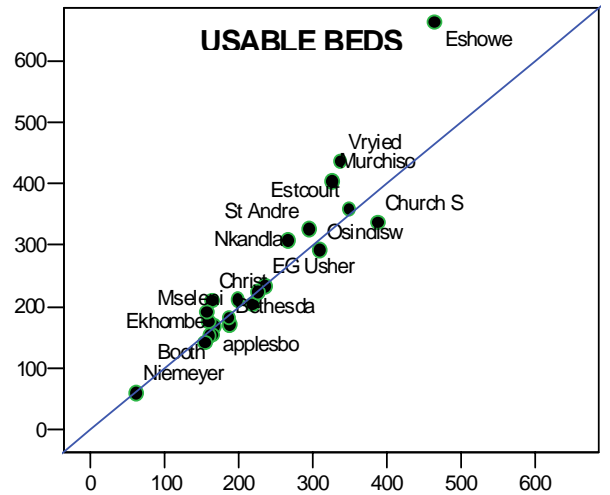
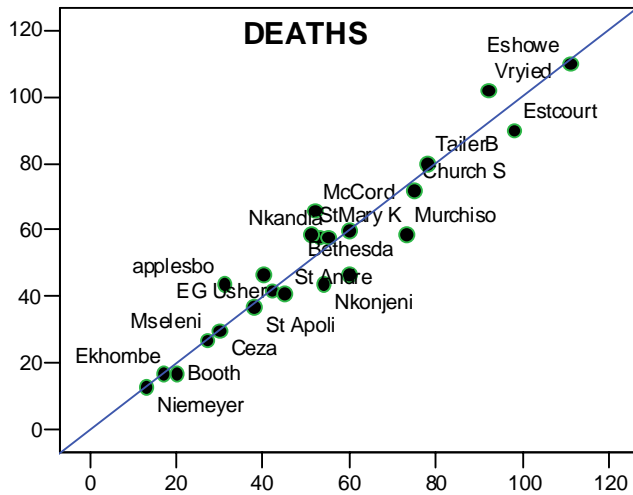


Figure 8-9 Validation of the reported number of deliveries and live births

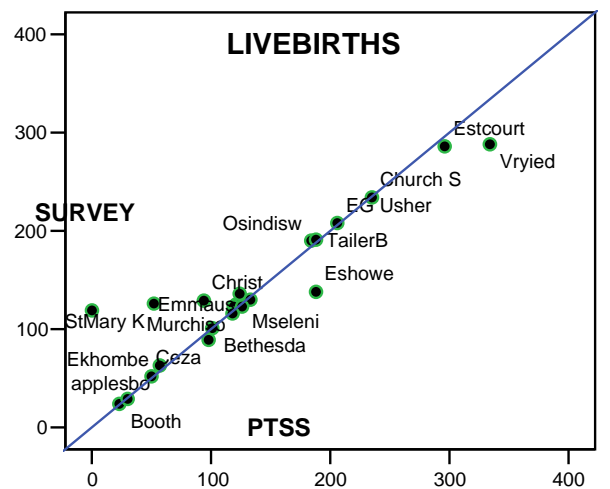
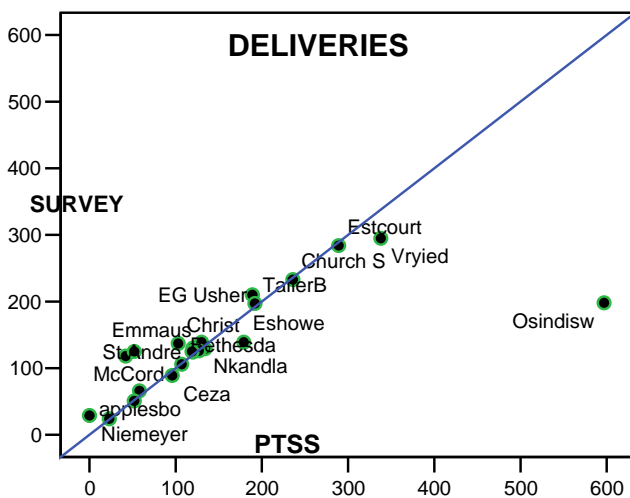
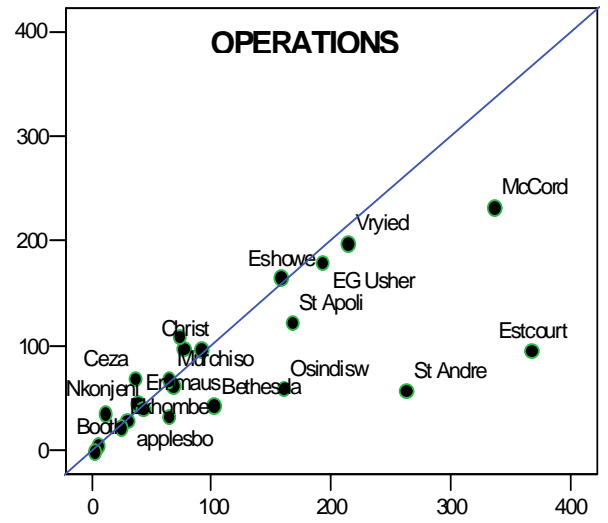
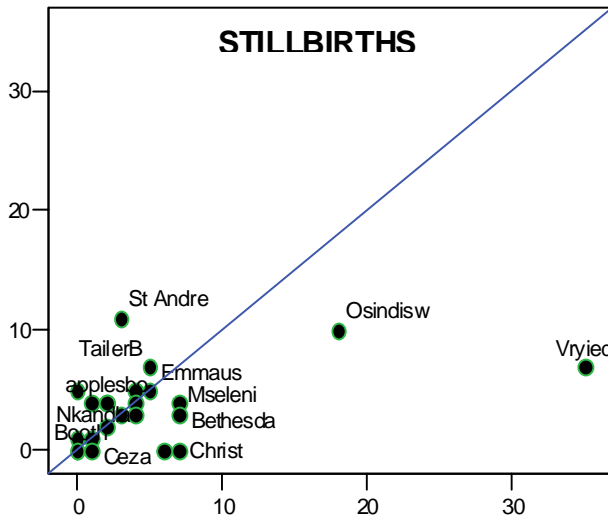


Figure 10-11 Validation of the reported number of stillbirths and operations



Figures 12-13 Validation of the reported number of day patients and outpatients

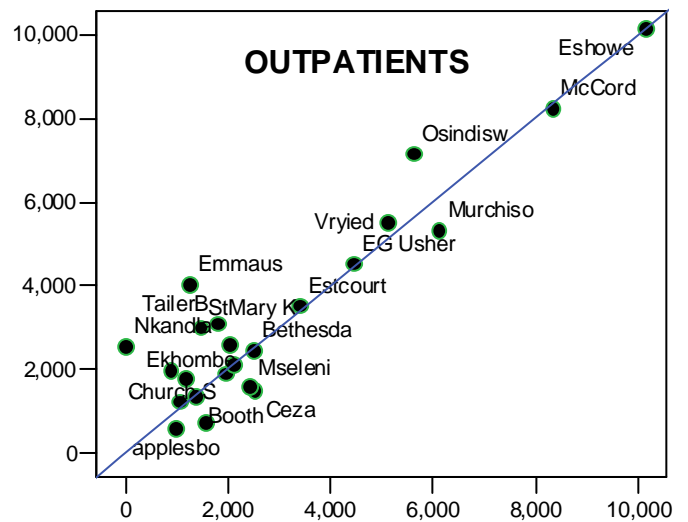
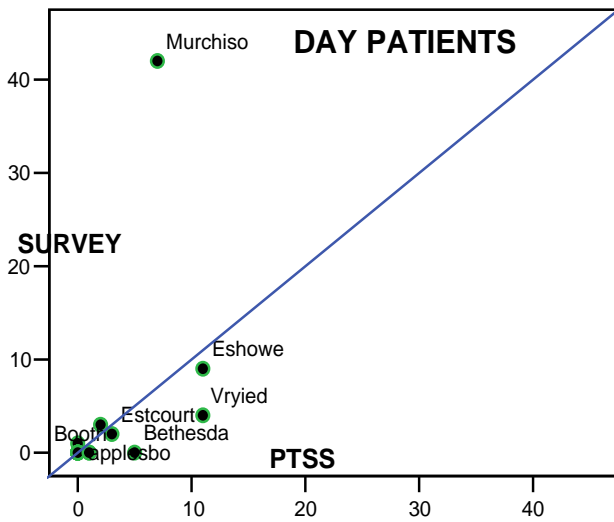
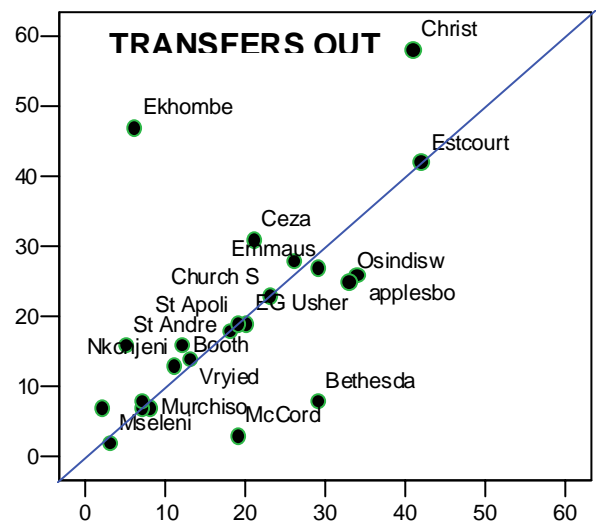
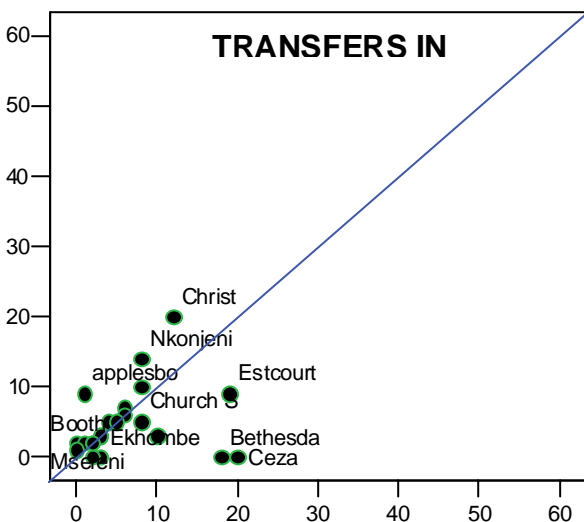


Figure 14-15 Validation of the reported number of transfers



Estimation of occupancy and turnover

The above inconsistencies affect the estimates of occupancy and turnover. As described in issue 7 of the Epidemiology Bulletin, these indicators measure the utilization of the hospital resources. The formulae used by the DOH to estimate these indicators are the followings:

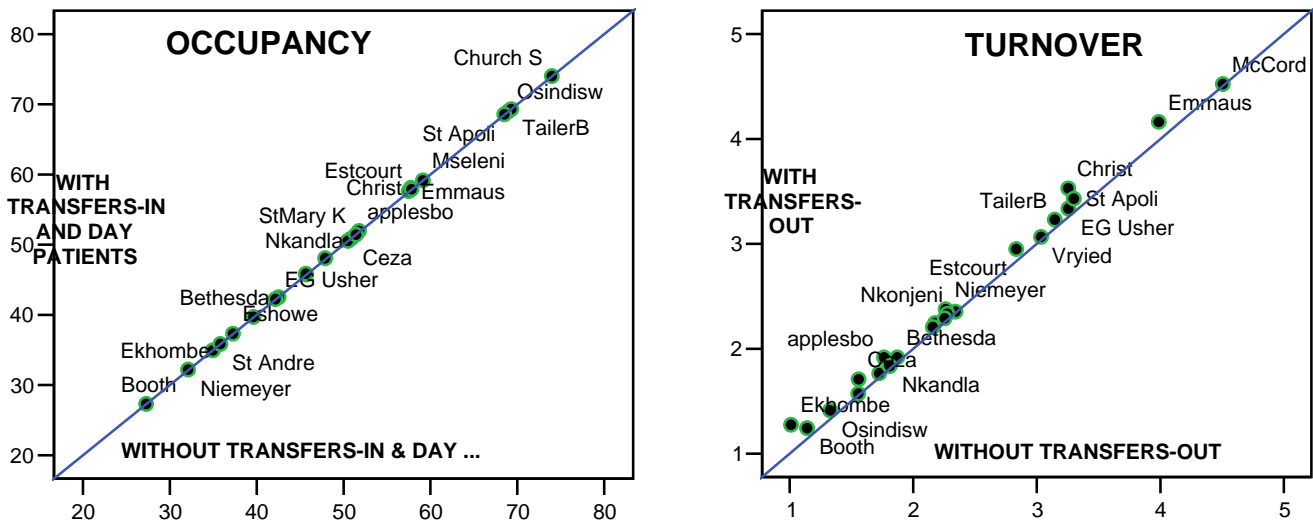
$$\text{Occupancy} = \frac{(1/2 \text{ Day patient} + \text{Inpatient days} + \text{Transfers in})}{\text{Usable beds} * \text{days in a month}} \times 100$$

$$\text{Turnover} = \frac{(\text{Discharges} + \text{Deaths} + \text{Transfers out})}{\text{Usable beds}}$$

The above formulae could be streamlined by excluding transfers and day patients. The scattering shown by the Figures 12-15 suggests that in most hospitals the number of day patients, outpatients and transfers reported by the PTSS are inconsistent with the number collected by the survey. The high variation creates comparability problems among hospitals and within hospitals. This low consistency in reporting is likely to be due to the different way of categorizing these variables and to the different degree of compliance with the reporting criteria. Fortunately, because of the small number involved, transfers and day patients have minimal or no influence on occupancy and turnover. In other words, they do not add significant information to the estimation of these indicators compared with inpatient days, beds, discharges and deaths.

Figures 16 and 17 show respectively the values of occupancy and turnover estimated by including transfers and day patients (Y axis) against the occupancy and turnover, without transfers and day patients (X axis). The fact that the hospitals lay on the straight line, indicate that including or excluding transfers and day patients does not make any difference. The difference between the occupancy rates estimated by including transfers and day patients and the occupancy rates estimated without transfers and day patients, was less than 1%. For example the major difference was for Christ the King, for which occupancy was 58.1% if transfers and day patients were included and 57.8% if they were excluded. Turnover was not significantly affected by the exclusion of the transfers out, with Christ the King changing from 3.5 to 3.3 patients per bed per month if the number of transfers-out were respectively included and excluded. Because the information on transfers and day patients is the most inconsistent and it does not add significantly to the estimation of occupancy and turnover its data collection need to be justified by clarifying for what objective this information is to be collected. For example, transfers are relevant if they are specifically used to judge the utilization of the referral system but they are not relevant for the estimation of occupancy and turnover.

Figures 16-17 Occupancy and turnover, with and without transfers and day patients



Figures 18 and 19 compare the occupancy and turnover estimated by the PTSS and by the survey. Figure 18 shows the consistency of the estimates of occupancy based on the data reported from the PTSS (X axis) and from the survey (Y axis). Similarly, in Figure 19 each hospital is plotted according to the intersection of the turnover based on the data from the PTSS and from the survey.

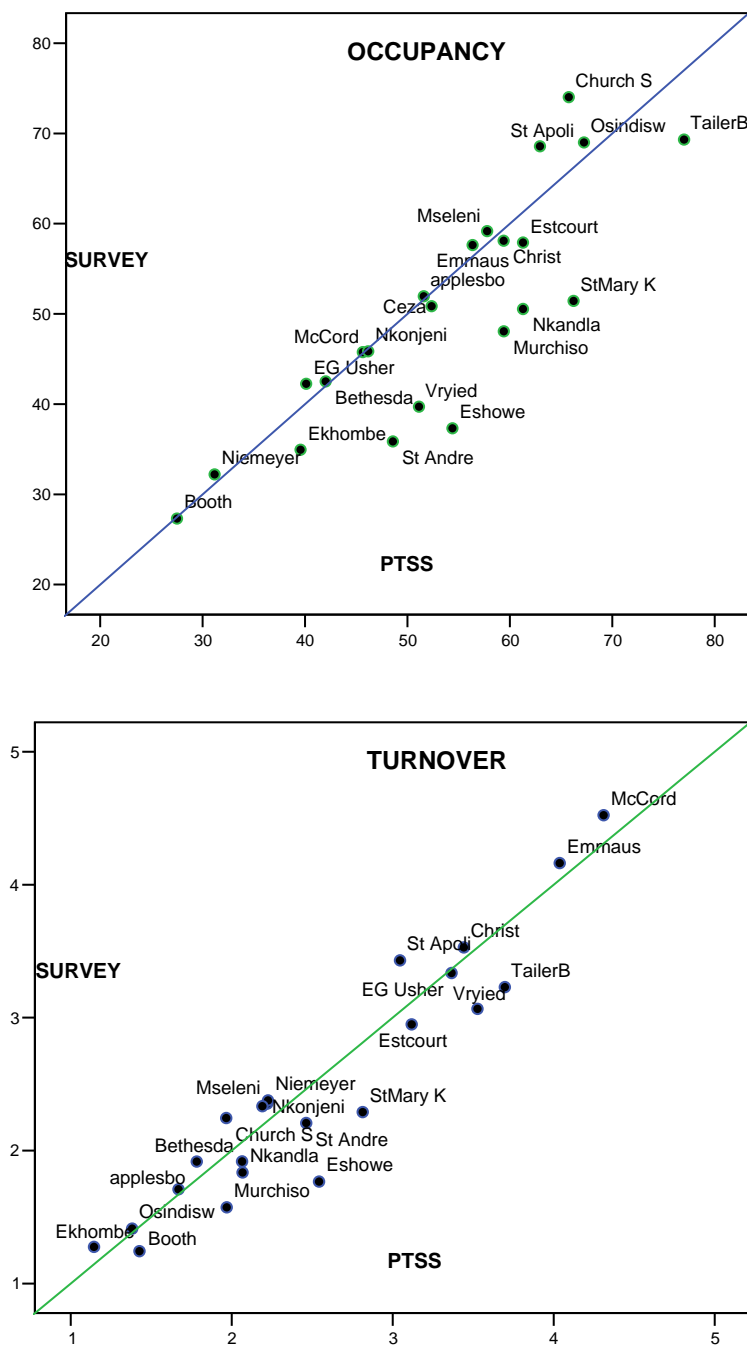
As with the individual variables, the hospitals on the right and on the left of the straight-line have respectively over-estimated and underestimated values. If the values collected by the survey on the beds, inpatient days, discharges and deaths were identical to the values reported by the PTSS, occupancy and turnover would be identical and the hospitals would lie on the straight line. Vice versa, hospitals for which the values reported by the PTSS differed from the values measured by the survey would fall at the left or at the right of the straight line. For example, the position at the right of the straight-line indicates over-estimation from the PTSS such as in the case of Eshowe, which had occupancy of 54% according to the data reported by the PTSS versus 38% estimated by the survey.

Usable beds and utilization

Over or under-estimation of occupancy and turnover depends on a few critical variables. The number of beds influences the denominators of both indicators while the numerators are influenced by the number of inpatient days for occupancy and by the number of discharges and deaths for turnover. Figures 18 and 19 should be compared with Figures 3-15 to have an idea on the relationship between the misreporting of the individual variables and the over or under-estimation of occupancy and turnover. For example, Figure 7 shows that Eshowe was on the left of the straight line for the number of beds because this hospital under-reported the number of beds. This caused a deflation of the denominator for occupancy and turnover, leading to their overestimation, as indicated by the position of Eshowe at the right of the straight lines of Figures 18 and 19.

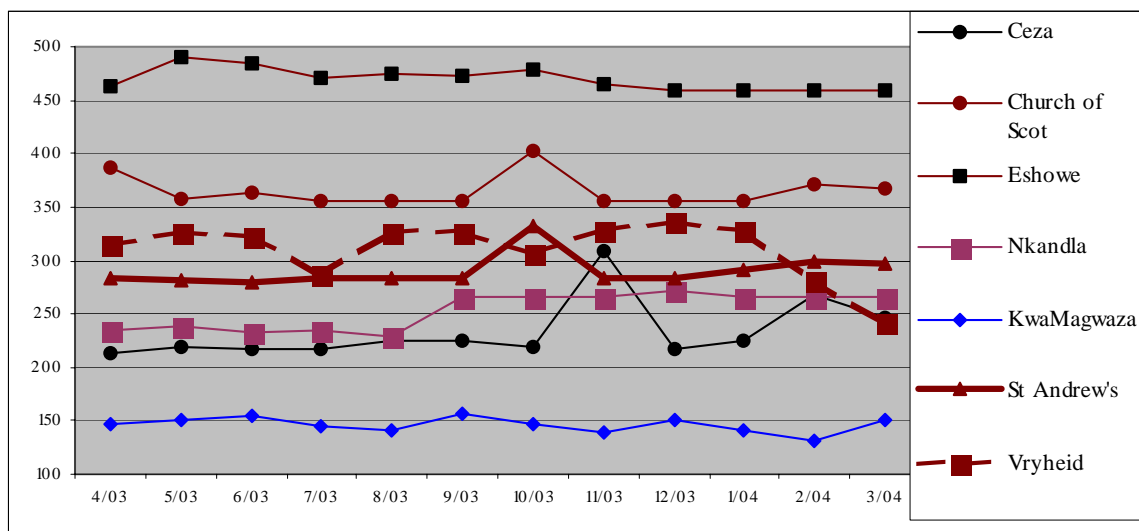
The incorrect reporting of the number of beds was the most important cause of over and underestimation of occupancy and turnover. The same hospitals which were under-reporting their beds, as shown by their position at the left of the straight line in Figure 7, were overestimating occupancy and turnover, as shown by their position at the right of the straight line of Figures 18 and 19. Vice versa, the hospitals that over-reported the number of beds, as shown by their position at the right of Figure 7, were underestimating their occupancy and turnover, as shown by their position at the left of Figures 18 and 19. This is due to the fact that while the variables at the numerators of these indicators were less problematic, the inflation (over-reporting of beds) or the deflation (under-reporting of beds) of the denominators were more influential in causing respectively under-estimation and over-estimation of occupancy and turnover.

Figure 18-19 Occupancy and turnover, PTSS (X) versus the survey (Y)



The reason for the under or over-reporting of the number of beds is due to the variation with which beds are reported. Figure 20 shows that the hospitals at the left and at the right of the straight line of Figures 18 and 19 had high monthly variation in the number of beds reported by the PTSS. Such monthly fluctuations can only be explained by a high variation in the reporting of the number of usable beds due to variable interpretation of the definition related to authorized, usable and occupied beds. This variation is caused by the difficulty in ensuring standardized reporting across the wards of each hospital. The individual interpretation of what is to be reported as usable beds causes substantial daily and monthly variation in the reported number of usable beds. These problems of internal consistency of the reporting system could be improved by conducting some analysis on the variation in the daily number of occupied and usable beds, cots, cribs, and incubators. Unfortunately, at the moment the PTSS is only able to produce monthly reports and does not allow to extract daily numbers for further statistical analysis.

Figure 20 Monthly variation in the number of reported usable beds



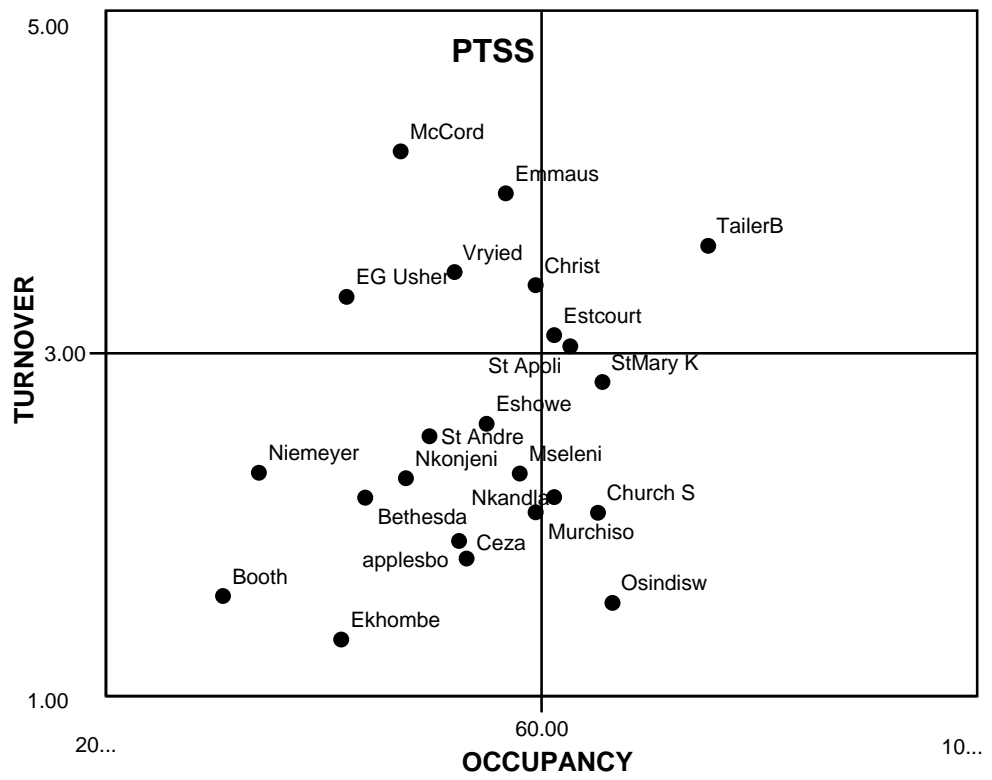
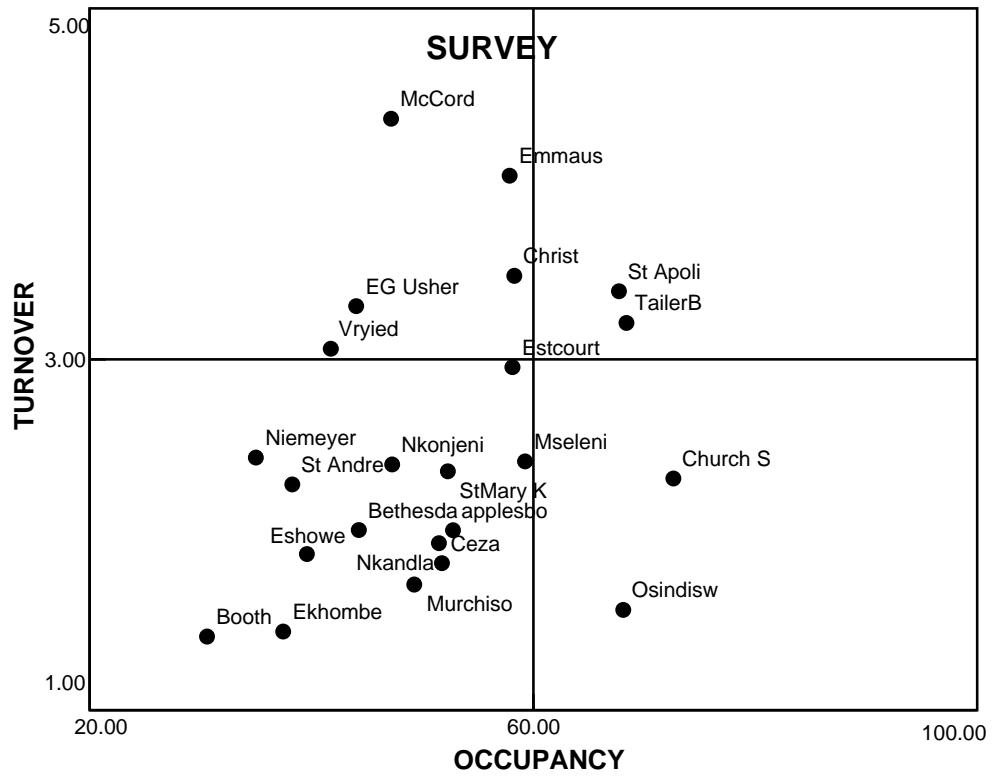
The inconsistencies in the reporting are fortunately insufficient to cause substantial changes in the indicators of hospital efficiency. For most of the hospitals included in the survey the difference in the occupancy estimated by the PTSS versus the occupancy estimated by the survey were in the order of a few percentage points, with a few hospitals having more than 10 percentage points difference between the values of the PTSS and the values of the survey. This suggests that the data from the PTSS are of reasonable quality for most of the hospitals covered by the survey. However, this needs to be confirmed by the application of the validation to all the provincial hospitals.

Pabon Lasso Graphs

The efficiency profile according to the Pabon Lasso Graphs is shown in Figures 21 and 22. The Pabon Lasso, which was introduced in issue 7 of the Epidemiology Bulletin, is a graphical representation of the utilization of each hospital according to its turnover (Y axis) and occupancy (X axis). The intersection of the average turnover

and occupancy divides the graph into four quadrants with different efficiency profiles. The most efficient quadrant, located on the upper right hand side is characterized by higher than average occupancy and turnover. The least efficient quadrant on the lower left hand side is characterized by the opposite situation of under-utilization.

Figure 21-22 Pabon Lasso according to the survey and the PTSS



Figures 21 and 22 show respectively the Pabon Lasso according to the occupancy and turnover estimated from the validated month, according to the data from the survey and from the PTSS. When Figures 21 and 22 are compared, a few hospitals like Vryheid, Eshowe and St Mary Kwamagwaza shift slightly towards the upper right indicating an over-estimation of their efficiency by the PTSS. Other hospitals such as St Apollinaris and Church of Scotland move towards the lower left, indicating slight under-estimation of their efficiency by the PTSS. However, most of the hospitals remain in the same position, as indicated by the similarity of the two figures. This suggests that even with some problems of consistency, the data from the PTSS provide reasonably reliable information on the hospital efficiency.

Discussion

This initial survey was carried out to test a method to validate the data reported by 23 district hospitals. After this initial phase, the test will be refined and extended to the rest of the provincial hospitals in the next few months and will hopefully become an in-built monitoring system to validate the data collected by the PTSS. This analysis has provided a graphical representation of the consistency of the data coming from the PTSS and has helped to generate suggestions on how the system could be improved.

Clarity in the reporting criteria and compliance with them is critical to ensure the correct and consistent reporting. The low standardization in the reporting affects the comparability across hospitals at a given point in time and within the same hospital across different periods of time. The DOH should monitor the monthly fluctuations reported by the PTSS to identify hospitals exceeding the expected values and requiring action to strengthen their compliance with the reporting criteria. Such compliance depends on clarity of guidelines, incentives to collect the information, felt importance associated with certain variables, training, supervision, staff turnover and other factors. Any improvement in the reporting will depend on the influence that managers have on changing these factors and by the feedback they provide to the staff. If staff get the feeling that managers are not using the hospital indicators to achieve certain objectives, it is unlikely that they will see any purpose in reliably collecting the information. The major problem remains the lack of incentives to collect the information and the low priority given by most nurses to the reporting, which is felt as a bureaucratic task.

Prioritization of variables

The DOH should prioritize its efforts to improve the most critical variables affecting the reliability of occupancy, turnover and mortality. For example, the number of transfers and day patients reported by the PTSS were highly inconsistent with the number reported by the survey but this had minor consequences on the estimation of the indicators. On the other hand, minor inconsistencies in the number of beds had major consequences on occupancy and turnover. Because improving any information system requires substantial efforts, it is important to prioritize such efforts to standardize the most important variables first, before trying to improve the rest of the information. The reported number of admissions, discharges and inpatient days were less problematic and their reporting could improve further by checking their monthly variation to identify unlikely fluctuations exceeding trends. The most critical

variables were the number of beds and deaths and their reporting can improve considerably by applying certain criteria that will facilitate the standardization of the data collection.

Usable beds

The major inconsistency between the occupancy and turnover estimated from the PTSS and from the survey was due to the inconsistency in the number of usable beds. At the moment the data suggest that the inconsistent reporting of the number of usable beds is likely to be related to a subjective interpretation of what a usable bed is. To better understand the causes of the inconsistent reporting of the monthly number of beds, the DOH should analyze the variation in the daily usable and occupied beds disaggregated by type of bed including: boarder beds, adult beds, juvenile beds, cots, cribs and incubators. This would allow the DOH to exclude that inconsistent aggregation of the different types of usable and occupied beds (i.e. cots, cribs) is one major cause of inconsistent reporting. Another analysis could be conducted to assess the relationship between the daily variation in the number of admissions, deaths, discharges and occupied beds to identify other causes of inconsistencies. The PTSS software should be reprogrammed to extract the daily numbers for further statistical analysis.

The number of beds is critical because it is the only variable forming the denominator of the indicators of efficiency and it is a relatively small number compared with the inpatients and the discharges forming the numerator. Therefore, minor inconsistencies in the number of usable beds can easily create inflation and deflation in the denominators of occupancy and turnover with subsequent high fluctuations in these indicators. Improvement in the hospital information system can only come if managers grasp the influence that poor reporting has on the estimation of hospital efficiency.

Mortality data

The correct reporting of the number of deaths is critical for the comparability of the mortality across hospitals. The reporting of the number of deaths is affected by the poor standardization of the reporting criteria. This leads some hospitals to include and other hospitals to exclude stillbirths and deaths occurring in the casualty and in the outpatient department among the number of deaths. This inconsistency in the reporting of the number of deaths could be partially avoided by issuing clear guidelines on which deaths should be included or excluded. Besides the deaths occurring among inpatients and day patients, the guidelines should clarify which of the following categories should be included: stillbirths, deaths among outpatients and casualty visits, those arriving already dead, visitors who suddenly die in the compound of the hospital and bodies which do not originate from the hospital but which are temporarily stored in the mortuary for whatever reason.

Each hospital should compare the number of deaths reported by the wards and other sections of the hospitals with the number reported by the mortuary to identify the causes of inconsistency in the reported number of deaths. At the moment the PTSS collects only the number of deaths occurring in the wards, while the reporting should include the number of deaths recorded in the mortuary. This will help to identify

hospitals with potential problems of undercounting in case the deaths reported from the wards do not match the deaths reported from the mortuaries. The reporting from the mortuary should provide the number of deaths disaggregated by type of ward and other sections of the hospitals such as casualty and OPD.

Other variables

The considerable work that is required to improve the poor reporting of many of the other variables needs to be balanced with other priorities. The number reported by the PTSS on transfers-in, transfers-out, operations, live births, stillbirths, day patients and outpatients are poorly correlated with the number validated by the survey. There is a need to improve first the variables with a clearer link with management objectives such as deliveries, stillbirths and operations.

Efforts to improve the reporting of the other variables should be preceded by a clarification of the objective to collect them. Day patients, transfers-in and transfers-out are of no much relevance for the estimation of occupancy and turnover and they could be left out without any consequence. Transfers and day patients should be used to judge the referral system and not to estimate occupancy and turnover. Besides not adding any valuable information on the occupancy, the inclusion of the transfers-in at the numerator of the formula for occupancy is associated with double counting. In fact, each patient who is transferred into a hospital is counted as one transfer-in and as one inpatient day. Before carrying out any effort to improve the data collection on the transfers and day patients, the DOH should clarify why these variables are needed, at what level of the health system this information should be used and for what purpose.

References

Health Statistical Information. 1st April 2002 to 31st March 2003. DOH 2003.

KwaZulu-Natal Epidemiology Bulletin Issue 7. Use of the indicators to assess hospital efficiency. DOH. June 2004.

Annex

District hospitals included in the validation

Hospital Name	Abbreviation
Appelsbosch	Applesbo
Bethesda	Bethesda
Catherine Booth	Booth
Ceza	Ceza
Christ the King	Christ
Church of Scotland	Church S
EG Usher Memorial	EG Usher
Ekhombe	Ekhombe
Emmaus	Emmaus
Estcourt	Estcourt
Eshowe	Eshowe
McCords	McCord
Mseleni	Mseleni
Murchison	Murchiso
Niemeyer Memorial	Niemeyer
Nkandla	Nkandla
Nkonjeni	Nkonjeni
Osindisweni	Osindisw
StMary Kwamagwaza	StMary K
St Apollinaris	St Apoli
St Andrew's	St Andre
Tayler Bequest	TailerB
Vryheid	Vryied