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GENERAL NOTICE

NOTICE 72 OF 2009

Proposal 2009 – Invitation for submissions for RPL 2010

INVITATION FOR SUBMISSIONS

The Director General of Heath hereby invites submissions from all stakeholders contemplated in section 90(1)(v) of the National Health Act, 2003 (Act No. 61 of 2003). This invitation is in terms of regulation 2 of the Regulations Relating to the Obtainment of Information and the Processes of Determination and Publication of Reference Price List (GN R. 681 of 23 July 2007) and is aimed at the development of the reference price list (RPL) for 2010.

Submissions must be in accordance with the guidelines attached to this invitation and published as additional information to the regulation referred to above.

The information to be submitted relates to health financing, the price of health services, business practices within or involving heath establishments, health agencies, health workers or health care providers and is necessary for the development and publication of the RPL.

Two printed copies plus 1 electronic copy (compact disc) of the submission must be delivered at Room 823, 8th Floor Fedlife Building, c/o Prinsloo and Church, Pretoria before 15h00 on the 03 April 2009. No late submissions will be accepted. Due to the time constraints no extensions can be granted.

1. Background

1.1. Information that may be submitted

This information may include, but is not limited to-

1.1.1. Activity times for health services rendered within a health establishment, including surgical and medical procedures, which means the time required to complete the actual procedure or service;

1.1.2. overhead cost, i.e. the cost incurred in rendering a set of items included in a reference price list schedule;

1.1.3. labour cost, i.e. the cost of labour that can be traced to the provision of a reference price list item;

1.1.4. professional fees;

1.1.5. cost of medicines, scheduled substances and medical devices;

1.1.6. cost of maintenance of premises;

1.1.7. cost of consumables used in the delivery of health services;

1.1.8. security costs;

1.1.9. cost of foodstuffs for patients;

1.1.10. cost of services or products used to ensure patient safety;

1.1.11. cost of insurance related to the provision of health services;

1.1.12. details of persons or institutions providing services to, or at the establishment;

1.1.13. scales of benefits payable by medical schemes to the health to the health establishment;

1.1.14. occupancy rate, which is utilised capacity of a facility or equipment divided by the available capacity during the period under consideration;

1.1.15. non confidential information on the health establishment;

1.1.16. income and expenditure;

1.1.17. billing guidelines and rules where these exist;

1.1.18. waste management costs;

1.1.19. details of agreement with third parties; or

1.1.20. any other costs that are ordinarily incurred.

1.2. The information must-

1.2.1. be in accordance with the pricing methodology contemplated in 4 (2) in regulation 681 of 2007;

1.2.2. indicate cost parameters that are different in respect of different provider groups;

1.2.3. be comprehensive and provide for item codes and item type, where applicable;

1.2.4. provide for representative samples and how the sample sizes used have been calculated; and

1.2.5. include explanations for adjustments or assumption made in the cost of evaluations.

2. Who may make submissions

2.1. RPL submissions are expected to have gone through a rigorous peer review process prior to submission of the RPL. As a consequence of this and the fact that the RPL affects all providers in the relevant disciplines, submissions will not be accepted from individuals or individual companies.

2.2. Submissions will therefore only be accepted if they are received from a professional association representing the discipline concerned, or a statutory body established to regulate the relevant profession, provided that there are no legal impediments to the relevant bodies making the submission. Where several sub disciplines are represented by an umbrella professional association which provides an interdisciplinary peer review process, submissions must be made via that umbrella body.

2.3. The submissions made in 2008 for 2009 that were accepted, but are still are still in the process of verification should not make a submission for 2010.

2.4. Dental practitioners may not make submission as the engagement process with the Department of Health is ongoing. However, all dental specialist disciplines must participate in this invitation

3. Engagement with stakeholders

3.1. The Department of Health intends to make the RPL process inclusive by engaging all stakeholders.

3.2. The Department of Health respects the contractual arrangements between the Associations and their consultants. However, the Department of Health wishes at this point in time to state that all correspondence will be conducted with the relevant professional association, and not with the appointed consultants, or sub- groups. .

3.3. A briefing session will be held on the 6th February 2009 at the Department of Health, Impilo 1 boardroom at 9 o'clock with all interested parties.

4. Failure to make submissions

4.1. In those disciplines where reference prices are based on costing surveys, which have already been conducted, in the absence of new costing information inflation-linked adjustments will be made to prices.

5. Independence of consultants

5.1. Consultants commissioned by parties making submissions to the RPL to undertake costing surveys must be independent of the relevant association and profession. These consultants must be free from any interest and any business or other relationships, which could, or could reasonably be perceived to, materially interfere with the consultant's ability to objectively evaluate the costs associated with the relevant profession. A separate declaration of independence should be provided with each submission. Non-compliance with this requirement will result in rejection of submissions.

5.2. To the extent that any consultant has an interest or any business or other relationship with the relevant association or profession which that consultant or the party making the submission believes does not materially interfere with the consultant's ability to objectively evaluate the costs associated with the relevant profession, a full declaration of the interest or relationship must accompany the submission.

5.3. Please note that if, notwithstanding such declaration, the RPL Advisory Committee considers the declared interest or relationship to materially interfere with the consultant's ability to objectively evaluate the costs associated with the relevant profession, the submission may be rejected on this basis.

5.4. All declarations of interest or relationship will be published on the Department of Health website.

5.5. Should any interest or relationship come to light subsequent to receipt of a submission, which ought to have been declared, this may result in rejection of the submission.

5.6. Previous acceptance of RPL submissions should not be construed as acceptance of the independence of the consultants concerned for purposes of the RPL 2010 process.

6. Verification of scope of practice

6.1 The stakeholder making a submission must warrant that the procedures listed in the submission fall within the scope of practice of the relevant profession, as determined by the relevant statutory council.

7. Verification and authenticity of survey results

7.1. The Director– General may request information for verification purposes. The verification may take various forms such as visits to selected surveyed practices to verify the submitted information.

7.2. The RPL review process will focus on accuracy and authenticity of costing surveys and submissions. Submissions will only be accepted on the basis that-

7.2.1. All information pertaining to the process will be made available to parties appointed by the Department of Health to verify the process;

7.2.2. Practices participating in the cost surveys must be willing to allow such parties to visit their practices and gain access to their financials and non-financials to verify the information provided for the costing surveys. Failure to provide this information timeously may result in rejection of the submission.

7.2.3. The full source data of individual practice information must be provided as part of the costing submission. For purposes of the submission, the individual practices should not be identified. However, for verification purposes, parties making submissions must be willing to identify all practices listed in the database. This identification will information will be treated confidentially .

7.2.4. Where any adjustments are made to cost survey results prior to submission for any reason, such as assumed error or implausibility of results, all such adjustments and the motivation thereof must be made explicit in the submission together with the original data.

7.2.5. Should any material misrepresentations of data come to light at any stage of the evaluation process, such data will not be accepted, and the submission may be rejected on this basis.

8. Non-proprietary nature of submissions

8.1. The RPL is a government driven process and all information in that regard will be in public domain publication, to be freely used by any stakeholder. Therefore the RPL process and all submissions related to this process will not include any structural components over which any person or body holds copyright or any other form of intellectual property.

8.2. Every submission must be accompanied by a written guarantee that

8.2.1. Publication of the RPL based on the proposals made in the submission will not constitute an infringement of copyright held by any party, and will not require any licensing agreements or royalty payments;

8.2.2. Parties making use of the RPL through software systems which facilitate billing between medical schemes and providers, or reproducing the RPL to publicise the benefits offered by medical schemes will not be an infringement of copyright, and will not require any licensing agreements or become subject to any royalty payments;

8.2.3. By using the proposals made in the submissions, the RPL will not be restricted by any intellectual property interest or proprietary restriction from maintaining or altering the relevant portion of the RPL; and

8.2.4. The party making the submission indemnifies the RPL for any claims or damages arising from undisclosed intellectual property violations arising from implementation of the proposals in their submission.

9. New technology

9.1.1. Requests for new technology codes may be subjected to a health technology assessment (HTA) process by the Department of Health, directorate Health Technology unit, and their inclusion in the RPL may be suspended pending the outcome of such process.

9.1.2. HTA reviews will be facilitated by the provision of comprehensive information relating to HTA assessments conducted internationally and locally, including but not limited to scientific literature on the new technology, information relating to the need for the introduction of such technology and the projected utilization in South Africa

10. Exceptional Situations

10.1. It is acknowledged that the costing methodology described in this document may not necessarily be suitable for all health care disciplines or service environments. Any modifications to the methodology may be appropriate but the Department of Health must be informed of such process, for example, in relation to private hospitals, pathology laboratories and emergency services.

10.2. If an intended costing methodology deviates substantially from the methodology documented here, then the parties and the Department of Health , in consultation with the provider group will develop an appropriate costing methodology.

11. Publication of Submissions

All submissions shall be published for general information and comment on the Departmental website.

Any information regarded as confidential must be clearly identified in the submission to prevent publication of this information and contravening the competition Act, proprietary information etc. failure to clearly identify this information could result in publication of the information, and the Department of Health wishes to state that no responsibility can be accepted for submissions where this aspect is ignored.

All comments must be delivered to Room 823, 8th Floor FedLife Building, c/o Prinsloo and Church, Pretoria within thirty days of the date for publication of the submiited information before 15:00.

The comments should be submitted by providing two paper copies of the comments, and an electronic copy on compact disc.

12. Contact Person

Any enquiries regarding the submissions must be directed to Mr S Jikwana at

(012) 312 0669 or on e-mail address jikwas@health.gov.za.

GUIDELINES

FOR

REFERENCE PRICE LIST 2010

Reference Price List Guidelines

1. Introduction

The Reference Price List (RPL) is primarily a set of items (procedure codes) with corresponding reference prices. The underlying principle to the approach for reference pricing is that the cost of providing the particular service must be made explicit, and that this cost forms the basis of the reference price.

In order to apply this principle certain preconditions must be met:

1.1. a standard nomenclature must exist to identify the service being priced; and

1.2. an agreed upon methodology to determine the reference price associated with a particular service.

2. The pricing methodology depends on the following assumptions:

2.1. A particular reference fee schedule is determined for a well-defined and relatively homogeneous provider group;

2.2. Cost parameters will be different for different provider groups – this may be the case even if the level of remuneration for professional time is the same between groups;

2.3. Reference price components will be based on country-wide averages, with the result that actual price components will differ geographically, and will depend on individual practice efficiencies and practice specific factors.

2.4. Standard nomenclature

The reference price list consist of a list of items (fees, tariffs), where each item represents a particular service provided by the provider group to which the reference price list apply. This list of items must comply with the following general requirements:

2.4.1. *comprehensiveness* – the list should provide for all the recognised services (accepted practice) rendered by the provider group to which it applies;

2.4.2. *consistency* – there should be no duplication or overlap between items in the list;

2.4.3. *systematism* – the list should reflect the basic organising concepts used by the provider group, such as anatomical regions and/or treatment modality; as far as possible each item should be a complete unit of service, with minimal use of modifiers or add-on items.

2.5. A reference price list item consists of the following components:

2.5.1. *Schedule* – a schedule contains the price list items applicable to one or more provider groups;

2.5.2. *Provider group* – a professional group or sub-group (discipline, sub-discipline) or health service provider category to which a particular schedule applies;

2.5.3. *Item code* – a numeric code that is unique to a particular schedule (the actual code length may vary by schedule, up to a maximum of six digits);

2.5.4. *Item type* – a one letter field used to indicate whether the item is an actual service item, or a modifier, note or rule relating to the use of one or more service items;

2.5.5. *Item terminology/nomenclature* – a brief written definition of the price list item (each item must have a terminology);

2.5.6. *Descriptor* – a written narrative that provides further definition and the intended use of the item (optional);

2.5.7. *Relative Value Unit (RVU)* – a numeric value that expresses the value of this item relative to all the other items in the schedule, and is multiplied by a Rand Conversion Factor (RCF) to obtain the price of the item (RVUs can vary by provider group for each item in a schedule);

2.5.8. *Benefit Factor* – in general all items in a reference price list will have a benefit factor of 1, but health care funders may negotiate with individual health care providers to vary this factor in order to reimburse by agreement either above or below the reference price for an item.

3. Pricing Methodology

3.1. Introduction

The basic formula for calculating a service price is the cost of providing the service plus a profit component that is based on a return of investment rate on operating expenses (Figure 1).

Figure 1 : Item Price Components

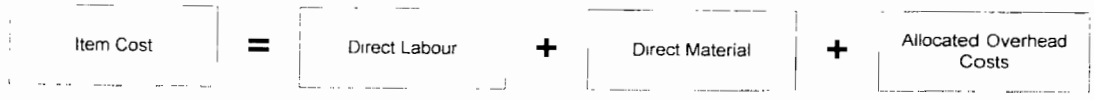
The justification for the profit component is based on the following:

- Provision needs to be made for the growth and development of the health care practice, particularly in the light of rapidly changing health care technology and knowledge.
- The return on investment component represents the expectation of a return by a hypothetical investor in a health care practice. For the purposes of the reference price list, return on investment will be based on the bankers' acceptance rate. Individual practices would normally adjust this rate by taking into account the risk profile of the practice.

3.2. Item cost

Item cost in turn is based on the cost of the direct labour and material used in providing the service represented by the fee item, plus an allocated portion of the overhead costs of the practice (Figure 2).

Figure 2 : Item Cost Components



3.2.1. Direct Labour.

This is the cost of labour that can be directly and conveniently traced to the provision of the service represented by the particular fee item. Direct labour cost is based on the duration of time spent by the health care provider in performing the service.

3.2.2. Direct Materials.

Significant materials used (consumed) in providing the service that can be conveniently traced to it. Minor materials (e.g. swabs, etc) are best handled as indirect materials and accounted for as part of the allocated overheads. In practical terms, direct materials are those materials consumed in the practice that can be recovered from the patient as part of a specific chargeable procedure as direct materials. Indirect materials are those materials that cannot be charged for in addition to a procedure and their cost is allocated to overheads.

3.2.3. *Allocated overhead costs.*

All of the costs associated with providing the total set of services rendered by the health care practice that are not part of direct labour or material are allocated to each service through a specific allocation mechanism.

4. Guidelines for Calculating Direct Labour Costs

4.1. Appropriate professional remuneration.

The expected annual remuneration of health care providers used in the calculation of direct costs will be based on the salary packages paid in the public sector for equivalently qualified health care providers. As a general rule the package value of the experience in the public service at the upper end of the applicable scale will be used in the calculations.

4.2. Composite direct labour costs.

A particular service item may have direct labour components relating to more than one health care provider, e.g. a radiology procedure with direct cost components for the radiographer and radiologist.

4.3. Adjustment for complexity of procedures.

Appendix B presents a method to calculate the relative value units of a fee item to take the relative complexity of different procedures into account. The method involves the calculation of responsibility values relative to a standard procedure. The service's unit value (usually duration expressed in minutes) of the fee item is then multiplied by the responsibility value to obtain the relative value unit for the item. If this method is used the direct labour rate (rand conversion factor) must be adjusted to bring the total direct labour cost back to the target amount. This will have the effect that the practitioner doing a normal distribution of items across the different responsibility values (complexity) will earn the target professional remuneration. If on average more complex procedures are done, the remuneration will be correspondingly higher. If a provider group elects not to use this mechanism then relative value units will simply be based on the average duration of the fee item (if the allocation unit is minutes).

4.4. Productivity factors

The adjustment of the standard volume with a productivity factor is done in recognition of the fact that health care providers can not be productive every minute of the available time, because of situations such as patient turnover, travel between places of work, meals, equipment breakdown, etc. The productivity factor used in submissions must be substantiated through representative time studies where it deviates from the default 75%.

5. Overhead costs

Costs included as overheads.

5.1. All non-manufacturing costs and manufacturing costs that are not classified as being direct labour or direct materials, are allocated to manufacturing overheads (Table 1).

5.1.1. *Manufacturing costs other than direct labour or direct materials.*

- Indirect Labour. That labour cost that cannot be physically traced to the creation of products, or that can be traced only at great cost and inconvenience.

- Indirect Materials. Small items of materials that may become an integral part of the finished product, but that may only be traceable into the product at great cost and inconvenience. In practical terms indirect materials are those materials consumed in the practice that cannot be recovered from the patient as part of a specific chargeable procedure of service (item).

5.1.2. *Non-manufacturing costs.*

These consist of marketing or selling costs, and administrative costs. Although all practices have non-manufacturing costs, this forms only a small percentage of the total cost of most practices. The cost of a receptionist would most probably be the major expense in this category. Many receptionists are utilised for "manufacturing" functions as well, for example, ordering of materials and supplies, sterilisation of instruments, which further decrease the true proportion of non-manufacturing costs. The cost and inconvenience for a practice to trace these costs to separate cost categories are not worthwhile, and all non-manufacturing costs are thus assigned to manufacturing overhead.

5.2. Overhead costs must be classified according to the schedule given in Table 5 below. Specific provisions are:

- All costs must be VAT exclusive.

- Bad debt provisions will be limited to 2.5% of total revenue.

- The average size of practices in square meters must be provided as well as an average rental fee per square meter. Where practice premises are subsidised, the subsidised cost should be reflected and not the market related cost of the space.

- Where consumables are charged as direct costs using a medication or materials item (e.g. the 'Setting of a sterile tray' code for medical practices) the cost of such consumables should not be included as part of overheads.

- Where a surcharge exists for rendering services away from the usual place of service (e.g. as is the case in the medical practitioner schedule) transport costs cannot be included as part of overhead costs as this will amount to double recovery of such costs.

Table 1 : Overhead Cost Examples

Category		Include	Exclude
1. Personnel costs			
1.1	Indirect labour costs	Salaries and wages of all practice staff	Salaries and wages included in direct labour costs
1.2	Salary related levies & taxes	UIF, Skills development levies, Regional service council levies	Sickness benefit insurance, catered for in sick leave inclusion in direct labour standard volume calculation
1.3	Professional dues & continuing education	Professional association membership fees Professional council fees Continuing education related expenses	
1.4	Protective clothing and uniforms	The cost of protective clothing of staff as well as cleaners and general workers. The costs of uniforms if not included as an allowance	Gloves and masks if included under 6. The costs of uniforms if included as a salary allowance
2. Premises			
2.1	Rental of space	The actual cost should be reflected and not the market related cost of the space	Rental subsidies or rebates
2.2	Building maintenance & repairs	The general cost of repairs and maintenance of the buildings.	Any cost of a capital nature, such as improvements of the buildings and infrastructure
2.3	Services	Electricity, water & cleaning services	

Category		Include	Exclude
2.4	Medical waste removal	Cost of containers for the storage of medical waste. Removal cost of medical waste. Disposal cost	Container costs included under 6.
2.5	Security	The cost of a security system. The cost of an armed response service	
3. Practice Management & Administration			
3.1	Accounting, audit and management fees	Accounting fees paid to an external accountant or accounting practice. Bookkeeping fees paid to an external bookkeeper. Management and admin fees paid to an external business rendering these services. Auditor's fees	
3.2	Advertising & marketing	Promotions, donations & sponsorships. Brochures. Other media advertising or marketing activities. Business related entertainment	
3.3	EDI and medical scheme administration fees	The levies for "Switch" services	
3.4	Software licensing & support	Software and/or the license fee of programmes Technical support	Computer equipment Internet connection fees ISDN or ADSL rental fees
3.5	Communication costs	Internet connection fees ISDN or ADSL rental fees Telephone, fax and cell phone costs Lease cost of a telephone (communication) system	Costs of a personal nature
3.6	Legal expenses	General legal fees Labour law and IR consultation fees	Legal fees associated with the collection debts.
3.7	Postage and courier services	Stamps and registered letters. Courier services. Post box rental	

Category		Include	Exclude
3.8	Printing and stationery	The printing cost of administrative books, documents, forms and patient files used in the dental practice. Photocopy expense. General office stationery	Consumables if included under 6.
3.9	Transport costs	Average mileage per annum multiplied by the Automobile Association rate	When covered by specific fee items Personal use
4. Financing & Insurance costs			
4.1	Bank charges & interest	Bank charges and admin fees paid	Standard and special equipment financing costs
4.2	Credit card commission		Commission paid on non health related services
4.3	Bad debt costs	Calculated at fixed rate of 2.5% of turnover	
4.4	Practice risk insurance	Public liability insurance Insurance of the buildings if owned by the practice Insurance of vehicles if owned and used by the practice	Standard and special equipment insurance – automatically included in equipment cost calculation
4.5	Malpractice risk insurance		
6. Indirect material			Any material or consumables included as direct cost, or covered by material or medicine related fee items
7. Sundry expenses		If specified	If not specified
8. Equipment		Capital, insurance and maintenance costs provided for in equipment cost calculation	
9. Overhead recovered		Deduct	

6. Overhead Cost Recovery.

6.1. Any overhead costs recovered directly or indirectly (excluding services fees) from the patient or other parties must be deducted from the relevant overhead cost item. For example a cost of a telephone call charged to a patient, or subletting space or equipment.

6.2. Equipment.

The cost of equipment that is considered standard for a provider group should be included in overheads.

Special equipment (i.e. equipment used for procedures not considered to be standard practice for the specific provider group) should be considered as a separate cost centre and the cost of this special equipment included in the overhead costs of these procedures.

The cost of any piece of equipment that exceeds R15 000 must be substantiated by a sample of invoices or by at least three valid quotes from suppliers.

6.3. Standard Volumes.

In general standard volumes for overhead allocation should be calculated in the same way as for direct labour allocation, except that leave and sick leave can not be taken into consideration. Alternatively the productive minutes per annum for the equipment should be used.

Unrealistically low productive minutes per annum will not be considered. The benchmark productivity rate for special equipment will be 65%.

6.4. Overhead Cost Adjustment.

Overhead costs based on surveys will be adjusted to the bottom end of the 95% confidence interval, with margin of error of 10%, to increase the likelihood that the cost basis of the RPL is at least at the stated level. The confidence rate calculation and adjustment method is documented in the accompanying spreadsheet.

7. Direct Material

7.1. Mark-ups.

The following principles will be applied to the calculation of direct materials:

7.1.1. Mark-ups cannot be a source of income or profit.

7.1.2. Actual cost components of material handling should be quantified.

7.1.3. Emergency Medication.

Material/medication held for use in an emergency can be written off on acquisition and the costs included in general overheads.

8. Cost and Activity Times Surveys

Overhead cost and activity times for procedures must be on representative sample of actual practices. All submissions must show how the sample sizes used have been calculated. Low response rates are common in survey of this nature and over-sampling should be considered to address this problem. It is not possible to give minimum acceptable response rates, but consider that the confidence interval adjustment for overheads describe above will be correspondingly larger with a low response rate. Survey results will be subject to verification and the original survey data must be made available for scrutiny. Overhead totals of all responding survey practices must be made available to verify the confidence interval adjustment of the overhead costs.

8.1. Where high level surveys have shown significant variation in practice, stratified samples should be used to ensure adequate representation of the different practice types in the sample.

8.2. In general it is recommended that statistical advice be sought in the design of practice cost surveys. This particularly important for disciplines with a small number of practitioners.

9. Activity Times

9.1. Accurate service duration are vital components of proper costing studies. Appendix C gives guidelines for activity time determination. Whenever possible reference must be made to international benchmark times for equivalent procedures. Medical scheme data will also be used in the verification of theatres times

10. Basic Example

This is a basic example of the cost calculation for an item, with no direct material costs, where the basis of allocation is duration of the service expressed in minutes. Allocation on the basis of service duration (expressed in minutes) is commonly, but not exclusively, used in costing health services. Other allocation units include kilometres (patient transport) and bed days (hospitals). In the case of facilities bed capacity must be calculated on the basis of licensed beds.

10.1. Calculation of direct labour costs:

- Determine appropriate annual professional remuneration (PR).
- Determine standard volume (SV) for the allocation unit per year. The standard volume is the amount of the allocation base that should have been used to produce what was produced during the period (here a year) under consideration. This is not the actual amount used – that will depend on the relative efficiency of operations of a particular practice. In this case we will use the total available minutes per year by correcting for weekends, public holidays and leave (See the actual calculation in **Error! Reference source not found.**). In the case of time based allocation the standard volume is further adjusted by a productivity factor to account for unproductive time, such lunch breaks, time between patients, etc.
- Calculate the predetermined direct labour rate (LR) per allocation unit:

$$LR = \frac{PR}{SV}$$

- Multiply the predetermined direct labour rate (LR) with the average amount (A) of the allocation unit used by the service item (in this example duration in minutes) to obtain the direct labour cost (LC).

$$LC = LR \times A$$

10.2. Calculation of allocated overhead costs:

- Determine total overhead costs per year (O).
- Determine standard volume (SV) for the allocation unit per year. The process is the same as in 13.2.2 above.
- Calculate the predetermined overhead rate (OR) per allocation unit:

$$OR = \frac{O}{SV}$$

- Multiply the predetermined overhead rate (OR) with the average amount (A) of the allocation unit used by the service item (in this example duration in minutes) to obtain the allocated overhead cost (OC).

$$OC = OR \times A$$

10.3. Calculation of return on investment component

- Calculate mark-up (M) on operating overheads:

$$M = \frac{BA}{(1 - CR - ((1 - CR) * STC)) - BA}$$

Where:
CR = company tax rate and
STC = secondary company tax rate ,
BA= bankers' acceptance rate as published by the Reserve Bank.

- Calculate the annual return on investment (ROI) on operating expenses by multiplying the total overhead cost per year (O) with the mark-up on operating overheads:

$$ROI = O \times M$$

- Determine standard volume (SV) for the allocation unit per year. The process is the same as in 13.2.2 above.

- Calculate the return on investment rate (ROIR) per allocation unit:

$$ROIR = \frac{ROI}{SV}$$

- Multiply the return on investment rate (ROIR) with the average amount (A) of the allocation unit used by the service item (in this example duration in minutes) to obtain the allocated return on investment amount (ROIC).

$$ROIC = ROIR \times A$$

10.4. Basic Example Calculated

The basic approach given above is now used to calculate the fee for a 15 minute procedure executed by a single health care provider. This procedure has no direct material costs. The allocation unit will be minutes and the calculation of the standard volume in minutes per year is given in **Error! Reference source not found.**.

Table 2 : Standard Volume Calculation

Days in the year	365.25[1] days
Work days	
Minus weekends	-(2 x 52) = -104
Public holidays	-11
Annual holidays	-22
Sick leave	-8
Total days available	220.25 days
Minimum working hours per day	8 hours
Total available hours in a year	1 762
Base volume for direct labour (minutes)	105 720
Productivity factor for direct labour	0.75
Standard volume for direct labour (Actual available minutes)	**79 290**
Base volume for overheads (exclude leave & sick leave)	120 120

Productivity factor for overhead	0.75
Standard volume for overheads	90 090

[1] To provide for leap years the average duration of a year is set to 365.25

Table 3 : Direct Labour Rate Calculation

Professional remuneration (total package per annum)	226 088
Direct labour rate per minute	2.851

Table 4 : Overhead Rate Calculation

Total estimated overheads per annum	316 000
Overhead rate per minute	3.507

Table 5 : Return on Investment Rate Calculation

Bankers' Acceptance Rate	7.00%
Expected rate of return after tax	7.00%
Company tax rate	29.00%
Secondary company tax rate	12.50%
Calculated mark-up before tax on overhead	12.70%
Annual expected return on investment	40 132
ROI rate per minute	0.445

The final calculated price (P) (VAT Exclusive) of the example service is given by the following formula:

$$P = (LR + OHR + ROIR) \times UV$$
$$P = (2.851 + 3.507 + 0.445) \times 15$$
$$P \approx 102.00(VATExclusive)$$

where:

LR = Direct labour rate per minute

OHR = Overhead rate per minute

ROIR = Return on investment rate per minute

UV = Average duration of service item in minutes (unit value)

Appendix A: Procedure for addition, deletion or change to fee items

Submission of Item/ Procedure Code Changes

1. Introduction

The Department of Health will consider proposals for code changes that have been submitted by national professional associations and speciality societies through the appropriate national professional associations) national regulatory agencies and other organisations

Item change requests include revisions, additions and deletions to any of the components of a procedure code.

The goal of requests for coding changes should be to maintain the best schedules possible, These schedules would therefore be code sets that include only those procedures needed to adequately and accurately maintain patient records and to support claim submission.

1. The components of a procedure/ service code

A procedure / service code consists of the following components:

1.1. A *Schedule:* A schedule contains the procedure items applicable to one or more homogenous provider groups

1.2. Provider Group: A professional group or sub-group (discipline, sub-discipline) or health service category to which a particular schedule applies

1.3. Item Code: A five digit numeric code that is unique to a particular schedule

1.4. Item Type: A one-letter field used to indicate whether the item is an actual service item, or a modifier, note or rule relation to the use of one or more service items.

1.5. Item Technology/Nomenclature: A brief written definition of the price list item. Each item must have a terminology.

1.6. *Descriptor:* A written narrative that provides further definition and the intended use of the item. A descriptor is optional.

1.7. *Relative Value Unit (RVU):* A numeric value that expresses the value of this item relative to all the other items in the schedule. A RVU is multiplied by a Rand Conversion Factor (RCF) to obtain the price of the item. RVUs can vary by provider group for each item scheduled.

1.8. *Benefit Factor:* In general all items in a reference price list will have a benefit factor of 1. Health care funders may negotiate with individual health care providers to vary this factor in order to reimburse by agreement either above or below the reference price for an item.

2. Guidelines

The following guidelines should be followed when submitting requests for changes related to the coding system. Any requests that do not meet these guidelines are not likely to receive favourable consideration during the evaluation process.

2.1. A suggested procedure/service should be a distinct service that is part of current clinical/technical practice (i.e. that the proven clinical efficacy has been established and documented) and is not now included in the relevant Schedule.

2.2. The frequency of occurrence should be considered when submitting a request. The suggested procedure/service should be performed across the country in multiple locations and by many providers (per discipline) as the Schedules are not intended to accommodate procedures that are delivered on an infrequent basis.

2.3. A suggested service/procedure should be neither a fragmentation of an existing procedure/service nor currently reportable by one or more existing codes.

2.4. A suggested service/procedure should not be requested as a means to report extraordinary circumstances related to the performance of a procedure/service already having a specific code.

2.5. A suggested revision should address omissions or ambiguities within a current procedure/service code's terminology or descriptor.

2.6. A suggested **deletion** should address a procedure/service that is no longer considered current or acceptable clinical/technical practice.

2.7. The professional association's "acceptance" or "approval" programmes shall not be the sole basis on which a procedure code is **added.**

2.8. Additions, deletions or changes to the Schedules may be considered to allow for compliance with relevant rules and regulations relating to treatment.

2.9. Previously submitted but not accepted change requests must be accompanied by new information in order to be reconsidered.

2.10. A suggested Relative Value Unit / RPL Rate should include all information and address all aspects to be considered in determining a RVU/Rate (see above pricing criteria).

3. Evaluation criteria

Requested changes to the RPL Schedules must meet the ten submission guidelines noted above. The following additional criteria should be considered:

3.1. Is the procedure/service currently taught in an accredited training school, or in an accredited post-graduate programme?

3.2. Is the procedure/service currently accepted therapy?

3.3. Does the procedure/service apply to treatment provided by generalists and specialists without differentiation?

3.4. Does the procedure/service endorse or reflect a product-specific technique?

3.5. Information provided in a 'vignette' assists in the evaluation of requests for additions or revisions. A 'vignette' provides a description of the typical patient and the clinical procedure as performed by the practitioner, as well as whether it is appropriate to report the procedure with any others. For a stand-alone

procedure/service the 'vignette' should note which other procedures must be reported at the same time, and which must not.

4. **Instructions**

Please consider the following when completing either version (addition, revision, deletion) of the request:

- **A separate request is required per code for each desired action related to the code.**
- Provide substantive justification for proposing the request. Please avoid reasons such as "no code currently available."
- Include vignettes, if helpful. A vignette must include the following information:
    - Description of the typical patient for whom the procedure is used.
    - Description of the clinical procedure itself.
    - An indication whether it is appropriate to report the procedure with any others.\
    - For a stand-alone procedure a note on other procedures that must be reported at the same time, and those which must not.
- When requesting a new procedure code that represents new technology, attach available supporting peer-reviewed literature.
    - Attach literature, when available, indicating widespread usage and acceptance of the procedure.
- When requesting a deletion, provide an alternate code that is not an unspecified code for reporting the procedure. If there is no alternative or the procedure is believed to be obsolete, express this in writing.

5. A suggested Relative Value Unit / RPL Rate must include the following information:

5.1. Time (Unit Value)

Indicate the average time required (expressed in minutes) to perform all steps necessary to complete the defined procedure once. Use the following as a guideline and indicate the time required per category as indicated:

- *Clinical time.*

Clinical time refers to the time required to complete the actual procedure/ service, as well as pre-, inter- and post- procedural activities for which no other distinct procedure code exists.

Distinct procedures are either independent procedures that are reported in addition to this code. For example, preparing a surgical site and the changing of instruments needed to render the procedure/ service are considered clinical time. The time required to obtain anaesthesia before the procedure can commence, is however excluded if local anaesthesia is reported in addition to this code.

- *Assistant time.*

Assistant time (also known as aide time) includes the mixing of materials, developing of radiographs, etc.

- *Clerical time.*

Clerical time includes recording the procedure on the patient's record and if applicable, converting the clinical findings to a meaningful report.

5.2. Responsibility (Responsibility Value)

Indicate the responsibility to provide the procedure/ service. The following must be considered :

- *Experience and knowledge.* The actual observation or practical acquaintance required to provide the service. This is analogous to the level of education or training required to provide the service.

- Judgment and mental effort. The mental exertion or striving involved in the formation of an opinion or notion concerning the provision of the service.

- Skill and physical effort. The ability, competence, technique, and physical exertion or striving required to provide the service.

- Risk and stress to the patient. The clinical and technical risks involved to the patient, as well as the strained effort and demand on physical and mental energy on the patient receiving the service (and thus also the medico-legal risk to the practitioner in providing the service).

6. Indicate other current and similar procedure codes with which this procedure relates (if any).

6.1. Equipment and materials:

An indication of the equipment and material(s) required to provide the procedure.An indication of the cost of the equipment and material(s) to provide the procedure.

An indication if the equipment used are considered as "standard equipment" for a standard practice within the discipline.

6.2. Location and Other Services:

An indication if the procedure is provided in the health care professional's (HCP) own practice, hospital, etc or both.

An indication if the services of other Health Care Professionals are required to provide the procedure / service. Examples include laboratory services, anaesthetists, etc.

Appendix B

CALCULATING RESPONSIBILITY VALUES

Introduction

If health care professionals were requested to list the five most difficult procedures/services they perform, and these lists were compared to those if other health care professionals, there would be a consensus that some procedures are more difficult than others. In addition, some procedures carry greater risk than others, which may heighten stress and anxiety for the practitioner, boosting the threat of legal action should failure occur. The fee should reflect the difficulty of the procedure, and a relative scale for difficulty should be developed by a knowledgeable group of health care professionals.

The Relative Value Unit (RVU) for each procedure/service is determined by multiplying the time required to perform that service by its responsibility value:

$RVU_{service} = Time_{service} \times Responsibility_{service}$

Procedure Evaluation

Armstrong (1990, p.378) defines a job analysis as 'the examination of the procedure, its components, and the circumstances in which it is performed'. This definition may be applied to the analysis of procedures or services. From the procedure analysis, a responsibility factor may be derived, which is a statement of skills, knowledge and other attributes required to carry out the procedure.

The evaluation of a procedure/service should comply with certain criteria:[1]

It should establish the rank order of procedures within the spectrum of a discipline's procedures/services, and measure the difference between values.

It should ensure that, as far as possible, judgements about procedure values are made on objective rather than subjective grounds.

It should provide a continuing basis for assessing the values of procedures, that is easy to understand, to administer and to control, as well as being accepted by the oral health care profession as fair.

[1] A modified version of the definition of job evaluation schemes by Armstrong (1990, p.382).

There are several criteria that are often used in job evaluation in an attempt to take into account discernible differences in skill and responsibility, such as, level of decision, complexity, knowledge, equipment used and level of education or training required to do the work (Armstrong, 1990, p.383).

The Health Care Finance Administration established three parameters to determine relative intensity for medical services (Cowper, 1996, p.295). The parameters are skill and physical effort; mental effort and judgement, and stress to the patient. It is however suggested that the following four defined criteria be used to determine the responsibility of performing a procedure/service:

Experience and knowledge. The actual observation or practical acquaintance required to provide the service. This is analogous to the level of education or training required to provide the service.

Judgment and mental effort. The mental exertion or striving involved in the formation of an opinion or notion concerning the provision of the service.

Skill and physical effort. The ability, competence, technique, and physical exertion or striving required to provide the service.

Risk and stress to the patient. The clinical and technical risks involved to the patient, as well as the strained effort and demand on physical and mental energy on the patient receiving the service (and thus also the medico-legal risk to the practitioner in providing the service).

Typically, criteria are not explicit; thus allowing for each person's subjective judgment. In a comparative rating scale, the criteria are made explicit by asking the decision maker to compare to an experience standard (Emory and Cooper, 1991, p.208).

The procedure to be selected as the experience standard, should be a procedure/service which is rendered by the 'average' practitioner; for the 'average' patient; simple (unaccompanied by complications); frequently performed, and limited in variation of technique.

There is little conclusive support for any particular scale length. One argument is that more points on a scale provide for greater sensitivity of measurement. The most

widely used scales range from three to seven points, and it does not seem to make much difference which number is used (Emory and Cooper, 1991, p.208).

However, in order not to lose sensitivity in the conversion of scale scores to responsibility values, a scale length should be approximately equivalent to the number of increments in the range of responsibility factors. A trial study showed that the spectra of procedures/services are best served with eleven increments in responsibility, based on a nine-point semantic differential scale (a rating scale variant). The use of more points on a scale may also help to counteract the error of central tendency.

Figure 3 is a nine-point rating scale with the four proposed scale criteria. If a procedure/service (or groups of procedures/services) requires a responsibility factor, the decision makers are requested to rate the procedure/service by comparing it to the experience standard. The decision makers should start by first plotting their own rating of the experience standard in order to enhance the rating process (The rating of the experience standard should be kept by the decision maker as reference for rating other services).

Exhibit 1: Questionnaire form for rating a procedure/service:

1 Experience and knowledge required:	Irrelevant	____ ____ ____ ____ ____ _ X_ ____ ____ ____	Important
2. Judgement and mental effort involved:	Active	____ ____ ____ _ X_ ____ ____ ____ ____ ____	Passive
3. Skill and physical effort required:	Easy	____ ____ ____ ____ ____ ____ ____ X: ____ ____	Difficult
4. Risk and stress to the patient:	High	____ ____ ____ ____ _ X_ ____ ____ ____ ____	Low

How many times in the last 12 months have you provided this service? _____

If zero, how many times have you provided this service in your career? _____

Note. The that the scales are reversed to minimise the well known 'halo effect' One might score each of the items from 0 to 8. Based on the scores of these four items, each service or group of services will be scored from 0 to 32.

Figure 4 illustrates how this is accomplished.

Exhibit 2: Allocation of scores to a service or group of services

Knowledge	0	1	2	3	4	5	6	7	8
Judgement	8	7	6	5	4	3	2	1	0
Skill	0	1	2	3	4	5	6	7	8
Risk	8	7	6	5	4	3	2	1	0
Total Score = 20				5	4	5	6		

The total raw scores of the decision makers are now calculated and a mean or median for the service (or group of services) determined. Figure 5 is used to transform the mean score of services to responsibility values. It should be noted that extreme scores in a distribution might skew the mean, and median values should then be considered.

If the mean (or median) for the group of services in the example is also 20, the responsibility value for the group of services would be 1.6.

Exhibit 3: Transformation of mean scores to responsibility values:

Mean Totals (0-10):	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23	24-26	27-29	30-32
Responsibility Factors:	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
RV for procedure:							X				

Individual services within a group, may now be adjusted if a variation in responsibility within the group itself is indicated. However, groupings enhance the maintenance of the system, and adjustments of this kind should not be considered lightly. It should also be remembered that the RVU is a function of time and responsibility, and although services within a group may have the same responsibility, the difference in time required to provide these services, will result in different RVU's for services within that group.

New procedures/services that may be listed next edition of the RPLs, may be assigned the RV of related groups of services. Only new groups of services or individual services that cannot be related to established groups will have to go through the entire rating process.

It is of interest that workers on the Resources Based Relative Values Scale (RBRVS) for medical services, observed that service providers with almost no

experience of particular services tend to assign high relative values to those services whereas providers with great experience assign comparatively low relative values. Their explanation for the observation was that providers who render a service infrequently are less familiar and find the service more difficult to provide, whereas those who provide the service routinely consider it easier and assign a lower value (Cowper, 1996, p.298.). An indication of the decision makers' familiarity with a particular service (or group of services) is therefore inferred.

Application of Direct Labour

The RVU of a service is determined by multiplying the Unit Value (UV) with the Responsibility Value of that service (RVU = UV x RV). This RVU value in turn, is multiplied with the predetermined direct labour rate (conversion factor) to determine the cost of direct labour for the particular procedure. This calculation is illustrated in the following example.

If a procedure/service has a hypothetical UV of 10, and an RV of 1.2, and if the predetermined direct labour rate for that category of practitioners is R2.12, the direct labour is calculated as:

Direct Labour = RVU x Cf
= (UVxRV) x Cf
= (10x1.2) x R2.12
= 12 x R 2, 12
= R25.44

APPENDIX C: SUGGESTED APPROACH TO WORKLOAD RECORDING METHOD (UNIT VALUES)

Introduction

The objectives of work measurement is twofold, namely, to determine how much work can be done in a specified period of time in terms of volume and quality, and to determine how long it will take to do a given amount of work.

The Workload Recording Method is used to determine the time required by an average healthcare professional to provide services. The mean time required to provide that service is termed the Unit Value (UV) of that service and is expressed in minutes of Workload Units (WU). The unit value of a service is used to allocate overhead costs to that particular service, and is also of cardinal importance in the determination of relative value units for services.

Depending on the health care professional type, workload units can be expressed in minutes of Radiology Workload Units (RWU), Dental Workload Units (DWU), Psychology Workload Units (PWU), etc.

The Workload Recording Method provides a common comparable measuring approach among health care professional types and adaptation(s), where necessary, should be clearly identified.

Unit Values per Service and Standard Volume Adjustment

Most clinical services can be expressed in terms of minutes. Workload units are thus the minutes of direct labour and the measure of activity for healthcare professionals in

their practices and one WU is equal to one minute of clinical, clerical and assistant time.

Time studies should be conducted in order to generate the necessary statistics to assign permanent or temporary unit values to services. The time studies should be conducted in various places of services (sites) in the RSA and should measure the time required to perform several activities, of which the following six categories are specified:

Treatment. Treatment includes the steps required to perform the procedure up to and including the recording thereof on the patient's record. Treatment includes clinical time, assistant time and clerical time:

Clinical time. Clinical time refers to the time required to complete the actual procedure, as well as pre-, inter- and post- procedural activities, In a dental practice for example, the placement and removal of cotton rolls, the application of a rubber dam, the changing of instruments needed to do the procedure (e.g. burs, scaler points, handpieces, etc.) and chairside 'laboratory activities' (e.g. temporary crowns, fitting a prosthesis, etc.) are all included as part of clinical time.

Assistant time. Assistant time also known as aide time. Examples of assistant time include developing of radiographs, the mixing of materials, and evacuation of the patient's mouth during the procedure, etc.

Clerical time. Clerical time includes recording the procedure on the patient's record and if applicable, converting the clinical findings to a meaningful report (when it is required as part of the procedure).

2.Handling of specimen/laboratory work. The handling of specimen/laboratory work includes the time for completion of a laboratory requisition (lab-slip), delivering the laboratory work to the reception / despatch area, labelling thereof and entering information on a laboratory control sheet (activities required for transfer from the health care professional's office to a laboratory). Handling of laboratory work excludes the handling of incoming (completed) laboratory jobs. Handling of laboratory work excludes laboratory services.

3. Pre-treatment patient care activities. Pre-treatment activities include the steps from guiding the patient from the reception area to completion of all preliminary preparation normally required in the presence of the patient before treatment can proceed. Examples of pre-treatment activities in a dental practice include regaining the patient's record, guiding the patient from the reception area to the surgery, seating the patient, preparation of the patient (i.e. placing of a bib and removal of prosthesis (removable), spectacles, lipstick, etc.), repositioning of the equipment, preparation of the health care professional (i.e. washing of hands, gloving, etc.), checking the patient's record and counselling in relation to the visit.

4. Post-treatment patient care activities. Post-treatment activities include the steps normally required in the presence of the patient after treatment has been completed, up to guiding the patient back to the reception area. Examples of post-treatment activities in a dental practice include re-dressing the patient (e.g. removing the bib, replacing removable prosthesis, spectacles, etc.), repositioning of dental equipment, removing the patient from the chair, counselling regarding the next dental visit, and re-dressing of the health care professional (e.g. removing gloves, washing hands, etc.), guiding the patient to the reception area and filing the patient's record.

5. Routine surgery preparation. Routine surgery preparation includes all support activities (in relation to the preparation of the surgery and reusable supplies for performing procedures) performed by health care professionals and/or staff in the

surgery after treatment of the patient. These include between patient disinfecting of surfaces, surgery preparation of instruments for sterilising, etc., but exclude the actual sterilising time of an autoclave or other type of steriliser.

Maintenance and repair. Maintenance and repair include all standard surgery maintenance procedures performed by health care professionals and/or staff at set intervals (e.g. daily, weekly, monthly). It encompasses only those activities which are done occasionally and which need not be repeated for each patient treated, e.g. daily disinfecting and cleaning of the surgery prior to shut down. Maintenance and repair include emergency repairs, part of which is defined as time spent identifying the defect. It does not include repair of major breakdowns.

Unit Values per Service

Only the "treatment time" (clinical, assistant and clerical) is used to determine the unit value of a procedure.

The time spent on "handling of specimen/laboratory work" for transfer from the health care professional's office to a laboratory is added to the treatment time to determine the unit value of those procedures that requires such handling. Take note that this does not apply when a schedule has a listed code for the handling of specimen/laboratory work (See CPT code 99000 as an example).

The time spent on the handling of laboratory work should not be determined for each service involving laboratory work, but the mean time thereof should be allocated to these services. The reasons for this approach are fourfold:

Part of the action of handling laboratory work is often done by the health care professional after patients have left. In order to enhance the timing of this 'break in continuity', it should be timed separately.

The time spent on this activity may vary from practice to practice. There is however, no significant difference in the time spent on handling the laboratory work between different services, which makes differentiation per service type unnecessary.

There are dental services, for example, complete dentures, that require the action of handling laboratory work more that once as part of the same procedure.

Comparisons between services on the time spend to complete, are more accurate if the handling of laboratory work can be excluded.

Standard Volume Adjustment

The Standard Volume used in the RPL has been standardised for all provider types. The time spent on pre- and post-treatment patient care activities, routine surgery preparation, as well as maintenance and repair can be classified as surgery downtime, and is used to determine/adjust the Standard Volume.

Many non-specified activities vary significantly between practices, therefore, some activities may never be time studied or assigned a unit value. Examples of non-specified activities include: accounting/billing activities; administrative activities; breaks and personal time including formal breaks mandated by law, contract or policy, wash-up or other personal time; computer orientated activities; evaluation, development and research; formal education; procedures without unit values; supplies and equipment; training, etc. Some of these activities can be taken into account in order to calculate the Standard Volume.

Permanent, Temporary and Extrapolated Unit Values

The time studies should include all clinical, clerical and assistant time expended toward the completion of a service. It should involve more than one health care professional providing the service and should be performed several times in various locations. Each unit value per service should represent an averaging of how the service is performed in dissimilar facilities by different health care professionals.

Acceptable studies should then be edited and presented to the RPL review process. Depending on a statistically significant number of health care professionals, who have each completed an acceptable number of timings, permanent or temporary unit values are assigned to values generated from the time studies.

A permanent (p) unit value per service is established only after appropriate data is obtained from a statistically significant number of health care professionals who have each completed an acceptable number of timings.

An interim temporary (t) unit value per service is assigned to a service based on fewer time studies which meet the requirements established by the RPL review process. A temporary (t) unit value may not be assigned without a time study and may not be assigned by an individual health care professional in the field.

An extrapolated (e) unit value per service may be assigned to a service before standard time studies have been performed. The extrapolated (e) unit value may be derived in part from components of previous time studies on similar services.

Determining Unit Values

A time study is a work measurement technique, used to determine the time a qualified worker takes to complete a particular element of a task under specified circumstances at a defined rate.

A qualified HCP in South Africa is a person, registered at the Health Professional Council of South Africa (or others as maybe required), who has the physical, mental and intellectual characteristics to do the work with a particular level of knowledge, application and skill. These requirements imply that:

The quality of the final product meets with acceptable clinical standards;

The 'best' method (current acceptable standard of care) is followed;

The available equipment and technology are utilised optimally;

Materials are not wasted, and

The highest degree of safety standards is maintained.

The time it takes to complete a service is measured with a stopwatch through direct observation. The time it takes to complete a service must be a 'fair time'. A fair time is the standard time an average health care professional requires completing a procedure satisfactorily.

The study process starts by analysing all services into basic steps or elements. These steps are used to clarify the scope of the service, and permit the critical appraisal and possible improvement of the method of performing the service. However, the purpose of the study is to determine the time it takes to provide the service only, and not to

improve on the method(s) used. A service will thus only be timed in steps when it is usually not completed in one visit.

The next step in the process is to time the steps (or visits) of the service to build up the total basic time for that service and health care professional.

The standard time for a particular service and health care professional is the sum of the observed values (total basic time) divided by the number of observations. In other words, the standard time is the mean time that a particular health care professional requires to provide a particular service.

The standardised unit value for a service is the mean of the standard times of that service, and can be defined as the mean number of workload units (expressed in minutes) of technical, clerical, and assistant time required by experienced health care professionals of average capability to perform all necessary steps in order to complete the defined service once.

An acceptable time study should include the recording of the following data:

- The health care professional type that has performed the procedure;
- The location where the procedure has been performed – surgery (in office); theatre (in hospital) or other;
- The procedure code and description;
- The number and description of the steps of the procedure (if appropriate);
- The actual timing per step of the procedure; and
- The total time of the procedure.

APPENDIX D

SAMPLE SIZE CALCULATION

A Short Discussion of Sampling and Bias issues in the context of the NHRPL review of 2010

This short paper is intended for all stakeholders with an interest in the 2010 NHRPL review process. The aim of the paper is to highlight some key issues that have plagued the NHRPL process since it began. The actual model prescribed in the regulations on how NHRPL tariff values should be calculated will not be considered here. Rather the focus will be on how data is collected and used in the NHRPL submissions.

Sampling as a means to collect data

This paper does not deal with problems associated with data collection and interpretation from providers who could be considered centralized – that is to say, they can easily access *all* of their relevant cost information for their provider subgroup, for example Hospitals and Pathology Labs. Other providers, Doctors for example, do not keep their information on costs centrally, or in a standard format. It is the collection of data from this second provider type that is addressed here. (Note that Providers and Provider populations are discussed throughout the paper – these terms should be interpreted as a specific discipline such as Surgeons, Physiotherapists, etc).

Collecting data from all providers in these situations is time consuming and expensive. A suitable alternative is collection of the data through sampling. Sampling involves collecting the necessary data from a representative subset of the overall provider population. Based on the data collected from the sample, certain inferences can be made about characteristics of the overall provider population. A pertinent issue in the NHRPL review process is the measurement of overhead costs.

Various methods are available for selecting the specific sample from which to obtain data. Examples of these methods include simple random sampling and stratified random sampling. Random sampling has the desirable property of 'unbiased estimation' which allows inference of the observed characteristic to the overall population. What random sampling means in plain English is, that each person in the population has an equal chance of being selected for the sample. Stratified random sampling takes this a step further by considering similar subgroups of a population separately, and can improve the efficiency of the sampling process. There are also various physical mechanisms for collecting the sample data. These include phone calls, visits, and physical or electronic mail surveys. These methods each have different costs and success rates.

Sample Sizes

Acceptable sample sizes for data collection and inference can be calculated using just a few parameters and assumptions.

The standard formula is as follows:

$$n = \left\{\frac{Z_\alpha \sigma}{d}\right\}^2$$

Where n is the sample size being calculated, Z_α is the value of the cumulative standard normal distribution at the α level (a two sided confidence interval at 5% would yield $Z_{2.5}$ as 1.96), σ is the variance of the population, estimated by the variance of the sample if the variance of the population is unknown, and d is the precision of the estimate required (in other words it is the *width* of the confidence interval).

What is immediately clear from the formula is that the sample size required for a given precision and width of confidence interval does not depend on the size of the population. While this is true for large populations with small sampling rates, it does not hold true for smaller populations or where high proportions of the population are being sampled (say above 5%). In these cases a correction needs to be made. This adjustment is called the Finite population correction factor.

In these cases then, the standard error of the sample (equal to $\sigma/\sqrt{n}$) must be multiplied by the correction factor: $\sqrt{\frac{(N-n)}{(N-1)}}$ where N is the size of the population and n is the size of the sample. This reduces the sample variance and confidence interval

width, and the required sample size for the same level of precision. The calculation for the required sample size is then:

$$n = \frac{N(Z_\alpha \sigma)^2}{(N-1)d^2 + (Z_\alpha \sigma)^2}$$

By way of an example consider a certain provider group with 279 distinct practices, overhead costs with standard deviation of R125,473, and a tolerance of error (d) equal to R26,544. This leads to a finite population corrected sample size required of 66; uncorrected for the finite population the sample size required would be 86.

Response Bias

Generally speaking survey costs are inversely proportional to success and response rates. Visits to providers are the most expensive and most accurate way to collect data, followed by phone calls, physical postage and lastly email - which are the easiest surveys to carry out, but have notoriously low response rates as people can just ignore the email. Response rates as discussed here are defined as the proportion of providers that respond with the required information divided by *all* those from whom the information was requested. All surveys are subject to the risk of certain bias. These biases may be in the selection of candidates to participate in the sample – even for visited providers, a certain subgroup may not agree to meet and these may have different characteristics from the ones who agree to meet. Electronic surveys select only those who are electronically enabled, and for whom the email details are available and accurate, which may also introduce some bias. To date many of the NHRPL cost studies have been carried out through email surveys, which is where potential problems can occur in the form of response bias.

Response bias (or non response bias) is a term used to describe the bias in survey results when responses to a survey are voluntary and the response rate is not close to 100%. Response bias poses a particular risk where respondents are not indifferent to the subject matter – such as in cost or financial related matters. Response bias is problematic in that it violates the principle of random sampling – not everyone has the same chance of being in the sample of data collected. While there may have been equal opportunity, there is unequal participation. As a result it is not possible to make inferences about the overall provider population where there is a risk of response bias

in the sample data. It should be noted that this is true even when the degree and direction of the bias is not known. It must also be noted that the use of standard statistical techniques, such as confidence intervals, cannot be used to adjust for response bias as the assumptions underpinning these methods are violated in the presence of the bias.

The issue can be described mathematically as follows:

Let the overall population mean for overhead costs (using this as an example measure) be defined as:

$$\bar{Y} = W_R\bar{Y}_R + W_N\bar{Y}_N$$

Where W_R and W_N are the relative population proportions of Respondents and Non Respondents respectively, and $\bar{Y}_R$ and $\bar{Y}_N$ are the average overhead costs for Respondents and Non Respondents respectively.

We can calculate the bias in our estimation of $\bar{Y}$ as:

$$bias(\bar{y}_R) = W_N(\bar{Y}_R - \bar{Y}_N)$$

Therefore, as the response rate on surveys approaches 100% and as the difference in estimates between respondents and non respondents approaches zero the bias is minimized. Acceptable response rates cited in literature on the subject range from 50% to over 80%. However acceptance of the results also depends on the difference in estimates between respondents and non respondents which is not known. A large difference requires a higher response rate than a small difference. Various alternatives exist to estimate the bias from data, but all of them require gathering of additional information from non respondents. For voluntary surveys with relatively low response rates it is therefore highly recommended that additional data be gathered in a more active way so as to collect the required information on possible response bias.

Stratified Sampling

Stratified Random sampling is a technique used to optimize sampling resources by allowing smaller sample sizes while minimizing overall variances in inferences. This is achieved by identifying a number of Strata from the population that have similar characteristics (such as geographical area) and are likely to show some similarity in overhead costs say. The effect of stratified sampling is to remove the effect of the difference in averages between these strata from the overall variance of the sample thus requiring smaller sample sizes to attain the same levels of precision.

The average and standard deviation of the overhead costs for each strata can then be combined to form estimates of the overall population average and variance. An important additional piece of information required is the size of the population in each stratum – for example, the number of Doctors in Gauteng. The estimates for the population average overhead cost are then simply the weighted average overhead costs from the strata with the weights being the actual population in each stratum (not the number sampled from each stratum). The variance to be used for computation of the confidence interval is also a weighted average of the sample variances and stratum population variances but with weights equal to $\left\{\frac{N_k}{N}\right\}^2 \frac{N_k - n_k}{N_k\, n_k}$ where N is the size of the total population, N_k is the size of the k[th] Stratum, and $n_k$is the size of the sample from the k[th] stratum. Various techniques are available for the choice of sample sizes from each strata, including proportional allocation and optimal allocation, which aims to minimize the overall variance in the sample. In general it is advisable to sample more data from larger strata and strata with higher variance.

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