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# COSTING OF PHARMACEUTICALS IN NEW ZEALAND FOR HEALTH ECONOMIC STUDIES: BACKGROUNDER AND PROTOCOL FOR COSTING

**Burden of Disease Epidemiology, Equity and Cost-Effectiveness Programme (BODE³)**

**Technical Report: Number 6**

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# Acknowledgements

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# Introduction

The aim of this Protocol is to inform costing of pharmaceuticals for the cost-effectiveness/cost-benefit analyses of the Burden of Disease Epidemiology, Equity and Cost-Effectiveness Programme (BODE$^3$) and He Kainga Oranga, the Housing and Health Research Programme, of the Department of Public Health, University of Otago, Wellington. It may also prove useful to others undertaking similar cost-effectiveness/cost-benefit analyses.

## *Perspective*

To meet the objectives of these research projects, the aim is to capture all costs related to pharmaceuticals where they are substantial and/or it is practicable to do so. These costs include the acquisition cost of the drug, pharmacy mark-ups and dispensing fees etc. Both costs borne by the government and by the patient will be included. As noted by PHARMAC in their Prescription for Pharmacoeconomic Analysis[1] "the total pharmaceutical cost should be included irrespective of whether it is paid by the patient or the government"[1]. To maximise flexibility for different perspectives, this Protocol sets out a suggested method for separately costing 'health funder (government) costs' and 'patient costs' related to pharmaceuticals. An estimate of the total pharmaceutical cost is readily done by combining the estimated components if this better meets the perspective of the analysis.

Of note, this Protocol provides only a guide to the principles of calculating the costs of pharmaceuticals in New Zealand. In some circumstances, it will not be possible to calculate the exact cost for a given pharmaceutical because of the confidential nature of rebates and other supply agreements negotiated between PHARMAC and suppliers. It should also be noted that the information is current to September 2011, but a number of significant changes to funding systems have been signalled for the near future. To ensure accuracy, information should be checked against the most up-to-date information available from PHARMAC, available in the introductory sections to the Pharmaceutical Schedule and/or on their website.

Research and development costs will not be included because these costs are generally recovered through the market price of the drug. Health services related to prescribing or administration of the drug (e.g. general practitioner visits or nursing time) are considered a separate resource item and will not be considered in this Protocol. Further information on costing other healthcare resources can be found in the technical reports in the publication section of the BODE$^3$ webpage (www.uow.otago.ac.nz/BODE3-info.html).

The subsidies paid by the government, and the amount contributed by the patient, can vary from year to year. Thus, the most appropriate subsidy structure must be determined for each analysis, depending on the year(s) being costed for the study. Of note, the BODE$^3$ Programme has a base year of 2006 but tests the cost-effectiveness of interventions within the *current healthcare system*. Thus, subsidy structures will be those of the present year, but costs will be deflated to 2006 values.

Where more than one brand of a drug is available, the subsidised brand listed in the New Zealand Pharmaceutical Schedule will be costed, unless costing is being applied to patient-level data where it is known that an alternative brand was used.

Goods and Services Tax (GST) is a transfer payment and as a rule should be excluded when calculating costs of pharmaceuticals.

# Funding of Pharmaceuticals in New Zealand

One of the principal tenets of the medicines system in New Zealand is that "New Zealanders [should] have access to the medicines they need, regardless of their individual ability to pay and within the government funding provided"[2]. This provides for subsidised access to a core list of medicines within the available budget. Other innovative new medicines, low-volume or high-cost medicines may also be funded on an individual level through the Exceptional Circumstances and Special Authority mechanisms. Individuals can access all pharmaceuticals that have been approved for use in New Zealand, but will need to pay any additional cost if the pharmaceutical is not subsidised.

Pharmaceuticals are approved for use by the New Zealand Medicines and Medical Devices Safety Authority (Medsafe). Funding is determined by the Pharmaceutical Management Agency of New Zealand (PHARMAC), and District Health Boards (DHBs). PHARMAC is not obliged to fund all pharmaceuticals approved by Medsafe.

## *Community Pharmaceuticals*

PHARMAC determines which Community Pharmaceuticals should be subsidised in New Zealand, and to what level[3]. "Community Pharmaceuticals" are defined as "Pharmaceuticals listed in Sections A to G of the Pharmaceutical Schedule that are subsidised by the Funder from the Pharmaceutical Budget for use in the community"[4].

Each year, the Community Pharmaceutical Budget is agreed between the DHBs and PHARMAC, and then set by the Minister of Health. The money is held by the DHBs. PHARMAC works on behalf of the DHBs to negotiate pharmaceutical prices and manage spending on community drugs from the Community Pharmaceutical Budget. Working within the agreed budget, PHARMAC decides which drugs should be subsidised; it is a legal requirement that PHARMAC does not exceed the set budget, while funding as many appropriate pharmaceuticals as possible within that budget. The Community Pharmaceutical Budget for the year ending 30 June 2010 was $694 million; the pharmaceutical spend was $693.8 million[5]. Twenty new medicines were funded, and access was widened for 25 others[6].

Those community pharmaceuticals that are subsidised are listed on the Pharmaceutical Schedule (sections A to G), and must be made available nationally (i.e. by all DHBs). Through the Pharmaceutical Schedule, PHARMAC aims to fully subsidise at least one Community Pharmaceutical within each therapeutic subgroup.

Additional drugs may be available within the therapeutic group, but many will be only partly subsidised, or not subsidised at all.

There is some ambiguity about the exact operational definition of community pharmacies and hospital pharmacies. For example, the pharmacy located at Dunedin Hospital operates as both a Community Pharmacy, dispensing "walk-in" prescriptions, and also as a Hospital Pharmacy, dispensing medicine for use within the hospital. However, community and hospital pharmacies operate under different Pharmacy Services Agreements with the DHB to dispense, respectively, "Community Pharmaceuticals" (as listed in sections A to G of the Pharmaceutical Schedule; see above) and "Hospital Pharmaceuticals" (as listed in section H of the Pharmaceutical Schedule (see below). In addition, community pharmacies can supply for sale pharmaceuticals that are not subsidised, as well as a variety of non-pharmaceutical products.

## *Hospital Pharmaceuticals*

DHBs fund pharmaceuticals for use in their hospitals and outpatient services. The term "Hospital Pharmaceuticals" encompasses National Contract Pharmaceuticals, Discretionary Variance (DV) Pharmaceuticals and Discretionary Community Supply Pharmaceuticals.

Currently, each DHB is responsible for deciding which Hospital Pharmaceuticals they will fund, with the exception of certain cancer drugs ("Pharmaceutical Cancer Treatments") that operate under a different system (see section on Pharmaceutical Cancer Treatments). However, in July 2010 a decision was made by Government to move towards a system where PHARMAC will be responsible for managing the funding of all pharmaceuticals within DHB hospitals, eventually working within a fixed budget as is currently done for Community Pharmaceuticals. It is anticipated that a national Hospital Treatments Basket will be implemented by mid-2013[7].

Under the current system, PHARMAC negotiates national contracts for supply for some, but not all, pharmaceuticals used in hospitals and lists these in section H of the Pharmaceutical Schedule[1]. The contract sets a standard national price for the drug. This does not limit the range of pharmaceuticals that can be used by DHB hospitals, but can dictate the brand of a drug that must be used if Hospital Supply Status (HSS; indicated by a bold brand name in the Pharmaceutical Schedule) is negotiated as part of the national contract. Where there is HSS, DHB hospitals are obligated to buy that brand, subject to any Discretionary Variance (DV) limits set by PHARMAC. DV limits control to what extent a hospital can choose to purchase a brand other than the HSS brand (see section on Hospital Pharmaceuticals).

[1] Section H is a legal part of the Pharmaceutical Schedule, but it is published separately and is not part of the online Pharmaceutical Schedule; it must be downloaded separately from the PHARMAC website www.pharmac.org.nz.

Pharmaceutical companies will compete on price to gain Hospital Supply Status for their drugs.

Individual DHBs can also choose to fund other hospital pharmaceuticals not listed in the Pharmaceutical Schedule, but must not act inconsistently with the Schedule.

As well as specialist hospital pharmaceuticals, DHB hospitals normally supply all medications that a patient needs while in hospital, including the medications that they would usually receive in the community. Thus, many of the pharmaceuticals listed in section H of the Pharmaceutical Schedule for hospital use are the same drugs that are listed in sections A to G of the Pharmaceutical Schedule for community use, and the listed manufacturer's price is the same. However, the funding mechanisms are different (although that will not alter costing in BODE$^3$).

DHBs can also choose, at their discretion, to fund from their own budget certain pharmaceuticals for use in the community (Discretionary Community Supply Pharmaceuticals). Which drugs can be funded in this way is controlled by PHARMAC. These Discretionary Community Supply Pharmaceuticals are listed in section H, Part III of the Pharmaceutical Schedule. One such example is pegfilgrastim, a granulocyte colony-stimulating factor to reduce neutropenia associated with chemotherapy. DHBs may not fund any pharmaceutical for community use that is not listed as a Discretionary Community Supply Pharmaceutical unless it is approved under Hospital Exceptional Circumstances (see section on Exceptional Circumstances). However, patients can be discharged from hospital with a short-term supply of a required medicine for continued use in the community.

## *Pharmaceutical Cancer Treatments*

Since the early 2000s, PHARMAC has been the decision-maker for which cancer treatments *must* be funded by DHBs for hospital use. PHARMAC determines a basket of "Pharmaceutical Cancer Treatments" (PCTs) that are then listed in the Pharmaceutical Schedule sections A to G and identified with "PCT" next to the drug name. DHBs must provide access to the listed PCTs, and fund them from their own budgets for use in both their hospitals and outpatient services.

Other cancer drugs that are not "PCTs" are also listed in the Pharmaceutical Schedule for use in the community (subsidised by the Community Pharmaceutical Budget; Schedule sections A to G) or in hospital (funded by DHBs at their discretion; section H of the Schedule if there is a national pricing contract). Examples include tamoxifen for breast and endometrial cancer and bicalutamide for prostate cancer.

DHBs may only provide access to an unlisted pharmaceutical for the treatment of cancer under the Cancer, Community or Hospital Exceptional Circumstances programmes (see below); as part of a paediatric oncology service; as part of a clinical trial; or if the patient's treatment was initiated prior to 1 July 2005. Private specialists can treat patients with cancer drugs that have been approved by Medsafe, but not listed by PHARMAC in the Pharmaceutical Schedule, at the patient's (or their private insurer's) cost.

## *Exceptional Circumstances*

Funding for drugs that are provided under Exceptional Circumstances needs to be approved by PHARMAC on a case-by-case basis.

The Community Exceptional Circumstances (CEC) budget is managed by PHARMAC. It allows appropriate drugs to be funded in the community on an individual basis when it is not possible to fund the drug from the Community Pharmaceutical Budget through the Pharmaceutical Schedule[4]. If approved, the drug is fully funded for a specific patient from the CEC budget. Funding may be granted when a condition is very rare (national prevalence of n<10 individuals), the patient has an unusual reaction to the alternative funded treatment, or an unusual combination of circumstances applies. Clinical benefit, cost-effectiveness, and the patient's ability to pay for the treatment may also be considered, but funding will not be granted for financial reasons alone.

Under Hospital Exceptional Circumstances, a drug for use in the community by a specific patient that does not meet CEC criteria may be funded from a DHB hospital's own budget if this is deemed appropriate and cost-effective for the DHB. Where a pharmaceutical for the treatment of cancer is funded under Cancer Exceptional Circumstances, it is funded from the hospital's own budget.

Further details are provided in the New Zealand Pharmaceutical Schedule[4]. Note that this process is under review and may change in the near future.

## Pricing of pharmaceuticals

PHARMAC negotiates supply agreements but does not directly purchase, stock or distribute pharmaceuticals[8 9].

PHARMAC is able to negotiate substantial discounts from pharmaceutical companies because there is controlled access to the Pharmaceutical Schedule to ensure that the budget is strictly adhered to. For generics, pharmaceutical companies compete on price by tender to have sole supply status for the drug. Half of the total volume of subsidised drugs is purchased by tender.

Where pharmaceutical companies don't want to make public a low price, they may offer rebates rather than price reductions. Rebates may also be used as part of a risk-sharing strategy where public expenditure on a certain drug is capped at a set amount, and any additional spending on the drug is covered partly or fully by the pharmaceutical company, or some other type of agreement will be reached to manage the spending. In either case, the rebate is repaid to the funder (i.e. the DHB) by pharmaceutical suppliers as part of the supply agreement. Another common strategy is to bundle two or more drugs (multi-product agreements), where a pharmaceutical company substantially discounts an older product in return for a new product being subsidised. 35% of contracts (by value) for 2010 involved some kind of rebate, with 22.5% involving a lower subsidy, and 13% a cap[6].

PHARMAC also practices reference pricing, where the same subsidy is paid for pharmaceuticals that have the same or similar therapeutic effect (e.g. oral contraceptives, statins). A pharmaceutical company can choose to price a particular drug higher than this, but the product will be only partly subsidised to the level of the reference price, with the consumer paying the remaining amount.

These tendering and negotiating strategies create savings of more than $300 million per year, which can then be used to subsidise other drugs[8]. To put this in context, the total community pharmaceutical budget is approximately $700 million per year.

Due to the confidentiality of these price negotiations, it is not possible to calculate a precise cost for any given pharmaceutical. BODE[3] would ideally aim to capture the net cost to government after rebates had been deducted. However, this information is not available. The values used in our current analyses will be, by necessity, those listed in the Pharmaceutical Schedule, rather than the actual price paid. However, the PHARMAC Annual Report for the year ending 30 June 2010 reported that there was a gross expenditure on community pharmaceuticals of $748.8 million (plus $3.6 million other expenditure), less an estimated $58.6 million expected from suppliers as rebates, producing net expenditure of $693.8 million[5]. Thus, for that year, rebates

saved approximately 8% of gross expenditure. However, the amount of rebate differs between drugs, and may produce on occasion a net price reduction of as much as 80% or more. To provide some estimation of pharmaceutical spending after rebates, we may test different scenarios in sensitivity analysis (e.g. 10, 25 and 50% rebate on price, or more if PHARMAC indicates a higher level of rebate[2]) when pharmaceutical acquisition price is a key driver of cost-effectiveness. If changes in costs of other treatment resources captured in cost-effectiveness analysis (such as hospitalisations and surgeries) greatly outweigh the pharmaceutical costs associated with a certain intervention, the relative importance of adjusting correctly for rebates will be low.

If a drug is not listed in the Pharmaceutical Schedule, the manufacturer's price from other sources such as MIMS New Ethicals[10] will be used for costing calculations, and a manufacturer's surcharge added if appropriate (see section on Manufacturer's prices).

[2] PHARMAC may be willing to provide more information on the range of rebate values that should be tested for a specific pharmaceutical if requested

# Costing Calculations

The following sections refer to pharmaceuticals other than extemporaneously prepared products and special foods; further information on costing for these items is available from the New Zealand Pharmaceutical Schedule[4] and from PHARMAC.

This Protocol relates to costing of pharmaceuticals for individual prescriptions in the community or for use within DHB hospitals. It does not cover alternative methods of supply such as bulk supply orders (e.g. by private hospitals or institutions), practitioner supply orders, and situations where PHARMAC has made alternative distribution agreements ("xpharm" agreements) that operate outside of the pharmacy system, most notably provision of 'flu vaccines for at-risk groups.

## *Community Pharmaceuticals*

In the Pharmaceutical Schedule, the fully subsidised brand of a medicine is indicated by a tick and a bold brand name; any brand that has sole supply status is indicated by underlining. Brands without the tick are not fully subsidised and may cost the patient a manufacturer's surcharge (see section on Patient charges). If the manufacturer's price differs from the subsidy, it is given in brackets.

For community pharmaceuticals, DHBs reimburse pharmacies according to the following calculation[11]:

Total payment for each pharmaceutical (excluding GST) is the:

- GST-exclusive subsidy (Sc) as listed in the Pharmaceutical Schedule *plus*
- the pharmacy margin (M) on the subsidy (Sc) *plus*
- the base pharmacy services fee (BPSF) adjusted by the appropriate multiplier (F)
- subtraction of the patient co-payment (CoP; "prescription fee").

The calculation can be presented mathematically as:

Total government cost = [Sc + (Sc*M) + (BPSF*F)] – (CoP exclusive of GST)

Each component is explained below in the following sections, along with the related rules and exceptions.

The patient bears the cost of any co-payment (CoP), and any non-subsidised portion of the drug cost (see section on Patient charges). Note that if the total cost is

required, then the patient costs (CoP + nonsubsidised drug cost with mark-up, calculated as per section on Patient charges) would also be included at this step; this may often be the case for BODE$^3$.

A spreadsheet to calculate government, patient and total costs for pharmaceuticals is available from Rachel Foster (rachel.foster-russell@otago.ac.nz); once finalised the spreadsheet will be posted with the report on the BODE$^3$ publications webpage found at www.uow.otago.ac.nz/BODE3-info.html.

### *Subsidies (Sc)*

The subsidy on a community pharmaceutical is listed in the Pharmaceutical Schedule, and is shown as the amount before any mark-ups or fees and exclusive of GST. However, the manufacturer's prices (and thus the cost to Government of subsidising each drug) may vary from that listed because suppliers may provide rebates or have other supply agreements that are not specified in the Pharmaceutical Schedule (see section on Pricing of pharmaceuticals).

Subsidy for some drugs requires Special Authority, which is granted to an individual patient. Approval may depend on the availability of funding from the Pharmaceutical Budget. Costing for Special Authority drugs will need to be done on an individual basis.

### *Pharmacy margin (M)*

A margin to cover the procurement and stockholding of pharmaceuticals is applied by community pharmacies to the *subsidised* portion of any pharmaceutical cost (Sc). Rates are:

- 4% for pharmaceuticals with a Pharmaceutical Schedule Pack Subsidy of <$150
- 5% for pharmaceuticals with a Pharmaceutical Schedule Pack Subsidy of >$150.

### *Base Pharmacy Services Fee (BPSF)*

The Pharmacy Service Fee is essentially a dispensing fee and is charged on all prescription products supplied through a community pharmacy (excluding special arrangements such as Practitioner's Supply Orders and Bulk Supply Orders). The

base rate (i.e. the BPSF) for March 2010 to August 2011 was $5.30. This is adjusted by multipliers as follows:

| Service | Multiplier (F) |
|---|---|
| General pharmaceuticals | 1 |
| Extemporaneous compounding | 1.5 |
| Exceptional circumstances | |
| • pharmaceutical in PS | 1 |
| • pharmaceutical not in PS | 1.5 |
| Class B controlled drugs | 1.3 |
| Monitored therapy | 2 |
| Complex medicine | 1.5 |
| Aseptic dispensing | 3 |
| Sterile manufacturing | 3 |

**PS** = Pharmaceutical Schedule

Note that intravenously or intrathecally administered cancer (and other) drugs will require aseptic dispensing (i.e. preparation of the drug for administration under sterile conditions using specialised equipment and techniques).

Pharmacy Service Fees can change by year; the most-up-to-date figures can be obtained from PHARMAC.

### *Quantity of Supply*

The quantity dispensed from a prescription for a community pharmaceutical has implications for costs related to dispensing fees. The cost calculated for a pharmaceutical will generally be based on the cost per course of treatment or, if treatment is ongoing, per month or year as appropriate. With the exception of oral contraceptives (maximum 6 months), community pharmaceuticals are subsidised for a maximum treatment period of 3 months[3]. Whether a 3-month prescription is dispensed as three monthly lots or one 90-day lot depends on its classification in the Pharmaceutical Schedule[4]. For many of the more common and cheaper drugs, it is recommended that 3-month prescriptions are dispensed in a single 90-day lot, which avoids repeat dispensing fees with monthly lots. Such drugs are identified by a large asterisk in the Pharmaceutical Schedule listing. Most other drugs must be dispensed in monthly lots, but some can be dispensed in a 90-day lot if endorsed “Certified Exemption by a prescriber” (identified by a black triangle in the Pharmaceutical Schedule) or if the patient qualifies for an access exemption. Exceptions to this are where a drug is under close control, is a class B controlled drug, or is unstable. Where a course of treatment is less than a month (e.g. an antibiotic course) then only the amount required is dispensed.

[3] PHARMAC has signalled the possibility that this maximum treatment period may change in the near future.

In cost-effectiveness analyses where the marginal cost is the key parameter, drugs are costed according to how much it would cost to provide one additional "unit" of the drug. The marginal cost will be important in some BODE$^3$ analyses, depending on the intervention and the comparator. The "unit" in most cases in these analyses will be one additional course of treatment, or providing treatment for one additional patient (e.g. per month or per year).

If the smallest pack size listed in the Pharmaceutical Schedule is larger than needed to treat one patient or to provide one course of treatment, the drug will be costed at the proportional cost of that pack size if it can be feasibly expected that the remainder of the pack can be dispensed to other patients. For instance, furosemide 40mg is subsidised as a 1000 tablet pack for $10.75 (Pharmaceutical Schedule July 2011). Only the proportion of that pack that would be used by a single patient would be costed, because prescriptions for other patients could also be dispensed from that same 1000-tablet pack.

On the other hand, for an individual delivery system such as an inhaler or tube of ointment, the whole delivery unit (e.g. the inhaler or tube) would be costed regardless of whether one dose or the entire amount in the unit was used, because no other patient would be dispensed medication from that same delivery unit. Similarly, where the amount prescribed differs from the amount contained in the available pack size for items such as single-use vials or liquid antibiotics that must be reconstituted prior to dispensing, the subsidy will cover the pack used, including the wastage. In such circumstances, costing calculations must take into account the amount dispensed, rather than the dose prescribed.

For BODE$^3$, the dose that will be modelled will normally be based on either the approved dose as outlined in the prescribing information from Medsafe and/or the Pharmaceutical Schedule or, if more appropriate, clinical trials from which efficacy data have been extracted for modelling. Use of other dosage estimations, such as defined daily doses, can be problematic (e.g. http://www.bmj.com/content/328/7436/385/reply#52963). Actual daily dose information is available from PHARMAC in some cases.

Further information on determining the correct dose by bodyweight or body surface area, and estimating the duration of treatment, is given in the Protocol for Costing and Event Pathways in BODE$^3$ that, once finalised, will be posted as a report on the BODE$^3$ publications webpage (www.uow.otago.ac.nz/BODE3-info.html).

### *Manufacturer's prices*

Manufacturer's prices (where they differ from the subsidy) can also be obtained from the Pharmaceutical Schedule for all listed drugs (prices given in brackets). The

schedule shows the *standard* price (exclusive of GST) at which a community pharmaceutical is supplied ex-manufacturer to wholesalers. As noted above, the true price the drug is supplied at may differ from that listed due to price and supply negotiations, but the listed price represents the best available estimate in the absence of full disclosure of such agreements.

If a drug is not listed in the latest version of the Pharmaceutical Schedule that can be accessed, it will be deemed to be not subsidised, and the manufacturer's price (on the NZ market) from other sources such as MIMS[10] will be used for costing calculations.

### *Patient charges*

For each drug, the Government will only pay the amount subsidised as set out in the Pharmaceutical Schedule. In some cases, the manufacturer's price may be higher than that, and some drugs are only partly subsidised, or not subsidised at all.

Any difference between the acquisition cost of the drug and the subsidy – "the manufacturer's surcharge"– is paid by the patient. The pharmacy is entitled to add a mark-up to this surcharge. This mark-up may be of any level, but a suggested level in the Pharmaceutical Schedule is a multiplier of 1.86, which is calculated to cover pharmacy mark-up on the surcharge plus other costs such as GST (currently 15%). This multiplier is only an estimate of pharmacy mark-up, which in reality may be substantially higher or lower in individual pharmacies. Nevertheless, 1.86 represents the current best estimate for this multiplier and will be used in BODE$^3$ cost calculations. While BODE$^3$ calculations normally aim to exclude GST, further calculations to try to remove the GST component of this multiplier are unlikely to make this calculation significantly more accurate.

As previously noted, patients may also contribute a standard co-payment (CoP), i.e. the "prescription fee", which is GST inclusive. As of 1 September 2008, most adults pay a $3 prescription fee per item for community pharmaceuticals, provided that they are eligible for publicly funded health and disability services in New Zealand, and obtain the prescription from an 'eligible' provider/prescriber; most providers/prescribers are eligible under this system[4]. The most important exceptions are patients who hold a Community Services Card (CSC), a High Use Health Card (HUHC), or a Prescription Subsidy Card (PSC), and those under 6 years of age, for whom there are zero fees. In the case of specialist prescribing or where a provider or patient is not "eligible", the co-payment is $15 per item (refer to Ministry of Health website)[12]. For BODE$^3$, if the difference in patient co-payments between different individuals is considered to be a significant factor in determining cost-effectiveness,

[4] Eligible provider/prescriber means: a) a prescriber employed by a DHB; b) a provider/prescriber providing services under an access or service agreement with the Ministry of Health, a DHB or a PHO; c) an After Hours provider with an access or service agreement with a PHO or a DHB; d) a midwife

one possible approach will be to average the co-payment using the distribution of fees in the New Zealand population. For instance (as a highly simplified example), if one third of the population is eligible for zero fees because they have a CSC, HUHC, PSC or are aged under 6[5], and the remaining two-thirds of the population are not eligible for exemption, then the average co-payment would be $2 rather than $3 per item.

The cost to the patient (if necessary to present, rather than the total [government + patient] cost) can be calculated as follows using the GST exclusive values as listed in the Pharmaceutical Schedule for the manufacturer's price (MP) and subsidy (Sc), and the multiplier of 1.86:

Patient cost = ((MP – Sc)*1.86) + (CoP exclusive of GST)

The prescription fee co-payment is subtracted from the total amount to be claimed from the government by the pharmacy for the item.

Note that this calculation includes only the drug and dispensing cost, and does not include other indirect items such as compliance packs.

## *Hospital Pharmaceuticals*

Hospital pharmaceuticals for which PHARMAC has negotiated a national contract (National Contract Pharmaceuticals) are listed in section H of the Pharmaceutical Schedule. The price listed is the national price (excluding GST) at which the drug can be purchased by a DHB from the pharmaceutical supplier who holds the national contract with PHARMAC.

Hospital Supply Status (HSS) is indicated by a bold brand name in the Pharmaceutical Schedule. As described in section on Hospital Pharmaceuticals, drugs may be subject to DV limits. A DV limit of 1% means that at least 99% of the total volume of all brands of the drug purchased by the hospital must be the HSS brand, and only a maximum of 1% of other brands can be purchased. Where the DV limit is ≤5%[6], costing calculations for BODE$^3$ will assume that the HSS brand would be used for all purchasing of that drug.

If a drug does not have HSS or a DV limit, a hospital can purchase the listed brand of drug at the price set out in the Pharmaceutical Schedule. However, they can also choose to purchase a different brand at whatever price they negotiate with the supplier. As these negotiated prices are not available in the public arena, BODE$^3$

[5] In 2008, 911,000 New Zealanders were issued a community services card, and around 420,000 children are aged 6 years and under.
[6] In the March 2011 issue of the Pharmaceutical Schedule, all DV limits in section H were either 1 or 5%.

costing calculations will be based on the brands and prices listed in section H of the Pharmaceutical Schedule if possible. Manufacturer's prices for unlisted drugs will be obtained from alternative sources such as MIMS New Ethicals[10].

The pharmacy services for hospital pharmaceuticals are provided by the hospital pharmacy, and as such is a DHB service and not a profit-making private business such as community pharmacies. Thus, no pharmacy margin or other mark-ups are applied. PHARMAC suggests that "for pharmaceuticals dispensed in hospital pharmacies, a dispensing fee should only be included if the pharmaceuticals are dispensed for outpatient use"[1]. A reasonable approximation of the cost to dispense an outpatient pharmaceutical would be to use the Base Pharmacy Services Fee and associated multipliers to cost the pharmacy time. For more complex dispensing not covered under the multipliers, pharmacist time should be calculated on the basis of the pharmacist's hourly rate. Note that use of the latter would be rare. For instance, a drug requiring aseptic dispensing would simply have a pharmacy service fee of three times the BPSF ($15.90 in 2011).

It is important to note that price systems for hospital pharmaceuticals may soon change, with PHARMAC becoming responsible for managing the funding of all pharmaceuticals within DHB hospitals.

## *Cancer Treatments*

Subsidies (and Manufacturer's price, if different from the subsidy) for PCTs are listed in sections A to G of the Pharmaceutical Schedule. Other cancer drugs that are not "PCTs" are also listed in the Pharmaceutical Schedule. Both PCTs and other cancer drugs should be costed as for other community (section on Community Pharmaceuticals) or hospital pharmaceuticals (section on Hospital Pharmaceuticals).

## *Future Generic Drugs*

PHARMAC recommends that if the patent expiry of a pharmaceutical is expected within 10 years of funding, the cost-effectiveness analysis should take into account future reductions in the price of the pharmaceutical when (if) a generic version of the drug becomes available. They give a conservative estimate of a 70% price reduction with introduction of a generic[1]. BODE$^3$ will incorporate such projections in costing, where appropriate, in sensitivity analyses.

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