Worked example of the calculation of the price of purchasing medication for long-term treatment: Fluphenazine

The annual price of medication to treat a population can be estimated using the formula:

* Number of cases to be treated x Price per unit of medicine x Number of units per day x Duration of treatment in days

**Worked example: the treatment of schizophrenia using fluphenazine depot injection in Jordan**

*This simplified example assumes all people with schizophrenia would be offered treatment with fluphenazine depot injection. However, it unlikely that all people would be treated using depot injection. Alternative oral medication, such as chlorpromazine, haloperidol or risperidone may be prescribed to a substantial proportion of people. A representative survey of existing practice could give a guideline as to the proportionate use of different antipsychotic medications in the country.*

*An estimate of the total cost of fluphenazine depot injection includes the cost of administering the periodic injection: a nurse to administer the injection and equipment such as syringe and needle.*

*A significant proportion of people taking fluphenazine depot medication experience extrapyramidal side-effects and are prescribed anticholinergic medication to control these side-effects.*

1. **How to find the: *Number of cases to be treated***

The number of cases to be treated per 1 000 000 population can be estimated from the prevalence, the proportion of cases who appropriate for treatment with medication, and the coverage target.

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| **Question** | **Example using schizophrenia** | **Number per 1 000 000** |
| 1. What is the prevalence of the disorder? | Based on prevalence estimates from 132 core studies, Saha et al[[1]](#footnote-1) estimated the median prevalence estimates of schizophrenia to be 4.6 per 1000 for point prevalence, 3.3 for period prevalence, 4.0 for lifetime prevalence and 7.2 for lifetime morbid risk. Period prevalence estimates refer to a period of between 1 month and 12 months, which corresponds best for calculating an annual cost. Prevalence estimates from the “least developed” countries were significantly lower than from both “emerging” and “developed” sites, and prevalence in migrants was higher compared to native-born individuals. | 3300 |
| 1. How many cases need treatment with antipsychotic medication? | Antipsychotic medication can safely and effectively help people with schizophrenia through the crisis of acute psychosis, and it is recommended that treatment continues for at least 12 months after acute psychotic symptoms have remitted. | 3300 |
| 1. What is the coverage target? | The coverage target can be adjusted to match local circumstances and resources. Starting from a low baseline (e.g. 5−10%) it may be impractical to aim for total (i.e. 100%) coverage target. In this example, 80% coverage is used as a goal. | 2640 |

Thus the number of cases to be treated to achieve 80% coverage is 2640 per 1 000 000 adult population.

1. **How to find the: *Price per unit of medicine***

Ideally, you have your own local data on the price of medication; alternatively, you could search the database of medicine prices, availability, affordability and price components at <http://www.haiweb.org/MedPriceDatabase/> (some pricings are from several years ago, as in this example). When you land on the haiweb page, you will see guidance on how to use the database on the right, and the criteria that you can carry out your “Analysis by” on the right.

For example, to find the price of fluoxetine in Jordan:

* Expand: “Price and availability by medicine”
* Expand: “By therapeutic group (WHO EML classification)”
* Expand: “24 - Psychotherapeutic medicines”
* Expand: “Fluphenazine”
* Expand: “Fluphenazine 25 mg/ml injection”
* Select: “All reference price sources”
* In the new selection area in the middle of the page, untick: “Select all/Deselect all”
* Scroll down and tick: “Jordan May 2004”
* Scroll to the top and select “Show data for selected surveys”
* At the right of the page under “Analysis by” use the drop down menu to select “US $”.
* In the table, read across from “Lowest price generic”, under “Price”, you will see the unit (tablet) price for fluphenazine 25 mg/ml injection: US$ 0.99 (database accessed on 16.06.2017) based on 2004 pricing.

1. **How to find the: *Duration of treatment* and *Number of units per day***

Guidelines, such as, the mhGAP intervention guide (Version 2.0) can be used as a source for duration of treatment.

For example:

“In person with ﬁrst episode, relapse, or worsening of psychosis symptoms: Consider discontinuation of medications 12 months after symptoms have resolved”; and

“Person with psychotic symptoms persisting more than 3 months: Consider discontinuation of medications if person is in full remission of symptoms for several years” (page 47 of mhGAP-IG V2).

Therefore, a person with schizophrenia being treated with an antipsychotic is likely to remain on treatment for at least 12 months.

Typical dosages are between 12.5 mg and 100 mg every 14−35 days, adjusted according to response ([British National Formulary](https://bnf.nice.org.uk/drug/fluphenazine-decanoate.html#indicationsAndDoses)). For the purposes of this calculation, a dose of fluphenazine 50 mg every 2 weeks is used as a typical dose.

1. **Calculation of annual price of fluphenazine**

For one person with schizophrenia to be treated for one year, the price of fluphenazine 50 mg every two weeks:

* Price per unit of medicine (US$ 0.99) x Number of units per day (2 units/14 days) x Duration of treatment (365 days) = US$ 51.62

Applying the figures to the formula (above) to calculate the annual price for 80% coverage of a population of 1 000 000 adults:

* Number of cases to be treated (2640) x Price per unit of medicine (US$ 0.99) x Number of units per day (2/14) x Duration of treatment (365 days) = US$ 136 280.

This calculation can be adapted as guidance for different population sizes and for different levels of coverage.

The adult (aged 15 years and over) population of Jordan is 5 859 000 (2015 from [World Population Prospects, 2017](https://esa.un.org/unpd/wpp/Download/Standard/Population/)). Thus the target number of cases of schizophrenia to be treated in Jordan each year to achieve 80% coverage is: 2640 x 5.859 = 15 468 people.

* Number of cases to be treated (15 468) x Price per unit of medicine (US$ 0.99) x Number of units per day (2/14) x Duration of treatment (365 days) = US$ 798 480.

The target of 80% coverage is unlikely to be achievable immediately, and instead countries may decide to set a progressive target, for example, starting from current baseline and rising by 10% each year.

1. Saha S, Chant D, Welham J, McGrath J. [A systematic review of the prevalence of schizophrenia](http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.0020141). PLOS Med. 2005;2(5):e141. doi:10.1371/journal.pmed.0020141. [↑](#footnote-ref-1)