

ATC/DDD Classification

ATC/DDD methodology: a country perspective

Ly Rootslane, Department of Pharmacy, Tartu University, Estonia

Alar Irs, Department of Clinical Pharmacology, Tartu University, Estonia

An interest in drug utilization in both scientific and governmental circles has developed as a result of the rapid increase in drug consumption over the last 30 years. In order to measure drug use, it is important to have both a classification system and a unit of measurement. Medicinal products can be classified using different methods, either in alphabetic order, by manufacturer, or by diseases treated. Different systems have been used at different times and in different countries but the most important contribution has come from the Drug Utilization Research Group (DURG) which has carried out international drug utilization research.

The first studies on drug consumption undertaken in the mid-1960s showed great differences between population groups. The most important result of these studies was consensus that an internationally accepted classification system of medicinal products was needed. By modifying and extending the existing classification system set up by the European Pharmaceutical Market Research Association (EPHRA), the Norwegian Medicinal Depot developed a system known as the Anatomical Therapeutic Chemical (ATC) classification. At the same time, the defined daily dose (DDD) as a unit of measurement in drug utilization studies was also established. Today, the WHO Collaborating Centre for Drug Statistics Methodology in Norway collaborates with the WHO International Working Group for Drug Statistics Methodology in determining ATC/DDD classification.

The ATC/DDD system in Estonia

The ATC/DDD system is implemented in Estonia and is used for different regulatory and scientific purposes.

Estonia is situated in the North-eastern part of Europe and is the smallest of the three Baltic countries with a population of 1.45 million. In 1991,

Estonia re-established its independence after being part of the Soviet Union for 50 years. The requirements and rules for medicinal products were controlled during that period by the central government and were similar for all Soviet republics. Before 1991, all pharmacies, wholesalers and manufacturers were 100% state owned and purchases and distribution of medicines were centralized. During this period, the assortment of medicinal products was limited and trade names mimicked the name of the active substance. As the manufacturing licence of each medicinal product was owned by the State, products of different manufacturers carried one trade name. There was no standardized classification of medicinal products at that time. Products were classified according to alphabetic order, therapeutic groups, chemical structure, or sale and storage conditions.

During the early years of Estonia's independence, major reforms were carried out in the health care sector. The decision was made for Estonia to develop its own system for the regulation of medical products modelled on those developed and operated by other Nordic countries. The Estonian State Agency for Medicines (SAM) was established in 1991 and began with only six employees. The main tasks of the Agency were to grant marketing authorizations and import/export licences, and carry out inspection of wholesalers, pharmacies and manufacturers. As retail and wholesale enterprises were privatized, the assortment of medicinal products broadened. A new system of classification was needed but financial and human resources were scarce. The ATC classification was chosen as a solution since it was considered to be easy to understand, to have a reasonable structure, and the only expense was the price of the codebook. Furthermore, it was widely used in neighbouring countries and was recommended by WHO.

To introduce the concept, ATC codes were inserted into the marketing authorization application and, to promote the use of the classification by wholesalers, the codes were attached to the import/export certificates. Lists of authorized products including the ATC codes were published in the national pharmaceutical literature. New regulations for the Wholesale Trade of Medicinal Products included

the requirement to use the ATC classification in wholesale activities.

However, several problems arose. Firstly, the ATC classification had been created to cover medicinal products used in Northern Europe and medicinal products manufactured in Russia and other post-soviet countries and used in Estonia in the early 1990s contained active ingredients not included in the ATC classification. To overcome this discrepancy, new ATC codes were created for local use. Active ingredients were classified according to therapeutic groups and chemical structure and a fifth level number commencing at 80 was created. Products containing more than one active ingredient were not listed in the original classification which led to problems in the identification of active ingredients of medicinal products. As different combination products containing only one similar active ingredient might have the same ATC code, special local ATC codes were created for combinations. All active ingredients were listed, and a unique ATC code was created for the different combinations.

The WHO International Working Group on Drug Statistics Methodology publishes the ATC classification once a year in January. There are often changes to the classification – ATC codes of some active ingredients are different from the previous versions. In consequence, two ATC codes are used during a certain period, which creates double classification with difficulties in reporting the data. To make the introduction of the national system easier, the decision was made to introduce these changes only once every 4 years. The ATC codes of 1994 were therefore not used until 1998.

Use of the ATC/DDD system

The ATC system can be used for many purposes in combination with the defined daily dosages (DDD). The defined daily dosages were developed as a tool for presenting drug consumption figures and have been used for many years in drug utilization studies where they are useful for both national and international comparisons of drug consumption and the evaluation of long-term trends in drug use (2). Drug consumption figures serve as a basis for the identification and evaluation of factors influencing the level of drug use. Drug consumption estimates have typically been based on sales data, which do not reflect the actual use of drugs, although for the purposes of comparing countries and looking for trends, sales statistics can provide reliable information.

Routinely performed drug utilization studies are considered to be useful in determining drug policies and in evaluating the quality of pharmacotherapy. Mapping of drug use patterns can be used to identify excessive or inadequate use of medicines. Another important goal of drug utilization studies is to indicate areas where education and/or information are needed in order to improve prescribing and use of drugs.

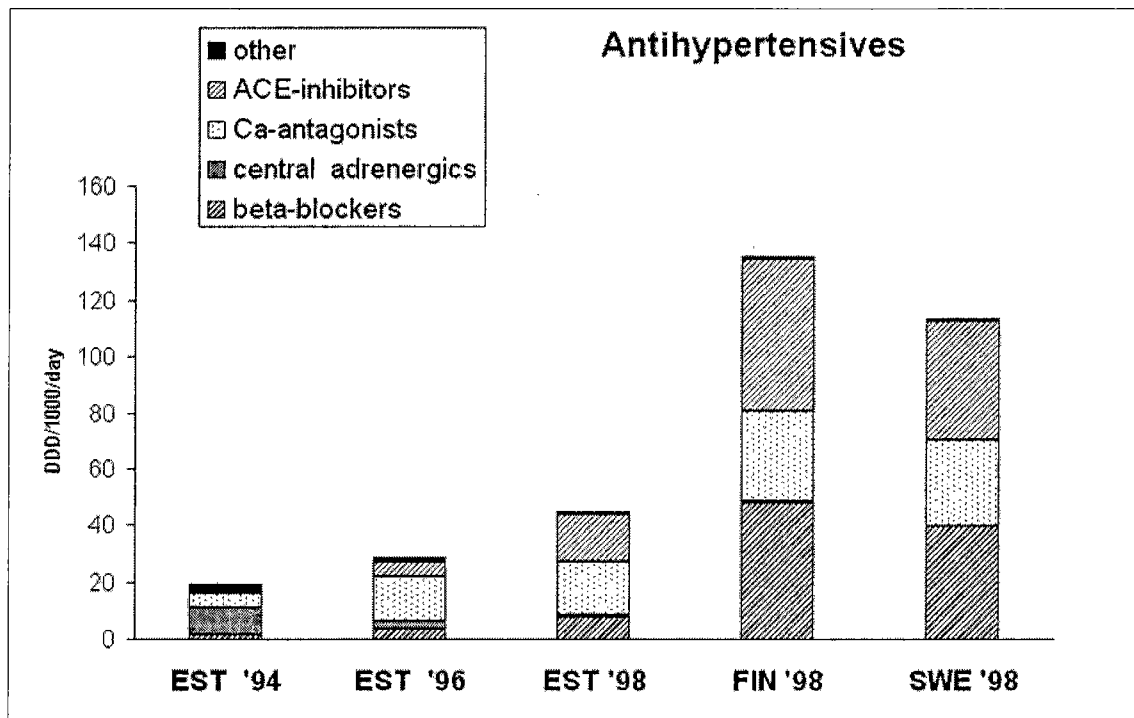
Drug statistics in Estonia

By the end of 1994, most wholesalers were using the ATC classification, which enabled the SAM to start compiling national drug consumption statistics based on the ATC/DDD system. All wholesalers had to report their sales twice a year to the SAM according to the Procedures for Wholesale Trade of Medicinal Products, valid since 1994. The structure of the sales data was also described in the Procedures. There were 25 licensed medicinal product wholesalers in Estonia in 1994. Since most of them were not able to report their sales electronically, a lot of work had to be completed before summarized statistics could be compiled.

The first Estonian Statistics on Medicines publication was based on wholesalers' reports for the year 1994. National consumption statistics were expressed as the number of DDDs per 1000 inhabitants per day (DDD/1000/day). Drug consumption expressed in this way can be used to gain a rough estimate of the number of patients exposed to a given drug. The drug consumption statistics were published both in the local language and English to permit international comparison. The DDD methodology correctly describes differences in levels of drug use and choice of drugs. The number of DDDs per 1000 inhabitants per day has been used to measure and document the difference between national and international use of various drugs.

Comparison of drug consumption

Comparison with the data obtained with other Nordic Countries only only only only only only shows big differences in some therapeutic groups. For example, the use of beta-blockers, anticoagulants and inhalation anti-asthmatic drugs was considerably less frequent compared to the Nordic Countries. Many of the new groups of effective drugs well known in Nordic Countries were used in modest quantities, if at all (for example, antihypertensives, Figure 1). On the other hand, several drugs were widely used in Estonia although they were not considered to be the drugs of choice

Figure 1. Antihypertensives (expressed as DDD/1000/day)

in the Nordic Countries because of their high risk/benefit ratio. As shown in Figure 1, the consumption of antihypertensives in Estonia was compared to the use of the same drugs in Finland and Sweden. In 1994, the most used medicines for treatment of hypertension in Estonia were central adrenergic agents (mostly reserpine), which were no longer actively used in other Nordic countries. The use of antihypertensive drugs in Estonia doubled during the period 1995–1998, but was still lower than in Finland and Sweden in 1998 although there are no data to indicate that the incidence of hypertension is lower in Estonia than in other Nordic countries. Beta-blockers, ACE-inhibitors and calcium-channel blockers had already replaced the older antihypertensive agents.

Annual drug consumption data

Once the national drug use patterns are known, utilization data should be monitored over time, documenting the changes and evaluating the patterns by relevant comparisons. Estonian drug consumption data have been published annually since 1994. The complete data were made available a year later.

As the medicinal products market develops, the statistics available a year later are no longer up to date. As a result, a more timely system had to be developed. In co-operation with wholesalers, it was decided that the SAM would create new software and wholesalers would present data both in monetary value and by volume units quarterly. The aim of the SAM in developing the new programme was to summarize, correct and analyse wholesaler's data and create statistical reports in different formats.

The new software was introduced at the beginning of 1999 and the wholesale data of 1998 were collected. The software is able to create a variety of different reports quarterly and makes it possible to compare drug consumption and expenses. Some of the reports are available on the SAM web-side at <http://www.sam.ee>.

Thus, the possibilities of drug utilization studies have been extended, and studies can be carried out in a more timely manner. Quarterly data of drug consumption is available in ATC/DDD format and also in monetary values. The statistics based on

ATC/DDD can also provide data about the sale of prescription-only medicinal products or over-the-counter (OTC) products, differentiation between retail pharmacies or hospital sales, consumption of medicinal products with marketing authorizations and products used on a named-patient basis.

Regularly obtained drug consumption data can be used for evaluating the influence of different health policy decisions. For example, the importation of medical products containing phenacetin was not allowed in Estonia as of 1997 because of the adverse reaction profile. As a consequence, the use of phenacetin decreased and the consumption of ibuprofen as an alternative OTC analgesic increased very rapidly.

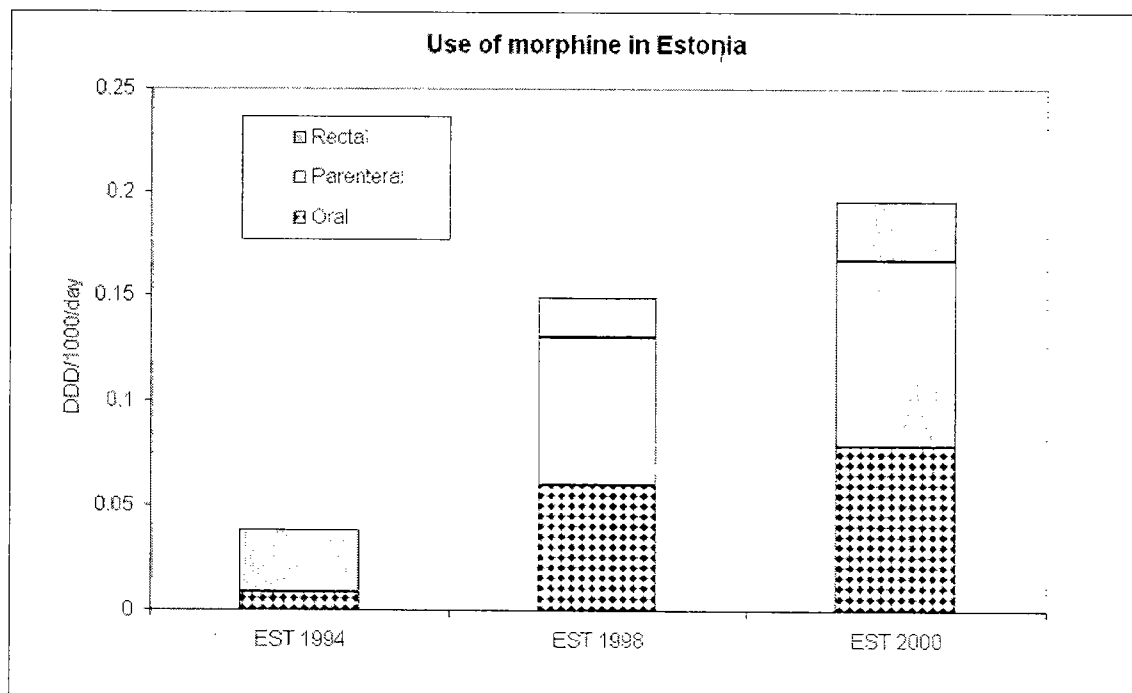
Since 1999, medicinal products containing metamizole were added to the list of prescription-only medicines because of a high risk of serious adverse reactions. Enteral metamizole was widely used in Estonia as an OTC drug and was one of the most popular analgesics. The use of tablets containing metamizole has decreased in 2000 compared to 1999.

The present drug reimbursement scheme based on obligatory patient co-payment was introduced in Estonia in 1993. The drug consumption data of 1994 and 1995 were able to show the impact of the new system, although it was very difficult to explain why the use of prescription only medicines (covered by at least 50% reimbursement) increased more slowly than the use of OTC products.

Drug utilization monitoring has been helpful in follow-up of all changes in the list of reimbursement products, e.g. to evaluate the validity of the assumptions made by the authorities before the change was introduced. Therefore, data from drug utilization studies can be used to measure the effects of drugs on overall health care costs and resource consumption. These data are fundamental to pharmaco-economic evaluation as they can provide real-life estimates of drug use prevalence, effectiveness, compliance and safety.

Data on the use of drugs have been regularly considered when taking decisions on regulatory matters, in reimbursement policy, in teaching and in the development of formularies. As an example, the use of morphine and other opiates is relatively low

Figure 2. Morphine (expressed as DDD/1000/day)



in Estonia, but has increased year by year. During the Soviet period, morphine was prescribed for cancer pain only for terminally ill patients and administered mainly by injection. There have been a lot of different workshops and meetings for doctors explaining the need for narcotic analgesics to provide better control of cancer pain. As a result, the consumption of morphine has increased approximately five times and half of the morphine used in 2000 was administered enterally or rectally (Figure 2). Correct statistics are vital in identifying problem areas and following-up the impact of interventions.

Conclusion

- The ATC classification is essential to drug utilization studies and to support regulatory decisions, reimbursement policy, under- and postgraduate teaching, and in the development of formularies.
- The ATC classification of medicinal products is simple to use.
- Implementation of a classification system on a national basis requires more time and dedication than financial resources.

- The ATC/DDD system provides the means to create national statistics, which can be compared historically with other countries.

References

1. WHO Collaborating Centre for Drug Statistics Methodology. *Guidelines for ATC classification and DDD assignment*, Oslo, 2000.
2. Kiivet, R.A., Bergman, U., Rootslane, L., Rago, L., Sjoqvist, F. Drug use in Estonia in 1994–1995: a follow-up from 1989 and comparison with two Nordic countries. *European Journal of Clinical Pharmacology*, **54**(2): 199–224 (1998).
3. Suomen Lääketilasto 1994 (Finnish Statistics on Medicines). National Agency for Medicines and Social Insurance Institution, Helsinki 1995.
4. Suomen Lääketilasto 1999 (Finnish Statistics on Medicines). National Agency for Medicines and Social Insurance Institution, Helsinki 2000.
5. Svensk Läkemedelsstatistik 1994 (Swedish Statistics on Medicines) Apoteksbolaget AB, Stockholm, 1995.
6. Svensk Läkemedelsstatistik 1999 (Swedish Statistics on Medicines) Apoteksbolaget AB, Stockholm, 2000.