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SYMPOSIUM PROCEEDINGS

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SYMPOSIUM PROCEEDINGS
COLLEGE OF PHARMACY, DALHOUSIE UNIVERSITY

"DEVELOPING, VALIDATING AND APPLYING PRESCRIBING INDICATORS: EXPERIENCE FROM CANADA AND ABROAD"

June 1-2, 2009

Halifax, Canada

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PRESCRIBING INDICATORS: WHAT CAN CANADA LEARN FROM EUROPEAN COUNTRIES?

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ABSTRACT

Background
Drug therapy can improve patients' quality of life and health outcomes; however, underuse, overuse and inappropriate use of drugs can occur. Systematic examination of potential opportunities for improving prescribing and medication use is needed.

Objective
To convene a diverse group of stakeholders to learn about and discuss advantages and limitations of data sources, tools and methods related to drug prescribing indicators; foster methods to assess safe, appropriate and cost-effective prescribing; increase awareness of international organizations who develop and apply performance indicators relevant to Canadian researchers, practitioners and decision-makers; and provide opportunities to apply information to the Canadian context.

Methods
Approximately 50 stakeholders (health system decision-makers, senior and junior researchers, healthcare professionals, graduate students) met June 1-2, 2009 in Halifax, Canada. Four foundational presentations on evaluating quality of prescribing were followed by discussion in pre-assigned breakout groups of a prepared case (either antibiotic use or prescribing for seniors), followed by feedback presentations.

Results
Many European countries have procedures to develop indicators for prescribing and quality use of medicines. Indicators applied in diverse settings across the European Union use various mechanisms to improve quality, including financial incentives for prescribers.

Conclusion
Further Canadian approaches to develop a system of Canadian prescribing indicators would enable federal/provincial/territorial and international comparisons, identify practice variations and highlight potential areas for improvement in prescribing, drug use and health outcomes across Canada. A more standardized system would facilitate cross-national research opportunities and enable Canada to examine how European countries use prescribing indicators, both within their country and across the European Union.

Key Words: *Drug utilization; prescribing indicators; quality indicators; collaboration; internationality*

INTRODUCTION

A decision-maker/researcher exchange symposium, *Developing, Validating and Applying Prescribing Indicators: Experience from Canada and Abroad,* was held on June 1-2, 2009 in Halifax, Canada at the College of Pharmacy, Dalhousie University with ~50 participants and key Canadian and international speakers to discuss currently available prescribing indicators and their strengths and limitations. The purpose of this paper is to present an overview and discussion of the issues addressed at this symposium and to provide further discussion regarding the application of insights gained at this meeting to the Canadian context.

In 2007 annual per capita spending on drug therapy in Canada was approximately $770;[1] the average individual received 13 prescriptions and seniors over 80 years of age filled an average of 74 prescriptions.[2] Drug therapy can improve patients' quality of life and health outcomes; however, underuse, overuse and inappropriate use of drugs can occur. For example, five to twenty-three percent of drug-related hospitalizations have been linked to inappropriate prescribing, transcription errors and failure to satisfactorily monitor drug treatment.[3] These data are not unique to Canada; suboptimal prescribing, which may cause regional variations in drug use, adverse clinical, economic and humanistic outcomes, unnecessary and inappropriate drug use, dangerous drug combinations, missed opportunities for beneficial therapy and unintended harm, exists worldwide. The extent of suboptimal prescribing in Canada and its effect on patient outcomes and on health care system costs, including the affordability of prescription drugs, are not systematically captured.[4,5] Systematic examination of potentially inappropriate prescribing or medication misuse by patients is needed.

Prior to the 1960s, drug utilization studies were conducted primarily for marketing purposes and data were not widely available to researchers or health authorities.[6] During the 1960s, factors, including the availability and marketing of new drugs, increased consumption of drugs. Concern developed regarding variations in prescribing patterns, adverse reactions and cost implications of increased volumes of prescribed drugs which stimulated interest in drug utilization research. This focus led to the development of Pharmacoepidemiology.[7] Pharmacoepidemiology is defined as "the study of the use of and the effects of drugs in large numbers of people"[8] (pg 3). In North America and Europe differences in health care systems and in the availability and accessibility of data sources resulted in different approaches to drug utilization research; North American studies were often based in individual hospitals and conducted for purposes of quality improvement, while European studies focused on regional and national comparisons.[6,9]

As a result of the increased interest in drug utilization several methodological innovations were developed by researchers with the World Health Organization (WHO) and international researchers including: the development of an international drug classification system, the World Health Organization - Anatomical Therapeutic Classification system (WHO-ATC); a system to measure drug intensity - the Defined Daily Doses (DDD);[10] the development of a simple benchmark to flag potential problems in the quality of drug prescribing-the drug utilization 90% (DU90%);[11-15] the development of the Beers criteria to assess quality of prescribing medication in the elderly;[16-19] and other indicators to monitor drug use.[20-23] In addition, special interest drug utilization groups were formed to facilitate cross national drug comparisons, e.g. the European Drug Utilization Research Group (EuroDURG) and the International Society for Pharmacoepidemiology (ISPE) Special Interest Group on Drug Utilization.[24] EuroDURG has merged into ISPE and currently constitutes the Regional European network of ISPE special interest group for drug utilization (SIG DUR).[25] However, there has been limited Canadian participation.[26]

Canada

Canada's drug utilization research is varied and relatively limited. National initiatives are undertaken in Canada by the National Prescription Drug Utilization Information System (NPDUIS) (http://www.pmprbcepmb.gc.ca/english/View.asp?x=116), which was developed by the Canadian Institute for Health Information (CIHI) in consultation with the Patented Medicine Prices Review Board (PMPRB). It is managed by the Pharmaceuticals Department of Canadian Institute for Health Information (CIHI). There have been Canadian initiatives to develop drug utilization indicators using existing

aggregated administrative databases.[27] Researchers also use provincial administrative databases to examine prescribing trends and to link to outcomes data. These studies include descriptive analyses identifying potentially inappropriate prescribing or lack of adherence to clinical practice guidelines, the effect of educational programs to improve prescribing, evaluation of prescribing within a chronic disease, and the effect of administrative policies to improve prescribing.[5,28-47]

The University of British Columbia Centre for Health Services and Policy Research (CHSPR) (http://www.chspr.ubc.ca/) has produced two editions of The Canadian Rx Atlas, which provides a portrait of patterns of prescription drug use and costs across Canada[48] and for the province of British Columbia.[49] Other provinces have specific structures to study drug prescribing. For example, in Québec the Conseil du medicament, a legislated agency and research unit, reports to the Minister of Health and Social Services with advice on therapeutic value, fairness and cost-effectiveness of medications, and also promotes optimal medication use through their research unit (www.cdm.gouv.qc.ca). In addition, the Québec Network for Medication Use Research (RQRUM) was established to conduct studies to optimize the use of medicines in Québec (http://www.frsq.gouv.qc.ca/en/index.shtml).

The private sector has also undertaken and supported drug utilization studies, e.g. IMS/Brogan (www.imshealth.com) and others, with a focus on responding to the needs of the pharmaceutical industry as well as working with government insurance programs and academia.[50-52]

Canada has made some progress in examining performance indicators. For example, a recent four-province study examining the Beers Criteria (a validated tool for assessing quality of drug therapy in the elderly) was undertaken by the Canadian Institute for Health Information.[53] The importance of comparisons across regions, provinces and countries has been recognized,[54] and some work has been done in Canada with specific drug categories in specific provinces or in comparison with specific countries;[28,48,49,55,56] however, there appears to be limited capacity to undertake cross provincial and national comparisons. There is much to be learned from European countries where drug utilization research has developed more nationally organized approaches.

History of European Drug Utilization Research

Drug utilization research in Europe began earlier than in Canada and benefited from available and accessible aggregate data sources.[24] In 1969 a common classification for drugs and a common volume unit for purposes of comparison in drug utilization studies were proposed based on recommendations at a World Health Organization (WHO)/Euro symposium *Consumption of Drugs.* This was accomplished through the work of a small informal group of mainly northern European scientists.[57] They developed the anatomical therapeutic chemical (ATC) classification system for drugs and the DDD, a comparative unit of drug use robust across therapeutic populations.[24] The WHO ATC/DDD System can be used to describe drug utilization in populations, compare drug use across jurisdictions, identify potential drug related problems, and evaluate the impact of continuing professional development, formulary polices or regulatory changes.[58,59] The ATC/DDD System also provides a classification system for drugs as well as a denominator for determining the rate of reported adverse drug reactions (e.g. the WHO uses it to monitor ADR worldwide).[60]

In 1976, an informal Drug Utilization Research Group (DURG) was formed to encourage cross-national drug utilization studies based on the ATC/DDD methodology. This initiative was supported by publications of comparative drug utilization studies in the Nordic countries (where the WHO ATC/DDD methodology was adopted earlier) that revealed large differences in drug use over several therapeutic areas not attributed to differences in morbidity.[24] There has been ongoing support for drug utilization research using the ATC/DDD methodology by the World Health Organization (WHO-DURG) and at the European level (The European Drug Utilization Research Group (Euro-DURG)). The Euro-DURG, established in 1996 as an independent, umbrella organization for national drug utilization research (DUR) groups, continues to promote rational drug therapy through international communication and cooperation in drug use research and pharmacoepidemiology.[24,61]

Symposium Goals

The goals identified for the Symposium included:

- Convene a diverse group of stakeholders to learn about and discuss advantages and limitations of data sources, tools and methods related to drug prescribing indicators.
- Foster evaluation and research targeted to identification of safe, appropriate and cost effective prescribing.
- Encourage an international drug utilization community of practice (including Canadian researchers, graduate students and decision makers) to assess the impact of regulations, programs and policies that affect drug prescribing.
- Increase awareness of the role of international organizations that develop and apply performance indicators and discuss how this work is relevant to Canadian researchers, practitioners and decision makers.

LEARNING FROM EUROPEAN EXPERIENCES

Canada may learn from international endeavours regarding drug utilization, such as the development of prescribing indicators. We highlight three presentations by European researchers at the Symposium which illustrated the ongoing work in Europe on prescribing indicators, including theoretical work related to analysis and validation, application and cross-national comparisons using prescribing indicators.

1. PRESCRIBING QUALITY INDICATORS: ANALYSIS AND VALIDATION – THEORETICAL WORK AND AN EXAMPLE FROM DENMARK

Presented by: Dr. Morten Andersen, Senior Researcher Clinical Pharmacology, University of Southern Denmark, Denmark

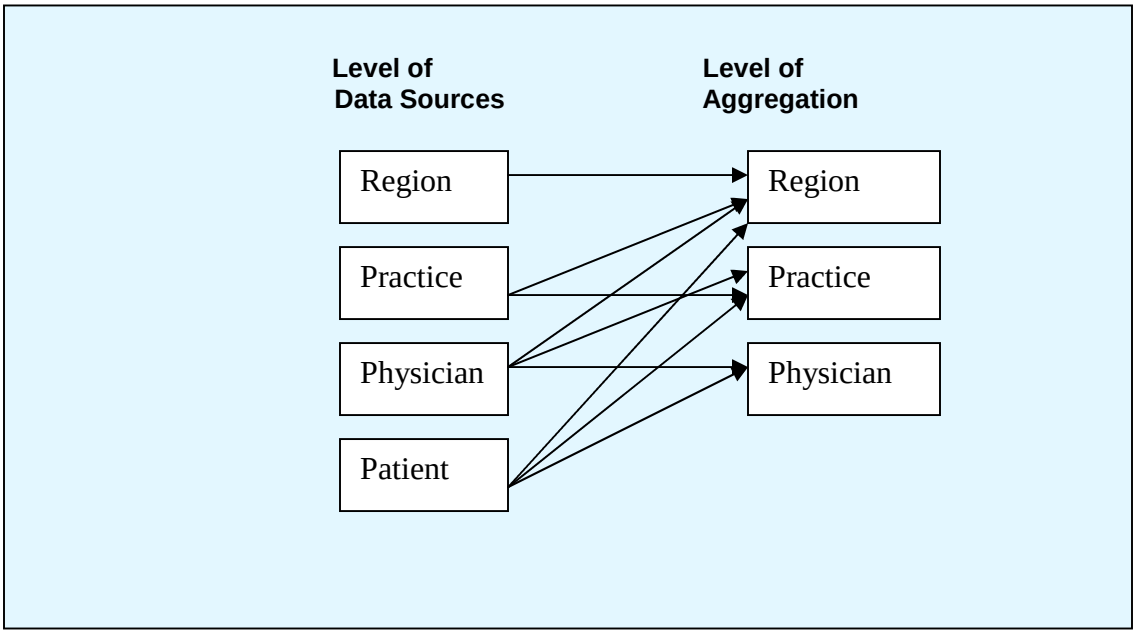
Background

The Danish Medicines Agency (www.dkma.dk) develops quality indicators for medications at a national level. A quality prescribing indicator is defined by Lawrence & Olesen (1997) as "a measurable element of prescribing for which there is evidence or consensus that it can be used to assess quality, and hence change in the quality, of treatment provided."[62] In essence, a quality prescribing indicator should assess if the right drug is prescribed to the right patient for the right condition.

Indicator Type and Use

The accessibility and availability of appropriate data determine the type and use of indicators. Data can be collected at the micro (individual physician and patient), meso (practice) and macro (regional and national) levels. It can be aggregated from the micro to the macro level. This is depicted in Figure 1.

FIG. 1 Measurement possibilities: different levels of data and different levels of aggregation



Source: Andersen, M. (June 2009). "Prescribing quality indicators: Analysis and validation". Presented at *A Symposium for Decision Maker/Researcher Exchange - Developing, validating and applying prescribing indicators: Experience from Canada*, College of Pharmacy, Dalhousie University, Halifax, Nova Scotia, June 1-2, 2009.

The type of indicators in health research range from those that facilitate comparisons to those that assess quality of services/outcomes.[63] Indicators are used in a variety of roles which range from the generation of research hypotheses to the monitoring and measurement of intervention effects and

measurement of true quality.[64,65] Within these roles, indicators can identify problems at macro, meso or micro level. The individualized nature of the micro-level data may present privacy and confidentiality concerns.

Indicator Validity

Figure 2 illustrates the relationship between the type of indicator, its use and validity. To be effective, indicators must actually measure what they claim to measure, i.e. they must be valid.[65] Within this context, four types of validity are identified for quality indicators: content validity; face validity; construct validity; and concurrent validity.[64-67] See Box 1.

FIG. 2 Relationship between type of indicator, its use and validity

Type of Indicator	Use of Indicator		Validity
Comparative indicators	Generating hypotheses	Identifying problems	Face validity and content validity
↓	Monitoring, measuring intervention effects	↓	Construct
Quality indicators	Measuring true quality	Identifying physicians or patients with suboptimal prescribing and medication use	Concurrent

Source: Adapted from Andersen, M. (June 2009). "Prescribing quality indicators: Analysis and validation". Presented at *A Symposium for Decision Maker/Researcher Exchange - Developing, validating and applying prescribing indicators: Experience from Canada*, College of Pharmacy, Dalhousie University, Halifax, Nova Scotia, June 1-2, 2009.

BOX 1 Four types of validity and their characteristics

Content validity:

In developing quality indicators for nonsteroidal anti-inflammatory drug (NSAID) use, the content validity was ensured[67] by:

- Involvement of an expert group
- A comprehensive literature search
- Support of current evidence based guidelines and recommendations

Face validity:

Face validity is related to the indicator's relevance, credibility and acceptability

- Delphi study of randomly selected Danish general practitioners[66]

Construct validity:

- Corresponding to theoretical concepts of quality
- Supported by a correlation and factor analysis of different indicators[64]
- Measures quality without bias or confounding
- Discriminative ability and sensitivity to change

Concurrent validity:

- In agreement with the best possible practice quality measure using available standard (gold standard)
- Agreement between register-based indicators and gold standard quality assessment using medical records.[67]

Comparing Indicators to a Gold Standard

The relationship between prescribing indicators and a gold standard for optimal treatment is illustrated in Table 1. Often prescribing quality indicators are based on easily accessible information from registers, e.g. prescription databases, where drug choice is compared to guidelines. These data, however, do not provide a perfect picture of treatment quality. Therefore it can be useful to compare register-based indicators to a gold standard based on more comprehensive clinical data obtained from medical records.

The gold standard assessment of optimal treatment may take into account disease severity, co-morbidity and contraindications. For a sample of patients, appropriate or inappropriate drug choice according to the prescription database can be compared to an assessment of optimal or sub-optimal treatment based on the clinical data. Agreement between the register-based indicator and the gold standard (concurrent validity) can be evaluated analogously to a diagnostic test[68] (Table 1).

TABLE 1 Agreement between an indicator and a gold standard

		Gold standard		**Total**
		Positive (optimal treatment)	**Negative (sub-optimal treatment)**	
Indicator	Positive (appropriate drug choice)	a	b	a + b
	Negative (inappropriate drug choice)	c	d	c + d
	Total	a + c	b + d	n

Sensitivity = a/a+c; Specificity = d/b+d; Positive predictive value (PPV) = a/a+b; Negative predictive value (NPV) = c/c+d

Source: Adapted from Altman DG. Practical Statistics for Medical Research. London; New York: Chapman and Hall, 1991

Areas for Concern

Certain types of validity can be of particular salience under specific circumstances. Andersen (2006) describes indicator validity studies based on asthma management and NSAID use.[65] For example, a validity problem can occur with the asthma indictor because of low indicator precision arising from a low number of patients to whom the indicators apply. This can take place when there is a large variation in the number of patients per condition across practices as well as a great variation in the practice size. Concerns regarding *content validity* should be raised when process indicators are used instead of outcome indicators. The evidence base must be explicit and the link between process and outcome must be clear.

There should be concern about *face validity* when indicators are used for feedback, interventions or comparisons between practices when there are structural and contextual differences among practices. Another reason for concern relates to *concurrent validity*, i.e., when the use of a drug depends on individual patient characteristics but administrative health care data are used as a proxy of indication, disease severity or co-morbidity.

In addition, indicator precision is particularly relevant in certain situations. For example, for direct comparisons between practices or between practices and a reference value (a standard or average), and for assessing change over time it is important that different values of the indicator are not only due to chance. Precision will be low when practices are small and the disease conditions are rare. There is often a trade-off between precision and discriminative abilities when choosing time periods for analysis.

2. DRUG UTILIZATION 90%: A KEY PRESCRIBING INDICATOR USED IN SWEDEN

Presented by: Dr. Ulf Bergman, Professor, Senior Medical Officer, Division of Clinical Pharmacology, Karolinska Institute, Karolinska University Hospital, Stockholm, Sweden

Background

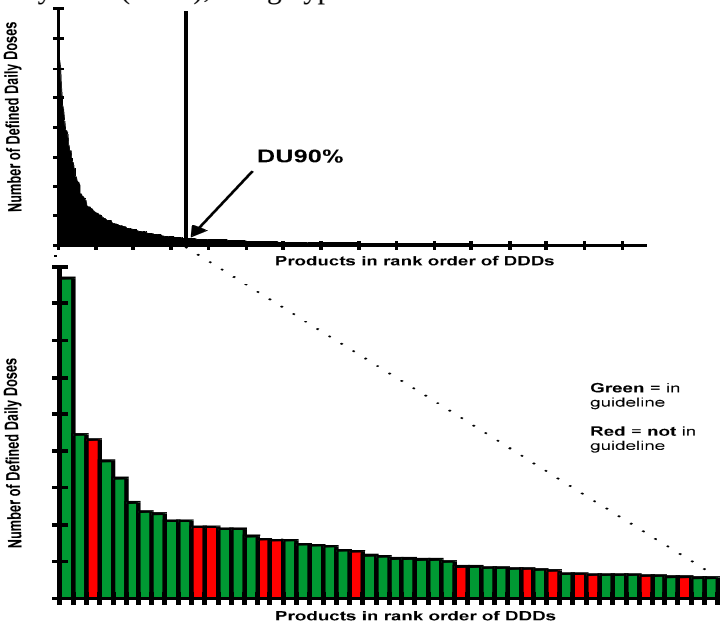
In 1999, the Swedish Medical Quality Council developed indicators focusing on three components: drug utilization; drug handling routines; and adverse drug reactions. These indicators also formed the basis of a prescribing quality report, which was piloted in clinics (e.g. cardiology, internal medicine, psychiatry, surgery and primary care) and found to be useful.[69,70]

The DU90%

One of the key indicators used in Sweden is the Drug Utilization 90% (DU90%). The DU90% is a calculated quantity that is defined as the number of drugs that account for 90% of the total volume of drug use.[11,12] Unlike a top 10 prescription list, the DU90% aggregates drugs across therapeutic categories and takes into account the prescribing volume (in DDDs) of drug use, and can be applied at the macro, meso or micro levels. It uses a simple methodology and is inexpensive, flexible and adaptable for comparative data. The DU90% can also be used to measure adherence to clinical practice guidelines or formulary policies.

Figure 3 provides a theoretical illustration of the DU90% concept.[11] The top diagram shows the number of drugs ranked by volume of DDD and the arrow indicates the number of drugs that reflect 90% of all DDDs within a specified time and at a specified level (e.g., individual prescriber, a Primary Health centre, a hospital or a clinic, a region or a country). DU90% is the area under the curve. The bottom diagram enlarges the DU90% segment to show the drugs listed in the guideline drugs (green) versus the non-guideline drugs (red). The measure of adherence is calculated as the percentage of the number of DDDs whether in the guideline or not in the guideline of the total number of DDDs in this segment. It can be selected for a specific drug class (ATC) or all drugs.

FIG. 3 Adherence to medication recommendations within drug utilization (DU90%), drug products in rank order of defined daily dose (DDD), using hypothetical data



Source: Bergman U, Popa C, Tomson Y, Wettermark B, Einarson TR, Sjöqvist F. Drug utilization 90% -a simple method for assessing the quality of drug prescribing. Eur J Clin Pharmacol 1998;54:113-118. Reproduced with permission.

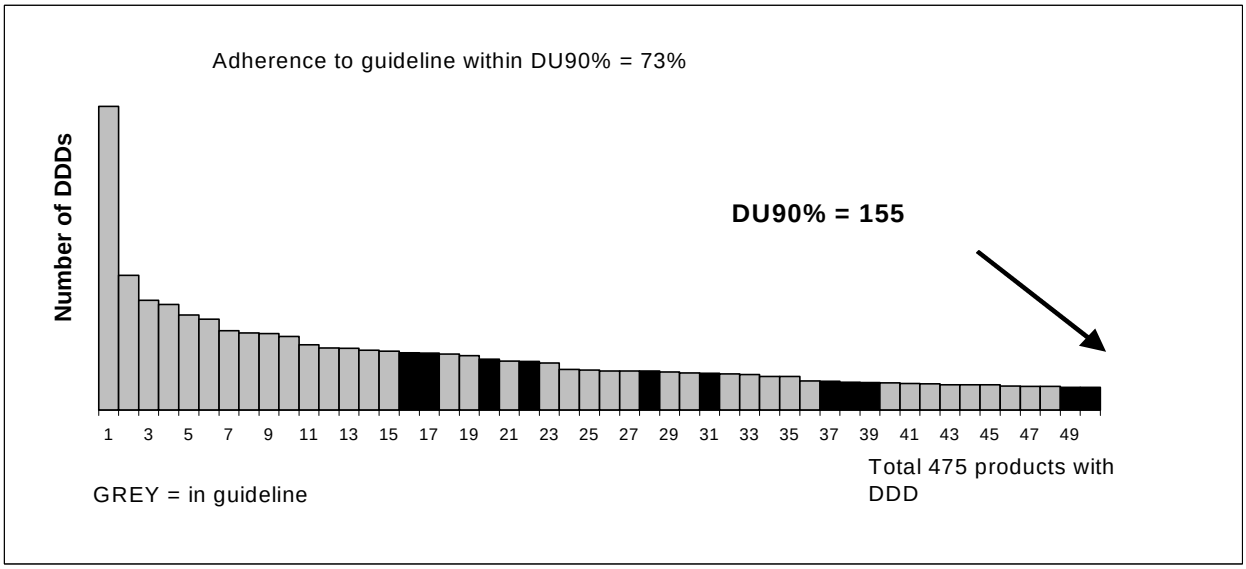
FIG. 4 (A and B) The drug utilization 90% (DU90%)/drug cost 90% (DC90%) drug profile for a primary health care (PHC) centre, Sweden

FIG. 4A

Prescribing profile
DU90%
Drug Utilization

Prescriber: **PHC centre studied**
Patient residency: **All**
Patient age & sex: **All**
Guideline: **Wise List 2002**

Period: **Oct-Dec 2002**
Therapeutic area: **All with DDDs**
ATC-code(s): **A-C & G-V**
Source: Dispensed prescriptions
Nat. Corporation of Pharmacies



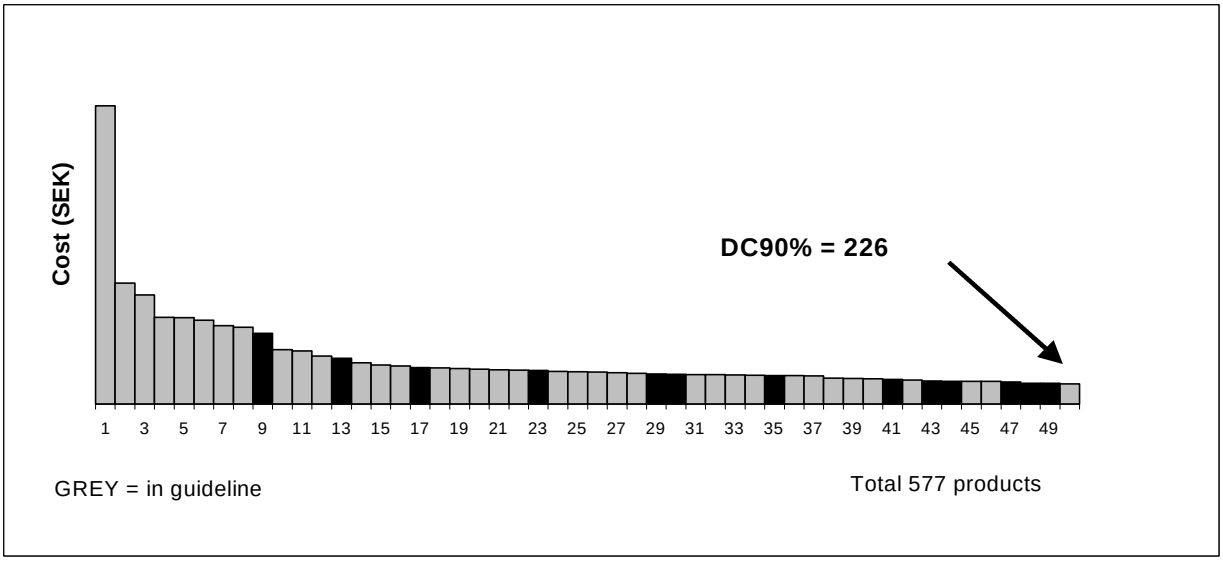
	PHARM. PRODUCT	SUBSTANCE	(DDD)	DDD	% TOT	Rx	COST (SEK)	SEK/DDD
1	**TROMBYL**	low dose aspririn	1 tabl	24 989	7,3%	258	9 390	0,38
2	**ZOCORD**	simvastatin	15 mg	11 088	3,3%	94	99 535	8,98
3	**LEVAXIN**	levothyroxine	0,15 mg	9 036	2,7%	154	10 307	1,14
4	**BEHEPAN**	cyanocobalamin	1 mg	8 691	2,6%	101	11 865	1,37
5	**ATENOLOL NORDIC**	atenolol	75 mg	7 808	2,3%	131	10 888	1,39
6	**LASIX RETARD**	furosemide	40 mg	7 492	2,2%	73	9 816	1,31
7	**TRIATEC**	ramipril	2,5 mg	6 538	1,9%	27	18 168	2,78
8	**PLENDIL**	felodipine	5 mg	6 351	1,9%	72	28 863	4,54
9	**ZOPIKLON NM**	zopiclone	7,5 mg	6 305	1,9%	131	9 516	1,51
10	**PULMICORT TURBUH.**	budesonide inhal.	0,8 mg	6 075	1,8%	86	36 470	6,00
11	**GLIBENKLAMID NM**	glibenclamide	7 mg	5 357	1,6%	65	11 378	2,12
12	**STILNOCT**	zolpidem	10 mg	5 110	1,5%	107	16 048	3,14
13	**ENALAPRIL RATIOP.**	enalapril	10 mg	5 074	1,5%	42	7 522	1,48
14	**FUROSEMID RECIP**	furosemide	40 mg	4 912	1,4%	27	2 440	0,50
15	**SELOKEN ZOC**	metoprolol	0,15 g	4 849	1,4%	124	28 039	5,78
16	ENALAPRIL BIOCHEMIE	enalapril	10 mg	4 723	1,4%	48	6 911	1,46
17	TRIOBE	vitamin B-complex	1 tabl	4 698	1,4%	53	10 077	2,14
18	**SALURES**	bendroflumetiazide	2,5 mg	4 600	1,3%	43	4 614	1,00
19	**FEM-MONO RETARD**	isosorbide mononitrate	40 mg	4 500	1,3%	31	5 246	1,17
20	IMDUR	isosorbide mononitrate	40 mg	4 181	1,2%	50	6 729	1,61
...								
155								
DU90%	**1-155**			306 939	90,1%	4 664	1 007 811	3,28
	156-475			33 869	9,9%	1 130	292 190	8,63
TOTAL	**1-475**			**340 808**	**100,0%**	**5 794**	**1 300 001**	**3,81**

Bold = in guideline
Drugs and products without DDD exluded (102, corresponding to 91 252 SEK)

FIG. 4B

Prescribing profile
DC90%
Drug Cost

Prescriber: **PHC centre studied** Period: **Oct-Dec 2002**
Patient residency: **All** Therapeutic area: **All**
Patient age & sex: **All** ATC-code(s): **A-V**
Guideline: **Wise List 2002** Source: Dispensed prescriptions
Nat. Corporation of Pharmacies



	PHARM.PRODUCT	SUBSTANCE	(DDD)	COST	% TOT	Rx	DDD	SEK/DDD
1	**ZOCORD**	simvastatin	15 mg	99 535	7,2%	94	11 088	8,98
2	**LANZO**	lansoprazol	30 mg	40 381	2,9%	84	3 864	10,45
3	**PULMICORT TURB.**	budesonide inhal.	0,8 mg	36 470	2,6%	86	6 075	6,00
4	**CIPRAMIL**	citalopram	20 mg	28 935	2,1%	47	4 046	7,15
5	**PLENDIL**	felodipine	5 mg	28 863	2,1%	72	6 351	4,54
6	**SELOKEN ZOC**	metoprolol	0,15 g	28 039	2,0%	124	4 849	5,78
7	**COZAAR**	losartan	50 mg	26 132	1,9%	40	3 360	7,78
8	**FOSAMAX VECKOT.**	alendronic acid	10 mg	25 650	1,8%	29	2 268	11,31
9	LIPITOR	atorvastatin	10 mg	23 589	1,7%	18	3 998	5,90
10	**TRIATEC**	ramipril	2,5 mg	18 168	1,3%	27	6 538	2,78
11	**PRAVACHOL**	pravastatin	20 mg	17 700	1,3%	15	2 254	7,85
12	**STILNOCT**	zolpidem	10 mg	16 048	1,2%	107	5 110	3,14
13	SUBUTEX	buprenorphine	1,2 mg	15 283	1,1%	17	238	64,21
14	**MIXTARD 30/70**	insuline	40 IE	13 782	1,0%	28	1 519	9,07
15	**CITALOPRAM RATIOP.**	citalopram	20 mg	13 066	0,9%	36	2 990	4,37
16	**KÅVEPENIN**	phenoxymethyl-pc	2 g	12 758	0,9%	128	1 267	10,07
17	ZOLOFT	sertraline	50 mg	12 220	0,9%	13	1 477	8,27
18	**VIAGRA**	sildenafil	50 mg	12 064	0,9%	14	212	56,91
19	**BEHEPAN**	cyanocobalamin	1 mg	11 865	0,9%	101	8 691	1,37
20	**FOSAMAX**	alendronic acid	10 mg	11 677	0,8%	12	1 036	11,27
...								
226								
DC90%	**1-226**			1 252 727	90,0%	5 359	306 483	4,09
	227-577			138 526	10,0%	1 025	34 325	4,04
TOTAL	**1-577**			**1 391 253**	**100,0%**	**6 384**	**340 808**	**4,08**

Bold = in guideline

Source: Wettermark B, Nyman K, Bergman U. Five years' experience of quality assurance and feedback with individual prescribing profiles at a primary healthcare centre in Stockholm, Sweden. Quality in Primary Care 2004; 12:217-226. Reproduced with permission.

Legend: DDD (daily defined dose); TOT (total); Rx (dose); SEK (Swedish krona)

Note: DU90% is the number of drugs constituting 90% of all drug volume expressed in DDDs; DC90% is the number of drugs constituting 90% of total drug costs.

Application of the DU90%

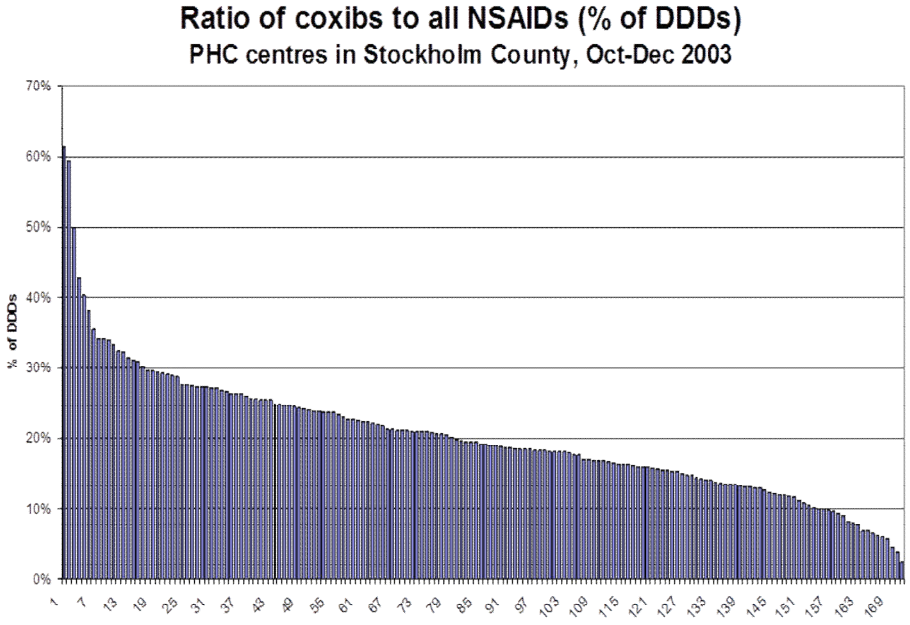
The Stockholm County Council, a local initiative in Stockholm, produced a "Wise Drug List" (www.janusinfo.se) which contains 200-250 mainly first line drugs for common disorders. This list is available to both physicians and patients, which enables them to compare their practice with other practices and with county and/or national standards.[69,71] Incorporating the Drug Cost 90% (DC90%), which uses cost as the measurement unit, into the profile provides another way to present prescribing patterns. Figure 4 provides a DU90%/DC90% prescribing profile which shows the number of drugs that represent 90% of the volume of use in DDDs and 90% of overall drug costs for a specific Primary Health Care Centre in Stockholm.[72] Drugs on the recommended guideline list are in grey.

Current Status

In Sweden, work is ongoing to better integrate clinical and prescribing data and to help physicians improve their prescribing for better patient outcomes.[69,71] Godman et al (2009) describe the strategies developed, implemented and being assessed in two of the largest four counties in Sweden (i.e., Stockholm and Östergötland). One example of ongoing initiatives in the Stockholm County Council is academic detailing which provides information to doctors and pharmacists and is supplemented with computerized information and a feedback system called JANUS.[69,71]

Sweden has established national quality and accountability initiatives, including a national prescription register,[73] and the transfer of the responsibility for examining drugs used and drug costs from the national to the regional level.[71] Quality improvement activities occur at the level of the Drug and Therapeutics Committees (DTC) which are joint initiatives of the primary care and the hospital sectors.[74] These activities allow tracking the ratio of use of newer drugs, e.g. selective cyclooxygenase-2 inhibitors (coxibs) to standard drugs, e.g., all non-steriodal anti-inflammatory drugs (NSAIDs). Figure 5 illustrates a report on the ratio of coxibs to all NSAIDs in percent of defined daily dose (DDD).

FIG. 5 Ratio of cyclooxygenase-2 inhibitors (coxibs) to all non-steroidal anti-inflammatory drugs (NSAIDs) in % of defined daily doses (DDDs) for primary health centres (PHCs) in Stockholm County, Oct-Dec 2003



Source: National Prescription register, Apoteket AB
Legend: NSAIDs - non-steroidal anti-inflammatory drugs
Y axis – Percent DDD (defined daily dose)
X axis – 175 primary health care (PHC) centres in Stockholm County, Sweden

In addition, pilot projects are ongoing to help primary care physicians better understand their data. For example, Box 2 illustrates the transfer of the accountability process for the county of Stockholm, Sweden.

BOX 2 An illustration of the prescribing accountability transfer process for county of Stockholm, Sweden

The county of Stockholm with 2 million inhabitants has:

- One central Drug and Therapeutics Committee (DTC) – a central committee taking all the policy decisions in the county
- Five (5) local Drug and Therapeutics Committees (DTCs) that implement the decisions made by the central DTC
- 175 primary health care centres (PHC), with on average 5-6 general practitioners/prescribers in each centre
- Each PHC annually receives a DU90%/DC90% prescribing profile as a basis for writing a quality of drug prescribing report[69], which is illustrated in Figure 4.

Source: Gustafsson LL, Wettermark B, Godman B, et al. for the Regional Drug Expert Consortium. The 'wise list' – A comprehensive concept to select, communicate and achieve adherence to recommendations of essential drugs in ambulatory care in Stockholm. Basic & Clinical Pharmacology & Toxicology, 2011; 108: 224-233.

3. CROSS-NATIONAL COMPARISONS USING PRESCRIBING INDICATORS: A EUROPEAN PROJECT

Presented by: Dr. Vera Vlahović-Palčevski, Department of Clinical Pharmacology, University Hospital, Rijeka, Croatia

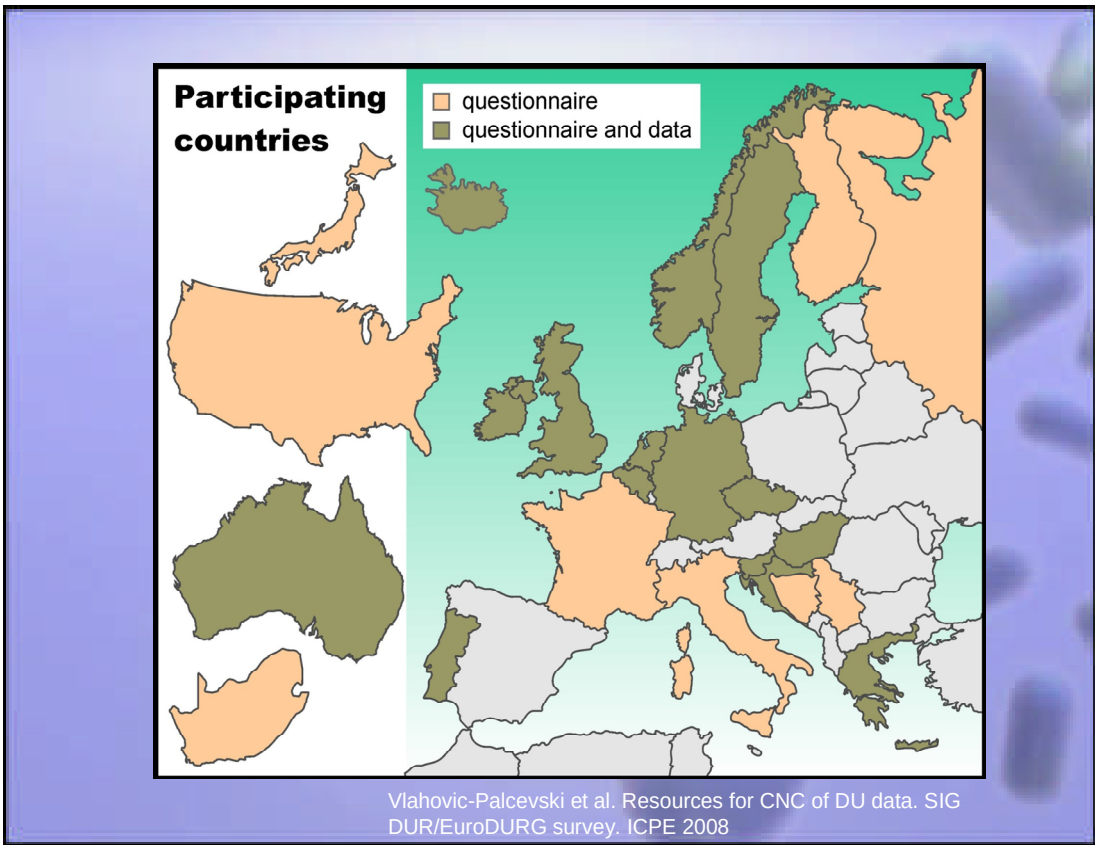
Background

There is increasing relevance of cross-national comparisons in drug utilization research (DUR) because of the joint trends of globalization and health related inter-regional/county travel. In 2008, a project was initiated to collect worldwide information on national drug utilization monitoring systems to facilitate international cooperation in the development of cross national comparisons of patterns of drug use.

The Process

An initial step was to assess the feasibility of collecting cross national drug consumption data and to evaluate the level of sophistication of the process of data collection in each country.[75] The project collected information from 24 participating countries (15 countries from the European Union, Australia, South Africa, Japan, Russia, United States and other countries); however, only 14 of these 24 countries provided drug utilization data in addition to completing the questionnaire on DUR activities as illustrated in Figure 6.

FIG. 6 Comparison of drug utilization data of participating countries: Results of ISPE SIGDUR/EuroDURG Survey



24 Countries

24 Question-naires

14 DUR data

Country	Abbr.	Surface 1000km2	Population millions	Questionnaire	DUR data
Australia	AU	7741	20.6	X	
Belgium	BE	30	10.4	X	X
Bosnia	BA	51	4.6	X	
Croatia	HR	56	4.5	X	X
Czech Republic	CZ	79	10.2	X	X
Finland	FI	338	5.1	X	
France	FR	547	60.8	X	
Germany	DE	357	82.4	X	X
Greece	GR	132	10.7	X	X
Hungary	HU	93	9.9	X	X
Iceland	IS	103	0.3	X	
Ireland	IR	70	4.2	X	X
Italy	IT	301	58.1	X	
Japan	JP	378	127.3	X	
Netherlands	NL	41	16.6	X	X
Norway	NO	385	4.6	X	X
Russia	RU	17075	140.0	X	X
Portugal	PT	92	10.6	X	X
Serbia	RS	77	10.5	X	
Slovenia	SI	20	2.0	X	X
South Africa	ZA	1220	43.8	X	
Sweden	SE	450	9.0	X	X
UK	UK	243	60.9	X	X
USA	US	9629	303.8	X	

Source: Cross comparison of drug utilization data for participating countries: Results of ISPE SIGDUR/EuroDURG Survey. Presented at the 24th International Conference on Pharmacoepidemiology, Copenhagen, Denmark, August 17-20, 2008.

Lessons from the Project

Although useful information was collected, the process was time consuming with limited collaborative effort internationally. Only 14 countries were able to deliver data and the ability to check the validity of that data was limited by time constraints and a high variability in sophistication of DUR data among the participating countries, which limits the potential for international comparisons. Even with the limited data, fundamental trends and variability among countries were evident; these observations brought into question the efficacy of interventions to control drug prescribing.

This project also highlighted the importance of being able to make cross country comparisons in this era of globalization. Further, the project underscored the need for standardized methods for data collection and aggregation; such standardisation would lessen the need for statistical manipulation of the data to facilitate comparisons across jurisdictions. Finally, the World Health Organization ATC/DDD methodology was found to be the most applicable strategy for cross-national comparisons.

In summary, the long term objectives of cross national comparisons of drug use are: to stimulate worldwide use of WHO indicators of rational drug use; to further develop internationally acceptable indicators of quality drug prescribing; to establish cross national programs that monitor use of specific drugs; to facilitate recording of drug use in cross national epidemiological disease registers; and to enhance comparability of data on drug exposure (e.g. volume, expenditures and quality) in international databases.

LESSONS FOR CANADA FROM INTERNATIONAL EXPERIENCES WITH PRESCRIBING INDICATORS

The need for countries to standardize their prescribing data for purposes of international comparison was highlighted in the challenges faced by the *Cross-National Comparisons Using Prescribing Indicators: A European Project*.[75] Standardized data across Canadian provinces/territories used by a pan-Canadian network of researchers, health professionals, managers and patient groups would facilitate comparisons of prescribing approaches, patients' drug use and patients' outcomes and highlight promising practices for other Canadian regions and international jurisdictions. There are several steps required for Canada to develop this capacity.

First, to have standardized data Canada must develop organizational structures and frameworks conducive to the collection of data that can be standardized across federal/provincial/territorial jurisdictions, diverse practitioners (physicians, nurse practitioners, pharmacists, etc.) and health care organizations. Once data is standardized, baseline data can be used for benchmarking. Canadian jurisdictions (i.e., provincial/territorial pharmacare programs, federally sponsored drug benefit programs) and private plans do not have uniform drug formularies. There is also inconsistency in the coding for various levels of benefit, criteria for reimbursement and patient cost sharing mechanisms. Unfortunately, detailed information is not readily accessible to researchers, although some information sources exist (e.g., www.drugcoverage.ca operated by Plasmid Biocommunications Inc., etc) and some public efforts are being made to compare drug use across Canada (e.g., Canadian Institute for Health Information).

Second, the data produced must have standards of quality assured across all jurisdictions along with a coordinated methodology for collection, data auditing, storage and access. Individual health professionals, practice groups, district health authorities, provinces and countries may have different capacities to collect data and also different preferences for the type of indicators developed and methods of presentation and feedback based on their political and clinical contexts.[76] Quality indicators developed by international or national organizations would therefore require testing prior to local/provincial implementation. To be able to apply results of drug utilization, decision makers and prescribers must be aware of and understand the rationale underlying quality prescribing indicators and how their application can improve health outcomes for Canadians. The process must be both transparent and accountable.

Third, quality indicators must be both valid and reliable; and when possible, be linked to appropriate health outcomes. Further, the process of indicator development must have the flexibility to respond to changes in scientific evidence.

Fourth, indicators need to be interpreted within the context of patient overall health and well-being. Patient outcomes are complex. There are intrinsic individual differences that can impact patient outcomes (e.g., demographic characteristics, patient preferences and values, health related behaviours and activities, financial and social support resources, etc.). Risk adjustment would account for some of the effect of these factors and should be a component of outcome-based performance measures.[77]

In addition to the above points identified during the workshop, there are other considerations that need to be recognized.[78,79] First, it is important to recognize stakeholders, e.g., government, regulators, payers, purchaser organizations, patients and citizens, have data requirements. Second, a focus on a specific indicator may have unanticipated consequences, e.g., aspects of the health system without indicators may be neglected or manipulation of the performance indictor system may occur.[76] Third, while process measures may be more appropriate in the short term, long term improvement in patient health outcomes is also needed.[76] For example, it may take years before the effects of an intervention are apparent, e.g., the use of statins for the prevention of cardiovascular disease. Fourth, efficiency and equity are additional determinants of prescribing quality that need to be measured.[76]

CONCLUSION

Canada needs approaches to encourage and facilitate the development of a more standardized system of prescribing and quality use of prescribing indicators across the country. Such a system would encourage and enable Canadian provincial/territorial and international comparisons of prescribing practices that would identify practice variations and highlight the potential to improve prescribing and drug use leading

to improved health outcomes across Canada. A more standardized system would also facilitate cross-national research opportunities for Canada.

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