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Towards an effective access into Polish national health data – just a step away from a wealth of information

MPH Anna Zapalska
NUEVO HTA s.c.

MPharm, MBA Dominik Dziurda
GSK Services Sp. z o.o.

Zygmunt Podolec
Research and Development Centre MEDINET

MPH Dagmara Tronczyńska
GSK Services Sp. z o.o.

on behalf of the Epidemiology and Cost of Illness Section of Polish Pharmacoeconomics Society

Abstract

Background: Public health institutions (National Health Fund -NFZ, Social Insurance - ZUS, National Institute of Hygiene - PZH) gather population-based, real-time, extensive set of data, characterizing the health status and behaviour of individual patients in relation to health care resources spending pattern. The accessibility of the data for scientific purposes would be a significant step towards optimization of expenditure and assimilation of innovation. Furthermore, improved availability of pharmacoepidemiological and health-related data has been set as one of the strategic goals of The Section of Epidemiology and Cost of Illness of Polish Pharmacoeconomics Society - PTFE.

Methods: To show the value of widely-available comprehensive data analysis platform, and to initiate a debate addressing this issue. Non-systematic review of relevant papers dealing with the problem in question has been conducted with special focus on available Polish studies.

Results: A few general areas are characterized by a direct link between effective data availability and practical measures taken to optimize expenditure and rationalize innovation assimilation, namely: availability of comprehensive multi-perspective burden of illness studies, accurate identification of complex health care demands through description of co-morbidity patterns, continuous monitoring of treatment patterns enabling the detection of irregularities and implementation of treatment-optimizing mechanisms, as well as the identification of associated phenomena which affect expected treatment effectiveness (compliance) in order to design comprehensive solutions addressed for specific subpopulations of patients. Major obstacles significantly restricting the utilization of data from Polish health care system include: lack of direct link between reported expenditure and covered population in available sources, lack of unique drug record within the system, complex decision-making process leading to merging different public sources into one comprehensive picture.

Conclusion: Data collected by public health institutions represent a valuable source of information enabling real-time monitoring of population health status: co-morbidity patterns, burden of illness, compliance, and therapeutic patterns. Analyses based on a comprehensive and actual data will help to define health priorities, allowing the appropriate allocation of financial resources in order to achieve the desired effects with regards to public expenditure and dynamic access to innovations.

Key words: Pharmacoepidemiology, Quality of Health Care, Data Mining,

Introduction

Recent experiences, Polish but also those considered long-term in nature originated from other countries, clearly indicate that the databases managed by public health institutions (National Health Fund - NFZ, National Institute of Hygiene - PZH, Social Insurance - ZUS) are a valuable source of strategic information. Analyses using the data collected by the public institutions include the whole population, not only a predefined group of patients, as is usually the case in the surveys.

According to the Act on Healthcare Services Financed from the Public Funds, the National Health Fund has the right to process personal data of insured persons with the focus on monitoring the patients' state of health and the needs of the insured for health care services, medications, and medical devices [1]. Different projects conducted within the framework of PZH, especially the Hospital Morbidity Project, constitute a complementary set of data, which allow building a clearer picture of epidemiological changes and evolving health care needs. ZUS possesses the missing piece of the puzzle as it manages the data concerned with social spending linked with sick leaves and the cost of rehabilitation, as well as the data on the long-term economic consequences reflected by the disability pension.

Structured access to the reimbursement and health care utilization data can deliver more precise assessment of disease burden and help to identify patterns of co-morbidity and behavioural factors (compliance), which play an important role in disease management. This knowledge can lead to better setting of health priorities, indicating the most cost-effective area of health care investment as well as monitoring the impact of changes in public health.

On the level of individual patient, real life data can be confronted with the guidelines for the treatment of specific disease entities. It has the potential to result in clinical practice optimization through training or updating procedure standards in the light of scientific evidence. Potentially desired effect in the field of public health can be linked with improved allocation of funds in the health care system. Effective utilization of the content by identifying and streamlining the rules for access may be an additional stimulus supporting the efforts to optimize health care.

The scope of drug use undergoes constant change therefore systematic observations should be fundamental to studying this process, allowing for improving the quality of drug prescription and setting priorities to the rational allocation of resources in health care.

The Section of Epidemiology and Cost of Illness of Polish Pharmacoeconomics Society has set a number of goals with respect to its activities, especially on improving the availability of epidemiological and cost data. This could be performed through “dynamization” of channels of access to National Health Fund and Social Insurance data. This paper is intended to initiate a debate addressing this access by showing the value of building such comprehensive data analysis platform.

Review of literature

Non-systematic review of relevant papers has been conducted with special focus on available Polish studies.

International experience

Norwegian Prescription Database (NorPD), created in 2004, is a perfect example of a database in which data on drug consumption are collected and processed [2, 3]. NorPD provides health care decision-makers with direct access to current data. Its main purpose is to study drug consumption and changes in trends over time, thus ensuring the ongoing monitoring of the patients' state of health. Data provided by NorPD were used, among other things, to describe the use of antimicrobial therapy in primary health care in Norway, taking into account the age and gender of the patients [4]. The available data allowed to identify the patients with the highest level of antibiotics consumption and to detect differences between individual groups with regard to different variables. Access to data enables the health care system to fast track changes in trends in antibiotic consumption and identifies "habits" in drug prescriptions.

A number of other examples of international databases that allow collecting and using data for the purposes of the health care decision-makers are presented in Table 1. These solutions facilitate continuous monitoring and improving the quality of medical services. The value of facilitating access to national public health resources is evident in cost of illness studies conducted in different national settings. They are normally

carried out using various data sources, namely survey data, epidemiological data from disease registers, and public and private institutions data, such as the payer's data, social security offices data, IMS Health, etc.

It is possible to create a database of this type in Poland, allowing for continuous and ongoing monitoring of patient's state of health, involving the data which, according to the Ministry of Health regulations and the president of the National Health Fund, must be sent to the payer by the health care providers [8, 9].

Polish experience

Reliable monitoring of changes in health care system may be crucial in optimizing the allocation of financial resources in health care services and the availability of drugs and medical devices. Access to the data collected by the National Health Fund in Poland has been a significant base for a number of studies and analyses, which are considered an important source of current knowledge on the demographic structure of patients, changes in health trends and in the cost of treatment.

Currently, NHF is reporting the precise number of packages sold by EAN codes for outpatient use as well as cumulative drug spending in hospital setting [10]. On the other hand, until now the majority of available local cost of illness analysis has been primarily obtained based on epidemiological data from dedicated disease registers, data obtained from the patients surveyed or from the individual health service providers. Lack of a direct link between reported spending and covered population imposes significant restrictions on interpretability of these data.

Cost of rheumatoid arthritis in Poland in the period 2003 – 2007

A major study, Professor Jacek Ruszkowski's report entitled "The actual economic cost of illness in Poland" demonstrates the possibility of using the data on the patients' state of health in Poland [11]. The analysis was designed to evaluate the real cost of rheumatoid arthritis (RA) in the period 2003-2007. The direct costs were mainly assessed based on the data obtained from the NHF, while the indirect costs were calculated by evaluating the expenditure of the Social Insurance Institution. In addition, the assessment of productivity loss due to rheumatoid arthritis was performed.

The difficulty of calculating the actual cost of illness in Poland is due to the problem of availability of data (or complete lack of access to it); the problem of identifying the costs makes the study even more important. Prof. Ruszkowski's study fills the gap with respect to reliable estimates on total, direct, and indirect cost of illness incurred by Polish economy. Until now, only the expenditure related to diagnosing and treating the disease (direct costs) has been estimated, while the expenditure on social security (indirect costs), shown by the report to be substantially higher than the costs of RA treatment, has not been analysed. Therefore, access to National Health Fund and Social Insurance Institution data has enabled the execution of a comprehensive assessment of the costs associated with the onset of RA; furthermore, it helped to determine the economic losses incurred as a result of the loss of productivity of those unable to work due to RA.

Rationalization of antibiotic therapy in Opole Voivodeship

An analysis of regional antibiotic consumption, educational campaign for doctors and their patients, and the implementation of the guidelines for rational antibiotic therapy were carried out within the framework of Programme for Rational Antibiotic Therapy in the Primary Health Care in Opole Voivodeship, which was launched in 2007 [12, 13].

The complete data stored by NHF concerning antibiotics prescribed to patients by primary care doctors was analysed. The only limitation was the lack of data concerning the indications for the use of antibiotics. The average number of antibiotic therapies per patient in different age groups were considered the main indicator. The results of the study indicated a need to implement an efficient intervention system across the whole region that would help to monitor and rationalize the habits of primary care doctors concerning the prescribed antibiotics. In order to optimize antibiotic treatment, a number of training sessions for family doctors have been conducted, including an analysis of the guidelines for the use of antibiotics in the treatment of respiratory diseases as compared to the course of antibiotic treatment, which was prescribed by the doctor and registered in the system.

Table 1. Examples of drug databases (NorPD [2], DNPR [5], Register of Medicinal Product Statistics [6], NPDUIS [7])

Norway	Norwegian Prescription Database (NorPD) [2] Aim: • Collecting and processing data on inpatient hospitalizations, mental health, and outpatient care • A tool for mapping and monitoring trends • A source of research on drug consumption • Providing the employees of the health care system with the possibility of continuous monitoring of expenditure and expense planning. Data used: • Number of users, the distribution by gender, age, or county/health area • Number of users per 1000 inhabitants • Population base by gender, age, or county or health area • Turnover by value (pharmacy retail price in NOK) • Turnover by dose (DDD - defined daily dose).
Denmark	Danish National Patient Register (DNPR) [5] • Two types of data: administrative and clinical data • Administrative data: includes the patient identification number (CPR number), municipality, ward, time and date of admission, information about the circumstances that led to being admitted to hospital • Clinical data includes: diagnostic and surgical procedures.
	Register of Medicinal Product Statistics [6] Aim: • Gathering data on drug sales in Denmark with a statistical tool - medstat.dk. Data used: • The share of prescription medicines sold to individuals in total sales • Number of users, age, gender • ATC code, reporting errors and omissions, etc., selling over-the-counter medicines and prescription medicines • Region, sales volumes, DDD • Eligible for reimbursement/reimbursed, year.
Canada	National Prescription Drug Utilization Information System (NPDUIS) [7] Aim: • Data gathering and providing decision-makers with information and insights about the changes in trends in prices, consumption, and costs. Data used: • Data on costs and payment information with regard to prescription medicines • Data Form identifying which drugs are eligible for public drug programmes in Canada. • Data on medicinal products.

The tangible results of the Programme for Rational Antibiotic Therapy in the Primary Health Care in Opole Voivodeship were seen as early as in the second month of programme duration. They consisted of 16% decrease in the number of antibiotic courses prescribed by the doctors who took part in this training as compared to an overall 8.76% decrease in this parameter in the group of physicians who did not undergo training; also, there were changes with respect to the identity of prescribed antibiotics.

The analysis of the NHF data for Lubuskie Voivodeship

Analysis of antibiotic consumption

The study based on data from Lubuskie branch of NHF and the Central Statistical Office (CSO) was included to emphasize the implication and importance of the data collected by the public payer [14]. The aim of the study was to analyse the use of antibiotics (ATC J01) in outpatient population (> 1 million). The relationship between the level of antibiotic sales, patients' age, and the season of the year was analysed. In addition, an attempt was made to identify the group of patients with recurrent bacterial infections. The unique nature of available data allowed for the creation of a tool, i.e. a map, showing the increase in disease relapse associated with the use of antimicrobial therapy.

Analysis of compliance in patients treated with statins

The aim of the analysis was to assess the phenomenon of compliance (non-adherence to a recommended course of treatment) in patients treated with statins [15]. In this analysis, the information reported to the Lubuskie branch of the National Health Fund, concerning the number of prescriptions for reimbursed drugs dispensed in the period 2002–2005, was used as a source of data. The analysis database included 21 million records (documenting each dispensation of medication at a pharmacy) for 800 000 patients. The main indicators used to describe this phenomenon included the value of medication possession ratio (MPR) of patients and the percentage of patients achieving a minimal level of compliance guaranteeing satisfactory clinical effects. The analysis demonstrated significant irregularities in the context of adherence to the recommended course of treatment in the population of Lubuskie Voivodeship: the average value of MPR in the analysed population was 55.8%, and only 12% of the population showed a continuity of medication use. Authors of the analysis concluded that noncompliance might be the main cause of limited effectiveness in the group of patients treated with statins. They also emphasized the role of education, which plays a crucial role in improving the general health and in reducing the costs of treating cardiovascular incidents.

Chemotherapy costs in Poland (2004 - 2009)

Tkacz study (2010) is one of the analyses that utilize the data obtained from NHF to determine the population in selected therapeutic area, the cost of treatment, age structure, and changes in the availability of cancer treatment in Poland [16]. The study was designed to evaluate the value of the data collected by the National Health Fund; an analysis of their limitations and potential. Between 2004 and 2009 in Poland, NHF recorded the data regarding public funding of chemotherapy in 169 733 women and 150 307 men. The analysis of NHF data showed an increase in costs significantly exceeding the trend resulting from an increase in the number of patients. The analysis of the age structure of patients indicated the age range of the largest group of beneficiaries and helped to determine the differences between the voivodeships in the field of oncology treatment, allowing for detection of a strong migration trend in patients. This study confirms that the data collected by the National Health Fund is a valuable source of information that plays an important role in allotment of financial resources.

Potential benefits of effective access

Identifying patterns of co-morbidity

Scientific literature abounds in research on identifying the patterns of co-morbidity. To the best of the authors' knowledge, the results of the analysis of co-morbidity based on the National Health Fund data have not been published to date. However, as a result of the importance assigned to this issue, reference was made to the study carried out in Germany. One of the issues discussed in the context of the analysis of data on drug consumption is co-morbidity (≥ 2 units

of disease) in the elderly. According to the results of population-based study conducted in Germany (KORA-Age Study) on a group of patients aged 65-94 years (N = 4.127), four co-morbidity patterns were distinguished. Information related to 13 chronic conditions was collected through questionnaires and telephone calls [17]. The most frequently reported conditions were hypertension (57.9%), eye disease (38.1%), and heart disease (25.8%). The analysis showed that co-morbidity concerned 58.6% of the elderly; furthermore, 44% of them manifested at least one of the following patterns: 1) cardiovascular and metabolic diseases; 2) joint, liver, lung, and eye disease; 3) psychiatric and neurological disorders; 4) gastrointestinal diseases and tumours.

Monitoring of medication use

An example of the benefits associated with drug usage analysis is presented in the report prepared for WHO [18]. The report provides data such as: estimation of the number of patients exposed to the drug; estimation of drug consumption for a selected time horizon (e.g. one year, or a comparison of a few years, setting trends), for a specific area (at the level of hospital, city, voivodeship, country, or a comparison of a selected voivodeship vs. data from across the country) or for demographically diverse groups (e.g. gender, age); estimation e.g. on the basis of epidemiological data available for the selected disease entity, the extent to which the medication technology is properly used (or abused). Moreover, such analyses allow for comparison of observed data with current treatment guidelines for a specific disease entity in order to detect irregularities and to implement mechanisms to optimize treatment.

Cost of illness analysis

Limited resources in health care require optimal allocation of financial resources. The world standard for prioritizing the objectives is the estimation of the costs and burdens involved in disease management. In Poland, such an evaluation is usually prepared based on the data obtained from the patients' surveys, individual health service providers, or, rarely, from disease registers. The previously discussed examples of international analyses are increasingly based on the data provided by public institutions, including payers, which, because of its completeness and relevance is a reliable source of data that can be used for the calculation of the costs associated with a specific disease entity.

Compliance analysis

Data collected by NHF payer is a key source of data on drug use and the problems associated with their effectiveness, including non-compliance. The analysis discussed previously, which was based on the data from the Lubuskie branch of the National Health Fund, showed the scale of the phenomenon, thus indicating the need to implement measures such as education programmes [15]. Despite some limitations of the analysis based on data reported to the National Health Fund pharmacy, its usefulness in detecting abnormalities related to therapeutic adherence is obvious.

Therapy optimization in the context of the current guidelines

Research on the consumption of medications may be useful for assessing the relationship between the doctor's instructions and the clinical practice. It may also help in evaluating whether a medicinal product may be misused, by establishing if the patients take increasing doses of the drug or if the medication is excessively re-prescribed. Monitoring enables detecting the abnormalities in drug consumption and allows for implementation of remedial programmes. In Poland, such activities were undertaken by the National Program of Protection of Antibiotics [19]. This group monitors the use of antibiotics by cooperating with the National Health Fund and by analysing antibiotic consumption as well as the structure of consumption of various classes of drugs. These analyses constitute the basis for designing interventions and evaluating their effectiveness, contributing to significant changes in the amount of prescribed drugs and their proper selection.

Conclusions

Data being collected by the public health institutions constitute a valuable source of information. NHF and ZUS data possess crucial importance, because they enable real-time monitoring of the state of the population (in terms of selected parameters). Analyses based on a comprehensive and current data will help determine the present situation and set health priorities, allowing the appropriate allocation of financial resources

that will ensure the desired effect in the field of public expenditure.

The limitations of the studies on drug consumption based solely on the pharmaceutical data transferred to NHF should not be ignored. One of the major limitations to consider is the ambiguity related to the indications for which the drug was prescribed. Studies reporting the phenomenon of compliance should take into consideration the fact that dispensing a prescribed medication is not always equivalent to taking the medication. Utilization of complementary sources of information that deliver diagnosis and clinical outcome data may increase the reliability of the studies. In the case of assessment of the costs of illness, analysis should be supplemented by data collected by Social Insurance Institution, associated with reduced productivity of citizens: disability pension, social pension, rehabilitation and sickness benefits.

An important issue in the context of the potential of data reported to NHF is the evaluation of its quality. One of the studies mentioned previously demonstrates the usefulness and high quality of NHF data [16]. The aim of this analysis was to assess the value of the data in terms of the number of patients in each age group. The authors emphasize that: "(…) the data collected by the National Health Fund may be a valuable source of information on population, its age structure and the cost of inpatient chemotherapy. This information is of special importance because of its relevance, the state of the population in terms of those parameters can be displayed with a few weeks delay."

Achieving effective platform of access to databases managed by public health institutions seems to go beyond the "good will" of these institutions. It could be considered as a “must” for the system intended on achieving a fundamental step towards optimizing spending and, concurrently, stimulating access to health care inventions.

Conflict of interests: This document has been voluntarily created for the Polish Pharmaeconomics Society. Anna Zapalska is a partner and Zygmunt Podolec is an owner of the analytical/research companies. Dominik Dziurda and Dagmara Tronczyńska are the employees of a pharmaceutical company. The authors declare that there is no conflict of interest with regards to the topics addressed in the paper.

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